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Year in Review



Our Blueprint for Sustainability



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Ford Around the World

## History Inspired | Thinking Forward

Discover Our Blueprint for Sustainability...



### REINVENTING THE F-150

In 2013, Ford reinvented the Ford F-150, America's favorite truck. The all-new F-150 is the toughest, smartest and most capable F-150 ever – setting the standard for the future of trucks.



### OUR EXECUTIVE CHAIRMAN

"We want to be a leader in wireless automotive communication technology, in line with our Blueprint for Mobility, which maps out a step-by-step plan to achieve an integrated, sustainable transportation system by mid-century."



### CONFLICT MINERALS

Our approach to managing conflict minerals compliance is consistent with our supply chain sustainability approach, and we are working closely with our suppliers to increase supply chain transparency.



### OUR REGIONS

Read about key sustainability initiatives in our Asia Pacific, Africa, Europe, and South America regions.



### A LEGACY OF GIVING BACK

We have supported community efforts for more than 100 years. And it's not just about donating money. It's about building partnerships to address difficult challenges.



### OUR BLUE PLAN OF ACTION

For many years we have been deeply committed to conserving water within our own facilities. Our corporate water strategy is taking this commitment to the next level.



Voice: [EXECUTIVE VICE PRESIDENT, GLOBAL MANUFACTURING AND LABOR AFFAIRS, FORD MOTOR COMPANY](#)

"For every new vehicle we create, we follow a 100-point environmental checklist that helps us identify the production and facilities improvements we can make as we're pushing it through development."



### C-MAX SOLAR ENERGI CONCEPT

Ford's C-Max Solar Energi Concept is a first-of-its-kind, sun-powered vehicle. Instead of powering its battery from an electrical outlet, the vehicle harnesses the power of the sun.



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## Year in Review

Welcome to the 15<sup>th</sup> annual nonfinancial report of Ford Motor Company. During 2013, Ford Motor Company celebrated the 150<sup>th</sup> anniversary of the birth of Henry Ford and the 100<sup>th</sup> anniversary of his moving automotive assembly line. And 2014 will mark the 100<sup>th</sup> anniversary of the \$5-a-day wage. These technological and social innovations changed the world. Today, our sustainability work is history inspired, while thinking forward.

Read more [ABOUT THIS REPORT](#)



[WILLIAM CLAY FORD, JR.](#)

"Henry Ford would be very comfortable in today's business environment, and, like the company he founded, would embrace the challenge of translating his vision of attainable mobility in a responsible and sustainable way for the future."



[ALAN MULALLY](#)

"We are working to serve our customers with the freshest lineup, and that commitment gives us the opportunity to continuously improve our quality, fuel efficiency, safety, smart design and value."



[ROBERT BROWN](#)

"Our approach to sustainability has served us well as we have grown and expanded. As we introduce new products, build new world-class facilities and expand existing operations, we are leveraging our accumulated experience and best practices."



**OUR SUSTAINABILITY JOURNEY**

For nearly 15 years, we have made steady progress in addressing key issues including climate change and human rights. Read about our sustainability-related highlights from 2013, month by month.

Discover the [MAP OF OUR YEAR](#)

## KEY PERFORMANCE DATA



In 2013, we improved the average fuel economy of our U.S. truck fleet by 3 percent compared to 2012.



In 2011, we announced a goal to reduce the amount of water used to make each vehicle by 30 percent globally from 2009 to 2015. We have achieved this goal – two years ahead of schedule.

See a summary of [OUR KEY PERFORMANCE DATA](#)



### [OUR GOALS AND COMMITMENTS](#)

We have set goals, commitments and targets for many of our material issues and other important performance areas.



### [ASSURANCE](#)

We invited stakeholders to review our reporting and provide feedback.



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## Letter from William Clay Ford, Jr.

When it was founded in 1903, Ford Motor Company was what we would now think of as a start-up. The dawn of the 20<sup>th</sup> century was a time of revolutionary change in how people and things got around – and how far they could go. Cutting-edge ideas such as ethanol-fueled and electric cars were generated and tried at an astonishing pace. Some succeeded; others failed. What set Ford apart and enabled it to grow and prosper was continuous improvement and innovation: the moving assembly line, the \$5-a-day wage, the affordable automobile.

We are once again in a time of rapid change in our industry.

The future is coming at us fast, offering many exciting possibilities as well as potential bumps in the road. How do we navigate the rapid technological changes that are reshaping our industry and the fast pace of growth that is reshaping our company? How do we move quickly enough to capture opportunities and influence the future of mobility? The answer: by staying true to our heritage of innovation, our principles and our One Ford plan while looking ahead not just five years but 20 or even 50 years from now.



## Our Principles

In 2000, at the dawn of the 21<sup>st</sup> century, I addressed the national Ceres Conference in San Francisco to announce that our company would follow the Ceres Principles, a 10-point code of corporate environmental conduct. By endorsing these principles, we pledged to go beyond the requirements of the law to preserve and protect the environment, and human health and safety.

My announcement was greeted with alarm in some quarters and skepticism in others. Some felt that our commitment to sustainability would harm our business results; others believed it was an empty gesture that would not change how we operated. But in the years that followed, sustainability became a core element of our business plan. Our company ultimately prospered as we reduced our environmental impact and implemented a global code of conduct to ensure sound and respectful working conditions for people throughout our own operations and our supply chain.

Today our commitment to sustainability is helping us achieve our vision of building great products, a strong business and a better world. In 2013 record profits in North America and Asia Pacific Africa helped us achieve one of the best years in the history of our company. In 2014 we were recognized as one of the world's most ethical companies by the Ethisphere Institute, a leading think tank dedicated to the advancement of best practices in business ethics and sustainability. It was our fifth year in a row of positive net income, and fifth year in a row of being recognized as an ethical company by the Ethisphere Institute.

## Our Plan

Our One Ford plan is the overall strategy that guides our operations. The central focus of this plan is serving customers in all markets around the world with a full family of vehicles: small, medium and large cars, utilities and trucks. In every region in which we compete, our vehicles offer the best quality, fuel efficiency, safety, smart design and value.

Our ongoing commitment to reducing the environmental impact of our vehicles is documented in our Blueprint for Sustainability, a systematic plan to improve fuel efficiency and reduce CO<sub>2</sub> emissions. This plan provides our road map, consistent with One Ford, for addressing the critical issues of climate change and fuel economy. It outlines our near-term, mid-term and long-term product plans, as well as the technology we will use to reach them, through 2020.

## Our Progress

Our One Ford plan continues to create outstanding results. In 2013 our global sales increased by about 12 percent as customers took delivery of some 6.3 million new Ford and Lincoln vehicles. In 2014 we will launch the most new products in our history – 23 new or significantly refreshed vehicles to customers around the world. That includes 16 launches in North America, which is triple the number of products we launched in North America in the previous year. To support these product launches we will continue our largest manufacturing expansion in the last 50 years. We have increased capacity or added production in seven of our North American plants and are opening two new plants in Asia and one in South America in 2014.

As part of our commitment to leading fuel economy, our EcoBoost® engines – which use turbocharging and

direct injection to deliver up to 20 percent better fuel economy without sacrificing performance –are now available on 90 percent of Ford vehicles. Expanded availability in high-volume nameplates helps make fuel economy more affordable for hundreds of thousands of drivers. We will offer fuel-efficient EcoBoost® engines in 18 North American nameplates in 2014, up from 11 in 2012 and seven in 2011.

At the turn of the 20<sup>th</sup> century it was far from certain whether electric or gasoline-powered vehicles would claim the market for automobiles, but in the end it was gasoline that dominated for the whole of that century. Today, thanks to advances in technology, that competition has been renewed.

In the U.S., in the early part of the 21<sup>st</sup> century, we now offer six electrified vehicles. We sold about 85,000 hybrids, plug-in hybrids and all-electric vehicles in 2013, the first full year all six vehicles were available in dealer showrooms. We began offering the all-electric Ford Focus Electric in Europe in 2013 and we will introduce a hybrid Mondeo and the C-MAX Energi plug-in hybrid in 2014.

Henry Ford understood the importance of a stable, thriving supply chain. Beginning in the 1920s, he established a network of 25 small, rural, water-powered factories so farmers could make auto parts during part of the year and farm the rest of the year, providing more income for farmers and a more diverse supply base for Ford.

In 2000, Ford was the first automaker to take on the issue of human rights in the automotive supply chain, not because we were under public pressure to do so but because it was the right thing to do for our business and communities around the world. We continue to work with our suppliers and lead industry efforts to promote sustainability in all aspects across the entire supply base. In 2014, we will mark a milestone by completing our first report on conflict minerals in our raw materials supply chain.

In 2000, I also announced a focus on water conservation. Between 2000 and 2013, we cut our water use by 61 percent, or more than 10 billion gallons. More recently, we recognized a human right to water and developed a comprehensive water strategy based on the CEO Water Mandate that we signed in 2014. The strategy seeks to continue to cut our own use of water while addressing water issues in our supply chain and in the communities in which we operate.

Looking further ahead, we also want to be a leader in wireless automotive communication technology, in line with our Blueprint for Mobility, which maps out a step-by-step plan to achieve an integrated, sustainable transportation system by mid-century. It outlines a future of connected cars that communicate with each other and the world around them to make driving safer, ease traffic congestion and sustain the environment.

In 2013 we began testing a Ford Fusion Hybrid automated research vehicle in conjunction with the University of Michigan and State Farm to study automated driving and other advanced technologies. In 2014 we announced new projects with the Massachusetts Institute of Technology and Stanford University to research and develop solutions to some of the technical challenges surrounding automated driving. All of these projects build on a decade of automated driving research at Ford and represent a vital step toward our vision for the future of mobility.

We don't know exactly what forms future mobility systems will take, but they will likely involve collaborative networks in which vehicles and infrastructure "talk" to each other to share the information needed for efficient, safe transportation, particularly in congested urban areas. Technology – both hardware and software – will be the enabler of this future.

## Looking Ahead by Looking Back

During 2013, Ford Motor Company celebrated the 150<sup>th</sup> anniversary of the birth of Henry Ford. We also noted the 100<sup>th</sup> anniversary of his moving automotive assembly line. And 2014 will mark the 100<sup>th</sup> anniversary of the \$5-a-day wage, my great-grandfather's choice to share profits with workers in a way that effectively doubled their salaries. His technological and social innovations changed the world, driving down the cost of automobiles and helping to create a middle class that could afford to buy the products they themselves made and who gained a degree of mobility unknown to earlier generations. I think Henry Ford would be very comfortable in today's business environment, and, like the company he founded, would embrace the challenge of translating his vision of attainable mobility in a responsible and sustainable way for the future.



**William Clay Ford, Jr.**  
Executive Chairman



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## Q&A with Alan Mulally

**Q:** *Ford is growing faster than ever in terms of new product introductions. How does Ford's "Blueprint for Sustainability" guide this work?*

A: Our One Ford plan continues to deliver. An important part of our One Ford plan is accelerating development of new products our customers want and value. We are working to serve customers in all markets with a full family of vehicles – small, medium and large cars; utilities and trucks – each delivering top quality, fuel efficiency, safety, smart design and value. In support of that goal, we are introducing 23 new or significantly refreshed vehicles in 2014, double the number of launches in 2013.

Our commitment to serving customers with fuel-efficient vehicles and addressing the critical issue of climate change are part of our Blueprint for Sustainability. One of our company's core values is contributing to building a better world everywhere Ford operates, and our commitment to sustainability is a key part of that contribution. The Blueprint laid the foundation for our "power of choice" strategy, offering customers the power to choose a fuel-efficient vehicle that best fits their needs. We offer customers a full lineup of powertrain options, including gas, diesel, hybrid, plug-in hybrid and full battery electric vehicles. Our fuel-efficient EcoBoost® engine technology is equipped on more than 2 million Ford vehicles on the road today!



*Ford is growing rapidly in emerging markets. What are some of the opportunities you see in places like China and India?*

We are very excited to be growing profitably so we can better serve customers in all markets, including China and India. We had a record year in our Asia Pacific region, with wholesale volume increasing 30 percent in 2013, and 2014 is off to a strong start. Our strong global performance was led by Focus, which was the best-selling nameplate in the world in 2013. Focus was joined by Fiesta to give Ford two of the top five best-selling nameplates worldwide. To continue fulfilling our commitment to global growth we aim to boost our sales to nearly 8 million vehicles by the middle of this decade. We also are planning to make a full third of our sales in Asia and Africa by 2020.

*What new product directions are you especially excited about?*

We are working to serve our customers with the freshest lineup, and that commitment gives us the opportunity to continuously improve our quality, fuel efficiency, safety, smart design and value. The all-new Ford F-150 – with its use of advanced materials like high-strength steel in the frame and high-strength, military-grade aluminum alloy in the body – is a fantastic example of how we are innovating to deliver on our Blueprint for Sustainability.

*What role have Ford employees played in Ford's turnaround, and what role do they play in taking the company into the future?*

We are so proud of what we have accomplished. Ford always has attracted the best and the brightest, and our progress shows the power of a skilled and motivated team working together. We remain fully committed to implementing our One Ford plan and holding ourselves and each other accountable for our expected behaviors, which include respecting, listening to, helping and appreciating one another. The future of Ford is very bright because we are building on a strong foundation.

*Are you concerned that young people – the so-called millennials – are showing less interest in car ownership than previous generations?*

People everywhere appreciate the freedom that comes with mobility, and that is why we are accelerating the implementation of Henry Ford's compelling vision of opening the highways to all mankind. Part of that vision means exploring new models of transportation – including car sharing and multi-mode transportation – that might appeal more to millennials. It will take creativity to solve the challenge of global gridlock, and we are innovating to be part of the solution.

*Alan*

**Alan R. Mulally**

President and Chief Executive Officer



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## Letter from Robert Brown

The companies that thrive in the 21st century will be those that best align their business with key global sustainability challenges. At Ford, sustainability is an integral part of the One Ford plan that drives our business. A key theme of my work at Ford is making sure that sustainability remains at the heart of our strategy and that we take the practical steps needed to continue to integrate sustainability into our business processes. Two recent examples bring our integration strategy to life.

The first example is how we're managing sustainability during an unprecedented global expansion. As we introduce new products, build new world-class facilities and expand existing operations, we are leveraging our accumulated experience and best practices. We are developing centers of excellence in Asia Pacific and other regions, and better linking people who have sustainability responsibilities throughout the company. Our centers of excellence provide input to practical targets associated with specific time frames. Ford's science-based [climate goal](#) is to contribute to stabilizing carbon dioxide (CO<sub>2</sub>) concentrations in the atmosphere at a level that avoids the most serious consequences of climate change.

Second, the reinvention of the 2015 Ford F-150 pickup truck demonstrates our integrated approach and how capability and efficiency do not have to be mutually exclusive. The redesign of the F-150 was driven by the needs of our loyal customers for a tough and capable next-generation truck. At the same time, the new F-150 is a step forward in our Blueprint for Sustainability. We took one of our largest vehicles and went to great lengths to deliver improved capability while reducing weight to enhance efficiency and performance, setting a new industry standard in the process. We accomplished this through new applications of high-strength steel and aluminum alloys, which not only reduce weight but also improve the dent resistance and overall durability of the truck body. The materials were rigorously tested and analyzed for durability, overall performance and [lifecycle environmental impact](#). For a closer look at the new F-150, please see [Case Study: The Future of Pickup Trucks](#).

Below are some additional sustainability highlights.

## Financial Health

Ford has delivered five successive years of positive net income, driven in part by our sustainability strategy and our commitment to great products that are high quality, green, safe and smart. That's why last year's sustainability report was introduced by Bob Shanks, our Chief Financial Officer. When he emphasized the importance of sustainability to the company's financial health, it got people's attention. This report was introduced by John Fleming, executive vice president, Global Manufacturing and Labor Affairs, with a focus on water strategy.

## Climate Change

We continue to implement our [Sustainable Technologies and Alternative Fuels Plan](#), although the energy landscape has changed significantly since we launched it. In particular, unconventional oil and gas development in North America has increased supplies and eased energy costs in the region. This may have contributed to a dip in our overall U.S. average fleet fuel economy in 2013. Despite improvements in both our truck and car fuel economy, more trucks were purchased, which drove down the overall average.

To help customers meet their own fuel economy goals, we developed a very sophisticated analytical application that provides in-depth [information to fleet buyers](#). The analytical application provides data about choices available, life cycle ownership costs, the timing of costs and savings, and the amount of CO<sub>2</sub> emissions they can avoid by choosing efficient and alternative fuel vehicles.

## Water

In early 2014, Ford endorsed the United Nations CEO Water Mandate, and we have built our comprehensive water strategy around its core elements. The strategy reflects our integrated approach. It focuses on using water efficiently in our operations. It also includes working with our supply chain and engaging with stakeholders and policy makers. We integrate our volunteer and grant-making programs, directing their efforts to address water challenges in the communities in which we operate.

Reflecting the importance of the water issue to Ford, a cross-functional team from across Ford divisions –



including our Environmental Quality Office and our Manufacturing, Purchasing, Research and Community Relations functions – reviews water issues in a holistic way, while our Board of Directors reviews our water-related progress yearly.

## Vehicle Safety

We seek to make advanced safety and driver assist features available on widely available products. For example, our Rear View Camera, which transmits an image of what is behind the vehicle when it is shifted in reverse, is available on every Ford and Lincoln vehicle in North America. In Europe, it is offered on the Ford Focus, B-MAX, C-MAX, S-MAX and Kuga.

We also know that safety involves more than technology. That's why our Driving Skills for Life program is now operating in 16 countries. While in some countries the program is aimed mainly at young, novice drivers, in others we encourage the participation of new drivers of all ages.

## Supply Chain

Ford has long understood our reliance on the sustainability of our [supply chain](#). We have been a leader in promoting sound working conditions and environmental management across the automotive supply base. These efforts are managed by and integrated into our Purchasing function.

In 2013, we continued to advance our efforts to ensure the minerals in our products are sourced responsibly. We assessed the presence of these minerals through the many tiers of our supply chain. We also collaborate with other automakers and other industries to encourage mineral smelters and refiners to become certified conflict free.

In summary, it is an exciting time in our industry and our company. Our approach to sustainability has served us well as we have grown and expanded. And I expect that our integrated systemic approach to sustainability will provide the platform for addressing future issues like automated vehicles, urban congestion and mobility for today's underserved. Many opportunities are before us, and I welcome your feedback on our performance.



**Robert Brown**

Vice President, Sustainability, Environment and Safety Engineering

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# Performance Summary

Below is a summary of our key performance data. Please also see the [Year in Review](#) for discussion of data parameters, as well as the data sections in the [Financial Health](#), [Climate Change and the Environment](#), [Supply Chain](#), [Water](#), [Vehicle Safety](#) and [Driver Assist Technologies](#), and [People](#) sections for additional indicators, five-year trends and notes on data assurance.

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## Financial Health

	2011	2012	2013
Global Quality Research System "things gone wrong" (3 months in service), total "things gone wrong" per 1,000 vehicles <sup>1</sup>	1,447	1,373	<b>1,388</b>
Global Quality Research System customer satisfaction (3 months in service), percent satisfied <sup>2</sup>	68	72	<b>72</b>
Sales satisfaction with dealer/retailer, Ford brand, U.S., net promoter score	85.0	87.0	<b>88.0</b>
Sales satisfaction with dealer/retailer, Ford brand, Europe, net promoter score	82.0	86.5	<b>86.5</b>
Service satisfaction with dealer/retailer, Ford brand, U.S., net promoter score	75.0	78.0	<b>77.0</b>
Service satisfaction with dealer/retailer, Ford brand, Europe, net promoter score <sup>3</sup>	64.0	71.5	<b>72.5</b>
Shareholder return – Bloomberg total return analysis, percent	(36)	23	<b>22</b>
Net income/loss, \$ billion	20.2	5.7	<b>7.2</b>
Sales and revenue, \$ billion	136	133.64	<b>146.9</b>

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## Climate Change and the Environment

	2011	2012	2013
Ford U.S. fleet fuel economy, combined car and truck, miles per gallon (higher mpg reflects improvement)	27.8	30.0	<b>29.5<sup>5</sup></b>
Ford U.S. fleet CO <sub>2</sub> emissions, combined car and truck, grams per mile (lower grams per mile reflects improvement)	318	297	<b>302</b>
Ford Europe CO <sub>2</sub> tailpipe emissions per vehicle, grams per kilometer (based on production data for European markets)	130	116 <sup>6</sup>	<b>NA<sup>7</sup></b>
Worldwide facility energy consumption, billion kilowatt hours	15.5	14.2	<b>15.0</b>
Worldwide facility energy consumption per vehicle, kilowatt hours per vehicle	2,778	2,539	<b>2,442</b>
Worldwide facility CO <sub>2</sub> emissions, million metric tons	5.1	4.79	<b>4.82</b>
Worldwide facility CO <sub>2</sub> emissions per vehicle, metric tons	0.91	0.86	<b>0.78</b>
Energy Efficiency Index, percent (higher percentage reflects improvement) <sup>8</sup>	2.6	6.4	<b>17.0</b>

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## Water

	2011	2012	2013
Global water use, million cubic meters <sup>9</sup>	25.6	23.7	<b>24.9</b>

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## Vehicle Safety

	2011	2012	2013
U.S. safety recalls, number per calendar year (including legacy vehicles on the road for 10+ years)	13	24	<b>16</b>
U.S. units recalled, number of units (including legacy vehicles on the road for 10+ years)	3,339,000	1,399,000	<b>1,188,000</b>
IIHS Top Safety Picks by model year, percent of Ford Motor Company vehicles tested receiving the honor	52	75	<b>93</b>

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## Supply Chain

	2011	2012	2013
Number of individuals trained in working conditions requirements and sustainability management systems	2,414	2,760	<b>2,920</b>
Assessments to date <sup>10</sup>	834	811	<b>915</b>
Training cascade to workforce, individuals trained	372,998	430,257	<b>488,472</b>

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## People

	2011	2012	2013
Employee satisfaction, Pulse survey, overall, percent satisfied	69	71	<b>75</b>
Overall dealer attitude, Ford, relative ranking on a scale of 1–100 percent (winter/summer score)	84/82	84/83	<b>84/85</b>
Overall dealer attitude, Lincoln <sup>11</sup> , relative ranking on a scale of 1–100 percent (winter/summer score)	61/64	68/67	<b>76/78</b>
Ford Motor Company Fund contributions, \$ million	20	21.6	<b>26.3</b>
Corporate contributions, \$ million	10	8.5	<b>11.4</b>
Volunteer Corps, thousand volunteer hours	110	115	<b>150</b>
Lost-time case rate (per 100 employees)			
Americas	0.9	0.8	<b>0.7</b>
Asia Pacific Africa	0.1	0.1	<b>0.1</b>
Europe	0.3	0.4	<b>0.3</b>

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1. The Global Quality Research System (GQRS) is a Ford-sponsored competitive research survey. The GQRS is a good indicator of other quality results. For the 2011 model year, we began reporting global GQRS TGW data. In previous years we had reported only North American region GQRS TGW data. In addition, we changed the GQRS survey to include additional questions on vehicle entertainment and information systems. Therefore, the 2011 results are not comparable to previous years.
2. The Global Quality Research System (GQRS) is a Ford-sponsored competitive research survey. The GQRS is a good indicator of other quality results. For the 2011 model year, we began reporting global GQRS Customer Satisfaction data. In previous years, we had reported only North American region GQRS Customer Satisfaction data. In addition, we changed the GQRS survey to include additional questions on vehicle entertainment and information systems. Therefore, 2011 results are not comparable to previous years.
3. European sales and service satisfaction with dealers and retailers are net promoter scores based on 24 European markets, including Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.
4. Revenues for 2012 were restated due to a retroactive accounting policy change.
5. In 2013, we improved the average fuel economy of our U.S. car fleet by 2 percent, and of our U.S. truck fleet by 3 percent compared to 2012. However, our combined corporate average fuel economy decreased by 1.7 percent in 2013 due to increased customer demand for trucks over cars.
6. For 2012, final official data from the European Commission (EC) were published in November 2013 for passenger cars (vehicle category M1). For passenger cars, only 65 percent of the best-CO<sub>2</sub>-performing fleet vehicles is accounted in this data as part of the EC's phase-in plan. Improvement is reflected in decreasing grams per kilometer. These figures are based on production data for European markets. European and U.S. fleet CO<sub>2</sub> emissions are not directly comparable because they are calculated in different units and because they are assessed based on different drive cycles. In 2009, we switched from reporting European vehicle CO<sub>2</sub> emissions as a percent of a 1995 base to reporting actual fleet average CO<sub>2</sub> emissions, to parallel our reporting for other regions.
7. No data are yet available for 2013. Official 2013 data will be published by the European Commission in the fourth quarter of 2014.
8. The energy efficiency index is a normalized indicator of energy used in our manufacturing facilities per vehicle produced based on a calculation that adjusts for typical variances in weather and vehicle production. The Index is set at 100 for the baseline year to simplify tracking annual improvements. In 2012, we expanded our energy efficiency to include global energy use data. In previous years, it only included energy use at North American facilities. In 2012, we also reset the baseline year to 2011. A year 2000 baseline was used through 2006; the baseline was reset to year 2010 starting in 2011. The year 2012 improvement indexed against the year 2011 baseline was 6.4, indicating a 6.4 percent improvement in global energy efficiency per vehicle from 2011 to 2012. Higher percentage reflects improvement.
9. In 2013, we restated some historical data to account for divestiture of a facility.

10. In 2013, the training and assessment data was updated to reflect a consistent calculation methodology; however, certain figures may be slightly lower than 2012.
11. Ford stopped production of Mercury with the 2011 model year. Beginning in 2011, the dealer satisfaction data for Lincoln dealers no longer include Mercury dealers.



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About This Report

# Ford's Goals, Commitments and Status

This table summarizes Ford's goals, commitments, targets and progress in our material issue areas and other important performance areas. Please see the data sections for our complete data reporting and data notes.

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Key: ✓ Achieved ➡ On Track ⚡ In Process ✗ Not on Track

## Financial Health<sup>1</sup>

Goal/Commitment	2013 Progress	Status
In 2012, we created a suite of new near-, mid- and long-term goals under our "Blueprint for Mobility."	Continued to explore what transportation will look like in 2025 and beyond, and identified the types of technologies, business models and partnerships needed to get us there.	➡
<b>Related Links</b> → <a href="#">Our Blueprint for Mobility</a>		

1. Our Financial Health goals have been re-aligned to correspond with our Mid-Decade Outlook, details of which can be found on Slide 14 of our [2013 Update and 2014 Outlook presentation](#) dated December 18, 2013.

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Key: ✓ Achieved ➡ On Track ⚡ In Process ✗ Not on Track

## Climate Change and the Environment

Goal/Commitment	2013 Progress	Status
<b>Climate Change – Products</b>		
Do our share to stabilize carbon dioxide (CO <sub>2</sub> ) concentrations in the atmosphere at 450 ppm, the level generally accepted as that which avoids the most serious effects of climate change.	Increased fleet-average fuel economy from our U.S. car fleet by 2 percent and our U.S. truck fleet by 3 percent in 2013 compared with 2012. <sup>2</sup>  Reduced fleet-average CO <sub>2</sub> emissions of European vehicles by 18 percent from the 2007 to 2013 calendar years.	➡
<b>Related Links</b> → <a href="#">Data: Fuel Economy and CO<sub>2</sub> Emissions</a> → <a href="#">Climate Change</a> → <a href="#">Vehicle Fuel Economy and CO<sub>2</sub> Progress and Performance</a> → <a href="#">Vehicle – Results</a>		
For each of our new or significantly refreshed vehicles, we will continue to offer a powertrain with leading fuel economy.	Followed through on this commitment with vehicles introduced in all our regions, and will continue to do so in future product launches.	➡
<b>Related Links</b> → <a href="#">Vehicle Fuel Economy and CO<sub>2</sub> Progress and Performance</a>		
<b>Climate Change – Manufacturing</b>		
Reduce global facility CO <sub>2</sub> emissions per vehicle by 30 percent by 2025 compared to a 2010 baseline.	Reduced 2013 CO <sub>2</sub> emissions by 9 percent per vehicle produced compared to 2012.	➡
<b>Related Links</b>		

	<ul style="list-style-type: none"> <li>→ Data: Worldwide Facility CO<sub>2</sub> Emissions per Vehicle</li> <li>→ Operational Energy and Greenhouse Gas Emissions – Performance</li> </ul>
Reduce facility energy use per vehicle globally by 25 percent between 2011 and 2016, adjusted for weather and production.	Reduced average energy consumed per vehicle produced by 4 percent compared to 2012. 
<b>Related Links</b>	
	<ul style="list-style-type: none"> <li>→ Data: Worldwide Facility CO<sub>2</sub> Emissions per Vehicle</li> <li>→ Operational Energy and Greenhouse Gas Emissions – Performance</li> </ul>
<b>Environment – Products</b>	
Increase the use of recycled, renewable and lightweight materials.	Since 2011, all vehicles produced in North America have soy foam seating. 
Use soy foam seat cushions and backs on 100 percent of Ford vehicles manufactured in North America.	Since 2012, all new and redesigned vehicles launched in North America meet our goal to use at least 25 percent recycled content seat fabrics.
Use at least 25 percent recycled content in seat fabrics on all new and redesigned vehicles sold in North America.	Continued to develop sustainable materials strategy requiring recycled plastics and textile materials for many applications globally. Continued to implement strategic principles for expanding the use of recycled and renewable materials that seek to reduce total lifecycle impacts.
<b>Related Links</b>	
	<ul style="list-style-type: none"> <li>→ Choosing More Sustainable Materials</li> </ul>
Increase the use of allergy-tested and air-quality-friendly interior materials.	Continued to implement specification for low-emissions and allergy-free materials, which is being migrated across product lines. 
<b>Related Links</b>	
	<ul style="list-style-type: none"> <li>→ Improving Vehicle Interior Environmental Quality and Choosing Allergy-Tested Materials</li> </ul>
<b>Environment – Manufacturing</b>	
Reduce water use.	(See Water section of Goals Table.)
Reduce CO <sub>2</sub> emissions.	(See Climate Change section of Goals Table.)
Reduce waste sent to landfill by 40 percent on a per-vehicle basis between 2011 and 2016 globally.	Reduced waste to landfill per vehicle produced by 14 percent compared to 2012. 
<b>Related Links</b>	
	<ul style="list-style-type: none"> <li>→ Data: Waste to Landfill per Vehicle</li> <li>→ Waste Management</li> </ul>
Maintain volatile organic compound (VOC) emissions from painting at North American assembly plants at 23 grams/square meter or less.	Achieved 2013 VOC emissions at North American assembly plants of 16.8 grams/square meter. 
<b>Related Links</b>	
	<ul style="list-style-type: none"> <li>→ Data: North America Volatile Organic Compounds Released by Assembly Facilities</li> <li>→ Non-CO<sub>2</sub>, Facility-Related Emissions</li> </ul>
2. However, our combined U.S. corporate average fuel economy declined by 1.7 percent in 2013 due to increased customer demand for trucks over cars.	

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## Water

Goal/Commitment	2013 Progress	Status
Cut the amount of water used to make each vehicle by 30 percent globally by 2015, compared to 2009.	Achieved this goal two years ahead of schedule. We will be updating our global manufacturing water strategy in 2014 and setting a new long-term target. Our target for 2014 is a reduction of 2 percent per vehicle produced from 2013.	
<b>Related Links</b>		
	<ul style="list-style-type: none"> <li>→ Data: Water</li> <li>→ Progress in Reducing Water Use</li> </ul>	

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## Vehicle Safety

Goal/Commitment	2013 Progress	Status
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<p>Design and manufacture vehicles that achieve high levels of performance in real-world safety and in public domain crash-testing programs and that offer innovative safety and driver assist technologies.</p>	<p>For the 2014 model year, earned the highest possible Overall Vehicle Score of five stars in the New Car Assessment Program (NCAP) of the U.S. National Highway Traffic Safety Administration (NHTSA) for nine Ford Motor Company vehicles.</p> <p>For the 2013 Insurance Institute for Highway Safety (IIHS) awards, earned Top Safety Picks for 13 Ford Motor Company vehicles. Three of the 13 also earned Top Safety Pick+ designations.</p> <p>In the 2013 Euro NCAP assessments, earned a five-star safety rating for the Ford Tourneo Connect.</p> <p>Expanded the availability of Lane-Keeping System, a driver assist feature, in North America. See the Safety and Driver Assist Technologies section for information on our other technologies.</p>	➡
<p>Meet or exceed all regulatory requirements for safety.</p>	<p>Continue to meet this goal every year. Ford's internal Safety Design Guidelines and other internal standards go beyond stringent regulatory requirements. Ford often establishes internal standards on emerging issues long before public domain or regulatory standards are adopted.</p>	➡
<p>Provide information, educational programs and advanced technologies to assist in promoting safe driving practices.</p>	<p>Continued to invest in Ford Driving Skills for Life (DSFL), launching the program in Europe for the first time in 2013. In the U.S., Ford DSFL focuses on teen drivers through five signature programs. In 2013 the Ford DSFL U.S. National Tour reached out to more teens, parents and educators than ever before and included nearly 30 days of hands-on training. In our Asia Pacific markets, Ford DSFL is aimed at novice drivers of all ages. Approximately 14,000 drivers in this region were trained in 2013. On the technology side, MyKey, Ford's innovative technology designed to help parents encourage their teenagers to drive more safely, is now in more than 6 million Ford and Lincoln vehicles on the road in the U.S. and is available on nearly all Ford Motor Company retail vehicles in North America.</p>	➡
<p>Play a leadership role in vehicle safety and driver assist research and innovation.</p>	<p>In December 2013, unveiled a Ford Fusion Hybrid automated research vehicle that will enable us to further test current and future sensing systems and driver assist technologies.</p> <p>Continued to collaborate with other automotive companies on precompetitive safety projects to enhance the safety of the driving experience and develop future technologies, such as through the U.S. Council for Automotive Research.</p> <p>And, continued to collaborate with university partners on a wide range of research projects, including research into advanced safety technologies. In 2013, awarded 28 new University Research Program grants to 19 universities around the globe.</p>	➡
<p>Play a leadership role in research and development relating to "connected vehicles."</p>	<p>Continued to participate in several multi-stakeholder research projects relating to connected vehicles, including the Crash Avoidance Metrics Partnership and the Vehicle Infrastructure Integration Consortium in the U.S., and DRIVE C2X, Safe Intelligent Mobility – Test Field Germany, and interact!Ve in Europe.</p>	➡

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## Supply Chain

Goal/Commitment	2013 Progress	Status
Encourage key production suppliers to: introduce codes of conduct aligned with international standards and Ford's Code of Human Rights, Basic Working Conditions and Corporate Responsibility; develop robust management and compliance	Approximately 80 percent of our Production Aligned Business Framework (ABF) suppliers have demonstrated that they have codes of conduct in place that are aligned with international standards.	➡

systems to support their codes; and extend these expectations to their own suppliers.

Approximately 45 percent of our ABF production suppliers have demonstrated that they have met all three Ford milestones – that is, they have aligned codes of conduct in place supported by robust management systems governing their own operations and their supply chain.

#### Related Links

- [Going Further with Our ABF Suppliers](#)

Help suppliers build their capacity to manage supply chain sustainability issues through factory-level and management training on working conditions, human rights, ethical business practices and environmental responsibility; require participating suppliers to cascade training information to their own employees and suppliers.

In 2013, trained more than 230 Ford suppliers in Brazil, Mexico, Turkey, Romania, and South Africa.<sup>3</sup> The global total of Ford suppliers trained since program inception is nearly 2,100<sup>4</sup>.



By having training cascaded by participating suppliers, have impacted more than 2,900 supplier representatives, nearly 25,000 supplier managers, more than 485,000 individual workers, and more than 100,000 sub-tier supplier companies since the program's inception.

#### Related Links

- [Building Supplier Capability through Localized Training and Collaboration](#)
- [Data: Working Conditions Training and Assessment Status for Supply Chain](#)

Assess Tier 1 suppliers for compliance with local laws and Ford's supply chain sustainability expectations.

Since 2003, have conducted more than 900 third-party audits of existing and prospective Tier 1 suppliers in 21 countries.



#### Related Links

- [Assessing Suppliers](#)
- [Data: Working Conditions Training and Assessment Status for Supply Chain](#)

Work collaboratively across the industry to facilitate development of an industry-wide approach to key supply chain sustainability issues, including working conditions, human rights and raw materials sustainability.

We are an active member of the AIAG, the auto industry's primary organization for supply chain issues. We chair six AIAG committees: Corporate Responsibility Steering Committee, Working Conditions Oversight, Chemicals Management and Reporting, Greenhouse Gases, Environmental Sustainability Advisory group and Healthcare Value Task Force. We are active members of several organizations seeking to find effective solutions to the issue of conflict minerals including the Public Private Alliance for Responsible Minerals Trade and the Conflict Free Sourcing Initiative. We are a founding member of the UN Global Compact Advisory Group on Supply Chain Sustainability. Also, we helped found the CSR Europe Automotive Working Group on Supply Chain Sustainability in 2011.



#### Related Links

- [Industry and Cross-Industry Collaboration](#)

Better understand the carbon footprint of Ford's supply chain to inform the development of a broad-based carbon management approach for our supply chain.

Surveyed 145 suppliers in 2013 (up from 135 in 2012, 128 in 2011 and 35 in 2010) regarding greenhouse gas emissions, and achieved an 89 percent voluntary response rate.



#### Related Links

- [Supplier Greenhouse Gas Emissions](#)

Source at least 10 percent of U.S. purchases from minority- and women-owned businesses annually.

Purchased \$6.5 billion in goods and services from approximately 250 minority-owned suppliers and \$1.8 billion in goods and services from more than 150 women-owned businesses, our fourth-consecutive year of improvement.



#### Related Links

- [Supplier Diversity Development](#)
- [Data: Engagement and Community](#)

3. Trainings in Brazil, Mexico, Turkey and South Africa were joint industry trainings coordinated through AIAG. Trainings in Romania were held in conjunction with CSR Europe.

4. This figure includes suppliers trained in Ford-led and joint industry trainings.

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## Health and Safety

Goal/Commitment	2013 Progress	Status
<b>Safety</b>		
Fatalities target is always zero.	In 2013, for the third time in Ford's history, did not have an employee work-related fatality during the calendar year. Tragically, we experienced three fatalities among contractors – one in Chicago, one in India and one in Russia.	✗
	<b>Related Links</b>	
	→ <a href="#">Data: Workplace Safety</a>	



Serious injuries target is zero; overall goal is to attain industry competitive lost-time and DART levels and drive continuous improvement; specific targets are set by business units yearly for five years into the future.

Our safety record improved compared to 2012. A major safety indicator – the lost-time case rate – was at 0.44, a nearly 14 percent improvement from the 2012 rate of 0.51. We experienced 131 serious injuries among our direct and joint venture employees, compared to 139 the previous year.

Related Links

- Data: Workplace Safety
- Workplace Health and Safety

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**Health**

Maintain or improve employee personal health status through participation in health risk appraisal and health promotion programs.

Had active personal health promotion programs in place in most regions. Deployed common global metrics and developed plans to implement them in remaining countries. Employee participation in health-risk appraisals is a core component of U.S. health benefit program. In 2013, more than 80 percent of salaried employees and retirees met the objectives of this program and increased their awareness of personal health improvement opportunities.



Related Links

- Health as a Strategic Advantage

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## Map of Our Year



### Our Sustainability Journey

Click on the months to see Ford's sustainability-related highlights for 2013.

## January

### Record Profits

Reported total company full-year pre-tax profit of \$8 billion for 2012, our third year in a row of \$8 billion or more in pre-tax profits.

### Diversity Efforts Recognized

Named one of America's Top Organizations for Multicultural Business Opportunities by Diversity Business magazine; Ford has been on this list since 2001.

### Double Dividend

Announced we would double our dividend.

## February

### New Waste Reduction Goal

Announced new global waste goal: a 40 percent reduction in waste sent to landfill per vehicle produced between 2011 and 2016 – equal to just 13.4 pounds per vehicle worldwide.

## March

### Ethics Award

Honored for the fourth year in a row by the Ethisphere Institute as one of the World's 100 Most Ethical Companies.

## April

### New Hires

### Expanding Environmentally-Friendly

Announced we would hire an additional 2,000 hourly workers at our Kansas City Assembly Plant to help meet demand for our F-150 truck.

## **Painting**

Announced plans to expand industry-leading 3-Wet paint capacity by 50 percent in 2013 by adding the environmentally friendly process to four more plants on three continents.

## **May**

### **Water Futuring**

Conducted a “water futuring” workshop to examine “what if” scenarios about water in the years ahead and better understand the long-term implications of water scarcity on Ford’s operations.

## **June**

### **Cutting Energy Use**

Announced that we reduced the amount of energy used per vehicle produced by 22 percent in the past six years; also announced plans to reduce usage another 25 percent on a per-vehicle basis by 2016.

### **Green Brands Honor**

Moved up 13 spots to No. 2 on Interbrand’s list of Best Global Green Brands.

## **July**

### **Founder’s Birthday**

Marked the 150<sup>th</sup> anniversary of the birth of Henry Ford.

### **Expanding GHG Reporting**

Became the first automaker to sign on to voluntary greenhouse gas reporting program for all industries in India, adding to the voluntary reporting we already do in the United States, China, Canada, Mexico, Brazil and Argentina.

### **Salaried Hires**

Announced we will hire an additional 800 salaried employees for a total of more than 3,000 salaried employees in the U.S. in 2013 – our largest hiring initiative in more than a decade.

## **August**

### **Hybrid Sales**

Delivered our best August electrified vehicle sales ever with more than 8,292 sales, up 288 percent over the same period a year ago. Ford’s plug-in hybrids, Fusion Energi and C-MAX Energi, delivered their best sales month year-to-date, with 600 and 621 units sold, respectively.

## **September**

### **EcoBoost® Milestone**

2 millionth EcoBoost® produced.

### **Driver Education in Europe**

Launched Ford Driving Skills for Life in Europe. Ford will invest €1.5 million in the first year of this program alone to provide free, hands-on training in the U.K., Germany, France, Spain and Italy.

### **Recharging Employees**

Introduced an electric vehicle charging program at nearly all of our U.S. and Canadian facilities, which will allow employees with electric vehicles to commute to and from work entirely on electricity.

## **October**

## Expanding Water-Saving Machining Process

Added our water-saving near-dry machining capability to six plants globally – a number that will nearly double in the next few years.

## November

### Plant-Based Interior Fabrics

Unveiled a Ford Fusion Energi plug-in hybrid vehicle with Coca-Cola's PlantBottle Technology in interior fabrics; the first time this technology has been applied beyond packaging.

### LatinNCAP

In the Latin New Car Assessment Program, received the maximum five stars for adult protection for the new Ford EcoSport and Focus.

## December

### Global Launches

Announced plans to launch 23 new or significantly refreshed vehicles globally in 2014, open three more manufacturing facilities and add more than 5,000 jobs in the U.S.

### EuroNCAP Results

In the 2013 European New Car Assessment Program, earned the maximum five-star safety rating for the Ford Tourneo Connect – the first compact “people mover” to be awarded this rating.

### Automated Research

Revealed a Ford Fusion Hybrid automated research vehicle that will be used to make progress on future automated driving and other advanced technologies.



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For this Sustainability Report and our previous seven reports, [Ceres](#) convened Stakeholder Committees to advise us. Ceres leads a national coalition of investors, environmental organizations and other public interest groups working with companies to address sustainability challenges. Ford agreed to work with a stakeholder team that was selected for us by Ceres. The Ceres Stakeholder Committee that was convened is an independent group of individuals drawn primarily from the Ceres coalition and representing a range of constituencies that have expertise in environmental, social and governance issues.

The Committee reviewed past reports and the outline for this 2013/14 Sustainability Report. The Committee met once by teleconference, and some members provided input to Ceres outside of the meeting.

The Committee provided a range of suggestions to improve Ford's reporting and materiality analysis. Major points of feedback and Ford's responses are shown below.<sup>1</sup> Other Committee recommendations will be considered for future reporting.

Reporting Recommendations	Response
<b>Highlight progress against goals.</b> Given the large quantity of information presented in the report, some of which does not change from year to year, stakeholders recommend opening each section of the report with highlights that describe "what's new" relative to the previous year's report and where specific progress has been made. Ford should use the report for "storytelling" as a means to provide context at the global and business unit levels, highlight its most innovative and cutting-edge programs, candidly discuss key success and challenges, and demonstrate recent impact.	In this year's Sustainability Report we have designed the landing page of each material issue section to include a summary of key progress points. Also new since the last report, these landing pages will highlight our most innovative programs. We continue to provide a " <a href="#">Map of Our Year</a> " and use case studies throughout the report to provide context and additional detail related to our most innovative programs, as well as our challenges.
<b>Enhance financial reporting disclosures.</b> Stakeholders appreciate that Ford has highlighted "green" and the emphasis on sustainability as a pillar of Ford's business strategy in financial reports, but expect to see additional discussion of key risks and opportunities, as well as realized business value, associated with material issues in Ford's investor communications as well as in the Sustainability Report. Ford should be moving toward demonstrating to investors and capital market players, through its reporting, how sustainability is creating business value.	This Sustainability Report is our main vehicle for communicating the business value of our sustainability strategy and performance. We have included a section on financial performance in our Sustainability Report for the past nine years and outline the business benefits of addressing each of our material issues. We also discuss climate-related risks and opportunities in the <a href="#">Climate Change</a> section of this report. The 2013 Ford Annual Report includes a section on "Better World," which highlights several of our key areas of sustainability focus again this year. For the launch of our 2012/13 report, our chief financial officer and our global director, Sustainability and Vehicle Environmental Matters, conducted a briefing on highlights of the report for investors and other interested stakeholders. Ford's executive vice president, Global Manufacturing and global director, Sustainability and Vehicle Environmental Matters conducted a similar briefing about this report.
<b>Commit to existing 2022–2025 fuel efficiency/GHG standards.</b> In light of the reality that some automakers might push for a weakening of the 54.5 mpg fuel efficiency standard for model years 2022–2025 when the standard undergoes a mandatory midterm review, stakeholders encourage Ford to demonstrate its commitment to the current standard and to remaining on the 450 ppm glide paths, based on the fact that the goal is readily achievable using existing technology.	Ford continues to be committed to contributing our share toward stabilization on the 450 ppm glide path, and our actions and positions are consistent in delivering to those levels. Ford continues to support the One National Program for greenhouse gas (GHG) emissions and fuel economy. Given the timeframe of the regulation, the midterm review is the focal point to assess the feasibility of the 2022–2025 standards and ensure that there is alignment with market and business realities. Ford believes a range of fuel-efficient vehicles is the best way to reduce carbon dioxide emissions consistent with delivering our share to the 450 ppm glide path, while still meeting the various needs of our customers.
<b>Support the CA Low Carbon Fuel Standard.</b> Stakeholders urge Ford to join General Motors in publicly expressing its support for the California Low Carbon Fuel Standard (LCFS). The LCFS is an important policy that will help lead the nation toward greater reductions in the carbon footprint of the transportation sector, while also creating significant economic opportunities. Support for this standard is a natural fit with Ford's interest in reducing the carbon profile of its vehicles.	We are committed to working with all key stakeholders to promote climate change policy that helps to match vehicle technology, fuel technology and availability, and consumer demand to effectively reduce transportation sector emissions and reach climate stabilization goals. The LCFS is one way to address the fossil carbon content of transportation fuels. We welcome, and have worked to promote, comprehensive market-based policy approaches, rooted in science, that provide a coherent and effective framework for GHG emission reductions and improved and low-carbon fuels, and that give companies a clear understanding of their integral role in achieving overall societal transportation sustainability goals.
<b>Reconsider position on zero emission vehicle (ZEV) policy.</b> Stakeholders ask Ford to reconsider its support for the Alliance of Automobile Manufacturers position regarding ZEV policy in California and elsewhere in light of the	Ford continues to be committed to contributing our share toward stabilization on the 450 ppm glide path. Our planned product actions include increasing levels of electrified vehicles up to and beyond 2025, consistent with our Sustainable Technologies and Alternative Fuels plans.

Alliance's efforts to impede program implementation in California and potential adoption elsewhere. Endorsing the Alliance's position seems to be at odds with Ford's statements that electric vehicles are a core element of the company's Sustainable Technologies and Alternative Fuels Plan.

Ford will support the Alliance of Automobile Manufacturers' positions that are consistent with our plans stated above. In addition, it is a Ford priority to work collaboratively with all stakeholders in support of appropriate regulation and to foster key electrification enablers (including customer information, comprehensive policy alignment, infrastructure and market readiness planning) that will allow Ford to deliver our share to the common goal of GHG reductions that are necessary to mitigate the consequences of adverse climate change.

We discuss our policy positions related to alternative fuel vehicles in the [Climate Change](#) section of this report.

#### **Continue active engagement on conflict minerals.**

Stakeholders appreciate the due diligence process graphic in last year's report and Ford's articulation of the actions it is taking in its direct and indirect operations. Stakeholders look forward to seeing the results of Ford's compliance with new SEC disclosure rules while also (1) emphasizing the need for Ford to support diplomatic engagement in the Great Lakes region of Africa, and (2) strongly encouraging Ford to comment positively on the forthcoming European Union directive that would establish a certification scheme to prevent the sale of conflict minerals in Europe.

In this year's Sustainability Report we have continued to expand coverage of our work with suppliers to ensure responsible sourcing of raw materials, including conflict minerals. This year's report also includes [an interview with our in-house expert](#) on our work addressing [conflict minerals](#).

#### **Set expectations for supply chain GHG goals.**

Ford notes that it encourages suppliers to set their own GHG reduction goals. However, most of the supplier targets remain intensity based, rather than absolute. Stakeholders strongly encourage Ford to set a time-bound goal, such as 2020, for shifting from encouragement to requirement, at least among ABF suppliers, with an expectation that the goals will be in absolute terms and that they, along with Ford, will push similar expectations down the supply chain. Stakeholders also encourage Ford to expand requirements beyond GHG reduction goals to include other key issues such as water use and energy efficiency.

In this year's Sustainability Report we discuss how we expanded our survey of supplier GHG emissions in 2013 to 145 suppliers, which accounted for approximately 50 percent of our 2012 purchases of \$90 billion. We also expanded the GHG survey to include non-production as well as production suppliers. We will continue to expand the number of suppliers we survey in 2014. We also began to survey our suppliers on water use in 2014, using the CDP Water program.

#### **Expand and disclose employee engagement goals.**

Ford refers to its employees as its most valuable resource, but this does not come through clearly in the People section of the report. Stakeholders know that Ford is doing good work to engage with its employees; now is the time to back that up with firm, time-bound goals and related key performance indicators that go beyond health and safety measures. This is an opportunity for Ford to leverage employee engagement to drive sustainability initiatives and innovation, and to leverage its sustainability initiatives to engage employees as key partners and innovators.

A current priority of the sustainability group at Ford is developing a network of employees involved in sustainability, aimed at further integrating sustainability into the global organization. We do not have specific goals and metrics related to employee engagement but have worked to expand the employee data provided in this report.

This report also includes [commentary from the President of the Ford Motor Company Fund and Community Services](#), who discusses the importance of employee engagement in our work in the community.

#### **Expand and disclose human rights-related measures.**

Stakeholders thank Ford for its disclosure of information related to global working conditions training and assessments. As next steps, stakeholders would like to see Ford provide additional, narrative information describing common violations and the specific strategies employed to address them, and set time-bound goals for the number of training sessions and participants (including managers), by region.

In this year's Sustainability Report we continued to report on common findings from the supplier assessments we undertook in 2013. We also report our process for dealing with any violations we find. Going forward, we set a goal to expand supplier audits to at least 25 percent of our production suppliers for high-priority countries in each of our major operating regions.

## **Data Assurance**

Some of the data in our reports have been subject to various forms of internal and third-party verification, as follows.

- Financial data were audited for disclosure in the Ford Annual Report on Form 10-K.
- Sixty-one percent of Ford's global facility GHG emissions are third-party verified. All of Ford's North American GHG emissions data since 1998 are externally verified by The Financial Industry Regulatory Authority, the auditors of the NASDAQ stock exchange, as part of membership in the Chicago Climate Exchange. In addition, all of our European facilities impacted by the mandatory EU Emissions Trading Scheme (EU-ETS) are third-party verified. All EU-ETS verification statements are provided to Ford, by facility, from Lucideon (formerly CICS) for UK facilities, Lloyds for Spain, Intechnica for Germany and SGS for Belgium. North American facilities are verified against the Climate Registry's General Reporting Protocol. European facilities are verified against the EU-ETS rules and guidelines.
- Ford voluntarily reports facility carbon dioxide emissions to national emissions registries or other authorities in the U.S., Canada, Mexico, Argentina, Australia, Brazil, China and Taiwan.
- Various environmental data are reported to regulatory authorities.
- Ford's facility environmental data are managed using our Global Emissions Manager database, which provides a globally consistent approach to measurement and monitoring.

The kind of assurance used for each data set is noted in the data charts.

1. This synopsis draws from a summary of the stakeholder engagement process prepared by Ceres; however, it does not cover every point raised and was not reviewed by the participating stakeholders.



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Letter from William Clay Ford, Jr.

Q&A with Alan Mulally

Letter from Robert Brown

Performance Summary

Ford's Goals, Commitments and Status

Map of Our Year

Assurance

#### > About This Report

## About This Report

At Ford, we see reporting as an ongoing, evolving process, not an annual exercise. We expect our reporting to evolve further and invite your feedback on this Report, and our approach to reporting, at [sustaina@ford.com](mailto:sustaina@ford.com).

This Report covers the year 2013 and early 2014. The data are primarily for 2013 (for operations) and for the 2013 and 2014 model years (for vehicles). In addition to this full online Report, we publish an eight-page [summary report](#) for use by employees, customers and other stakeholders. Our most recent previous report was released in June 2013.

Data in this Report are subject to various forms of [assurance](#) as noted in the data tables. The summary report was reviewed by Ford's top executives and the Sustainability Committee of the Board of Directors. A Ceres [stakeholder committee](#), which included representatives of environmental groups and socially responsible investors, reviewed the outline for the full report.

This Report is aligned with the Global Reporting Initiative (GRI) G3 Sustainability Reporting Guidelines at a self-declared application level of "A." See the [GRI Index](#) for a complete listing of the GRI indicators. We have begun the process of transitioning to the GRI G4 Guidelines. More information on the GRI and the application levels can be found on the [GRI website](#).

Although this is not formally an "integrated report" – one that combines financial and sustainability reporting – we have expanded on our longstanding practice of reporting on Ford's financial health and its interrelationships with our sustainability performance (see, for example, the [value chain](#) infographic, which includes examples of value creation at each stage).

This Report also serves as Ford's annual United Nations Global Compact (UNGC) "Communication on Progress," as it includes discussion of Ford's implementation of the 10 principles of the UNGC and support for broad U.N. development goals. Please see the [UNGC Index](#) for information on where the UNGC principles are covered in this Report.

Consistent with the GRI Guidelines' guidance on boundary setting, the data in this Report cover all of Ford Motor Company's wholly and majority-owned operations globally, unless otherwise noted. Data measurement techniques, the bases of calculations, changes in the basis for reporting or reclassifications of data previously reported are noted in the data charts.

Further information about our reporting approach can be found in the [Reporting and Transparency](#) section of this report.

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## SUSTAINABILITY REPORT 2013/14



Year in Review



Our Blueprint for  
Sustainability



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Climate Change and the  
Environment



Water



Vehicle Safety



Supply Chain



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### Our Blueprint for Sustainability

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## Our Blueprint for Sustainability

At Ford, we define sustainability as a business model that creates value consistent with the long-term preservation and enhancement of environmental, social and financial capital.

Read more about our [BLUEPRINT FOR SUSTAINABILITY](#)



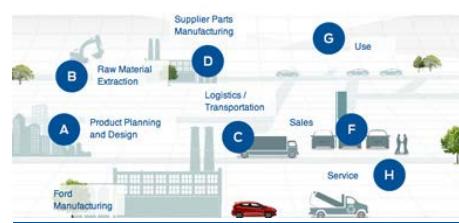
## OUR STRATEGY

Ford's business strategy is embodied in our One Ford plan. One Ford expands on our company's four-point business plan for achieving success globally.

Read more about [OUR STRATEGY](#)



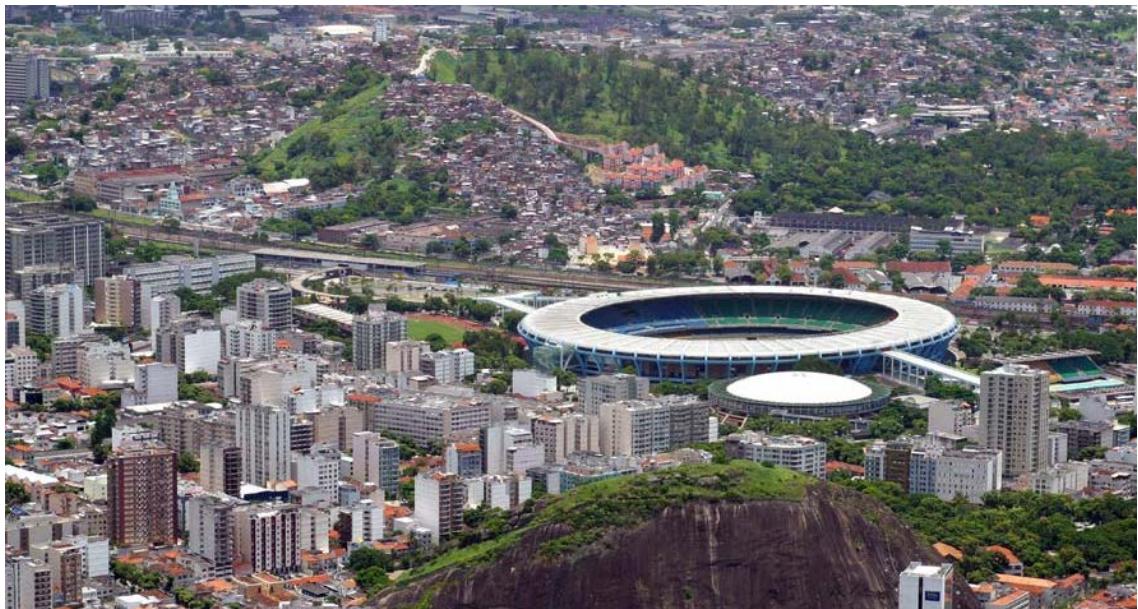
## MATERIALITY ANALYSIS



## OUR VALUE CHAIN

Our interactive materiality matrix categorizes issues according to their concern to stakeholders and their current or potential impact on the company.

As a major multinational enterprise, our activities have far-reaching environmental, social and economic impacts. Our value chain graphic illustrates the major value chain stages and identifies key impacts, stakeholders and examples of value we create at each stage.



## GOVERNANCE

To Ford, “governance” includes more than simply fiduciary responsibility to shareholders; the concept also encompasses accountabilities regarding our impact on the world and responsibilities toward a diverse set of stakeholders.

Read more about [GOVERNANCE AT FORD](#)



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## Overview

At Ford, we define sustainability as a business model that creates value consistent with the long-term preservation and enhancement of environmental, social and financial capital.

Several years ago, the term “Blueprint for Sustainability” was introduced at Ford to describe the actions we are taking to achieve outstanding fuel economy and reduce greenhouse gas emissions from our products. We now use the term more broadly to describe our sustainability strategy as a whole, reflecting the fact that our important sustainability issues are part of a complex system that interconnects our products, plants, people and the communities in which we operate.

This section provides an overview of our [business](#) and [sustainability strategies](#), how the company is governing and managing sustainability issues, and how these, together, drive sustainability performance.

We also describe the [materiality analysis](#) we have used to identify our most significant sustainability issues, and focus our strategy and reporting. The section called [Our Value Chain and Its Impacts](#) provides an updated and expanded value chain analysis, including our efforts to maximize the positive impacts, and minimize the negative impacts of our operations and products throughout our value chain. The [Governance](#) section explains Ford’s overall governance and sustainability governance, including how we address human rights and other ethical issues, how we engage with [stakeholders](#), how we participate in [public policy](#) processes and our [management of key sustainability issues](#).



## MATERIALITY MATRIX

Our interactive materiality matrix categorizes issues according to their concern to stakeholders and their current or potential impact on the company.



## OUR VALUE CHAIN

As a major multinational enterprise, our activities have far-reaching environmental, social and economic impacts.

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## Our Strategy

Ford's business strategy is embodied in our One Ford plan, which was adopted in 2007 and has guided the company ever since. One Ford expands on our company's four-point business plan for achieving success globally. The four-point business plan consists of the following:

- Aggressively restructure to operate profitably at the current demand and changing model mix
- Accelerate development of new products our customers want and value
- Finance our plan and improve our balance sheet
- Work together effectively as one team

Building on this plan, One Ford encourages focus, teamwork and a single global approach, aligning employee efforts toward a common definition of success. It emphasizes the importance of working together as one team to achieve automotive leadership, which is measured by the satisfaction of our customers, employees and essential business partners, such as our dealers, investors, suppliers, unions/councils and the communities in which we operate. We have defined a [set of behaviors that are expected of all employees](#) to support the One Ford plan.

The goal of One Ford is to create an exciting and viable company delivering profitable growth for all. We are focused on building:

- Great Products, a full family of vehicles – small, medium and large; cars, utilities and trucks – with best-in-class quality, fuel efficiency, safety and smart design;
- Strong Business, based on a balanced portfolio of products and global presence; and
- Better World, accomplished through our sustainability strategy.

Our aim is to have profitable growth across geographies and product types.

One Ford has been implemented through the consistent use of processes at the highest levels of the company for risk assessment, strategy development, business planning and performance review.

As detailed in the [Financial Health section](#), for 2013, Ford's pre-tax operating profit of \$8.6 billion (excluding special items) was among the best in our history and Automotive operating-related cash flow hit a record, since at least 2001. These full-year results reflect an Automotive sector operating profit that was the highest in more than a decade, with record profits in North America and Asia Pacific Africa since at least 2000, about break even results in South America, and a loss in Europe – but a lower loss than the prior year. These achievements are more evidence that our One Ford plan continues to deliver.

Our financial turnaround has been based largely on our ability to deliver high-quality, innovative and desirable products everywhere we operate, in both mature and rapidly growing markets. We have aligned our product development, manufacturing and marketing organizations worldwide to deliver the right products to the right markets as efficiently as possible.

In all vehicles and regions, Ford's global vehicles showcase our commitment to sustainability. Technologies like EcoBoost®, direct injection of gasoline or diesel fuel, six-speed transmissions, and hybrid and plug-in hybrid powertrains deliver choice to drivers everywhere.

We're continuing to implement the One Ford plan. But we also [Go Further](#) – to deliver ingenious products, make them available to everyone, and serve each other, our customers and our communities. Go Further is our global brand promise and our approach as we accelerate ahead.



Go Further

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## Sustainability Strategy

Our sustainability strategy is embedded in our business plan and consistent with our aim to deliver Great Products, a Strong Business and a Better World. At Ford, we define sustainability as a business model that creates value consistent with the long-term preservation and enhancement of environmental, social and financial capital.

For more than a dozen years, we have built our sustainability strategy on a foundation of transparency, accountability and [stakeholder engagement](#). We focus our efforts using a [materiality analysis](#). Our [public reporting](#) has been an important part of our commitment to transparency and has helped to drive progress in our company and across the industry.

Key components of our sustainability strategy that address our material issues include the following:

- Our climate change strategy is based on what needs to happen in the world – the stabilization of greenhouse gases in the atmosphere – and our contribution to achieving stabilization through fuel economy improvements, the use of alternative fuels and energy-efficiency improvements at our facilities. A cross-functional team called Sustainable Mobility Governance oversees the strategy. Please see the [Climate Change section](#) for details of our strategy and performance.
- We have adopted a comprehensive water strategy that corresponds to the key elements of the CEO Water Mandate and is based on five key platforms designed to effect substantial, sustainable and measurable impacts. Please see the [Water section](#) for details of that strategy and our performance.
- We were the first automaker to recognize that protecting human rights in our operations and our supply chain is an important sustainability issue. Our human rights strategy includes adherence to our Code of Human Rights, Basic Working Conditions and Corporate Responsibility ([Policy Letter 24](#)), as well as assessments of alignment with the Code in our operations and by our suppliers. It also includes training and building the capabilities of our suppliers to manage sustainability issues in their operations. Please see the [Governance](#) and [Supply Chain](#) sections for more information on our human rights strategy and performance.

We take a holistic approach to these and other sustainability issues, recognizing the interconnections between them. Our philosophy is that sustainability issues should be integrated into business processes and managed by the organizational functions, just as for other key business issues. For example, our work on human rights and environmental sustainability in the supply chain is managed by our Procurement division and forms an important theme in our ongoing partnerships with our suppliers. Please see the [Sustainability Governance](#) and [Sustainability Management](#) sections and the [letter from Robert Brown](#) for more information on these topics.

Our Sustainability, Environmental & Safety Engineering organization oversees sustainability strategy development and implementation by identifying emerging challenges and opportunities, and mobilizing resources within the company to address them and help us remain competitive in a changing world. A current priority is developing a [sustainability network](#) within the company aimed at further integrating sustainability into the global organization.

Our business units have set a series of [goals and targets](#) related to sustainability. Our Manufacturing organization, for example, develops a yearly [scorecard](#) that impacts performance evaluation and compensation for all managers who work in manufacturing. These targets cover performance areas such as safety, energy and water use, and emissions reductions.

Our sustainability strategy, and the pursuit of our related goals, have enhanced our

reputation and contributed to the competitiveness of our products, operations and work force, helping us build social, environmental and financial value.

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## Materiality Analysis

Ford generally updates its materiality analysis every other year. We updated the materiality analysis most recently in 2012 and early 2013, adding key inputs, replacing outdated inputs and gathering feedback from internal experts. A Ceres Stakeholder Committee reviewed the analysis in early 2013 and provided feedback. The analysis will be updated again in 2014 to guide development of the 2014/15 Sustainability Report and align the process more closely with the Global Reporting Initiative G4 Reporting Guidelines.

In the most recent analysis, climate change issues remained at the highest level of concern for Ford and external stakeholders. Water and supply chain issues, which had risen to the highest level of importance for both Ford and external stakeholders in the previous materiality analysis, remained highly important.

In addition, some new issues emerged, some dropped out and others were recast or reorganized. Significant changes from previous analyses included the following:

- Financial issues had been at the highest level of importance to Ford and external stakeholders for three materiality analyses (spanning six years). In the 2012/13 analysis, for the first time since 2006, financial issues dropped to the mid level of concern for non-Ford stakeholders, moving them from the “top right” box of our materiality matrix to the “middle right” box. This is likely a reflection of Ford’s strong and consistent improvements in financial performance. Nonetheless, financial health remains a critical issue to Ford and a central focus of our overall strategy and everyday activities. Therefore, we continue to report on it as a highly material issue.
- The governance issue of Ford’s strategy for addressing human rights in our own operations and throughout our supply chain increased to the highest level of priority for non-Ford stakeholders. This was due to increased importance of this issue to communities, investors and customers. The issue was already at the highest level of concern for Ford, but the change moved the issue to the “upper right” box of the material issues matrix. We already report on governance in detail, including Ford’s approach to human rights, and we will continue to do so based on the increased importance of these issues to external stakeholders.
- Water issues were reorganized to reflect water impacts in three key areas: on local communities, from and on Ford operations, and from Ford’s product design decisions. All three of these issues were of the highest concern to Ford and external stakeholders.
- Vehicle safety moved down in importance to stakeholders to a medium level of concern but remained at the highest level of concern for Ford. This likely reflects a view that automakers, including Ford, are managing vehicle safety issues well.
- Supply chain issues, especially those related to the sustainability of raw materials and the environmental and human rights performance of suppliers, remained at the highest level of importance for Ford and other stakeholders. In the 2012/13 analysis, a new category of supply chain issues was added relating to Ford’s approach to identifying and managing supply chain sustainability risks – including raw materials sustainability – and Ford’s process for promoting, assessing and remediating sustainability performance among suppliers.
- Issues associated with Ford’s sustainability strategy, management and governance also increased to the highest level of importance for non-Ford stakeholders, moving this issue to the “upper right” box on the material issues matrix.



## MATERIALITY MATRIX

Our interactive materiality matrix categorizes issues according to their concern to stakeholders and their current or potential impact on the company.



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## Overview of the Analysis Process

## What Is Materiality?

For the purposes of this report, we consider material information to be that which is of greatest interest to, and which has the potential to affect the perception of, those stakeholders who wish to make informed decisions and judgments about the company's commitment to environmental, social and economic progress. Thus, materiality as used in this Sustainability Report does not share the meaning of the concept for the purposes of financial reporting.

## How Was the Analysis Conducted?

To identify and prioritize material issues, we updated the analysis done for our 2010/11 Sustainability Report using a three-step process.

## Identification of Material Business Issues

We developed a list of almost 550 issues, grouped into 15 topics. The issues were identified by reviewing Ford business documents as well as inputs from employees, dealers and our major external stakeholders: customers, communities, suppliers, investors and nongovernmental organizations (NGOs). For the Ford analysis, the documents included Ford policies, business strategy and performance tracking tools, and the Annual Report on Form 10-K. To represent stakeholder views, we looked at Ford-specific inputs such as summaries of stakeholder engagement sessions as well as documents that represent stakeholder views more broadly, such as the Ceres Roadmap to Sustainability, reports on consumer trends and attitudes, and reports from socially responsible and mainstream investors.

## Assessment of Value Chain Impacts

For the 2012/13 analysis, we added a formal value chain analysis step to our materiality process. Though we had previously identified key impacts and impacted stakeholders across Ford's value chain stages, we updated that analysis and integrated it into our material issue identification and prioritization process. First, we mapped our material issues across Ford's value chain to ensure we are considering each issue at all the value chain stages where it has a substantial impact. Then, we assessed which stakeholders are more and less impacted by each issue at each value chain stage. We then gave the stakeholder group or groups that are most impacted by a certain issue across Ford's value chain a higher weight in estimating the overall importance of that issue to non-Ford stakeholders. However, for the final results of our prioritization of issues, we did not apply this new methodology, as the results of both approaches to calculating the overall impact score for non-Ford stakeholders on an issue-by-issue basis were similar.

## Prioritization of the Issues

We noted the frequency with which issues were raised in the source documents and rated each issue as low, moderate or high for current or potential impact on the company in a three- to 10-year timeframe, as well as degree of concern to stakeholders (by stakeholder group). Though we consider possible impacts and importance out to 10 years, three to five years is the timeframe in which Ford can make meaningful changes in our own actions based on our internal planning and production cycles. For each issue, the ratings were averaged separately for Ford and stakeholders (with extra weight assigned to investors and multi-stakeholder inputs, as they are key audiences of our reporting).

The issues and their ratings were then plotted on a "materiality matrix." The y-axis shows concern to stakeholders increasing from bottom to top. The x-axis shows increasing impact to Ford from left to right. "Current or potential impact on Ford" was assessed based on the potential an issue has to impact Ford's financial position; corporate reputation including standing in local communities, social license to operate and consumer perceptions of our company and products; employee

productivity and retention; and other key impacts.

We consider the issues in the “upper right” sector to be the most material. We do not further prioritize issues within a given box of the matrix as relatively more or less important than other issues in that same box, but we encourage users to click through the interactive matrix to access the detailed descriptions and other context on the individual issues. None of the issues is unimportant; the position of each in the matrix simply represents our understanding of its relative importance to the company and its stakeholders.

## Review of the Analysis

The draft matrix was reviewed internally. It was then revised again after review by a Ceres stakeholder committee that included representatives of environmental and other NGOs, socially responsible investment organizations and a supplier company. Please see the [Assurance](#) section for information on how we responded to the Committee's recommendations.

## Use of the Analysis

We use this analysis to identify issues to cover in our reporting and as an input to our sustainability strategy development. This analysis, and the methods for conducting materiality analyses generally, are works in progress. Though we undertake an in-depth materiality analysis every two years, we continue to consider material issues and stakeholder inputs informally between formal analyses. We are continually improving our reporting based on the formal and informal assessment of changing issues and stakeholder perspectives.

We work hard to ensure that our materiality analysis and the resulting matrix is comprehensive and precise without being so complicated that it is difficult to understand or apply. However, sustainability issues are not discrete. Rather, they overlap and interconnect in a complex system that is difficult to capture in a list of issues. Analyzing issues by stakeholder group adds depth to our understanding of who is concerned about which issues and why, but in the process of placing them on a two-dimensional matrix, some of that nuance is lost. Finally, an element of subjectivity is inevitable.

We have participated with other companies and organizations in documenting current methods for materiality analysis with the expectation that this will help advance the practice.



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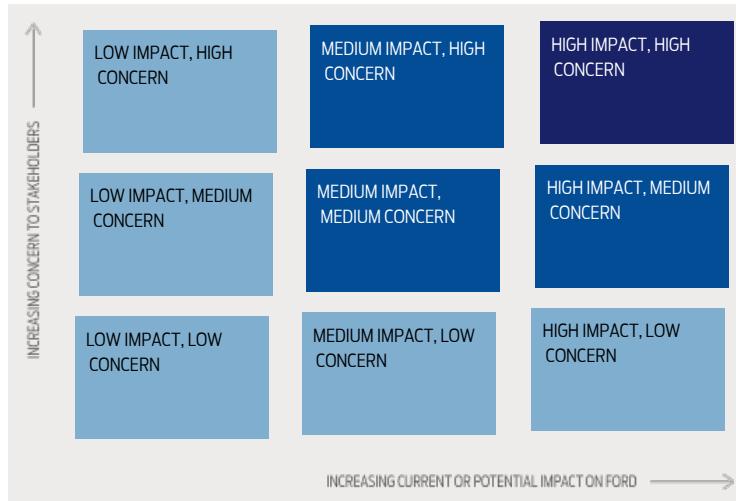
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##### ► Materiality Matrix

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## Materiality Matrix



### Reporting priorities

- Issues at this level set the agenda for our sustainability strategy and our printed summary report.
- Issues at these levels set the agenda for the rest of the web report and future reporting.
- Issues at these levels are not currently covered in detail by reporting.

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## Materiality Matrix

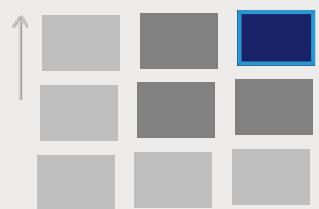
You have selected:

**High Impact, High Concern****14** material issues have been identified as having a high current or potential impact on Ford and a high concern to stakeholders.

Issues at this level set the agenda for our sustainability strategy and our printed report.

→ [Our reporting priorities](#)

Select a level of the matrix:

**Sustainability vision and management**▼ **Sustainability vision, governance and management**

Definition/description	Includes governance structures, goals and indicators, business case, stakeholder engagement, reporting
Comments	Continued to increase in importance to stakeholders since last analysis. Added the sub-issue of linking management performance assessments and compensation to sustainability issues.
Trend (from previous analysis)	↑ Increased in importance to stakeholders
More information	<ul style="list-style-type: none"> <li>→ <a href="#">Our Strategy</a></li> <li>→ <a href="#">Sustainability Governance</a></li> <li>→ <a href="#">Sustainability Management</a></li> <li>→ <a href="#">Stakeholder Engagement</a></li> </ul>

**Public policy**▼ **GHG/fuel economy regulation**

Definition/description	Regulation of vehicle emissions globally, state-by-state regulation in U.S.; increasing stringency and inconsistency of regulation; challenges posed by lack of U.S. federal climate legislation
Comments	Some decrease in concern for stakeholders on this issue, likely due to passage of new national Corporate Average Fuel Economy (CAFE) requirements in the U.S., new EU requirements in Europe and lack of progress on national GHG regulations in the U.S. However, both stakeholder concern and impact on Ford remained high enough to maintain this issue as an "upper right, most material" issue.
Trend (from previous analysis)	↗ Already at the highest level
More information	<ul style="list-style-type: none"> <li>→ <a href="#">Climate Change Policy and Partnerships</a></li> <li>→ <a href="#">Ford's Greenhouse Gas Emissions</a></li> <li>→ <a href="#">Public Policy Positions</a></li> </ul>

**Governance**▼ **Human rights strategy**

Definition/description	Includes Ford's policies and practices related to human rights
Comments	In previous analyses, an issue of top concern for stakeholders. It fell to mid-concern in the last analysis but returned to high concern in this analysis.
Trend (from previous analysis)	↑ Increased in importance to stakeholders
More information	<ul style="list-style-type: none"> <li>→ <a href="#">Human Rights in the Supply Chain: Ford's Approach</a></li> </ul>

## Climate Change

### ▼ Low-carbon strategy

Definition/description	Ford's strategy to reduce carbon emissions from products and operations; goals and targets; use of renewable energy and offsets
Comments	Strongly related to other material issues; of high interest to government and investors and increased in interest to communities since the last analysis.
Trend (from previous analysis)	☒ Already at the highest level
More information	<ul style="list-style-type: none"> <li>➔ Climate Change</li> <li>➔ Sustainable Technologies and Alternative Fuels Plan</li> <li>➔ Electrification: A Closer Look</li> <li>➔ Operational Energy and Greenhouse Gas Emissions</li> </ul>

### ▼ Vehicle GHG emissions

Definition/description	Ford's product actions to meet its carbon dioxide (CO <sub>2</sub> ) target
Comments	Increasingly driven by regulatory requirements as well as Ford's voluntary product CO <sub>2</sub> goal.
Trend (from previous analysis)	☒ Already at the highest level
More information	<ul style="list-style-type: none"> <li>➔ Climate Change</li> <li>➔ Sustainable Technologies and Alternative Fuels Plan</li> <li>➔ Electrification: A Closer Look</li> <li>➔ Vehicle Fuel Efficiency and CO<sub>2</sub> Emissions Progress and Performance</li> </ul>

### ▼ Electrification strategy

Definition/description	Ford's strategy to deliver electric vehicles to the marketplace and work with partners to address infrastructure and utility interface issues
Comments	Reflects the challenges of transitioning from traditionally fueled vehicles to plug-in vehicles and modest consumer uptake of electric vehicles.
Trend (from previous analysis)	☒ Already at the highest level
More information	<ul style="list-style-type: none"> <li>➔ Sustainable Technologies and Alternative Fuels Plan</li> <li>➔ Electrification: A Closer Look</li> </ul>

## Water

### ▼ Water strategy – local community impacts

Definition/description	Includes growing recognition of water as a key sustainability issue, including water scarcity and risks, need for water risk assessments, and understanding of linkages between water and carbon
Comments	Reorganized for this analysis to disaggregate the impacts of water issues on communities, Ford operations, and Ford product decisions. Added issue of human right to water.
Trend (from previous analysis)	☒ Already at the highest level
More information	<ul style="list-style-type: none"> <li>➔ Water Impacts, Risks and Opportunities</li> <li>➔ Operating in Water-Scarce Regions</li> <li>➔ Water: Overview</li> </ul>

### ▼ Water strategy – water impacts of products

Definition/description	A new issue incorporating the water impacts of different powertrain, fuel and other vehicle technology decisions
Comments	Impacts largely occur at raw materials phase of Ford value chain (e.g., materials for batteries) and use phase (e.g., upstream impacts of fuel production).
Trend (from previous analysis)	New
More information	<ul style="list-style-type: none"> <li>➔ Water Impacts, Risks and Opportunities</li> <li>➔ Operating in Water-Scarce Regions</li> <li>➔ Water: Overview</li> <li>➔ Progress in Reducing Water Use</li> <li>➔ Water Consumption in the Vehicle Lifecycle</li> </ul>

### Water strategy – water impacts of operations

Definition/description	Includes impacts on water sources, water management, cost of water and discharges to water
Comments	Particular concern in areas of water scarcity; issue gaining a higher public profile.
Trend (from previous analysis)	↗ Increased in importance to stakeholders
More information	<ul style="list-style-type: none"> <li>→ Water Impacts, Risks and Opportunities</li> <li>→ Operating in Water-Scarce Regions</li> <li>→ Water: Overview</li> <li>→ Progress in Reducing Water Use</li> <li>→ Water Consumption in the Vehicle Lifecycle</li> </ul>

## Operations

### Environmental management

Definition/description	High-level environmental operational concerns, including environmental management, environmental compliance
Comments	Continues to have highest importance to Ford, reflecting continued management focus on achieving environmental targets. Increased in importance to external stakeholders since last analysis.
Trend (from previous analysis)	↗ Increased in importance to stakeholders
More information	<ul style="list-style-type: none"> <li>→ Greening Our Operations</li> <li>→ Environmental Management</li> </ul>

## Supply chain sustainability

### Human Rights in the Supply Chain: Ford's Approach

Definition/description	Issues covered by Ford's working conditions code; need for industry cooperation
Comments	Increased in importance to investors since last analysis, remains of high interest to communities, suppliers and NGOs.
Trend (from previous analysis)	▣ Already at the highest level
More information	<ul style="list-style-type: none"> <li>→ Human Rights in the Supply Chain: Ford's Approach</li> <li>→ Sustainable Raw Materials</li> </ul>

### Supplier relationships

Definition/description	Includes importance of Ford's financial viability to suppliers and vice versa, and importance of strong relationships as well as the established policies and performance commitments
Trend (from previous analysis)	▣ Already at the highest level
More information	<ul style="list-style-type: none"> <li>→ Creating a Sustainable Supply Chain: Ford's Approach</li> <li>→ Building Strong Supplier Relationships</li> </ul>

### Sustainable raw materials

Definition/description	Includes issues around conflict minerals, rare earth metals and other strategic materials, and overall impacts of raw material extraction on the environment, communities, geopolitics and Ford's costs
Trend (from previous analysis)	▣ Already at the highest level
More information	<ul style="list-style-type: none"> <li>→ Sustainable Raw Materials</li> </ul>

### Supply chain environmental sustainability

Definition/description	Includes the need to address carbon and water issues in supply chain relationships
Trend (from previous analysis)	▣ Already at the highest level
More information	<ul style="list-style-type: none"> <li>→ Supply Chain Environmental Management</li> </ul>



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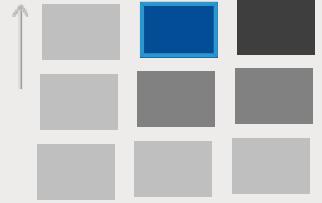
### Medium Impact, High Concern

No material issues have been identified as having a medium current or potential impact on Ford and a high concern to stakeholders.

Issues at this level set the agenda for the rest of the web report and future reporting.

→ [Our reporting priorities](#)

Select a level of the matrix:



No material issues have been identified at this level.

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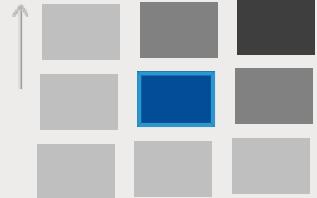
## Medium Impact, Medium Concern

9 material issues have been identified as having a medium current or potential impact on Ford and a medium concern to stakeholders.

Issues at this level set the agenda for the rest of the web report and future reporting.

→ [Our reporting priorities](#)

Select a level of the matrix:



## Public policy

## ▼ Political payments and contributions

Definition/description

Includes need for a consistent and transparent public policy position and concerns about company donations to candidates and campaigns; lobbying costs; employee Political Action Committee; indirect giving through trade associations, etc.

Comments

Stakeholders, including shareholders, remain interested in "political accountability" or transparency around corporate participation in the political process and various forms of corporate political donations.

Trend (from previous analysis)

☒ Same position

More information

- [Public Policy](#)
- [Policy Letters and Directives](#)

## Ford financial health

## ▼ Supplier viability and competitiveness

Definition/description

Includes economic viability of suppliers and the importance of supplier viability for Ford's operations and products as well as communities where Ford and suppliers operate

Comments

Was already at mid-level of concern for Ford in previous analyses. Increased in concern for stakeholders in this analysis.

Trend (from previous analysis)

⬆ Increased in importance to stakeholders

More information

- [Creating a Sustainable Supply Chain: Ford's Approach](#)
- [Building Strong Supplier Relationships](#)

## Operations

## ▼ Energy use and oil consumption

Definition/description

Operations/facilities: concerns about cost and availability; energy security

Trend (from previous analysis)

☒ Same position

More information

- [Operational Energy and Greenhouse Gas Emissions](#)

## ▼ Air emissions (other than GHGs)

Definition/description

Includes volatile organic compound emissions and ozone-depleting emissions from operations

Comments

Lower level of concern to Ford reflects active and successful management toward targets.

Trend (from previous analysis)

➡ Same position

More information

➡ Non-CO<sub>2</sub>, Facility-Related Emissions

#### ▼ Hazardous pollutants

Definition/description

Hazardous substances in products, manufacturing and supply chain

Trend (from previous analysis)

➡ Same position

More information

➡ Sustainable Materials  
➡ Non-CO<sub>2</sub> Tailpipe Emissions  
➡ Non-CO<sub>2</sub>, Facility-Related Emissions  
➡ Waste Management

#### ▼ Land and nature

Definition/description

Impacts of Ford operations on land and nature including biodiversity

Comments

Increased in importance to Ford largely due to increased relevance of land and nature impacts due to building new plants in the Asia Pacific region.

Trend (from previous analysis)

⬆ Increased in importance to stakeholders

More information

➡ Sustainable Land Use and Biodiversity  
➡ Green Buildings

#### ▼ Other environmental operational issues

Definition/description

Includes spills, nuisances (noise), and pre- and post-production logistics

Trend (from previous analysis)

⬇ Lower level of concern to Ford

More information

➡ Greening Our Operations

## Product

#### ▼ End-of-life management

Definition/description

Includes design for recycling, extended producer responsibility for end-of-life vehicles, and market demand for recycling and recovery of components and materials.

Trend (from previous analysis)

Decreased in importance for Ford, but increased in importance for stakeholders.

More information

➡ Sustainable Materials

## Governance

#### ▼ Shareholder concerns/resolutions

Definition/description

Includes issues related to the Board of Directors and executive management including compensation, board independence, and evaluation of Board performance and effectiveness; issues brought up in past shareholder resolutions; and shareholder engagement.

Trend (from previous analysis)

⬆ Increased in importance to stakeholders

More information

➡ Governance  
➡ Corporate Governance – Board of Directors



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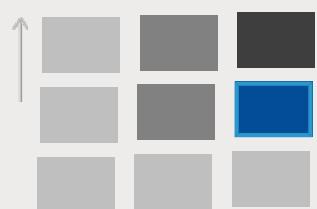
## High Impact, Medium Concern

**28** material issues have been identified as having a high current or potential impact on Ford and a medium concern to stakeholders.

Issues at this level set the agenda for the rest of the web report and future reporting.

→ Our reporting priorities

Select a level of the matrix:



## Governance

## ▼ Ethical business practices

Definition/description Concerns covered by codes of conduct, e.g., corruption and anti-competitive behavior

Comments Of increasing interest to some stakeholders, especially in the context of Ford expansion in areas that historically have higher risk for corruption. This issue may continue to rise in stakeholder concern to become an "upper right, most material" issue in future analyses.

Trend (from previous analysis)  Same positionMore information → Ethical Business Practices  
→ Corporate Governance – Board of Directors  
→ Sustainability Governance

## Public policy

## ▼ Global environmental regulation

Definition/description Trend toward greater regulation and the cost of compliance

Comments Continues to be of high importance to Ford.

Trend (from previous analysis)  Same positionMore information → Public Policy  
→ Climate Change Policy and Partnerships

## Ford financial health

## ▼ Risk and cost management

Definition/description Broad concerns about Ford's financial performance, with a focus on costs and cost-related risks, including health care and retiree legacy costs; operational and regulatory costs; labor costs; commodity, energy and resource supply and costs; and access to capital

Comments A top concern for Ford and mid-level concern for stakeholders. Added sub-issues on risks associated with raw materials regulations and supply. Also added sub-issues reflecting impact of overall global economic conditions and economic conditions in local markets on Ford's financial health.

Trend (from previous analysis)  Lower in importance to non-Ford stakeholders

More information → Financial Health

## ▼ Product competitiveness

Definition/description	Ford's strategy related to products and sales, including product mix, market share and meeting customer demands, including for more fuel-efficient products
Comments	A top concern for Ford and mid-level concern to stakeholders.
Trend (from previous analysis)	⬇ Lower in importance to non-Ford stakeholders
More information	<ul style="list-style-type: none"> <li>➔ Financial Health</li> <li>➔ Product Competitiveness</li> </ul>

#### ▼ Manufacturing efficiency

Definition/description	Includes reducing complexity of products, lean and flexible manufacturing, flexible work rules
Comments	A key element of Ford's ability to respond to changing markets; part of public discussion about aid to automakers.
Trend (from previous analysis)	➡ Same position
More information	<ul style="list-style-type: none"> <li>➔ Current Financial Health</li> <li>➔ Greening our Operations</li> </ul>

#### ▼ Alignment of production with demand

Definition/description	Ford's realignment of production capacity to lower levels of demand and the shift from trucks and SUVs to cars; supply-base rationalization; managing downsizing
Comments	Same importance to stakeholders, still of highest concern to Ford, particularly because of overcapacity in Europe.
Trend (from previous analysis)	➡ Same position
More information	<ul style="list-style-type: none"> <li>➔ Financial Health</li> </ul>

#### ▼ Quality

Definition/description	Product quality and customer service/customer relationship management
Trend (from previous analysis)	➡ Same position
More information	<ul style="list-style-type: none"> <li>➔ Customer Satisfaction and Quality</li> </ul>

### Ford future competitiveness

#### ▼ Sustainable mobility

Definition/description	Ford's approach to the increasing challenges of urban mobility, congestion, urbanization and mega cities, as well as rural mobility and economic opportunity
Comments	Added the issue of business opportunities of green vehicles, to better represent the scope of sustainable mobility to Ford and external stakeholders. Also added the issue of viability of public transportation.
Trend (from previous analysis)	➡ Same position
More information	<ul style="list-style-type: none"> <li>➔ Mobility Solutions</li> <li>➔ Understanding Customer Needs</li> <li>➔ Electrification: A Closer Look</li> </ul>

#### ▼ Emerging market product and service strategy

Definition/description	Ford's approach to emerging markets; infrastructure development; human rights as an issue in growth markets; Ford's impacts/contributions in emerging markets (other than products and services), including local sourcing, pollution, potential for partnerships
Comments	With projected growth in the company's Asia Pacific operations, would have increased in importance for the Company if it was not already at the highest level. Key drivers of the issue include congestion, shifting demographics, urbanization and social equity. Added the sub-issues of increasing importance of urban customers and introduction of green products and operations technologies into emerging markets.
Trend (from previous analysis)	➡ Same position
More information	<ul style="list-style-type: none"> <li>➔ Financial Health</li> <li>➔ Product Competitiveness</li> <li>➔ Mobility Solutions</li> <li>➔ Ford Around the World</li> </ul>

### Water

#### ▼ Operational water use

Definition/description	Includes impacts on water sources; water management, cost of water and discharges to water.
Comments	Particular concern in areas of water scarcity; issue gaining a higher public profile.
Trend (from previous analysis)	▣ Same position
More information	→ Progress in Reducing Water Use → Case Study: Ford Manufacturing Water Saving Technologies

## Climate change

#### ▼ Cleaner vehicle technologies

Definition/description	Ford's development of low-carbon technologies, including hybrids, electric vehicles, clean diesel, fuel cells; also emerging technologies such as nanotechnology
Trend (from previous analysis)	▣ Same position
More information	→ Sustainable Technologies and Alternative Fuels Plan → Electrification: A Closer Look → Vehicle Fuel Efficiency and CO <sub>2</sub> Emissions Progress and Performance

#### ▼ Fuel economy

Definition/description	Increasingly global issue, but particular focus on Ford's U.S. fleet
Comments	Increasingly driven by regulatory requirements as well as Ford's voluntary product CO <sub>2</sub> goal; reduced in importance since last analysis, primarily to NGOs.
Trend (from previous analysis)	▣ Lower in importance to non-Ford stakeholders
More information	→ Vehicle Fuel Efficiency and CO <sub>2</sub> Emissions Progress and Performance → Sustainable Technologies and Alternative Fuels Plan

#### ▼ Other climate change issues

Definition/description	Includes importance of reporting on fuel economy/climate footprint in all markets, reporting on the science of climate change, commitment to work with industry partners and policymakers on climate change issues, and climate change adaptation
Comments	This issue likely increased in importance for Ford and stakeholders in response to the addition of climate change adaptation as an element of this issue in this year's analysis.
Trend (from previous analysis)	↑ Increased in importance to Ford and stakeholders
More information	→ Climate Change

#### ▼ Clean/alternative fuels

Definition/description	Includes vehicle and refueling infrastructure issues related to increased use of biofuels, and the lifecycle carbon footprint of alternative fuels.
Trend (from previous analysis)	▣ Increased in importance to stakeholders
More information	→ Sustainable Technologies and Alternative Fuels Plan → Electrification: A Closer Look → Vehicle Fuel Efficiency and CO <sub>2</sub> Emissions Progress and Performance

## Operations

#### ▼ GHG emissions

Definition/description	Includes cost of controlling GHG emissions
Comments	Less of a concern than GHG emissions from vehicles; a mid-level concern for Ford and NGOs/stakeholders.
Trend (from previous analysis)	▣ Same position
More information	→ Operational Energy and Greenhouse Gas Emissions

#### ▼ Waste generation and management

Definition/description	Includes Ford's operational waste generation, management and disposal
Comments	Increased in importance to Ford in this analysis after increasing in

importance to stakeholders in the last analysis.

Trend (from previous analysis)

⬆ Higher concern for Ford

More information

➡ Waste Management

## Vehicle safety

### ▼ Vehicle safety

Definition/description

Active and passive safety; pedestrian safety; customer interest in and demand for safe vehicles; increasing regulation generally with focus on active safety; challenge of evolving in-vehicle technology

Comments

Developed and emerging market issues differ.

Trend (from previous analysis)

⬇ Lower in importance for stakeholders

More information

➡ Vehicle Safety and Driver Assist Technologies

## Product

### ▼ Lifecycle assessment

Definition/description

Includes the need for rigorous lifecycle assessment processes

Trend (from previous analysis)

➡ Same position

More information

➡ Design for Lifecycle Sustainability

### ▼ Environmentally preferable materials

Definition/description

Cradle-to-cradle approach: use of renewable, recycled and recyclable materials

Trend (from previous analysis)

➡ Same position

More information

➡ Sustainable Materials

### ▼ Customer privacy

Definition/description

Ford's management of customer information to maintain customer privacy.

Trend (from previous analysis)

⬆ Increased in importance to Ford and stakeholders

More information

➡ Ford Motor Credit Company

➡ Policy Letters and Directives

### ▼ Marketing and communications/demand creation/advertising

Definition/description

Includes issues associated with Ford's marketing, communications and advertising efforts, including the issue of demand creation for different vehicle types

Trend (from previous analysis)

⬆ Increased in importance to Ford and stakeholders

More information

➡ Customers

➡ Policy Letters and Directives

## Workplace

### ▼ Workplace health and safety

Definition/description

Health and safety management systems; ergonomics

Trend (from previous analysis)

➡ Same position

More information

➡ Workplace Health and Safety

### ▼ Employee morale and teamwork

Definition/description

Includes issues of employee satisfaction, development, recruitment and retention as well as increasing employee interest in sustainability

Comments

New sub-issues were added in this category, including employee interest in working for a sustainable company and the need to engage employees in sustainability issues.

Trend (from previous analysis)

⬆ Increased in importance to stakeholders

More information

➡ Employees

#### ▼ Employee labor practices/decent work

Definition/description	Ford's employment practices, including wages, wage ratios, benefits, permanent v. temporary positions; training and education; turnover; impact of aging workforce
Comments	High concern to communities and investors.
Trend (from previous analysis)	▣ Increased in importance to Ford
More information	<ul style="list-style-type: none"><li>➔ Working Conditions in Ford Plants</li><li>➔ Policy Letters and Directives</li></ul>

#### ▼ Diversity/equal opportunity

Definition/description	Diversity of Ford Board and management; harassment programs and monitoring
Comments	Increased in importance to Ford and to investors. Already of high concern to communities and NGOs.
Trend (from previous analysis)	▣ Increased in importance to Ford
More information	<ul style="list-style-type: none"><li>➔ Diversity and Inclusion</li></ul>

## Community engagement

#### ▼ Community engagement

Definition/description	License to operate, NGO relationships and specific community concerns such as breast cancer, obesity, compliance
Comments	Increasing concern to Ford, lower concern to communities and NGOs in this analysis. However, community interest in specific issues of engagement like water increased in this analysis.
Trend (from previous analysis)	☒ Same position
More information	<ul style="list-style-type: none"><li>➔ Engaging with Communities</li></ul>

#### ▼ Community impacts and contributions

Definition/description	Encompasses a range of direct and indirect economic impacts, including local hiring and sourcing and philanthropic donations to the community; also local environmental impacts
Comments	High concern to communities.
Trend (from previous analysis)	▣ Increased in importance to Ford
More information	<ul style="list-style-type: none"><li>➔ Communities</li><li>➔ Human Rights in the Supply Chain: Ford's Approach</li><li>➔ Financial Health</li></ul>

## Supply chain sustainability

#### ▼ Identifying and managing sustainability-related supply chain risks

Definition/description	Includes Ford's approach to assessing and managing suppliers' sustainability performance, including supplier requirements, assessments/monitoring and remediation. Also includes risks related to raw materials sourcing, such as scarcity/single source, conflict minerals and raw material regulations
Comments	New issue this year; previously embedded in other supply chain topics. This issue was separated from other supply chain topics based on increasing awareness and concern among some stakeholder groups. It may continue to rise in concern for stakeholders and move to an "upper right, most material" issue in future analyses.
Trend (from previous analysis)	New
More information	<ul style="list-style-type: none"><li>➔ Creating a Sustainable Supply Chain: Ford's Approach</li></ul>



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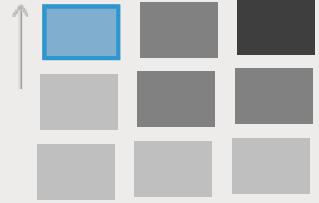
### Low Impact, High Concern

No material issues have been identified as having a low current or potential impact on Ford and a high concern to stakeholders.

Issues at this level are not currently covered in detail by reporting.

→ [Our reporting priorities](#)

Select a level of the matrix:



No material issues have been identified at this level.

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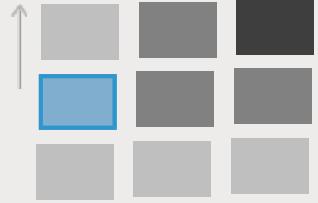
### Low Impact, Medium Concern

1 material issue has been identified as having a low current or potential impact on Ford and a medium concern to stakeholders.

Issues at this level are not currently covered in detail by reporting.

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Select a level of the matrix:



### Ford future competitiveness

- Innovation management

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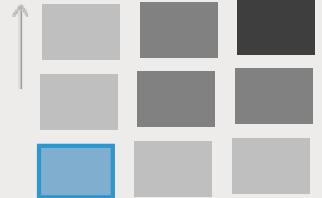
## Low Impact, Low Concern

**2** material issues have been identified as having a low current or potential impact on Ford and a low concern to stakeholders.

Issues at this level are not currently covered in detail by reporting.

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Select a level of the matrix:



### Public policy

- Health care policy

### Climate change

- Emissions trading/cost of carbon

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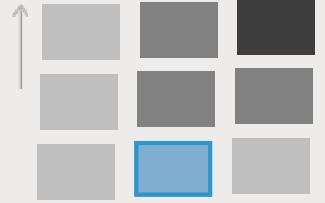
### Medium Impact, Low Concern

5 material issues have been identified as having a medium current or potential impact on Ford and a low concern to stakeholders.

Issues at this level are not currently covered in detail by reporting.

➔ [Our reporting priorities](#)

Select a level of the matrix:



### Ford financial health

- Dealer viability and competitiveness

### Product

- Labeling
- Noise
- Vehicle interior air quality

### Vehicle safety

- Emerging market vehicle and road safety

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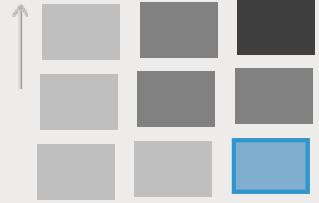
## High Impact, Low Concern

2 material issues have been identified as having a high current or potential impact on Ford and a low concern to stakeholders.

Issues at this level are not currently covered in detail by reporting.

→ [Our reporting priorities](#)

Select a level of the matrix:



### Product

- Compliance
- Tailpipe emissions

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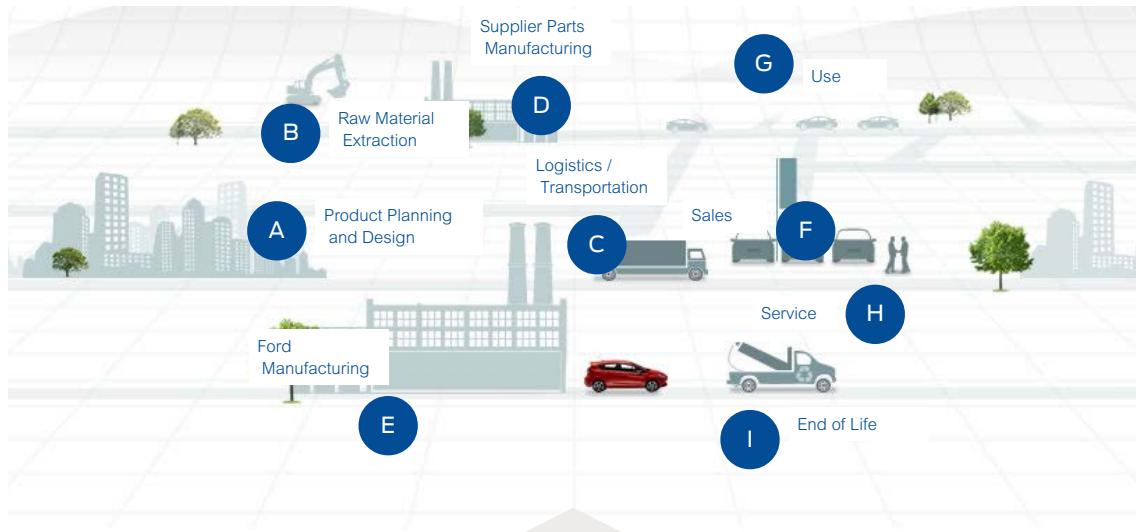
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## Our Value Chain and Its Impacts



As a major multinational enterprise, our activities have far-reaching environmental, social and economic impacts. The graphic above illustrates the major stages of our value chain and identifies key impacts, stakeholders, and examples of value we create at each stage.

We recognize that the issues and impacts are interconnected and that positive and negative effects in one part of the chain can reverberate in the other parts. The value chain assessment was revised and updated for this report as part of the "materiality analysis" which prioritizes the most significant issues in our value chain.

### A Product Planning and Design

This stage has far-reaching impacts throughout our value chain, as it includes all major decisions about which products we will make, what technologies we will develop and implement, and how and where our products will be made.

Innovation and R&D play a key role in our ability to enhance positive impacts and reduce negative impacts of our products and operations. We also add indirect value and have indirect impacts at this stage based on the decisions we make about products, manufacturing processes, manufacturing volumes, suppliers, etc.

#### Key issues / impacts

- Greenhouse gas (GHG)/fuel economy and other environmental regulations
- Low-carbon strategy
- Energy use/oil consumption and GHG emissions
- Electrification strategy
- Environmental management
- Water strategy
- Sustainability vision, governance and management
- Land and nature

In 2013 we spent  
**\$6.4 billion**  
on engineering, research and development.

**718**

U.S. utility patents were issued to Ford and subsidiaries for new technologies and processes we developed in 2013.

In 2014 we will launch  
**23**

new or significantly refreshed vehicles to customers around

- Waste generation and management
- Tailpipe emissions
- End-of-life management
- Sustainable mobility
- Sustainable materials
- Emerging market products and services strategy
- Alignment of production with demand
- Product competitiveness
- Brand reputation/value
- Quality
- Risk and cost management
- Vehicle safety

the world – the most in a single year in more than a century.

#### **Key stakeholders**

- Ford
- Employees
- Suppliers
- Communities

### **B Raw Material Extraction**

This stage can have significant impacts on the communities where extraction occurs. Extraction creates value for raw material suppliers and local communities through employment and other benefits.

However, it also has significant environmental and social impacts on local communities. We are working to reduce negative impacts from extraction, including addressing issues relating to Conflict Minerals, human trafficking and rare earth elements.

#### **Key issues / impacts**

- Water strategy
- Supply chain environmental sustainability
- Sustainable materials
- Global environmental regulation
- Low-carbon strategy
- Emerging market products and services strategy

Since 2011, we have been asking our global production supply base to report their use of Conflict Minerals by material weight.

We submitted our first Securities and Exchange Commission (SEC) report on conflict minerals in 2014.

#### **Key stakeholders**

- Suppliers
- Communities
- Ford

### **c Logistics / Transportation**

This stage includes the transport of parts from our suppliers to our manufacturing plants and of finished vehicles from our factories to our dealerships.

We create value at this stage by providing business and jobs in the transportation and packaging industries. We also work to reduce emissions and waste associated with parts transportation and packaging.

Since 2006, we have been tracking and reporting transportation- and logistics-related GHG emissions; we now track this for all our

However, transportation causes impacts to local communities and the environment, especially in the areas of emissions, waste, traffic and road safety.

#### Key issues / impacts

- Low-carbon strategy
- GHG emissions
- Sustainability vision, governance and management

#### Key stakeholders

- Suppliers
- Ford
- Employees
- Communities

regions and report externally for North America, South Africa, India and Australia.

We are reducing our freight emissions by reducing the number of vehicle miles traveled to deliver parts, as well as improving route efficiencies and switching to lower-emission transport methods.

## D Supplier Parts Manufacturing

Supplier parts manufacturing includes our direct suppliers as well as multiple levels of suppliers who provide components to our direct suppliers.

We add value at this stage by providing business to suppliers, which in turn creates jobs, income and investment in communities. We also add value through extensive efforts to improve the sustainability of our suppliers' operations. We also generate indirect impacts at this stage, primarily in the form of environmental impacts of parts manufacturing and social and economic impacts to local communities based on changes in our supplier base and production levels.

#### Key issues / impacts

- Supply chain environmental sustainability
- Ethical business practices
- Human rights in the supply chain
- Environmental management
- Supplier relationships
- Water strategy
- Supplier viability

#### Key stakeholders

- Suppliers
- Ford
- Communities
- Employees

In 2013, we spent  
**\$100 billion**

with more than 12,100 production and non-production supplier companies globally.

All of our direct suppliers adhere to our requirements on human rights, working conditions and environmental sustainability, as laid out in our Global Terms and Conditions.

To date, Ford's supplier training programs have impacted more than 2,900 supplier representatives, who in turn have cascaded the training information to nearly 25,000 supplier managers and more than 485,000 individual workers as well as over 100,000 sub-tier supplier companies.

## E Ford Manufacturing

Manufacturing at our own facilities is the heart of our business and is, of course, the value chain stage where we create the most direct value and impacts.

In 2013, we employed  
**181,000**

We create value at this stage through employment and investment in the communities where we operate, and through continual efforts to improve the environmental performance of our operations and to ensure human rights and excellent working conditions for our own employees. Our impacts at this stage include the environmental impacts of our manufacturing facilities, as well as the social and economic impacts of our plant operations.

#### Key issues / impacts

- Emerging market products and services strategy
- Environmental management
- Brand reputation/value
- Innovation management
- Emissions and pollutants
- Sustainable mobility
- Energy use/oil consumption
- Health and safety

#### Key stakeholders

- Ford
- Employees
- Communities

people globally.

Also in 2014, we will add

**11,000**

salaried and hourly jobs in the U.S. and Asia combined.

In 2013, we contributed

**\$3.2 billion**

in taxes globally.

Reduced CO<sub>2</sub> emissions from our global operations in 2013 by 15 percent per vehicle produced, compared to 2012.

Also in 2013, we invested

**\$37.7 million**

in local communities through charitable contributions.

## F Sales

The sales stage includes our communications with customers about our products and the work of our global dealer network.

We add value at this stage by providing customers with products that meet their needs and exceed their expectations, and through the employment and investment generated by our dealerships.

#### Key issues / impacts

- Alignment of production with demand
- Product competitiveness
- Emerging market products and services strategy
- Electrification strategy
- Sustainable mobility
- GHG/fuel economy regulation
- Quality
- Low-carbon strategy
- Cleaner vehicle technologies

In 2013, we sold more than

**6.33 million**

vehicles globally.

Worldwide, we had

**11,772**

Ford and Lincoln dealerships as of year-end 2013.

#### Key stakeholders

- Dealers
- Ford
- Customers
- Investors

## Use

Most of the direct value and impacts of our products occur during the use stage, when they are being driven by our customers.

We add value at this stage by delivering high-quality, fuel-efficient products that make our customers' lives better. We generate indirect value by supporting the vast network of businesses that benefit from vehicle use – from fuel providers and road builders to less-obvious beneficiaries such as the travel and tourism industry. We generate impacts through the environmental and social impacts of our vehicles, including tailpipe emissions and vehicle and road safety.

#### Key issues / impacts

- Vehicle GHG and other emissions
- Global environmental regulation
- Low-carbon strategy
- Environmental management
- Electrification strategy
- Fuel efficiency/economy
- Sustainable mobility
- Cleaner vehicle technologies and fuels
- Public policy engagement
- Quality
- Emerging market products and services strategy
- Alignment of production with demand
- Product competitiveness
- Brand reputation/value

#### Key stakeholders

- Customers
- Ford
- Communities

Reduced fleet-average CO<sub>2</sub> emissions from our U.S. car fleet by 2 percent and our truck fleet by 3 percent in 2012 compared with 2013<sup>1</sup>.

Reduced fleet-average CO<sub>2</sub> emissions from our European vehicles by 18 percent from the 2007 to 2013 calendar years.

For the 2014 model year, nine Ford Motor Company vehicles earned the highest possible Overall Vehicle Score of five stars in the New Car Assessment Program (NCAP) of the U.S. National Highway Traffic Safety Administration (NHTSA). These five-star vehicles include the Ford Focus, Focus Electric, Explorer, Taurus, Fusion, Fusion Energi and Transit Connect and the Lincoln MKS and MKZ.

For the 2013 Insurance Institute for Highway Safety (IIHS) awards, 13 Ford Motor Company vehicles earned Top Safety Picks from the IIHS: the Ford Fiesta (sedan and hatchback), Focus, Fusion, Taurus, Edge, Explorer, Escape, Flex and F-150 (crew cab) and the Lincoln MKZ, MKS, MKT and MKX.

1. However, our combined corporate average fuel economy decreased by 1.7 percent in 2013 due to increased customer demand for trucks over cars.

## H Service

Our dealer network creates value and impacts through their network of vehicle service centers.

We generate direct value at this stage through the employment and investment of dealership service centers, and by working to reduce the environmental impacts of our service processes, such as recycling used parts. We add indirect value by generating demand for replacement parts

As of March 2013, more than 600 dealers in 48 states have participated in our green

and other support services, which in turn provide employment and economic benefits.

#### Key issues / impacts

- Sustainable mobility
- Quality
- Brand reputation/value
- Dealership network viability

#### Key stakeholders

- Dealers
- Ford
- Customers

dealer onsite facility assessment to identify energy- and cost-saving opportunities and become certified to sell our electrified vehicles. More than 200 additional dealers signed up to undergo this process during the remainder of 2013.

In the U.S., 2013 marked the 10-year anniversary of our Core Recovery Program, through which we have been reusing and recycling parts removed at dealership service centers for use in the production of new Ford vehicles. During the last 10 years, the program has saved approximately

**120 million**

pounds of vehicle waste from being buried in landfills or being sent to junkyards.

## I End of Life

Our vehicles have impacts and value even after they are done with their useful driving life.

We generate indirect value at this stage by supporting the vehicle dismantling, recycling and disposal industries. (Ninety-five percent of the materials in our vehicles can be recycled or reused.) Our vehicles also have impacts at end of life primarily in the form of waste production.

#### Key issues / impacts

- Hazardous pollutants
- Emerging market products and services strategy
- Risk and cost management
- Waste generation and management
- Sustainable materials
- End-of-life management

In North America, about

**95 percent**

of vehicles that go out of registration are processed by a dismantler or scrap metal recycling facility, with approximately 86 percent of the vehicle by weight recovered for reuse, remanufacturing or recycling.

#### Key stakeholders

- Recyclers
- Ford
- Communities

In Europe, Ford has take-back and recycling networks for Ford brand vehicles in 19 EU markets and participates in collective recycling systems in another 10. All Ford vehicles marketed in Europe are now certified as reaching recyclability of 85 percent and recoverability of 95 percent.



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## Governance

To Ford, governance includes more than simply fiduciary responsibility to shareholders; the concept also encompasses accountabilities regarding our impact on the world and responsibilities toward a diverse set of stakeholders.

Our sound governance and management systems enable us to operate in a transparent and accountable way and to provide effective oversight of all our operations. Our high ethical standards – formalized in company policies and demonstrated by managers at all levels – help us translate our aspirations into action. And importantly, our sustainability-related structures, processes and management systems are integrated into our core business processes.

## Awards and Recognitions

In 2013 and early 2014, Ford received a number of awards and recognitions for our corporate responsibility and sustainability efforts and governance practices.

In 2014, for example, Ford was honored by the Ethisphere Institute – for the fifth year in a row – as one of the World's Most Ethical Companies. The Ethisphere Institute's proprietary rating system assesses companies in five core areas: ethics and compliance program; reputation, leadership and innovation; governance; corporate citizenship and responsibility; and culture of ethics.

Also in 2014, Ford was included for the first time on EuroNext Vigeo's World 120 list, which recognizes companies for their environmental, social and governance (ESG) performance. The rating process for this list includes assessment against 330 ESG indicators. Ford also continued to be listed on EuroNext Vigeo's list of the top 50 U.S. companies for ESG performance.

Ford's additional 2014 recognitions included listing on Maclean's Sustainalytics inventory of the 50 Most Socially Responsible Corporations in Canada, as well as on the FTSE4Good Index Series. The FTSE4Good Index Series includes companies meeting stringent environmental, social and governance criteria.

In 2013, Ford ranked number 2 on Interbrand's list of Best Global Green Brands, up from number 15 in 2012. The rankings are determined via an analysis of 83 submetrics across six pillars: governance, stakeholder engagement, operations, supply chain, transportation and logistics, products and services. Also, each brand was evaluated based on how the public perception of its environmental sustainability initiatives matched up to its actual performance.

In addition, Ford was chosen for inclusion in the Tomorrow's Value Rating for 2013. Tomorrow's Value Rating analyzes the extent to which companies who are recognized as "sustainability leaders" actually integrate sustainability management into their core business strategy.

Ford was also named one of *Fast Company* magazine's World's Most Innovative Companies in 2013, and was included in the Dow Jones Sustainability Index North America. In late 2013, Covance EthicalQuote, a reputation index tracking 2,800 of the world's largest companies on corporate responsibility-related topics, named Ford one of the top 20 most "buzzed about" companies, as measured by news headlines pertaining to sustainability and ethics.

Two Ford vehicles – the Ford Taurus and Ford Flex – were named by the Automotive Science Group (ASG) as among the "Best 5" in their class for the 2013 model year, as measured by combined social, environmental and economic performance scores. The ASG assessed more than 1,400 U.S. light vehicles for model year 2013, using a proprietary automotive life cycle assessment platform, the Automotive Performance Index. The Index incorporates social, environmental and economic performance analyses.



**William Clay Ford, Sr.**, who helped steer Ford Motor Company into the modern era as an employee, director and influential member of the Ford family, died on March 9, 2014, at the age of 88. Mr. Ford served as Director Emeritus of Ford Motor Company, and was the last surviving grandchild of the company's founder, Henry Ford. Mr. Ford served Ford Motor Company for 57 years as an employee and board member, playing a pivotal role in shaping the company for more than half of its 110-year history.

Finally, we were also recognized for our sustainability reporting in 2013. First, an independent survey published by KPMG ranked Ford among the 10 leading global companies for corporate responsibility reporting. The KPMG ranking assessed companies' reporting on seven key criteria: strategy, risk and opportunity; materiality; targets and indicators; suppliers and the value chain; stakeholder engagement; governance of corporate responsibility; and transparency and balance.

Second, the World Business Council for Sustainable Development highlighted Ford's sustainability reporting twice in its own publication on the effectiveness of such reporting: once for disclosures relating to governance and accountability, and again for acknowledging trends and challenges and discussing how those may affect future growth.

We also won several [awards related to diversity](#) in 2013 and 2014. And, our vehicles and engines won several ["green" awards](#).

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## Sustainability Governance

Upholding high standards of corporate governance is key to maintaining the trust of investors and other stakeholders. In this section, we discuss governance by our Board of Directors and how we set, communicate and enforce these standards to employees. In addition, we discuss how we are integrating sustainability into our organizational structures and business processes, and our approach to sustainability reporting – a key element of our commitment to transparency.

### In this section

- ➔ Governance and Management Structures
- ➔ Corporate Governance – Board of Directors
- ➔ Policy Letters and Directives, including our human rights policy
- ➔ Ethical Business Practices
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## Governance and Management Structures

## Board-Level Governance

## Board of Directors

William Clay Ford, Jr., **Executive Chairman**  
Alan R. Mulally\*, **President and CEO**Stephen G. Butler\*\*  
Kimberly A. Casiano\*\*  
Anthony F. Earley, Jr.\*\*  
Edsel B. Ford II  
Richard A. Gephart\*\*  
James P. Hackett\*\*  
James H. Hance, Jr.\*\*  
William W. Helman IV\*\*  
Jon M. Huntsman, Jr.\*\*  
John C. Lechleiter\*\*  
Ellen R. Marram\*\*  
Homer A. Neal\*\*  
Gerald L. Shaheen\*\*  
John L. Thornton\*\*

## Board Committees

Audit  
Compensation  
Nominating and Governance  
Sustainability  
Finance

## Policy Documents

- [Corporate Governance Principles \(PDF, 53kb\)](#)
- [Code of Ethics for Board of Directors \(PDF, 34kb\)](#)

## Related Links

## Ford Websites

- [Committee Charters](#)

## Sustainability Management

## Vice Presidents

VP, Sustainability, Environment and Safety Engineering  
Executive VP, Manufacturing & Labor Affairs  
Group VP, Global Product Development  
Group VP, Global Purchasing  
Executive VP, Global Marketing Sales & Service and Lincoln

## Policy Documents

- [Code of Conduct Handbook \(PDF, 0.99Mb\)](#)
- [Code of Ethics for Senior Financial Personnel \(PDF, 17kb\)](#)

## Related Links

## This Report

- [Sustainability Management](#)
- [Policy Letters and Directives](#)

## Sustainable Mobility Governance

A senior-level team led by the Vice President of Sustainability, Environment and Safety Engineering – responsible for defining our climate change strategy and delivering our sustainability strategy in the marketplace.

## Key Business Processes

Business Plan Review  
Global Product Development System  
Special Attention Review  
Ford Production System  
ISO 14001 Certification  
Order-to-Delivery



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## Corporate Governance – Board of Directors

Ford's Board of Directors is guided by the company's corporate governance principles, code of ethics and charters for each board committee – all of which are publicly available in the [corporate governance](#) section of the Ford website.

The board addresses significant business issues as a full group and through five committees: Audit, Compensation, Finance, Nominating and Governance, and Sustainability. The Sustainability Committee was formed in 2008 from the former Environment and Public Policy Committee, reflecting the evolution of its responsibilities and the company's challenges and opportunities. The [Sustainability Committee charter](#) is available online.

During 2013, 10 directors served on the Sustainability Committee, which is chaired by Dr. Homer Neal, an independent director. Ford's board met nine times and the Sustainability Committee met four times.

The board's Nominating and Governance Committee considers several qualifications when considering candidates for the board. Among the most important qualities directors should possess are the highest personal and professional ethical standards, integrity and values. They should be committed to representing the long-term interests of all shareholders. Directors must also have practical wisdom, mature judgment and objectivity. Ford recognizes the value of diversity, and we endeavor to have a diverse board, with experience in business, government, education and technology, and in areas that are relevant to the company's global activities.

Under New York Stock Exchange (NYSE) Listed company rules, the majority of our directors must be independent directors. The NYSE rules also provide that no director can qualify as independent unless the board affirmatively determines that the director has no material relationship with the listed company. Ford's standards in determining whether or not a director has a material relationship with the company are contained in the company's Corporate Governance Principles. Based on Ford's standards, 13 of the company's current 16 directors are independent. Two of Ford's directors are women, and two are members of minority groups.

Each board member participates in an annual assessment of the effectiveness of the board and the Committees on which he or she serves. We have established a procedure for shareholders to submit accounting and other concerns to independent directors and to send other communications to the board.

For more information on Ford corporate governance practices, including the principles and policies that govern the conduct of the board and the members of the board, [please visit our website](#).

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## Policy Letters and Directives

At Ford, Policy Letters establish a framework of broad, basic principles within which the company conducts its business globally. Corporate Directives provide more in-depth information on narrower topics than Policy Letters, and therefore may only apply to a particular segment of the business or to specific activities. In addition to Policy Letters and Directives, numerous descriptions of business practices, handbooks, guidelines and statements of business standards govern the conduct of personnel globally.

The following are Ford standards with particular relevance to sustainability.

## Human Rights

Ford's commitment to human rights is embodied in our Code of Human Rights, Basic Working Conditions and Corporate Responsibility, which forms the foundation for work within our own operations and our supply chain. This code articulates our commitments on key human and labor rights issues.

First adopted in 2003 as the Code of Basic Working Conditions, this code was more formally issued as Policy Letter 24 in 2007. In early 2012, Policy Letter 24 was revised and its title was changed to the [Code of Human Rights, Basic Working Conditions and Corporate Responsibility](#).

Policy Letter 24 is based on fundamental elements of internationally recognized labor standards, including the Universal Declaration of Human Rights, International Labour Organization Covenants, the Organisation for Economic Co-operation and Development's Guidelines for Multinational Enterprises, the United Nations' Global Compact Principles, the Global Sullivan Principles, and standards of the Fair Labor Association and International Metalworkers' Federation. Ford encourages businesses throughout our supply chain to adopt and enforce similar policies, and seeks to identify and do business with organizations that conduct business to standards that are consistent with Policy Letter 24. See [Setting Requirements for Sustainability Issues in Our Supplier Contracts and Guides](#) for more information.

Policy Letter 24 covers workplace and recruitment issues such as working hours, child labor and forced labor, health and safety, harassment and discrimination, and freedom of association. It also reflects our increasingly integrated approach to managing human rights and community issues by articulating our commitments on several key issues that extend beyond the fence lines of our facilities, including community engagement and indigenous populations, bribery and corruption, and environment and sustainability.

One of the aims of the early 2012 revision to Policy Letter 24 was to develop an implementation plan for the "protect, respect and remedy" framework designed by John Ruggie, Special Representative to the United Nations Secretary General on business and human rights at the international level. Ford is implementing many of these recommendations, and we are using the framework to benchmark our own strategies and to integrate the principles into the assessment process. The Policy also includes a commitment to work with local, indigenous people on [sustainable water use](#), and language to specifically address human trafficking. In previous versions of Policy Letter 24, Ford considered human trafficking to be a potential element of "forced labor." However, given the California law requiring disclosure on supply chain due diligence related to forced labor and human trafficking, we felt it important to make our definition of forced labor and human trafficking more explicit to our suppliers and stakeholders. See [Forced Labor and Human Trafficking in Supply Chains](#) for more information.

Finally, Policy Letter 24 – consistent with our Global Terms and Conditions – communicates our encouragement of suppliers to adopt and enforce similar policies for their suppliers and subcontractors. We actively promote and assess

implementation of sustainable policies and practices in our own operations and in our supply chain. The performance criteria for assessments of Ford-owned facilities and facilities operated by Ford now address several key community issues and evaluate engagement with members of the local community. The key community issues include environmental impact, local environmental concerns, social performance, volunteerism, philanthropy, and commitment to all local citizens, indigenous populations and community groups.

We encourage personnel who have a good-faith belief that there may have been a violation of this Policy to report it through established channels or to Ford's Office of the General Counsel. These reports are then forwarded to the Global Manager of Social Sustainability, who takes action to clarify, validate and correct the situation, if necessary. No retaliatory actions are taken against individuals who report concerns about violations of Policy Letter 24.

## Diversity

We are committed to equal opportunity in all aspects of our business and to fostering diversity in our work force. Our Policy Letter and Directives relating to diversity address equal opportunity and require that there be no disparate treatment because of race, religion, color, age, sex, national origin, disability, gender identity, sexual orientation or veteran status, and other factors that may be covered by local law. We recognize that diversity in our work force is a valuable asset, and we strive to provide an inclusive work environment in which different ideas, perspectives and beliefs are respected.

## Bribery and Corruption

Our Policy Letters and Directives help set ethical standards within Ford. It is our policy to never pay bribes nor to allow others to pay bribes on our behalf, and to comply fully with the laws of each country in which we do business. Our personnel are directed to immediately report any requests or solicitations for an improper payment through our company reporting system.

## Political Contributions

Ford's Policy Letter on governmental relationships covers issues relating to public policy and political contributions. These issues are discussed in depth in the [Public Policy](#) section.

## Customer Satisfaction and Safety

Ford has several policy statements aimed at increasing the quality of our products and promoting the safety of our customers. Our Policy Letter on quality sets the foundation for a process that emphasizes the importance of quality in everything we do and notes that the customer defines quality. It establishes a Quality Operating System and the use of metrics and data to make decisions. Our Policy Letter on vehicle safety sets forth Ford's commitment to design and build vehicles that meet or exceed applicable laws and regulations, and to advance the state of the art in safety wherever practicable. We strive for continuous improvement in vehicle safety, which applies to accident avoidance attributes as well as occupant protection systems. This policy requires that we will be demonstrably active and responsible in all areas of automotive safety, including vehicle design and manufacture, operator behavior and the highway environment.

## Environment and Employee Health and Safety

Our policies on employee health and safety and the global environment make it clear that sustainable economic development is important to the future welfare of Ford and society in general. Protecting these things is an important consideration in the business decisions we make and an integral part of our business planning processes. Our products, services, processes and facilities are planned and operated to incorporate relevant objectives and targets that are periodically reviewed to minimize, to the extent practical, the creation of waste, pollution, and any adverse impact on employee health, safety or the environment. Protection of health, safety and the environment is a company-wide responsibility of employees at all levels.

## Privacy

The trust and confidence of our customers are important to Ford Motor Company and essential to building long-term relationships and delivering excellent products and personalized services. The company recognizes that customers, employees and others have concerns about privacy and expect us to protect and handle personal information responsibly.

Ford is committed to implementing responsible privacy and data-handling practices.

The company's Policy Letters and related Directives are designed to ensure the continuing trust and confidence of individuals who entrust us with personal information.

## Social Media Interactions

We encourage responsible employee participation in social media – such as Facebook, Twitter and Flickr, as well as blogs and other web-based discussion forums – and have developed a set of digital participation guidelines for our employees. A [version of the guidelines](#) is available publicly. We also use online training to educate our nonmanufacturing work force about the use of social media and the need to communicate honestly and respectfully in connection with our business.

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## Working Conditions in Ford Plants

Ford's Policy 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility applies to our own facilities as well as those of our joint venture partners and suppliers. Since 2004 we have conducted formal assessments of Ford and joint venture facilities globally. During 2011, we revised Policy Letter 24 and did not conduct any assessments. In 2012, we conducted three assessments, and in 2013, we conducted five.

Sites are selected for assessment by Ford's Sustainability and Vehicle Environmental Matters (SVEM), Global Labor Affairs, and Purchasing Supply Chain Sustainability functions based on the site's impact on our supply chain, emerging issues, and the views of thought leaders, nongovernmental organization representatives and human rights activists.

The process for assessing Ford facilities includes a questionnaire completed by facility management and a detailed review of documents related to the full range of working conditions issues (e.g., collective bargaining agreements, grievance procedure logs, employee hotline records, and health and safety audit reports).

The findings of the questionnaire and document review serve as the basis for interviews with facility management. Where procedures and/or documentation are lacking, or where we feel it would otherwise be valuable, the assessments also include facility visits.

The findings of the assessments are initially shared with human rights organizations with which Ford works and are then published within our [sustainability report website](#). We have sought the opinions of neutral third parties who have visited plants and/or reviewed the assessment process, and they have agreed that the process is robust and has integrity.

The findings of the past assessments confirmed that Ford's wholly and majority-owned facilities are operating in compliance with Policy Letter 24.

We continue to receive positive feedback from external stakeholders about the policies and systems in place at Ford facilities. While we and our stakeholders have confidence in our systems, we nonetheless believe it is important to continue conducting the assessments given that conditions can change and new issues emerge.

For information on working conditions in our supply chain, see the section on [Human Rights in the Supply Chain: Ford's Approach](#).

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## Ethical Business Practices

Our Corporate Compliance Office ensures the company has a comprehensive program to promote the company's culture of compliance and ethics within our dynamic global business. The Corporate Compliance Office is part of Ford's Office of the General Counsel and works with many other areas of the company to ensure an effective compliance program. Our compliance program is overseen by a committee of senior management and the Audit Committee of the Board of Directors.

The compliance program raises awareness of the company's commitment to ethical practices, helps define corporate guidelines to operations through Policy Letters and Directives, ensures an infrastructure that allows for the reporting of Policy violations or business-related legal violations through a number of avenues worldwide, oversees the investigation of such reports, conducts legal risk assessments, and provides training and education on key legal and ethical risk areas. The Corporate Compliance Office works with outside consultants to review different aspects of the compliance program and implements appropriate improvements. In the past two years, the company's Code of Conduct Handbook and risk assessment process have been externally reviewed. Currently, our Corporate Compliance Office is working to set up comprehensive, region-specific compliance systems in our newest region, Ford Middle East and Africa.

Our Policy Letters and Directives formally establish expectations for our employees and others working on behalf of the company, and our Code of Conduct Handbook is the fundamental tool for communicating these expectations. The Code of Conduct Handbook, our chief ethical guidance document, is a compilation of the most important and relevant Policy Letters, Directives and standards for Ford personnel. It is available in 14 languages. The online version, available to company personnel, includes active links to the original source documents, thus providing a single source for the relevant information.

The Handbook outlines requirements for our employees and those working on behalf of the company and provides background resources for a wide range of business-related situations, including:

- The workplace environment
- Gifts, favors and conflicts of interest
- Use of company assets and data safeguarding
- Integrity of financial records
- Product quality, safety and environmental matters
- Intellectual property
- Working with governments (political activities)
- Competition and antitrust laws
- International business practices

All non-manufacturing employees and most contract personnel around the world are required to certify that they have reviewed the Handbook.

## Training

To reinforce information contained in the Code of Conduct Handbook, we introduce new mandatory online training courses on a regular basis for our global nonmanufacturing employees and other targeted personnel. The courses focus on ethics, conflicts of interest, gifts and favors – topics on which we have long provided employee training – as well as touching on additional issues that have global applicability, such as bribery. Recent courses have also covered the topic of protecting personal and company information. A new Code of Conduct online

training course was introduced in December 2012. As of April 8, 2014, nearly than 95,000 individuals, or approximately 91 percent of those invited, had completed the course.

## Reporting Violations

Another component of our compliance program is an infrastructure that encourages and allows for the reporting of any potential violations of our Policy Letters and Directives, and any violations of laws related to the business. Our nonmanufacturing work force and contract personnel are regularly reminded of their responsibility to report any known or suspected violation of the law or company policies. There are many ways for individuals to report such violations, including direct communications to a member of one of the control groups – such as the General Auditors' Office, Human Resources, or the Office of the General Counsel – as well as telephone tip lines and email. All of our plants have posters describing how our manufacturing work force can centrally report. In addition, non-manufacturing employees must either report potential conflicts of interest, or attest (annually) that they do not have any conflicts of interest to report.

We assess compliance with our ethical standards through regular legal audits that cover a range of topics relating to legal requirements and internal policies.

## Anti-Bribery/Anti-Corruption

Part of Ford's philosophy as a company is to manufacture products close to where our consumers are located. We have 65 plants worldwide, and all of the countries in which these plants are located have their own business-related laws, with varying levels of enforcement and differing cultural norms. It's essential to us that we conduct our business according to the highest ethical standards in every location in which we operate, and that we not acquiesce to local norms where those norms do not meet our high standards. We have clear policies in place relating to bribery and corruption, as well as procedures for reporting any breaches of those policies.

In 2012, we strengthened the anti-bribery/anti-corruption portions of our Global Terms and Conditions for non-production suppliers. In 2013, we expanded those same stronger provisions to the Global Terms and Conditions for production suppliers. Furthermore, we worked with one of our joint ventures in Asia to enhance their anti-bribery policies. In 2012 and 2013, we had portions of our anti-bribery program tested at several global locations, to be sure our anti-bribery program is effective in each area of the globe. We also continued to train key individuals throughout the company – those who may encounter bribery or corruption issues in the course of their work – in how to recognize and avoid problems.



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## Reporting and Transparency

External reporting is a fundamental element of accountability.

Sustainability reporting not only demonstrates transparency but, in our view, is the basis of organizational learning, demonstrates our values, and both reflects and drives outstanding economic, environmental and social performance. The following are central elements of our reporting strategy.

## Materiality

Over the last several years, Ford has sought to increase the materiality and responsiveness of our reporting to stakeholders. A key part of our reporting strategy has been a materiality analysis, which has been a critical tool in helping shape the content of this report. The analysis is updated every other year, most recently in early 2013. We use the analysis to focus our reporting on those issues determined to be most material to the company over a three- to 10-year time horizon. This report discusses in detail the issues identified as most material, while also covering other sustainability issues of importance to Ford and our stakeholders.

## Assurance

Please see the [Assurance](#) section for discussion of our approach to third-party review of this report and data assurance.

## External Guidelines

This report is aligned with the Global Reporting Initiative (GRI) G3 Guidelines at the [self-declared A application level](#). Ford has supported and participated in the development of the GRI Guidelines since their inception.

This report also serves to disclose how we are implementing the United Nations Global Compact (UNGC). An index cross-referencing UNGC and relevant sections of this report can be found on the [UNGC Index](#) page.

## Targeted Reporting

Linked with our efforts to increase the materiality of our reporting, Ford has also continued to take steps to produce more targeted audience-, location- and subject-specific sustainability communications. For example, we produce an eight-page [executive summary](#), to share at events (such as ride-and-drives) for those who want a brief overview of our efforts and progress. And, beginning with our 2011/12 Sustainability Report, we increased our coverage of regional issues with [regional reports](#) for Asia Pacific Africa, Europe and South America.

## Benchmarking and External Feedback

Ford seeks formal and informal feedback on our Sustainability Report from a number of organizations with expertise in reporting, in addition to the Ceres Stakeholder Review Committee. Other feedback we received can be found in [Downloads](#).

Over the years, our Sustainability Reporting has been recognized for its quality. Ford's 2009/10 Sustainability Report was a finalist in the 2010 Ceres/Association of Chartered Certified Accountants (ACCA) North American Sustainability Reporting Awards. Our 2008/9 report took second place in this award in 2009, and our 2007/8 report was the co-winner in 2008. Our 2004/5 report placed in the top five. Ceres suspended the awards program in 2012.

As noted on the [Governance landing page](#), in 2013 an independent survey published by KPMG ranked Ford among the 10 leading global companies for corporate responsibility reporting.



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## Sustainability Governance and Integration

At Ford, our goal is to fully integrate sustainability issues into our core business structures and processes, rather than manage them separately. As we build capacity in this area and move toward that goal, however, we recognize that it is also important to establish some sustainability-specific structures and processes.

### Structures for Managing Sustainability

The following are the primary structures we use to manage and embed accountability for sustainability within Ford.

- **Board-Level and Executive-Level Responsibility:** Ford's governance of sustainability issues build on a strong foundation of Board of Director and senior management accountability for the company's environmental, social and economic performance. At the board level, the Sustainability Committee has primary responsibility for reviewing strategic sustainability issues, though some of those issues are also addressed in other committees and by the board as a whole. Within management, the vice president of Sustainability, Environment and Safety Engineering has primary responsibility for sustainability issues and oversees the Sustainability & Vehicle Environmental Matters group, the Environmental Quality Office, the Vehicle Homologation & Compliance group and the Automotive Safety Office.
- **Dedicated Sustainability Function:** Ford's Sustainability & Vehicle Environmental Matters organization coordinates corporate-wide sustainability strategy and activities, including leading the company's corporate-level sustainability reporting and stakeholder engagement and integrating sustainability throughout the company. In 2013, this organization took steps to build a network of individuals from across the company – in a broad array of functions – who have sustainability-related responsibilities. Participants in this network will share information about best practices, policies, metrics, targets and other sustainability issues.
- **Integration into Core Functions:** Numerous functions within the company have responsibility for some or multiple aspects of sustainability. For example, the Workplace Health and Safety Office, the Environmental Quality Office and the Human Resources Department each manage specific issues that fall under the umbrella of sustainability. Also, Product Development is taking the lead on the company's sustainable mobility efforts; Global Purchasing is addressing supply chain sustainability issues such as conflict minerals, water and human rights; and Ford Land and Manufacturing & Labor Affairs personnel are implementing energy-efficiency and water-reduction efforts in our buildings and plant facilities. Our Marketing function is involved via the "Go Green" Dealership Sustainability Program; our Information Technology group is implementing a PC power management program to help us decrease energy consumption; and our Communications department helped us transition to the use of office paper with post-consumer recycled content.
- **Issue-Specific Structures:** Ford has also developed structures to address specific global sustainability issues facing the company. For example, we have established a Sustainable Mobility Governance Forum – a senior-level team led by the vice president of Sustainability, Environment and Safety Engineering – responsible for defining our climate change strategy and delivering our sustainability strategy in the marketplace. The group's strategic direction is provided by a senior executive forum, including vice president and executive stakeholders, which guides the development of the vision, policy and business goals.

### Key Processes for Integrating Sustainability

We believe that integrating sustainability considerations into our existing systems and processes – rather than creating new systems and processes – is the most

effective way to embed sustainability into our business. The following are some examples of how we are doing this.

- **Business Plan Development and Compensation:** We continue to align elements of performance and compensation to support our One Ford plan. As part of the annual business planning process, Ford's business units develop scorecards to track their performance. Metrics from these scorecards are part of the performance assessment of managers at various levels of the company and affect their compensation. Executive compensation is affected by the company's performance in a range of areas, including sustainability. Compensation is awarded based on two basic processes. First is the achievement of individual goals and performance evaluation. Significant elements of an individual's evaluation are based on achievement of performance targets – some with significant sustainability implications, depending on the individual's role. Second, depending on individual performance, employees may be awarded bonuses and other compensation based on company-wide performance against annually established targets. Sustainability targets are integral to company-wide achievements and translate primarily into product and financial performance metrics.
- **Corporate Policy Letters and Directives:** Ford maintains a comprehensive set of [Policy Letters, Directives](#) and other corporate standards that govern all company activities. Several of these relate to aspects of sustainability, including, for example, Policy Letter 24: the Code of Human Rights, Basic Working Conditions and Corporate Responsibility.
- **Management Systems:** Ford uses a variety of systems and processes to manage the different aspects of our business, several of which govern or incorporate sustainability issues. For example, all Ford manufacturing facilities and our Product Development function are certified to ISO 14001, the leading global system standard for managing environmental issues. We also require our preferred "Q1" suppliers of production parts to certify their facilities to ISO 14001. In another example, Ford's Purchasing function has integrated assessments of working conditions into its broader process for evaluating suppliers on issues such as quality, cost and delivery (see our [Supply Chain](#) section for more).



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## Sustainability Management

This section describes our systems for managing sustainability within two of our major business functions – Product Development and Manufacturing – and on the key sustainability issues of environmental and climate change management. (Our systems for supply chain management are discussed in the [Supply Chain](#) section.)

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## Product Development

The development of our new products starts with an understanding of the consumer: who they are, how they live and what they want in a vehicle. Next comes the identification of advanced technologies and breakthrough ideas by our Research Labs and our Advanced Product Strategy, Advanced Marketing and Advanced Design groups. These and other groups work within an annual planning process to assess the latest developments in technologies and consumer trends to identify the best new technologies and anticipate the needs and desires of the marketplace. Our product cycle plan defines timing for new or updated vehicles and the associated technology applications. Product development engineers, designers and product marketing teams work together to finalize a vehicle concept. Once the business case is approved, our vehicle programs are brought to market using our Global Product Development System, or GPDS.

The GPDS, launched in 2005, merges the best product-creation methods from all of Ford Motor company's global operations and is refreshed continually with the latest lessons learned as we develop new products. The GPDS provides a common set of milestones and metrics for the development of all vehicle programs across our regional business groups, which increases efficiency and quality.

As a part of this system, and as part of our One Ford global integration process, we require all vehicles to meet specific competitive and performance targets at every milestone along the product's development path. These targets consider a wide range of environmental performance criteria, such as fuel economy, recycled materials and substances of concern. For example, our product carbon dioxide emission-reduction goal, coupled with a commitment to improve fuel economy, has been translated into fuel economy targets for each new vehicle. We develop these competitive vehicle attribute targets for every vehicle program, to deliver on key customer demands and Ford strategies, by using a range of consumer data, internal brand data and competitor vehicle data. Based on this process, we have committed that for each of our new or significantly refreshed vehicles, we will continue to offer a powertrain with leading fuel economy. We are following through on this commitment with vehicles introduced in both the U.S. and Europe, and we will continue to do so in future product launches.

In addition, we have identified global leaders and attribute teams within Ford who coordinate the development of the global product attribute targets in key areas such as sustainable materials, recycling, materials of concern, vehicle interior air quality and vehicle life cycle issues. These leaders coordinate the global implementation of our corporate sustainability strategies and support our One Ford strategy to harmonize product development across regions.

We use a Design for Sustainability (DfS) approach to maximize the environmental, social and economic performance of our vehicles early on in the product conception and development process. Our Product Sustainability Index is our primary tool for incorporating DfS principles into our vehicles. For more information on this process please see [Applying Life Cycle Analysis](#).



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## Manufacturing

The Ford Production System (FPS) is a continuously improving, lean, flexible and disciplined common global production system that encompasses a set of principles and processes to drive a lean manufacturing environment. Key elements of the system include effective work groups, zero waste/zero defects, aligning global capacity with global market demand, optimizing production throughput, and using total cost to drive performance.

Each principle has a set of guidelines, or "measurables," that help us to meet or exceed objectives. The measurables are deployed and tracked for every manufacturing location using the SQDCPME Scorecard, which keeps focus on the vital components of a sustainable business: Safety, Quality, Delivery, Cost, People, Maintenance and Environment.

Many processes have been put into place to support the FPS and the Scorecard, including SQDCPME metrics, internal process confirmations and FPS Best Practices. The Scorecard is reviewed regularly by management, and progress against SQDCPME targets is a factor in the performance reviews of all managers in the manufacturing chain of command, from site-level managers to Ford's CEO. Each Manufacturing employee has an annual performance review that is based on objectives that are derived from the Scorecard. Manufacturing's Scorecard objectives are cascaded through each organization down to the plant floor-level employee at the beginning of each year, to create alignment on objectives and measures of performance throughout the Manufacturing organization.

Manufacturing is integrated with Product Development in the Global Product Development System (GPDS). Beginning early in a program, the GPDS includes deliverables for Manufacturing that drive a consistent and reliable process through the implementation of such requirements as efficient die construction practices, standard and current bill of process, manufacturing design specifications, modularity and complexity. The standard bill of process allows us to confirm that our operations include all of our global best practices, as well as effective failure mode avoidance and successful process quality control. Manufacturing Engineering utilizes computer-aided, or "virtual," design for manufacturing, which is aligned with the GPDS milestones, to improve the efficiency and quality of vehicle assembly.

Manufacturing works within the Global Quality Operating System (QOS) to develop, measure and continuously improve robust processes. This work starts early in the product development cycle to ensure that our manufacturing facilities are able to achieve the metrics outlined on the Scorecard. By following the disciplined processes and deliverables of the GPDS, the FPS and the QOS, we are able to continue defect prevention and reduce "things gone wrong" and warranty spending using global design rules and the manufacturing standard bill of process.

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## Environmental Management

Ford has an environmental Policy and environmental Directives that apply to our operations globally (see our [Code of Conduct Handbook](#)). All Ford manufacturing facilities and product development functions are certified to ISO 14001, the leading global standard for managing environmental issues. In addition, we require our preferred "Q1" suppliers of production parts to certify their facilities. These commitments place our most significant potential environmental impacts under one comprehensive environmental management system.

Our manufacturing management team translates our comprehensive [global environmental targets](#) into annual regional- and facility-level targets, which differ depending on the relevant regulations and financial and production constraints in each region. We develop our targets through a comprehensive process that considers past performance, future regulation trends, environmental technology advances, financial conditions and other relevant factors. Progress against these targets is reviewed regularly by all levels of management.

In 2010, Ford completed the full global implementation of an Environmental Operating System (EOS). As a counterpart to our Quality Operating System, the EOS provides a standardized, streamlined approach to maintaining compliance with all legal, third-party and Ford internal requirements, including government regulations, ISO 14001 and Ford's own environmental policies and business plan objectives and targets. The EOS drives compliance responsibility to the operations level by assigning compliance-related tasks to the appropriate personnel and tracking the completion of those tasks. The system also standardizes tracking and reporting systems, which simplifies compliance, reporting and analysis at all levels of the company. This system allows us to manage an ever-increasing range of external regulations and internal performance objectives more effectively and with fewer resources. For example, the average plant has to comply with approximately 90 corporate requirements, 100 to 400 national regulations and 200 plant-specific requirements. The EOS consolidates all of these requirements into easy-to-follow tracking and reporting systems organized by recurring tasks, nonrecurring tasks and critical tasks. The EOS is fully aligned with the Ford Production System. In 2013, we implemented a complementary [Energy Management Operating System](#).

Ford has moved to a single-group ISO 14001 certification for its plants in North America. All plants and Ford Customer Service Division facilities in North America share this group certification. Likewise, all other regions (South America, Europe, and Asia Pacific Africa) share single-group certifications. Group certification saves time and money, with no degradation in plant environmental performance.

Ford continues to use the Global Emissions Manager (GEM) database, which provides a globally consistent approach for measuring and monitoring environmental data. This system helps us track our efforts to reduce water consumption, energy use, carbon dioxide emissions and the amount of waste sent to landfill. The data that GEM provides and the level of analysis it allows also helps us set more effective environmental management targets and develop more specific strategies for improving environmental performance. We are continuing to add metrics and tracking systems to GEM to further enhance our environmental management objectives.

For more on our environmental management systems, see [Facilitating and Measuring Progress](#). For more on our plant development standards, see [Green Buildings](#). And for information on our plans to develop plants in Asia, please see [Focus on Asia](#).



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## Climate Change Governance

The climate change issue is managed through governance systems at all levels of the company. The Sustainability Committee of our Board of Directors regularly reviews Ford's actions related to climate change.

Our plans for addressing climate change – whether relating to our products, facilities or policies – are highlighted and agreed to at the highest levels of Ford's executive management through the Business Plan Review process. Related emerging issues are reviewed as needed in Special Attention Review meetings. In addition, strategic product direction related to climate change goals is provided by a senior executive committee, made up of vice president and executive stakeholders, who guide the development of the vision, policy and business goals. (See [Governance and Management Structures](#).)

Related executive planning teams are responsible for developing detailed and specific policy, product and technical analyses to meet objectives. These teams base their plans on scientific data and promote actions that will help achieve the company's environmental ambitions, recognizing the need to use a holistic approach to effectively protect the environment. Metrics have been established and are reviewed regularly to ensure satisfactory progress. We have also developed strategic principles to guide our approach. See the [Climate Change](#) section for more information on how we are managing this critical issue.

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## Public Policy

Every day, government officials around the world make decisions that impact Ford. As a global automotive company, it is important that we have a voice in policies that affect our business in the countries in which we operate, and that Ford be recognized as a credible, leading source of information as those policies are formulated. Across a range of issues – including manufacturing, climate change, energy security, human rights, trade, tax policies, education and vehicle safety, among others – we strive to be part of the solution by supporting policies that are economically, environmentally and socially sustainable for Ford and for the world. Informed policy makes for better policy, whether at the international, national, regional, state or local level. The Ford policies discussed in this section are outlined in our [Code of Conduct Handbook](#), which applies to Ford globally.

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## Participation in the Policy-Making Process

Ford seeks to be an active participant in the political process in a manner that is transparent and supports our business interests. On issues of highest priority for us, we stay in regular contact with legislators and regulatory officials in our major markets, to share with them our interests and perspectives and offer expert input into the policy-making process. Our Government Affairs office oversees these lobbying activities.

### Membership in Coalitions and Associations

Ford belongs to a broad range of partnerships and coalitions, as well as industry and trade associations (such as the Alliance of Automobile Manufacturers), that lobby in the legislative and regulatory realms on behalf of their members. Working with others in these types of organizations enables Ford to better leverage our resources on issues of importance to us, and to develop and promote policies that have potentially far-reaching benefits for industry and society.

Of course, we do not always agree with every position taken by these organizations. In cases where we don't agree, we have to determine if, on balance, we agree with enough of the organization's positions that we should continue to engage with them. And, we always reserve the right to speak with our own voice and make our own positions clear, even when they may not align with the positions of associations to which we belong.

### Ford Policy on Political Contributions

Ford Motor Company does not make contributions to political candidates or political organizations as a matter of policy, but may do so in limited cases in some non-U.S. countries where it has operations. Company resources are not employed for the purpose of helping elect candidates to public office, even when permitted by law. Nor do we take positions for partisan political purposes – that is, specifically for the purpose of advancing the interest of a political party or candidate for public office. These policies remain unchanged, notwithstanding the U.S. Supreme Court's January 2010 decision that loosened restrictions on corporate independent expenditures.

With proper executive approval, Ford may contribute to support or oppose a U.S. state or local ballot proposal, if such contributions are permitted by law and if the issue is of significant interest or importance to the company. Information with respect to contributions made in connection with ballot questions and referenda is publicly available through the appropriate local or state reporting authorities.

We do encourage employees to participate in political and governmental affairs, and recognize that company efforts and programs to encourage employee participation must fully respect the right of employees to use personal time as they choose, and decide the extent and direction of their political activities. The Ford Motor Company Civic Action Fund (the "Ford PAC"), which is supported by voluntary donations from Ford employees, gives campaign contributions to national, state and local political candidates from both major political parties in the U.S. The company pays the solicitation and administrative expenses of the Ford PAC, which are minimal, as permitted by law.

All contributions made to the Ford PAC and all distributions from the Ford PAC are in compliance with Federal Election Commission (FEC) and applicable state regulations. A list of the Ford PAC's contributions made during 2013 can be found at the [FEC website](#).

Decisions about political contributions by the Ford PAC are made by Ford's Governmental Affairs office, in accordance with business objectives that support our competitiveness in the global automotive industry. Ford PAC contributions are used to support issues directly related to manufacturing and Ford business objectives. All

Ford PAC candidate contributions in excess of \$3,000 must be approved by the Ford PAC Political Contributions Committee, an eight-member, cross-functional group of Ford employees representing a range of organizational levels.

Ford complies fully with all laws and rules governing our employees' interactions with officials at all levels of government (federal, state and local). Furthermore, all of our contact and dealings with government officials must not only comply with all applicable laws, but also with our global corporate Policies and Code of Conduct. Note that under federal law, foreign nationals are prohibited from making contributions in connection with any U.S. election and are thus not eligible to join the Ford PAC.

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## Public Policy Positions

This section summarizes Ford's positions on key public policy issues currently under discussion in the U.S. Two important topics are not addressed here: Climate change policy is discussed in the [Climate Change Policy and Partnerships](#) section, and policy regarding sustainable raw materials is discussed in the [Sustainable Raw Materials](#) section.

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### Non-CO<sub>2</sub> Tailpipe Emissions

In the U.S., the Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) regulate smog-forming tailpipe emissions, including hydrocarbons, nitrogen oxides, carbon monoxide and particulate matter. California finalized Low Emission Vehicle III Standards in 2012, and the EPA issued Tier 3 emissions and fuels standards in early 2014.

We will continue to work with the agencies through their regulatory processes to help develop rules that are both effective and feasible. In setting tailpipe emission regulations, consideration of other vehicle rules such as fuel economy and greenhouse gas standards and safety standards must be taken into account to ensure that the total package of requirements is workable.

Ford continues to oppose technology mandates that seek to impose quotas or limits on the production or sale of vehicles with specified powertrain technologies. Regulatory efforts to dictate market outcomes, or to pick technology "winners" and "losers," have never produced a successful outcome. Manufacturers need the flexibility to build the kinds of vehicles that the marketplace demands based on consumer preferences and other external factors. Emissions standards should be performance-based and should be designed to enable manufacturers to introduce vehicles with an array of different, affordable technologies.

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### Undesirable Chemicals

The European Union's REACH program (Registration, Evaluation, Authorization and restriction of Chemical substances) regulates and seeks to phase out chemicals of concern. More and more countries have adopted similar regulations, including Turkey, Romania, China, Japan, Taiwan, South Korea and Canada.

In the U.S., the Senate and House have both proposed bills since 2010 to overhaul the Toxic Substances Control Act, which was first enacted in 1976, but to date none have passed. The state of California passed a "safer consumer products" law (the Green Chemistry Initiative), which took effect in late 2013, which will require manufacturers of selected products (so called "priority products") sold in California to identify safer alternatives to a potential range of 1,200 chemicals known to be harmful to public health and the environment. The California law will also phase in a requirement that manufacturers whose priority products contain listed chemicals of

concern must conduct an “alternative assessment” and replace the chemicals of concern with safer alternatives, or explain to state regulators why the chemicals of concern are needed and warn consumers or undertake steps to mitigate the public’s exposure to those substances. Vermont has proposed a similar green chemistry law, which has not yet passed but is expected to. The California law and the Vermont bill, with their requirements of alternative assessments, go beyond REACH-like statutes, which mandate simply removing or phasing out substances of concern.

In January 2009, the United Nations implemented regulations requiring a globally harmonized system (GHS) of classification and labeling of chemicals. In the U.S., implementation of the GHS requirements starts with employee training, which must be completed by the end of 2013. By June 1, 2016, employers must be in full compliance with the revised Hazard Communication Standard (HCS), including complete training of employees on new hazards and/or revisions to workplace hazard communication programs.

We believe that regulatory requirements for the phase-out of undesirable chemicals need to be prioritized and implemented in a workable manner. Government and industry resource constraints mean that not all chemicals of concern can be addressed at once. Moreover, manufacturers and suppliers need adequate lead-time to identify replacement substances that are more environmentally friendly than the ones they replace, and also to design and engineer components that incorporate these new substances. Ford will continue to work with regulatory agencies to help develop rules that target the highest-priority chemicals first, and that drive steady progress toward the elimination of chemicals of concern in an effective and efficient manner.

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## Manufacturing Policy

Manufacturing is a critical driver of economic growth, providing jobs and tax revenue, creating new products and technologies, and promoting overall prosperity. About 70 percent of all the research and development investment in the U.S. comes from the manufacturing sector. Ford alone spends \$5 billion on research and development annually. We believe that a strong manufacturing base – with its attendant focus on engineering, science and technology innovations – is important not only for national prosperity but for energy independence, energy security and sustainability.

A variety of policy areas impact the success of U.S. manufacturing, and it is important that Ford informs U.S. policy makers shaping a climate for economic growth, regulatory certainty and a strong foundation for U.S. exports. Integrated elements of a competitive U.S. manufacturing agenda include the following:

- **Corporate tax reform:** The U.S. has the highest corporate tax rate among developed countries. A lower rate allows U.S. companies to compete on a level playing field and frees up capital that can be reinvested in new products, technologies and manufacturing innovation.
- **Regulatory efficiency and certainty:** Ford’s continued investment in the U.S. is enhanced by a stable and predictable regulatory environment for safety, fuel economy and greenhouse gas emissions that balance our shared policy goals, economic realities and consumer acceptance. A performance-based, data-driven approach to regulation is critical as we develop emerging technologies such as vehicle-to-vehicle communications and driver assist features. We need efficiency in the regulatory process that provides certainty and avoids a patchwork of state regulations that can undermine efficiency – often with no societal or environmental benefit. When multiple regulators exist, we need to work together to ensure that we ultimately develop standards that are achievable and consistent with one another so that compliance costs are minimized.
- **Trade:** Ford has supported every free trade agreement approved by the U.S., and Ford is the leading vehicle exporter in the U.S. As noted below, we support strong free trade policies – enabling market access and prohibiting currency manipulation. In addition, trade agreements also can help shape and harmonize regulations. A U.S.-E.U. trade agreement that pursues regulatory harmonization and mutual recognition of standards would enhance both regions’ competitiveness in today’s global marketplace.
- **Training and Education:** We need to continue training our work force and encourage education in math, science and engineering if the U.S. is to remain competitive and innovative. In our hourly work force, continued “up-skilling” is critical to maintaining our competitive performance. Existing federal training programs should be flexible, work closely with states, and prioritize incumbent worker training.

## Vehicle Safety

At Ford, safety is one of the key principles that inform and guide our every design and engineering effort. We are committed to continuous improvement in vehicle safety; we are also actively involved in driver education and efforts to promote safer roadways. Ford will continue working with governments and the public to help further reduce auto accident and fatality rates, which in 2012 increased from the historic lows of 2011. (Early estimates from the U.S. National Highway Traffic Safety Administration project that traffic fatalities in 2013 declined to nearly the 2011 level.)

At Ford, we take our commitment to safe driving seriously and recognize that driver distraction is an important safety issue. Extensive research shows that manually operating electronic devices, such as cell phones, that are not integrated into the vehicle can divert a driver's eyes from the road and cause drivers to take their hands off the steering wheel, increasing the risk of a crash substantially. That is why Ford pioneered the use of hands-free, voice-activated technology to help drivers keep their hands on the wheel and eyes on the road. It is also why Ford was the first automaker to support a national ban on the use of hand-held devices while driving; we also support graduated driver license programs that restrict cell phone use and text messaging by new drivers, as discussed below. We go further by educating young drivers across the country about safe driving techniques through our Driving Skills for Life program. And we try to lead by example; Ford has a corporate policy prohibiting the use of hand-held mobile devices while driving company-owned vehicles.

Ford is rapidly expanding its research on connected vehicles that can wirelessly talk to each other, when appropriate, to warn of potential dangers, to enhance safety and identify impending traffic congestion for more efficient driving. Ford participates in field tests in the U.S. and Europe to aid in the development of these next-generation vehicle-to-vehicle and vehicle-to-infrastructure communication technologies. We are also working closely with governments, standards organizations and other automakers globally to develop harmonized standards around the world to help deliver these technologies as quickly, safely and affordably as possible.

Ford strongly supports Graduated Driver Licensing (GDL) programs in the U.S. as a means of helping to reduce crashes, injuries and fatalities involving novice teen drivers. The most effective GDL programs require a minimum learner permit age of 16, an intermediate license until age 17, and at least 65 hours of supervised training, in addition to prohibiting night-time driving after 8 pm and banning all teenage passengers for intermediate drivers. All U.S. states have adopted some level of GDL requirements, though not all states have chosen to adopt all GDL elements. Ford encourages every state and the District of Columbia to adopt strong GDL programs, including information on safety belt use and the dangers of impaired and distracted driving.

See the [Vehicle Safety and Driver Assist Technologies](#) section for more on our vehicle safety technologies and activities.

## Human Rights

Ford is committed to respecting human rights everywhere we operate, because it is the right thing to do and it strengthens our business in the long run. We are a leader in addressing human rights and working conditions in the auto industry. As discussed on the [Policy Letters and Directives](#) page, our commitment to human rights is embodied in our Policy Letter 24: Code of Human Rights, Basic Working Conditions, and Corporate Responsibility.

In 2008, we joined the United Nations Global Compact, a framework for businesses committed to aligning their operations and strategies with 10 universally accepted principles in the areas of human rights, labor, the environment and anti-corruption.

And for several years, we have worked with leaders of the U.S. Department of State's human rights programs and the U.S. Department of Labor to explore how to encourage multinational companies to act as a positive force in protecting human rights in global trade, both through work in their own supply chains and through advocacy. We have also consulted with these agencies on how the U.S. government can encourage the protection of human rights through its purchasing practices.

Several states have passed local legislation to prevent human trafficking, and we are watching for a federal regulation. Ford supports the underlying goals of human rights legislation, and where appropriate, we are participating in sector-specific

initiatives and with international organizations to systematically evaluate supply chains to determine the most effective measures to combat human rights violations.

For more on our commitment to human rights, see [Human Rights in the Supply Chain](#).

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## International Trade

As a global automaker, Ford has a strong interest in issues relating to international trade. With manufacturing facilities in the Americas, Europe, and Asia Pacific Africa, sales in all key global markets and a global supply chain that moves parts worldwide, we are a strong supporter of trade liberalization. Free trade is foundational to our business model. In fact, the auto sector is the largest exporter of goods in the U.S., and Ford is the largest exporter within the sector.

Ford has supported every free trade agreement (FTA) ratified by the U.S. government since the U.S. first began free trade negotiations in the mid-1960s.

To further increase U.S. exports and support American jobs, we believe a new approach to trade is required that puts U.S. manufacturing at the forefront. Given the importance of manufacturing to the U.S. economy, Ford supports a manufacturing-driven trade strategy that:

- Drives innovation and delivers economic opportunity to its citizenry by maintaining a vibrant manufacturing sector as its cornerstone; and
- Enables U.S. manufacturing to compete on a level playing field against the best competition from around the globe.

Finally, we believe 21<sup>st</sup> century trade deals should work to remove 21<sup>st</sup> century trade barriers. The elimination of trade-distorting policies such as currency intervention and manipulation must be included in any trade initiative. Currency manipulation provides foreign automakers with an export subsidy of several thousand dollars per vehicle, while at the same time acting as the ultimate nontariff barrier, protecting their market from imports. Ford believes the market should set currency exchange rates – not governments.

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## Education

Ford understands that global competitiveness depends on the ability of our K-12 educational systems and post-secondary institutions to prepare a 21<sup>st</sup> century work force. With baby boomers beginning to retire in large numbers, and many high-skilled jobs going unfilled, improving the quality and performance of our schools has become an urgent issue facing communities large and small across the country. Within these communities, too many students are disconnected and unsuccessful in schools that struggle to be as engaging and relevant as they need to be. Add to that the considerable anxiety being generated by an economy in transition – from industrial- to knowledge-based – and education emerges as a critical factor in securing financial health and prosperity for individuals, communities and the nation.

Ford recognizes the importance of these issues and supports public policies and initiatives that are designed to mobilize educators, employers and community leaders to bring communities together to transform the entire educational system. These programs provide students with real-world learning opportunities that help them:

- Develop essential higher-order skills, such as critical thinking, problem solving, communication, innovation and creativity;
- Make connections between the academic subjects taught in the classroom and their application in the real world;
- Make meaningful connections to higher education; and
- Build more sustainable communities by involving local business and community organizations to create service-based academic projects that make learning more applicable to real-world situations and positively impact the community.

By helping communities address this most critical challenge, Ford continues its long tradition of leading and supporting educational initiatives that empower students, strengthen communities and benefit the economy. See the [Investing in Communities](#) section for more information on the programs we support.

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## Electrification

As advanced technology vehicles – such as hybrids, plug-in hybrids and all-electric vehicles – emerge onto our highways and roads, manufacturers must work together, and with governments as appropriate, to set standards for certain technical aspects of these new vehicles, to enable the market for them to proceed forward smoothly.

Consider, for example, when we go to a gas station, we take for granted that the pump nozzle is a size that will work with our vehicle. Early on, a standard size and configuration had to be developed and agreed to across all automobile and gasoline pump manufacturers, so that drivers could have a hassle-free experience when they went to fill up. As demand for and availability of plug-in electric vehicles continues to rise, it is similarly important that consistent standards be put in place regarding the technical aspects of these vehicles.

In North America, the Society of Automotive Engineers (SAE), with Ford's participation, successfully aligned all original equipment manufacturers (OEMs) on a standard charge connector and communication protocol that enables all plug-in vehicles to use common charge points. This allows all public charge stations to be compatible with all vehicle manufacturers' products. For Ford, it enables our plug-in vehicles to charge a fully depleted battery in 2.5 to 3.5 hours. The same approach is under consideration in Europe and China. For faster charging, the SAE (again with Ford's participation) also approved a standard plug and interface to enable future equipped vehicles to charge their battery in 20 minutes or less. In Europe, the standards organizations adopted this same "fast-charge" framework, called the DC Combo System. Ford continues to participate in standards work to harmonize wireless charging globally.

Ford is also working with other OEMs and suppliers to provide a common database of charge point locations for display within vehicles' navigation systems. And, we and the industry are working collaboratively with the Obama administration and the U.S. Congress to address the challenges associated with the deployment and commercialization of electric-drive vehicles and infrastructure. In 2013 we signed onto the U.S. Department of Energy's pledge to increase vehicle charging infrastructure available in workplaces across the country in January 2013. As part of this program we are installing 200 electric vehicle charging stations at Ford facilities in the U.S. and Canada in 2014.

We have also taken a standards approach in the design of the Ford-branded charge stations from Leviton or AeroVironment. These charge stations not only meet the standards referenced above, but work with all of our plug-in products (i.e., plug-in electric vehicles and battery electric vehicles) and can be used in indoor, outdoor, residential and commercial use throughout U.S. and Canada. In Europe, a similar relationship has been established with Schneider Electric consistent with our European deployment of electrified vehicles.

See [Electrification: A Closer Look](#) for more information about our collaborative approach to encouraging the development of electric vehicles.

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## SUSTAINABILITY REPORT 2013/14



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Ford Around the World

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Engaging with These Stakeholders

## Stakeholder Engagement

We have sustained, interdependent relationships with several distinct categories of stakeholders: employees, customers, dealers, suppliers, investors and communities. Also important is our relationship to "society," which includes government agencies, nongovernmental organizations (NGOs) and academia. We identified these categories of stakeholders through internal analysis and discussion during the early phases of developing our sustainability programs. This section describes who our primary stakeholders are and how we engage with them. See the [People](#) section for further discussion of our stakeholders.



## Employees

As of year-end 2013, we employed approximately 181,000 individuals and had 65 plants around the world. (Included in the number of plants are those of our consolidated joint ventures.) Substantially all of the hourly employees in our Automotive operations in the U.S. are represented by unions and covered by collective bargaining agreements. Most hourly employees and many nonmanagement salaried employees of our subsidiaries outside the U.S. are also represented by unions. These unions are key partners with Ford in providing a safe, productive and respectful workplace.

Ford faces workplace health and safety challenges similar to those of many multinational manufacturing companies. These challenges include, for example, establishing and reinforcing high, common expectations for the safety of our employees worldwide. Most of our manufacturing facilities have joint union/management safety committees that guide the development and implementation of safety programs in their operations.

**181,000**

Employees



## Customers

Ford's customers make us who we are. In 2013, we sold more than 6.3 million vehicles to our customers worldwide.

**6.3 Million**

We serve three primary types of customers: individual retail consumers, small business customers and large commercial fleet customers. We will continue to expand our products and services for these existing customers while working simultaneously to gain new customers in emerging markets.

## Vehicles

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### Dealers

Our dealers are the face of Ford to our customers and communities. They are key employers and contributors to local economies. Ford and Lincoln dealers in the U.S. alone employed 170,000 individuals at the end of 2013, with an annual payroll of more than \$7 billion. Worldwide, we had 11,772 Ford and Lincoln dealerships at the end of 2013.

**11,772**

Dealers

---

### Suppliers

Suppliers are an integral part of our business, and our success is interdependent with theirs. We rely on 1,100+ global production suppliers to provide many of the parts that are assembled into Ford vehicles. Another 11,000+ supplier companies provide a wide range of nonproduction goods and services, from industrial materials to computers to advertising.

Our supply base is increasingly global. We are expanding production in several regions to serve the sales growth that is expected to occur in emerging markets. We are also expanding our sourcing in these lower-cost emerging markets, as a way to serve both local markets and the global supply chain. These changes, and our efforts to ensure good working conditions in our supply chain, are discussed in detail in the [Supply Chain](#) section of this report.

Over

**\$100 Billion**

Annual Buy

---

### Investors

Our success as a company directly affects our approximately 144,000 investors, and we have been focused on improving Ford's financial health. More information on our investors is available in the [Financial Health](#) section of this report.

We continue to maintain open communication with the investment community. We regularly host conference calls and participate in key automotive conferences during the year. During 2013, Bob Shanks, Ford's chief financial officer, held a special briefing for investors and the media to discuss details of the 2012/13 Sustainability Report and answer questions. In addition, our [Investor Relations website](#) is a good source of information for investors. It contains various company reports, a schedule of events and investment information.

**143,770**

Stockholders

---

### Communities

Our company impacts the communities in which we operate in numerous ways, from the employment we provide and the taxes we pay, to the environmental and safety performance of our operations, to the ways in which we support and participate in civic life. Responsibly managing these impacts is not just about being a good neighbor; it is fundamental to the success of our business.

**65**

Plants Worldwide

---

The communities in which we operate are composed of a diverse range of individuals and groups. They include our customers, our employees, our business partners and their employees, government regulators, members of civil society and community organizations, and those individuals who live and work around our facilities, among others. Developing and maintaining positive relationships with these varied groups is an important factor in our reputation and operational efficiency.

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&gt; Engaging with These Stakeholders

## Engaging with These Stakeholders

Stakeholder engagement takes place in countless formal and informal ways every day across our company, from meetings with local community groups to market research with customers to gatherings of Ford dealers and suppliers.

At the corporate level, we use a variety of mechanisms to engage with stakeholders on sustainability issues to help us better understand the broader societal issues that our company addresses. Some of these mechanisms are informal and ad hoc. In fact, simply picking up the telephone to discuss an issue with any of the numerous sustainability-related organizations or individuals with whom Ford has a relationship is a part of our standard protocol.

Indeed, the very process of engaging with stakeholders on our Sustainability Report has led to expanded and enhanced information in the report in a number of areas, including our positions on key public policy and other issues.

Some of our more formal engagement mechanisms include the following:

- **The creation of forums to gather stakeholder input on our activities, challenges and performance.** We work with stakeholder committees to help shape and provide feedback on our Sustainability Reports. For example, working with a [Ceres Stakeholder Committee](#) is one of the important ways we get input from stakeholders – including environmental groups, engaged shareholder groups and investors – to inform and shape our reporting approach and our materiality analysis. We have also organized meetings with individuals and groups of stakeholders to solicit input on the key sustainability challenges and opportunities facing Ford. These and other engagements have provided valuable feedback on our sustainability strategy.
- **Outreach on emerging and ongoing issues of particular importance to Ford or our stakeholders.** We believe we have taken a thoughtful approach to our stakeholders as we work through challenging issues. On the increasingly important issue of water availability, for example, we held a ["water futuring" workshop](#) in 2013 with approximately 40 of our employees and outside stakeholders, to examine scenarios about water in the years ahead. Stakeholder input has also been critical to the development and testing of our approach to [human rights](#) and [carbon dioxide reductions](#), among other issues.
- **Engagement with local stakeholders in the communities in which we operate as part of our Code of Human Rights, Basic Working Conditions and Corporate Responsibility assessment process.** Read more about our community engagement in our [Communities](#) section.
- **Consultation with organizations that have implemented campaigns targeting Ford.** We are not currently being targeted by organizations implementing campaigns. However, in the past we have benefited from the alternative perspectives presented during these consultations.
- **Engagement with rating and ranking organizations in the investment community.** This has provided insight into external perspectives on some important issues and our relative performance in addressing them.
- **Offering new product test-drive opportunities and advanced product reveals to our employees, who, in turn, communicate about our vehicles to their friends and families.** Read more about our employee engagement efforts in the [People](#) section.

Stakeholder	Communications Forums
-------------	-----------------------

## Communities/Society

65 plants worldwide\*

## Communications Forums

- Community Relations Committees
- Interactions with governments
- Membership in associations
- Dialogues with nongovernmental organizations

\*Includes our Genk Assembly Plant, which will close at the end of 2014; does not include two plants in the U.K. that closed during 2013.

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## Investors

143,770 stockholders\*

\*Common stockholders as of February 7, 2014.

- Investment community forums
  - Quarterly earnings communications
  - Annual shareholders' meeting
  - Annual report
  - Proxy statement
  - SEC filings (e.g., 10-K, 10-Q, 8-K)
- 

## Customers

6.3 million vehicles

- Consumer Insight process
  - Customer care programs
  - Dealer interactions
- 

## Suppliers

- 1,100+ production suppliers
- 11,000+ nonproduction suppliers
- Over \$100 billion annual buy

- Top supplier meetings
  - Aligned Business Framework supplier dialogue sessions
  - Supplier quality roundtables
  - Supplier Diversity Development Networking
  - External supplier organizations, such as the Automotive Industry Action Group and the Original Equipment Suppliers Association
- 

## Dealers\*

- Ford: 10,707
- Ford-Lincoln (combined): 880
- Lincoln: 185
- Total: 11,772

\*Worldwide dealerships, as of December 31, 2013.

- Intranet communications
  - Brand sales and service representatives
  - Brand Dealer Councils
  - Dealer roundtables
  - President's Circle
  - Salute to Dealers
  - Advertising and public service announcements
- 

## Employees

Approximately 181,000 employees\*

\*As of December 31, 2013

- Town hall meetings
  - Labor/management committees
  - Pulse survey
  - Union representation
  - Intranet surveys and chats
  - Executive Diversity Council
  - Local Diversity Councils
  - Employee Resource Groups
-



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Focus on Asia

Ford Motor Credit Company

▼ Mobility Solutions

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Case Study: The Future of  
Pickup Trucks

Voice: Larry Fink



## Financial Health

As our financial security strengthens, we are investing in our products, our people and our communities. The financial health of our company has a ripple effect that goes well beyond our business itself as we work toward profitable growth for all.

Read more about [OUR APPROACH TO FINANCIAL HEALTH](#)



## A TECHNOLOGY COMPANY

Our cars, utilities and trucks are more technologically connected than ever. Everything we do is based on technological innovation – whether it is quality, fuel efficiency, safety, smart design or value – the hallmarks of our One Ford plan.

Read more about [PRODUCT COMPETITIVENESS](#)

## OUR PERFORMANCE PROGRESS



In 2014, we will launch 23 new or significantly refreshed vehicles to customers around the world – the



We reported 2013 full-year pre-tax profit of \$8.6 billion<sup>1</sup> (excluding special items), driven by the highest

most in a single year in more than a century.

Automotive pre-tax profit in more than a decade and continued solid profit from Ford Credit.

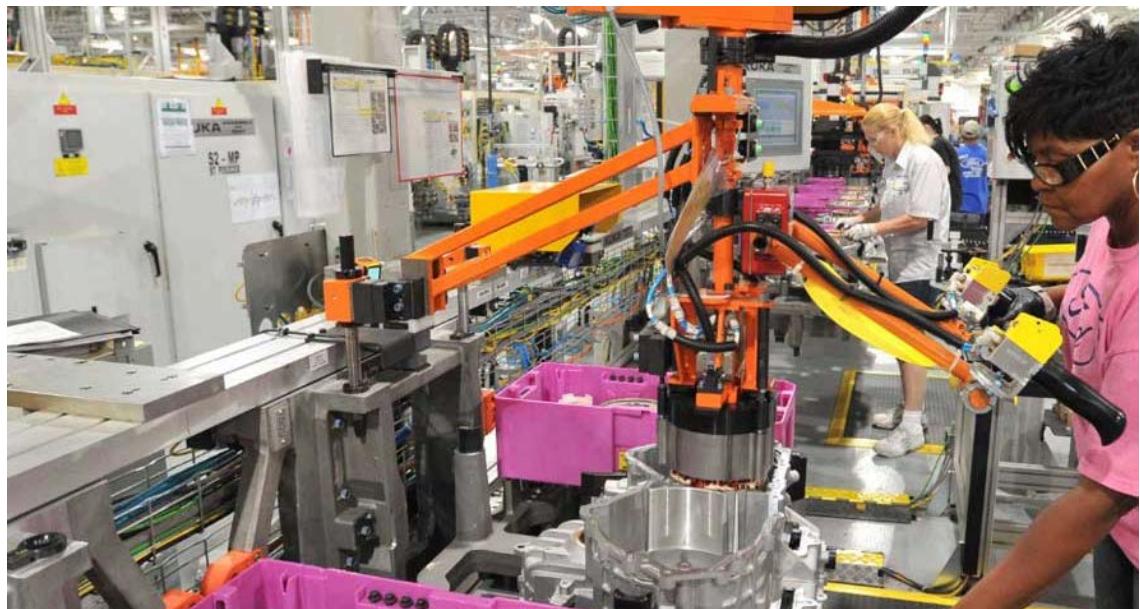


To support our aggressive growth strategy and meet demand for our vehicles, we are adding jobs in several key regions – 11,000 in the U.S. and Asia combined in 2014 – and building new facilities.



We increased market share in the world's two largest automotive markets – China and the U.S. – as well as in South America. We improved our retail car share in Europe, a region with challenges but where we believe we are on track to return to profitability in 2015.

See more at [FORD'S GOALS, COMMITMENTS AND STATUS](#)



## OUR MANUFACTURING CAPABILITIES

We are rapidly expanding our advanced manufacturing capabilities and boosting global production to meet consumer demand. By 2017, we will increase our global flexible manufacturing to produce, on average, four different models at each plant around the world, allowing for greater adaptability based on varying customer demand.

Read more about [OUR PLANT INVESTMENTS](#)



### Case Study: [REMAKING THE F-150](#)

When it came time to update the F-150, one of Ford's most important products, we faced a pivotal question: How do you improve on such a successful vehicle? Do you change it incrementally or take a leap forward? We chose the leap forward approach, reinventing the 2015 F-150 as the toughest, smartest



### Voice: [LARRY FINK](#)

Chairman and Chief Executive Officer, BlackRock

"Financial sustainability demands that companies be mindful of their social and environmental impact. By monitoring their own impact (and that of others), companies are better able to assess both risks and opportunities, giving their shareholders, customers

and most capable F-150 yet.

and employees a distinct advantage."



## OUR GROWTH IN ASIA PACIFIC

Today, one in every five vehicles we sell globally is in Asia Pacific. By 2020, it will be one in three. To keep pace with this enormous growth, we are building new plants and expanding existing ones, hiring workers, growing our dealer networks, and further developing our supply chain across China, India and Thailand.

Read more about [OUR GROWTH IN ASIA PACIFIC](#)



## OUR BLUEPRINT FOR MOBILITY

Our Blueprint for Mobility sets near-, mid- and long-term goals for solutions to the challenges facing mobility systems now and in the future as the world becomes more populated and urbanized.

Read more about [OUR MOBILITY WORK](#)

## 2013 HIGHLIGHTS



**6.3 million**

Ford vehicles sold around the world –  
16 vehicles every 60 seconds.



**2 millionth**

EcoBoost® produced.

1. For additional information, see Ford Motor Company's [Annual Report](#) on Form 10-K for the year ended December 31, 2013.

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Case Study: The Future of Pickup Trucks

Voice: Larry Fink

## Overview

The F-150 and the Mustang: two iconic Ford vehicles with storied legacies at our company. The descendant of our first true pickup back in 1925, the Ford F-Series (including the F-150) has been the best-selling truck in America for 37 years running. The Mustang, the original "pony car" of the 20<sup>th</sup> century and arguably the heart and soul of the Ford brand, celebrated its 50<sup>th</sup> anniversary in April 2014.

Yet even with these classics, we are revamping and adapting technologies and tools to stay ahead of customer interests, all while building in elements that make the vehicles – and indeed our own company – more sustainable. The 2015 F-150, for example, is the first pickup made with a high-strength steel frame and aluminum-alloy body, resulting in a weight reduction of up to 700 pounds. The new 2015 Mustang, which will be sold in Europe and Asia for the first time, will offer buyers the choice of a turbocharged 2.3L EcoBoost® engine, delivering more horsepower and torque with less fuel. ([Read more about the F-150 in this case study.](#))

And these are just two of many examples of innovation as we stay true to our One Ford plan, the output of which is great products, a strong business and a better world. Our One Ford plan is built on a compelling vision, a comprehensive strategy and relentless implementation. At the center of our One Ford plan is the priority to accelerate development of new products that our customers want and value.

Nowhere is that acceleration more evident than in our 2014 product launch schedule. Over the course of 12 months, we will launch 23 new or significantly refreshed vehicles to customers around the world – the most in a single year in more than a century and more than double the 11 global vehicle launches in 2013. (See graphic below.) To support our aggressive growth strategy and meet demand for our vehicles, we are adding jobs in several key regions – 11,000 in the U.S. and Asia combined in 2014 – and building new facilities. In 2014, we will open our Changan Ford Assembly Plant No. 3 and Changan Ford Transmission Plant in Chongqing, China, the Camaçari Engine Plant in Brazil, as well as the Ford Otosan Yenikoy Assembly Plant in Turkey. We are continuing with our largest manufacturing expansion in the last 50 years.

The growth in 2014 comes on the heels of one of our company's best years ever. We reported 2013 full-year pre-tax profit of \$8.6 billion<sup>1</sup> (excluding special items), driven by the highest Automotive pre-tax profit in more than a decade and continued solid profit from Ford Credit. We increased market share in the world's two largest automotive markets – China and the U.S. – as well as in South America. We improved our retail car share in Europe, a region with challenges but where we believe we are on track to return to profitability in 2015.

As our financial security strengthens, we are investing in our products, our people and our communities. The financial health of our company has a ripple effect that goes well beyond our business itself as we work toward profitable growth for all.

In 2013, our company launched 11 new or significantly refreshed vehicles globally, pushed forward on our comprehensive plan for restoring profitability in Europe, invested for further growth in Asia Pacific and continued our work on sustainable mobility.

## 2013 Snapshot: Financial Health

\$8.6 billion

full-year pre-tax profit, excluding special items

OUR BLUEPRINT FOR MOBILITY

Our Blueprint for Mobility sets near-, mid- and long-term goals for solutions to the challenges facing mobility systems now and in the future.

Case Study: [THE FUTURE OF PICKUP TRUCKS](#)

In 2013, Ford reinvented the Ford F-150, America's favorite truck. The all-new F-150 is the toughest, smartest and most capable F-150 ever – setting the standard for the future of trucks.

## 6.3 million

Ford vehicles sold around the world. That's 16 vehicles every 60 seconds



## 11

new or significantly refreshed vehicles launched globally



Nearly

## 6,500

new hourly and salaried employees in the U.S. to support new products, growth and investment



## 6,000

combined hourly and salaried jobs to be added in Asia Pacific in 2014



## 2 million<sup>th</sup>

EcoBoost® produced



### Henry Ford: 150 Years Later

On July 30, 2013, we marked the 150<sup>th</sup> anniversary of the birth of Henry Ford, whose innovative ideas revolutionized transportation and brought mobility to the masses. Many historians credit him with creating a middle class in America. His high minimum wage – revolutionary at the time – set a precedent for fair distribution of company wealth that influenced later management practices.

While he initially struggled to get Ford Motor Company on solid financial footing, Henry Ford broke through with the Model T, which debuted in October 1908. More than 15 million of those vehicles were built and sold as Ford's company put the world on wheels.

The innovative spirit of Henry Ford took root in many other forms after the success of the Model T, including the following:

- **The moving assembly line:** In 1913, Henry Ford introduced the first moving assembly line for cars. Within 18 months, the amount of time needed to build a Model T went from 12.5 man-hours to 1.5 man-hours, ushering in the modern auto industry.
- **\$5 workday:** To reduce high turnover rates among workers, Henry Ford more than doubled their pay in 1914, from \$2.34 for a nine-hour day to \$5 for an eight-hour day.
- **Vertical integration:** To improve quality, Henry Ford sought to own, operate and coordinate all the resources needed to produce complete automobiles. This principle, known as vertical integration, was put into practice in 1927 with the Model A.

His spirit of innovation continues to guide Ford Motor Company today, reflected in our lineup of vehicles, in new technologies such as Ford SYNC®, and in fuel-efficient EcoBoost® engines.

### 2014 Product Launches Compared With 2013<sup>2</sup>

All new and significantly refreshed products.



1. For additional information, see Ford Motor Company's [Annual Report](#) on Form 10-K for the year ended December 31, 2013.

2. Regions not additive to global total.



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## "Going Further"

### What does it mean to "Go Further?"

At Ford, it means pushing ourselves to deliver great products that build a strong business and a better world. Go Further is our global brand promise that exemplifies our company's culture and identifies what makes Ford unique. It's a pledge that we make to our colleagues, to our customers and to our communities.

To put this into perspective, [One Ford](#) is our road map and plan while "Go Further" is the promise behind our efforts. More than just a tagline, Go Further is also a way to express three characteristics that link back to our company's heritage: people serving people, ingenuity and attainability. At Ford, we strive to Go Further through our interactions with our customers, employees, dealers, suppliers, investors and communities.

We're also going further by making innovations, such as affordable fuel technologies, available to everyone – not just to a select few who can afford to pay premium prices.

Since we introduced Go Further in early 2012, we have embedded it into the culture of our company, allowing us to make an even deeper emotional connection with our customers and our employees while conveying our mission in a simple and effective manner.

A global brand promise makes sense for a company whose products are truly global in scope. For many decades, we acted as a collection of regional companies, with products tied to specific markets. Today, our globalized platforms, and vehicles such as the Ford Fiesta, Focus, C-MAX, Escape/Kuga and Fusion/Mondeo, have created a clear and consistent identity for Ford in the world marketplace, allowing us to speak to consumers in a single voice and communicate a single promise.

As we discuss in the [Blueprint for Sustainability](#) section, our One Ford plan, coupled with our global brand, enables us to advance our sustainability strategy while revitalizing the financial health of our company as a whole. Our sustainability strategy and our overall One Ford business strategy are fundamentally linked.

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## Our Financial Health

Our financial results tell a story of a company that is growing and improving its fiscal health. For the full year, our pre-tax operating profit of \$8.6 billion (excluding special items) was among the best in our history and Automotive operating-related cash flow hit a record, since at least 2001. These full-year results reflect an Automotive sector operating profit that was the highest in more than a decade, with record profits in North America and Asia Pacific Africa since at least 2000, about break even results in South America, and a loss in Europe – but a lower loss than the prior year. Ford Credit was solidly profitable.

In 2014, we are continuing to invest to create innovative products such as the all-new F-150 to ensure Ford has the freshest and most attractive product line-up in the industry. At the same time, we are also investing to expand our portfolio into new markets, as well as adding capacity, where appropriate, to satisfy increasing demand. As a result, 2014 will be a solid year for the company and a critical next step forward in implementing our One Ford plan to continue delivering profitable growth for all.

Meanwhile, our global product process is saving us money while enabling faster development of new vehicles and more efficient delivery of new technologies in our core markets. Significant progress has been made and continues on our commitment to consolidate platforms. In 2007, we utilized 27 different vehicle platforms. We now have 15 total platforms and are on track to meet our target of nine global core platforms. We are able to reinvest the savings of this platform consolidation back into product development, introducing more products at a faster product cadence – and better profitability.

For the fourth straight year, Ford was the best-selling brand in America. According to R. L. Polk data, the Focus was the No. 1 selling vehicle nameplate in the world in 2013, thanks to its continued strength in Europe and a rapidly expanding Asian market. And, we continued to sell the world's top-selling pickup truck – the F-Series, which has seen significant improvements in fuel efficiency. In early 2014, we unveiled the re-invented 2015 [F-150 pickup](#) with a high-strength steel frame and aluminum-alloy body.

Today, we are equally known for our competitive products in all segments of the market, including small and midsize cars as well as sport utility vehicles and our top-selling pickup trucks. For each of our new or significantly refreshed vehicles, we continue to offer a powertrain with leading fuel economy. And, we're offering customers choices of the fuel-efficient systems that work best for them – from EcoBoost®-powered gasoline vehicles to hybrids to electrified vehicles. More than 90 percent of Ford's North American lineup is available with an EcoBoost® engine.

After receiving investment grade ratings from Moody's and Fitch in 2012, we received our Ford Blue Oval back. It had been put up as collateral in 2006 to secure an \$18.5 billion credit agreement.

Four of the major credit rating agencies, including Standard & Poor's, now rate us as investment grade.

## Financial Progress

In another sign of our financial progress, and consistent with our plan to provide regular growing dividends that are sustainable over an economic or business cycle, we doubled our quarterly stock dividend in 2013 and announced an additional 25 percent increase in early 2014. We had reinstated the dividend in 2012 after suspending it in 2006. The dividend is an important component of our vision of

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profitable growth for all – customers, employees, dealers, suppliers, investors and communities.

Also as a result of our strong financial performance, in the U.S. we paid record profit-sharing payments to about 47,000 eligible U.S. hourly employees. Profit-sharing payments were approximately \$8,800 per eligible employee on a full-year basis. Individual profit-sharing payments, which were made on March 13, 2014, were higher or lower based on employee-compensated hours.

In addition, in 2013, we made \$5 billion in cash contributions to our worldwide funded pension plans, up \$1.6 billion compared with 2012. For 2014, cash contributions to funded plans are expected to be \$1.5 billion globally. This is \$3.5 billion lower than in 2013, reflecting Ford's improved funded status.

Worldwide at year-end 2013, our pension plans were underfunded by \$9 billion, about \$6 billion of which is associated with our unfunded plans. In total, this represents an improvement of nearly \$10 billion compared with the status at year-end 2012, driven primarily by higher discount rates and cash contributions.

In the U.S., our market share was up 0.5 percentage points to 15.7 percent of the industry. Our strong U.S. vehicle sales in 2013 reflected our balanced portfolio of fuel-efficient vehicles, as our passenger cars, utilities and trucks each reported gains. Cars were up 10 percent, utilities were up 9 percent and trucks expanded 13 percent. Retail sales across the country were up 14 percent, with strongest growth on the West Coast.

Market share increased slightly in South America – from 9.0 percent in 2012 to 9.3 percent in 2013 – and retail market share in Europe increased from 7.2 percent in 2012 to 8.2 percent in 2013 (based on the five major markets). For the year, Ford was the second best-selling car brand in the traditional 19 markets we tracked in Europe for the sixth consecutive year. And in Asia Pacific Africa, market share went up from 2.8 percent in 2012 to 3.5 percent in 2013 driven by growth in China.

## Adding Jobs

To support our growth and manufacturing expansion, we are hiring in North America and Asia Pacific.

In North America, we created approximately 14,000 jobs during 2012 and 2013 alone as part of our largest hiring initiative since the beginning of the new millennium. In 2013, we hired nearly 3,000 salaried employees in the U.S. – most of them technical professionals to work in product development, manufacturing, quality and information technology. We expect to hire about 6,000 employees in Asia Pacific in 2014, the vast majority of them hourly employees.

As we expand our product lineup of fuel-efficient vehicles, we need more people in critical areas, such as engineering, vehicle production, computer software and other information technology functions. To attract new team members, we are expanding our use of social media to reach new, technology-savvy workers, and we're stepping up our efforts to reach military veterans. See the [People section](#) for more on employment at Ford.

Globally, we're continuing to add new jobs in [Asia Pacific](#). However, in [Europe](#) we had to make the difficult decision to close three plants, affecting approximately 13 percent of our European work force (excluding Russia).

## Plant Investments

A critical component of our recent business strategy has been our focus on realigning production with demand. This has meant retooling some facilities as flexible manufacturing sites, allowing for multiple types of products to be built on the same line. In some cases, this has also meant retooling facilities that previously built large trucks and sport utility vehicles (SUVs) to instead manufacture smaller and/or more energy-efficient vehicles. To these ends, and in conjunction with our 2011 bargaining agreement with the UAW<sup>1</sup>, we estimate we will invest \$6.2 billion in U.S. plants by 2015.

For example, we invested \$550 million to overhaul our Michigan Assembly Plant, which formerly built two full-size SUVs. Today, it is the only manufacturing site in the world to build vehicles with five different fuel-efficient powertrains on the same line. The plant is setting a new global standard for flexible manufacturing. More than 80 percent of the tooling in the plant's body shop can be programmed to produce a variety of body styles, allowing us to quickly adjust the mix between models as customer preferences change.

We are rapidly expanding our advanced manufacturing capabilities and boosting global production to meet consumer demand. By 2017, we will increase our global flexible manufacturing to produce, on average, four different models at each plant

around the world, allowing for greater adaptability based on varying customer demand. Also in 2017, virtually all Ford vehicles will be built off nine global core platforms, boosting manufacturing efficiency while giving customers the features, fuel efficiency and technology they want.

The benefits of our platform strategy are more products, faster product introductions, and better profitability. Optimizing platform count lets us increase volume per platform, improve our engineering efficiencies, and gain efficiencies of scale for ourselves and for our suppliers.

Other recent plant investments in the U.S. include the following:

- In early 2014, we announced we are investing \$500 million to add 300 jobs and upgrade our Lima Engine Plant in Lima, Ohio, to support production of our all-new 2.7-liter EcoBoost® engine for our next-generation 2015 F-150.
- In early 2014, we announced we will add 350 new jobs and invest \$80 million at our Kentucky Truck Plant to meet demand for our F-Series Super Duty trucks. The \$80 million will pay for facility upgrades and retooling that will boost production capacity by 15 percent.
- We are investing \$150 million and adding approximately 350 new jobs at our Buffalo (New York) Stamping Plant for new subassemblies, equipment upgrades and refurbishing.
- We are investing \$359 million at Dearborn and \$1.1 billion at Kansas City for the F-150 and the all-new 2015 Transit van.
- We have committed \$168 million at Ohio Assembly for the 2016 Ford F-650/F-750 medium-duty trucks.

We're committed to growth in other parts of the world, too. To meet increasing demand in the [Asia Pacific region](#), for example, we are building six new plants – four in China and two in India.

Map: New Ford facilities between 2012 and 2015 (projected openings)



#### 2012

- 1 – CAF Chongqing #2 Assembly Plant, China
- 2 – Craiova Engine Plant, Romania
- 3 – Ford Thailand Manufacturing Plant, Thailand

#### 2013

- 1 – CAF Chongqing Engine Plant, China
- 4 – JMC Nanchang Assembly, China

#### 2014

- 5 – Camaçari Engine Plant, Brazil
- 1 – CAF Chongqing #3 Assembly Plant, China
- 1 – CAF Chongqing Transmission, China
- 6 – Ford Otosan Yenikoy Assembly Plant, Turkey

#### 2015

- 7 – Sanand Assembly Plant, India
- 7 – Sanand Engine Plant, India
- 8 – CAF Hangzhou Assembly, China
- 9 – Ford Sollers Elabuga Engine Plant, Russia
- 10 – JMC Xiaolan Engine Plant, China

1. UAW originally stood for United Auto Workers; the full name today is the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America.



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## Focus on Europe

In Europe, we are in the process of implementing our transformation plan as announced in late 2012. Our actions are designed to increase cost efficiencies, address manufacturing overcapacity, accelerate product development and introduction, and strengthen our brand.

We completed the planned closures of two manufacturing facilities in the U.K. in 2013 and we will close our Genk, Belgium, manufacturing facility at the end of 2014.

We recognize the impact our actions have on many employees and their families, and we have been working together with all stakeholders as we make these changes to our business in Europe. In total, 6,200 positions – or about 13 percent of Ford's European work force (excluding Russia) – are affected from the plant closures in 2013 and 2014, including the salaried head-count reduction equivalent of 400 positions in late 2012. Wherever possible, we have been achieving employee reductions through enhanced employee separation programs and, with regard to our U.K. facilities, voluntary means and redeployment to other Ford locations.

The plant closures will reduce our installed European vehicle assembly capacity, excluding Russia, by 18 percent (or 355,000 units) and yield gross annual savings of \$450 million to \$500 million.

Rightsizing manufacturing footprint and cost efficiency is very important, but cost actions alone are not enough. This is why our One Ford transformation plan for Europe focuses on all elements of the business – product, brand and cost.

We continue to strengthen our brand through wide-ranging efforts. For full-year 2013, our European retail sales – sales to private customers – increased 14 percent, driving our retail market share up a full percentage point to 8.2 percent (based on the five major markets). The improvement in retail sales was the result of a strategic shift in 2013 to target healthier sales channels and reduce sales to rental fleets and reduce dealer self-registrations. Retail sales are more profitable and better for brand image and residual values.

Our retail success speaks to the strength of our new vehicles and products, and demonstrates the importance of continuing to invest in new vehicles even in the most difficult economic environments. Forty-three percent of all Ford vehicles sold in Europe in 2013 were either new or significantly refreshed models, including the B-MAX, Fiesta, Focus Electric, Kuga, Transit Connect, Tourneo Connect, Transit Custom, Tourneo Custom and Explorer in Russia.

Ford is continuing its aggressive new vehicle and technology rollout in all segments and markets. In late 2013 we committed to accelerate our new vehicle introductions in Europe with at least 25 new vehicles in five years from September 2012, accelerated from 15 new vehicles in five years announced in late 2012. This includes the launch of 10 new vehicles in 2014.

We're starting to see some early green shoots of economic recovery in Europe, but it is still very slow and fragile. In 2014 the market could be anywhere from 14 million to 15 million in our Europe 20 markets, compared to 13.8 million in 2013. But any recovery will be slow and modest. We're still only projecting a 15 million market in 2015, far away from the 18 million industry market in 2007.

Ford of Europe's return to profitability is supported by the following:

- A gradual recovery in European vehicle industry volumes;
- Improved margins through a strengthened brand and a richer product mix;
- Improved segment share with the launch of our expanded portfolio of sports utility and commercial vehicles, covering more market segments; and
- A more efficient manufacturing footprint, including significantly improved plant utilization.

The Europe transformation plan continues to progress well and the business unit remains on track to achieve profitability in 2015.

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## The Lincoln Motor Company

The Lincoln Motor Company is wooing new customers as we compete in the category known as "affordable premium." Reintroduced in late 2012, Lincoln is focusing on the largest and fastest-growing segments of the luxury market, with the intention of having all-new entries competing in 90 percent of the premium industry by 2015. The global premium industry overall is projected to grow by 39 percent by 2017, with China playing a key role. By 2017, the U.S. and China will represent 50 percent of the global premium industry.

We remain committed to reinventing Lincoln into a world-class luxury brand. Our Lincoln brand transformation began with the Lincoln MKZ, which was completely redesigned for 2013. The Lincoln MKZ is the first of four all-new vehicles that we will be launching through 2016 as part of our reinvention. The Lincoln MKZ was named 2013's best compact premium vehicle in the J.D. Power Automotive Performance, Execution and Layout (APEAL) Study, with March 2014 year-to-date sales in the United States up 145 percent year over year.

In 2014, we are adding the Lincoln MKC to the Lincoln lineup in the United States, providing an entry in the important small premium utility segment, which is fast growing in both the United States and China.

In 2013, we began selling the all-new Lincoln MKZ in Korea and we plan to begin selling Lincoln in China in the second half of 2014.

Lincoln Motor Company was purchased in 1922 by Edsel Ford from its founder, Henry Leland. During its early years, Edsel worked with numerous custom-body suppliers to make Lincoln one of the most distinctive luxury brands in the industry, with motorcars that were considered urbane, sleek and elegant. The revitalization of the Lincoln brand marries this heritage with our most modern technologies to meet the needs of savvy consumers who have many choices.

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## Product Competitiveness

Our financial turnaround has been based largely on our ability to deliver high-quality, innovative and desirable products everywhere we operate, in both mature and rapidly growing markets. To further our progress, we are continually improving quality and customer satisfaction, and anticipating and responding to changes in customer demand. We have aligned our product development, manufacturing and marketing organizations worldwide to deliver the right products to the right markets as efficiently as possible.

We see ourselves as much as a technology company as a car company, and our cars, utilities and trucks are more technologically connected than ever. Everything we do is based on technological innovation – whether it is quality, fuel efficiency, safety, smart design or value – the hallmarks of our One Ford plan.

We're leveraging technology to change the way people think about midsize cars. We started this journey in 2005 with an all-new Ford Fusion that was designed to win market share from popular Japanese midsize sedans. In the years since, we have continued to improve the Fusion, adding hybrid and plug-in hybrid models that are bringing more new buyers to the brand than any other Ford vehicle.

The global Ford lineup is now one of the most extensive in the industry and includes a full spectrum of offerings from innovative small cars (B-platform products), such as the Fiesta, to large, commercial trucks sold around the world.

We have realigned our capabilities to deliver better products faster than ever before. We are continuing our investment in [flexible manufacturing](#), which reduces costs for each new product and lets us shift production at an individual plant from model to model to respond to changes in customer demand quickly.

### The C MAX Solar Energi Concept

In early 2014, we announced a concept car that draws power from the ultimate renewable source: the sun. The C MAX Solar Energi Concept is a first-of-its-kind sun-powered vehicle with the potential to deliver the best of what a plug-in hybrid offers – without depending on the electric grid for fuel. Instead of powering its battery from an electrical outlet, the Ford C MAX Solar Energi Concept harnesses the power of the sun by using a special concentrator that acts like a magnifying glass, directing the sun's rays to solar panels on the vehicle roof.

The concept vehicle takes a day's worth of sunlight to deliver the same performance as the conventional C MAX Energi plug-in hybrid, which draws its power from the electric grid. By using renewable power, the Ford C MAX Solar Energi Concept is estimated to reduce the annual greenhouse gas emissions a typical owner would produce by four metric tons.

The concept car is a collaboration project of Ford, San Jose, California-based SunPower Corp. and Atlanta-based Georgia Institute of Technology.

The technology displayed in the C MAX Solar Energi Concept represents a promising outlook for the future of sustainable mobility and our efforts to curb climate change.

### The All-New Transit

We recently introduced our all-new 2015 Transit van, which will achieve an average of 25 percent better fuel economy and haul at least 300 pounds more than the previous E-Series.

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The van will provide professional tradespeople and commercial fleet customers unmatched fuel economy, innovative new configurations and leading versatility in the expanding commercial vehicle market. With global commercial vehicle sales expected to grow by 4.8 million over the next several years to 21 million units annually by 2017, Transit represents a major opportunity.

For North America, Transit will eventually replace the E-Series nameplate, first sold in 1961 as Ford Econoline and America's best-selling commercial van for 33 years. In other global markets, this all-new vehicle will replace popular, market-specific Transit models first sold in 1965, and the best-selling commercial vehicle in Europe.

Transit also is joined by the upgraded 2014 Ford Transit Connect, which pioneered the small van market in the United States.

We're going from an exclusively gasoline engine lineup of two V8s and a V10 in the E-Series to offering customers a standard 3.7L V6, the same 3.5L EcoBoost® engine offered in the Ford F-150 and an all-new 3.2-liter "Power Stroke" diesel option.

Ford will offer Transit's 3.7L V6 with a compressed natural gas/liquid propane gas (CNG/LPG) prep kit to assist customers running their vehicles with this abundant, affordable, clean fuel alternative.

The 2015 Ford Transit will be built at the recently upgraded Kansas City manufacturing facility.

## Giving Customers a Choice

Ford offers customers a range of electric vehicles to meet their needs.

We offer six electrified vehicles in the U.S.: the all-electric Focus Electric, the Fusion Energi and C-MAX Energi plug-in hybrids, and three hybrid electric vehicles. We launched the Focus Electric in Europe in 2013 and plan to launch the C-MAX Energi plug-in hybrid and a hybrid electric version of the Ford Mondeo in Europe in 2014. We plan to launch electric vehicles (EVs) in other global markets in coming years. See the [Portfolio Approach](#) section for more details.

## EcoBoost® Production

In September 2013, Ford celebrated a manufacturing milestone: We produced our 2 millionth EcoBoost engine since the launch of the line four years earlier. Growing customer demand for EcoBoost-powered vehicles in major markets worldwide is driving engine production higher. Factory output now averages more than 100,000 engines per month, up from 65,000 in 2012.

EcoBoost technology combines smaller overall engine size with turbocharging, direct injection and variable valve timing to bring customers outstanding performance and fuel economy. Ford EcoBoost engines can deliver significantly better fuel economy than larger-displacement gasoline engines.

The Ford global EcoBoost engine family includes the 1.0L three-cylinder; 1.5L, 1.6L and 2.0L four-cylinder engines; the powerful 3.5L V6; and the recently announced new 2.3L four-cylinder (Mustang, MKC) and 2.7L V6 (F-150). The technology is available in every region Ford serves worldwide and is offered on approximately 80 percent of our global nameplates.

To meet demand, we've invested nearly \$200 million to build 2.0L EcoBoost engines at our Cleveland, Ohio, engine plant. In Europe, we are doubling production capacity at our Cologne, Germany, engine plant to more than 1,000 engines a day. This is in response to robust demand for the 1.0L EcoBoost engine, which was named International Engine of the Year in 2012 and 2013 by a panel of auto journalists. The Cologne plant has also begun production of the 1.0-liter EcoBoost for the North American market. The 2014 Ford Fiesta is the first vehicle available in the U.S. with the 1.0L EcoBoost engine. We also produce the 1.0L EcoBoost at our engine plants in Craiova, Romania, and Chongqing, China.

Our [Sustainable Technologies and Alternative Fuels Plan](#), which highlights how we will meet our product carbon dioxide reduction goal, has positioned us to lead in our industry and will help us meet new regulatory emissions standards. In the U.S., government regulations will require approximately 35.5 mpg (fleet average) by the 2016 model year – a 30 percent improvement from the 27 mpg required for 2011 models. As consumer demand for smaller vehicles increases, we need to provide the vehicles people want, and provide them profitably, in order to remain a sustainable business.

## Global Ford EcoBoost Engine Production – Total Since Launch (as of September 2013)

Plant	Engine	Production
Cologne/Craiova	1.0-liter	284,000
Bridgend/Craiova	1.5-liter/1.6-liter	549,000
Valencia	2.0-liter	532,000
Cleveland	3.5-liter	635,000
<b>Total</b>		2,000,000

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## 2013 Sales and Highlights

Business Unit	2013 Wholesales (in thousands)	Percent change from 2012	2013 Highlights
North America	3,088	+11%	<ul style="list-style-type: none"><li>■ In the United States, our market share was up 0.5 percentage points to 15.7% of the industry.</li><li>■ Ford was the number-one selling brand of utilities in America for the third straight year.</li><li>■ Our F-Series was America's best-selling truck for the 37<sup>th</sup> year.</li></ul>
South America	538	+8%	<ul style="list-style-type: none"><li>■ We introduced global products, such as the Focus, with additional global products to come.</li></ul>
Europe	1,360	+1%	<ul style="list-style-type: none"><li>■ Ford was again the second best-selling car brand in the traditional 19 markets we tracked in Europe.</li><li>■ Britain and Germany were our highest-volume markets.</li></ul>
Asia Pacific Africa	1,344	+30%	<ul style="list-style-type: none"><li>■ We had highly successful launches of our all-new Kuga and EcoSport small utilities.</li></ul>

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## Customer Satisfaction and Quality

Quality is one of the four pillars in our approach to great products: quality, safe, smart and green. Meeting our quality strategic priorities, including customer satisfaction with our products, is a central mission of all of our employees. Quality priorities are also central to our sales, service and vehicle financing operations, which affect customers' satisfaction with vehicle purchase, service and financing experiences.

At Ford, improving quality is a daily activity. We have worked tirelessly to improve quality over the past decade, and we have made great strides in overall quality. We use an extensive Global Quality Operating System (GQOS) at every stage of vehicle development and manufacture to make sure that our vehicles meet or exceed customer expectations.

We begin designing for quality from the very earliest stages of every vehicle program. Years before a new model rolls off the assembly line, we define the right features and content to include based on extensive customer research, and we validate that our vehicle designs and manufacturing processes will deliver vehicles that meet or exceed customer expectations. Our engineers use a suite of high-tech design tools and virtual manufacturing technology to detect and avoid potential issues. We also undertake extensive testing of vehicle prototypes to ensure customers will experience the highest level of quality in our products. We continue to evaluate and fix any quality problems that may arise after our vehicles are sold. We evaluate every customer claim, and use this information to develop and implement effective solutions. We also gather feedback from our customers using survey tools that track and evaluate our quality and customer satisfaction performance.

Despite these efforts, we had some quality and customer satisfaction issues in 2013. For example, we had 16 recalls in 2013. In the past several years, we have been dramatically increasing the innovative technologies in our vehicles, the number of new models we introduce, and the speed with which we release them. In addition, we are boosting production in the U.S. and other regions to match growing demand for our vehicles. All of these trends increase the pressure on both our own and our suppliers' design, production and quality systems.

We have been working hard to rectify all quality and customer satisfaction problems and deliver on our promises to consumers. For example, we responded to customer complaints about the fuel economy of the 2013 C-MAX Hybrid. Although we developed the fuel economy label for the C-MAX Hybrid following the U.S. Environmental Protection Agency's labeling rules, we voluntarily changed the way we test and label the 2013 C-MAX Hybrid's fuel economy to better match performance and improve customer satisfaction. Because this voluntary step resulted in miles-per-gallon values different from the original C-MAX Hybrid label, Ford is making a goodwill payment to current 2013 C-MAX Hybrid owners for the estimated average fuel cost of the difference between the two labels, up to \$550. We also recalibrated the powertrain software of the C-MAX Hybrid to improve fuel economy performance. These modifications are being made at the dealership for 2013 C-MAX Hybrids and are included in the factory setting for 2014 vehicles. And we made additional changes to the 2014 C-MAX that will enhance the vehicle's fuel efficiency, including improved transmission efficiency and aerodynamics.

We have worked hard to create a culture of cooperation and focus on solving any problems — not passing blame or pointing fingers — so that when quality issues arise, we can address them quickly and effectively. We strive to ensure that we learn from every quality issue so that our overall performance continues to improve. For example, although we know that introducing new products quickly is critical, we also have to take the time to make sure everything about new vehicles is just right before they go to market. We track our progress on quality through a combination of internal and external measurements that assess how we are doing and where we can improve. The Global Quality Research System (GQRS), which tracks [customer satisfaction and "things gone wrong."](#) is our primary quality survey.<sup>1</sup> It is implemented for us by the RDA Group, a market research and consulting firm based

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in Bloomfield Hills, Michigan. We also subscribe to J.D. Power and Associates' Initial Quality Survey and Automotive Performance, Execution and Layout (APEAL) Study. Furthermore, we track warranty claims and costs internally. Global and regional quality improvements are detailed in this section.

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1. The GQRS study is conducted quarterly, with scores assessed from survey responses collected from vehicle owners by the RDA Group, a consulting firm.



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## Global and Regional Quality Improvements

The following are key measures of our vehicle quality:

### Global Warranty Spending

- Global warranty spending per unit decreased 3.4 percent in 2013, compared with 2012.
- Global warranty costs increased by \$365 million over the last four years (from year-end 2009 to year-end 2013). Warranty costs are expected to decrease by 16 percent from 2013 to 2018.

### GQRS Initial Quality (Three Months in Service) Report 2013

- In 2013, global full-year customer satisfaction was 72 percent, the same as in 2012.
- In 2013, global full-year "things gone wrong" (TGW) was 1,388 per 1,000 vehicles compared with 1,373 in 2012, an increase of 1 percent.

### In North America in 2013:

- Customer satisfaction was 78 percent compared with 79 percent in 2012.
- Full-year TGW was 1,650 per 1,000 vehicles compared with 1,514 in 2012, an increase of 9 percent.
- The number of Ford Motor Company safety recalls decreased from 24 in 2012 to 16 in 2013; the number of affected units also decreased from 1.4 million to 1.2 million. Warranty spending increased by 3.2 percent in 2013, compared with 2012.
- Ford's customer satisfaction with dealership sales experiences improved 1 point in 2013 compared with 2012 and 7 points since 2006. Customer satisfaction with vehicle service experiences declined by 1 point from 2012 to 2013, but has increased 7 points overall since 2006.

### In Europe in 2013:

- Customer satisfaction increased to 71 percent in 2013, up 3 percentage points from 2012.
- Full-year TGW improved significantly to 1,302 per 1,000 vehicles compared with 1,573 in 2012, a 17 percent improvement.
- Sales satisfaction with dealer or retailer remained the same as in 2012. Service satisfaction with dealer or retailer increased by 1 point from 2012 to 2013.<sup>1</sup>
- Warranty spending decreased by 13 percent compared with 2012.

### In Asia Pacific in 2013:

- Customer satisfaction increased to 68 percent, up 1 percentage point compared with 2012.
- Full-year TGW was 946 per 1,000 vehicles compared with 870 in 2012, a 9 percent increase.
- Sales satisfaction with dealer or retailer improved by 6 points from 2012 to 2013. Service satisfaction with dealer or retailer improved by 9 points in that time.
- Warranty spending decreased by 0.5 percent compared with 2012.

### In South America in 2013:

- Customer satisfaction was 65 percent in 2013, the same as 2012.
- Full-year TGW was 1,723 per 1,000 vehicles compared with 1,416 in 2012, a 22 percent increase.

- Warranty spending increased by 7 percent compared with 2012.

## Owner Loyalty

Owner loyalty is a measure of customers disposing of one Ford product and buying a new Ford product. In the U.S., owner loyalty increased in 2013 to 49.9 percent compared with 47.7 percent in 2012. In Europe, Ford owner loyalty decreased slightly to 51 percent from 52 percent in 2012.

- 
1. European sales and service satisfaction with dealers and retailers are net promoter scores based on 24 European markets, including Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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## Ford Future Competitiveness

While the world may seem stagnated by gridlocked governments and economic uncertainty, the truth is that we live in an era of constant change. Across the globe, citizens and brands are stepping up to make things happen through innovation, collaboration and perseverance.

Ford, for example, is launching 23 new or significantly refreshed products worldwide in 2014. While it once took five years to bring a new product to market, it now takes only 36 months. This accelerated pace is part of a broader sustained explosion in technology and innovation worldwide.

Notably, this new era of rapid change demands a corresponding mindfulness of the precious resources we too often take for granted: our time, our health, our population and our planet. Out of a world of hyper-stimulation, a culture of reflection is emerging, driving us to re-examine what matters most.

The marketplace is inundated with disruptive technology, such that even dramatic innovations are now viewed as commonplace. At the same time, consumers are increasingly drawn to the way things were, driving demand for nostalgia-based products and services.

To remain relevant and competitive in the long run, we need to prepare for a future that looks significantly different from the present. As we think about the forces that will shape global markets in the years to come, we look at many factors, including [consumer trends](#), [business risks](#), and other inputs into and outcomes of our [materiality analysis](#). This analysis has reinforced our belief that profound shifts are underway that will fundamentally reshape both the markets for our products and services, and the constraints under which auto manufacturers will operate in the future. One obvious driver of change is population growth: The United Nations predicts that the global population will reach 9 billion by 2050 and increase to 10.1 billion by 2100. Another is the shift in the locus of rapid economic growth from more mature markets to evolving economies in China, India, Brazil and other countries. (See [Focus on Asia](#) for insight into our growth in that region.)

These trends, along with advances in conventional and renewable energy technologies, are leading to significant shifts in energy supply and demand, several of which are highlighted in the World Energy Outlook 2013, a publication of the International Energy Agency (IEA):

- Despite widespread efforts to use energy more efficiently, energy demand is projected to grow by one third by 2035 (from 2011) with India and countries in Southeast Asia taking the lead in driving consumption higher.
- Energy-related carbon dioxide emissions are projected to rise by 20 percent to 2035, leaving the world on track for a long-term average temperature increase of 3.6 degrees Celsius, far above the internationally agreed 2-degree (Celsius) climate target.

We believe we have taken a responsible course to [plan our products](#) based on doing our part to achieve [climate stabilization](#). Our comprehensive water strategy takes into account water-related risks and opportunities across our value chain.

To meet the needs of our customers and contribute to addressing the global sustainability issues of the future, we are applying our core competencies, including innovation and partnership-building, to develop solutions for future [mobility](#) that reflect the realities of a changing world.

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## Focus on Asia

### Snapshot: Ford in Asia Pacific

**\$6.7 billion**

Total Asia Pacific Africa investment by 2015<sup>1</sup>

**4**

New plants under construction in China

**2**

New plants under construction in India

**50**

New Ford vehicles and powertrains to region by 2015

**15**

New cars and SUVs to China by 2015

**6,000**

New hires in region for 2014

**49 million**

Anticipated annual vehicle sales in the Asia Pacific Africa region by 2020

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Asia offers tremendous opportunities for our company. The fastest-growing markets for automobiles are in rapidly developing countries, especially China and India. China will remain the largest car market in the world for the foreseeable future, and India is projected to be the third-largest market in the world for the coming decade. By 2020, annual vehicle sales in the Asia Pacific Africa region will likely reach 49 million vehicles, with about 32 million of them in China.<sup>2</sup>

We estimate that 60 to 70 percent of Ford's growth in the next 10 years will come from this part of the world. Today, one in every five vehicles we sell globally is in Asia Pacific. By 2020, it will be one in three. Between now and the end of the decade, there will be a total driving age population of 2 billion in Asia Pacific, including 1.15 billion in China and 500 million in India, with their average annual income beyond the vehicle ownership threshold level (equal to approximately \$5,000 per capita GDP<sup>3</sup>).

To keep pace with this enormous growth, we are building new plants and expanding existing ones, hiring workers, growing our dealer networks, and further developing our supply chain across China, India and Thailand.

We are investing \$6.7 billion in Asia Pacific and currently employ some 23,000

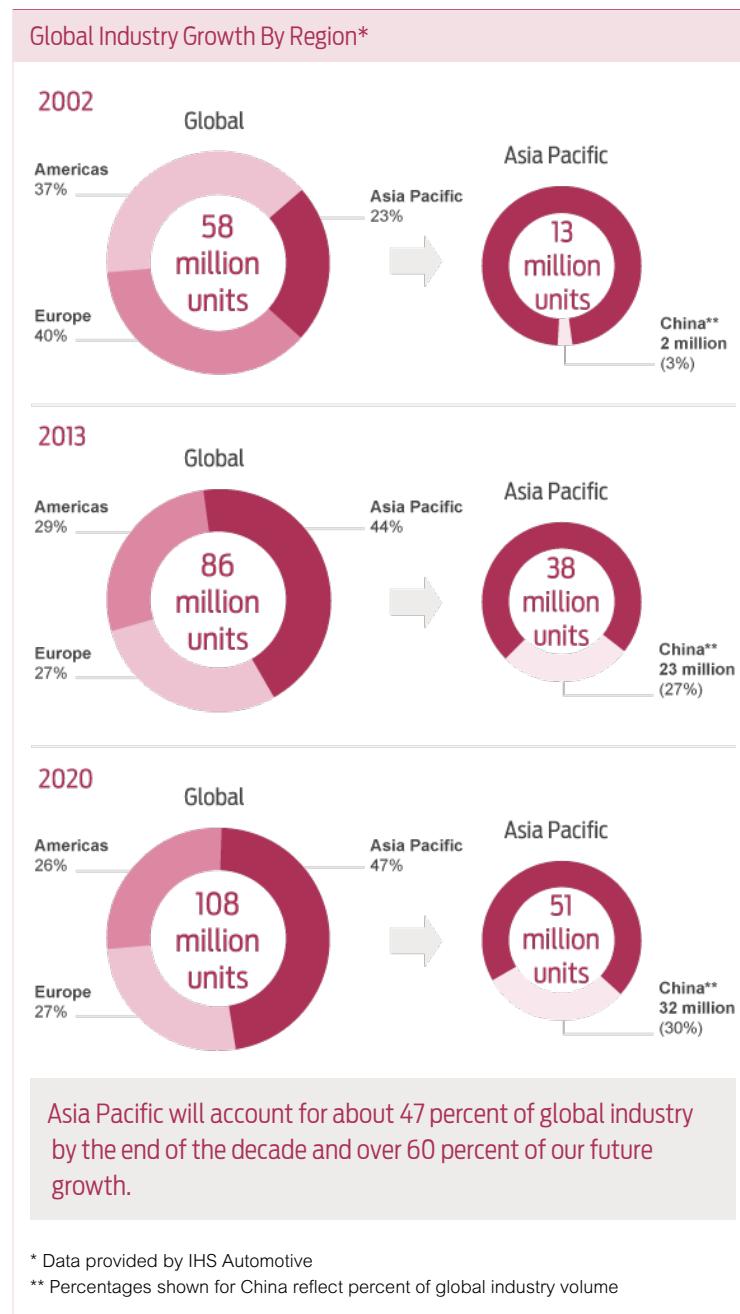
people in our wholly owned and consolidated joint ventures in the region. We are building or have recently opened 10 new plants in Asia Pacific – seven in China, two in India and one in Thailand. By 2015 we'll have the capacity to produce 2.7 million vehicles in the region.

In 2014, we will open our Changan Ford Automobile (CAF) Chongqing #3 Assembly Plant and CAF Chongqing Transmission Plant in Chongqing, China – our largest manufacturing concentration outside of Michigan.

To fuel all of this growth, we plan to hire about 6,000 employees in Asia Pacific in 2014, the majority of them hourly. We also have announced plans to expand our research and development facility in China, where we now have our regional headquarters, boosting the number of employees by more than 50 percent through 2018. We plan to add approximately 200 new employees each year, bringing the number of research and development employees to around 2,000 people.

Our strategy in Asia Pacific continues to be to grow aggressively with an expanding portfolio of global products with manufacturing hubs in China, India and Thailand.

Our market share in the region was a record 3.5 percent for 2013, up by 0.7 percentage points compared with 2012. The improvement was driven by China, where our market share for the full year rose to a record 4.1 percent, up by 0.9 percentage points compared with 2012.



In China, Ford manufactures and sells passenger vehicles through its joint venture Changan Ford Automobile (CAF), in which it has a 50 percent stake. Commercial vehicles like the Ford Transit are manufactured and sold through Jiangling Motors

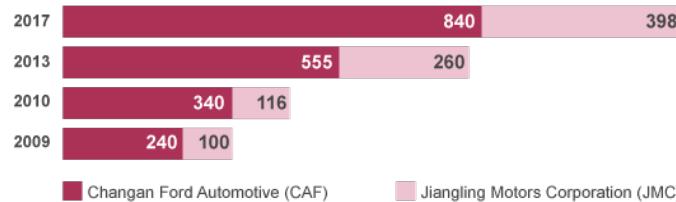
Corporation (JMC). Ford owns a 32 percent stake in JMC.

In 2013, we added about 100 dealers in China, bringing the total number of Ford dealers in China to over 600. This doesn't include new Lincoln dealers in China, which we are in the process of recruiting. We will be bringing the Lincoln portfolio to China in the second half of 2014 to tap into the luxury car segment in one of the world's most important auto markets.

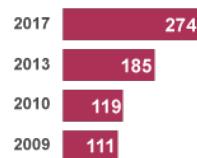
In India, meanwhile, the number of dealers is projected to grow by 22 percent between 2013 and 2015. India is becoming a global export hub for Ford.

### Asia Pacific Ford Dealer Network Plan

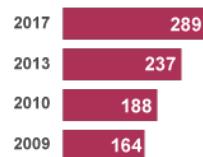
#### China



#### India



#### ASEAN 5\*



\* Includes Thailand, Indonesia, Philippines, Vietnam and Malaysia

1. In U.S. dollars for the time period of 1995 through 2015.
2. IHS Automotive
3. In 2005 constant dollars at the purchasing power parity exchange rate.



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## Ford Motor Credit Company

Established in 1959, Ford Motor Credit Company is a wholly owned subsidiary of Ford Motor Company that offers automotive financial services to dealerships and customers around the world. Its profits and distributions help support Ford's business, including vehicle development.

Ford Credit's focus is on supporting the sale of Ford and Lincoln vehicles, providing financial services to 5,200 Ford and Lincoln dealers and more than 3.8 million retail customers as of year-end 2013. The company has about 6,200 full-time employees and provides financing in approximately 100 countries.

Ford Credit's strong business practices enable it to finance customers across the credit spectrum, as well as successfully work with investors to fund the business. These practices and strong servicing also drive loyalty. Independent U.S. studies show that Ford Credit customers are more loyal to Ford, Lincoln and the brands' dealers than customers who utilize other financing.

Ford Credit also works on issues of interest to its stakeholders including the following:

- **Credit Availability:** Ford Credit provides financing for qualified dealers and consumers; it has utilized consistent and prudent credit standards for many years. Proprietary originations and collections models enable Ford Credit to finance a broader range of customers than if it used credit scores alone. The company provides world-class servicing.
- **Compliance:** Ford Credit uses responsible, consistent and transparent practices globally. The company has a culture of compliance and is committed to following both the letter and the spirit of the law. Ford Credit believes it maintains all required material licenses and permits, and it monitors proposed changes to relevant legal and regulatory requirements to remain compliant. Through governmental relations efforts, Ford Credit also attempts to participate in the legislative and administrative rule-making process on regulatory initiatives that affect finance companies.
- **Consumer Education and Focus:** Ford Credit is a long-standing supporter of and participant in financial education through organizations such as the American Financial Services Association (AFSA) program MoneySKILL, an online money management course for use with high school and college students, and Americans Well-Informed on Automobile Retailing Economics (AWARE), an AFSA industrywide group of which Ford Credit is a founding member. The company also participates in Junior Achievement; the Jump\$tart Coalition, which is dedicated to building financial literacy starting at a very young age; the Detroit Branch of the Federal Reserve Money Smart program; and other community and educational forums. Ford Credit's financial literacy workshop, "The 10 Ways to Achieve Financial Success," is presented across the United States by company volunteers to community and school groups, trade shows, conventions and other events. Ford Credit's website includes information in English and Spanish to help consumers make informed decisions about vehicle financing.
- **Customer Privacy and Service:** Ford Credit has a policy regarding customer information and privacy and uses systems and procedures to maintain the accuracy of customer information and to protect it from loss, misuse or alteration. Ford Credit provides training and communications to educate personnel about privacy requirements. Beyond protecting customer privacy, Ford Credit continuously works to provide a superior service experience, including programs offering payment deferrals following natural or other disasters.
- **Technology and Process Improvements:** Ford Credit continuously improves processes and uses technologies that drive efficiency and sustainability. These processes and technologies include customer services that facilitate online

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credit applications, electronic contract signing, paperless invoices, electronic payments and online account management; electronic document storage; and software tools and telephony technologies to enhance responsiveness and increase satisfaction for dealers and customers.

- **Business Continuity:** Ford Credit maintains business continuity plans throughout the company to continue critical operations and deliver seamless dealer and customer service in the event of a business interruption.
- **Community:** Ford Credit has a long-standing commitment to the communities in which it does business. This includes providing structured work experience programs for young people. Ford Credit employees also participate in numerous community activities globally. Examples include personal finance training in schools and community organizations; environmental projects such as river cleanup, park and school beautification and recycling; JDRF walks to benefit diabetes research; the Susan G. Komen Race for the Cure and other activities benefiting medical research or assistance organizations; and drives to collect items such as supplies for schools, food for the hungry, clothing for the needy and necessities for soldiers stationed far from home.



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## Mobility Solutions

### Ford's Definition of Mobility

Accessibility for people, goods and services to go where they need or want safely, efficiently and affordably – providing a simplified and fun customer experience. Our goal is to make mobility affordable in every sense of the word – economically, environmentally and socially.

In 2013, customers purchased some 6.3 million new Ford and Lincoln vehicles – 10 percent more than in the prior year and substantially more than the global industry's growth rate of 3 to 4 percent. Some of these customers bought our vehicles because we delivered products that met their needs better than before. Some bought them because we entered their markets for the first time. And still others bought our vehicles thanks to growing economic prosperity.

Such growth provides our company an opportunity to contribute to a better world through great products, good jobs, stronger communities – and the freedom of mobility. How we will do this is through what we call our "Blueprint for Mobility," which seeks to redefine the freedom of mobility we have enjoyed since Henry Ford began mass producing vehicles more than a century ago. Ford Motor Company is committed to being the leader in automotive mobility solutions.

When we announced the Blueprint for Mobility in early 2012, it highlighted our thinking about what transportation will look like in 2025 and beyond, and identified the types of technologies, business models, products and partnerships needed to get us there. Throughout 2013, we continued to make progress implementing the Blueprint for Mobility, which is similar in concept to our overall Blueprint for Sustainability. The Blueprint for Mobility sets near-, mid- and long-term goals for solutions to the challenges facing mobility systems now and in the future as the world becomes more populated and urbanized.

Our mobility vision aims for a holistic approach, blending smart transportation with intelligent vehicles and transport systems that are interconnected through a global technology network. We envision a radically different transportation landscape in which pedestrian, bicycle, private car, commercial and public transportation are woven into a connected network that saves time, conserves resources, lowers emissions and improves safety. We know we must view the automobile as one element of a broader transportation ecosystem and look for new ways to optimize the entire system through automation, electrification, services and other technologies.

Today, we're developing new research vehicles, such as our [Ford Fusion Hybrid automated research vehicle](#), that are helping us explore the opportunities for automated technologies so we can bring them to market faster. In addition, the [C-MAX Solar Energi Concept](#), which captures electricity from solar panels on its roof, demonstrates a possible next step in electrified vehicles. And we're working on innovative "apps" that can transform the way we connect with our vehicles.

We see a future of connected cars that communicate with each other and the world around them to make driving safer, ease traffic congestion and sustain the environment. By doing this, we can have an even greater impact on the next 100 years than we did in our first century.

### Addressing the Future

As we look to 2020 and beyond, there are a number of changes we already can see:

- The global population is growing;

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- ➔ [Our Blueprint for Mobility](#)
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- Life expectancies are increasing; and
- Today's emerging markets are becoming the epicenter of growth.

We are already seeing this in China, once viewed as an emerging market. Today, China is the world's largest car market – and the world's largest market for luxury goods. In the next few years, we expect China also could be the largest market for luxury vehicles.

Consider that there are about 7 billion people in the world today. Yet within our lifetime, that number will approach 9 billion. Also, there are more than 300,000 people over the age of 100 in the world today. By 2050, that number could surpass 2.5 million. Finding ways to design vehicles with these customers in mind will need to be a focus.

Right now, there are about 1 billion vehicles on the road worldwide. And it took roughly 100 years to get to this level. Yet, with more people and greater prosperity, many experts believe that number will double in the next 20 years, and then possibly double again.

These challenges go well beyond inconvenience. If we look at the numbers and look at the state of our global transportation infrastructure, it is not difficult to see a future in which the flow of commerce – and even the flow of health care and food delivery – are compromised. At Ford, we see global gridlock as not just an issue of business and economics, but as a problem that could have a significant impact on the quality of human life.

Although our executive chairman, Bill Ford, started talking about our Blueprint for Mobility in 2011 at a [TED conference](#), we have been working on these issues for a number of years with a focus on three primary challenges: pollution, congestion and safety.

We are already developing new business models and partnerships toward this future in a way that is shifting the paradigm of what it means to be an automaker. But no one company or industry will be able to solve the mobility issue alone. It is a huge challenge that will only be successful if governments, infrastructure developers and industry collaborate on a global scale. The speed at which solutions take hold will be determined largely by customer acceptance of new technologies, as well as how quickly cities develop the enabling systems and infrastructure.

The last few years have seen technological breakthroughs, such as vehicle-to-vehicle communications, that we didn't think possible a few decades ago. Increasingly, Ford has become a technology company that makes cars and trucks, and we will continue to explore ways to leverage these technological innovations so we can tackle mobility challenges.

### Automated Fusion Hybrid and the Blueprint for Mobility

As the next step in our Blueprint for Mobility, we recently revealed our Ford Fusion Hybrid automated research vehicle that will be used to help us develop new automated driving and other advanced technologies.

In the future, automated driving may help us improve driver safety and manage issues such as traffic congestion and global gridlock. But there are still many questions that need to be answered and explored before this becomes a reality. The goal of the automated Ford Fusion Hybrid research project is to test the limits of full automation and determine the appropriate levels of automation for near- and mid-term deployment.

The ongoing Ford Fusion Hybrid project, in conjunction with the University of Michigan and State Farm, builds on more than a decade of Ford's automated driving research. The Fusion Hybrid automated vehicle will test current and future sensing systems and driver-assist technologies. We aim to advance development of new technologies with supplier partners that can be applied to our company's next generation of vehicles.

The Ford Fusion Hybrid was chosen as the test platform for the new research effort because it is an affordable consumer car and among the leaders in offering the most advanced driver-assist technologies in its class. Because the Fusion Hybrid is built upon the latest common global electrical architecture, we expect that the work we do on this vehicle will be relevant across other vehicle platforms for some time.

Developing the necessary infrastructure to support a sustainable transportation ecosystem will require the collaboration of many partners across multiple industries. State Farm and the University of Michigan's robotics and automation research team are critical to creating the visionary research project. Ford is responsible for developing the unique components that allow the vehicle to

function at high levels of automation. The University of Michigan is leading key algorithm development in several areas, including 3-D mapping, localization (e.g., knowing where you are), and planning a safe pathway through the driving environment.

State Farm, meanwhile, is providing expertise by identifying the significant issues to address based on its repository of vehicle accident claims. The insurance company is also data mining our results to understand how a car driven by a human differs from a car driven by a computer. And, State Farm is studying the implications of automated driving for both the automotive and the insurance industries.

## Traffic Tamer Challenge

Traveling the streets of London can be an exercise in stress and frustration. Motorbikes, taxis, buses, cyclists, trucks and auto drivers – not to mention pedestrians – all compete on crowded and often narrow city streets.

The word “congestion” is an understatement when it comes to London traffic. In 2012, congestion cost Britain an estimated 4.3 billion (GBP) or the equivalent of 491 (GBP) per commuting household.<sup>1</sup>

Ford is working to change this. We challenged developers around the world to submit new or existing software applications that have the potential to assist in reducing traffic congestion and make commuting easier. The Traffic Tamer App Challenge ran between October 2013 and March 2014. A total of 23 individuals and teams met the full terms of the contest at the submission deadline in March.

We awarded a total of \$25,000 in prize money to [four winners](#), including the grand prize of \$10,000.

Developers were encouraged to use Ford’s OpenXC platform, a combination of open source hardware and software designed to create customized vehicle applications and modules.

This wasn’t our only “app” challenge. We also challenged developers to help customers optimize their own fuel-economy performance using the [OpenXC](#) platform. We’re planning more “open” platform experiments for 2014.

1. Source: INIRX



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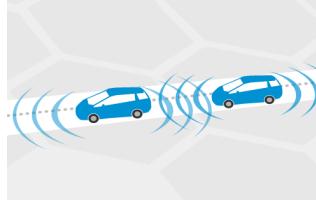
## Our Blueprint for Mobility

By 2050 we will have a true network of mobility solutions, and automobiles will likely look very different from how they look today.



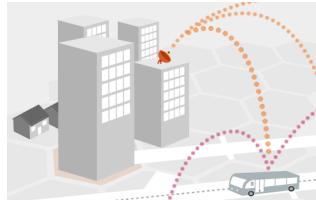
### Vehicle-to-vehicle communications

Vehicles will "talk" to one another, transmitting safety messages.



### Vehicle-to-infrastructure technologies

Vehicle-to-infrastructure technologies may enable improved safety while allowing more vehicles to share the road.



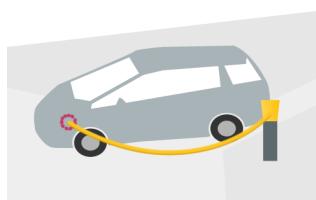
### In-car mobile communications and interfaces

In-car mobile communications and driver interfaces will become more intuitive. These systems will be able to proactively alert drivers to traffic jams and accidents.



### Electrified vehicles

Electrified vehicles will be more commonly used as shared modes of transport for urban users. Vehicles will be parked at charging stations and may well get their power through solar panels, like in our C-MAX Solar Energi Concept prototype.





## Digital maps and cell-based communications

The proliferation of digital maps and cell-based communications will provide better driver information and entertainment features.

At Ford, we believe that mobility challenges – in urban as well as in rural settings – require the same level of attention and determination that we have put toward developing solutions for the environmental challenges faced by our industry. Where environmental sustainability is concerned, we have been making great strides with new vehicle technologies, alternative fuels and vastly cleaner solutions.

A truly sustainable, long-term solution will require a global transportation network that includes vehicle, infrastructure and mobile communications. We need cars that can communicate with each other, and with the world around them, to make driving safer and more efficient. This smart, connected system will tie all modes of travel into a single network linking public and personal transportation together.

Ford was founded on the notion of opening the highways to all mankind, and we still believe in providing accessible, personal mobility for everyone. Our Blueprint for Mobility is based on an analysis of population growth, urbanization and other key societal and economic trends. Our goal is to make mobility affordable in every sense of the word – economically, environmentally and socially – and provide seamless mobility for all.

In the near term (roughly the next five to seven years), technologies – including some that are already in vehicles – will continue to improve. In the mid-term period (to about 2025), the amount of data that will flow to, from and through cars will continue to increase. Vehicle-to-vehicle and vehicle-to-infrastructure technologies may enable improved safety while allowing more vehicles to share the road. New technologies will provide more sophisticated systems of semiautomated driving.

We're working, for example, with the University of Michigan's Transportation Research Institute's [Connected Vehicle Safety Pilot Program](#), which is testing real-world implementation of connected vehicle safety technologies, applications and systems.

Everything in our Blueprint is achievable in the future based on existing technology. The key challenges are making the offerings affordable and attainable to all customers and finding ways for all stakeholders – the auto industry, governments, technology companies and more – to make the adaptations needed to the transportation infrastructure.

The bullets below provide more detail on the elements of the Blueprint. The near term focuses primarily on technology that Ford is already developing. The mid and long term, meanwhile, set up a vision of what we think future mobility will look like and how Ford, the industry and society as a whole will need to evolve.

Five to Seven Years	2017–2025	2025+
<p><b>Near Term</b></p> <ul style="list-style-type: none"> <li>▪ Ford Motor Company to be at the forefront of developing increasingly intuitive in-car mobile communication options and driver interfaces.</li> <li>▪ Further development of projects such as the vehicle-to-vehicle warning systems currently being tested in the Ann Arbor (Michigan) Safety Pilot Model Deployment and a system to proactively alert drivers to traffic jams and accidents which is being explored at Ford's European Research and Advanced Engineering Centre in Aachen, Germany.</li> <li>▪ The delivery of a better connected, safer and more efficient driving experience with limited automated</li> </ul>	<p><b>Mid Term</b></p> <ul style="list-style-type: none"> <li>▪ The introduction of semiautomated driving technologies, including driver-initiated automated capabilities and vehicle platooning in limited situations, to provide improved accident avoidance and driver assistance features that always allow the driver to be in the loop and aware of the situation in case he or she needs to take control.</li> <li>▪ Significantly more interaction between individual cars on the road through the utilization of ever-increasing computing power and numbers of sensors in vehicles, potentially helping to reduce the number of accidents at intersections and enabling limited semiautomated and automated highway lane</li> </ul>	<p><b>Long Term</b></p> <ul style="list-style-type: none"> <li>▪ A radically different transportation landscape in which pedestrian, bicycle, private car, commercial and public transportation traffic will be woven into a single connected network to save time, conserve resources, lower emissions and improve safety.</li> <li>▪ The arrival of smart vehicles capable of fully automated navigation, with increased automated operating duration, plus the arrival of automated valet functions, delivering effortless vehicle parking and storage.</li> <li>▪ The development of a true network of mobility solutions, with personal vehicle ownership complemented by greater use of connected and</li> </ul>

functions for parking and driving in slow-moving traffic, building on existing Ford features including Active Park Assist, Adaptive Cruise Control and Active City Stop.

- Further development and defining of new vehicle ownership models, as already demonstrated through Ford's marketing collaboration with Zipcar, the world's largest carsharing and car club service, and [our new carsharing program in Germany](#).

changing and exiting.

- The arrival of vehicle-to-cloud and vehicle-to-infrastructure communications that contribute to greater time and energy efficiency by enabling vehicles to recommend alternative transport options when congestion is unavoidable and to pre-reserve parking spots at destinations.
- The emergence of an integrated transport network, featuring cars plugged into public databases.
- New city vehicle options, as more and more one-, two-, and three-passenger vehicles are introduced to help maneuver on city streets.

efficient shared services, and completely new business models contributing to improved personal mobility.



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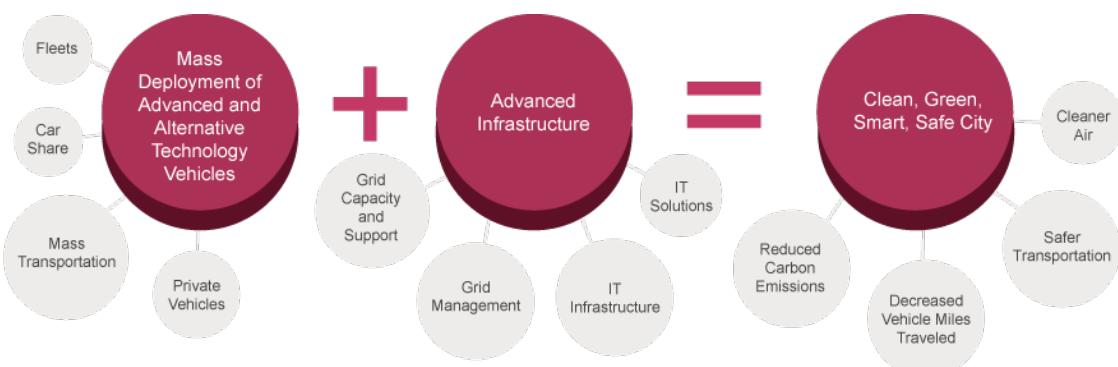
## New Models of Mobility

We are investing significant research and development dollars in new models of transportation, and helping to advance thinking about it. We are doing this through partnerships and pilot projects at several global locations. Some of these projects have focused on exploring how to deploy electric vehicles as part of integrated mobility solutions aimed at creating "clean, green, smart and safe" cities (see figure below). We believe that creative collaboration and innovative technologies and services can yield new solutions, and that these solutions can harness the benefits of mobility while reducing its environmental and social impacts.

Our dedicated research lab in California's Silicon Valley is part of our commitment to make technology affordable for millions. The Ford lab, which opened in 2012, serves as a hub for independent technology projects and the identification of new research investments with partners located along the U.S. West Coast. The lab helps to ensure that Ford keeps pace with consumer trends and aggressively prepares for the future by developing mobility solutions to harness technology.

Shared models of car ownership will also be increasingly important, especially in urban areas, where a peer-to-peer system of shared vehicles offers promising solutions. Electrification can enable more economical, more efficient and more environmentally friendly options. In addition, younger generations of consumers seem to have different relationships to cars that make them better suited to new models of mobility.

We have been involved in several carsharing research projects that are designed to develop new models and methodologies for systems that integrate vehicle sharing and public transportation systems.



## An Innovative Approach to Car Sharing in Germany

Many people around the world want the benefits of personal mobility but don't necessarily want to own a car. Carsharing offers an approach that can provide those benefits while reducing congestion and the environmental impacts of the private automobile.

According to a Ford Motor Company-sponsored poll,<sup>1</sup> more than half of Europeans – 56 percent – would consider car sharing, either through a formal program or through private arrangements. Drivers increasingly see carsharing programs as viable options, especially in dense urban areas where parking can be problematic and where public transportation fails to meet all mobility needs. Ready and affordable access to a pool of available vehicles can provide on-demand transportation flexibility.

A widely cited 2010 study from the University of California at Berkeley<sup>2</sup> estimated

that one carshare vehicle replaces anywhere from nine to 13 vehicles on the road. That includes four to six direct replacements; the rest are avoided purchases.<sup>3</sup>

In 2013, we announced a collaboration between Ford of Germany and our dealer network. Ford Carsharing is a joint effort between Ford Motor Company and Flinkster, the largest carsharing network in Germany. Owned by Deutsche Bahn, Flinkster provides technology support for Ford Carsharing, including the Web- and smartphone-based booking system for carshare participants and for the German Ford dealer association. The day-to-day business is run by the local Ford dealers.

As of March 2014, 32 dealers in 42 cities were participating, offering 95 vehicles to customers through the Ford Carsharing program. Because the carsharing program is integrated into the larger Flinkster mobility platform, Flinkster's 250,000 customers can access the Ford Carsharing vehicles while Ford Carsharing customers can access the 3,000 vehicles in the Flinkster fleet. Within the first year, we had 2,000 bookings with customers who drove more than 115,000 kilometers combined on Ford Carsharing vehicles.

Ford Carsharing taps into a potential customer base by offering a chance to experience Ford vehicles.

As a company, we are committed to a collaborative and integrated approach to future mobility. Ford Carsharing is one step in exploring what that future might look like.

- 
1. Survey carried out by The Futures Company between July and August 2012; 6,028 people were questioned across six European countries – Denmark, France, Germany, Italy, Spain and the U.K.
  2. E. Martin, S. Shaheen, J. Lidicker, "The Impact of Carsharing on Household Vehicle Holdings: Results from a North American Shared-Use Vehicle Survey." *Transportation Research Record*, 2010.
  3. The range of estimates on car sharing varies widely, and experience to date may not scale up proportionally if car sharing becomes more widespread.



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Voice: Larry Fink

## Mobility Challenges and Opportunities

As we look at the mega-trends (below) shaping the future, a business model built on private ownership of automobiles comes with inherent challenges, including increasingly diverse and fragmented markets for traditional automobile sales. We see this as an opportunity for companies that are able to respond to mobility needs creatively.

- **Urbanization:** By 2025, it is projected that at least 37 mega-cities will have a population of more than 10 million<sup>1</sup>. The migration of rural populations to urban areas often outpaces infrastructure development, leading to overcrowded, substandard living conditions and inconvenient, congested transportation systems.
- **Congestion:** Traffic congestion is estimated to cost the U.S. \$67.6 billion annually, and the average metropolitan driver endures 27 hours of traffic delays each year. In many places, especially developing countries, traffic delays are considerably worse, and are increasing at an alarming pace. As more vehicles crowd limited road networks, congestion increases. This, in turn, creates pollution, reduces fuel efficiency and wastes travelers' time.
- **Built and Digital Infrastructure:** More congestion means greater impacts on roadways and other infrastructure, which will require different products and solutions from a coalition of stakeholders. As transportation and utilities become more interdependent, collaboration must occur among manufacturers, energy/utility companies, and communications and information technology companies.
- **Climate Change:** Climate change and associated regulation is leading to new vehicle standards and increased costs. However, the benefits of more stringent vehicle fuel economy and greenhouse gas standards are eroded as vehicles spend more and more time idling in gridlock conditions.
- **Population:** Different regions of the world are experiencing opposing population trends. Among the more developed countries, only the U.S. is growing in population; Europe, Russia and Japan are all shrinking. Regions of Africa and Asia are growing in population and will have large numbers of young people. But by the middle of this century, most of the world will be much older on average. With most people living in urban areas, more and different forms of mobility will be needed to support independent living for seniors, the disabled and young people.
- **Social Inequality:** The gap between rich and poor creates enormous needs for innovative, affordable mobility solutions that meet human needs and help people build a better way of life. Unequal access to transportation often limits the opportunities available to those most in need. Better mobility is part of the solution to unemployment and income disparities.

### Related links

[This Report](#)

→ [Climate Change](#)

1. United Nations, Department of Economic and Social Affairs/Population Division. "World Urbanization Prospects: The 2011 Revision."



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## Key Partners

Mobility issues are complex and rapidly changing – and too big for one company to solve on its own. Developing solutions to mobility challenges requires innovative, systems thinking, across a wide range of stakeholder groups. We partner with organizations that can give us access to the latest research, insights and integrative ability.

For example, Ford has been working with the University of Michigan's Sustainable Mobility and Accessibility Research and Transformation (SMART) project since 2005. SMART takes a collaborative, systems approach to developing innovative, sustainable and connected mobility and accessibility solutions in urban regions around the globe. Building on the seminal work of Moving the Economy in Toronto, SMART has pioneered new thinking, new partnerships and pilot projects related to emerging markets and industry development. SMART's technology transfer collaborations, which are active globally, focus on three primary areas: "Connecting the Dots" (taking a systems approach); "Moving Money" (advancing innovation and New Mobility industry, jobs and economic development); and "Moving Minds" (attitudes and behaviors of people and decision-makers related to New Mobility).

Ford and SMART are leveraging each other's strengths to develop New Mobility business opportunities and markets while seeking to improve quality of life, employment and other community benefits in cities around the world over the long term.

SMART has been working with Ford's support to develop new visual and analytical platforms and tools for advancing new mobility industry development and enterprise. These tools are focused on understanding how markets grow in general, and how they grow for New Mobility in particular, to support economic development from Mobility. Additional projects are assessing cultural and demographic shifts and entrepreneurship with the objective of informing our product, service and technology development as well as our new mobility marketing strategies.

This approach is reflected in our support for educational goals as well. SMART and Ford are among several organizations funding programs at the University of Michigan's Zell Lurie Institute, which gives students real-world experience studying and applying scalable, energy-efficient mobility systems that have been deployed in countries around the world.

For more information, visit the [SMART](#) website.

Also, see the [Electrification](#) section for a discussion of a partnership with Whirlpool and others focused on improving the energy efficiency of cars, homes and the electric grid as a system.

## Ford-Branded Bicycles

What's an automobile manufacturer doing working on bicycles? Furthering our vision for urban mobility.

In 2013, we announced a partnership with Dahon, a leader in folding bicycles, to produce a complete line of new Ford-branded bicycles. Expected to launch in 2014, the licensing agreement will create a range of folding bicycles and electronic bikes (also known as e-bikes) for adults and children.

Both Ford and Dahon are committed to delivering smart, high-quality mobility solutions that meet customers' needs. Together, the two companies hope to influence more people to change their transportation habits and reduce carbon emissions.



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## Case Study: Saving Lives in Rural India

Henry Ford believed vehicles like his Model T would improve lives through greater mobility. Many generations later, and half a world away, a 21<sup>st</sup>-century Ford vehicle brought that vision to life – quite literally.

In the remote hills of Tamil Nadu, India, an innovative pilot project sponsored by Ford Motor Company helped several dozen pregnant women overcome geographical and technological barriers that are roadblocks to adequate health care.

Called Sustainable Urban Mobility with Uncompromised Rural Reach (SUMURR), the program made use of a Ford Endeavour that was designed to handle difficult terrain and traverse areas previously unreachable by four-wheeled vehicles. Medical professionals traveled in the Endeavour to reach their patients and to transport those patients to clinics. The health care teams also could use their laptops and cell phones to connect – via a wireless connection – to doctors and medical records. In all, 41 pregnant women delivered healthy babies thanks in large part to the Ford pilot project.

In the hilly villages of Kallakurichi, maternal and infant mortality is an all-too-common tragedy, with half of all pregnant women and their newborns at high risk of death, disease or disability resulting from inadequate care. Deliveries frequently occur in homes and are rarely attended by trained health professionals. Some of the villages are so remote that government-sponsored nurses have difficulty accessing them. Many pregnant women go for months – if not for their entire pregnancies – without any medical care.

We partnered with the Tamil Nadu Directorate of Public Health, the Indian Institute of Technology Madras (IIT Madras), the U.S. Department of State, George Washington University, and Hand in Hand India, a nonprofit focused on the empowerment of women. Between June 2012 and February 2013, the SUMURR program enabled some 1,600 women and children to receive health care, including immunizations and screenings for basic illnesses, at 27 pediatric and gynecology camps set up in remote villages. Many of these locations had never seen physicians before.

SUMURR ultimately reached another 3,100 people as our partners traveled to 54 villages to build community awareness on issues of maternal and child health. Originally, the project partners planned to work in 29 villages. But local nurses in other remote villages saw the benefits and asked to be included, explained K.S. Sudhakar, a project director for Hand in Hand.

Following the success of the pilot, we're exploring similar programs in other parts of rural India and in other countries where we have manufacturing operations. Ford invested about \$250,000 directly in the project, plus significantly more in terms of the time and expertise of our staff.

SUMURR isn't just altruism – there's a business rationale behind it, too. The SUMURR project offers one model of how Ford can leverage our expertise in fleet vehicles, data and financing to meet social needs and develop new markets.

"SUMURR exemplifies how Ford is using its global reach to address regional issues and causes around the world, and at the same time identify local social and technology entrepreneurs that we can partner with to further develop the kind of solutions that will shape our future," said K. Venkatesh Prasad, Ford's senior technical leader for open innovation, who oversaw the SUMURR technology development. "The fundamental aspects of what we did in rural India could very much wind up in the driveways of Detroit."





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## A. Cumulative Shareholder Five-Year Return



Provided by third party: Standard & Poor's, a division of the McGraw Hill Companies, Inc.

## Data notes and analysis

Updated data to reflect 2008 base.

For more information, please see Ford's [Annual Report](#).

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## B. Selected Financial Performance Indicators

	2008	2009	2010	2011	2012	2013
Revenues (\$ billion)†	146.3	116.3	129	136	133.61	146.9
Net income/(loss) attributable to Ford Motor Company (\$)	(14.7)	2.7	6.6	20.2	5.7	7.2

billion)†

Stock price range (per share) (\$)	1.01–8.79	1.50–10.37	9.75–17.42	9.05–18.97	8.82–13.08	<b>12.10–18.02</b>
Diluted per share amount of net income/(loss) (\$)	(6.46)	0.86	1.66	4.94	1.42	<b>1.76</b>
Cash dividends per share declared (\$)†	0	0	0	0.05	0.15	<b>0.4</b>
Automotive gross cash (\$ billion)‡	13.4	24.9	20.5	22.9	24.3	<b>24.8</b>
Shareholder return (percent)‡	(66)	337	67.9	(36)	23	<b>22</b>

✓ † Audited for disclosure in the Ford Annual Report on Form 10-K

👤 ‡ Provided by third party: Standard & Poor's, a division of the McGraw Hill Companies, Inc.; includes reinvestment of dividends

#### Data notes and analysis

1. Revenues for 2012 were restated due to a retroactive accounting policy change.
2. Automotive gross cash includes cash and cash equivalents and marketable securities, net of any securities-in-transit.

For more information, please see Ford's [10-K and 8-K](#) and [Annual Report](#).

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## C. Profile of Ford Investors

	2008	2009	2010	2011	2012	<b>2013</b>
Institutional Investors:	57	47	57	48	51	<b>52</b>
Top 15	33	28	29	23	25	<b>24</b>
Others	24	19	28	25	26	<b>28</b>
Employees and Management	12	9	7	7	7	<b>6</b>
Individuals <sup>1</sup>	31	44	36	45	42	<b>42</b>

👤 Provided by third party

#### Data notes and analysis

1. The ownership by individuals includes shares owned by the Ford family and by Ford employees and management outside of the Company savings plans.

For more information, please see Ford's [Annual Report](#).

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## D. Worldwide Income Taxes Paid

	2008	2009	2010	2011	2012	<b>2013</b>
Income taxes paid / (refunded)	553	(764)	73	268	344	<b>538</b>

#### Data notes and analysis

We are now reporting our Worldwide Income Taxes Paid, details of which can be found in the [10-K](#) on FS-74.

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Voice: Larry Fink

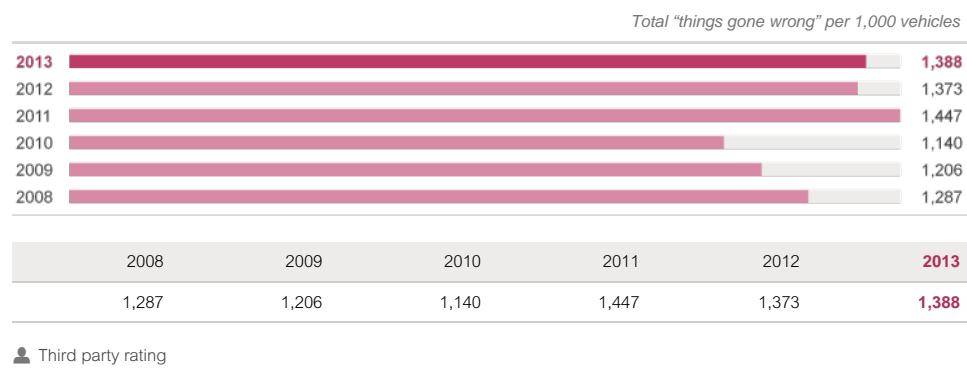
## Data: Product, Quality and Service

## Data on this page

- A. ↴ GQRS "Things Gone Wrong" (TGW) (3 months in service)
- B. ↴ GQRS Customer Satisfaction (3 months in service)
- C. ↴ Sales Satisfaction with Dealer/Retailer
- D. ↴ Service Satisfaction with Dealer/Retailer

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## A. GQRS "Things Gone Wrong" (TGW) (3 months in service)



## Data notes and analysis

Global full-year "things gone wrong" (TGW) was 1,388 compared to 1,373 in 2012, an increase of 1 percent. In the past several years, we have been dramatically increasing the innovative technologies in our vehicles, the number of new models we introduce, and the speed with which we release them. In addition, we are boosting production in the U.S. and other regions to match growing demand for our vehicles. All of these trends increase the pressure on both our own and our suppliers' design, production and quality systems. The Global Quality Research System (GQRS) is a Ford-sponsored competitive research survey. For the 2011 model year, we began reporting global GQRS TGW data. In previous years we had reported only North American region GQRS TGW data. In addition, we changed the GQRS survey to include additional questions on vehicle entertainment and information systems. Therefore, the 2011 results are not comparable to previous years.

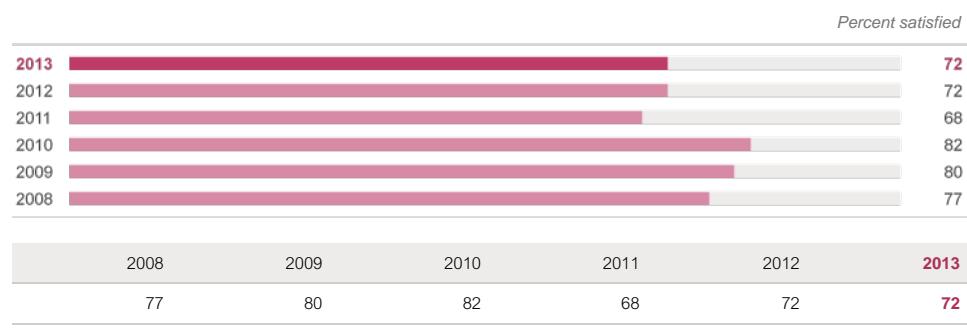
## Related links

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## B. GQRS Customer Satisfaction (3 months in service)



## Data notes and analysis

In 2013, global full-year customer satisfaction was 72 percent, the same as in 2012. In the past several years, we have been dramatically increasing the innovative technologies in our vehicles, the number of new models we introduce, and the speed with which we release them. In addition, we are boosting production in the U.S. and other regions to match growing demand for our vehicles. All of these trends increase the pressure on both our own and our suppliers' design, production and quality systems. The Global Quality Research System (GQRS) is a Ford-sponsored competitive research survey. For the 2011 model year, we began reporting global GQRS TGW data. In previous years we had reported only North American region GQRS TGW data. In addition, we changed the GQRS survey to include additional questions on vehicle entertainment and information systems. Therefore, the 2011 results are not comparable to previous years.

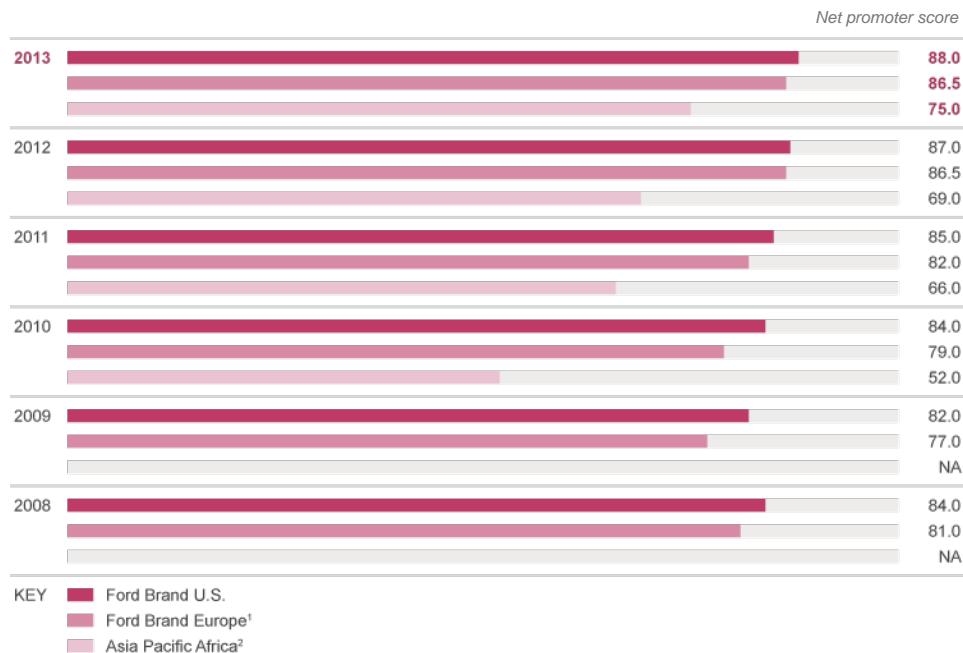
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## C. Sales Satisfaction with Dealer/Retailer



	2008	2009	2010	2011	2012	2013
Ford Brand U.S.	84.0	82.0	84.0	85.0	87.0	88.0
Ford Brand Europe (UK, Germany, Italy, France, Spain) <sup>1</sup>	81.0	77.0	79.0	82.0	86.5	86.5
Asia Pacific Africa <sup>2</sup>	NA	NA	52.0	66.0	69.0	75.0

## Data notes and analysis

1. European sales and service satisfaction with dealers and retailers are net promoter scores based on 24 European markets, including Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

2. We initiated the sales satisfaction with dealer/retailer in our Asia Pacific Africa region in 2010.

## Related links

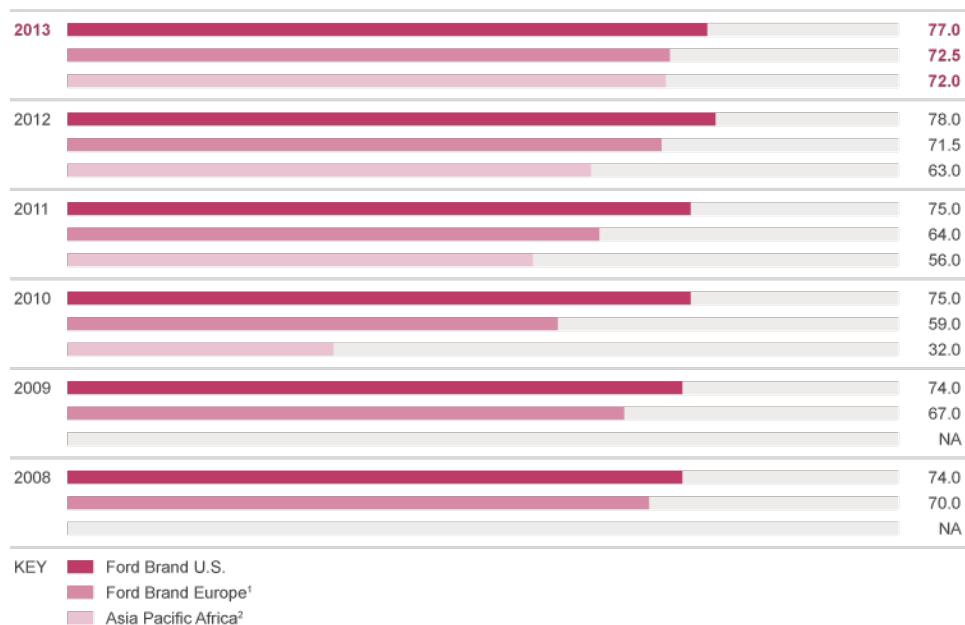
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## D. Service Satisfaction with Dealer/Retailer

Net promoter score



**KEY**

- Ford Brand U.S.
- Ford Brand Europe<sup>1</sup>
- Asia Pacific Africa<sup>2</sup>

	2008	2009	2010	2011	2012	2013
Ford Brand U.S.	74.0	74.0	75.0	75.0	78.0	<b>77.0</b>
Ford Brand Europe (UK, Germany, Italy, France, Spain) <sup>1</sup>	70.0	67.0	59.0	64.0	71.5	<b>72.5</b>
Asia Pacific Africa <sup>2</sup>	NA	NA	32.0	56.0	63.0	<b>72.0</b>

### Data notes and analysis

Prior to 2008, only warranty repair visits were measured. Starting in 2009, customer-paid repair and maintenance visits are also included. These additions have had a small negative impact on the 2009 score.

1. European sales and service satisfaction with dealers and retailers are net promoter scores based on 24 European markets, including Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

2. We initiated the service satisfaction with dealer/retailer in our Asia Pacific Africa region in 2010.

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Case Study: The Future of Pickup Trucks

Voice: Larry Fink

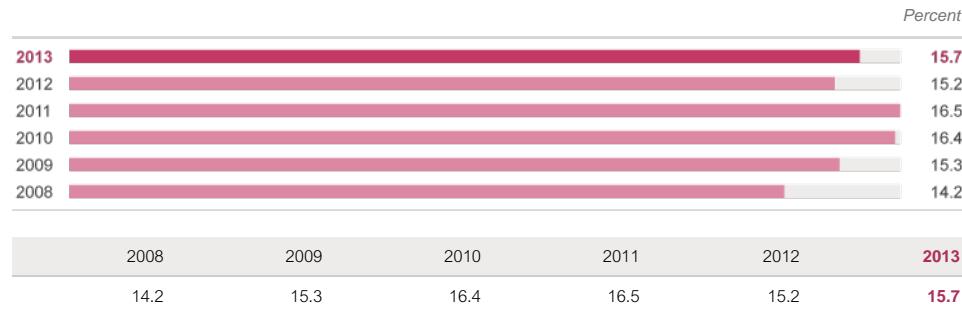
## Data: Market Share and Sales

## Data on this page

- A. ↓ Ford Motor Company Market Share – United States
- B. ↓ Ford Motor Company Market Share – Europe
- C. ↓ Ford Credit Market Share – United States
- D. ↓ Ford Credit Market Share – Europe
- E. ↓ Summary of Vehicle Unit Sales
- F. ↓ First-time Ford Buyers (Owners who Acquired a New Vehicle for the First Time)
- G. ↓ Owner Loyalty (Customers Disposing of a Ford Motor Company Product and Acquiring Another)

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## A. Ford Motor Company Market Share – United States



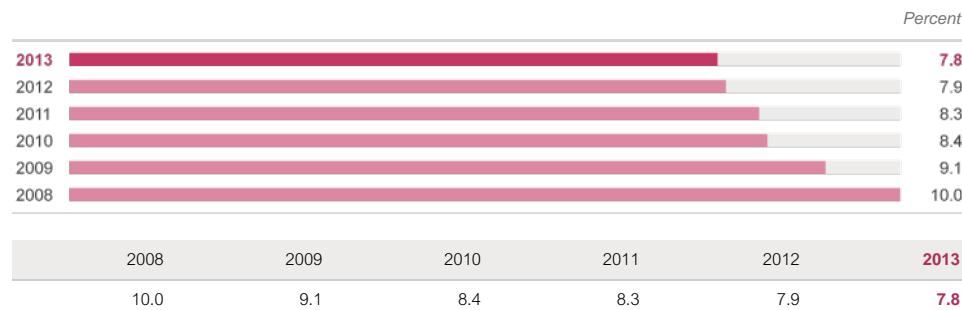
## Data notes and analysis

2012 market share was adjusted to correct a decimal place error.

The competitive environment in the United States remains intense. In 2013, our market share was up 0.5 percentage points to 15.7% of the industry.

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## B. Ford Motor Company Market Share – Europe



## Data notes and analysis

In 2013, Ford was again the second best-selling car brand in the traditional 19 markets we tracked in Europe. Our continued market strength reflects the strong momentum of our new or refreshed vehicles, including the B-MAX, Fiesta, Kuga, Tourneo Custom, and Transit Custom. Within the 19 markets, Britain and Germany are our highest-volume markets. Any change in the British or German market has a significant effect on the results of Europe.

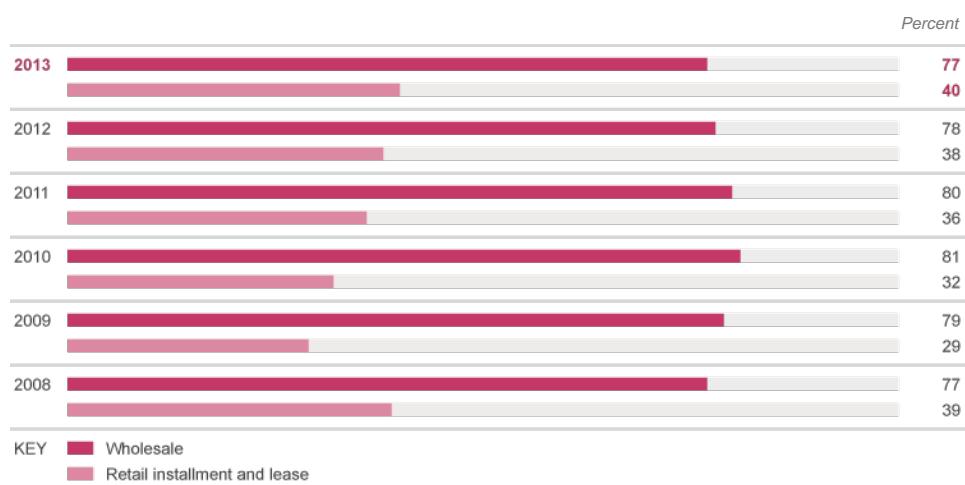
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→ Ford of Europe

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### C. Ford Credit Market Share – United States



	2008	2009	2010	2011	2012	2013
Wholesale	77	79	81	80	78	<b>77</b>
Retail installment and lease	39	29	32	36	38	<b>40</b>

Reported to regulatory authorities

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**Data notes and analysis**

These data include Ford, Lincoln and Mercury brands only.

For more information on Ford Credit, please visit [www.fordcredit.com](http://www.fordcredit.com). For more information on Ford Credit financial information, visit the [Ford Credit investor center](#).

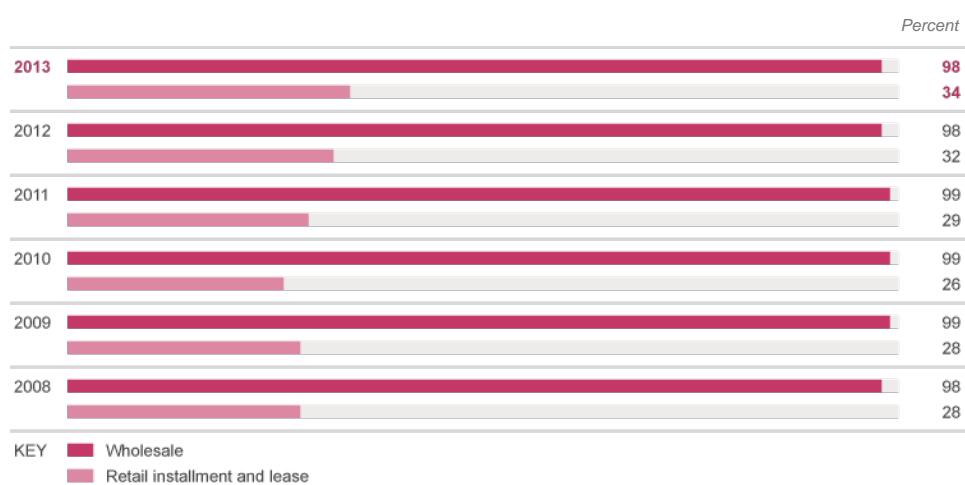
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### D. Ford Credit Market Share – Europe



	2008	2009	2010	2011	2012	2013
Wholesale	98	99	99	99	98	<b>98</b>
Retail installment and lease	28	28	26	29	32	<b>34</b>

#### Data notes and analysis

These data include Ford brand only.

For more information on Ford Credit, please visit [www.fordcredit.com](http://www.fordcredit.com). For more information on Ford Credit financial information, visit the [Ford Credit investor center](#).

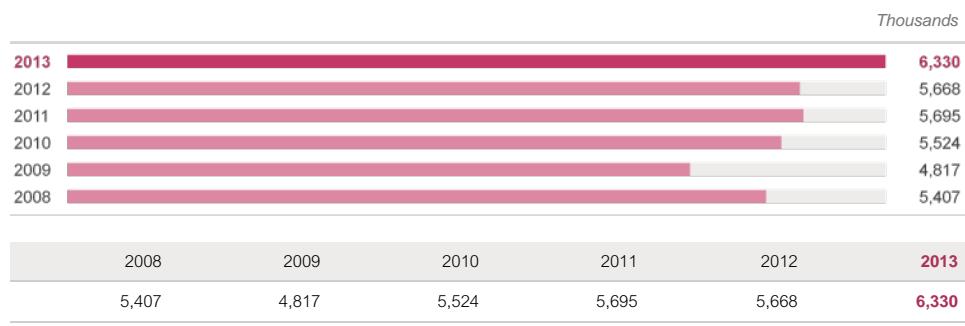
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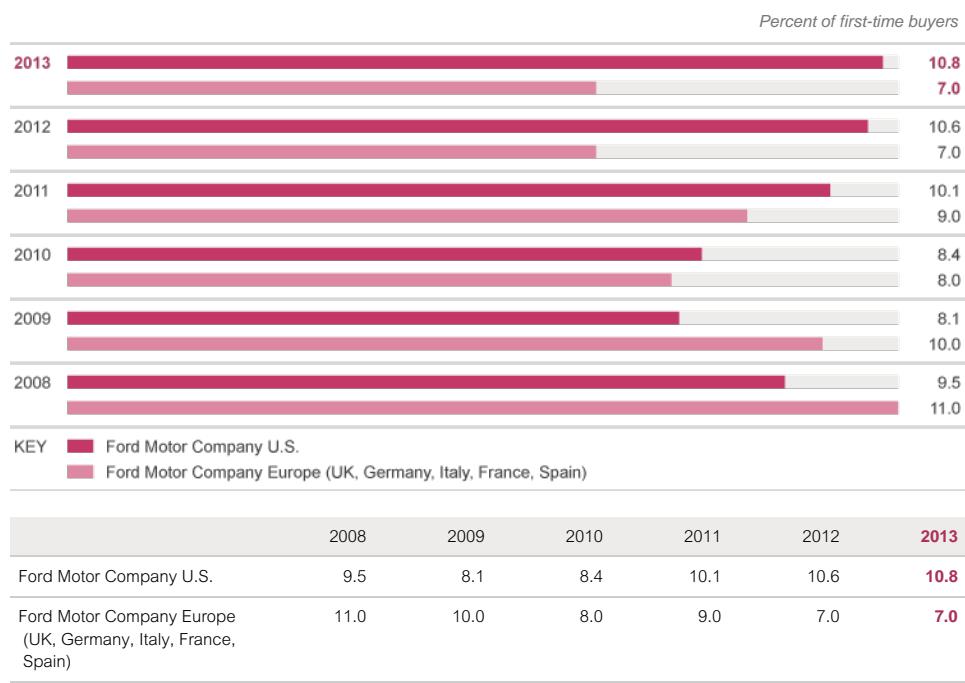
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## E. Summary of Vehicle Unit Sales



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## F. First-time Ford Buyers (Owners who Acquired a New Vehicle for the First Time)



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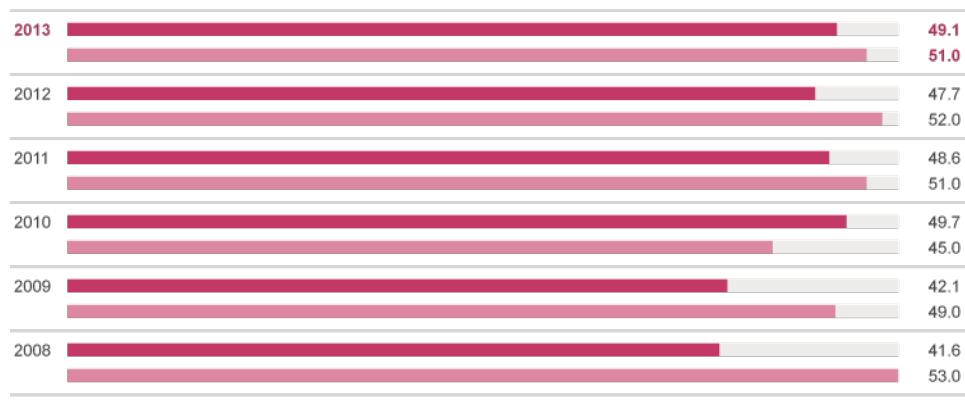
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## G. Owner Loyalty (Customers Disposing of a Ford Motor Company Product and Acquiring Another)

Percent loyal to corporation



KEY

█ Ford Motor Company U.S.

█ Ford Motor Company Europe (UK, Germany, Italy, France, Spain)

	2008	2009	2010	2011	2012	2013
Ford Motor Company U.S.	41.6	42.1	49.7	48.6	47.7	<b>49.1</b>
Ford Motor Company Europe (UK, Germany, Italy, France, Spain)	53.0	49.0	45.0	51.0	52.0	<b>51.0</b>

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Case Study: The Future of Pickup Trucks

Voice: Larry Fink

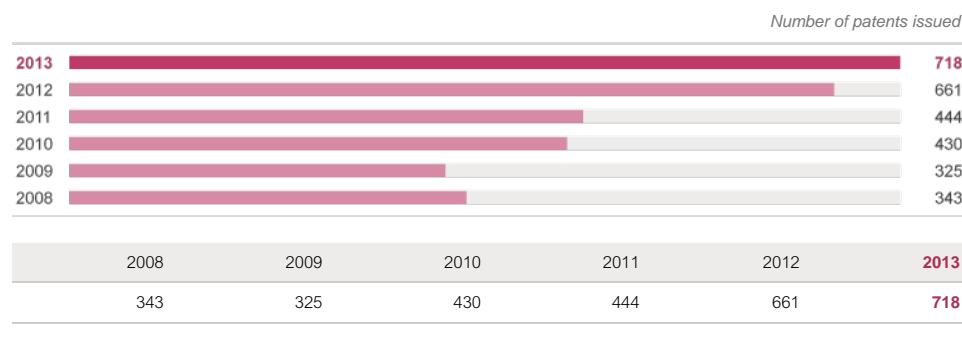
## Data: Innovation

### Data on this page

A. U.S. Utility Patents Issued to Ford and Subsidiaries

View all data on this page as [charts](#) | [tables](#)

### A. U.S. Utility Patents Issued to Ford and Subsidiaries



### Data notes and analysis

Utility patents are patents that cover the useful features of an invention, and these are measures of technological innovation. We have generated a large number of patents related to the operation of our business and expect this portfolio to continue to grow as we actively pursue additional technological innovation. The average age for patents in our active patent portfolio is five years.

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**> Case Study: The Future of Pickup Trucks**

Voice: Larry Fink

## Case Study: The Future of Pickup Trucks

Ford's F-Series lineup of full-size pickup trucks, developed more than six decades ago, has been the best-selling truck in the U.S. for 37 years and the best-selling vehicle of any kind for 32 years.

When it came time to update the F-150, one of Ford's most important products, we faced a pivotal question: How do you improve on such a successful vehicle? Do you change it incrementally or take a leap forward? We chose the leap forward approach, reinventing the 2015 F-150 as the toughest, smartest and most capable F-150 yet. It's all-new from the wheels up. We rethought everything from the materials used to the engines offered, because it was the right thing to do for our customers and helped to align the vehicle with our [Blueprint for Sustainability](#).

The 2015 F-150 demonstrates how capability and efficiency do not have to be mutually exclusive. When designing the all-new F-150 to meet or exceed the toughness F-Series customers depend on, Ford invested in advanced materials that improve stiffness and durability while reducing weight to improve towing, payload and gas mileage.

Starting with the signature fully boxed frame, Ford engineers increased the use of high-strength 70,000-psi steel – from 23 percent to 77 percent of the frame. The new frame is up to 60 pounds lighter than the previous model. High-strength, military-grade, aluminum alloys – already used in aerospace, commercial transportation, energy and many other rugged industries – are used throughout the F-150 body for the first time, improving dent and ding resistance, and also saving weight. Overall, up to 700 pounds of weight have been saved, helping the F-150 haul more, accelerate quicker and stop shorter, all while contributing to efficiency.

Changes were made under the hood as well, with four engine options that include an all-new 2.7L EcoBoost® with standard Auto Start-Stop technology, delivering an important combination of power and efficiency. The 2015 F-150 also showcases a wide range of features, described below, in line with our approach to make vehicles that are green, safe, smart and of the highest quality. We have filed for more than 100 patents related to the all-new F-150.

### Green

Features of the all-new F-150 that build on the weight reduction to achieve better fuel economy include:

- Four engine choices, including an all-new, even more efficient 2.7L EcoBoost engine that offers the same power as some mid-range V8s and includes extremely high output, lightweight design and standard Auto Start-Stop. Customers can also choose a 3.5L V6 engine with twin independent variable camshaft timing, downsized from a 3.7L engine because the truck's lighter weight allowed us to use a smaller engine while maintaining the same power to weight ratio. Also available are the proven 3.5L EcoBoost and the 5.0L Ti-VCT V8.
- Auto Start-Stop technology. Unlike start-stop solutions in other vehicles, this technology – specially tuned for truck customers – shuts off the engine to save fuel when the vehicle is stopped, except when towing or in four-wheel drive. The engine restarts in milliseconds when the brake is released.
- Active Grille Shutters on models equipped with EcoBoost engines. Active Grille Shutters stay open when extra engine cooling is needed, such as during low-speed stop-and-go driving or while working in hot weather. They automatically close to reduce aerodynamic drag at cruising speed.

### Safety and Driver Assist



Before the first 2015 F-150 rolls off the assembly line, it will have been subjected to thousands of hours and more than 10 million miles of combined real-world and simulated durability testing.

**1948**

First F-Series trucks built

**41 seconds**

A new F-series truck sold, on average, in 2013

**33+ million**

F-series trucks sold since 1948

**11 innovations**

Available for the first time in a light-duty pickup

In addition to a standard set of safety features, the F-150 features leading technologies that automatically assist drivers. They join available driver aids, including SYNC® with MyFord Touch®, hill start assist, MyKey®, rear view camera, reverse sensing and trailer brake controller to manage a trailer's brakes.

- Second-row inflatable safety belts, which work like a traditional belt but include a tubular airbag that inflates in the event of a crash and distributes the force of the impact across a wider area of the passenger's chest;
- Curve Control, which automatically provides more aggressive four-wheel braking when the truck is going into a corner too fast;
- Adaptive cruise control, allowing drivers to set a cruising speed and use radar technology to monitor traffic ahead and maintain a safe distance between vehicles;
- Lane-Keeping System, which is designed to help avert unintentional drifting of the vehicle outside the intended driving lane by automatically detecting the left- or right-hand road lane markings using a camera mounted between the windshield and interior rearview mirror; and
- Blind Spot Information System with Cross-Traffic Alert, which uses radar hidden in the taillamps to detect a vehicle entering a driver's blind spot while driving or backing up.

## Smart

From farms to construction sites, our customers want a truck that is a dependable partner, a mobile office and a go-anywhere workshop. The F-150 uses more technology than ever to stay connected and work efficiently, including:

- New 8-inch LCD productivity screen in the instrument panel, which includes updated truck apps – from fuel economy to towing tips – and the ability to create a customized home screen for customers to access their most frequently used apps in one place.
- Trailer hitch assist, a new rearview camera feature that adds a dynamic line based on steering wheel angle in the display to help customers line up truck and trailer without requiring a spotter or having to get out of the vehicle.
- Smart trailer tow module, using an all-new smart trailer tow wiring harness that helps identify and inform the driver of potential trailer connectivity issues, burned or unlit trailer marker lamps, and brake light and trailer battery faults.
- LED spotlights on sideview mirrors, which provide powerful, durable and bright lighting around the truck exterior.
- LED lighting embedded in the walls of the cargo box, which brightly illuminates the box interior to help customers quickly find tools or other items.
- Integrated loading ramps, which enable easy loading of ATVs, motorcycles and mowers.
- BoxLink™, which is a combination of metal brackets and custom cleats used to secure a variety of accessories in the cargo box, from ramps to storage bins to bed dividers.
- Remote tailgate, allowing for the tailgate to be locked, unlocked and released with the key fob – eliminating manual locking and increasing convenience and security. The tailgate also is damped, dropping down, hands-free, to a flat position when opened.
- High-wattage power outlets (400 watts, 110 volts) in the cab, allowing drivers to easily charge corded tools, battery chargers or mobile devices on-site or while driving.
- Next-generation tailgate step, which is now fully integrated inside the tailgate and virtually invisible when not in use.
- Rear under-seat storage in F-150 Super and Crew cabs, providing hidden storage for valuables. Two storage bins also are located underneath the rear seats.
- Boxside step, now available for the short 5.5-foot box.

## Quality

Before the first 2015 F-150 rolls off the assembly line, it will have been subjected to thousands of hours and more than 10 million miles of combined real-world and simulated durability testing.

The new F-150 towed trailers over mountain passes in temperatures above 120 degrees, withstood frame-punishing terrain on an off-road course and conquered a frozen lake at minus 40 degrees. It endured high-humidity chambers, salt vats and riverbeds. The F-150 towed heavy loads up grueling, steep roads.

Robots slammed doors, seats and tailgates thousands of times over, and dropped heavy objects onto the bed of the truck. It persevered through twisting and shaking from multiple directions for days at a time. Some Ford tests are so extreme that a five-day period equals 10 years or 150,000 miles of abuse by the roughest customers.

To test the high-strength, aluminum alloy for corrosion, Ford developed a modified, more aggressive corrosion test using an acidified spray. After simulating 10 years of exposure, the aluminum material showed virtually no signs of degradation. Ford even developed an all-new paint process for aluminum, and will lay claim to the two highest-volume aluminum paint shops in the world.



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## SUSTAINABILITY REPORT 2013/14

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Case Study: The Future of Pickup Trucks

› **Voice: Larry Fink**

## Voice: Larry Fink

Chairman and Chief Executive Officer, BlackRock

  
When companies are transparent about their sustainability efforts, investors and customers can understand what the company is doing and why. Without such understanding, companies won't get credit for what they are doing well or for improvements they make, and investors won't be able to direct their capital appropriately."

How we do plan for the future? As an investor with a strong fiduciary duty to our clients, it is something we at BlackRock ask ourselves constantly. Most of the assets we manage are intended to help support people in their retirements – retirements that are often 20 or 30 years in the future and may last another 20 or 30 years beyond that.

That's why the issue of financial sustainability is at the center of our thinking. How do we find companies to invest in that will deliver sustainable growth, not just for several quarters, but for many years? How do we help clients, whether they are corporations or individuals, identify strategies that will deliver the returns to meet obligations that may stretch decades into the future? How do we ensure our own strategy as a firm is sustainable, so we can continue to deliver on our commitments to our clients, our people and our own shareholders for years to come?

While businesses must navigate many near-term challenges, those that keep an eye on the future are typically better able to weather the challenges that come along – from unexpected storms like the financial crisis to ongoing challenges like climate change. That's because they've made the investments that foster long-term, sustainable growth, instead of looking for an easy short-term payout.

It concerns us as a long-term investor that, in the wake of the financial crisis, many companies have shied away from investing in the future growth of their companies, often by favoring buybacks or dividend increases over making investments in their future growth. We certainly believe that returning cash to shareholders should be part of a balanced capital strategy; however, when done for the wrong reasons and at the expense of capital investment, it can jeopardize a company's ability to generate sustainable long-term returns.

We do recognize the balance that must be achieved to drive near-term performance while simultaneously making those investments that will sustain growth – in innovation and product enhancement, capital and plant equipment, employee development and internal controls and technology.

Financial sustainability also demands that companies be mindful of their social and environmental impact. Companies affect and are affected by any number of social and environmental trends – increased longevity, pollution and climate change, natural resource depletion and changing consumer attitudes, to name a few. By monitoring their own impact (and that of others), companies are better able to assess both risks and opportunities, giving their shareholders, customers and employees a distinct advantage.

When companies are transparent about their sustainability efforts, investors and customers can understand what the company is doing and why. Without such understanding, companies won't get credit for what they are doing well or for improvements they make, and investors won't be able to direct their capital appropriately. The quality of a company's leadership has a profound impact on (and relationship to) the way it approaches issues of sustainability. When investing on behalf of clients, we evaluate how environmental, social and governance factors impact financial performance. And those assessments depend, in part, on a company's transparency.

We also work with clients to match their expectations for investment returns with the development and sustainability priorities of communities around the world. For example, we recently helped a client with the world's largest "green" bond project to date: a \$1 billion offering with a major European insurance group. The project is a "win-win" that provides the company with attractive returns while strengthening the market for these types of "green" securities. The transparency, liquidity and impact reporting of green bonds contribute to the creation of a robust and credible market, and the bonds themselves support projects that improve local communities worldwide.

At BlackRock, we know that the financial sustainability of our own company is closely intertwined with environmental and social issues. While we do not have a particularly large direct impact from our own operations, due to the nature of our business, we are nonetheless conscious of doing our part. When BlackRock needed to build a new data center – something that obviously takes an enormous amount of energy to run – we decided to locate it in upstate New York so that we could access hydropower in the area. This not only limited the environmental impact, it also made economic sense. We pay 3 cents per kilowatt hour (kWh) in that location; just a few hours away, in New York City, we pay 22 cents per kWh, and in Germany, for example, we would pay 46 cents per kWh.

Perhaps the greatest challenge to financial sustainability for our society today, however, is the one posed by the effects of longevity. The blessing of longer lives has created financial obligations that many institutions and individuals are simply not prepared to meet. People need to understand the longer arcs of their lives and rethink how they plan to support themselves through their entire lives, including through retirements that might be much longer than they anticipated. It's a complex challenge that workers and their employers, as well as policy makers, all have an urgent need to address.

Ultimately, we believe that the question of financial sustainability comes down to a shared responsibility – the responsibility of businesses, governments and individuals to take a long-term view, be aware of how the world is changing and help prepare for that future.



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Year in Review



Our Blueprint for  
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Climate Change and the  
Environment



Water



Vehicle Safety



Supply Chain



People



Ford Around the  
World

## Climate Change and the Environment

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▼ Greening Our Products

▼ Greening Our Operations

▼ Data

Case Study: Ford Fleet Purchase Planner

Voice: John Fleming



## Climate Change and the Environment

We have comprehensive strategies and goals for minimizing our environmental impacts, including reducing our contribution to climate change.

Read more about [OUR APPROACH TO CLIMATE CHANGE AND THE ENVIRONMENT](#)



## CLIMATE CHANGE STRATEGY

Ford has a science-based strategy to reduce greenhouse gas (GHG) emissions from our products and operations that focuses on doing our share to stabilize carbon dioxide (CO<sub>2</sub>) concentrations in the atmosphere.

Read more about [OUR STRATEGY, COMMITMENT AND PROGRESS](#)

## OUR GOALS AND PERFORMANCE PROGRESS

Goal: For each of our new or significantly refreshed vehicles, continue to offer a powertrain with leading fuel economy.



We reduced the average CO<sub>2</sub> emissions of our European car fleet by 18% between 2007 and 2013. In the U.S. in 2013, we improved the average fuel economy of our car fleet by 2% and of our truck fleet by 3% compared with 2012.<sup>1</sup>



Goal: Reduce CO<sub>2</sub> emissions from our facilities by 30% per vehicle produced from 2010 to 2025.

In 2013, we reduced facilities CO<sub>2</sub> emissions per vehicle produced by 9% and average energy consumed per vehicle produced by 4% compared with 2012.



Goal: Reduce waste sent to landfill by 40% on a per-vehicle basis between 2011 and 2016 globally.

We reduced waste to landfill per vehicle produced by 14% in 2013 compared with 2012.

See more at [FORD'S GOALS, COMMITMENTS AND STATUS](#)



## SUSTAINABLE TECHNOLOGIES AND ALTERNATIVE FUELS PLAN

Our sustainable technologies and alternative fuels plan is our route to improving fuel economy and cutting the CO<sub>2</sub> emissions of our products around the world. We have already implemented all of the near-term and many of the mid-term elements of this plan.

Read more about our [SUSTAINABLE TECHNOLOGIES AND ALTERNATIVE FUELS PLAN](#)



### Case Study: [HELPING FLEET CUSTOMERS MEET ENVIRONMENTAL AND COST GOALS](#)

We have developed a suite of purchasing tools to help fleet customers understand the most cost-effective ways to reduce the carbon emissions of their vehicle fleets, helping them meet environmental and financial goals simultaneously.



### Voice: [JOHN FLEMING](#)

Executive Vice President, Global Manufacturing and Labor Affairs, Ford Motor Company

"When we consider building a new plant, we look at the same issues no matter where we are thinking of locating the facility – air emissions, water usage, waste water and waste. But of course the emphases may vary depending on the local conditions."



## ELECTRIFICATION

We are taking a comprehensive approach to electrified vehicles (EVs). We have introduced six EV products. We are developing a suite of customer support tools such as charging station locators and fuel-efficiency tracking apps and working with utilities, cities and other partners to develop an electrified vehicle ecosystem that facilitates the adoption and use of EVs.

Read more in [ELECTRIFICATION: A CLOSER LOOK](#)

## 2013 HIGHLIGHTS



**114 million +**  
all-electric miles driven by Ford full battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) customers so far, resulting in an 8 million kg reduction in CO<sub>2</sub> compared to gasoline-powered miles.



**100%**  
of Ford vehicles produced in North America have used soy foam seating since 2011.

1. Our U.S. combined car and truck corporate average fuel economy decreased by 1.7% in 2013 due to increased customer demand for trucks versus cars.



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## Climate Change and the Environment

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Case Study: Ford Fleet Purchase Planner

Voice: John Fleming

## Overview

At Ford, we have been working for many years to reduce the environmental impacts of our vehicles and operations.

For example, we are doing our part to prevent or reduce the potential for environmental, economic and social harm due to climate change. We have a science-based strategy to reduce greenhouse gas (GHG) emissions from our products and operations that focuses on doing our share to stabilize carbon dioxide (CO<sub>2</sub>) concentrations in the atmosphere. We are on track to meet the central elements of our strategy: For each of our new or significantly refreshed vehicles, we will continue to offer a powertrain with leading fuel economy and we are reducing GHG emissions across our global product portfolio. We have also set a goal to reduce our facility CO<sub>2</sub> emissions per vehicle by 30 percent by 2025 compared to a 2010 baseline, building on our reduction of 31 percent from 2000 to 2010.

We are committed to reducing other elements of the environmental footprint of our vehicles and operations as well. For example, we continue to increase the use of sustainable materials in our vehicles. And, we reduced waste to landfill by 14 percent per vehicle produced from 2012 to 2013 and are implementing a plan to reduce waste sent to landfill by 40 percent on a per-vehicle basis between 2011 and 2016 globally. We are also continuing to reduce emissions of volatile organic compounds from our operations through the use of innovative technologies.

In this section we discuss our approach to the issue of [climate change](#) and the ways we are working to reduce the environmental footprint of our [products](#) and [operations](#).



### LIVING THE ELECTRIC LIFESTYLE

To help drivers make the transition to electric vehicles (EVs), and get the most out of their EVs, we are offering more than just the vehicle. We are delivering a total electric vehicle lifestyle.



### Case Study: [FORD FLEET PURCHASE PLANNER](#)

We have developed a suite of purchasing tools to help fleet customers understand the most cost-effective ways to reduce the carbon emissions of their vehicle fleets, helping them meet environmental and financial goals simultaneously.

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## Climate Change

Ford is committed to doing our share to prevent or reduce the potential for environmental, economic and social harm due to climate change.

We have a comprehensive, science-based global strategy to reduce greenhouse gas (GHG) emissions from our products and processes while working cooperatively with the public and private sectors to advance climate change solutions. We are taking a holistic approach to the issue, recognizing that it affects all parts of our business and is interconnected to other important issues, from water availability and energy security to human rights.

We believe our commitment to addressing the climate change issue in a comprehensive and strategic way is one of the factors that has helped to positively transform our company's current and future products and prospects.

## Our Commitment

Our climate change strategy is based on doing our share to stabilize the atmospheric concentration of carbon dioxide (CO<sub>2</sub>) at 450 parts per million (ppm), the level that many scientists, businesses and governmental agencies believe may avoid the most serious effects of climate change. This commitment includes the following:

- For each of our new or significantly refreshed vehicles, we will continue to offer a popular version powertrain with leading fuel economy.
- From our global portfolio of products, we will reduce GHG emissions consistent with doing our part for climate stabilization – even taking into account sales growth.
- We will reduce our facility CO<sub>2</sub> emissions by 30 percent from 2010 to 2025 on a per-vehicle basis, and average energy consumed per vehicle by 25 percent from 2011 to 2016 globally.

For an in-depth look at the science behind our commitment, please see [Ford's Science-Based CO<sub>2</sub> Targets](#).

Our technology migration plan for achieving vehicle CO<sub>2</sub> emissions reductions – embodied in our [Sustainable Technologies and Alternative Fuels Plan](#) – maps the road we're taking to achieve our product goals.

## Our Progress

We are on track to meet our commitments. We are making progress by adding advanced technologies to all our products and offering high-value, attractive models that are more fuel efficient while still meeting customer expectations for utility and performance. We also continue to invest in energy-efficiency improvements at our facilities worldwide and to assess carbon emissions in our supply chain through multi-stakeholder projects.

Among our recent and upcoming actions, we:

- Increased fleet-average fuel economy from our U.S. car fleet by 2 percent and our U.S. truck fleet by 3 percent in 2012 compared with 2013.<sup>1</sup>
- Reduced fleet-average CO<sub>2</sub> emissions from our European vehicles by 18 percent from the 2007 to 2013 calendar years.
- Reduced CO<sub>2</sub> emissions from our global operations in 2013 by 9 percent per vehicle produced, compared to 2012.
- Implemented our sixth engine model with our patented EcoBoost® fuel-saving technology, a 2.7L engine that will debut in the all-new 2015 Ford F-150. We will also debut a new 2.3L EcoBoost engine in our 2015 Lincoln MKC, and later in the 2015 Mustang.
- Exceeded our goal of producing 1.5 million EcoBoost engines globally by 2013, instead producing more than 2 million.
- Sold nearly 2.5 times as many electrified vehicles in 2013 as in 2012, including our Focus Electric (a battery electric vehicle) and C MAX Energi and Fusion Energi (plug-in hybrid electric vehicles), leading the market in plug-in hybrid

## Related links

### This Report

- Greening Our Products
- Greening Our Operations
- Sustainable Technologies and Alternative Fuels Plan
- Electrification: A Closer Look
- Vehicle Fuel Efficiency and CO<sub>2</sub> Progress and Performance

sales for the fourth quarter of 2013.

- Saw Ford electric vehicle customers drive over 114 million all-electric miles as of late April 2014, for a net CO<sub>2</sub> reduction of nearly 8 million kgs compared to gasoline-powered driving.
- Continued to offer three hybrid electric vehicle models: the Ford Fusion, Ford C-MAX and Lincoln MKZ.
- In Europe, offered 48 models and variants that achieve a CO<sub>2</sub> emissions level of 130 grams per kilometer (g/km), and 13 that achieve less than 100 g/km.

We discuss our [progress on vehicle fuel efficiency and CO<sub>2</sub> emissions](#) in more detail in the Greening Our Products section and our [progress in reducing facility-related energy use and CO<sub>2</sub> emissions](#) in the Greening Our Operations section.

## Supporting Climate Change Policies

Neither Ford nor the auto industry can achieve climate stabilization alone. Reducing emissions by the amount required calls for an integrated approach – a partnership of all stakeholders, including the automotive industry, the fuel industry, government and consumers. It can only be achieved by significantly and continuously reducing GHG emissions over a period of decades in all sectors of the economy. In the transportation sector, this means improving vehicle fuel economy, developing lower-carbon fuels and working with the government on complementary measures to encourage consumers to purchase these more fuel-efficient vehicles and lower-carbon fuels. We are committed to working with all key stakeholders to create policies that further promote the development of lower-carbon fuels and other complementary measures.

If there is a mismatch between available fuels, vehicles and consumers, climate stabilization goals will not be met. Accordingly, we are committed to advocating for effective and appropriate climate change policy. We are promoting comprehensive market-based policy approaches that will provide a coherent framework for GHG emission reductions, so that companies like ours can move forward in transforming their businesses with a clear understanding of their obligations. For more information on climate change policies globally please see [Climate Change Policy and Partnerships](#).

## In This Section

In this section we first provide an overview of the [climate change issue](#) and of [Ford's greenhouse gas emissions](#). We also discuss the [risks and opportunities](#) that climate change poses for Ford and our overall [climate change strategy](#). Finally we discuss [climate change public policy issues](#) and Ford's [climate change partnerships](#).

- 
1. However, our combined U.S. corporate average fuel economy declined by 1.7 percent in 2013 due to increased customer demand for trucks over cars.



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## The Issue

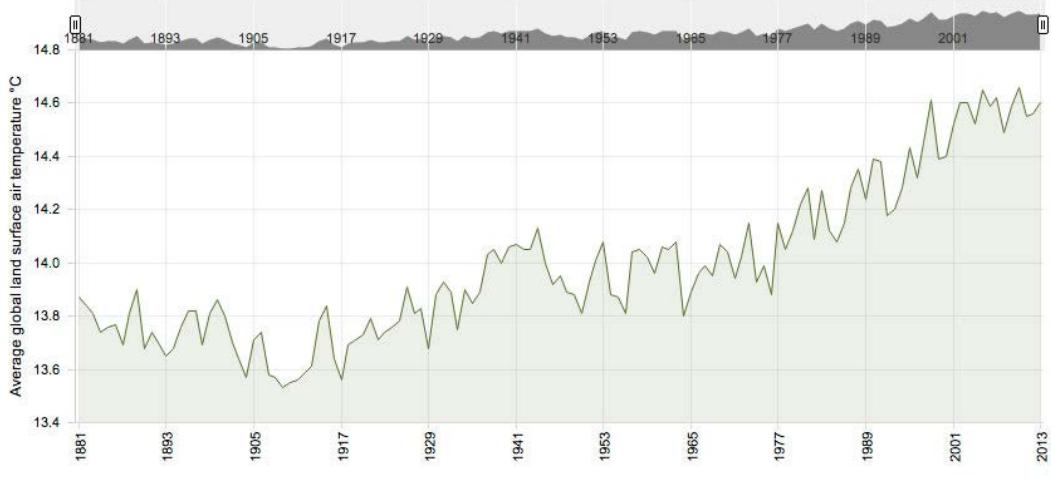
Climate change is the result of an increase in heat-trapping (greenhouse) gases in the atmosphere. Carbon dioxide (CO<sub>2</sub>) is the major long-lived greenhouse gas (GHG). The burning of fossil fuels (to provide electricity, heat and transportation, and to support industry and agriculture), as well as deforestation, leads to net emissions of CO<sub>2</sub> and increased levels of atmospheric CO<sub>2</sub>. The atmospheric concentration of CO<sub>2</sub> has increased from a preindustrial level of 270 to 280 parts per million (ppm) to a level of approximately 394 ppm at the beginning of 2013 (see Figure 1).

Global temperature records have been reported independently by scientists at the National Aeronautics and Space Administration (NASA) in the U.S., the National Oceanic and Atmospheric Administration (NOAA) in the U.S., the Climate Research Unit at the University of East Anglia in the U.K., and the Japanese Meteorological Agency. The records from these four independent groups are in good agreement and show a distinct warming trend over the past century. The past decade was the warmest decade in the instrumental temperature record. As shown in Figure 2, 2013 was among the warmest years on record. Independent measurements of rising sea levels, increasing acidification of the oceans, loss of Arctic sea ice and the retreat of glaciers around the world are consistent with the impact of rising GHG concentrations and global temperature.

Figure 1: CO<sub>2</sub> concentration measured at the observatory in Mauna Loa, Hawaii



Figure 2: Global temperature



Data source: NASA (2014)

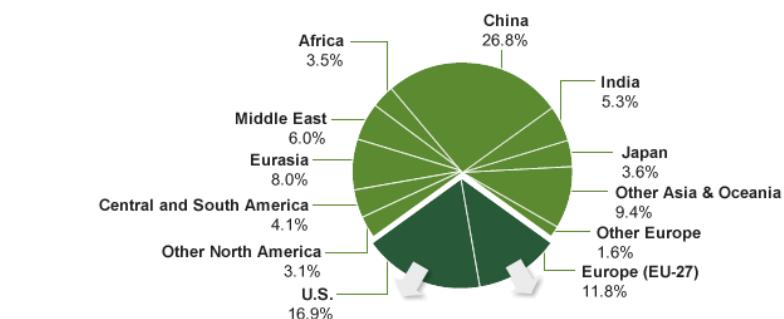
## Global Emissions

Figure 3 (below) provides a breakdown of estimated 2011 fossil fuel CO<sub>2</sub> emissions by region. For the U.S. and Europe (EU-27), the emissions are further broken down by sector and by mode in the transportation sector. The data were taken from reports published by the International Energy Agency, the European Environment Agency and the U.S. Environmental Protection Agency. Globally, emissions from cars and light-duty trucks comprise about 11 percent of all fossil fuel CO<sub>2</sub> emissions. In the U.S., cars and light-duty trucks account for approximately 20 percent of fossil fuel CO<sub>2</sub> emissions, or about 3 percent of global fossil fuel CO<sub>2</sub> emissions. In Europe, passenger cars and light-duty vehicles account for approximately 19 percent of fossil fuel CO<sub>2</sub> emissions, or about 2 percent of global fossil fuel CO<sub>2</sub> emissions.

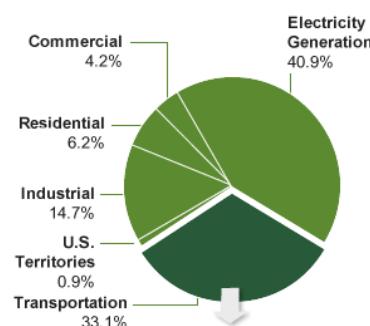
Until approximately 2007, the U.S. was the largest CO<sub>2</sub> emitter. Around 2008, however, emissions from China surpassed those from the U.S. due to China's rapid economic development, and it is expected that the gap between emissions from China and those from the U.S. will continue to widen in the future. Still, per-capita emissions of CO<sub>2</sub> in the U.S. are expected to remain higher (currently by approximately a factor of three) than those in China.

Figure 3: Regional distribution of fossil fuel CO<sub>2</sub> emissions in 2011

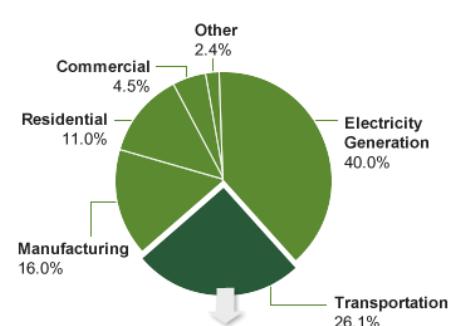
## Global CO<sub>2</sub> Emissions



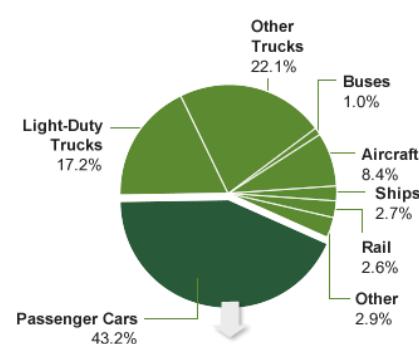
### U.S. by Sector



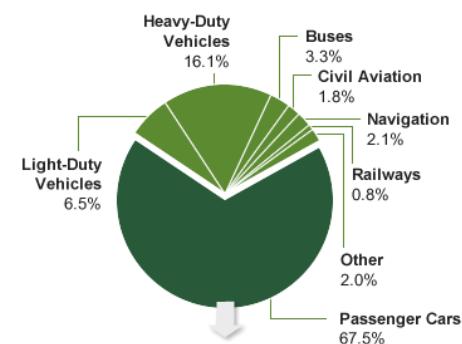
### Europe (EU-27) by Sector



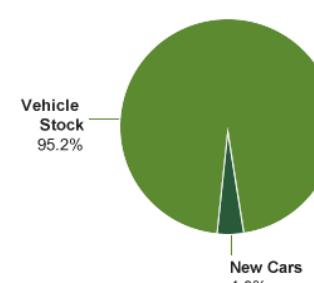
### U.S. Transportation



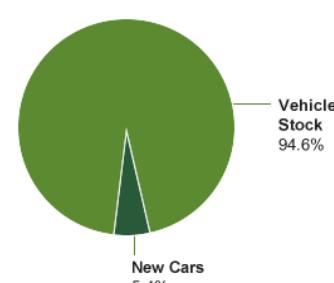
### Europe (EU-27) Transportation



### U.S. Passenger Cars



### Europe (EU-27) Passenger Cars



## Global CO<sub>2</sub> Emissions

Percent

	2011
U.S.	16.9
Europe (EU-27)	11.8
Other North America	3.1
Central and South America	4.1
Eurasia	8.0
Middle East	6.0
Africa	3.5
China	26.8
India	5.3
Japan	3.6
Other Asia & Oceania	9.4
Other Europe	1.6

**U.S. by Sector**

	Percent 2011
<b>Transportation</b>	<b>33.1</b>
U.S. Territories	0.9
Industrial	14.7
Residential	6.2
Commercial	4.2
Electricity Generation	40.9

**Europe (EU-27) by Sector**

	Percent 2011
<b>Transportation</b>	<b>26.1</b>
Manufacturing	16.0
Residential	11.0
Commercial	4.5
Electricity Generation	40.0
Other	2.4

**U.S. Transportation**

	Percent 2011
<b>Passenger Cars</b>	<b>43.2</b>
Light-Duty Trucks	17.2
Other Trucks	22.1
Buses	1.0
Aircraft	8.4
Ships	2.7
Rail	2.6
Other	2.9

**Europe (EU-27) Transportation**

	Percent 2011
<b>Passenger Cars</b>	<b>67.5</b>
Light-Duty Vehicles	6.5
Heavy-Duty Vehicles	16.1
Buses	3.3
Civil Aviation	1.8
Navigation	2.1
Railways	0.8
Other	2.0

**U.S. Passenger Cars**

	Percent 2011
Vehicle Stock	95.2
New Cars	4.8

**Europe (EU-27) Passenger Cars**

	Percent 2011
Vehicle Stock	94.6
New Cars	5.4

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## Beyond CO<sub>2</sub>

While carbon dioxide (CO<sub>2</sub>) is by far the most important greenhouse gas associated with the use of motor vehicles, small amounts of other greenhouse gases are also emitted, notably methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and hydrofluorocarbon-134a (HFC-134a). We take a holistic view of climate change and are addressing non-CO<sub>2</sub> emissions in our research, product development and operations.

Methane and nitrous oxide are combustion products formed in the engine and emitted into the atmosphere. Although the overall contribution of these pollutants is small, manufacturers have had to meet new standards for these emission constituents since 2012. We have assessed the contribution to climate change made by methane emissions from vehicles as about 0.3 to 0.4 percent of that of the CO<sub>2</sub> emissions from vehicles. We have also assessed the contribution to climate change from N<sub>2</sub>O emissions from vehicle tailpipe emissions (i.e., not including potential emissions associated with fuel production) as about 1 to 3 percent of that of tailpipe CO<sub>2</sub> emissions. The contribution from HFC-134a is slightly higher. We have estimated that the radiative forcing contribution of HFC-134a leakage from an air-conditioner-equipped vehicle is approximately 3 to 5 percent of that of the CO<sub>2</sub> emitted by the vehicle.<sup>1</sup> When expressed in terms of "CO<sub>2</sub> equivalents," the contribution of vehicle emissions to radiative forcing of climate change is dominated by emissions of CO<sub>2</sub>.

We are also addressing other non-CO<sub>2</sub> greenhouse gases such as perfluorocarbons (PFCs) and sulfur hexafluoride (SF<sub>6</sub>). Through our Restricted Substance Management Standard we have prohibited SF<sub>6</sub> in magnesium casting. We are continuing our scientific research to determine the relative contribution of a wide range of long-lived greenhouse gases on the radiative forcing of climate change. In 2013, for example, we worked with an international team of climate and atmospheric scientists to assess the global warming potentials of long-lived greenhouse gases. The values we developed were used by the Intergovernmental Panel on Climate Change (IPCC), the leading international organization for the assessment of climate change and related science, in their 2013 report on the physical basis for climate change.<sup>2</sup> And, we have assessed the contribution to climate change made by "criteria emissions" from light-duty vehicles, including hydrocarbons, nitrogen oxides (NO<sub>x</sub>), particulate matter and carbon monoxide. Given the impressive reductions in criteria emissions enabled by improvements in engine and exhaust after-treatment technology, we believe that these short-lived emission constituents from light-duty vehicles will continue to have a relatively minor influence on climate change in the future.<sup>3</sup> Their contribution will continue to decline even with no additional technological advancements in vehicles, as the existing vehicle fleet, which includes many older vehicles without the most advanced emissions technology, is replaced by new, less-polluting vehicles.<sup>4</sup>

### Reducing the Climate and Ozone Impacts of Vehicle Air Conditioning Refrigerants

Chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs) and hydrofluoroolefins (HFOs), which are used as refrigerants in vehicle air conditioning (AC) units, also have warming effects on the atmosphere and contribute to climate change. CFCs, which are commonly known for their negative impact on the Earth's ozone layer, also have the highest global warming potential of these three refrigerants. Ford has been a leader in conducting research on CFC replacements to eliminate their ozone impacts and reduce the overall global warming potential of air conditioning refrigerants.

In the 1980s and early 1990s, all vehicle manufacturers used CFC-12 (CF<sub>2</sub>Cl<sub>2</sub>) as the refrigerant in AC units. By the mid-1990s, in response to the Montreal Protocol on Substances that Deplete the Ozone Layer (1987), vehicle manufacturers switched to HFC-134a (CF<sub>3</sub>CFH<sub>2</sub>). Hydrofluorocarbons such as HFC-134a contain only hydrogen, fluorine and carbon; they do not contain chlorine and hence do not contribute to stratospheric ozone depletion. HFC-134a also has a shorter atmospheric lifetime and a substantially smaller global warming potential than CFC-12. As shown in Table 1 below, the global warming potential of HFC-134a is 1,370,<sup>5</sup> compared to CFC-12's global warming potential of 10,900.

As seen in Figure 1 below, the lifecycle emissions of CFC-12 from an AC-equipped car in 1990 were approximately 400 g per vehicle<sup>6</sup> – i.e., a CO<sub>2</sub> equivalent radiative forcing impact comparable to that of the CO<sub>2</sub> emitted from the tailpipe of the car. Replacement of CFC-12 with HFC-134a, together with improvements in AC systems, has led to a dramatic (approximately 30-fold) decrease in the climate impact of refrigerant emissions per vehicle for an AC-equipped vehicle. (This can be seen by comparing the two left-hand bars in Figure 1.) We estimate that lifecycle emissions of HFC-134a from vehicles manufactured in 2010 are approximately 100 g per vehicle per year.<sup>7</sup> Looking to the future, based on published assessments,<sup>8</sup> we believe that HFC-134a emissions from a typical light-duty vehicle manufactured in 2017 will be approximately 50 g per vehicle per year, further decreasing in the impact of HFC-134a emissions on a per-vehicle basis by a factor of two (see the third bar in Figure 1).

In the EU, we were required to use compounds with global warming potentials of 150 or less in the AC units for all approvals of new vehicle types by the end of 2012. This requirement extends to all registered vehicles beginning on January 1, 2017. HFC-134a has a global warming potential of 1,370 and it does not meet the new regulation. Hydrofluoroolefins (HFOs) are a class of compounds that are safe for the ozone layer and have very low global warming potential (typically less than 10). Based upon engineering, environmental and safety assessments, many automakers, including Ford, have chosen the compound known as HFO-1234yf (also known as HFC-1234yf or CF<sub>3</sub>CF=CH<sub>2</sub>) for use in European vehicles subject to the above-mentioned legislation timing. Research at Ford<sup>9</sup> has established that HFO-1234yf has a global warming potential of less than one<sup>10</sup>. As seen in the right-hand bar of Figure 1 below, by using HFO-1234yf, the AC refrigerant impact on global warming ceases to be discernible. In addition to using new refrigerants, Ford has also implemented new lower-leakage fitting designs in our AC systems, to reduce refrigerant leakage.

In the U.S., the EPA has proposed that HFCs such as HFC-134a should be added to, and regulated as part of, the Montreal Protocol. We do not support the inclusion of HFCs within the Montreal Protocol for the three reasons stated below:

- HFCs do not contribute to the depletion of stratospheric ozone. HFCs should therefore not be included in the Montreal Protocol on Substances that Deplete the Ozone Layer.
- As seen in Figure 1, replacing CFC-12 with HFC-134a has been a major step forward in environmental protection. Retaining the option to use HFC-134a in the future increases our ability to deliver cost-effective solutions for our customers.
- Emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, not HFCs, are the main driver of climate change. (HFCs are currently responsible for less than 1 percent of the radiative forcing by long-lived GHGs.) Regulations focused on less than 1 percent of the problem are not very useful. We need to adopt a life cycle perspective and focus on the most cost-effective options. Assessment of cost effectiveness is required before enacting blanket restrictions on HFCs.

Figure 1: Annual In-Use Greenhouse Gas (GHG) Emissions From Typical AC-Equipped Cars in the U.S in 1990, 2010 and 2016 Using Either CFC-12 (in 1990, Left-Hand Bar), HFC-134a (2010 and 2016, Middle Bars), or HFO-1234yf (Right-Hand Bar) Refrigerants.

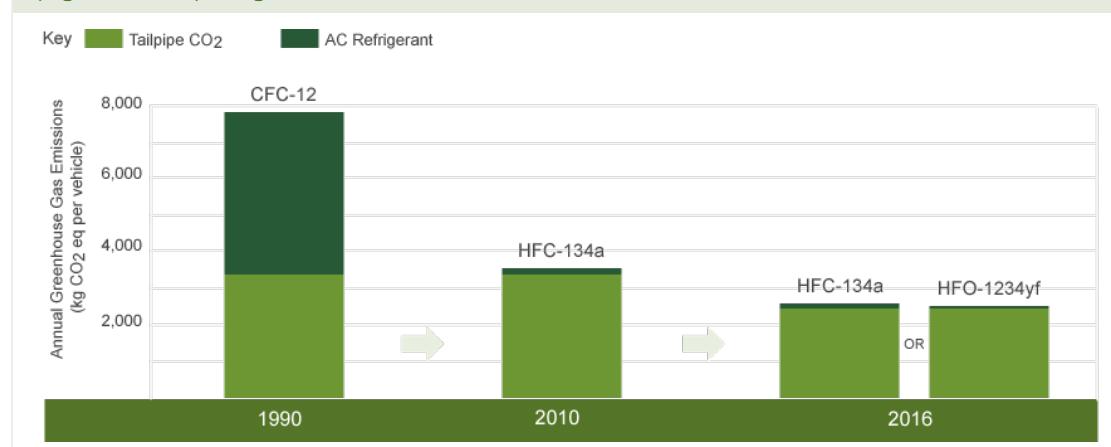


Table 1: Comparison of CFC-12, HFC-134a and HFO-1234yf

Compound	Chemical Formula	Safe for Ozone?	Atmospheric Lifetime <sup>11</sup>	Global Warming Potential <sup>11</sup>
<b>CFC-12</b>	CF <sub>2</sub> Cl <sub>2</sub>	No	100 years	10,200
<b>HFC-134a</b>	CF <sub>3</sub> CFH <sub>2</sub>	Yes	13.4 years	1,300
<b>HFO-1234yf</b>	CF <sub>3</sub> CF=CH <sub>2</sub>	Yes	10.5 days	<1

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11. O. Hodnebrog, M. Etminan, J.S. Fuglestvedt, G. Marston, G. Myhre, C.J. Nielsen, K.P. Shine, and T.J. Wallington, "Global Warming Potentials and Radiative Efficiencies of Halocarbons and Related Compounds: A Comprehensive Review," *Rev. Geophys.*, 51, 300–378 (2013). Global Warming Potential (GWP) is a relative measure of how much heat a greenhouse gas traps in the atmosphere. It compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide. A GWP is calculated over a specific time interval, commonly 20, 100 or 500 years. GWP is expressed as a factor of carbon dioxide (whose GWP is standardized to 1).

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## Ford's Greenhouse Gas Emissions

We estimate that annual carbon dioxide (CO<sub>2</sub>) emissions from Ford facilities and Ford vehicles driven by our customers are in the range of 300 to 400 million metric tons (Mmt) per year. It is not possible to give a more precise value because of uncertainties in the number of Ford vehicles in the on-road fleet and how many miles these vehicles traveled. The estimate includes emissions from our facilities, emissions from current-year vehicles, and most significantly the emissions from all Ford vehicles more than one year old on the road.

We updated this estimate of global greenhouse gas (GHG) emissions from our facilities and Ford vehicles in 2010, using data from 2008, the most recently available. The estimate is shown in Figure 1.

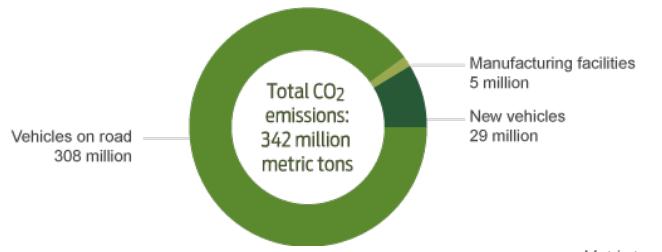
Please note that while we have control over our facility emissions, we have no control over the emissions of vehicles once they are produced and placed in service on the road.

Our assessment of the emissions from Ford's facilities and Ford-made vehicles on the road decreased between 2005 and 2008 from approximately 400 to 350 million metric tons of CO<sub>2</sub>, primarily due to better data availability for a key parameter.<sup>1</sup> Normalizing for the change in the key parameter, the emissions remained relatively stable at approximately 350 Mmt. Recognizing the inherent uncertainties in these estimations, we plan to update the assessments approximately every five years. We plan to conduct our next assessment in 2015.

### Related links

[This Report](#)[Supplier Greenhouse Gas Emissions](#)

Figure 1: Estimate of CO<sub>2</sub> Emissions from Our Facilities and Vehicles on the Road in 2008



CO <sub>2</sub> emissions	
5 million	Manufacturing facilities
29 million	New vehicles
308 million	Vehicles on road
342 million	Total

In detail, the updated 2010 snapshot of estimated CO<sub>2</sub><sup>2</sup> emissions shows that, between 2005 and 2008:

- Emissions from our facilities improved by approximately 38 percent. This reflects an approximately 16 percent improvement in the amount of CO<sub>2</sub> emitted per vehicle produced (i.e., our energy-efficiency index improved globally by about 16 percent from 2005 to 2008). It also reflects lower overall vehicle production in 2008. These estimates are fairly precise.<sup>3</sup> Facility GHG emissions, however, are a small percentage (about 2 percent) of the total.
- Emissions from calendar year 2008<sup>4</sup> vehicles on the road decreased by about 22 percent relative to the prior year, primarily reflecting a decline in vehicle sales. We have moderate confidence in the precision of the estimate for U.S. vehicles; the estimate for the rest of the world is less precise.<sup>5</sup>
- Emissions from all Ford vehicles on the road were estimated to be about 308

million metric tons of CO<sub>2</sub> per year, lower than in our previous analyses, primarily due to better data availability for a key parameter. This estimate, which accounts for about 90 percent of the total, remains highly uncertain.<sup>6</sup>

Outside the scope of this estimate, we are also in the process of understanding the GHG emissions from our key suppliers' facilities. And, we are expanding our approach to enhance supplier environmental performance beyond more-established supplier environmental performance expectations such as robust environmental management systems (ISO 14001 certification) and responsible materials management. (See the [Supplier Greenhouse Gas Emissions](#) section for details of our participation in initial efforts to assess GHG emissions in our supply chain.)

1. Our estimate for the CO<sub>2</sub> emissions for the greater-than-one-year-old on-road fleet decreased from 370 to 308 Mmt between 2005 and 2008. This decrease primarily reflects better data availability for a key value in the calculation (the global light-duty vehicle fraction of road transportation petroleum use, which we now assume to be 0.6 as opposed to 0.7 in our previous analyses). Using the old data value of 0.7 for the 2008 global CO<sub>2</sub> estimate would increase the 308 Mmt value to 359 Mmt. Such changes in our assessment reflect the difficulties in assessing the emissions precisely from the global fleet of Ford vehicles.
2. CO<sub>2</sub> emissions account for substantially all of the GHG emissions from our facilities and vehicles.
3. This is calculated consistent with the World Resources Institute/World Business Council for Sustainable Development Greenhouse Gas Protocol; it includes direct (Scope 1) and indirect (Scope 2) emissions.
4. 2008 is the most recent year for which complete data are available.
5. Calculated using Ford U.S. Corporate Average Fuel Economy and global market share figures. This estimate is subject to considerable uncertainty as it incorporates multiple assumptions about how consumers use their vehicles (e.g., miles traveled overall and urban/highway breakdown) and about fuel economy values in markets outside of the U.S.
6. This is calculated based on our market share and a sector-based approach to determine the fractional contribution of light-duty vehicles to global total CO<sub>2</sub> emissions. This estimate is subject to considerable uncertainty, as it is based on multiple assumptions, including that all automakers' fleets have the same fuel economy and vehicle life span.



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# Climate Change Risks and Opportunities

Over the past decade, concerns about climate change, the price of fuel and energy security – along with the global recession – have dramatically changed the automotive business. This creates substantial risks for automakers but also opportunities for innovation that enable growth and expansion. Below we discuss the general trends driving change in our markets and take a closer look at several key markets. We also discuss the physical and supply chain risks to our business posed by climate change.

### On this page

- ◀ Our Markets
- ◀ Physical Risks
- ◀ Supply Chain Risks

## Our Markets

There is little doubt that the climate change issue has fundamentally reshaped automotive markets around the world. The policy landscape is becoming more complex and interconnected with other market forces. The [Climate Change Policy and Partnerships section](#) of this report discusses regulatory developments in detail, but in brief, all of our major markets are increasingly shaped by government actions to regulate fuel economy and carbon dioxide (CO<sub>2</sub>) emissions, introduce low-carbon fuels and provide incentives to shift consumer and business behavior. Many governments are also actively involved in promoting the research, development and purchase of new vehicle and battery technologies.

Concerns about fuel prices and price volatility continue to drive a long-term trend toward consumer interest in more fuel-efficient vehicles. In many markets, energy security concerns are also a driver of fuel economy regulation and alternative fuel development, as governments and consumers seek to rely as much as possible on domestic sources of transportation fuel and reduce imports of petroleum products. Recent increases in the production of oil, gas, and biofuels in the U.S. are paving the way for the U.S. to become energy independent in the future.

Investors are showing greater concern about climate change as a material risk for many companies. A variety of voluntary public registries and information services (such as the Carbon Disclosure Project) are providing information to investors about greenhouse gas emissions, while in some countries companies are required to disclose information about their climate risks. Thus, providing climate-change-relevant information to investors and shaping our business strategy with climate change in mind are important elements of maintaining access to capital.

These market shifts are very significant to our company. Everywhere we operate, the financial health of our company depends on our ability to predict market shifts of all kinds and to be ready with the products and services our customers demand.

Our product globalization strategy is designed to help us respond to changing markets and regional preferences, and the risks and opportunities presented by the climate change issue. We have created global vehicle platforms that offer superior fuel economy, safety, quality and customer features. We then tailor each global platform to national or regional preferences and requirements. Our pledge that all our vehicles will offer the best or among the best fuel economy in their segment, coupled with a technology migration plan that is based on the science of climate change, positions us to keep pace with or get ahead of regulatory requirements. New technology is also cutting the time required to bring new vehicles to market, which helps us respond more effectively to the ever-increasing pace of change in our markets.

This approach has helped us take advantage of the market demand for more fuel-efficient vehicles and gain market share. However, the possibility that fuel prices could decline means there is also a risk that consumer preferences will shift back toward less fuel-efficient vehicles.

Please see the [Financial Health](#) section for further discussion of our changing markets and how we are responding to them, and the [Ford's Climate Change Strategy](#) section for discussion of our strategic response to the risks and opportunities posed by the climate change issue.

## Regional Market Trends

### North America

New regulations (discussed in the [Climate Change Policy and Partnerships](#) section) and concerns about fuel prices, energy security and the impacts of climate change are encouraging the sale of more fuel-efficient vehicles. National surveys in the U.S. continue to show that fuel economy is a key consideration in customers' vehicle purchase decisions. This is echoed by our own customer research and feedback. And, the trend is influencing buyer behavior. In 2006, more fuel efficient vehicles including "sub-compact cars" like the Ford Fiesta, "compact cars" like the Ford Focus, "mid-sized sedans" like the Ford Fusion, and small SUVs like the Ford Escape, made up approximately 39 percent of total industry vehicle sales. While in 2013, sales of these more fuel-efficient vehicles made up just over 52 percent of total industry vehicle sales. However, from 2012 to 2013 consumer demand for more fuel efficient vehicles compared to other vehicles leveled off: the growth of market share of these more fuel efficient vehicles was almost flat from 2012 to 2013 after growing steadily each year since 2009. In addition, over the past decade the use of ethanol in the U.S. gasoline market has increased by a factor of approximately five and there is now widespread availability of E10. With the implementation of the Energy Security and Independence Act of 2007, the trend of increasing renewable fuel use in both gasoline and diesel is likely to continue, and will be limited only by the capability and compatibility of the retail refueling infrastructure to deliver such fuels to the customer, as well as the capability of future vehicles to handle the increased renewable fuel content.

### Europe

In Europe, the long-term trend of high-priced fuel and increasing fuel efficiency has continued the market shift toward diesel-powered vehicles, which now make up more than half of all new vehicle sales. This trend is reinforced by sales incentives in some European countries aimed at reducing CO<sub>2</sub> emissions from older, less-efficient vehicles. In addition, downsized gasoline engines like Ford's line-up of EcoBoost® engines are also gaining traction with consumers, and more automakers – including Ford – are offering small, around 1.0 liter and below, direct injection, turbo engines. Several European countries have CO<sub>2</sub>-based taxation with aggressive tax break points, which has boosted sales of smaller, more fuel-efficient cars. Tough new CO<sub>2</sub> emission regulations have also come into effect, which will continue to drive fuel-economy improvements in new automobiles. Automakers, including Ford, have begun to introduce and announce plans for hybrid electric, battery electric and plug-in hybrid electric vehicles for the European market.

### Asia

The Chinese government is actively promoting vehicle electrification and supporting research in this area, based on its desire to support growth and development, balanced with the need for energy security and a cleaner environment. The Chinese central government currently provides incentives to purchasers of "new energy vehicles" (defined as battery electric and plug-in electric vehicles) that are manufactured in China. However, sales of the new energy vehicles have been consistently under the target set by the central government. The majority of domestic and global automakers are launching or considering launching a range of hybrid electric vehicle technologies in China, including Auto Stop-Start (micro-hybrid) and full hybrid electric vehicles. Some of these technologies are already available in the Chinese market. The majority of new energy vehicles currently available in China are offered by domestic Chinese manufacturers under national Chinese brands.

### South America

In Brazil, our largest market in South America, the use of biofuels is widespread, as a result of national policy and consumer preference. All gasoline in Brazil is blended with 20 to 25 percent ethanol, and pure ethanol is also used extensively as a motor fuel. A new regulation, the Automotive Regime, issued in 2012 requires that manufacturers selling vehicles in Brazil meet a minimum 12 percent improvement in industry-wide fuel efficiency by October 2017. A voluntary fuel-economy labeling program is also in place, along with a star ranking program for light vehicles that favors low-emission, low-CO<sub>2</sub>, ethanol, flexible-fuel and hybrid vehicles. Consumers tend to choose vehicles with small engines, and approximately 85 percent of new vehicles purchased have flexible-fuel capabilities. Since 2010, Ford has offered the Fusion Hybrid in Brazil.

## Physical Risks

Global climate change raises the potential for shifting patterns of extreme weather and other risks to our facilities.

For insurance purposes, we assess the risks each of our facilities faces (with input from third-party engineers) at least annually. This risk assessment is updated based on new data and takes into account the risk of exposure to hurricanes, tornadoes, other storms, flooding and earthquakes. As a result of this process, we believe we have a good understanding of the physical risks faced by our facilities and how those risks are changing over time.

Extreme weather has the potential to disrupt the production of natural gas, a fuel necessary for the manufacture of vehicles. Supply disruptions raise market rates and jeopardize the consistency of vehicle production. To minimize the risk of production interruptions, Ford has established firm delivery contracts with natural gas suppliers and installed propane tank farms at key manufacturing facilities as a source of backup fuel. Higher utility rates have prompted Ford to revisit and implement energy-efficiency actions that previously did not meet our internal rate of return. Climate change also has the potential to affect the availability and quality of water. We are examining this issue as part of our water strategy.

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## Supply Chain Risks

Our suppliers, which are located in more than 60 countries, are subject to market, regulatory and physical risks as a result of greenhouse gas regulation and the impacts of climate change. These risks could affect their competitiveness or ability to operate, creating the potential for disruptions to the flow of supplies to Ford. For example, suppliers may be subject to reporting requirements, fees or taxes, depending on where their operations are located. See the [Supply Chain](#) section for a discussion of actions we are taking to better understand the climate risks of our suppliers and to promote a competitive supply chain.

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## U.S. Energy Security

For many years, U.S. consumers and politicians have been concerned about energy security, due to the country's continuing dependence on imported foreign oil. These concerns have been based on a trend of increasing consumption of crude oil in the form of gasoline for transportation and increasing crude oil imports in the U.S. since the 1960s (see Figure 1 below). Unlike the utility sector, which has a diverse energy portfolio, light-duty transportation is approximately 95 percent reliant on crude oil. This dominance of crude oil, coupled with the continued reliance on foreign countries for supply, is at the core of the U.S. energy security concerns. Furthermore, instability in the Middle East, one of the world's primary oil-producing regions, as well as the high and volatile price of gasoline in the U.S., also feed these concerns.

However, recent trends in the consumption of crude oil for transportation in the U.S., driven in part by increases in vehicle fuel efficiency, as well as increases in the production of oil in the U.S., suggest that U.S. energy security will become less of an issue in the future. In fact, the International Energy Administration recently released a report that predicts that the U.S. will be the largest global producer of oil by the mid-2020s, and by 2030 will be a net exporter of oil. If this prediction holds true, the U.S., which now imports about 20 percent of its total energy needs, would become energy self-sufficient in the coming decades.<sup>1</sup>

The U.S. marketplace has also seen the widespread penetration of renewable fuel use over the past 10 years, which further reduces U.S. reliance on foreign sources of oil. Today more than 90 percent of the gasoline offered for sale at retail refueling stations contains 10 percent ethanol (E10) by volume. The Energy Independence and Security Act of 2007 mandated increasingly greater volumes of renewable fuel; ethanol is currently the primary renewable fuel of choice. It should be noted that the widespread use of E10 is only possible because the vast majority of public retail refueling stations have dispensing and tank infrastructure that is compatible with E10, and more than 95 percent of the on-road vehicle fleet today is able to operate on gasoline containing 10 percent ethanol. Discussions of the widespread availability of higher blends of ethanol fuel will require further improvements in retail refueling infrastructure and vehicle compatibility.

Figure 1 below shows that increases in fuel efficiency over the years have largely compensated for the increase in vehicle miles traveled. Since the 1970s, the fuel efficiency of new passenger cars more than doubled, and fuel economy rates in trucks have increased more than 50 percent. As a result, though vehicle miles traveled increased by a factor of four, gasoline consumption increased by only a little over a factor of two.

Figure 2 shows that U.S. demand for crude oil has declined in recent years. The economic downturn, improvements in vehicle fuel efficiency, and changes in consumer behavior have contributed to this decline.

Nonetheless, for the time being, energy security remains a serious concern in the U.S. and other major markets and it continues to drive demand for more fuel-efficient vehicles.

Figure 1: Total Miles Traveled and Gasoline Consumed

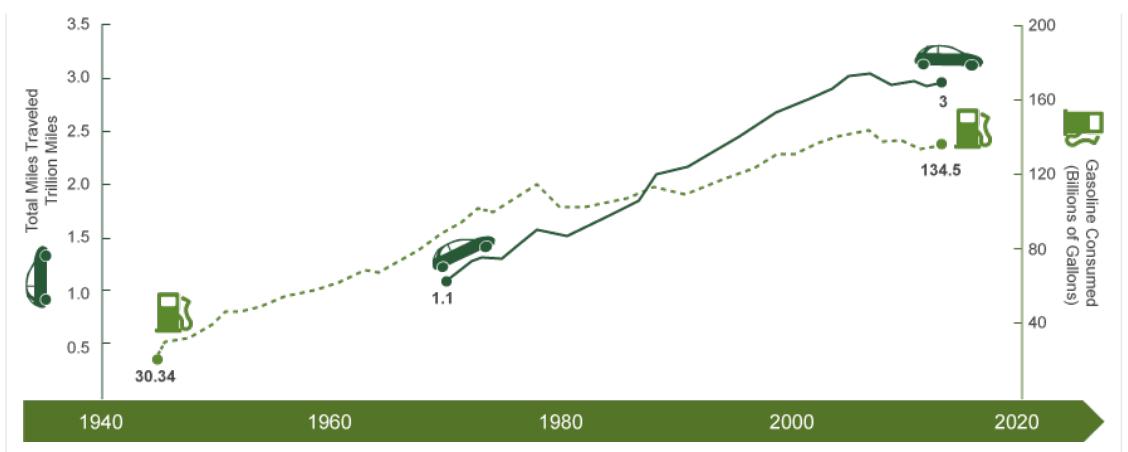
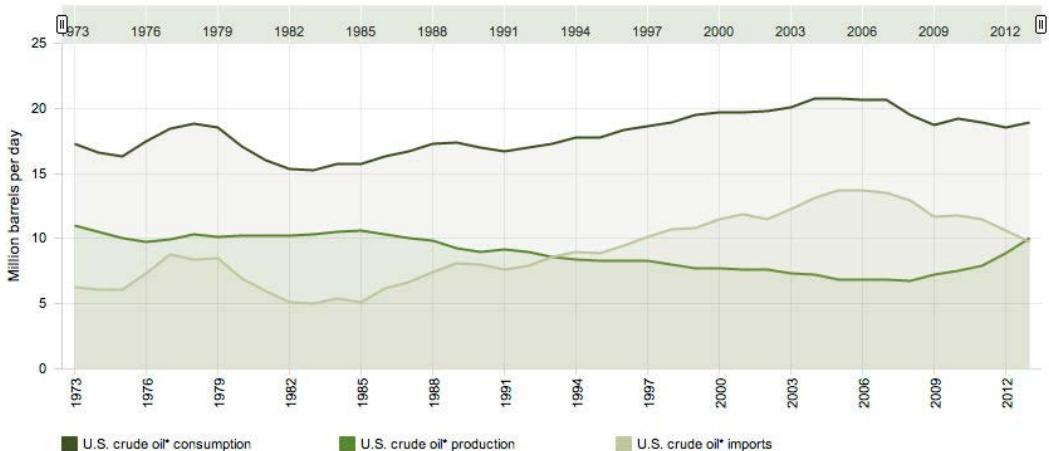


Figure 2: Crude Oil\* Consumption, Imports and U.S. Production



\* Note: includes crude oil and other petroleum products, including natural gas plant liquids, processing gain, fuel ethanol and biodiesel.

1. International Energy Administration, World Energy Outlook 2012.



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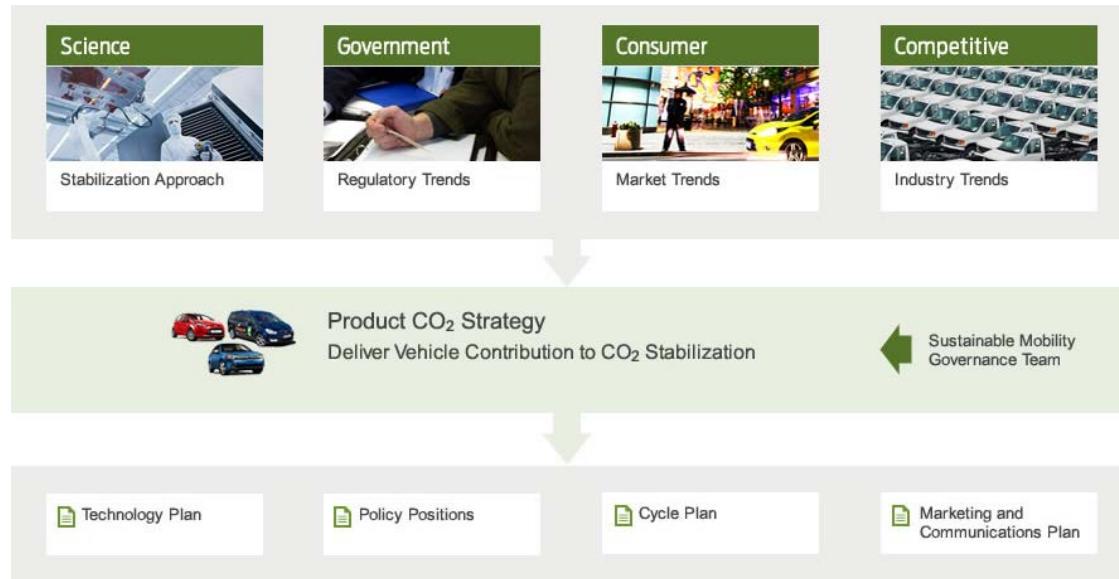
## Ford's Climate Change Strategy

To respond to the risks and opportunities posed by the climate change issue, our long-term strategy is to contribute to climate stabilization by:

- Continuously reducing the greenhouse gas (GHG) emissions and energy usage of our operations;
- Developing the flexibility and capability to market lower-GHG-emission products, in line with evolving market conditions; and
- Working with industry partners, energy companies, consumer groups and policy makers to establish an effective and predictable market, policy and technological framework for reducing GHG emissions.

Our product plans in all regions are aligned with our overall goal of contributing to climate stabilization. Our technology and product strategy to meet this goal is based on the modeling of vehicle and fuel contributions to emission reductions and an analysis of market and regulatory trends (see figure below). Our climate change strategy is supported by our sustainable mobility governance, which establishes structures and accountability for implementing the strategy.

## Product Sustainability Process



The specifics of our vehicle technology and product strategy to meet this goal are laid out in the [Sustainable Technologies and Alternative Fuels Plan](#), which can be found in the [Greening Our Products](#) section of this report. The plan details steps we are taking in the foreseeable future to develop and deploy vehicle and fuel technologies.

We believe this strategy is already showing results by positioning our company to take advantage of opportunities created by shifts in markets. We have implemented all of the near-term actions of our plan, and our commitment to outstanding fuel economy aligns well with consumer interest in fuel-sipping vehicles. For example, from 2009 to 2013, industry sales of more fuel-efficient vehicles including subcompact cars, compact cars, mid-sized sedans, and small SUVs increased by 57 percent. Sales of more fuel efficient vehicles also grew faster than overall industry sales, which grew by 51 percent from 2009 to 2013. Ford's sales of these vehicles increased even more than the industry overall, increasing by 67 percent from 2009 to 2013. However, from 2012 to 2013, industry-wide sales of these more fuel efficient vehicles grew a bit more slowly than overall vehicle sales; they increased by 8 percent, while overall industry sales grew by 9 percent. For the longer term, we are preparing to provide regionally appropriate approaches based on global platforms and advanced vehicle technologies, including electric vehicles, biofuel vehicles and (as fuel and infrastructure become available) hydrogen fuel cell vehicles. In addition, we have conducted dialogues with stakeholders, exploring sustainable mobility

## Related links

### This Report

- Sustainable Technologies and Alternative Fuels Plan
- Vehicle Fuel Efficiency and CO<sub>2</sub> Progress and Performance

projects to demonstrate mobility solutions that meet the needs of urban and rural communities by leveraging information technology to integrate private and public transportation options. Please see the [Financial Health](#) section for details on these efforts.

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Voice: John Fleming

## Climate Change Strategic Principles

Our approach to greenhouse gas (GHG) stabilization is aligned around the following key strategic principles:

1. Technical, economic and policy approaches to climate change need to recognize that all carbon dioxide (CO<sub>2</sub>) molecules (or GHG equivalents) produced by human activities make the same contribution to climate change. Once those molecules reach the atmosphere, they contribute to the greenhouse effect, regardless of their source. However, the cost of reducing those emissions varies significantly depending on their source, and we should attempt to achieve the most economically efficient solutions possible.
2. The transportation sector represents a closely interdependent system, characterized by the equation: "Vehicle + Fuel + Driver = GHG emissions." Each element in this equation depends on the others. For example, vehicle manufacturers can bring to market flexible-fuel vehicles, but successfully reducing GHG emissions depends on fuel companies providing renewable biofuels, as well as consumer demand for the vehicles and fuels.
3. Future developments in technologies, markets, consumer demand and policies are uncertain. The business strategies that Ford implements, and the public policies that we encourage, must have the flexibility to succeed in a range of potential scenarios.
4. Early affordable steps to reduce GHG emissions from our products and processes may delay the need for drastic and costly reductions later. Lack of agreement on long-term solutions cannot be used as an excuse to avoid near-term actions.

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## Ford's Science-Based CO<sub>2</sub> Targets

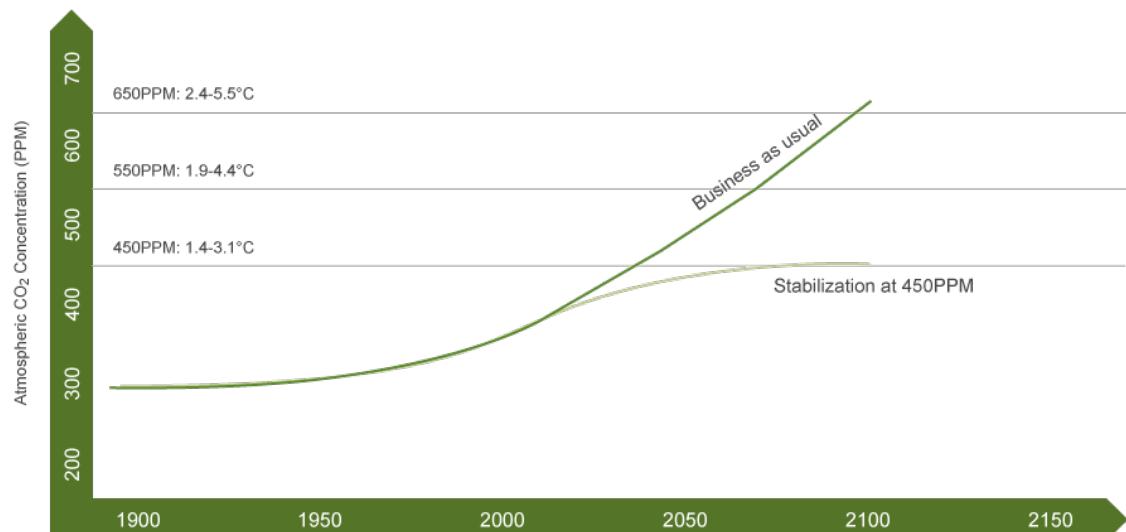
Throughout this report, we refer to Ford's climate goals as "science-based" – specifically, based on the science of climate stabilization. An advantage of this approach is that it gives us an objective, long-term goal focused on an environmental outcome – the stabilization of carbon dioxide (CO<sub>2</sub>) in the atmosphere. A disadvantage is that the goal can be difficult to explain and communicate. In this section, we delve into our science-based goal by discussing what stabilization means, how we use "glide paths" to align our product plans with emission reductions, and how our CO<sub>2</sub> model works and how we use it in our planning.

The stabilization-based goal had its start in 2004, when Ford's internal Climate Change Task Force faced a dilemma. After an extensive study, it was clear to the cross-functional group of senior executives that several forces were converging to fundamentally change vehicle markets, especially in North America and Europe. Current and anticipated greenhouse gas and fuel-economy regulation, rising fuel prices and growing consumer awareness of the climate change issue all pointed to a shift in sales toward cars rather than trucks, and toward smaller and more fuel-efficient vehicles. We needed to rapidly reorient our product offerings.

But what should drive new product goals? As a practical matter, the company needed to be able to meet new regulatory mandates, and we needed some way to plan for new products without certainty about future fuel economy regulations. Beyond that imperative, we had taken to heart our responsibility to contribute to meeting the challenge of climate change. So, Task Force members decided to base product planning on the goal of climate stabilization, and they asked Ford's in-house scientists to devise a way to test scenarios for meeting that goal.

## Our Stabilization Commitment

Ford researchers have played a leading role in scientific research to understand and quantify the contribution of vehicles to climate change. We have also worked with a variety of partners to understand current and projected man-made greenhouse gas (GHG) emissions, and the steps that can be taken to reduce them. Many scientists, businesses and governmental agencies have concluded that stabilizing the atmospheric concentration of CO<sub>2</sub> at approximately 450 parts per million (ppm) may help to forestall or substantially delay the most serious consequences of climate change (see chart below).

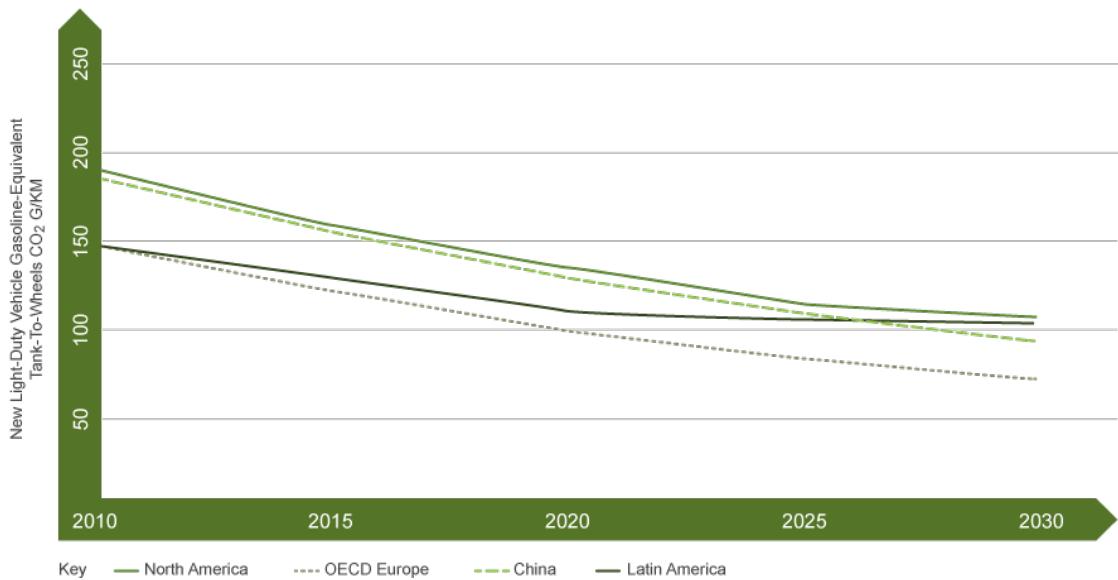


Ford has committed to doing our share to stabilize atmospheric CO<sub>2</sub> at 450 ppm. Using a science-based CO<sub>2</sub> model (see [The "CO<sub>2</sub> Model": The Science Behind Our Scientific Approach](#)), we have calculated the amount of light-duty vehicle (LDV) CO<sub>2</sub> emissions that are consistent with stabilizing the concentration of CO<sub>2</sub> in the

atmosphere at 450 ppm. We then calculated the reductions in the CO<sub>2</sub> emission rate (g/km) from new LDVs needed over the coming decades to achieve 450 ppm atmospheric CO<sub>2</sub>, based on projections of vehicle sales and scrappage. Plotting these emission levels over time yields the “CO<sub>2</sub> glide paths” that drive our technology plans.

We have calculated region-specific CO<sub>2</sub> glide paths for North America, Europe, Brazil and China. The glide paths take into account regional differences in vehicle size and fuel consumption, government regulations and biofuel availability. Although the initial (current) CO<sub>2</sub> emissions rate varies considerably by region, to provide the significant emission reductions needed, all regions need to move toward similar targets. For the light-duty vehicle sector to meet the 450 ppm CO<sub>2</sub> emissions limits, all automakers must reduce their LDV emissions by the proportion prescribed by the CO<sub>2</sub> glide paths (see chart below). We have shared our thinking behind the development of these industry-average targets with interested stakeholders and have received positive feedback. We have also published the methodology behind the development of our CO<sub>2</sub> glide paths in the peer reviewed scientific literature.<sup>1</sup>

## Industry-Average CO<sub>2</sub> Glide Paths<sup>2</sup>



In 2010, we applied the CO<sub>2</sub> glide path methodology to develop CO<sub>2</sub> targets for our commercial vehicles and facilities.

We believe that a science-based approach is the right way forward, and Ford's sustainability plan is based on these science-based emissions targets. We compare the glide paths to competitive and regulatory factors in each region to inform long-term technology plans, and identify opportunities and risks.

In general, our glide paths are consistent with existing and proposed fuel economy and vehicle CO<sub>2</sub> regulations. In the absence of certainty about future regulations, the glide paths provide a good guide for long-term product development planning. The industry North American glide path is generally consistent with existing and proposed U.S. fuel economy regulations through 2025. The Latin American glide path is more stringent than proposed regulations in Brazil. The European region industry glide path is generally consistent with European vehicle CO<sub>2</sub> regulations through 2020 but slightly less stringent than European proposed regulations for 2025. The Asia region glide path is slightly more stringent than vehicle CO<sub>2</sub> regulations proposed by the Chinese government for 2015 and slightly less stringent than Chinese proposed regulations for 2020.

We caution that while our product development plans are based upon delivering long-term reductions in CO<sub>2</sub> emissions from new vehicles that are similar to those shown for the industry-average glide paths, we anticipate that the year-over-year reductions will vary somewhat from the glide paths. In some years the reductions will be greater than those shown in the glide paths and in other years they will be less. That is because delivering on these targets will be dependent to some degree on market forces that we do not fully control (e.g., changes in energy prices and changes in the mix of vehicles demanded by the consumers in the markets in which we operate). Furthermore, our product strategy is based on multiple inputs, including regulatory requirements, competitive actions and technology plans.

We annually review the assumptions and input data in the CO<sub>2</sub> model. Because of the long-term view of the model, we only update the glide paths on a five-year basis. In 2012 we completed the first update since the glide paths were implemented. As part of this review, we assessed our glide path analysis methodology and incorporated new forecasts for vehicle sales and the latest data on the CO<sub>2</sub> intensity of fuels. The adjustments to glide paths based on these changes were minor.

believe a philosophy of continuous improvement implemented over the long term is the correct solution to this challenge. Following the CO<sub>2</sub> reductions called for in our glide path assessment is a significant challenge. It is a commitment that we do not undertake lightly. However, we believe that dramatic reductions in CO<sub>2</sub> emissions are required over the long term to forestall or substantially delay the most serious consequences of climate change, and we are committed to doing our part.

Ford's leadership in using climate science to set our CO<sub>2</sub> targets has been recognized externally. In 2012 we received a Goal-Setting Certificate at the U.S. Environmental Protection Agency's Climate Leadership Awards Ceremony and Conference for our global manufacturing CO<sub>2</sub> strategy.

To explore which vehicle and fuel technologies might be most cost-effective in the long-term stabilization of atmospheric CO<sub>2</sub> concentrations, we have worked with colleagues at Chalmers University of Technology in Gothenburg, Sweden. Specifically, we are working together to include a detailed description of light-duty vehicles in a model of global energy use for 2010 to 2100. Several technology cost cases have been considered. We found that variation in vehicle technology costs over reasonable ranges led to large differences in the vehicle technologies utilized to meet future CO<sub>2</sub> stabilization targets. We concluded that, given the large uncertainties in our current knowledge of future vehicle technology costs, it is too early to express any firm opinions about the future cost-effectiveness or optimality of different future fuel and vehicle powertrain technology combinations.<sup>3</sup> This conclusion is reflected in the portfolio of fuel and vehicle technologies that are included in our sustainability strategy. We are continuing to develop the global energy model with researchers at Chalmers. We believe the model will provide valuable insights into cost-effective mobility choices in a future carbon-constrained world.

- 
1. S. L. Winkler, T. J. Wallington, H. Maas, and H. Hass, Light-Duty Vehicle CO<sub>2</sub> Targets Consistent with 450 ppm CO<sub>2</sub> Stabilization, *Environ. Sci. Technol.*, [Light-Duty Vehicle CO<sub>2</sub> Targets Consistent with 450 ppm CO<sub>2</sub> Stabilization](#) (2014).
  2. E.U. and China glide paths were developed based on the New European Driving Cycle (NEDC), and North America and Latin America glide paths were developed based on the Federal Test Procedures (FTP), which are the testing requirements used by governments in these regions to assess the emission levels of car engines and/or fuel economy in light duty vehicles.
  3. M. Grahn, E. Klampfl, M. Whalen, and T.J. Wallington, "Sustainable Mobility: Using a Global Energy Model to Inform Vehicle Technology Choices in a Decarbonised Economy," *Sustainability*, 5, 1845–1862 (2013).



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## The “CO<sub>2</sub> Model”: The Science Behind Our Scientific Approach

In 2005, Ford's scientists began development of a global carbon dioxide (CO<sub>2</sub>) model. To create it, they modified the Sustainable Mobility Project model (developed by the International Energy Agency) and combined it with global CO<sub>2</sub> emission-reduction pathways for varying levels of atmospheric CO<sub>2</sub> stabilization (as described by the Model for the Assessment of Greenhouse Gas Induced Climate Change, developed by the National Center for Atmospheric Research). The scientists then calculated the CO<sub>2</sub> emission reductions required of new light-duty vehicles up to the year 2050 for a range of CO<sub>2</sub> stabilization levels and different regions of the world, using a simplifying assumption of the same percentage CO<sub>2</sub> emission reductions across all sectors.

At the lower CO<sub>2</sub> stabilization levels, the required emission reductions are extremely challenging and cannot be accomplished using vehicle technology alone. Ford's CO<sub>2</sub> model and other modeling tools combined to explore assumption sensitivities around vehicle technologies, baseline fuels and biofuels.

The CO<sub>2</sub> model is not intended to provide “the answer,” but rather a range of possible vehicle and fuel solutions that contribute to a pathway to CO<sub>2</sub> reductions and, eventually, climate stabilization. Our Blueprint for Sustainability – and the technology and product actions it spells out – is based on options developed through this modeling exercise.

The model and its results have been a centerpiece of discussions with a variety of stakeholders. Below are some of the questions that have been raised through these discussions, and the answers to them.

### How does the model account for emissions growth or reduction in developing countries?

We recognize that developing countries generally have relatively low per-capita energy use but high rates of emissions growth, reflecting growing economies. The CO<sub>2</sub> model uses a science-based approach that allows for growth in developing countries, to derive CO<sub>2</sub> reduction targets for light-duty vehicles consistent with a 450 ppm CO<sub>2</sub> stabilization pathway.

### Since fuel use is the dominant cause of CO<sub>2</sub> emissions, how does the model account for projected changes in the carbon footprint of automotive fuels?

Ford has studied multiple scenarios in which the auto industry and the energy industry work together to reduce overall well-to-wheels CO<sub>2</sub> emissions from the light-duty transportation sector. These joint strategy scenarios (see Figure 1 below) allow us to develop a least-cost vehicle technology road map. For the carbon footprint of fuels, we rely on the well-to-tank CO<sub>2</sub> emissions for different alternative fuels estimated by different region-based models, including the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model for North America, and the EUCAR/JRC/CONCAWE analysis for Europe.

### Are you continuing to test alternative scenarios?

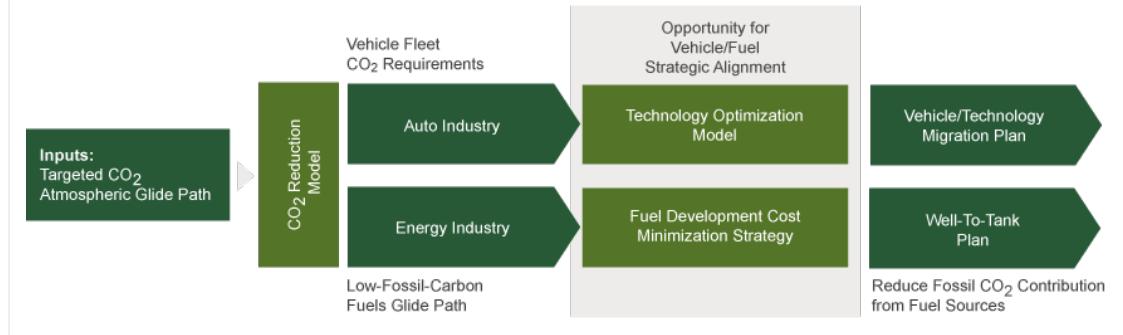
In the long run, the roles of consumers, governments and fuel availability will be pivotal in dictating actual CO<sub>2</sub> emission reductions, and Ford continues to take them into consideration in fine-tuning a truly viable and sustainable CO<sub>2</sub> stabilization pathway.

### How does the model consider the cost of technologies and alternative fuels?

In a separate study (and as discussed on the [Ford's Science-Based CO<sub>2</sub> Targets](#) page), Ford and our partner Chalmers University of Technology have developed a global energy model that looks into minimal-cost scenarios across different sectors and explores assumption sensitivities around vehicle technologies, fuel technologies, connections between the different energy sectors, and biofuels. The model provides information on the combinations of options that will yield the necessary emissions reductions at an affordable cost to consumers. We have used this model to develop

scenarios to assess the global lowest-cost vehicle and fuel technology solutions consistent with CO<sub>2</sub> stabilization.

Figure 1: Ford's Sustainability Framework and Technology Migration Development



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## Climate Change Policy and Partnerships

Ford and the automotive industry as a whole have an important role to play in achieving climate stabilization. We take this responsibility seriously, and have based our global approach to product planning and policy participation on the science of climate stabilization, doing our part to reduce emissions significantly in order to maintain atmospheric concentrations of greenhouse gas emissions at or below 450 ppm. We accept that simply "not getting worse" is not good enough. We are committed to working with all key stakeholders to promote climate change policy that helps to match vehicle technology, fuel technology and availability, and consumer demand to effectively reduce transportation sector emissions and reach climate stabilization goals. We welcome, and have worked to promote, comprehensive market-based policy approaches that will provide a coherent and effective framework for GHG emission reductions and give companies a clear understanding of their role in achieving reductions.

Clarity and consistency of fuel economy and vehicle GHG regulations is critical to our ability to plan, develop and implement new products. These regulations effectively regulate what vehicles we are allowed to build and sell.

However, light-duty trucks and passenger vehicles represent only about 11 percent of all global fossil fuel CO<sub>2</sub> emissions, so our industry alone cannot achieve climate stabilization. It will require major efforts by industries, government, and consumers. Even reducing the transportation sector's contribution to climate change cannot be done by automakers alone. It will require partnership of all stakeholders, including automakers, the fuel industry, government and consumers, because effectively reducing emissions will require not only improving vehicle fuel economy, but also developing lower-carbon fuels, infrastructure to deliver those fuels, and government actions to encourage consumers to purchase these more fuel-efficient vehicles and lower-carbon fuels.

In 2012 in the U.S., the Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) finalized regulations on a national approach to vehicle greenhouse gas and fuel economy standards for 2017 to 2025. Globally, however, growing budget deficits at national and regional levels have overshadowed climate policy discussions over the last several years.

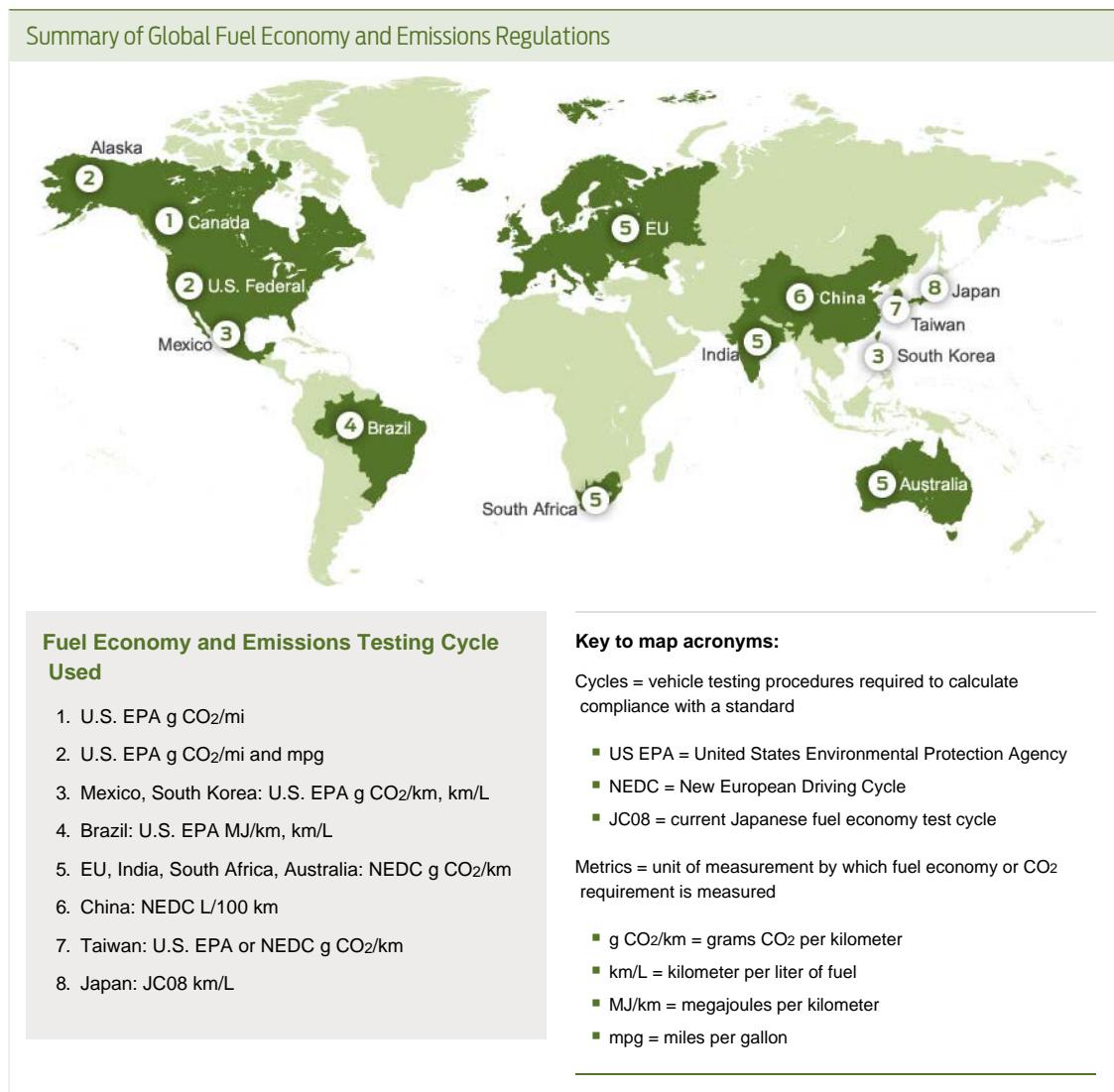
In our major markets, the regulation of fuel economy and/or vehicle CO<sub>2</sub> emissions is becoming increasingly complex. In addition to competing federal and regional regulations, governments are taking diverse approaches to incentives for emission reductions through rebates, fees, "feebates," privileges for low-emitting vehicles and penalties for high-emitting vehicles. At the same time, some state governments are introducing registration taxes on the same advanced vehicle technologies that assist in CO<sub>2</sub> reductions, to make up for the loss in tax revenues resulting from these vehicles' reduced use of conventional fuels. This very complex policy environment is one important driver of our strategy to develop fuel-efficient and advanced-technology platforms that can be shared globally and tailored to the needs of our customers. Customer vehicle-purchasing choices are affected by vehicle incentives, fuel costs, annual registration costs as well as overall maintenance and ownership costs.

We hope that the information that follows helps to illustrate the diverse array of GHG and fuel economy regulations and incentives that are now shaping our markets. This section provides more detail on developments and Ford's involvement in:

- [U.S. policy](#)
- [Climate change legislation](#)
- [Greenhouse gas and fuel economy regulation](#)
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The map below provides a summary of the existing and proposed CO<sub>2</sub> emission and fuel consumption requirements and standards that vehicle manufacturers face across the globe. For each country the primary metric used in the regulation is listed, such as miles per gallon or grams of CO<sub>2</sub> per mile, as well as the “drive cycle” or vehicle testing process required to calculate compliance with the requirement. The map illustrates that many countries have existing or proposed CO<sub>2</sub> or fuel consumption requirements and that these requirements vary considerably by country and region.





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# U.S. Policy

## On this page

- ↳ Climate Change Legislation
- ↳ Greenhouse Gas and Fuel Economy Regulation

## Climate Change Legislation

In the U.S., the policy debate surrounding climate change has been overshadowed by other issues, including concerns over budget deficits. Nevertheless, the U.S. Environmental Protection Agency (EPA) regulates greenhouse gas (GHG) emissions for mobile sources using their authority under the Clean Air Act, while the U.S. National Highway Transportation Safety Administration (NHTSA) has regulated motor vehicle fuel economy since the 1970s. In 2012, the EPA and NHTSA finalized joint greenhouse gas emission and fuel economy regulations for 2017 to 2025 model year light-duty vehicles. These regulations, which continue the "One National Program" approach, are discussed below under [Greenhouse Gas and Fuel Economy Regulation](#).

Ford has participated in the public discourse on broad-based, national climate policy for some time. In 1999, for example, we discussed greenhouse gases in our first corporate citizenship report. In 2000, we were the first automaker to publicly acknowledge the issue. In late 2005, we published a special report on the Business Impact of Climate Change, and in 2007 we joined the U.S. Climate Action Partnership (USCAP) to support the prompt enactment of national climate legislation. Because the USCAP organization has been dormant for more than a year, and this policy issue is now not expected to be taken up legislatively in the U.S., we asked to be delisted as a member of USCAP. We nonetheless remain committed to improving fuel economy and reducing greenhouse gas emissions, as evidenced by our support for the One National Program approach to fuel economy regulations discussed below.

These experiences, as well as our participation in carbon markets globally, have helped to shape Ford's position on climate policy. The linked issues of climate change and energy security create an urgent need to transform the country's economy into one with lower greenhouse gas emissions, higher energy efficiency, and less dependence on fossil fuels and foreign oil. This transformation will require changes in all sectors of the economy and society. A comprehensive legislative framework is needed to spur these changes.

The auto industry has supported the rules proposed by EPA and NHTSA, but regulations focusing on just one sector of the economy will not enable us to achieve the necessary level of GHG reductions. We believe we need a comprehensive, market-based approach to reducing GHG emissions if the U.S. is going to reduce emissions at the lowest cost per ton. An economy-wide program would provide flexibility to regulated entities while allowing market mechanisms to determine where GHG reductions can be achieved at the lowest cost. The environment doesn't care where reductions occur, but the economy does, and given the potentially high cost of abatement, it is important to achieve the greatest reductions at the lowest cost possible.

As part of an integrated approach to addressing energy security and climate change, Ford supports comprehensive legislation that will create a price signal to encourage consumers to purchase more fuel-efficient vehicles and engage in other climate-friendly behaviors. Thoughtful and comprehensive national energy and climate policy that provides a price signal is needed to support the billions of dollars being invested in low-carbon and fuel-efficient vehicle technologies. Without a cohesive policy that includes a price signal, we could be caught in an endless cycle wherein development of the advanced technologies needed to help address climate change and energy security is sporadic and not aligned with fuel providers or consumer demand.

Ford will continue to advocate for effective climate change policies that drive down GHG emissions and provide a framework for sound business and product planning.

## Related links

### External Websites

- ➔ National Highway Traffic Safety Administration
- ➔ U.S. Environmental Protection Agency Fuel Economy

## Greenhouse Gas and Fuel Economy Regulation

In July 2011, the Obama Administration announced that the state of California, the auto industry and other stakeholders had committed to support a single national program for motor vehicle fuel economy and greenhouse gas standards covering the 2017 to 2025 model years. This is an extension of the "One National Program" regulations that have already been put in place for the 2012 to 2016 model years. Ford views the continuation of the One National Program agreement as a positive step for all stakeholders toward our common goals of energy security and reduced greenhouse gas emissions.

In 2012, the EPA and NHTSA finalized regulations extending the One National Program framework through the 2025 model year. The new rules require manufacturers to achieve, across the industry, a light-duty fleet average fuel economy of approximately 45 mpg by the 2021 model year, and approximately 54.5 mpg by the 2025 model year, assuming all of the carbon dioxide (CO<sub>2</sub>) emissions reductions are achieved through the deployment of fuel economy technology. This represents a reduction of roughly 5 percent per year in CO<sub>2</sub> emissions from passenger cars for the 2017 to 2025 model years. For light trucks, the proposed standards represent a reduction in CO<sub>2</sub> emissions of about 3.5 percent per year for model years 2017 to 2021, and about 5 percent per year for model years 2022 to 2025.

It is important to note that the EPA's 2022 to 2025 GHG standards are final rules; in contrast, NHTSA's 2022 to 2025 Corporate Average Fuel Economy (CAFE) standards are conditional because, by statute, NHTSA may only set CAFE standards for up to five model years at a time.

Under the rules, each manufacturer's specific task depends on the mix of vehicles it sells. The rules include the opportunity for manufacturers to earn credits for technologies that achieve real-world CO<sub>2</sub> reductions, and for fuel-economy improvements that are not captured by EPA fuel-economy test procedures. Manufacturers also can earn credits for GHG reductions not specifically tied to fuel economy, such as improvements in air conditioning systems. The rules specify a midterm evaluation process under which, by 2018, the EPA will reevaluate its standards for model years 2022 to 2025 to ensure that those standards are feasible and optimal in light of intervening events. In parallel, NHTSA will undertake a process to promulgate final CAFE standards for those model years. In California, the California Air Resources Board has modified its GHG regulations so that complying with the federal program also satisfies compliance with California's requirements for the 2017 to 2025 model years.

Ford plans to participate in the midterm evaluation process. For the longer term, Ford supports a legislative solution codifying the One National Program approach beyond 2025, to head off the possibility that various agencies may promulgate and enforce multiple, inconsistent fuel economy and/or GHG regulations in the future.

A national program is essential for the efficient regulation of motor vehicle fuel economy and GHG emissions. It allows manufacturers to average the fuel economy and CO<sub>2</sub> emissions of their vehicles based on nationwide sales, which in turn enables manufacturers to formulate their product plans on a national level to achieve the necessary scale for future technology introductions. In contrast, state-by-state or regional regulations could force manufacturers to restrict the sale of some products in certain parts of the country, harming both consumers and dealers in those areas. Since CO<sub>2</sub> emissions do not create localized air-quality problems, state or regional standards are unnecessary, and would create hurdles, added costs and market disruptions in our path toward achieving reductions.

We intend to work closely with the EPA, NHTSA and other key stakeholders, including California, throughout the midterm evaluation process to ensure continued alignment between our shared goals for the environment and market realities of consumer acceptance of new advanced technologies.

### U.S. Heavy-Duty Vehicle Fuel Economy Regulations

In 2011, the EPA and NHTSA promulgated final regulations imposing, for the first time, GHG and fuel economy standards on heavy-duty vehicles (generally, vehicles over 8,500 pounds gross vehicle weight rating). These initial regulations cover the 2014 to 2018 model years for heavy-duty trucks, buses and vans. These regulations cut emissions by improving the fleet's fuel efficiency by 9 percent to 23 percent, depending on the size of vehicle. The federal government estimates that these standards will reduce GHG emissions by approximately 270 million metric tons. In Ford's case, the standards primarily affect our heavy-duty pickup trucks and vans, plus vocational vehicles such as shuttle buses and delivery trucks. In February 2014, President Obama announced that the EPA and NHTSA will issue a new round of standards for these vehicles covering the 2019 model year and beyond. These regulations are expected to be finalized by the spring of 2016.



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Purchase Planner

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## European Policy

The European Union has set mandatory carbon dioxide (CO<sub>2</sub>) targets for both cars and light commercial vehicles. The specific target for an automaker depends on the average weight of the automaker's vehicles registered in a given year; lower average vehicle weight results in stricter CO<sub>2</sub> targets for a given automaker. Ford cars registered in the EU have relatively low average weight compared to other automakers, which results in stricter targets for Ford compared to the overall industry target of 130 g/km during the 2012 to 2015 period. This target is set to decrease to 95 g/km in the 2020 to 2021 timeframe.

The EU has also established significant regulations about other items related to climate change, such as fuels (including bio-blending), tires and gear-shift indicators, as well as requirements related to fuel economy indicators and more efficient, low-CO<sub>2</sub> mobile air conditioning systems. The EU Commission, Council and Parliament also approved a target for commercial light-duty vehicles to be at an industry average of 175 g/km (with phase-in from 2014 to 2017) and 147 g/km in 2020. In fact, automobiles are one of the most regulated products in the EU, with requirements also covering non-CO<sub>2</sub> emissions, drive-by noise, recycling, substances, electromagnetic requirements, safety, technical aspects and more. Ford is complying and will continue to comply with all these various targets and prohibitions with appropriate product offerings.

In general, Ford is requesting that regulations and policies be well coordinated and not contradictory to each other, and that they also be technology-neutral, be proportional, avoid double regulation, offer sufficient lead time to adjust development and production cycles, and follow an integrated approach in which all stakeholders (industry, infrastructure, consumers and governments) contribute to the solution. Also, any CO<sub>2</sub> regulations should be in line with meeting the global CO<sub>2</sub> target of 450 ppm.

In several EU member states, CO<sub>2</sub> taxation is in place to encourage the early introduction of low-CO<sub>2</sub> vehicles. The major tax break points are often around 50 g/km, 95 to 100 g/km, and 120 g/km, with very high taxation in some countries above these levels. Unfortunately, these tax break points are not harmonized among the European countries.

The industry will continue to invest heavily in research and development, and new product programs in order to reach short-term CO<sub>2</sub> targets. The long-term target will require technological breakthroughs, new refueling infrastructure and a swift renewal of the car fleet on Europe's roads.

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# Canadian Policy

In September 2010, Environment Canada finalized greenhouse gas emissions regulations for 2011–2016 model year passenger automobiles and light trucks. This regulation aligns emission standards and test procedures with those of the U.S. The regulation provides companies with similar compliance flexibilities to those available under the U.S. Environmental Protection Agency's greenhouse gas (GHG) regulation, including advanced technology credits, air conditioning leakage and efficiency credits, flexible-fuel vehicle credits and credit transfer among fleets. The Canadian federal government is also expected to publish a final regulation in 2014 for light-duty vehicles that maintains alignment with EPA vehicle GHG standards for the 2017 to 2025 model years.

In February 2013, Environment Canada published the final regulation for 2014 to 2018 heavy-duty vehicles. It is also in alignment with the U.S. federal heavy-duty vehicle GHG regulations, which will begin with the 2014 model year. The Provinces of Quebec, Manitoba and British Columbia participate in the Western Climate Change Initiative and had committed to adopt GHG regulations based on California standards. Quebec has promulgated a GHG regulation based on the California standards, but with fewer flexibility mechanisms. Now that the Canadian federal regulation is in place, the Quebec government has amended the Quebec regulation to recognize equivalency with the federal standards. Reporting of Quebec fleet performance is still required. We are hopeful that Quebec will see the benefit of a single standard for Canada, consistent with the One National Program effort in the U.S. Ford has participated in regulatory discussions on this issue, providing technical expertise and supporting a tough, aligned, national standard. British Columbia and Manitoba have both acknowledged the value of the new federal standards.

Environment Canada has also regulated renewable fuel content in on-road gasoline. Effective September 2010, renewable levels in the national pool of gasoline must average 5 percent. Environment Canada has also implemented a regulation for renewable content in diesel fuel. As of July 2011, the regulation requires 2 percent renewable content in diesel fuels.

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## Asia Pacific Policy

In Ford's Asia Pacific region, sales in China are growing rapidly. Economic growth is a key priority of the Chinese government, to be balanced with energy security and the resolution of air pollution concerns.

The Chinese Ministry of Industry and Information Technology (MIIT) enforced the Stage III fuel consumption Monitoring & Reporting rule beginning July 1, 2012. We are on track to comply with this requirement through 2015. The China Automotive Technology and Research Center (CATARC) is developing Stage IV fuel-consumption targets for the Ministry, which are expected to be completed in 2014 and enforced in the 2016 to 2020 timeframe.

The Chinese government provides limited incentives for the purchase of "new energy vehicles" (including plug-in electric vehicles) made in China. The Chinese government also provides incentives of RMB60K (\$9,700) per vehicle to customers who purchase plug-in or pure electric vehicle models approved as new energy vehicles.

India, Japan, South Korea, Taiwan, and Vietnam have released new or modified fuel-economy limits, while Hong Kong, Japan, South Korea and Thailand have set or are developing complementary tax incentives based on fuel economy and carbon dioxide targets.

Ford is actively involved in dialogues with governments across Asia Pacific in a number of areas, including sustainable mobility, energy security and environmental protection.

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## South American Policy

In Brazil, our largest South American market, the large scale use of biofuels is a national policy. All gasoline is blended with 20 to 25 percent ethanol, and pure ethanol is extensively used as motor fuel. Most new vehicles are flexible-fuel vehicles, which are designed to accommodate fuel containing a range of ethanol content. Also, a minimum of 5 percent biodiesel must be added to diesel.

Brazilian emission requirements are periodically updated through an emissions-control program. Brazil also introduced a voluntary vehicle energy-efficiency labeling program; the labels indicate fuel consumption rates for light-duty vehicles with a spark-ignition engine. While the program is voluntary, Brazil also published a new automotive regime that requires participation in the fuel-economy labeling program with improved fuel consumption starting on October 1, 2016. Failure to achieve an absolute target for "corporate energy efficiency" as a function of "fleet corporate average mass" will result in a substantial tax increase and cumulative fines on all automotive domestic sales (local production and imports) retroactive as of January 2013. Additional tax reductions are available if further fuel-efficiency improvements are achieved. A star ranking for light vehicles was also recently introduced, favoring low-emission, low-carbon-dioxide (CO<sub>2</sub>), ethanol, flexible-fuel and hybrid vehicles. Diesel use in light vehicles under a one-ton payload is not allowed in Brazil, except for combined-usage vehicles with special off-road characteristics. Ten Brazilian states have issued vehicle pollution control plans and are taking actions to implement in-use vehicle inspection and maintenance programs. Brazil also phased-out S-1800 diesel fuel and now only markets S-10 and S-500; also, sulfur content in gasoline has been lowered to 50 ppm maximum.

In 2013, most of Ford's light-duty products in Brazil were offered as ethanol flexible-fuel vehicles. The new Ford Focus introduced in Brazil in 2013 is the world's first direct-injection flexible-fuel engine. We also provide light- and heavy-duty vehicles that meet biodiesel requirements.

Other South American countries, such as Argentina and Colombia, have significantly increased the use of biofuels. And in 2013, Chile introduced requirements that the fuel-consumption and CO<sub>2</sub>-emissions levels of light-duty vehicles be posted at sales locations and in owners' manuals.

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## Middle East and Africa Policy

Ford has a strong heritage in the Middle East and Africa, with more than six decades of presence in the region. The company has increased sales of the Ford and Lincoln brands in the region significantly in the past four years and we see it as poised to become one of the next big automotive growth markets. However, the region is comprised of diverse markets with different political, cultural and economic environments. While fuel economy and CO<sub>2</sub> have not been key political or consumer priorities in many of the markets in this region to date, the products we have sold in the region have generally benefited from fuel economy and CO<sub>2</sub> improvements we have implemented for products in other regions. We anticipate that new regulatory challenges and opportunities are likely to emerge in the near future.

South Africa has been in the lead in developing standards to reduce vehicle CO<sub>2</sub> emissions. They have enforced a tax based on the car's emissions levels since 2010.

Saudi Arabia has recently been focusing on fuel-efficiency improvements in their vehicle fleet. Requirements for vehicle labeling and reporting in the region are under discussion. They are also considering requirements for potential average fuel consumption fleet targets in the near future. We continue to maintain dialogue with the Kingdom of Saudi Arabia, and our other local markets, to ensure our product strategies complement and align with their national goals.

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## Renewable Fuels Policy

Today, more than 80 percent of global oil reserves are limited to 10 countries, while biofuels made from sugarcane can be produced in more than 100 countries. First-generation biofuels are playing an important role in building consumer awareness and spurring capital investment in infrastructure and facilities that can be used for more promising second-generation biofuels.

In the U.S., Ford is among the leaders in providing vehicles that can operate on biofuels, and we will continue to produce vehicles capable of operating on biofuels in line with consumer demand and retail refueling infrastructure development. Our flexible-fuel products, which we are delivering at no additional cost to consumers, go well beyond requirements and what most other automakers are doing.

Ford's vision for sustainable biofuels is for accelerated use of renewable fuels to deliver increased energy security, enhance economic development and help to address climate change. This vision includes rapidly expanding the number of vehicles that can operate on biofuels in some regions, increasing the number of stations offering biofuels, developing the fuel distribution network to support customer choice and value, and achieving technology breakthroughs to commercialize advanced biofuels.

Policies in several regions are aimed at increasing the use and availability of biofuels. The U.S. adopted a Renewable Fuel Standard requiring 36 billion gallons of biofuels by 2022, including more than 20 billion gallons of low-carbon advanced biofuels. The EU Renewable Energy Directive has established a 10 percent renewable energy target for transportation energy in 2020, including the use of renewable-based electricity. The EU is also adding more-specific criteria regarding the types of sustainable biofuels that can be counted toward this regulation, and is aiming to limit the amount of crop-based biofuels used to meet the standard. Brazil has had a very aggressive domestic ethanol program for years.

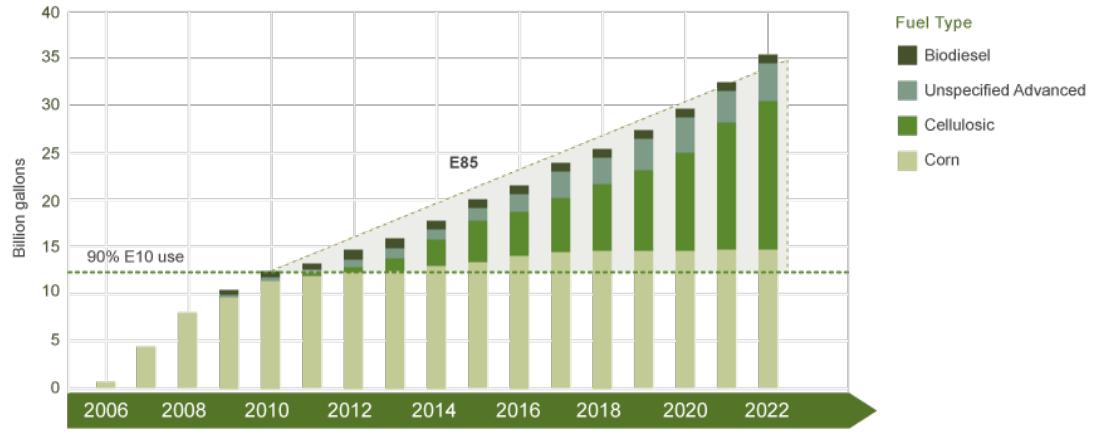
But these policies aren't enough. Providing value and refueling accessibility is critical to engage consumers and get them to use alternative energy sources. Hundreds of millions of vehicles in operation today were designed to use ethanol blends containing less than 10 percent ethanol, and our transportation energy infrastructure was set up to deliver petroleum-based fuels rather than high-concentration alcohols.

In January 2011, the U.S. Environmental Protection Agency (EPA) approved a waiver allowing the use of E15 (a blend of 85 percent gasoline and 15 percent ethanol) in 2001 and later model year vehicles, after previously issuing a waiver allowing E15 to be used in 2007 and later vehicles. Ford's owner manuals are the source for our consumers to identify recommended fuels for use in their particular vehicle. As of the 2013 model year, Ford vehicles are capable of using E15, while prior model years are limited to E10.

On the one hand, we recognize the potential benefits of expanded use of E15 fuel in helping to build markets for renewable fuels in some countries. In addition, since ethanol has an octane rating greater than today's gasoline, blends with higher levels of ethanol have the potential to produce a higher octane fuel, which can enable further improvements in engine efficiency. On the other hand, the implementation of the EPA's E15 waiver presents a number of concerns. In particular, customers should be advised to consult their owner guides, as the use of E15 in vehicles not designed for it has the potential to create problems and void warranties. There is also a need to develop a robust program of regulation to prevent the "misfueling" of older vehicles not authorized by EPA to use E15. We are concerned that the operation of such vehicles on E15 will result in various quality, durability and performance problems, leading to customer dissatisfaction.

In Europe, we recommend that biofuel use be harmonized throughout the region by targeting the introduction of B7 and E10 as standard fuels.

U.S. Renewable Fuel Standard



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## Partnerships and Collaboration

Addressing the linked issues of climate change and energy security requires an integrated approach – a partnership of all stakeholders, including the automotive industry, the fuel industry, other industries and enterprises, governments and consumers. It will also require the best collective thinking and collaboration from all of these sectors.

Ford is involved in numerous partnerships and alliances with universities, coalitions, nongovernmental organizations and other companies to improve our understanding of climate change. For example, Ford is:

- A charter member of the Sustainable Transportation Energy Pathways Program at the Institute of Transportation Studies at the University of California at Davis. The Institute aims to compare the societal and technical benefits of alternative sustainable fuel pathways.
- Industry co-chair of the U.S. DRIVE Cradle-to-Grave life cycle assessment of energy use, carbon dioxide (CO<sub>2</sub>) and greenhouse gas emissions.

Our participation in these and other partnerships helps us to formulate improved strategies for products and policies that will in turn help to address climate change and energy security. The following are links to the above-mentioned organizations and others with which we cooperate on climate change issues:

- [25x'25 \(Energy Future Coalition\)](#)
- [BP](#)
- [Center for Clean Air Policy's Climate Policy Initiative](#)
- [Clean Fuels Development Coalition](#)
- [Diesel Technology Forum](#)
- [Governors' Biofuels Coalition](#)
- [Harvard University, Belfer Center for Science and International Affairs](#)
- [Growth Energy](#)
- [My Energi Lifestyle](#)
- [University of California at Davis, Institute of Transportation Studies, Sustainable Transportation Energy Pathways Program](#)
- [U.S. DRIVE](#)
- [World Business Council for Sustainable Development](#)
- [World Resources Institute](#)
- [World Economic Forum](#)

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## Emissions Trading

Emissions trading is a key tool in both voluntary and mandatory greenhouse gas (GHG) emissions-reduction programs. Ford was an early participant in carbon markets, with a goal of gaining experience that will be valuable in an increasingly carbon-constrained world.

For example, Ford, along with 11 other companies and the city of Chicago, founded the Chicago Climate Exchange (CCX) in 2003. The CCX was a GHG emissions-reduction and trading program for emission sources and projects in North America. It was a self-regulated, rules-based exchange designed and governed by CCX members. Ford was the first and only auto manufacturing participant in the Exchange. Through the CCX, we committed to reducing our North American facility emissions by 6 percent between 2000 and 2010, and we exceeded that reduction target. The CCX elected to end the emissions-trading portion of the program after 2010, with cumulative verified emission reductions totaling nearly 700 million metric tons of carbon dioxide (CO<sub>2</sub>) since 2003.

Ford was also one of the original companies to join the U.K. Emissions Trading Scheme, the first voluntary, government-sponsored, economy-wide, cross-industry GHG trading program. Ford Motor Company Limited (U.K.) entered the program in March 2002, committing to and achieving a 5 percent CO<sub>2</sub> reduction for eligible plants and facilities over five years.

Ford now participates in the mandatory EU Emissions Trading System, which commenced in January 2005 and is one of the policies being introduced across Europe to reduce emissions of CO<sub>2</sub> and other greenhouse gases. The second phase of this program ran from 2008 to 2012, coinciding with the first Kyoto Commitment Period. The third trading period began in January 2013 and will run through December 2020.

Despite Ford facilities' low-to-moderate CO<sub>2</sub> emissions (compared to other industry sectors), the EU Emissions Trading System regulations apply to seven Ford facilities in the U.K., Belgium and Spain. The trading scheme requires us to apply for emissions permits, meet rigid emissions monitoring and reporting plans, arrange for third-party verification audits and manage tax and accounting issues related to emissions transactions.

Ford is actively involved in an ongoing evaluation of the EU Emissions Trading System at both the EU and member-state levels. We have used the experience gained from participating in the market-based mechanisms described above to ensure that we operate in compliance with the scheme's regulatory framework. Ford anticipated the start of the EU Emissions Trading System and established internal business plans and objectives to maintain compliance with the new regulatory requirements.

Through our participation in these programs, we built a world-class CO<sub>2</sub> tracking infrastructure for our facility emissions. We will continue to leverage this system to support mandatory and voluntary reporting globally, to measure progress against our new facility CO<sub>2</sub> target, and to ensure compliance with the EU Emissions Trading System program and the new mandatory U.S. Environmental Protection Agency reporting requirements.

Comprehensive reporting forms the foundation for all emissions trading. We voluntarily report GHG emissions in the U.S., Canada, Mexico, Argentina, Australia, Brazil, China, and Taiwan. Mandatory reporting is required in U.S., Canada, Australia, Europe. This reporting, which has won several awards, is discussed in the [Greening Our Operations](#) section.

### Related links

[External Websites](#)

→ [EU Emissions Trading Scheme](#)



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## Greening Our Products

As we are a customer- and product-driven company, our vehicles are the foundation of our business. Our products are also the source of our most significant environmental impacts, and are the focus of our efforts to reduce those impacts. In this section we report on the current environmental performance of our products and our efforts to "green" our products, or improve their environmental impacts.

Specifically, we address:

- [Our approach to life cycle analysis](#) including how we quantify our environmental impacts and apply lifecycle analysis in our product development process.
- [Our Sustainable Technologies and Alternative Fuels plan](#), which lays out our plan to improve the fuel efficiency of our products and advance the use of alternative fuels including electricity and bio-fuels. We have already implemented all of the near-term and many of the mid term elements of this plan.
- [Vehicle fuel efficiency and CO<sub>2</sub> emissions progress and performance](#), following our vehicles + fuel + driver = GHG emissions approach to understanding vehicle emissions during the "use phase" of a vehicle's lifecycle.
- [Non-carbon-dioxide tailpipe emissions](#), including hydrocarbons, nitrogen oxides, carbon monoxide and particulate matter that can contribute to smog formation and other air-pollution issues.
- [Sustainable materials](#), including efforts to increase our use of recycled and renewable materials, improve vehicle-interior air quality and eliminate substances of concern.
- [Our approach to electrified vehicles](#), which includes hybrid electric, plug-in hybrid electric and all-electric vehicles.

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## Life Cycle Analysis

We use a life cycle approach to understand, assess and reduce the adverse impacts of our products. Life cycle analysis considers the materials and energy use and emissions generated over the entire life cycle of our products from cradle to grave, including raw material acquisition, material production, product manufacture, product use, product maintenance, material and component recycling and recovery, and disposal at end of life. For vehicles, this includes the environmental burdens associated with mining ores, producing materials (e.g., steel, aluminum, brass, copper, plastics, etc.), fabricating them into parts, assembling the parts into a vehicle, operating the vehicle over its entire lifetime, producing fuel for the vehicle, maintaining the vehicle and finally, dismantling the vehicle at the end of its life. We use the knowledge gained from this kind of analysis to help us minimize negative impacts up front in product design decisions and to balance environmental, social and economic aspects in our product development process.

We are incorporating life cycle assessment (LCA) in different ways across our business functions. For example, our research teams are using LCA to filter and prioritize projects, and engineers are using LCA to help select one material or design alternative over another. We are also seeing increased use of LCA throughout the industry. For example, environmental advocates are performing their own LCAs in parallel with ours. These external analyses, which often use a different set of assumptions about life cycle impacts, sometimes confirm and sometimes challenge our findings. We will continue to develop and implement a portfolio of LCA tools internally. Furthermore, we will continue to work with other LCA experts to agree on standard methodologies and assumptions to facilitate credible life cycle comparisons.

As we continue expanding our product portfolio from vehicles powered by traditional internal combustion engines running on petroleum-based gasoline or diesel to a wider range of powertrains and fuels, life cycle analysis becomes increasingly important and complex. Therefore, we are increasing our use of life cycle analysis to understand the relative impacts and benefits of alternative powertrains such as electrified vehicles and alternative fuels including electricity and compressed natural gas. We are also using these analyses to help customers understand and choose among the wide range of more sustainable vehicles available in today's marketplace.

We are working to improve the life cycle sustainability of our products and operations across our value chain. Among our product sustainability efforts, we are increasing our use of [sustainable materials](#) and [eliminating undesirable materials](#) such as heavy metals and substances that are known to be common allergens. We are also working to [reduce greenhouse gases](#) and [other emissions](#) from our facilities and vehicles by developing cleaner and more energy-efficient production processes, improving the efficiency of our [packaging and transportation logistics](#) and introducing [cleaner](#) and more [fuel-efficient vehicles](#). Downstream in our value chain, we are [working with drivers](#) to educate them on ways to increase fuel economy and reduce vehicle emissions – for example, through driver interface technologies and our eco-driving program. Upstream, we are working with our suppliers to increase the sustainability of our products throughout the [supply chain](#).

The remainder of this section focuses on how we are using life cycle analyses to [quantify the environmental impacts of our products](#) and how we are [applying that knowledge](#) to improve product development decisions and help customers choose more sustainable products.

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→ [Sustainable Materials](#)

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## Quantifying Our Environmental Impacts

The first step in improving the life cycle performance of our products is to understand the environmental aspects of our products and the potential environmental impacts associated with them<sup>1</sup>. Much of our work to understand the environmental impacts of our products has focused on understanding their life cycle carbon-dioxide (CO<sub>2</sub>) emissions but we are also working to understand the life cycle water impacts of our products and the different fuels they use.

### Assessing Life Cycle Vehicle CO<sub>2</sub> Emissions

Estimates of vehicles' total life cycle CO<sub>2</sub> emissions vary depending upon the specifics of the vehicle analyzed and the vehicle's powertrain and fuel type. For example, based on assessments of the Ford Fiesta, Focus and Mondeo, we found significant differences in life cycle CO<sub>2</sub> emissions among the three vehicle models and between different engine and fuel types within a vehicle model. In all cases the "vehicle use" phase produces the largest portion of life cycle CO<sub>2</sub> emissions (for example, 77 percent of the total for the Focus diesel, 73 percent for the Focus diesel EConetic version, and 83 percent for the Mondeo gasoline). Vehicles with better fuel economy do reduce the use phase's contribution to life cycle CO<sub>2</sub> emissions; however, the use phase remains the dominant phase for most environmental impacts. See the table below for comparisons of life cycle CO<sub>2</sub> emissions across these four vehicles.

### Lifecycle CO<sub>2</sub> Emissions Comparison across Vehicle Models, Engines and Fuel Types

Vehicle Model	Engine	Fuel Type	Lifecycle CO <sub>2</sub> emissions
2013 Ford Focus EConetic	1.6 L	Diesel	23 metric tons*
2013 Ford Focus	1.0 L	Gasoline	27 metric tons
2011 Ford Fiesta	1.25 L	Gasoline	30 metric tons
2011 Ford Fiesta	1.6 L	Diesel	21 metric tons
2011 Ford Focus	1.6 L	Gasoline	32 metric tons
2011 Ford Focus	1.6 L	Diesel	27 metric tons
2011 Ford Kuga	2.0 L	Diesel	36 metric tons
2011 Ford Mondeo	2.0 L	Gasoline	42 metric tons
2011 Ford Mondeo	2.0 L	Diesel	37 metric tons

\* 1 metric ton = 1,000 kg = 0.98 U.K. tons = 1.1 U.S. tons

### Assessing the Life Cycle Emissions of Electrified Vehicles

Assessing vehicle life cycle energy consumption and greenhouse gas emissions is becoming a more complicated task as we add alternative fuels and powertrains to our vehicle lineup. For conventional gasoline- and diesel-powered vehicles, most of the energy is consumed, and most of the life cycle CO<sub>2</sub> emissions are released when the vehicles are driven, rather than when they are manufactured, maintained or recycled at end of life. As vehicle fuel efficiency improves and lower-carbon fuels are made available, the relative contribution of CO<sub>2</sub> emissions from the in-use phase will decrease. For plug-in hybrid electric vehicles (PHEVs), battery electric vehicles (BEVs) and hydrogen-powered fuel cell vehicles (FCVs), most of the life cycle CO<sub>2</sub> emissions are released during the production of the electricity or the hydrogen that provides the energy for the vehicle. A systems perspective that considers the full impacts of both the vehicle technology and fuel technology is thus required when considering the CO<sub>2</sub> emissions and energy use associated with alternative vehicle technologies. BEVs and FCVs are capable of achieving very low CO<sub>2</sub> emissions, particularly when powered by low-CO<sub>2</sub> electricity or low-CO<sub>2</sub> hydrogen. For all of our products, the emissions associated with the generation and delivery of their fuel has an impact on their life cycle emissions.

### Related links

#### This Report

- Electrification: A Closer Look
- Water

To better understand the impacts of different powertrain choices on life cycle CO<sub>2</sub> emissions, we compared the relative impacts and benefits of different propulsion technologies for a Focus-sized vehicle on a life cycle basis. We learned that for a battery electric vehicle (BEV) Focus, the carbon footprint of the electricity source used to charge the electric vehicle is the critical factor in determining whether or not the BEV has superior life cycle CO<sub>2</sub> emissions compared with a conventional Focus. In our study, we assumed the Focus BEV used electricity from sources below 400 g of life cycle CO<sub>2</sub>/kWh – such as the electricity currently used in California, Norway and Switzerland. Based on this study, we found that the most cost-efficient, low-CO<sub>2</sub> vehicles for customers are the Focus variants powered by the EcoBoost® engine or advanced diesel engines. If lower carbon electricity sources are used to charge the Focus BEV, however, the electric vehicle has lower life cycle CO<sub>2</sub> emissions than a Focus with EcoBoost or advanced diesel engines. For hybrid electric vehicles (HEVs) the range of life cycle CO<sub>2</sub> emissions is similar to advanced diesel and CNG vehicles on the lower end and advanced gasoline vehicles at the upper end, depending on driving conditions. The life cycle CO<sub>2</sub> emissions of PHEVs, like BEVs, are significantly impacted by the carbon footprint of the electricity.

## Understanding the Life Cycle Water Footprint of Our Vehicles

As part of our continuing focus on reducing water use and the development of our global water strategy, we are also using life cycle analysis to understand the water footprint of our vehicles. Our global water strategy, released in 2014, continues our focus on understanding and reducing our water-related impacts within our own facilities, and includes our supply chain. We are currently estimating fresh water withdrawal and consumption for the life cycle of a model year 2012 Ford Focus. Water withdrawal is water removed from the ground or diverted from a water source, while water consumption is water that is consumed and not available for further use. In this analysis, we are accounting for both direct and indirect water use throughout the life cycle including impacts from the vehicle itself (e.g., vehicle manufacturing and vehicle use) and impacts from the fuel used in the vehicle (e.g., production of fuel). We plan to share more details on the results of this analysis in future updates.

1. Environmental aspects is a term used in the ISO 14001 framework to denote elements of an organization's activities, products and services that can interact with the environment. Potential environmental impacts include any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services. Local Ford facilities use corporate lists of environmental aspects and potential impacts to identify and amplify those aspects that apply to their operations.



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Voice: John Fleming

## Applying Life Cycle Analysis

We are applying the knowledge gained through life cycle analysis in real world decisions including in our own product development decisions and in tools that help our customers choose more sustainable products. This section provides some examples of our practical applications of life cycle analysis.

### Improving Our Products with Product Sustainability Index

Our Product Sustainability Index (PSI) represents one of our most advanced applications of life cycle analysis in product development decisions. This tool, which has been used in our European product development operations since 2002, helps us to assess and find opportunities to reduce the impacts of our products over their entire life cycle – including environmental impacts such as global warming from greenhouse gas emissions, societal questions such as pedestrian protection and economic issues such as cost of ownership.

Ford's PSI tracks eight product attributes identified as key sustainability elements of a vehicle: life cycle global warming potential (mainly carbon dioxide (CO<sub>2</sub>) emissions); life cycle air-quality potential (other air emissions); the use of sustainable materials (recycled and renewable materials); vehicle interior air quality; exterior noise impact (drive-by noise); safety, as measured by the European New Car Assessment Program (including for occupants and also pedestrians); mobility capability (seat and luggage capacity relative to vehicle size); and life cycle ownership costs (full costs for the customer over the first three years).

Since 2002 we have been applying the PSI as a sustainability management tool in the development of all of our major new European vehicles. As a result of using the PSI assessment system, all of these models have shown improvements in environmental, social and/or economic performance when compared with the previous models. The chart below shows specific performance and areas of improvement for each model. The PSI will be used on all future products developed by Ford of Europe. Detailed reports on the PSI analysis for these vehicles can be downloaded from Ford of Europe's website.

### PSI Assessed Model Performance

#### Life Cycle Global Warming

##### Method

Emissions of CO<sub>2</sub> and other greenhouse gases from raw material extraction to material, part and vehicle production, driving period (150,000 km, incl. air conditioning) and final recycling/recovery (i.e., full vehicle lifecycle, cradle-to-cradle)

	Performance*	Better/Worse than Previous Model
2013 Ford Focus 1.6L TDCi ECOneric	23 tonnes CO <sub>2</sub>	Better
2013 Ford Focus 1.0L EcoBoost Petrol	27 tonnes CO <sub>2</sub>	No previous model
2013 Ford Focus Electric	33 tonnes CO <sub>2</sub>	No previous model
2013 Ford Focus Electric (with recommended electricity)	12 tonnes CO <sub>2</sub>	No previous model
2011 Ford Focus, 1.6 L, Gasoline	32 metric tons CO <sub>2</sub> equivalent	Better
2011 Ford Focus, 1.6 L, Diesel	27 metric tons CO <sub>2</sub> equivalent	Better
2009 Ford Fiesta ECOneric, Diesel	21 metric tons CO <sub>2</sub> equivalent	Better
2009 Ford Fiesta, Gasoline	30 metric tons CO <sub>2</sub> equivalent	Better
2008 Ford Kuga	37 metric tons CO <sub>2</sub> equivalent	No previous model
2007 Ford Mondeo 2.0L TDCi Diesel with	37 metric tons CO <sub>2</sub> equivalent	Better

DPF	equivalent	
2006 Ford S MAX 2.0L TDCi with DPF	39 metric tons CO <sub>2</sub> equivalent	Similar
2006 Ford Galaxy 2.0L TDCi with DPF	40 metric tons CO <sub>2</sub> equivalent	Similar

\*1 metric ton = 1,000 kg

### Life Cycle Air Quality

#### Method

Summer smog-related emissions from raw material extraction to material, part and vehicle production, driving period (150,000 km, incl. air conditioning) and final recycling/recovery (i.e., full vehicle lifecycle, cradle-to-cradle)

	Performance	Better/Worse than Previous Model
2013 Ford Focus 1.6L TDCi ECOnetic	21 kg ethene	Better
2013 Ford Focus 1.0L EcoBoost Petrol	26 kg ethene	No previous model
2013 Ford Focus Electric	8 kg ethene	No previous model
2013 Ford Focus Electric (with recommended electricity)	5 kg ethene	No previous model
2011 Ford Focus, 1.6 L, Gasoline	30 kg ethene equivalent	Better
2011 Ford Focus, 1.6L Diesel	25 kg ethene equivalent	Better
2009 Ford Fiesta ECOnetic, Diesel	22 kg ethene equivalent	Better
2009 Ford Fiesta, Gasoline	32 kg ethene equivalent	Better
2008 Ford Kuga	35 kg ethene equivalent	No previous model
2007 Ford Mondeo, 2.0-L TDCi Diesel with DPF	35 kg ethene equivalent	Better
2006 Ford S MAX, 2.0L TDCi with DPF	37 kg ethene equivalent	Similar
2006 Ford Galaxy, 2.0L TDCi with DPF	37 kg ethene equivalent	Similar

### Sustainable Materials

#### Method

Use of recycled and natural materials

	Performance	Better/Worse than Previous Model
2013 Ford Focus 1.6L TDCi ECOnetic	5.3% of non-metals	Better
2013 Ford Focus 1.0L EcoBoost Petrol	5.4% of non-metals	No previous model
2013 Ford Focus Electric	5.3% of non-metals	No previous model
2013 Ford Focus Electric (with recommended electricity)	5.3% of non-metals	No previous model
2009 Ford Fiesta ECOnetic, Diesel	8.5% of non-metals	Better
2009 Ford Fiesta, Gasoline	9% of non-metals	Better
2008 Ford Kuga	6% of non-metals	No previous model
2007 Ford Mondeo 2.0L TDCi Diesel with DPF	7.5% of non-metals	Better
2006 Ford S MAX 2.0L TDCi with DPF	18 kg of non-metals	Better
2006 Ford Galaxy 2.0L TDCi with DPF	18 kg of non-metals	Better

### Substance Management

Performance	Better/Worse than Previous Model
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<b>2013 Ford Focus 1.6L TDCi ECOneric</b>	Designed against rigorous standards based on certified processes	Better
<b>2013 Ford Focus 1.0L EcoBoost Petrol</b>	Designed against rigorous standards based on certified processes	No previous model
<b>2013 Ford Focus Electric</b>	Designed against rigorous standards based on certified processes	No previous model
<b>2013 Ford Focus Electric (with recommended electricity)</b>	Designed against rigorous standards based on certified processes	No previous model
<b>2009 Ford Fiesta ECOneric, Diesel</b>	Substance management, TÜV-tested interior and pollen filter efficiency	Better
<b>2009 Ford Fiesta, Gasoline</b>	Substance management, TÜV-tested interior and pollen filter efficiency	Better
<b>2008 Ford Kuga</b>	Substance management, TÜV-tested interior and pollen filter efficiency	No previous model
<b>2007 Ford Mondeo, 2.0L TDCi Diesel with DPF</b>	Substance management, TÜV-tested interior and pollen filter efficiency	Better
<b>2006 Ford S MAX, 2.0L TDCi with DPF</b>	Substance management, TÜV-tested pollen filter efficiency and allergy-tested label	Better
<b>2006 Ford Galaxy, 2.0L TDCi with DPF</b>	Substance management, TÜV-tested pollen filter efficiency and allergy-tested label	Better

### Drive-by-Noise

#### Method

Decibel level weighted to human ear dB(A)

	Performance	Better/Worse than Previous Model
<b>2013 Ford Focus 1.6L TDCi ECOneric</b>	68 dB(A)	Better
<b>2013 Ford Focus 1.0L EcoBoost Petrol</b>	66 dB(A)	No previous model
<b>2013 Ford Focus Electric</b>	69.7 dB(A)	No previous model
<b>2013 Ford Focus Electric (with recommended electricity)</b>	69.7 dB(A)	No previous model
<b>2011 Ford Focus, 1.6L Gasoline</b>	66 dB(A)	Better
<b>2011 Ford Focus, 1.6L Diesel</b>	68 dB(A)	Better
<b>2009 Ford Fiesta ECOneric, Diesel</b>	69 dB(A)	Better
<b>2009 Ford Fiesta, Gasoline</b>	72 dB(A)	Similar
<b>2008 Ford Kuga</b>	72 dB(A)	No previous model
<b>2007 Ford Mondeo 2.0L, TDCi Diesel with DPF</b>	69 dB(A)	Similar
<b>2006 Ford S MAX, 2.0L TDCi with DPF</b>	71 dB(A)	Better
<b>2006 Ford Galaxy, 2.0L TDCi with DPF</b>	71 dB(A)	Better

### Euro NCAP (independent safety rating)

#### Method

Complex method, structural stability, occupant safety, and pedestrian safety; active safety elements, etc., including European New Car Assessment Program (Euro NCAP) stars

	Performance	Better/Worse than Previous Model
<b>2013 Ford Focus 1.6L TDCi ECOneric</b>	5-star overall safety rating	Better
<b>2013 Ford Focus 1.0L EcoBoost Petrol</b>	5-star overall safety rating	No previous model
<b>2013 Ford Focus Electric</b>	Not tested	No previous model
<b>2013 Ford Focus Electric (with recommended electricity)</b>	Not tested	No previous model
<b>2011 Ford Focus, Gasoline and Diesel</b>	5-star overall safety rating, plus 4 Euro NCAP Advanced rewards for Active City Stop, Lane Keeping Aid, Forward Alert and Driver Alert	Better
<b>2009 Ford Fiesta ECOneric, Diesel</b>	5-star Euro NCAP rating for adult occupant safety; electronic stability control available for all versions	Better
<b>2009 Ford Fiesta, Gasoline</b>	5-star Euro NCAP rating for adult occupant safety; electronic stability control available for all versions	Better

<b>2008 Ford Kuga</b>	Euro NCAP safety rating: 5 stars for adult occupant protection, 4 stars for child occupant protection and 3 stars for pedestrian protection	No previous model
<b>2007 Ford Mondeo, 2.0L TDCi Diesel with DPF</b>	Euro NCAP safety rating: 5 stars for adult occupant protection, 4 stars for child protection and 2 stars for pedestrian protection	Better
<b>2006 Ford S MAX, 2.0L TDCi with DPF</b>	Euro NCAP safety rating: 5 stars for adult occupant protection, 4 stars for child protection and 2 stars for pedestrian protection	Better
<b>2006 Ford Galaxy, 2.0L TDCi with DPF</b>	Euro NCAP safety rating: 5 stars for adult occupant protection, 4 stars for child protection and 2 stars for pedestrian protection	Better

### Mobility Capability

#### Method

Mobility service (including seats, luggage) to vehicle size; measured as vehicle shadow in m<sup>2</sup> and luggage areas in liters

	Performance	Better/Worse than Previous Model
<b>2013 Ford Focus 1.6L TDCi ECOnetic</b>	8.76 m <sup>2</sup> shadow area, 363 liter luggage compartment	Better
<b>2013 Ford Focus 1.0L EcoBoost Petrol</b>	8.76 m <sup>2</sup> shadow area, 363 liter luggage compartment	No previous model
<b>2013 Ford Focus Electric</b>	8.76 m <sup>2</sup> shadow area, 237 liter luggage compartment	No previous model
<b>2013 Ford Focus Electric (with recommended electricity)</b>	8.76 m <sup>2</sup> shadow area, 237 liter luggage compartment	No previous model
<b>2011 Ford Focus, Gasoline and Diesel</b>	8.76 m <sup>2</sup> shadow area, 363 liter luggage compartment	Similar
<b>2009 Ford Fiesta ECOnetic, Diesel</b>	7.5 m <sup>2</sup> shadow area, 295 liter luggage compartment	Better
<b>2009 Ford Fiesta, Gasoline</b>	7.5 m <sup>2</sup> shadow area, 295 liter luggage compartment	Similar
<b>2008 Ford Kuga</b>	9.5 m <sup>2</sup> shadow area, 410 liter luggage, 5 seats	No previous model – among best in class
<b>2007 Ford Mondeo, 2.0L TDCi Diesel with DPF</b>	9 m <sup>2</sup> shadow area, 530 liter luggage, 5 seats	Better
<b>2006 Ford S MAX, 2.0L TDCi with DPF</b>	10.25 m <sup>2</sup> shadow area, 1,171 liter luggage, 5 seats	Better
<b>2006 Ford Galaxy, 2.0L TDCi with DPF</b>	10.4 m <sup>2</sup> shadow area, 435 liter luggage, 7 seats	Similar

\*1 metric ton = 1,000 kg

### Life Cycle Cost\*

#### Method

Sum of vehicle price and three years' service (fuel cost, maintenance cost, taxation) minus residual value

	Performance	Better/Worse than Previous Model
<b>2013 Ford Focus 1.6L TDCi ECOnetic</b>	Approx. €16,000	Better
<b>2013 Ford Focus 1.0L EcoBoost Petrol</b>	Approx. €15,000	No previous model
<b>2013 Ford Focus Electric</b>	Approx. €25,000	No previous model
<b>2013 Ford Focus Electric (with recommended electricity)</b>	Approx. €25,500	No previous model
<b>2011 Ford Focus, 1.6L Gasoline</b>	Approx. €16,400	Better
<b>2011 Ford Focus, 1.6L Diesel</b>	Approx. €16,700	Better
<b>2009 Ford Fiesta ECOnetic, Diesel</b>	Approx. €13,000	Similar
<b>2009 Ford Fiesta, Petrol</b>	Approx. €11,000	Better
<b>2008 Ford Kuga</b>	Approx. €19,100	No previous model
<b>2007 Ford Mondeo, 2.0L TDCi Diesel with DPF</b>	Approx. €18,300	Better

<b>2006 Ford S MAX, 2.0L TDCi with DPF</b>	Approx. €22,100	Better
<b>2006 Ford Galaxy, 2.0L TDCi with DPF</b>	Approx. €23,200	Better

\*No guarantee that the costs reflect market conditions (in particular dependent on assumed differences in residual value and running cost).

Both Ford's own internal assessments and external assessments have found the PSI to be an effective life cycle assessment and design tool. An external study, conducted by experts in life cycle science and sustainability, found the PSI to be a design and analysis step that provides a full sustainability assessment and meets the requirements of ISO 14040, the international life cycle assessment standard. The PSI assessments of the 2006 S MAX and Galaxy vehicles were certified against the ISO rules for life cycle assessment. This certification process also verified the overall PSI methodology used for all subsequent PSI-developed models.

## Comparing Material Choices with Life Cycle Analysis

We also use life cycle analysis to help us assess the environmental and cost impacts of different vehicle material choices. For example, we evaluated the relative benefits of using soy-based foam compared with traditional petroleum-based foams and found a net decrease of 5.5 pounds of CO<sub>2</sub> per pound of soy oil used over the life cycle of the vehicle. We now use soy-based foam in all of our vehicles in North America. We are now developing a life cycle analysis tool to understand the potential benefits and trade-offs of using bio-based composite materials in automotive components in collaboration with the University of Michigan's Center for Sustainable Systems. We have used this life cycle-based material selection tool to evaluate a cellulose-reinforced polypropylene composite used in grill shutter housing and found that it has overall advantages in energy and global warming impacts compared with the glass-fiber reinforced composite. For more information on soy-based foam and other renewable materials, please see [Renewable Materials](#)

Life cycle analysis also underpinned our decision to dramatically increase the amount of aluminum and high strength steel used in the 2015 F-150. Our studies show that using more aluminum, high strength steel and other lightweight materials lowers the vehicles' life cycle CO<sub>2</sub> emissions. Though the energy required to make these materials can be higher than the energy needed to produce the steel that is typically used, the increase in CO<sub>2</sub> emissions resulting from production-related energy use is more than offset by the CO<sub>2</sub> reduction from lowering vehicle weight and thereby improving vehicle fuel efficiency. We also found that lightweighting has the most life cycle CO<sub>2</sub> benefits on larger, heavier and more powerful vehicles. The use of aluminum and high-strength steel in the 2015 F-150 also makes the truck stronger, more durable and more capable than any previous F-150. For more information on the 2015 F-150, please see [Case Study: The New F-150](#).

## Helping Fleet Customers with Life Cycle Analysis Tools

In 2012, we launched a suite of tools that use life cycle analysis and other analytical strategies to help fleet customers compare the sustainability and cost benefits of the different vehicle technology and alternative fuel options available in today's marketplace. The toolkit allows fleet customers to assess the CO<sub>2</sub> footprint of their existing vehicle fleet and make side-by-side comparisons of emissions and fuel costs for different vehicle types, powertrain options, fuel options and personalized user criteria such as local fuel costs, regional and local electricity sources, and driving behavior. Based on this information, the tool helps a customer assess the relative emissions and cost benefits of different vehicle options. For example, for a customer deciding the best location to add electric vehicles to his or her fleet, the calculator shows that the Focus Electric emits about 70 g CO<sub>2</sub>/km using electricity from the low-carbon California grid but more than twice as much, about 150 g CO<sub>2</sub>/km, in the more coal-intensive Southeast U.S. The calculator enables our fleet customers to both save money and protect the environment. For more information on this suite of tools, please see our [Ford Fleet Purchase Planner™](#) case study.



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Case Study: Ford Fleet  
Purchase Planner

Voice: John Fleming

## Sustainable Technologies and Alternative Fuels Plan

### Overview of Our Plan

In 2007, we set out an ambitious plan of vehicle technology and alternative powertrain and fuel actions to meet our [climate stabilization goals](#). For the past seven years, we have consistently implemented this plan, delivering significant improvements in the fuel economy of our global product portfolio and enabling the use of alternative fuels.



### A Portfolio Approach

Ford is taking a portfolio approach to provide consumers with a range of different options that improve fuel economy and overall sustainability while still meeting individual driving needs. We call this strategy the “power of choice.”



### Improving Fuel Economy

Though the fuel economy of modern vehicles has improved significantly over the past few decades, there are still opportunities to further improve vehicles with traditional gasoline and diesel powertrains. We are implementing a range of advanced engine and transmission technologies as well as improving aerodynamics and reducing weight.



### Migration to Alternative Fuels and Powertrains

Alternative fuels and powertrains are playing a growing role in reducing carbon emissions. We are implementing a range of alternatives to conventional internal combustion vehicles including electrified vehicles – i.e., hybrids, plug-in hybrids and all-electric vehicles – as well as vehicles that run on renewable biofuels, natural gas and propane, and implementing advanced clean diesel technologies. We are also working to advance hydrogen fuel cell vehicle technologies.



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## Overview of Our Plan

Our sustainable technologies and alternative fuels plan, mapped out in 2007, is our route to improving the fuel economy and cutting the carbon dioxide (CO<sub>2</sub>) emissions of our products around the world. We remain committed to the plan and have completed the near-term actions and are currently implementing the mid-term actions.

✓ indicates action completed

In Place	Near Term	Mid Term	Long Term
<b>Fundamental technologies in place</b> <ul style="list-style-type: none"> <li>✓ Significant number of vehicles with EcoBoost® engines</li> <li>✓ Diesel use as market demands</li> <li>✓ Electric power-assisted steering – begin global migration</li> <li>✓ Battery Management Systems – begin global migration</li> <li>✓ Aerodynamics improvements</li> <li>✓ Dual-clutch and six-speed automatic transmissions replace four- and five-speeds</li> <li>✓ Increased unibody applications</li> <li>✓ Introduction of additional small vehicles</li> <li>✓ Auto start-stop systems (micro-hybrids) introduced</li> <li>✓ Add hybrid electric vehicle (HEV) applications</li> <li>✓ Flexible-fuel vehicles</li> <li>✓ Compressed natural gas (CNG) prepped engines available where select markets demand</li> </ul>	<b>Fully implement fundamental technologies; introduce significant weight savings</b> <ul style="list-style-type: none"> <li>EcoBoost engines available in nearly all vehicles; engine displacement reduction aligned with vehicle weight savings</li> <li>Electric power-assisted steering – high volume</li> <li>Additional aerodynamics improvements</li> <li>Six-speed automatic transmissions – high volume</li> <li>Introduce substantial weight reductions; 250–750 lbs.</li> <li>Increased application of Auto Start-Stop</li> <li>Increased use of hybrid technologies</li> <li>Introduction of plug-in hybrid electric vehicle (PHEV) and battery electric vehicle (BEV)</li> <li>Vehicle and powertrain capability to leverage available renewable fuels</li> <li>Develop fuel cell stack technology</li> </ul>	<b>Expand weight savings, hybrids and plug-ins</b> <ul style="list-style-type: none"> <li>Introduce second-generation EcoBoost and advanced tech diesel</li> <li>Efficient heating, ventilation and air conditioning for HEVs, PHEVs and BEVs</li> <li>High-volume eight-plus speed automatic transmissions</li> <li>Continued weight reduction actions via advanced materials</li> <li>Increase volume of HEV and PHEV technologies</li> <li>Evolve BEV and PHEV ecosystems</li> <li>Optimize engines/vehicles for higher octane/alternative fuels</li> <li>Introduction of fuel cell electric vehicles</li> </ul>	<b>Leverage hybrids and introduce alternative energy sources</b> <ul style="list-style-type: none"> <li>Second-generation EcoBoost and advanced tech diesels – high volume</li> <li>Continued efficiencies in electrical architecture and intelligent energy management</li> <li>Lightweight materials proliferate to global platforms</li> <li>Next-generation HEV and PHEV technologies</li> <li>Continued leverage of BEVs</li> <li>Engines capable of operating on fuels with increased renewable hydrocarbons</li> <li>Fuel cells migration timing aligned with fuels and infrastructure availability</li> </ul>

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## A Portfolio Approach

In the very early years of our industry, automotive engineers experimented with a variety of methods for powering vehicles, including electricity and biofuels. The internal combustion engine using petroleum-based gasoline and diesel rose to the top fairly quickly, and has been the standard vehicle power source for the past 100 years. Reminiscent of those early years, we are now in a period of intense development and adoption of new vehicle technologies and fuels. At this time, however, there is no single winner in the race for the vehicle of the future.

That is why Ford is taking a “portfolio approach” to developing sustainable technologies and alternative fuel options. Our goal is to provide diversity in fueling options, in order to meet customers’ differing needs, while improving vehicle energy efficiency and long-term sustainability. We are thus providing customers with a range of affordable, fuel-efficient vehicles, advanced powertrains and alternative-fueled vehicle options – including fuel-efficient EcoBoost® gasoline engines, advanced diesel engines, hybrids, plug-in hybrids, all-electric vehicles and alternative-fuel vehicles. We call this approach the “power of choice,” because it allows customers to choose the vehicle that best meets their driving needs.

### Giving Customers the “Power of Choice”

To deliver this “power of choice” strategy we are developing global vehicle platforms that are compatible with a wide range of fuels and powertrain technologies. This allows us to offer a portfolio of options to our customers, target options to regions where they make the most sense, and evolve our vehicles as technologies and markets develop. Global vehicle platforms that have “plug-and-play” compatibility with a wide range of technologies will also allow us to make the range of fuel and powertrain options available more affordably. For example, we have introduced an all-electric Ford Focus, a hybrid electric Ford C-MAX, and the C-MAX Energi plug-in hybrid – all built on our global C-platform.

We believe that traditional gasoline- and diesel-powered vehicles with internal combustion engines will continue to be a major part of the mix for quite some time. So we are working to improve the fuel efficiency of the engines and transmissions of our current vehicles, along with every vehicle subsystem.

Also, we currently produce a range of flexible-fuel vehicle models across our global markets; these vehicles can run on either regular gasoline or E85 (a blend of 85 percent ethanol and 15 percent gasoline). In South America, we also offer vehicles that can run on E100. Though biofuels are not available in every market, they are widely available in the U.S. and South America and in some parts of Europe, so it makes sense for us to provide this option to customers who can take advantage of it. In addition, biofuel availability is expected to increase globally. In Europe, the EU’s Renewable Energy Directive mandates that 10 percent of energy in the transportation sector must come from renewable fuels by 2020. In the U.S., the Renewable Fuel Standard requires annual increases in the volume of renewable fuels, reaching 36 billion gallons by 2022. Our flexible-fuel vehicles, which are provided at little or no additional cost, allow consumers to choose fuels based on availability and price. For the 2013 model year, we are offering 15 flexible-fuel models in the U.S.

We are also producing select vehicle models that can be converted to run on compressed natural gas (CNG) and liquefied petroleum gas (LPG) (also known as propane autogas). And, we are working with qualified vehicle modifiers to ensure that conversion to those fuels meets our quality, reliability and durability requirements. In 2013, we introduced a CNG/LPG conversion-ready F-150. We also continue to offer the Ford Transit Connect, the entire F-Series Super Duty® pickup truck and chassis cab lineup, our E-Series Van and Cutaway models, as well as our medium-duty trucks, with a CNG/LPG conversion-ready engine package. In Europe, we offer CNG and LPG conversions of various models in markets where dedicated infrastructure exists, such as Italy, Germany and the Netherlands.

CNG and LPG are particularly good options for fleet customers, such as taxi companies and delivery services, that use a central refueling system. In addition, CNG and LPG are widely available as vehicle fuels throughout South America and

Europe. We are delivering CNG/LPG-ready engines to provide another lower-carbon option to those customers for whom this option makes sense.

As noted above, we have also been developing a range of electrification technologies. In fact, we now offer six electrified vehicles for sale in the U.S. – three hybrid electric vehicles, two plug-in electric vehicles and one battery electric vehicle. Our vehicle electrification strategy is based on providing customers with a variety of vehicle choices to meet their driving needs. To read more about this strategy, please see [Electrification: A Closer Look](#). All-electric and plug-in hybrid vehicles may initially make the most sense for urban drivers and fleet users who have daily commutes under 40 miles. However, as battery and recharging options continue to advance, we expect these vehicles to work for a wider range of our customers.

In the longer term, hydrogen may emerge as a viable alternative fuel. Hydrogen has the potential to diversify our energy resources and lower life cycle greenhouse gas emissions, if low-carbon hydrogen production becomes feasible. To prepare for this, we are developing technology to power vehicles with hydrogen fuel cells. In addition, we are working to pair hydrogen fuel cell technology with vehicle electrification technologies to maximize the sustainability benefits of both technologies.

## Helping Customers Assess the Options

It can be confusing for customers to understand and choose between the wide range of new fuel-efficiency technologies, advanced powertrains, and alternative-fuel vehicles available in today's marketplace. We have developed a suite of tools to help our fleet customers assess the relative cost and emissions benefits of different vehicle options based on the specific use factors of their fleet. For example, with our tools, we can help fleet managers make a side-by-side comparison the life cycle CO<sub>2</sub> emissions and fuel costs of different vehicles using the details of their own driving behavior, local fuel prices, and local electricity prices and sources. See our case study for [more information on this and other fleet purchasing tools](#).

## Support from Our Global Energy Model

Our portfolio approach to sustainable vehicle technology and fuel options is further supported by our global energy modeling work. Ford researchers developed a global energy model to understand the combination of vehicle technologies, fuels, and energy technologies that would reduce life cycle emissions from light-duty transportation in line with our [climate stabilization goal](#) at the lowest overall cost to the economy. Our model compares different energy and fuels, vehicle technology, and technology adoption scenarios across the next 100 years. The results of this model support our belief that there is no single vehicle technology or fuel that will cost-effectively achieve the goal of climate stabilization better than our approach of developing and implementing a wide range of vehicle technology and fuel options.

This section describes our current actions and future plans to develop a wide range of energy-efficient technologies, alternative fuels and advanced powertrain technologies that will give our customers near-, mid- and longer-term options for more sustainable vehicles.



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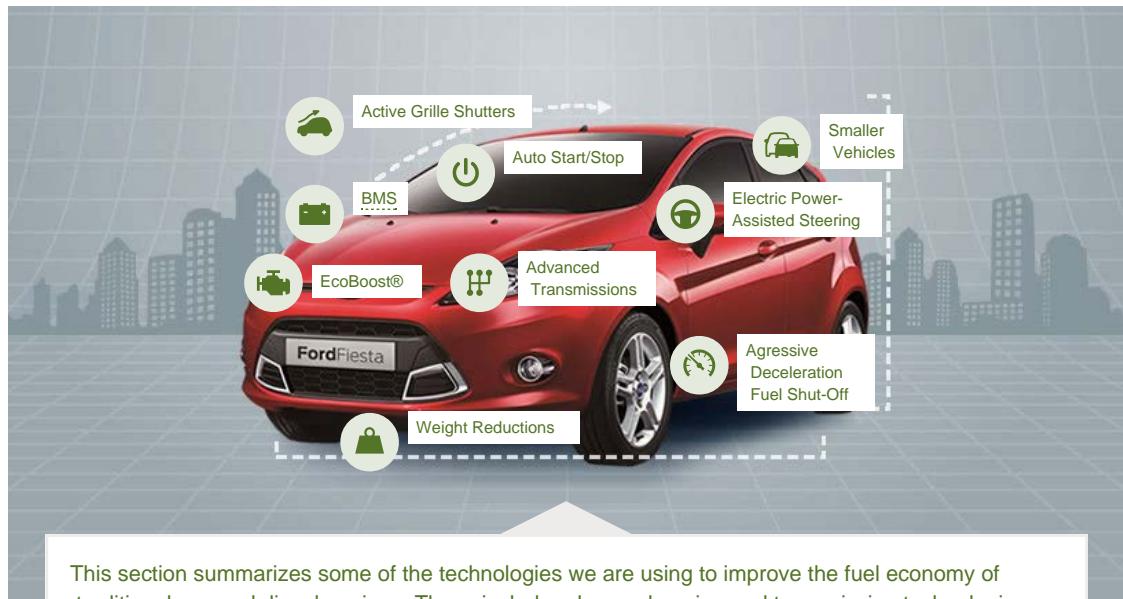
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## Improving Fuel Economy



This section summarizes some of the technologies we are using to improve the fuel economy of traditional gas and diesel engines. These include advanced engine and transmission technologies, weight reductions, and improvements to vehicle subsystems.

For more information about each of our fuel-efficiency technologies, please click on the icons in the graphic above.



### EcoBoost®

#### Technology Overview

The centerpiece of our near-term fuel-economy improvement efforts is the EcoBoost engine, which uses turbocharging and direct injection along with reduced displacement to deliver significant fuel-efficiency gains and CO<sub>2</sub> reductions, relative to larger displacement engines, without sacrificing vehicle performance.

#### Benefits

EcoBoost offers comparatively better value than many other advanced fuel-efficiency technologies. Due to its compatibility with most of the gas-powered vehicles we produce, we are able to offer EcoBoost's fuel-economy benefits throughout our product lineup more quickly and to a greater number of our customers. Our rapid deployment of EcoBoost in high volumes across a wide array of our vehicle nameplates is also helping us make a dramatic step forward in CO<sub>2</sub> emission reductions.

#### Deployment

Ford initially introduced the EcoBoost engine in 2009. Since then we have produced more than 2 million EcoBoost-equipped vehicles globally, responding to strong consumer demand for the technology. By the end of 2013 we offered EcoBoost engines on 15 North American nameplates. The engine is now available on 90 percent of our North American nameplates and nearly 80 percent of our European nameplates. Also, we continue to migrate EcoBoost engines to our other regions.

All told, we have introduced or announced seven EcoBoost engine displacements with multiple derivatives for specific vehicles and markets, as follows:

- 3.5L V6 EcoBoost: We introduced the first EcoBoost engine – a 3.5L V6 – in North America on the 2010 Lincoln MKS, Lincoln MKT, Ford Taurus SHO and Ford Flex. This engine provides comparable or superior performance to a normally aspirated V8 engine, but with the fuel economy of a V6. We also offer the 3.5L EcoBoost on the F-150, beginning with the 2011 model.
- 2.7L V6 EcoBoost: In 2014 we introduced a completely new twin-turbo 2.7L EcoBoost with Auto Start-Stop.
  - This engine is E85 compatible and meets California's strict low-emission vehicle (LEV III)

emissions requirements.

- This new engine will debut on the all-new 2015 Ford F-150, providing the performance of a mid-range V8 engine but with better fuel economy.

- 2.3L I-4 EcoBoost:

- In 2014, we introduced the new 2.3L I-4 EcoBoost engine on the Ford Mustang. This Mustang will be offered globally in multiple regions for the first time ever.
- The 2.3L will also be offered in the Lincoln MKC with front-wheel drive.

- 2.0L I-4 EcoBoost: In 2010 we introduced a 2.0L I-4 EcoBoost engine, the first in the EcoBoost lineup to go truly global.

- In the U.S., the 2.0L I-4 EcoBoost is currently available on the Ford Edge, Explorer, Focus, Escape and Fusion. In Europe, the Ford S MAX, Mondeo and Galaxy are available with a 2.0L EcoBoost option.
- In China, we offer the 2.0L EcoBoost on the Ford Mondeo.
- In Australia, we offer the 2.0L EcoBoost on the Ford Mondeo and Falcon.

- 1.6L I-4 EcoBoost:

- In Europe, the 1.6L I-4 EcoBoost engine is available on the Ford C MAX and Focus.
- In the U.S., the engine is available on the Ford Escape, Fusion and C MAX.

- 1.5L I-4 EcoBoost:

- Announced in early 2013, this engine will initially be produced at Ford's Craiova, Romania, Plant; other manufacturing locations will be announced in the future.
- The new engine was introduced first in China in the all-new Ford Mondeo, and is now available on the Fusion sedan in North America and the Mondeo in Europe.

- 1.0L I-3 EcoBoost:

- We introduced the 1.0L three-cylinder EcoBoost engine in Europe on the European Ford Focus. In 2013 we migrated this engine into the B MAX, C MAX and all-new Mondeo.
- In the U.S., we introduced the 1.0L EcoBoost on the 2014 Ford Fiesta.
- In India, we introduced the 1.0L EcoBoost on the Ford EcoSport. This engine will also be available in vehicles in China and other regions.

These EcoBoost engines illustrate Ford's plans to use smaller-displacement, boosted engines to deliver improved fuel economy and performance throughout our vehicle lineup. As EcoBoost is a key element of our long-term powertrain strategy, we will continue to improve its efficiency and vehicle application potential through the further development of supporting advanced technologies.



## Advanced Transmissions

### Technology Overview

We have adopted fuel-efficient six-speed transmissions across our product portfolio. We are now improving the performance and operating efficiency of all our transmissions by optimizing their operation with EcoBoost engines and further reducing parasitic losses such as mechanical friction, and extraneous hydraulic and fluid pumping. We are also developing more advanced transmission concepts to support additional fuel-efficiency improvements and vehicle performance benefits. For example, in 2013 we announced that we will jointly develop with General Motors an all-new generation of advanced-technology nine- and 10-speed automatic transmissions for cars, crossovers, SUVs and trucks.

### Benefits

The nine- and 10-speed transmissions we are developing will improve fuel economy by up to 5 percent over six-speed gear boxes, depending on the application. In addition, they provide better acceleration, smoother shifting and a quieter driving experience.

### Deployment

We have completed our migration to six-speed gearboxes in North America and Europe. We plan to start deploying the next-generation nine- and 10-speed transmissions worldwide in a few years.



## Electric Power-Assisted Steering

### Technology Overview

Electric power-assisted steering (EPAS) uses a small electric motor instead of conventional hydraulic systems to assist steering.

### Benefits

EPAS typically will reduce fuel consumption and decrease carbon dioxide emissions by up to 3.5 percent over traditional hydraulic systems, depending on the vehicle and powertrain application. On the 1.4L Duratorq® diesel Ford Fiesta, for example, which is available in Europe, EPAS provides a 3 to 4 percent improvement in fuel efficiency compared with a hydraulic-based power steering system. By combining EPAS with aerodynamic improvements, we improved the mileage of this vehicle by approximately 8 percent compared to the previous model year. These fuel efficiency improvements – and associated reductions in CO<sub>2</sub> emissions – help us deliver vehicles that qualify for lower emissions related taxation brackets in some countries. EPAS also enables other advanced technologies such as “pull drift” compensation, which detects road conditions – such as a crowned road surface or crosswinds – and adjusts the EPAS steering system to help the driver compensate for pulling and drifting. EPAS also enables Active Park Assist, which helps drivers to parallel park.

### Deployment

We already offer EPAS in the Ford Explorer, F-150, Mustang, Fusion, Flex, Taurus and Escape and the Lincoln MKS, MKT and MKZ Hybrid in North America; the Ford C-MAX, Focus, Focus ST and Fiesta in North America and Europe; and the Ford Ka and Kuga in Europe. EPAS is also used in all of our new electrified vehicles.



## Auto Start-Stop

### Technology Overview

“Start-Stop” technology shuts down the engine when the vehicle is stopped and automatically restarts it before the accelerator pedal is pressed to resume driving. Start-Stop technology includes sensors to monitor functions such as cabin temperature, power supply state and steering input, so that vehicle functioning remains exactly the same to the driver as when the engine remains on continuously. If the system senses that a vehicle function has been reduced and will negatively impact the driver’s experience, the engine will restart automatically.

### Benefits

This technology maintains the same vehicle functionality as that offered in a conventional vehicle, but saves the fuel typically wasted when a car is standing and running at idle. Savings vary depending on driving patterns. On average, it improves fuel efficiency by 3.5 percent, but it can improve fuel efficiency even more in city driving. The technology can also reduce tailpipe emissions to zero while the vehicle is stationary – for example, when waiting at a stoplight.

### Deployment

In the U.S., we introduced the technology on the all-new 2013 Ford Fusion with 1.6L engine and automatic transmissions. In 2014, it is available in the U.S. on the Ford Fusion with 1.5L EcoBoost engine. In Europe, Auto Start-Stop is already standard on the Ford Ka and certain versions of the Mondeo, S-MAX, Galaxy, Focus, C-MAX and Grand C-MAX. By 2016, 90 percent of our vehicle nameplates globally will be available with Auto Start-Stop.



## Weight Reductions

### Technology Overview

We are also working to improve fuel economy by decreasing the weight of our vehicles – in particular by increasing our use of unibody vehicle designs, lighter-weight components and lighter-weight materials.

We are using lightweight materials, such as advanced high-strength steels, aluminum, magnesium, natural fibers, and nano-based materials to reduce vehicle weight. And, some of our advanced engine and transmission technologies, such as EcoBoost® and our dual-clutch PowerShift transmissions, further reduce overall vehicle weight.

### Benefits

In general, reducing vehicle weight reduces fuel use. To achieve our fuel-efficiency goals, we need to reduce the weight of our vehicles by 250 to 750 pounds, without compromising vehicle size, safety, performance or customer-desired features. Weight reductions alone may have relatively small impacts on fuel economy. By itself, a 10 percent reduction in weight results in approximately a 3 percent improvement in fuel efficiency. However, if vehicle weights can be reduced even more substantially, it becomes possible to downsize the powertrains required to run the vehicle. Weight reductions combined with powertrain rematching not only improves fuel economy, but helps maintain overall performance (compared to a heavier vehicle with a larger engine).

Many lightweight materials also have benefits beyond fuel-efficiency gains. To learn more about the benefits of natural fiber materials, please see the [Sustainable Materials](#) section.

### Deployment

The all-new 2015 Ford F-150 represents our most extensive use of lightweight materials ever. Overall, this truck is up to 700 pounds lighter than the outgoing model thanks to extensive use of high-strength

steels and aluminum alloys. This significant weight reduction not only results in better fuel economy, it also allows the new F-150 to tow more, haul more, and accelerate and stop more quickly. To accomplish this weight reduction, we increased the use of high-strength steel in the all-new Ford F-150 frame from 23 percent to 77 percent to create a pickup frame that is stronger, more durable and structurally more rigid than the previous generation F-150, while saving up to 60 pounds of weight. The F-150's body also uses new applications of aluminum alloys, which not only reduce weight but also improve the dent resistance and overall durability of the truck body. The specific materials used were carefully tested and analyzed based on their durability, overall performance, and life cycle environmental impact. For more information on our use of life cycle analysis in choosing materials for this vehicle, please see the Life Cycle Analysis section. For more detail on our development of this vehicle and what it means to our company, [please see our F-150 case study](#).

Other examples of our use of lighter-weight materials in a range of vehicles and parts applications, include:

- In 2012, we announced that the all new Transit Van will replace the E-series van in the United States. This van makes extensive use of lighter-weight high-strength steel and boron steel. It has an average of 25 percent better fuel economy and haul at least 300 pounds more than today's E-Series.
- In 2012, we introduced a new, lightweight, injection-molded plastic technology called MuCell on the all-new Ford Escape. Manufacturing MuCell involves the highly controlled use of a gas such as carbon dioxide or nitrogen in the injection-molding process, which creates millions of micron-sized bubbles in uniform configurations, lowering the weight of the plastic part by more than one pound per vehicle. This is the first time MuCell has been used in an instrument panel. In addition to reducing weight, the MuCell microcellular foam saves money and production time. On the 2012 Escape, MuCell saves an estimated \$3 per vehicle versus solid injection molding, and molding cycle time is reduced 15 percent. This plastic was the Grand Award winner at the 2011 Society of Plastics Engineers competition in the "Most Innovative Use of Plastics Award" category.
- The Lincoln MKT crossover has an advanced lightweight magnesium and aluminum liftgate, which is more than 20 pounds, or 40 percent, lighter than a similar part made from standard steel.
- The Ford Explorer makes extensive use of high-strength steels. Nearly half of the vehicle's structure – including the A-pillars, rocker panels and front beams – are comprised of high-strength steels, such as boron. The Explorer also has an aluminum hood.
- In the Ford Focus, more than 55 percent of the vehicle shell is made from high-strength steel and more than 26 percent of the vehicle's structure is formed from ultra-high-strength boron steels. The Focus combines these high-strength steels with innovative manufacturing methods. For example, the vehicle's B-pillar reinforcement, a key structural part, is made from ultra-high-strength boron steel that has been produced using an innovative tailor-rolling process. The process allows the thickness of the steel sheet to be varied along its length, so the component has increased strength in the areas that are subjected to the greatest loads. The tailor-rolled B-pillar has eight different gauge thicknesses, to improve side-impact crash performance while saving more than three pounds per vehicle.
- We are also expanding our use of aluminum engine parts and all-aluminum engines. The current Mustang, for example, has an aluminum engine.
- By using high-strength steels, the European Ford Fiesta weighs approximately 40 kilograms less, depending on engine choice, even though it stands on virtually the same footprint as the previous model and has 10 kilograms of new safety features and sound insulation.

Ford researchers are also investigating additional new lightweight materials. For example, we are investigating and developing:

- New types of steel that are up to three times stronger than current steels and improve manufacturing feasibility because they can be formed into parts more easily.
- Polymeric plastic strengthening foams that are strong enough to stabilize bodywork in an accident but light enough to float on water. These foams are being used to reinforce sections of the steel auto body, such as the B-pillars.
- Surface coatings that reduce engine friction and remain intact even under the most adverse conditions.
- Alternative (copper-based) wire harness technologies that will enable significant weight reductions.
- Nanotechnology to model material properties and performance at the nano-scale, which will allow us to develop better materials more quickly and with lower research and development costs.
- Nano-filler materials in metal and plastic composites, to reduce their weight while increasing their strength. For example, we are developing the ability to use nano-clays that can replace glass fibers as structural agents in reinforced plastics. Early testing shows plastic reinforced with 5 percent nano-filler instead of the typical 30 percent glass filler has strength and lightweight properties that are better than glass-reinforced plastics.

Ford is also working to understand the health and safety issues that may be posed by nano-materials. Ford has joined with other automakers under the U.S. Council for Automotive Research umbrella to sponsor research into nano-materials' potential impact on human health and the environment. This research has addressed many health- and environment-related questions so that we can focus our nano-materials research and development in areas that will be most beneficial.



## Technology Overview and Benefits

Electrical systems are another area in which we are making progress. By reducing vehicle electrical loads and increasing the efficiency of a vehicle's electrical power generation system, we can improve fuel efficiency. Our Battery Management Systems (BMSs), for example, control the power supply system (in particular the alternator) to maximize the overall efficiency of the electrical system and reduce its negative impacts on fuel economy. This is accomplished by maximizing electricity generation during the most fuel-efficient situations, such as vehicle deceleration. In less fuel-efficient situations, the alternator's electricity generation is minimized to conserve fuel.

### Deployment

BMSs have already been launched globally on a majority of our vehicle platforms. We will continue to implement BMSs on remaining vehicles and will continue to optimize its functionality to further improve benefits. We have also introduced more efficient alternators, which improve fuel economy.



## Aggressive Deceleration Fuel Shut-Off

### Technology Overview

Aggressive Deceleration Fuel Shut-Off (ADFSO) allows fuel supply to the engine to be shut off during vehicle deceleration and then automatically restarted when needed for acceleration or when the vehicle's speed approaches zero. This advancement builds on the Deceleration Fuel Shut-Off technology available in our existing vehicles by extending the fuel shutoff to lower speeds and more types of common driving conditions, without compromising driving performance or emissions.

### Benefits

This improved fuel shutoff technology will increase fuel economy by an average of 1 percent. An additional benefit is increased deceleration rates, which should extend brake life and improve speed control on undulating roads.

### Deployment

Starting in 2008, ADFSO was implemented on the Ford Flex, F-150, Expedition and Escape and the Lincoln MKS and Navigator. We are continuing to implement it as we bring out new vehicles. The ADFSO technology will be a standard feature in all of our North American vehicles by 2015, and we will continue to expand implementation globally.



## Active Grille Shutters

### Technology Overview and Benefits

Active Grille Shutter technology is one of our key aerodynamics improvements. It reduces aerodynamic drag by up to 6 percent, thereby increasing fuel economy and reducing carbon dioxide (CO<sub>2</sub>) emissions. When fully closed, the reduction in drag means that the Active Grille Shutter can reduce CO<sub>2</sub> emissions by 2 percent.

### Deployment

We implemented Active Grille Shutter technology first on our European vehicles. In the U.S., we have implemented it on the 2012 Ford Focus and Edge, the 2013 Ford Escape and the all-new 2013 Ford Fusion.



## Smaller Vehicles

### Technology Overview and Benefits

Smaller vehicles provide consumers with another way to get better fuel economy. Simply by being smaller and lighter, smaller vehicles can significantly reduce fuel use and related emissions.

### Deployment

We are launching more small cars to provide more fuel-efficient options. For example:

- We introduced the all-new Ford Fiesta, our global subcompact vehicle commonly referred to as "B-car," Ford Fiesta globally.
- We are introducing a wide range of new vehicles in the U.S. and other markets based on our global

"C-platform," or compact sedan. In the next few years, we are introducing 10 new vehicles based on this C-platform. For example, in North America, our C-car platform underpins the gasoline-fueled Ford Focus, the battery-electric Focus Electric, the C MAX Hybrid and C MAX Energi, a plug-in hybrid.

- We are continuing to introduce new variations of the Transit Connect small commercial van in North America. This vehicle fills an unmet need in the U.S. market by offering the large cargo space that small business owners need in a fuel-efficient, maneuverable, durable and flexible vehicle package.
- In 2012 we revealed the all-new Ford EcoSport compact SUV, which will ultimately be available in nearly 100 markets globally, including India and Brazil. This vehicle is part of our global commitment to deliver fuel-efficient vehicles that customers truly want and value.

We have loaded these smaller vehicles with features and options commonly found on larger or luxury vehicles to make them attractive, thus encouraging customers to choose more fuel-efficient cars and trucks.

All of these smaller vehicles illustrate Ford's actions to provide consumers with a wider range of fuel-efficient options, as well as our efforts to leverage the best of our global products to offer new choices to customers in all of our regions worldwide.



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# Migration to Alternative Fuels and Powertrains

Our migration to alternative fuels and powertrains includes introducing electrified vehicles – including hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs) – as well as advanced Clean Diesel Technologies and vehicles that run on renewable biofuels. We are also working to advance hydrogen fuel cell vehicle (FCV) technologies.

For more information on our plans regarding each of these alternative fuels and powertrain technologies, please click on the Ford vehicles below.



[Renewable Biofueled Vehicles](#)

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## Advanced Clean Diesel



### Ford's New Full-Size Transit Van and F-650/750

Modern diesels are 30 to 40 percent more fuel efficient than gasoline vehicles. Ford offers a range of advanced diesels in Europe under the ECOncetic label. In the U.S., Ford will introduce a new 3.2L Power Stroke® turbo diesel engine in our full-size Transit van. That engine will join the newly upgraded, second generation 6.7L V8 Power Stroke turbo diesel offered in the F-Series Super Duty® and F-650/F-750 medium-duty commercial trucks, offering customers powerful and fuel-efficient choices.

## Technology Overview and Benefits

Diesel engine technology is not in itself new. However, advanced diesel technologies offer significant advantages over traditional gasoline engines and older diesel engines. They consume 30 to 40 percent less fuel than gasoline engines, and on a well-to-wheels basis they emit 15 to 30 percent less carbon dioxide (CO<sub>2</sub>).<sup>1</sup> In addition, direct-injection diesel engines provide exceptional power and torque, resulting in better driving performance and towing capabilities. Advanced diesel technology also dramatically reduces non-CO<sub>2</sub> tailpipe emissions such as NOx and particulate matter.

Our advanced diesel engines use a range of technologies in the engine and after-treatment systems to reduce emissions. For example, our 1.6L Duratorq® TDCi engine, used on European vehicles, includes more efficient eight-hole fuel-injector nozzles, a more powerful engine-control unit and a water-cooled charge air cooler. In addition, parasitic losses have been cut through use of low-friction piston ring coatings, a variable-flow oil pump and a more-efficient vacuum pump. After-treatment system improvements include a coated diesel particulate (soot) filter coupled with a lean NOx trap to enable Euro 5 emissions compliance.

Our diesel engines offered in the U.S. also use a range of advanced after-treatment technologies to reduce emissions, including:

- a diesel oxidation catalyst that converts and oxidizes hydrocarbons into water and carbon dioxide;
- selective catalytic reduction that uses an ammonia and water solution to convert the NOx in the exhaust stream into water and inert nitrogen; and
- a diesel particulate filter that traps any remaining soot and periodically burns it away when sensors detect that the trap is full.
- The 3.2L Power Stroke diesel in the Transit van combines the diesel oxidation catalyst and diesel particulate filter in a single, package-efficient component.

## Deployment

In Europe, where diesel-powered vehicles account for more than 50 percent of new vehicle sales and make up approximately 30 percent of the total vehicle fleet on the road, Ford continues to improve its strong lineup of fuel-efficient and clean diesel vehicles. For example, we continue to introduce ECOncetic versions of Ford models that deliver improved fuel economy and emissions. The ECOncetic lineup currently includes versions of the Ford Fiesta, Focus, Mondeo and Transit. Several of the ECOncetic models use diesel engines, which meet the stringent Euro 5 emissions standards and emit less than 100 g/km of CO<sub>2</sub>. For example, the new Focus ECOncetic has fuel economy of 3.4L/100 km and emits just 89 g/km of CO<sub>2</sub>.

In North America, where diesel engines are primarily used in the medium-duty truck market, Ford offers two advanced diesel engines. In 2015, we will introduce a diesel version of the full-size Transit van, powered by a new 3.2L Power Stroke turbo diesel engine. Like the larger 6.7L Power Stroke V8 diesel, which Ford introduced on F-Series Super Duty trucks in 2011, the 3.2L turbo diesel engine's fuel system has been carefully tailored and calibrated for combustion efficiency. It enables the newest Power Stroke engine to achieve exceptional fuel-economy ratings without affecting power levels.

These new diesel engines meet the U.S. Environmental Protection Agency's and California Air Resources Board's strict medium duty chassis and heavy-duty truck emission regulations.

Our advanced diesel engines are also compatible with biodiesel, a renewable fuel made from soybean oil and other fats. The 2011 Super Duty is Ford's first vehicle in North America that is B20 compatible, meaning it can run on fuel composed of 20 percent biodiesel and 80 percent ultra-low-sulfur diesel. The diesel Transit van is B20 compatible. In Europe, our vehicles are compatible with B7, and we are working with European fuel standards organizations to establish fuel-quality standards for biodiesel blends greater than B5. The use of biodiesel helps to reduce dependence on foreign oil and reduces life cycle CO<sub>2</sub> emissions. For more information on biofuels, please see the [Renewable Biofueled Vehicles](#) section.

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1. Figures based on J.L. Sullivan, R.E. Baker, B.A. Boyer, R.H. Hammerle, T.E. Kenney, L. Muniz, and T.J. Wallington, 2004, "CO<sub>2</sub> Emission Benefit of Diesel (versus Gasoline) Powered Vehicles," *Environmental Science and Technology*, 38: 3217-3223



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**Ford C MAX Hybrid**

Hybrid electric vehicles are powered by a traditional internal combustion engine and battery power to deliver improved fuel economy.

## Technology Overview and Benefits

HEVs are powered by both an internal combustion engine and an electric motor with a battery system. The key benefit of HEVs is reduced fuel consumption: When they are powered by the electric motor and battery system, they do not burn gasoline. In most instances at low speeds and for short distances, Ford hybrids run exclusively on electricity. At higher speeds, and when more power is needed, the gasoline engine kicks in.

All of our hybrid vehicles use Ford's powersplit architecture, meaning they can run exclusively on battery power, exclusively on gas power or on a combination of both to deliver the best overall fuel efficiency. Ford hybrids also feature a Regenerative Braking System. Unlike a traditional gasoline engine in which the energy generated by braking is lost, this innovative technology enables Ford hybrids to capture braking energy normally lost and use it to help recharge the battery.

In the past our HEVs used nickel-metal-hydride batteries. The HEVs we now produce use more advanced lithium ion batteries. For more detail on our battery technologies, please see [Battery Technologies](#).

Our new HEVs feature additional technology improvements, including:

- Electric motors capable of operating at higher electric speeds,
- Optimized gear ratios, allowing for improvements in fuel economy,
- More precise controls to deliver higher levels of refinement as the powertrain transitions between engine and electric drive, and
- Reduced weight to help increase fuel economy.

Our new hybrids also have a suite of driver information systems to help drivers maximize fuel efficiency. For more information on these technologies, please see [Helping Drivers Improve Fuel Efficiency with Information Technology](#).

## Deployment

We are currently increasing our hybrid volume and preparing for hybrid capability across our highest-volume global product platforms.

In 2013-14, in the U.S. we offer the C MAX Hybrid and Fusion Hybrid, both of which were launched in 2012, and the Lincoln MKZ hybrid. The C MAX hybrid is one of three electrified vehicle options on our C-platform; the others are the Focus Electric battery electric vehicle (BEV) and the C MAX Energi plug-in hybrid electric vehicle (PHEV). The C MAX Hybrid uses Ford's powersplit hybrid architecture, with improved fuel efficiency and a lighter, smaller lithium ion battery system. The Fusion is the first sedan to offer gasoline, hybrid and plug-in hybrid powertrains, underscoring Ford's commitment to giving customers the "power of choice" in fuel-efficient technologies. In 2014, we plan to introduce a hybrid version of Ford Mondeo in Europe.



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## Battery Electric Vehicles (BEVs)



### Ford Focus Electric

Electric vehicles use no gasoline; they are powered by a high-voltage electric motor and battery pack. Ford currently offers one BEV in the U.S., the Focus Electric, which has a U.S. Environmental Protection Agency (EPA) combined fuel-economy rating of 105 miles per gallon equivalent (MPGe), a driving range of 76 miles on a charge and requires no more than four hours to charge when using a 220-volt outlet.

### Technology Overview and Benefits

Battery electric vehicles do not have an internal combustion engine and do not use any on-board gasoline. Instead, they use a high-voltage electric motor, which gets its power from a high-voltage battery pack charged by plugging into a standard 110-volt or 220-volt outlet in the U.S., or a 230-volt outlet in Europe. The primary benefit of BEVs is that they completely eliminate carbon dioxide (CO<sub>2</sub>) and other emissions directly from the vehicle. However, they are not necessarily zero-emission over their total lifecycle, depending on the source of electricity used to charge their batteries. Because electricity is often cheaper than gasoline, BEVs may be less costly to operate than gasoline vehicles.

Ford's electric vehicles use lithium-ion batteries, which provide better performance, require less space and weigh less than the nickel-metal-hydride batteries used in previous-generation hybrid electric vehicles. The Focus Electric's advanced lithium-ion battery system was engineered by Ford in cooperation with the supplier LG Chem. It uses an advanced, active-liquid cooling and heating system to precondition and regulate the temperature, which helps to maximize battery life and fuel-free driving range.

A full recharge of the Focus Electric takes just four hours at home with the 240-volt charge station. The Focus Electric also features a Regenerative Braking System, which can help maximize vehicle driving range by capturing braking energy and using it to recharge the battery. And, the vehicle uses a wide range of advanced information-technology features, including an enhanced version of MyFord Touch® – our new driver interface technology – and tools for remote vehicle communications and charging. For more information on these technologies, please see [Living the Electric Lifestyle](#).

### Deployment

We are implementing an expanded, comprehensive electric vehicle strategy aligned with growing public interest in advanced technologies that reduce the use of gasoline and diesel. To read more about our overall approach, please see [Electrification: A Closer Look](#).

The Focus Electric, our all-electric passenger sedan is based on the all-new Focus. This car has a driving range of 76 miles on a single charge of its lithium-ion high-voltage battery and achieves an EPA-rated combined fuel efficiency of 105 MPGe. We introduced the Focus Electric in the U.S. in 2012 and in Europe in 2013.



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## Plug-in Hybrid Electric Vehicles (PHEVs)



### Ford C MAX Energi

Plug-in hybrid electric vehicles are powered by an internal combustion engine and a high-voltage electric battery that can be charged from an electric outlet. The engine and the battery work together to provide the benefits of grid-connected power and hybrid powertrain efficiency. Ford offers two PHEVs in the U.S., the C MAX Energi and the Fusion Energi.

### Technology Overview

PHEVs are similar to HEVs in that they are equipped with both an electric battery and a gas-powered engine. Unlike HEVs, however, PHEVs are equipped with a high-capacity battery that can be charged from a private household or public electric outlet. While regular HEVs maintain a roughly constant battery charge, PHEVs discharge the battery while driving to provide additional fuel savings. PHEVs have the potential to reduce tailpipe emissions to near zero when running on battery power. When the battery is depleted, the vehicle can continue to operate on the gas-powered engine, providing significant benefits over battery electric vehicles in terms of driving range before refueling. A PHEV's overall life cycle emissions depend on the electrical power source and the usage characteristics of the vehicle. PHEVs can be significantly less expensive for consumers to operate than gasoline-powered vehicles, particularly for consumers who take relatively short trips most of the time. During such trips, PHEVs allow drivers to travel on grid-based electricity stored in batteries instead of more costly gasoline.

The high-voltage battery is charged through regenerative braking and discharged during acceleration events to improve the overall fuel economy of the vehicle – similar to the operation of today's conventional hybrids.

### Benefits

Overall, plug-in hybrid vehicles offer several benefits, including:

- Reduced dependency on petroleum and increased energy independence,
- Reduced environmental impact through reductions in greenhouse gas emissions as well as smog-forming tailpipe emissions,
- Increased use of electricity from renewable energy sources (e.g., wind and solar) for vehicle recharging, and
- Potential consumer savings on energy and fuel costs.

PHEV vehicles provide the extra benefit of being able to charge the batteries at home or other parking location. This means that PHEVs might better suit those customers who do the majority of their driving in city and other urban environments, where electric battery power is the preferred powertrain alternative.

### Deployment

Ford currently offers two PHEVs in the U.S.: the Ford C MAX Energi and the Fusion Energi. We plan to introduce the C MAX Energi in Europe in 2014.

Like Ford's HEVs, the C MAX Energi and Fusion Energi offer a range of information-technology tools to help drivers improve fuel efficiency. For more information on these technologies, please see [Living the Electric Lifestyle](#).

The long-term success of PHEVs in the real world depends on cooperation between automakers, utilities, the government and drivers. Ford is engaged in multiple collaborative projects to help smooth the transition to electrified vehicles. For more information on this, please see [Improving the Electric Vehicle Ecosystem](#) in our Electrification section.

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> **Plug-in Hybrid Electric Vehicles (PHEVs)**

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**Ford Galaxy**

Biofuels offer a relatively affordable way to reduce carbon dioxide (CO<sub>2</sub>) emissions. To date, we have introduced more than 6.3 million flexible-fuel vehicles globally. Ford is a market leader and pioneer in ethanol-powered, flexible-fuel vehicles and will continue to provide a range of products that are E85-capable, aligned with infrastructure growth and consumer demand.

## Technology Overview

Biofuels are alternative forms of gasoline and diesel made from renewable sources, usually plant materials. Ethanol, the most common biofuel alternative used with gasoline, is made from the fermentation of sugars, most commonly corn sugars (in the U.S. and Europe) or sugar cane (in Brazil). Biodiesel, a biofuel alternative to petroleum diesel, is made from the transesterification of vegetable oils, including soy, canola, palm and rapeseed, or from animal fat. Most biodiesel in the U.S. is made from soybeans. Biofuels are primarily used in blends with petroleum-based fuels. Gasoline is mixed with ethanol and diesel is mixed with biodiesel. In the U.S., most retail market gasoline already contains up to 10 percent ethanol (referred to as E10). E85, a mix of 85 percent ethanol and 15 percent gasoline, is also available. For biodiesel, in the U.S. the most commonly blend is 5 percent or 20 percent biodiesel mixed with petroleum-based diesel (B5 and B20 respectively), while in Europe a 7 percent biodiesel blend (B7) is most commonly used.

Modern gasoline vehicles can run on gasoline blends up to 10 percent ethanol (E10) in the U.S. without any modifications. Vehicles require minimal modifications to run on gasoline blends above E10, such as hardening seals in the engine, which can be corroded by solvents in biofuels. Today vehicles in Brazil meeting different requirements operate on E25. Modern compression ignition engines, which are made to run on petroleum-based diesel, also require some modifications to run on biodiesel. For more information about biofuels, biofuel infrastructures, and challenges, please see the [Fuels](#) section. For more information on our approach to renewable fuel policy, please see the [Renewable Fuels Policy](#) section.

## Benefits

Biofuels are an important component of our sustainability strategy for three reasons. First, biofuels can help to address economic, social and environmental sustainability, which includes helping us meet our CO<sub>2</sub> emission-reduction targets. Second, the use of biofuels requires relatively modest and affordable modifications to existing vehicle and fueling technology, which makes them a viable near-term option. Third, biofuels offer synergies with our other strategies. For example, the high octane rating of ethanol is a potential enabler for the introduction of higher compression-ratio engines and higher engine-boost technologies that improve the efficiency and torque of our future downsized engines.

## Deployment

Ford has a long history of developing vehicles that run on renewable biofuels. Our founder, Henry Ford, was a strong proponent of biofuels, and we produced our first flexible-fuel vehicle (FFV) approximately 100 years ago: The Ford Model T was capable of running on gasoline or ethanol.

Ford has taken a leadership position on biofuels. Since 1997, we have offered FFVs

capable of running on gasoline or E85 ethanol (or E100 hydrous ethanol in Brazil). In the U.S., we met our commitment to double our FFV production from 2006 to 2010. To date, we have introduced more than 6.3 million FFVs globally. Ford FFV models are available in many European markets as well.

In Europe all of our new diesel vehicles can run on B7, a blend containing 7 percent biodiesel. We have worked with fuel standards organizations to allow the use of biodiesel blends of greater than B7 in our future products. In order for biodiesel to be a success, it is critical that the fuel be blended to meet stringent standards for quality and consistency. In the U.S., since 2012 our F-Series Super Duty® trucks with a 6.7L diesel engine are compatible with B20, and we expect the new Transit van with a 3.2L turbo diesel to be B20-compatible as well. In addition, the gasoline version of these vehicles will be flexible-fuel compatible with gasoline, E85 or any ethanol-gasoline blend between E0 and E85.



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## CNG/LPG Vehicles



Ford F-150 Pickup

Vehicles that run on compressed natural gas (CNG) and liquefied petroleum gas (LPG – also called propane autogas) typically have lower emissions and lower fuel costs than gasoline and diesel vehicles. Ford offers engine packages specially prepared for conversion to run on CNG and LPG on many of our vehicles targeted to the commercial fleet market.

### Technology Overview

Ford offers engine packages specially prepared for conversion to run on compressed natural gas (CNG) and liquefied petroleum gas (LPG – also called propane autogas), on many of our vehicles targeted to the commercial fleet market. CNG and LPG can help commercial vehicle fleets reduce their environmental footprint because they provide similar performance with significantly lower emissions. They can also help fleets reduce fuel costs, as they typically cost less on a gallon-equivalent basis than gasoline or diesel. Commercial fleets can also take advantage of centralized refueling and/or defined routes, which help address fueling infrastructure issues. Our gaseous-fuel-prepped engines include hardened components such as valves and valve seats that can withstand the higher operating temperatures and lower lubricity of gaseous fuels.

Our vehicles with gaseous-prepped engines can be converted to either dedicated alternative fuel systems, which can only run on either CNG or LPG, or to bi-fuel systems, which can run on the alternative fuel or on regular gasoline. Bi-fuel vehicles generally have longer range because they have the combined range of both on-board fuel types and can continue to operate seamlessly on gasoline when the alternative fuel is not available.

### Benefits

CNG and LPG vehicles have both environmental and economic advantages. Vehicles using these fuels have lower carbon dioxide (CO<sub>2</sub>) emissions and lower total greenhouse gas (GHG) emissions than gasoline or diesel vehicles. When running on CNG, vehicles typically emit about 25 percent less CO<sub>2</sub> and about 10 percent fewer total GHGs on a well-to-wheels basis, according to Argonne National Laboratory's GREET model. LPG-fueled F-series trucks typically emit 17 to 24 percent fewer total life cycle GHG emissions, according to a study commissioned by the Propane Education and Research Council. CNG and LPG also reduce non-CO<sub>2</sub> tailpipe emissions such as NO<sub>x</sub>, SO<sub>x</sub>, particulate matter and carbon monoxide.

CNG and LPG also have significantly lower fuel costs. In the U.S., CNG costs range from approximately \$1.50 to \$2.80 per gallon<sup>1</sup> on a gasoline-gallon equivalent basis, resulting in a 40 to 75 percent reduction in fuel cost compared to using diesel or gasoline. Businesses using CNG-fueled trucks often see payback on the conversion cost in as little as 24 to 36 months of use. In the U.S., LPG costs approximately \$2.00 per gallon, on a gasoline-gallon equivalent basis, resulting in an up to 50 percent fuel savings per gallon compared to gasoline and diesel.

While CNG provides better GHG and fuel costs reductions, LPG can have other benefits. For example, LPG fueling systems typically cost significantly less to install. LPG fuel tanks are also smaller than CNG, resulting in less loss of cargo and/or passenger capacity.

## Deployment

Interest in CNG and LPG vehicles is growing globally. In the U.S., for example, sales of Ford's commercial vehicles with CNG/LPG prepped engine packages increased by more than 350 percent from 2009 to early 2013. Today, CNG/LPG prep packages are purchased 3 to 5 percent of Ford vehicles that offer this option. In the U.S., we provide gaseous prepped engine packages as a factory installed option on select commercial vehicles. We work with qualified vehicle modifiers (QVM) to convert vehicles with gaseous prepped engines to CNG and LPG fuel systems. Ford has established a rigorous qualification program for QVMs that provides guidance, modification recommendations, and engine operating specifications required to ensure customer satisfaction and reliability in line with Ford Motor Company standards. We perform on-site assessments at each QVM location to ensure conformance to a high standard of manufacturing, assembly, workmanship and customer service. We currently work with five QVM suppliers for CNG conversions (Altech-Eco, IMPCO, Landi Renzo, Venchurs and Westport) and one QVM for LPG conversions (ROUSH CleanTech).

Ford's approach to CNG and LPG vehicle conversions using QVMs offers a range of benefits. For example, the competition among QVMs has resulted in improved quality and reduced prices for conversion systems, as well as spurring innovation and technology improvements. This approach has made it possible for Ford to offer a much wider range of commercial vehicles with CNG and LPG than other full-line manufacturers.

In the U.S., Ford vehicles currently available with CNG and LPG gaseous fuel prepped engine packages include:

- F-150 Pickup, 3.7L
- Transit Connect, 2.5L
- Transit variants including full-size vans, wagons, cutaways, and chassis cabs with 3.7L
- E-Series Cargo Vans, 5.4L/6.8L
- E-Series Wagons, 5.4L/6.8L
- E-Series Cutaway & Stripped Chassis, 5.4L/6.8L
- F-Series Super Duty® Pickup & F-350 Chassis Cab, 6.2L
- F-Series Super Duty Chassis Cabs, F-450/550/650, 6.8L
- F-53 & F-59 Stripped Chassis, 6.8L
- Lincoln MKT Town Car limousine livery packages with 3.7L

For the U.S. market, Ford is also currently developing CNG/LPG-prepped engine packages for:

- The all new F-650 Medium Truck

In Australia, Ford offers LPG versions of the Falcon Ute commercial vehicle using Ford's EcoLPi engine technology. In Europe, we offer CNG and LPG conversions of various models in markets where dedicated infrastructure exists, such as Italy, Germany and the Netherlands. In Germany, for example, we offer CNG bi-fuel versions of the Ford C-MAX and Focus. In India, we offer a bi-fuel CNG version of the Ford Ikon Flair.

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1. Based on prices from January 2014 available at <http://www.cngnow.com/average-cng-prices/pages/default.aspx>



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## Hydrogen Fuel Cell Vehicles (FCVs)

**Ford Focus**

Hydrogen fuel cell vehicles are electric vehicles powered by hydrogen fuel cells. The fuel cells are essentially batteries fueled by hydrogen. They emit just water vapor and heat, without other tailpipe pollutants.

### Technology Overview and Benefits

Hydrogen fuel cell vehicles are similar to battery electric vehicles (BEVs) in that they use a high-voltage electric motor to propel the vehicle. Unlike BEVs, however, FCVs are equipped with a hydrogen fuel tank and a fuel cell system that generates electric power to drive the electric motor. So FCVs use onboard hydrogen stored in the fuel tank and refueled in minutes, while BEVs are powered by electric energy stored in the high-voltage battery. As a result, FCVs provide the environmental benefits of a BEV but they have a longer driving range and significantly shorter refueling time.

In an FCV, an automotive fuel cell propulsion system runs the vehicle by converting hydrogen and oxygen into electrical current through an electro-chemical reaction in the fuel cell stack. It emits just water vapor and heat, without other tailpipe pollutants. Therefore, FCVs are considered to be zero- emission vehicles. FCVs can also be hybridized with a high-voltage battery, to improve vehicle performance and better optimize the cost and robustness of the fuel cell propulsion system. In fact, all of our efforts to improve high-voltage electronics, electric motors, regenerative braking and battery technology on BEVs, HEVs and PHEVs can be applicable to FCVs, if and when these vehicles become commercially viable.

We believe that hydrogen-powered fuel cell vehicles may be an important long-term solution for improving energy security and diversifying our energy sources, as well as for reducing greenhouse gas emissions, if hydrogen fuel emerges as a viable low-carbon energy carrier. Therefore, Ford has committed to significant hydrogen fuel cell research and development.

### Deployment

#### Technology Demonstration

Ford has been working on fuel cell vehicle development and technology demonstration for more than a decade. From 2005 to 2009, we participated in a technology demonstration program partially funded by the U.S. Department of Energy (DOE), as well as in other government-supported demonstration programs in Canada and Europe. A total of 30 Ford Focus FCVs were in operation in these programs. These vehicles were tested to demonstrate technical feasibility, performance durability and reliability. For example, they were subjected to driving tests at sub-zero temperatures and high altitudes to prove vehicle performance under a range of customer-encountered driving environments. By 2009, these vehicles had accumulated more than a million driving miles without significant technical problems, thereby demonstrating the reliability of fuel cell powertrain systems in real-world driving conditions. The data collected from this fleet have been critical to the further development of Ford's fuel cell technology. Based on the knowledge gained in this first generation of fuel cell technology, we have completed development and laboratory validation of additional generations of fuel cell technologies. These later-generation technologies improve the robustness and "freeze start" capability of the fuel cell propulsion system.

## Challenges of Commercialization

Even with the advances we have made in hydrogen technology over the past 10 years, we still have challenges to overcome before hydrogen FCVs can compete in the market with current vehicle technology. The cost and durability of the fuel cell system are the most significant challenges. For example, extensive DOE analysis has not yet revealed an automotive fuel cell technology that meets the DOE's targets for real-world commercialization, or that maintains proper performance throughout the targeted lifetime while staying within the targeted cost. There are also still significant challenges related to the cost and availability of hydrogen fuel and onboard hydrogen storage technology. To overcome these challenges and make fuel cell vehicle technology commercially viable, we believe further scientific breakthroughs and continued engineering refinements are required.

## Continuing Research and Development

Given these significant challenges to commercialization, Ford had reprioritized its internal resources to concentrate on core fuel cell research that will help increase the commercialization potential of FCVs, including materials development and basic scientific research to solve cost and durability challenges.

In January 2013, however, we announced a partnership with Daimler AG and Nissan Motor Co., Ltd., to accelerate the commercialization of fuel cell vehicle technology by jointly developing a common fuel cell system that will reduce technology costs by maximizing design commonality, leveraging volume and deriving efficiencies through economies of scale. This collaboration could lead to the launch of the world's first affordable, mass-market fuel cell electric vehicles as early as 2017.

We are continuing our core fuel cell research as well. Our materials research is focused on the membrane electrode assembly (MEA) and bipolar plates, which make up key cost and/or durability elements of the fuel cell stack. For example, we are working to develop a new fuel cell catalyst that will significantly reduce the use of precious metals, such as platinum, and we are exploring alternatives to expensive components, such as developing low-cost corrosion-resistant bipolar plates. Simultaneously, we are working to increase the power density of the individual fuel cell stack. This could potentially reduce the use of the expensive materials and components in the stack. MEA research is also crucial to our ability to optimize fuel cell stack operating conditions and reduce system complexity. We are working on the fuel cell stack research and development with our alliance partners: Daimler AG and the Automotive Fuel Cell Cooperation (AFCC), a Vancouver-based company owned by Ford and Daimler AG. We are also working to optimize the overall propulsion-system architecture to take advantage of advances in fuel cell materials and lessons learned from our demonstration FCV fleet. By developing advanced computational modeling that will help us understand the mechanisms underlying ideal fuel cell functioning and anticipate failure modes under real-world usage, we are able to propose operating strategies and system architectures that minimize fuel cell propulsion system costs. These modeling tools support our fuel cell materials and system research.

On-board hydrogen storage is another critical challenge to the commercial viability of hydrogen FCVs. Current demonstration vehicles use compressed gaseous hydrogen storage. However, the high-pressure tanks required for this storage use expensive materials for reinforcement such as carbon fiber. In addition, the current tanks are large and difficult to package in a vehicle without unacceptable losses in passenger or cargo space. Therefore, we are pursuing research on materials-based on-board hydrogen-storage technology, including complex hydride and novel hydrogen sorbent technologies, which may ultimately achieve higher energy density and lower cost.

## Hydrogen Refueling Infrastructure

Producing and distributing hydrogen fuel is another important hurdle on the road to implementing hydrogen-powered FCVs and hydrogen-powered internal combustion engines (H<sub>2</sub>ICEs). The GHG-reduction benefits of hydrogen fuel depend on what procedures and feedstocks are used to produce the hydrogen. Currently, the most state-of-the-art procedure is a distributed natural gas steam-reforming process. However, when FCVs are run on hydrogen reformed from natural gas using this process, they do not provide significant environmental benefits on a well-to-wheels basis (due to GHG emissions from the natural gas reformation process). It would be necessary to employ carbon-sequestration technologies in hydrogen production from fossil fuels or increase the use of renewable energy sources to enable the hydrogen for hydrogen-fueled FCVs to provide significant environmental benefits.

Even if the challenges of producing hydrogen can be overcome, there is still no widespread hydrogen fueling system. Therefore, new infrastructure must be invested in, designed and executed throughout the country to make hydrogen-powered vehicles commercially attractive to Ford customers.

Working alone, Ford will not be able to overcome all of the challenges hydrogen vehicles face. That is why Ford is collaborating with a wide range of partners.



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## Vehicle Fuel Efficiency and CO<sub>2</sub> Emissions Progress and Performance

How is Ford doing in its quest to improve vehicle fuel efficiency and greenhouse gas (GHG) emissions? This section reviews our progress in reducing “use-phase” vehicle emissions – those that come from the vehicles while they are being driven, rather than during their manufacture or disposal. Life cycle analyses have found that 80 to 90 percent of vehicle-related GHGs are emitted during the use phase. Please see the [Life Cycle Analysis](#) section for more information on this topic. Emissions from our operations, logistics (i.e., the transportation of parts for our vehicles and of finished vehicles to dealerships), and from our supply chain are also important elements of our greenhouse gas emission impacts and reduction strategy. These topics are covered in the [Greening Our Operations](#) section (regarding our facilities) and the [Supply Chain](#) section (regarding logistics and suppliers).

Emissions during a vehicle's use phase are obviously dependent on the vehicle's fuel economy, which in turn depends on many characteristics of the vehicle itself (such as its weight, powertrain and aerodynamics). The bulk of this section focuses on our progress in improving vehicle fuel efficiency. This progress is largely the result of implementing the technologies described in our [Sustainable Technologies and Alternative Fuels Plan](#).

Use-phase vehicle emissions are also dependent on the “well-to-wheels” greenhouse gas profile of the fuels used in the vehicles. Therefore, we also report on progress in developing lower carbon fuels, including electrification, biofuels, and gaseous fuels including compressed natural gas (CNG) and liquefied petroleum gas (LPG, or propane autogas).

Use-phase emissions also depend on consumer vehicle choices and driving behavior. If consumers choose more fuel-efficient vehicles, the emissions from their driving will be lower, other things being equal. In addition, use-phase emissions are influenced by how customers drive and maintain their vehicles. The amount and nature of consumer driving is an important factor in determining total motor vehicle GHG emissions, but it is often ignored. So, this section also discusses our efforts to help drivers improve the fuel efficiency of their driving behavior.

Our shorthand for these three factors influencing use-phase vehicle emissions is:

$$\text{Vehicle} + \text{Fuel} + \text{Driver} = \text{GHG Emissions}$$

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### Improving Vehicle Fuel Efficiency

To meet our climate change goals, we are focused in the near term on implementing the most cost-effective fuel-efficiency technologies across a large volume of our vehicles, as well as on introducing new products that offer improved fuel efficiency without compromising style or performance. We are concentrating on affordable and near-term sustainable technology solutions that can be used not for hundreds or thousands of cars, but for millions of cars, because that is how Ford can truly make a difference.

For each of our new or significantly refreshed vehicles, we will continue to offer a popular version powertrain with leading fuel economy. Global platforms, such as those on which our Ford Fiesta and Focus are built, allow us to roll out our advanced technologies at a lower cost, achieving the large volumes that provide a real benefit.

We are offering our customers the “power of choice” when it comes to fuel-efficient vehicles and fuel-saving technologies – i.e., the ability to choose what best suits their needs from a wide range of advanced technologies implemented across our product lineup. To do this, we have introduced a wide variety of new engine and transmission technologies – as well as electrical system improvements, weight reductions and aerodynamic improvements – that deliver significant fuel-economy benefits for millions of drivers in the near term. We also offer electrified products, natural gas- and propane-ready engines, and vehicles that can operate on higher blends of biofuels. EcoBoost® engines, which use gasoline turbocharged direct-injection technology, are an important part of our efforts to improve vehicle fuel efficiency. EcoBoost engines significantly improve fuel economy and reduce CO<sub>2</sub> emissions, and provide superior driving performance compared to larger-displacement engines. Because EcoBoost is affordable and can be applied to existing gasoline engines, we can implement it across our vehicle fleet, bringing fuel-efficiency benefits to a wide range of our customers. We produced over 2 million EcoBoost engines globally by the end of 2013, surpassing our previously announced goal of producing 1.5 million in that timeframe. We now offer EcoBoost engines on 90 percent of our North American and European nameplates, and 80 percent of our nameplates globally. In addition to EcoBoost engines we now offer a wide range of fuel-efficient technologies on our conventionally fueled vehicles, including advanced transmissions and Auto Start-Stop.

We offer six electrified vehicles (EVs) in the U.S.: the all-electric Focus Electric, the Fusion Energi and C-MAX Energi plug-in hybrid electric vehicles (PHEVs), and three hybrid electric vehicles (HEVs). We launched the Focus Electric in Europe in 2013 and plan to launch the C-MAX Energi plug-in hybrid and a hybrid electric version of the Ford Mondeo in Europe in 2014. We plan to launch additional electrified vehicles in other global markets in coming years. Consumer interest in EVs grew in 2013. In 2013, the total number of EVs sold in the U.S. was 596,948, which accounted for a 3.8 percent of the total vehicles sold, up from 492,319 sold in 2012, which was 3.3 percent of vehicles sold in 2012.<sup>1</sup> In 2013 Ford sold over 87,000 EVs including battery electric vehicles (BEVs), HEVs, and PHEVs – an all-time record for Ford. EV sales accounted for 3.5 percent of company sales, up from 1.6 percent share in 2012. Our overall share of the EV market also grew substantially. In the fourth quarter of 2013, our retail EV market share was 14.3 percent, up from 6.5 percent in 2013. While Ford’s share of the electrified vehicle market is growing, electrified vehicles still only represent a small fraction of U.S. sales. Electrified vehicles still have a long way to go to get significant penetration in a market that is still dominated by gasoline-powered vehicles.

In 2014, we will introduce the 3.2L Power Stroke® diesel engine in the U.S. in the

fuel-efficient Transit full-size van. This engine, which will be manufactured in South Africa, adds to our lineup of advanced, clean diesel technologies used in vehicles marketed around the globe.

In Europe we also offer advanced common rail diesel engines across our European model range, as well as an ECOnetic Technology range of low-CO<sub>2</sub> vehicles.

We have committed that for each of our new or significantly refreshed vehicles, we will offer a powertrain with leading fuel economy. For more information on our overall approach to fuel-efficient and alternative powertrain technologies, please see our [Sustainable Technologies and Alternative Fuels Plan](#).

The following are some examples of our fuel-efficient vehicles and progress in improving fuel efficiency by region.

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## North America

In North America, we continued to introduce new vehicles that use the technologies identified in our [Sustainable Technologies and Alternative Fuels Plan](#), and that offer outstanding fuel economy and reduced CO<sub>2</sub> emissions.

In 2013 in the U.S., we improved the average fuel economy of our car fleet by 2 percent, and of our truck fleet by 3 percent compared to 2012. However, our combined U.S. corporate average fuel economy decreased by 1.7 percent in 2013 due to increased customer demand for trucks over cars. Fleet CO<sub>2</sub> emissions improved by 11 percent compared to 2008.

We now have the most fuel-efficient vehicle lineup in our company's history.

We also continued to expand the use of our EcoBoost engines, which significantly improve the fuel economy of gasoline engines. As of the end of 2013, 90 percent of our North American and European nameplates offer EcoBoost engines.

We have made significant progress in improving the fuel economy of, and hence reducing the CO<sub>2</sub> emissions from, our vehicles in North America. Figure 1 illustrates the improvement in fuel economy of key Ford vehicle models from 2004 to 2014.

**Figure 1: Nameplate fuel economy improvement summary**

Model	2004–2014 MY % FE Improvement <sup>2</sup>
 Focus	24.5 <sup>3</sup>
 Escape	26.9
 Explorer	29.0 <sup>4</sup>
 F-150	19.2 <sup>5</sup>

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## Europe

Ford offers one of the broadest low-CO<sub>2</sub> vehicle portfolios in Europe. Our efforts to improve fuel efficiency are paying off. Preliminary data shows that we have reduced the average CO<sub>2</sub> emissions of our European car fleet by around 18 percent between the 2007 and 2013 calendar years.<sup>6</sup>

We are using a variety of technologies to accomplish these gains. We offer three ECOnetic vehicles, ultra-low-CO<sub>2</sub> versions of selected Ford diesel vehicles that leverage several advanced, fuel-saving technologies. The ECOnetic name was chosen because it links ecologically sensitive technology to our "energy in motion" design philosophy, which combines driving quality and emotional styling.

In addition, we offer three EcoBoost gasoline engines in Europe, the 2.0L, 1.6L, and the 1.0L EcoBoost engines. These engines are available on the Ford Fiesta, B MAX, EcoSport, C MAX, Grand C MAX, Focus, Mondeo, S MAX, and Galaxy. They are available in combination with other fuel-saving technologies such as [Auto Start-Stop](#), Smart Regenerative Charging, [Active Grille Shutter](#), and EcoMode. Ford is the only non-premium manufacturer currently offering Active Grille Shutter.

In 2013 and 2014 we are also extending our global electric vehicle plan to Europe. We launched the Focus Electric, an all-electric vehicle, in June 2013. We will launch the C MAX Energi, plug-in hybrid and a hybrid version of the Mondeo in late 2014. We also offer compressed natural gas (CNG) and liquefied petroleum gas (LPG, or propane autogas) versions of the Ford Fiesta, Focus, B MAX, C MAX, and Mondeo. And, we offer a flex-fuel version of the Ford Focus that can run on E85 (85 percent ethanol). All of our diesel vehicles can run on up a fuel blend of up to seven percent bio-diesel (B7).

Some examples of vehicles we offer in Europe with best-in-class, or extremely low-CO<sub>2</sub> include:

- The Fiesta delivers best-in-class fuel economy with a 1.0L EcoBoost engine that achieves 4.3L/100 km and 99 g/km CO<sub>2</sub>.
- In total, we now offer seven versions of the new Fiesta with CO<sub>2</sub> emissions below 100 g/km.
- The Fiesta ECOnetic, Ford's most fuel-efficient and lowest-CO<sub>2</sub>-emission passenger car ever, offers fuel economy of 3.3L/100<sup>7</sup> km (86 mpg U.K.<sup>8</sup>/71 mpg U.S.) and CO<sub>2</sub> emissions of 85 g/km. The new model showcases technology innovations such as Auto Start-Stop, Smart Regenerative Charging, EcoMode and shift indicator light. It also benefits from a bespoke engine calibration and optimized gear ratios. A lower suspension and wheel deflectors, as well as low-rolling-resistance tires, are used to further reduce driving resistances.
- The Focus ECOnetic delivers fuel economy of 3.4L/100 km<sup>9</sup> (83.1 mpg U.K.<sup>10</sup>/69 mpg U.S.) and CO<sub>2</sub> emissions of 88 g/km, making it the most fuel-efficient non-hybrid family car currently available in Europe.
- The Mondeo ECOnetic has a specially calibrated 115PS (85 kW) version of the 1.6L Duratorq TDCi engine equipped with a diesel particulate filter. Due to a combination of changes compared to the standard Mondeo, the Mondeo ECOnetic is delivering a combined fuel consumption of 4.3L/100 km<sup>11</sup> (65.6 mpg U.K.<sup>12</sup>), which translates into average CO<sub>2</sub> emissions of 114 g/km.
- The Focus 1.0L EcoBoost model delivers best-in-class fuel economy and the lowest CO<sub>2</sub> emissions compared to its rivals. The 1.0L EcoBoost 100PS version delivers 4.8L/100 km<sup>13</sup> (58.9 mpg U.K.<sup>14</sup>/49 mpg U.S.) and CO<sub>2</sub> emissions of 109 g/km. The 125PS model returns 5.0L/100 km<sup>15</sup> (56.5 mpg U.K.<sup>16</sup>/47 mpg U.S.) with CO<sub>2</sub> emissions of 114g/km.
- An updated version of the Focus with an 1.0L EcoBoost 100 PS, on offer since January 2014, provides fuel economy of 4.3L/100 km (65.6 mpg U.K.<sup>17</sup>) and 99 g/km CO<sub>2</sub>. This is the first non-hybrid gasoline powered family car in Europe to break the 100 g/km CO<sub>2</sub> barrier.

In total, Ford offers 48 models and variants in Europe with CO<sub>2</sub> emissions below 130 g/km, of which 13 models or variants have CO<sub>2</sub> emissions below 100 g/km.

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## Asia Pacific Africa

In the Asia Pacific region, we are launching more vehicles equipped with the EcoBoost engine in response to growing consumer demand for more fuel efficient vehicles. We will offer EcoBoost engines in 20 vehicles in Asia Pacific by mid-decade, a five-fold increase from 2012. In 2013, EcoBoost was available in 10 vehicles in the region. The 1L I-3 EcoBoost was introduced in the region for the first time on the Ford Fiesta, available in Australia, China, New Zealand, Taiwan, and ASEAN, and the EcoSport, available in Australia, China, India, and New Zealand. Also in 2013, the 1.5L I-4 EcoBoost was available the new Mondeo in China. The new Mondeo in China is the first vehicle at Ford to include the newly introduced 1.5L EcoBoost engine. We also offer the 1.6L and 2.0L I-4 EcoBoost variants in the Edge, Kuga, Mondeo, Falcon, Focus ST, and Fiesta ST. In March 2014, Ford's joint venture, Changan Ford Automobile Co., Ltd. (CAF), began producing 1L EcoBoost engines at a new engine plant in Chongqing to power the Ford Fiesta and EcoSport vehicles built for China.

The fuel-efficient EcoBoost engines are being well received by our customers in the Asia Pacific region. In 2013, sales of EcoBoost equipped vehicles in the region rose by 250 percent compared to 2012. Seventy-seven percent of the Ford Mondeos and 90 percent of the Ford Edges sold in China are equipped with EcoBoost.

In China, Ford will upgrade its entire powertrain portfolio with 20 advanced engines and transmissions to support its aggressive plan to introduce 15 new vehicles to China by mid-decade. These advanced, fuel-efficient technologies – including turbocharging, direct injection, twin independent variable camshaft timing (Ti-VCT) and six-speed transmissions – will deliver more than a 20 percent improvement in

fuel economy to Ford's passenger vehicle fleet in China by 2015, which represents a key part of Ford's near-term sustainability goals in China.

In India, we are also continuing to introduce vehicles with excellent fuel economy. In 2013, we introduced the all-new Ford EcoSport with a 1.0L EcoBoost, the first vehicle in India to have this technology. We also continue to offer the Ford Fiesta – powered by TDCi diesel powertrain developed for India – that delivers class-leading fuel economy and reduced CO<sub>2</sub> emissions. This builds on fuel economy leadership established with the Ford Figo, launched in March 2010, which has two engine options: a best-in-class, fuel-efficient 1.4L TDCi diesel and a very competitive 1.2L gasoline engine. In Australia, we introduced the 1.0 L EcoBoost on the Fiesta and all-new EcoSport. We also offer an EcoBoost versions of the Ford Mondeo, and Ford Falcon, Fiesta ST, Focus ST, and Kuga. Also in Australia, we offer our EcoLPi liquid-injection liquefied petroleum gas (LPG) system for the Falcon, providing customers with the most advanced LPG technology on the market. The Falcon EcoLPi fuel system improves fuel economy by 12 to 15 percent, while also improving power by approximately 27 percent over the prior LPG Falcon model.

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## South America

In South America, we are improving fuel economy by introducing some of the efficient engine and transmission technologies currently used in North America, and by offering technologies compatible with the widespread use of biofuels in Brazil. We offer our EcoBoost engine on the Ford Mondeo in Argentina and the Ford Fusion in Brazil.

We are continuing to implement the new, more-efficient "Sigma" engine, which improves efficiency compared to current engines through reduced internal friction and improved electronic throttle controls. We have also improved the gearing ratios, aerodynamics and rolling resistance of our South American models, further increasing fuel economy. In Brazil, our Ford EcoSport, a B-segment SUV, is a fuel economy leader in its segment. In 2013 in Brazil, we launched the new Ford Fiesta, which received an "A" rating for fuel efficiency in the [new Brazilian fuel-efficiency labeling system](#). Ford also received a "Seal of Excellence" award for the Ford Fusion Hybrid and 2014 model year Fiesta 1.6L TiVC in Brazil; these awards are given to vehicles in the top 20 percent for fuel economy, regardless of vehicle segment or type.

Over the past few years, we have successfully implemented a large number of fuel-efficiency technologies in our B- and C-sized vehicle segments, which make up approximately 80 percent of the Brazilian market. These include twin independent variable cam timing engines and direct-injection engines, Battery Management Systems, smart alternator systems, and dual-clutch automatic transmissions.

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1. Industry EV sales and share is estimated due to nondisclosure of data by some competitors.
  2. Unadjusted combined.
  3. Wagon excluded, BEV excluded.
  4. Explorer Sport, Sport Trac and ethanol-fueled FFVs excluded.
  5. Ethanol-fueled FFVs, natural gas and supercharged vehicles and SVT Raptor excluded.
  6. The final 2013 calendar-year fleet-wide CO<sub>2</sub> emissions data for our European fleet will be available in November 2014. For all years, these data do not include Volvo.
  7. The stated fuel consumption and CO<sub>2</sub> emissions are measured according to the technical requirements and specifications of the European Regulation (EC) 715/2007 as last amended.
  8. The stated fuel consumption and CO<sub>2</sub> emissions are measured according to the technical requirements and specifications of the European Regulation (EC) 715/2007 as last amended. The European standard test drive cycle, NEDC, is used for type approval of fuel economy and CO<sub>2</sub> data. They differ from fuel economy calculations developed in the U.S. or other regions of the world. The fuel economy figures in mpg are based on the U.K. imperial gallon, which is 1.2 times the U.S. gallon.
  9. The stated fuel consumption and CO<sub>2</sub> emissions are measured according to the technical requirements and specifications of the European Regulation (EC) 715/2007 as last amended.
  10. The stated fuel consumption and CO<sub>2</sub> emissions are measured according to the technical requirements and specifications of the European Regulation (EC) 715/2007 as last amended. The European standard test drive cycle, NEDC, is used for type approval of fuel economy and CO<sub>2</sub> data. The fuel economy figures in mpg are based on the U.K. imperial gallon, which is 1.2 times the U.S. gallon.
  11. The stated fuel consumption and CO<sub>2</sub> emissions are measured according to the technical requirements and specifications of the European Regulation (EC) 715/2007 as last amended.
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  13. The stated fuel consumption and CO<sub>2</sub> emissions are measured according to the technical requirements and specifications of the European Regulation (EC) 715/2007 as last amended.
  14. The stated fuel consumption and CO<sub>2</sub> emissions are measured according to the technical requirements and specifications of the European Regulation (EC) 715/2007 as last amended.

The European standard test drive cycle, NEDC, is used for type approval of fuel economy and CO<sub>2</sub> data. The fuel economy figures in mpg are based on the U.K. imperial gallon, which is 1.2 times the U.S. gallon.

15. The stated fuel consumption and CO<sub>2</sub> emissions are measured according to the technical requirements and specifications of the European Regulation (EC) 715/2007 as last amended. The European standard test drive cycle, NEDC, is used for type approval of fuel economy and CO<sub>2</sub> data.
16. The stated fuel consumption and CO<sub>2</sub> emissions are measured according to the technical requirements and specifications of the European Regulation (EC) 715/2007 as last amended. The European standard test drive cycle, NEDC, is used for type approval of fuel economy and CO<sub>2</sub> data. The fuel economy figures in mpg are based on the U.K. imperial gallon, which is 1.2 times the U.S. gallon.
17. The stated fuel consumption and CO<sub>2</sub> emissions are measured according to the technical requirements and specifications of the European Regulation (EC) 715/2007 as last amended. The European standard test drive cycle, NEDC, is used for type approval of fuel economy and CO<sub>2</sub> data. The fuel economy figures in mpg are based on the U.K. imperial gallon, which is 1.2 times the U.S. gallon.

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## Fuel

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Improving fuel economy alone will not reduce life cycle greenhouse gas (GHG) emissions to the levels required for carbon dioxide (CO<sub>2</sub>) stabilization. We also need fuels with lower fossil carbon content<sup>1</sup>, including biofuels, electricity, and gaseous fuels such as compressed natural gas (CNG), liquefied petroleum gas (LPG), and hydrogen. Ford cannot increase alternative fuel use simply by offering vehicles that can use these fuels. Widespread use of these fuels will also require significant efforts by fuel and energy providers, including continued development of the fuels themselves and considerable updating or expansion of refueling infrastructure. Government action will also be required to facilitate the adoption of common standards for fuel quality and refueling infrastructure, as well as measures such as tax incentives to encourage manufacturers to produce the fuels and consumers to use them.

In this section, we briefly discuss fuel alternatives Ford is currently implementing commercially: electrification, biofuels, and two gaseous fuels, compressed natural gas (CNG) and liquefied petroleum gas (LNG, or propane autogas). For more information on how Ford is developing and rolling out vehicles and powertrains that use these fuels, please see [Sustainable Technologies and Alternative Fuels Plan](#).

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### Electrification

Electrification addresses both energy security and climate change concerns, because electricity can be made from a wide variety of fuels, including domestic sources and renewable energy.

Ford foresees a future that includes a variety of electrified and traditional vehicles, something we call “power of choice.” We are electrifying existing, traditional vehicle lines rather than creating unique electrified vehicle models. That way, our customers can choose from a variety of vehicle powertrains, including efficient gasoline engines, hybrid electric vehicles, plug-in hybrids and full-battery electric vehicles. Our comprehensive electrification strategy touches all aspects of the electrification ownership experience, seeking to make it engaging, empowering and easy to live with.

For more information on Ford’s approach to electrified vehicles, as well as issues associated with using electricity as a vehicle fuel, please see [Electrification: A Closer Look](#). For more information on the hybrid electric, plug-in hybrid and battery electric vehicles we have launched or plan to launch, please see the [Sustainable Technologies and Alternative Fuels Plan](#).

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### Biofuels

Biofuels are a key piece of our blueprint for sustainability to reduce CO<sub>2</sub>. While current corn-based ethanol production in the U.S. is estimated to provide a modest (approximately 20 percent) reduction in vehicle GHG emissions on a well-to-wheels basis, next-generation biofuels such as lignocellulosic bioethanol could offer up to a 90 percent GHG reduction benefit.<sup>2</sup> Consistent with consumer demand, Ford will continue to provide a range of products designed to run on a wide range of ethanol blends. Flexible fuel vehicles (FFVs) provide fuel choice to consumers when the fuel

is available and are necessary to transition to advanced alternative fuels.

We believe that the use of biofuels may increase from a current level of approximately 2 to 3 percent globally to 10 to 30 percent of global liquid road-transportation fuel over the next few decades. We are conducting research and development to ensure that our vehicles will be compatible with and able to incorporate the full benefits of biofuels. Our current work focuses on the two biofuels that are available at a commercial scale: ethanol and biodiesel. Biofuel use has been expanding globally. Bioethanol (frequently called just ethanol) is made from corn, beets or sugar cane and substitutes for gasoline. Biodiesel is derived from plant oils and substitutes for diesel fuel. In the U.S. in 2007, federal legislation expanded the Renewable Fuel Standard (RFS), mandating a significant increase in the use of biofuels by 2022.

The following describes issues and challenges associated with expanding the use of biofuels in vehicles.

### Current Generation Biofuels

The U.S. and Brazil are the world's largest producers of ethanol, which is made from the fermentation of sugars. In the U.S. the sugar is typically derived via the hydrolysis of corn starch, while in Brazil the sugar is obtained directly from sugar cane. Ethanol is primarily used in blends with gasoline. Hydrous ethanol, which is approximately 95 percent ethanol and 5 percent water, is also used in Brazil. Blends are identified using the volumetric content of ethanol, which is specified numerically after the letter "E" for ethanol. For example, E10 is 10 percent by volume ethanol and 90 percent petroleum gasoline. Most automotive fuel supplied in the U.S. is E10. The U.S. Environmental Protection Agency (EPA) has recently issued a waiver permitting E15 to be sold in the U.S. for use in 2001 or newer model year vehicles. Our position regarding E15 is discussed in the [Renewable Fuels Policy](#) section.

An important benefit of ethanol is its higher octane rating, which can improve the efficiency and torque of today's high-efficiency internal combustion gas engines. We developed a new fundamental molecular approach to calculating the octane increase provided by ethanol blended into gasoline, which is more accurate than previous approaches.<sup>3,4</sup> The octane rating of a fuel is a critical fuel property that describes its resistance to "knock," which results from early or uncontrolled fuel ignition. To avoid "knocking," the compression ratios designed into engines are limited by the lowest expected octane rating of available fuels. However, engines operate at higher thermal efficiency when they can be operated at higher compression ratios using appropriate higher-octane fuel. The increased availability of ethanol in the future provides an opportunity for fuel providers to deliver fuels with higher octane ratings and automakers to provide higher compression ratios – and therefore more efficient engines.<sup>5</sup> For example, our studies suggest that increasing the percentage of ethanol in gasoline from the current 10 percent (E10) found in most commercially available gasoline, to 20 percent (E20) while also improving engine compression ratios to take advantage of the associated increase in fuel octane, would reduce vehicle CO<sub>2</sub> emissions by nearly 5 percent.<sup>6</sup>

High-octane ethanol blends offer a win-win-win opportunity in which the increased availability of ethanol could enable increased engine efficiency, resulting in fuel savings for our customers, improved energy security and reduced CO<sub>2</sub> emissions. However, ethanol blends above E10 also may damage engines that are not designed to operate on higher concentrations of ethanol; this poses a particular concern for older vehicles. Appropriate planning and coordination between stakeholders is needed to manage transition issues such as these. Our research into ethanol fuels and octane rating implications will help us take the best advantage of higher-octane ethanol-fuel blends when they are made available in the future.

Biodiesel is a biofuel alternative to petroleum diesel that is made from the transesterification of vegetable oils, including soy, canola, palm and rapeseed, or from animal fat. Biodiesel is distinct from "renewable diesel," which is made by hydrotreating vegetable oils or animal fats. In the U.S., most biodiesel is currently made from soybean oil. Biodiesel is typically used in blends with petroleum diesel, where the volumetric content of biodiesel is specified numerically after the letter "B" representing biodiesel.

### Future Biofuels

The biofuels currently available at a commercial scale (e.g., ethanol and biodiesel) have advantages relative to their petroleum-derived counterparts. They can be made from locally available raw materials, providing support for rural communities and reducing the need for foreign-supplied oil, while increasing national energy security. They also reduce life cycle (or well-to-wheels) CO<sub>2</sub> emissions compared to conventional petroleum-based fuels. However, important issues remain regarding the energy density of some biofuels, the best way to use these fuels to reduce GHG emissions, their ability to meet fuel needs without impacting food supplies and their potential impact on land-use decisions. (These issues are discussed in more detail below in the [Biofuel Challenges](#) section.)

Meanwhile, Ford is working to support and promote the next generation of biofuels, including cellulosic biofuels. These are primarily fuels made from plant cellulose – stalks, leaves and woody matter – instead of from sugars, starches or oil seeds. Cellulosic biofuels will have many advantages. They should minimize possible

market competition between food and fuel. They would allow for the more complete use of crops such as corn and soybeans by using additional parts of these crops, including stems and leaves, for fuel production. In addition, cellulosic biofuels can be made from “energy crops,” such as switchgrass and wood, that require less fertilizer and less energy-intensive farming methods. This would further reduce the total CO<sub>2</sub> footprint of the resulting biofuels. There has been significant progress in technologies and processes to transform biomass feedstocks into ethanol in recent years and a few small-scale plants are now in operation in the U.S. and elsewhere. Technological barriers to large-scale production of cellulosic ethanol have been largely overcome. The main barrier now is the regulatory uncertainty associated with recent downward revisions of cellulosic biofuel mandates and the associated poor business case for cellulosic ethanol production in an uncertain market. Capital availability also remains a significant challenge to commercialization. Given these challenges, it is our assessment that next-generation biofuels will not be available at scale in the marketplace for at least 10 years. Looking further into the future, if additional technical breakthroughs in production efficiencies are made, and if the investment climate is sufficiently favorable to encourage the large capital outlays required to build the necessary biorefineries, next-generation biofuels could play a significant role in addressing climate change and energy security.

### The United States Renewable Fuel Standard and the Future of Biofuels

The Energy Independence and Security Act of 2007 expanded the Renewable Fuel Standard (RFS) by requiring a significant increase in the use of biofuels – to a total of 36 billion gallons per year by 2022. This law also requires that, beginning in 2010, a certain portion of biofuels must be “advanced” and/or cellulosic-based fuels. Ethanol blended into gasoline is expected to supply the majority of this biofuel mandate and could displace a substantial fraction of U.S. gasoline demand by 2022.<sup>7</sup> The use of biodiesel in the U.S. is also likely to increase in the coming years. However, it will not likely increase to the same levels as ethanol, because the RFS mandates lower volumes of biomass-based diesel, there is less availability of cost-effective feedstock material, and because a relatively small percentage of light-duty passenger vehicles in the U.S. use diesel fuel.

Full deployment of E10 for gasoline-powered vehicles would achieve approximately one third of the RFS-mandated biofuel use by 2022. Therefore, meeting the full RFS biofuel requirement will require much greater use of E85 in FFVs and/or the development of vehicles that can use “mid-level blends” of ethanol and gasoline (i.e., between E10 and E85). The expanded use of E85 in FFVs would require a corresponding increase in the E85 fueling infrastructure in the next 10 to 20 years. An approach using mid-level ethanol blends would require that all new vehicles be designed for higher ethanol capability, and the existing fueling infrastructure would need to be updated for compatibility with fuel containing higher concentrations of ethanol. While the introduction of and expanded use of E15 might help achieve the RFS goals if carried out properly, the problems associated with the approach taken by the EPA to date (as discussed above) outweigh the benefits. For any of these approaches to be successful, the new ethanol-blend fuels will have to provide enough value to the consumer to attract them to buy these fuels. Regardless of the specific strategy used, coordinated efforts will be required between automakers, fuel suppliers, consumers and the government to meet the RFS mandate while ensuring the compatibility of vehicles and ethanol-blended fuel. Without alignment between vehicles, fuels and infrastructure, a mismatch will occur, and it will be difficult to meet the RFS mandate successfully.

### Biofuel Infrastructure

More widespread use of biofuels would increase their benefits for reducing GHG emissions and improving energy security. This requires greater availability of both biofuels and vehicles capable of using biofuels. In the U.S., the E85 refueling infrastructure remains inadequate. Out of more than 160,000 refueling stations in the U.S., approximately 3,300 (or slightly more than 2 percent) offer E85. This trails the availability of E85 vehicles in the marketplace. FFVs make up approximately seven percent of the current U.S. light-duty vehicle and FFVs now account for nearly 20 percent of all new light-duty vehicles being produced. The FFV fleet is substantial and growing. To reap the energy security and climate change opportunities of the FFV fleet more infrastructure, particularly more access to affordably priced E85, is necessary.

### Biofuel Challenges

Much of the interest in biofuels results from their potential to lessen the environmental impacts of transportation fuels while contributing to energy independence. Biofuels are typically made from domestic and renewable resources, they provide an economic boost to rural communities, and they help to reduce greenhouse gas emissions because the plants from which they are made absorb atmospheric CO<sub>2</sub> while they are growing. But are biofuels the best solution to our growing fuel-related environmental, economic and political problems? The issues are complex. We believe biofuels are an important part of the equation for addressing climate change and energy security. We recognize, however, that major advances need to be made in production processes, source materials and fuel types for biofuels to achieve their full potential.

Challenges relating to today's biofuels include the following:

- **Energy Density:** The energy density of ethanol is approximately two-thirds that of gasoline.<sup>8</sup> This means there is approximately one-third less available energy in a gallon of ethanol than in a gallon of gasoline. As a result, drivers using fuels containing higher amounts of ethanol will have to refuel more frequently. Ethanol does have improved qualities, such as higher octane, that can be leveraged to offset some of the lower energy content relative to gasoline. In 2012, Ford researchers published an assessment that quantified the potential benefits of high-octane ethanol gasoline blends in the U.S.<sup>9</sup> Biodiesel has approximately the same energy density as conventional petroleum-based diesel.
- **Lifecycle Greenhouse Gas Emissions:** The CO<sub>2</sub> that is released when biofuels are burned is from carbon that was captured from the atmosphere by the plants used to produce biofuel feedstocks. However, current farming and production processes utilize fossil fuels in the production of ethanol and biodiesel, so the production of these biofuels results in a release of some fossil-fuel-based GHG emissions on a complete lifecycle basis. In addition, emissions of nitrous oxide (N<sub>2</sub>O), another GHG resulting from biofuel feedstock production, need to be carefully considered for all types of biofuel feedstocks and farming techniques on a full life cycle basis, including the appropriate allocation of emissions to co-products (such as animal feed) derived from biofuel production. Government and academic studies suggest that using E85 with ethanol from corn results in approximately 20 to 30 percent fewer life cycle GHG emissions than gasoline, on an energy-equivalent basis. GHG emissions related to petroleum can vary greatly depending on the source. Producing crude oil from tar sands, for example, results in a greater release of GHGs than producing crude oil from conventional sources. The use of renewable energy sources in the production of ethanol and biodiesel production can reduce their lifecycle GHG emissions further. We believe that developing cellulosic or biomass-based biofuels with next-generation processes will significantly decrease the GHG emissions associated with biofuels, by up to 90 percent.<sup>10</sup>
- **Competition with the Food Supply:** Another concern about current corn- and soybean-based biofuels is that they compete in the marketplace with food supplies and are often cited as one of the factors that increase food prices. In 1990, the production of ethanol in the U.S. consumed approximately 3 percent of the corn harvest, but in 2012 that figure was 41 percent. Ethanol production removes only the starch from the corn kernel – the remaining portion (about one-third of the weight of the corn kernel) is a highly valued feed product (called distillers grains) and a good source of protein and energy for livestock and poultry. When taking into account the livestock feed yield of the distiller's grains, about 30 percent of the U.S. corn harvest was used for ethanol production. This mitigates the competition between ethanol production and food production. In addition, the growth of the energy crop market has encouraged improvements in farming productivity (e.g., bushels per acre) that may not have occurred otherwise, further reducing the impact of biofuels on corn availability. The increase in corn used for ethanol production in the U.S. over the past 10 to 15 years has been essentially matched by the increased harvest over the same period. The increased harvest has been driven mainly by improved yield per acre and, to a lesser extent, by increased acreage. If next-generation biofuels can efficiently utilize biomass such as plant stalks, woodchips or grasses and be grown on marginal land with little irrigation, then competition with food crops should be minimized.
- **Land-Use Conversion for Biofuel Production:** Recent studies have looked at the overall CO<sub>2</sub> and N<sub>2</sub>O impacts of "direct" land-use changes associated with biofuels – i.e., converting natural ecosystems to farmland for the production of crops to make biofuels. Additional studies have considered an "indirect" land-use change scenario in which the use of farmland for biofuels in one region indirectly leads to the conversion of natural ecosystems to farmland in another region due to crop market feedbacks (either replacing the grain in the marketplace or due to increased prices). Recent studies indicate that the magnitude of land-use changes in the early studies were overestimated. Significant uncertainty remains and this is an area of active research.

At Ford, we are following the debates about biofuels closely. As we proceed, we need to consider how biofuels are derived and carefully review issues such as the potential net greenhouse gas benefits; political, economic, social and environmental concerns related to biofuel and petroleum use; and the management of land, food and water resources. We agree with the general consensus among scholars and industry experts that the current generation of biofuels has modest environmental benefits and is a first step toward cleaner transportation and energy independence. We are actively investigating the potential of next-generation biofuels that have greater environmental, energy security and economic benefits. We believe that improvements in the efficiency of farming technologies and biomass production processes, and the development of advanced biofuels, will significantly increase the benefits and long-term sustainability of biofuels. Even with these improvements, solving our climate change and energy security problems will require a multifaceted set of solutions, including new fuels, improvements in vehicle efficiency, and changes in consumer driving patterns and practices.

For more information on our implementation of biofueled vehicles, please see [Renewable Biofueled Vehicles](#). To learn about Ford's perspective on biofuel-related public policy issues, please see [Climate Change Policy and Partnerships](#).

## Compressed Natural Gas (CNG) and Liquefied Petroleum Gas (LPG or propane autogas)

Interest in and use of CNG and LPG, or propane autogas, as a vehicle fuel is expanding, although they still account for a small percentage of vehicle fuels used today.. Supply of CNG and LPG is also growing as new reserves of natural gas are being accessed through non-conventional drilling methods. These fuels also offer some environmental and cost benefits that make them good options for some drivers. CNG and LPG are especially relevant for centrally fueled vehicles, such as government fleets, taxis, delivery trucks, and construction and maintenance fleets.

In the U.S. increasing domestic natural gas production is further reducing prices. This increase in domestic supply, coupled with improved vehicle technologies, is promoting many fleet managers to reconsider using these fuels in their fleets.

In the U.S. CNG is primarily used in heavy-duty vehicles, such as long-haul trucks and buses, and medium-duty vehicles, such as our Ford Super Duty trucks. However, as a result of additional requests from business and fleet customers, Ford also announced plans to offer an F-150 with CNG capability in 2014. LPG is used primarily in medium-duty vehicles and some light-duty vehicles such as taxis.

In Europe, South America and Asia, these fuels are somewhat more widely used. CNG is most widely used in Iran, Pakistan, India, Argentina and Brazil. LPG is most widely used in Turkey, South Korea, Poland, Italy and Australia. Globally, CNG is used in only about 1.3 percent of the total vehicle fleet, while LPG is used in about 3 percent.

CNG- and LPG-fueled vehicles emit less greenhouse gases than comparable gasoline-powered vehicles. Vehicles running on CNG typically emit about 25 percent less CO<sub>2</sub> and about 10 percent fewer total GHGs on a well-to-wheels basis. Vehicles running on LPG typically emit 15 to 25 percent fewer total life cycle GHG emissions. CNG and LPG also reduce non-CO<sub>2</sub> tailpipe emissions such as NO<sub>x</sub>, SO<sub>x</sub>, particulate matter and carbon monoxide.

CNG and LPG also have significantly lower fuel costs. CNG costs approximately 40 to 70 percent less than gasoline on a gasoline-gallon equivalent basis depending on location. LPG costs approximately 50 percent less per gallon compared to gasoline. While CNG provides better GHG and fuel costs reductions, LPG can have other benefits. For example, LPG refueling systems typically cost significantly less to install. LPG fuel tanks are also smaller than CNG, resulting in less loss of cargo and/or passenger capacity.

There are some significant challenges to wider adoption of CNG and LPG as vehicle fuels. Though both fuels are widely available in most countries, there is not an established refueling infrastructure for vehicles in most countries. In addition, to provide adequate driving range, both gases must be stored under pressure in the vehicle, requiring larger and heavier tanks that reduce vehicles' passenger and cargo capacity.

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## Driver

The “driver” portion of the GHG emissions equation holds the potential for substantial emission reductions at minimal cost, but it is often overlooked. Ultimately, drivers decide which vehicles and fuels they will purchase and how those vehicles will be driven. While our major focus is on the vehicles we make, we have also reached out to drivers around the world to promote the practice of “eco-driving.” We do this by providing training, information and vehicle technology that helps drivers learn how to drive using the least fuel possible. We are also facilitating the development of apps and other tools to help drivers track and improve their fuel efficiency. For example, in 2013 we held a Personalized Fuel-Efficiency App Challenge, which resulted in creation of a range of apps to help customers optimize their personal fuel economy performance on the road and share that information with others.

### Helping Drivers Improve Fuel Efficiency with Information Technology

Ford's in-vehicle technology system – MyFord Touch® – offers an array of real-time information on fuel-economy performance that can coach drivers to get more miles to the gallon and save on fuel costs. In addition, MyFord Touch's map-based navigation system offers an Eco-Route option that quickly calculates the most fuel-efficient route a driver can take to get from A to B. Ford testing shows that Eco-Route can help achieve fuel economy gains of up to 15 percent. This technology will be available across our full range of vehicles, from affordable small cars to high-end luxury vehicles. It is currently available on the Ford Escape, Explorer, Focus, Fusion, C MAX, Taurus, Edge, Flex, F-150 and Super Duty®. By 2015, approximately 80 percent of Ford's North American models will offer MyFord Touch, with similar percentages predicted for the world market. SYNC was launched in Europe in 2012. It was initially available on the Ford B MAX and is available in now in Fiesta, B MAX, EcoSport, C MAX, Kuga, Transit and Tourneo Custom, Transit and Tourneo Connect, and Transit and Tourneo Courier. SYNC2 will be launched with the new Focus in 2014 and will also be available in the all new Mondeo from late 2014. SmartGauge® with EcoGuide is a dashboard display in the Ford Fusion, C MAX and Lincoln MKZ Hybrids, the Fusion and C MAX Energi plug-in hybrids, and the Focus Electric that gives drivers information to help them maximize fuel efficiency. The system provides information on current fuel economy, fuel economy history, odometer reading, engine coolant temperature, fuel level, battery charge status, electric vehicle mode, tachometer, engine output power, battery output power, power to wheels, engine pull-up threshold and accessory power consumption. Drivers can use the system to track their long-term fuel economy progress and illustrate it either with a traditional chart or using an innovative display of “growing leaves and vines.” The more efficient a customer is, the more lush the leaves and vines, creating a visual reward for the driver's efforts. In addition, the real-time system feedback allows drivers to assess and modify their driving habits to achieve maximum fuel economy.

In Europe, we offer the EcoMode system to help drivers maximize their fuel economy. This system monitors the key parameters for optimal fuel consumption that drivers can affect by changing their driving behavior, including gear shifting, anticipation (i.e., driving as consistently and smoothly as possible) and motorway driving (i.e., driving with the most efficient speed on highways and country roads). In addition, the system considers the percentage of cold-engine short trips. Through this monitoring process, Ford EcoMode generates a driver profile with a scoring system for these driving parameters and offers information on how to improve fuel economy over time. This process can be translated into driver advice that can help make the best use of the vehicle's technology. The system is now available in Europe on the Fiesta, B MAX, Focus, C MAX, Kuga, Mondeo, S MAX and Galaxy, as well as the all new Transit/Tourneo Customer and Connect.

### Eco-Driving Information and Training

Ford has demonstrated that drivers who practice “eco-driving” can improve their fuel economy by an average of 24 percent. Eco-driving tips are available to the public on

Ford's website, and online training is available through the Ford Driving Skills for Life (DSFL) program. In addition, a Web-based eco-driving program has been available to all U.S. salaried Ford employees since 2006.

Ford began work on the eco-driving concept in 2000, when we first offered an eco-driving program through our German dealerships, in partnership with the German Federation of Driving Instructor Association and the German Road Safety Council. That program, which continues today, trains drivers in smarter and greener driving skills and vehicle maintenance habits. It uses specially trained and certified instructors to run programs for several target groups, including fleet drivers and customers. By the end of 2013 more than 17,000 German drivers had been "eco-trained" through this program.

In 2013, Ford continued to support the ECOWILL project, which stands for Eco-Widespread Implementation for Learner Drivers and Licensed Drivers. Ford has been the only automotive industry member active in this project since it began in 2010. This project, which concluded as scheduled in April 2013, was based on the premise that "eco-driving" can reduce CO<sub>2</sub> from motoring and improve road safety without making it less "fun to drive." ECOWILL succeeded in meeting two primary goals:

- A mass roll-out of high-quality/standardized short duration eco-driving trainings. Ford operates one-hour courses with professional driving instructors as part of this goal, and
- Promoting the education and testing of eco-driving for learner drivers in regular driving school under the leadership of EFA, the European driving school association.

Thanks to this project, approximately 32,000 new drivers were "eco-trained," and more than 10,000 already-licensed drivers received this training. The project resulted in many benefits that will continue on after its formal conclusion. For example, the "eco-driving" training developed through this program was added to driver training programs required in all European countries. ECOWILL also influenced the creation of many national eco-driving and road safety initiatives and resulted in a successful eco-driving "coaching" methodology that can be used in other programs.

From 2010 to 2013 Ford also contributed to a European research project called "eCoMove." Through this project, Ford and 32 partner organizations developed and tested vehicle-to-driver communications technologies focused on reducing CO<sub>2</sub> emissions from road transport by reducing inefficiencies in driver behavior. In field tests, the new technologies resulted in a 15 percent improvement in fuel economy and CO<sub>2</sub> emissions. As part of this project, Ford tested an accelerator pedal that provides tactile feedback to the driver and an associated dashboard display that coach drivers on more fuel efficient driving behavior. The system provides drivers with information about approaching road conditions that can help drivers make more efficient driving choices, such as slowing down earlier and more slowly. The system also helps drivers time their speed to reach traffic lights when they will be green to avoid unnecessary stopping and accelerating. This new driver assistance system leverages existing Ford technologies including traffic sign recognition, advanced map information, car-to-car and car-to-infrastructure communications to help drivers prepare for or avoid road congestion and changes in topography.

In Asia Pacific Africa, we launched the [Ford DSFL driver training program](#) in 2008. In this region the program places equal emphasis on safe driving and eco-driving, as customers are interested in both. In 2013, Ford DSFL in Asia trained licensed drivers in mainland China, India, Indonesia, Taiwan, Thailand, Vietnam, the Philippines and South Africa. Approximately 14,000 drivers were trained through this program in 2013. More than 77,000 people have been trained since the program began in Asia six years ago.



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## Non-CO<sub>2</sub> Tailpipe Emissions

Smog-forming vehicle emissions result from the incomplete combustion of fuels, impurities in fuels and the high-temperature oxidation of atmospheric nitrogen during the fuel-combustion process. Regulated smog-forming tailpipe emissions include hydrocarbons, nitrogen oxides (NOx), carbon monoxide and particulate matter.

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### U.S.

In the U.S., smog-forming emissions are regulated by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act as well as by the California Air Resources Board (CARB).

As of 2010, all of Ford's U.S. vehicles have been certified to the EPA's Tier 2 regulations, a comprehensive and challenging set of vehicle emissions requirements.

The Tier 2 program, which began with the 2004 model year, coordinates the introduction of cleaner fuels with more stringent vehicle-tailpipe emissions standards to achieve near-zero non-carbon-dioxide (CO<sub>2</sub>) tailpipe emissions from cars and light trucks. These regulations significantly reduce targeted vehicle emissions, including nitrogen oxides and non-methane organic gases, to help reduce the formation of ozone and particulate matter. The Tier 2 regulations apply to all passenger cars, light trucks and medium-duty passenger vehicles. Ford completed implementing Tier 2 emissions requirements on all relevant vehicles in the 2009 model year.

The Tier 2 program has been highly successful at reducing smog-forming emissions from vehicles and improving urban air quality. The EPA estimates that this program has resulted in reductions in oxides of nitrogen emissions (from all relevant mobile sources) of at least 1.2 million tons as of 2010. Our own studies suggest that the emission reduction benefits of modern vehicles that meet Tier 2 standards will continue to increase as older vehicles that were produced before the Tier 2 standards are replaced by modern vehicles.<sup>1</sup>

In 2014, the EPA adopted new Tier 3 standards, which are more stringent motor-vehicle emissions standards for future model years. As part of these new standards, the EPA is also requiring reduction of the sulfur levels in gasoline, which will improve the performance of existing catalyst technology in gasoline vehicles and result in reduction of nitrogen oxides, carbon monoxide and volatile organic-compounds emissions from vehicles. The EPA also has stringent emissions standards and requirements for EPA-defined "heavy-duty" vehicles and engines (generally, those vehicles with a gross vehicle weight rating of between 8,500 pounds and 14,000 pounds). These regulations are relevant to Ford's Super Duty® trucks and some commercial vans. In order to meet the standards for heavy-duty diesel trucks, Ford and most other manufacturers use selective catalytic reduction (SCR) systems, which require periodic customer maintenance. The EPA has issued guidance calling for stringent warning systems and driver inducements to alert motorists to the need for the maintenance of SCR systems.

For the California market, Ford is required to meet the state's stringent Low Emission Vehicle II (LEV-II) emissions requirements for light-duty vehicles. Under the LEV-II program, manufacturers are effectively required to produce a number of Partial Zero Emission Vehicles (PZEV). A PZEV is a vehicle certified to near-zero emissions standards. Strictly speaking, PZEVs are required to:

- meet California's Super Ultra Low Emission Vehicle (SULEV) exhaust emissions standard;

- produce zero fuel-system evaporative emissions; and
- be emissions-compliant for a full useful life of 150,000 miles.

For the 2013 and 2014 model year, Ford offered the Focus Electric ZEV, Focus and Fusion PZEV, as well as plug-in hybrid Enhanced Advanced Technology (AT) PZEV versions of the Ford Fusion and C-MAX. In 2012, CARB finalized revisions to its LEV and ZEV regulations. The new LEV-III Program begins to take effect with the 2015 model year and includes more stringent tailpipe and evaporative emissions standards for light- and medium-duty vehicles, extended durability requirements and changes to the certification test procedures, which will require manufacturers to certify vehicles on fuel containing 10 percent ethanol. The amended ZEV regulations mandate substantial annual increases in the production and sale of battery-electric, fuel-cell and plug-in hybrid vehicles for the 2018–2025 model years. By the 2025 model year, approximately 15 percent of a manufacturer's total California sales volume will need to be made up of such vehicles. The LEV-III regulations will also require automobile manufacturers to design and develop new emissions after-treatment systems. Compliance with the 2018–2025 ZEV mandate involves intensive planning efforts and large capital investments in order to deliver the required number of advanced-technology vehicles. We are concerned that the market and infrastructure in California might not support the large volumes of advanced-technology vehicles that manufacturers will be required to produce, particularly in the 2018–2025 model years. We also are concerned about potential enforcement of the ZEV mandate in other states that have adopted California's ZEV program, where the existence of a market for such vehicles is even less certain. We are working with both the EPA and CARB through their regulatory processes to help develop rules that are both effective and feasible. In setting tailpipe emissions regulations, other rules that apply to vehicles – such as fuel economy/greenhouse gas standards and safety standards – must be taken into account to ensure that the total package of requirements is workable.

Ford continues to oppose technology mandates that seek to impose quotas or limits on the production or sale of vehicles with specified powertrain technologies. Regulatory efforts to dictate market outcomes, or to pick technology "winners" and "losers," are typically unsuccessful and characterized by unintended, unwanted consequences. Manufacturers need the flexibility to build the kinds of vehicles that the marketplace demands based on consumer preferences and other external factors. Emissions standards should be performance based and should be designed to enable manufacturers to introduce vehicles with an array of different technologies.

Information about the emissions performance of all Ford vehicles sold in the U.S. can be found at the [EPA's Green Vehicles site](#).

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## Europe

Since 1990, we have decreased the non-CO<sub>2</sub> tailpipe emissions from our vehicles sold in Europe by up to 90 percent through the development of a new generation of downsized, high-efficiency gasoline- and diesel-powered vehicles with improved engine technologies and high-tech exhaust gas treatment devices. As part of these emissions-reduction efforts, all of our diesel engines are now fitted with a maintenance-free diesel particulate filter system that requires no additives for filter regeneration.

Further air-quality improvements have been generated as we have introduced vehicles equipped with technology to meet the more stringent Euro 5 emissions standards. We currently offer three variants of our GTDi EcoBoost® engine in Europe: the 1.6 liter, 2.0 liter and the 3-cylinder 1.0 liter. These are among the most technologically advanced engines in production, combining high-pressure direct injection, a low-inertia turbo and twin independent variable cam timing. They join our lineup of high-efficiency common rail diesel engines all complying with Euro 5 emissions levels. In 2012, Ford also launched a new version of the 1.6-liter Ford Duratorq® TDCi engine, featuring the first lean NOx-absorbing technology in a Ford diesel, as well as a completely redesigned common rail injection system to deliver more precise control and increased combustion efficiency. All of our new passenger cars registered as of January 1, 2011, and all light-duty vehicles registered as of January 1, 2012, comply with the Euro 5 standard.

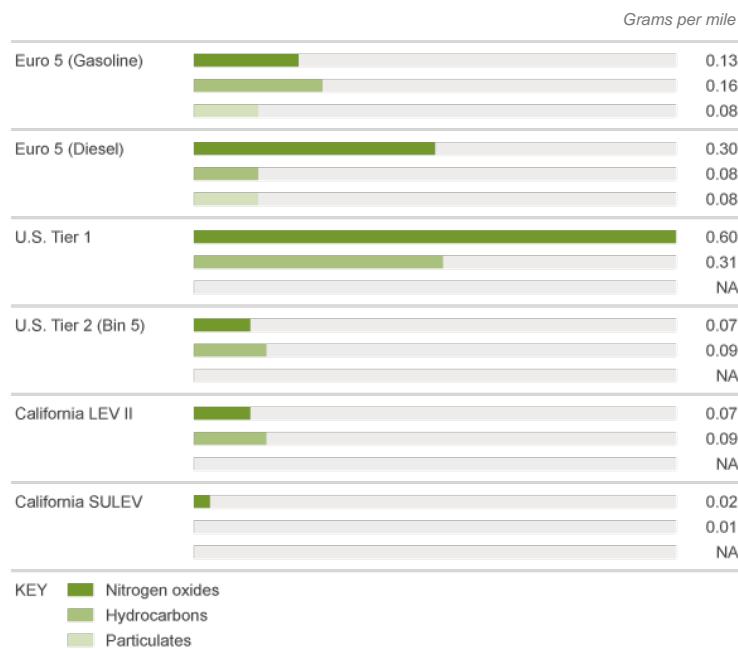
Euro 6 standards have been developed. The initial phase of Euro 6 will be applied beginning in September 2014. The second phase of Euro 6 standards, which will be even more stringent, will be applied beginning in 2017. New test procedures based on consumer driving patterns are also under development by the European Commission and are intended to be finalized during 2013 for use during the implementation of the Euro 6 standards. These new emissions-testing requirements are focused primarily on delivering reduced tailpipe NOx emissions. The European Commission is also developing rules for increasing the severity of the low-temperature testing and evaporative emissions requirements again. The new rules should be finalized during 2013. We are actively engaged with the European Commission and the European member states in developing better regulation.

Even with the significant emissions improvements in modern vehicles, some smog-

forming emissions levels remain higher than desired. For example, roadside emissions of NO<sub>2</sub> in some locations exceed the stringent European NO<sub>2</sub> air quality limits. Ford is working with the European Commission and other stakeholders to define a new emissions test procedure that better measures on-road vehicle emissions for the second stage of Euro 6 regulations. Our own air quality simulations predict a significant improvement in roadside air quality as the existing vehicle fleet is replaced with newer, cleaner vehicles and as emissions regulations become increasingly stringent.

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## Emissions Regulations in the U.S. and Europe



	Nitrogen oxides	Hydrocarbons	Particulates
Euro 5 (Gasoline)	0.13	0.16	0.08
Euro 5 (Diesel)	0.30	0.08	0.08
U.S. Tier 1	0.60	0.31	NA
U.S. Tier 2 (Bin 5)	0.07	0.09	NA
California LEV II	0.07	0.09	NA
California SULEV	0.02	0.01	NA

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## Asia Pacific Africa

Since 2010, our new gasoline-fueled passenger vehicles have been designed to comply with China IV requirements (based on Euro 4 standards). China began implementing more recent European standards (Euro 5) in Beijing in 2013. Korea and Taiwan have adopted very stringent U.S.-based standards for gasoline vehicles and European-based standards for diesel vehicles. Japan, which has unique standards and test procedures, began implementing more stringent standards in 2009. Ford is working to comply with all of these standards using a variety of approaches, including on-board diagnostics and after-treatment technologies.

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## South America

New passenger and commercial vehicles in South America must comply with varying levels of U.S.- or European-based emissions regulations. Recently, Brazil, Argentina and Chile have introduced more stringent emissions standards. Brazil approved European Stage 5 (Euro 5) emissions and on-board diagnostic standards for heavy trucks starting in 2012; more stringent light-vehicle limits also came into effect starting in 2012. Argentina also will apply Euro 5 standards beginning in 2015 (for new vehicle homologations) and 2017 (for new vehicle registrations). Chile approved a plan to introduce more stringent emissions standards (i.e., Euro 4 and 5 or corresponding U.S. emissions standards) nationwide for light- and medium-duty vehicles, and progressive alignment with the Metropolitan Region (i.e., the capital city Santiago and surrounding area) by September 2014. Heavy-duty vehicles will be

required to meet Euro 5 (or corresponding U.S. emissions standards) by October 2014. As a consequence, the following non-CO<sub>2</sub> emissions-control technologies have been or will be introduced on our vehicles sold in South America: on-board diagnostic systems in Brazil and Argentina (which are being studied for use in Chile); particulate filter technology for some diesel products; and selective catalytic-reduction systems for heavy diesels in all three countries.

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## Sustainable Materials

Materials are an important element of a vehicle's sustainability at all stages of its life cycle. Material selection can influence the safety, fuel economy and performance of the vehicle, as well as opportunities to recycle or reuse the vehicle's components at the end of its life. The materials used in a vehicle can also have implications throughout our value chain. A material can be more or less sustainable based on a number of factors, including its origin (virgin, renewable or recycled), the resources and manufacturing methods used to process it, the emissions produced throughout its life cycle and its application.

Ford has been working for many years to increase the use of recycled and renewable materials and to reduce the use of undesirable materials. Vehicles in North America typically are composed of 20 percent to 25 percent post-consumer recycled material by weight, primarily due to the extensive use of metals with recycled content (see [What is in a Vehicle?](#) for detail). Therefore, we have concentrated our efforts on developing new uses for recycled materials in the nonmetallic portions of our vehicles, which are typically composed of virgin materials. While the amount of recycled content in each vehicle varies, we are continually increasing the amount of recycled material used in each vehicle line and have implemented a number of innovative uses of sustainable materials (see [Choosing More Sustainable Materials](#)). We use tools such as [life cycle assessment and life cycle costing](#) to help us make beneficial materials choices.

Since the early 1990s, Ford has had a Voluntary Recycled Content Usage Policy in North America, which sets targets for the use of nonmetallic recycled content in each vehicle and increases those targets year by year and model by model. Under this program, recycled materials are selected for all of our vehicles whenever technically and economically feasible. We are now developing sustainable materials requirements for new vehicle programs and significantly refreshed vehicle lines to increase the recycled and renewable content, and we are developing specific, numerical, model-over-model improvement targets. We pilot tested vehicle-level recycled content targets with the 2014 F-150. We plan to leverage learnings from that pilot to improve future target-setting processes and expand them across additional vehicle lines in the future.

We are also continuing to introduce successful applications of recycled and renewable content into more vehicles for increased environmental benefit. We are focusing on materials technologies that improve environmental and social performance, and reduce costs and weight. To facilitate this, we are working with our commodity business planners, materials purchasers and materials engineers to develop a comprehensive list of cost-effective sustainable materials that can be implemented across multiple parts and vehicle lines. All recycled and renewable materials on this list are compared with virgin grades to ensure appropriate physical properties and component performance. By combining goals for updated or redesigned vehicles with identification and testing processes, we are standardizing and expanding the use of sustainable materials in our vehicles.

As we introduce sustainable materials, we do not assume that recycled materials are always the best solution. For example, we take into consideration whether recycled materials may increase vehicle weight or have significant energy demand in collection or recycling. We also have to balance our global materials strategy, which has dramatically reduced the number of materials we specify and use in order to maintain consistent quality and enable cost reductions, with the challenges of finding globally common recycled materials and recycled material feedstock. In some cases, the introduction of recycled and renewable materials runs counter to that commonization progress, since the feedstock for these materials can vary by region. For example, it is often more efficient to use materials made from local sources that divert waste from local landfills than to ship recycled-material inputs across the globe. We are working to ensure that we use local materials as a feedstock for our recycled-content materials.

We are developing and implementing an integrated sustainable materials strategy that builds on our voluntary recycling standards and our work to develop and implement more recycled and renewable materials. This strategy includes:

**■ Developing guiding principles for incorporating recycled and renewable materials in our vehicles:** We have formed a cross-functional and globally integrated sustainable materials council to guide the sustainable materials strategy for the company. This informal team has developed a set of guiding principles to help us think through choices of materials. These principles, listed below, reflect our collective thinking on the most effective ways to increase the use of recycled and renewable materials in our vehicles:

- Recycled and renewable materials will be selected whenever technically and economically feasible.
- Recycled and renewable content will be increased year over year and model by model. Product quality, durability, weight, performance (material specification and/or part design verification) and economics will not be adversely impacted by the use of recycled and renewable content materials.
- Tools and enablers will be provided to select, specify, track and validate the use of recycled and renewable materials.
- Recycled and renewable materials will be used where there is evidence of reduced or improved life cycle impact.
- Recycled materials will be used primarily in the market of origin, to minimize the carbon footprint.
- Renewable content sourcing shall not compete with the food supply. Sustainable supply must be ensured (in terms of stable supply and sustainable growth).

**■ Integrating recycled and renewable materials into the official strategies that govern materials and commodities purchasing:** We are developing global materials specifications that include recycled material specifications to facilitate greater use of these materials. Many commodity-purchasing plans already list recycled-content materials as a preferred material option, including those for battery trays, battery shields and wheel-arch liners. In addition, we developed a comprehensive resin strategy that requires the use of recycled plastics for underbody and aerodynamic shields, fender liners, splash shields, stone-pecking cuffs and radiator air-deflector shields manufactured in North America.

In other cases, we are adding recycled-content materials into our material-specification documents where we have found the recycled materials meet our rigorous performance requirements. This makes it easier for component engineers and Tier 1 suppliers to choose sustainable materials by providing a direct comparison of their performance characteristics with an equivalent virgin material.

We have also developed a material specification that defines *post-consumer*, *post-industrial* and *depolymerized recycled content* and ensures that the use of in-house scrap is not counted toward recycling targets. We are also working on specifications for renewable materials to make it easier for product engineers to incorporate renewable materials where we have found that they meet our performance standards.



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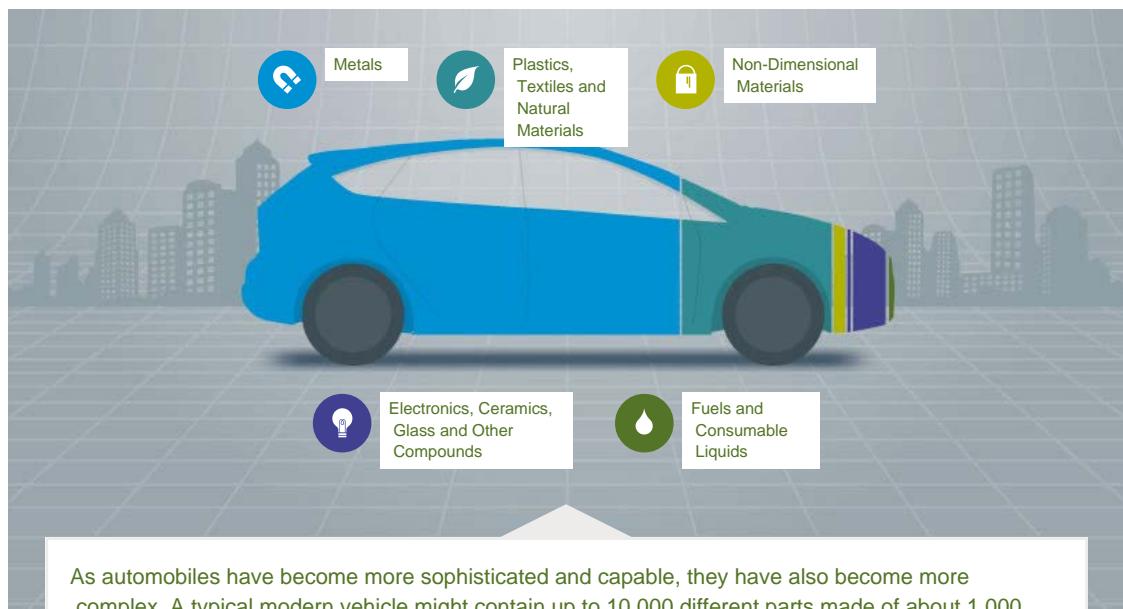
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Case Study: Ford Fleet Purchase Planner

Voice: John Fleming

## What is in a Vehicle?



As automobiles have become more sophisticated and capable, they have also become more complex. A typical modern vehicle might contain up to 10,000 different parts made of about 1,000 different types of materials, that in turn are made from about 10,000 different chemical substances. To understand our approach to sustainable materials, it is useful to understand the kinds and amounts of materials that are in our vehicles. The graphic above shows the primary materials categories used in our vehicles. Click on each material category to read more about those materials, the approximate amounts used in our vehicles, and our sustainable-material strategy.

### Metals

Most vehicles are made of at least 75 percent metals by weight. While the metals in today's vehicles are primarily steel and iron, we are working to increase the use of lightweight metals such as aluminum, magnesium and titanium. By replacing iron and steel with these metals, we can reduce the total weight of the vehicle and therefore help improve vehicle fuel economy. However, we use life cycle analysis tools to ensure that when we use lighter materials, like aluminum, we end up with net life cycle energy and CO<sub>2</sub> benefits. (For more information, see the [Lightweight Materials](#) section.) Because all metals are routinely recycled at the end of a vehicle's useful life, we focus most of our sustainable materials efforts on nonmetallic parts.



Ford Ranger

79% metals



Ford Fiesta

76% metals



Ford Fusion

76% metals



Ford Edge

76% metals



### Plastics, Textiles and Natural Materials

These materials are the primary focus of our sustainable materials efforts. Though they make up a much smaller percentage by weight of the average vehicle than metals, they are the second-largest



Ford Ranger

17% plastics, textiles and natural materials



Ford Fiesta

19% plastics, textiles and natural materials

Ford Fusion

category in most vehicles. Increasing the amount of recycled content in these materials diverts waste from landfills. Increasing the amount of renewable content in these materials can reduce our dependence on finite resources and reduce life cycle greenhouse gas emissions. We are using a wide range of recycled-content plastics and renewable, plant-based materials in our vehicles. (For more information, see [Choosing More Sustainable Materials](#).)



**18.5%** plastics, textiles and natural materials



**Ford Edge**  
**18%** plastics, textiles and natural materials



## Non-Dimensional Materials

These are materials such as paint, adhesives and sealants that have no shape or “dimension” before they are incorporated into a vehicle. Many non-dimensional materials have been a traditional source of volatile organic compound (VOC) emissions during the vehicle manufacturing process. We are taking steps to replace VOC-emitting materials with alternatives or change our processes to reduce or recapture VOC emissions. (For more information, see [Non-CO<sub>2</sub> Facilities-Related Emissions](#).)



**Ford Ranger**  
**1%** non-dimensional materials



**Ford Fiesta**  
**1%** non-dimensional materials



**Ford Fusion**  
**1.3%** non-dimensional materials



**Ford Edge**  
**1%** non-dimensional materials



## Electronics, Ceramics, Glass and Other Compounds

Ford has been working with our suppliers, dealers, dismantlers and industry associations (such as the United States Council for Automotive Research (USCAR) Vehicle Recycling Partnership) to develop, share and implement best practices to deal with these categories of materials, which are a small percentage of any given vehicle by weight but are hard to recycle at the end of the vehicle's life. Dealers and dismantlers are encouraged to reuse or recycle these materials whenever it is technically and economically feasible, to help divert them from landfills. Ford seeks to keep these materials to less than 5 percent of our vehicles, to maintain an overall vehicle recoverability rate of 95 percent.



**Ford Ranger**  
**0.2%** electronics  
**2.3%** ceramics, glass and other compounds



**Ford Fiesta**  
**0.5%** electronics  
**3%** ceramics, glass and other compounds



**Ford Fusion**  
**0.2%** electronics  
**3.5%** ceramics, glass and other compounds



**Ford Edge**  
**0.2%** electronics  
**4%** ceramics, glass and other compounds



## Fuels and Consumable Liquids

These materials include the gasoline in the tank, engine oil, lubricants and other liquids. They are generally removed at dismantlers and recycled/reused where possible.



**Ford Ranger**  
**0.5%** fuels and consumable liquids



**Ford Fiesta**  
**0.5%** fuels and consumable liquids



**Ford Fusion**  
**0.5%** fuels and consumable liquids



**Ford Edge**  
**0.8%** fuels and consumable liquids



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## Choosing More Sustainable Materials

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### Carpet

Recycled-content carpets are used in many vehicles, including the U.S. and European Ford Focus, the 2012 North American Fiesta and the 2013 Escape and Explorer.



### Replacement bumpers

Many European vehicles use recycled plastic replacement bumpers when original bumpers are damaged.



### Seat fabrics

Seat fabrics in versions of the Ford Fiesta, Taurus, Mustang, Focus, F-150, Super Duty®, Fusion, Flex, Escape and Explorer contain 25 percent to 100 percent recycled content.

### Seat foam

Since 2011, all vehicles manufactured in North America have used seat foam made with soy oil, which reduces carbon dioxide (CO<sub>2</sub>) emissions and decreases dependence on petroleum oil.



## Body

### High-Strength Steels

Many vehicles – including the all-new Ford Fusion, the Explorer and the European Fiesta – use high-strength steels, which weigh less than traditional steels but have the same or better performance.

### Aluminum and Magnesium

Many vehicles use aluminum and magnesium parts, which are lighter in weight than traditional steel, resulting in better overall vehicle fuel economy.

In 2014 we will introduce an all-new F-150, which makes extensive use of high-strength steels and aluminum. For more information on this vehicle, please see [our F-150 case study](#).



## Headliner fabric

In North America, the 2012 Ford Fiesta, 2013 Econoline and 2013 Super Duty use 50 percent to 75 percent recycled content in the headliner fabric.



## Underhood parts

Recycled plastics and nylon are used in non-surface parts on many vehicles; these parts may include fan shrouds, battery trays, heater/air-conditioning housing, wheel-arch liners, engine fans and covers, and underbody systems.



## Sound-absorption materials

Recycled denim scrap from apparel production is used in sound-absorption materials on many vehicles, including the 2012 Ford Focus.



## Storage

Injection-molded plastics reinforced with renewable wheat straw were implemented in the third-row storage bins on the Ford Flex. Wheat straw is a byproduct of growing wheat, and is commonly burned. Using this material as a reinforcement in plastics has environmental benefits.



## Plastics

Ford vehicles use a range of innovative, natural-fiber-reinforced plastics. For example, in Europe, the Ford Mondeo uses plastics made with 50 percent kenaf and 50 percent polypropylene. In North America, a kenaf-reinforced armrest is used on the 2012 Ford Escape and a coconut-fiber trunk liner is used on the 2012 Focus Electric.

We are working to improve the sustainability of our vehicles by using materials that are more sustainable from a total life cycle perspective. This includes increasing the use of recycled, renewable, recyclable and lightweight materials. Recycled materials incorporate post-consumer and/or post-industrial waste materials; renewable materials are made from

plant-based materials; and lightweight materials use special materials and/or designs that provide the same or better performance as other alternatives with less weight.

## Recycled Materials

Recycled materials do not mean low-quality materials. Our researchers work to ensure that post-industrial and post-consumer recycled-plastic materials have the same level of quality and same material specifications as the virgin material parts. In some cases, we are working to recycle the materials from our auto parts right back into the same use. For example, we are developing methods for recycling and cleaning post-industrial recycled fascia and bumper scrap so that it can be molded into new fascias and bumpers. We are even working to "upcycle" certain materials – that is, recycle it into uses with higher material and performance requirements than the virgin material. For example, we are working on upcycling post-consumer laundry detergent containers and milk bottles into blow-molded automotive components. In addition, we are developing a method to recycle polyurethane foam scrap to make new polyurethane foam components instead of landfilling it at the end of its life. In Europe, we will soon launch vehicles that use upcycled post-consumer drinking bottles for energy-absorbing materials.

This section describes our efforts to include recycled content in our vehicles, and to recycle parts removed from our vehicles during vehicle servicing.

### Using Recycled Materials in "Nonvisible" Parts

Our efforts to increase recycled materials focus on nonmetallic parts, which historically have had little or no recycled content. We recently updated our global sustainable materials strategy, which stipulates that a wide range of parts on vehicles be made out of plastics from post-consumer recycled waste, such as beverage bottles, tires and automotive battery casings. The vehicle parts containing recycled content include underbody and aerodynamic shields, fender liners, splash shields, stone-pecking cuffs, battery-housing covers and base plates, wheel-arch liners, heating and ventilation components, fan shrouds and powertrain undershields, and fabric rear-wheel liners. Our global sustainable materials strategy saves money and reduces landfill waste. We estimate that in North America alone, Ford saves approximately \$10 million per year by using recycled materials.

Most of our recycled-content parts are made of at least half-recycled materials. For example, many underbody and underhood plastic parts are made from 75 percent recycled batteries and 8 percent recycled high-density polyethylene (HDPE) bottles. Most of the underbody molded and/or masticated rubber parts we use in North America are made from blends of recycled polypropylene and car tires, and contain 75 percent to 90 percent post-consumer recycled content. We use more than 50 million pounds of post-consumer recycled materials on the exterior of Ford vehicles made in North America, which translates to more than 17.8 pounds per vehicle on average across our North American fleet.

These parts not only increase our use of recycled materials, they can also have additional benefits. For example, fabric rear-wheel liners, which contain 30 percent to 40 percent recycled content, are 50 percent lighter than plastic wheel liners, and they absorb sound, which potentially reduces the need for sound-deadening insulators, sprays and foams. We continue to expand the use of recycled plastics into additional parts where they meet performance and cost requirements.

We are using post-consumer recycled nylon in many underhood parts, including air-cleaner housings, engine fans, fan shrouds, HVAC temperature valves, engine covers, cam covers and carbon canisters. We are using nylon resin made from recycled carpets for cylinder head covers in the Ford Escape, Fusion, Mustang and F-150.

### Using Recycled Materials in Visible Interior Applications

Across our global operations, we are also using recycled materials for interior parts, where it can be much more challenging to achieve the necessary appearance and performance than using recycled materials for underbody, subsurface and exterior black parts. We are continuing to expand our use of recycled seat fabrics and seat components that meet all appearance and performance requirements.

Since the 2009 model year, the seat fabrics in most of our new or redesigned North American vehicles have been made from at least 25 percent post-industrial or post-consumer recycled content. Thirty-seven different fabrics meeting the requirements have been developed and incorporated into Ford vehicles. In addition, many of our non-woven headliner fabrics now contain 50 percent to 75 percent recycled yarns, depending on the color.

Ford is the first automaker to use REPREVE® – a hybrid fiber made from recycled plastic water bottles and post-industrial waste – for seating fabric. This fiber, which was introduced on the 2012 Ford Focus, is being used on the 2013 and 2014 Ford Focus, 2013 and 2014 Ford Fusion, the 2014 Ford Edge, and the 2015 Ford Mustang and Ford F-150. Approximately 22 plastic, 16-ounce water bottles are used to make the seat fabric in a Focus; approximately 39 such bottles are used for seats

in the Fusion S and SE; and between 63 and 110 such bottles are used for the F-150, depending on the model. The following table highlights some of the recycled-content interior materials in our recent vehicles:

Vehicle	Material	Partner	Benefits
<b>2015 Mustang Base Series</b>	Seat fabric bolster: 54 percent recycled content from post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	<ul style="list-style-type: none"> <li>■ Reduces consumer and industrial waste</li> <li>■ Reduces depletion of natural resources</li> <li>■ Reduces energy consumption</li> <li>■ Uses closed-loop system for recycling manufacturing waste</li> </ul>
	Seat fabric insert: 38 percent recycled content from post-industrial recycled yarns	Sage Automotive Interiors	<ul style="list-style-type: none"> <li>■ Reduces waste</li> <li>■ Reduces depletion of natural resources</li> </ul>
<b>2015 Ford Mustang I4/GT Series</b>	Seat fabric insert & bolster: 54 percent recycled content from post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	<ul style="list-style-type: none"> <li>■ Reduces consumer and industrial waste</li> <li>■ Reduces depletion of natural resources</li> <li>■ Reduces energy consumption</li> <li>■ Uses closed-loop system for recycling manufacturing waste</li> </ul>
<b>2015 Ford F-150 XL Series</b>	Seat fabric insert bolster: 54 percent recycled content from post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	<ul style="list-style-type: none"> <li>■ Reduces consumer and industrial waste</li> <li>■ Reduces depletion of natural resources</li> <li>■ Reduces energy consumption</li> <li>■ Uses closed-loop system for recycling manufacturing waste</li> </ul>
	Seat fabric insert: 25 percent recycled content from post-industrial recycled yarns	Aunde	<ul style="list-style-type: none"> <li>■ Reduces waste</li> <li>■ Reduces depletion of natural resources</li> </ul>
<b>2015 Ford F-150 XLT Series</b>	Seat fabric bolster: 33 percent recycled content from post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	<ul style="list-style-type: none"> <li>■ Reduces consumer and industrial waste</li> <li>■ Reduces depletion of natural resources</li> <li>■ Reduces energy consumption</li> <li>■ Uses closed-loop system for recycling manufacturing waste</li> </ul>
	Seat fabric insert: 66 percent recycled content from post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	<ul style="list-style-type: none"> <li>■ Reduces consumer and industrial waste</li> <li>■ Reduces depletion of natural resources</li> <li>■ Reduces energy consumption</li> <li>■ Uses closed-loop system for recycling manufacturing waste</li> </ul>
<b>2015 Ford F-150 Sport Series</b>	Seat fabric bolster: 33 percent recycled content from post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	<ul style="list-style-type: none"> <li>■ Reduces consumer and industrial waste</li> <li>■ Reduces depletion of natural resources</li> <li>■ Reduces energy consumption</li> <li>■ Uses closed-loop system for recycling manufacturing waste</li> </ul>
	Seat fabric insert: 25 percent recycled content from post-industrial recycled yarns	Aunde	<ul style="list-style-type: none"> <li>■ Reduces waste</li> <li>■ Reduces depletion of natural resources</li> </ul>
<b>2014 Ford Edge SE Series</b>	Seat fabric bolster: 100 percent recycled content from post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	<ul style="list-style-type: none"> <li>■ Reduces consumer and industrial waste</li> <li>■ Reduces depletion of natural resources</li> <li>■ Reduces energy consumption</li> <li>■ Uses closed-loop system for recycling manufacturing waste</li> </ul>
	Seat fabric insert: 38 percent recycled content from post-industrial recycled yarns	Sage Automotive Interiors	<ul style="list-style-type: none"> <li>■ Reduces waste</li> <li>■ Reduces depletion of natural resources</li> </ul>
<b>2014 Ford Edge SEL Series</b>	Seat fabric bolster: 100 percent recycled content from post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	<ul style="list-style-type: none"> <li>■ Reduces consumer and industrial waste</li> <li>■ Reduces depletion of natural resources</li> <li>■ Reduces energy consumption</li> <li>■ Uses closed-loop system for recycling manufacturing waste</li> </ul>
	Seat fabric insert: 25 percent recycled content from post-industrial recycled yarns	Aunde	<ul style="list-style-type: none"> <li>■ Reduces waste</li> <li>■ Reduces depletion of natural resources</li> </ul>
<b>2014 Ford Edge Sport Series</b>	Seat fabric insert: 100 percent recycled content from post-consumer recycled yarns	Miko Fabrics	<ul style="list-style-type: none"> <li>■ Reduces waste</li> <li>■ Reduces energy required for yarn manufacturing by 64 percent and manufacturing-related CO<sub>2</sub> emissions by 60 percent</li> <li>■ Uses only neutral, nontoxic dyes and no harmful solvents in the fabric manufacturing process</li> </ul>
<b>2015 Ford Mondeo</b>	Seat fabric insert: 37 percent from post-industrial	Sage Automotive	<ul style="list-style-type: none"> <li>■ Reduces consumer and industrial waste</li> </ul>

(European version)	yarns Seat fabric bolster: 43 percent recycled content from post-industrial yarns	Interiors, Unifi	<ul style="list-style-type: none"> <li>■ Reduces depletion of natural resources</li> <li>■ Reduces energy consumption</li> <li>■ Uses closed-loop system for recycling manufacturing waste</li> </ul>
<b>2013 Ford C MAX (North America)</b>	Seat fabric (S/SE models): 27 percent post-industrial and post-consumer recycled yarns	JCI/Thierry	<ul style="list-style-type: none"> <li>■ Reduces industrial and consumer waste</li> <li>■ Reduces waste, water and CO<sub>2</sub> emissions</li> </ul>
<b>2013 Ford Escape (North America)</b>	Carpet: 100 percent recycled content from post-consumer and post-industrial recycled yarns  Seat fabric (S/SE models): 27 percent post-industrial and post-consumer recycled yarns	Reiter	<ul style="list-style-type: none"> <li>■ Uses material from approximately 25 20-ounce plastic bottles for each Escape</li> </ul>
<b>2013-14 Ford Fusion S and SE Series</b>	Seat fabric bolster: 100 percent recycled content from post-consumer and post-industrial recycled yarns  Seat fabric insert: 37 percent recycled content from post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	<ul style="list-style-type: none"> <li>■ Reduces consumer and industrial waste</li> <li>■ Reduces depletion of natural resources</li> <li>■ Reduces energy consumption</li> <li>■ Uses closed-loop system for recycling manufacturing waste</li> </ul>
<b>2013-14 Ford Fusion Hybrid and Sport Series</b>	Seat fabric: 100 percent recycled content from post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	<ul style="list-style-type: none"> <li>■ Reduces consumer and industrial waste</li> <li>■ Reduces depletion of natural resources</li> <li>■ Reduces energy consumption</li> <li>■ Uses closed-loop system for recycling manufacturing waste</li> </ul>
<b>2012 Ford Focus Electric</b>	Seat fabric: 100 percent recycled content from post-consumer and post-industrial recycled yarns	Unifi, Sage Automotive Interiors	<ul style="list-style-type: none"> <li>■ Uses material from approximately 22 recycled plastic bottles in each vehicle</li> <li>■ Reduces consumer waste to landfill</li> <li>■ Reduces depletion of natural resources</li> </ul>
<b>2011-12 Ford Fiesta (North America)</b>	Seat fabric: 25 percent post-consumer recycled yarns  Nonwoven headliner: 75 percent post-consumer recycled yarns  Carpet: 100 percent recycled content from post-consumer and post-industrial recycled yarns	Aunde	<ul style="list-style-type: none"> <li>■ Reduces consumer waste</li> <li>■ Reduces depletion of natural resources</li> </ul>
		Freudenberg	<ul style="list-style-type: none"> <li>■ Reduces consumer waste</li> <li>■ Reduces depletion of natural resources</li> </ul>
		Peltzer	<ul style="list-style-type: none"> <li>■ Reduces waste, energy consumption and depletion of natural resources</li> </ul>
<b>2011-13 Ford Explorer XL and XLT</b>	Seat fabric insert: 25 percent to 30 percent post-industrial recycled yarns  Seat fabric bolster: 30 percent post-industrial recycled yarns  Carpet backing (base series): carpet insulation 40 percent post-industrial recycled yarns  Carpet backing (limited series): carpet insulation 25 percent to 28 percent post-industrial recycled yarns	Aunde, Guilford	<ul style="list-style-type: none"> <li>■ Reduces waste, water and energy consumption and depletion of natural resources</li> </ul>
		IAC	<ul style="list-style-type: none"> <li>■ Reduces energy consumption by at least 20 percent</li> <li>■ Reduces waste by at least 17 percent</li> <li>■ Reduces CO<sub>2</sub> emissions by at least 14 percent</li> <li>■ Reduces water use by at least 9 percent</li> </ul>
<b>2011-13 Ford Econoline</b>	Headliner fabric: 50 percent to 75 percent post-consumer recycled content	Freudenberg	<ul style="list-style-type: none"> <li>■ Reduces consumer waste</li> <li>■ Reduces depletion of natural resources</li> </ul>
<b>2011-13 Ford Super Duty</b>	Headliner fabric: 50 percent to 75 percent post-consumer recycled content	Freudenberg	<ul style="list-style-type: none"> <li>■ Reduces consumer waste</li> <li>■ Reduces depletion of natural resources</li> </ul>
	Seat fabric insert: 25 percent post-industrial recycled yarns  Seat fabric bolster: 30 percent post-industrial recycled yarns	Sage Automotive Interiors, Guilford, Aunde	<ul style="list-style-type: none"> <li>■ Reduces waste</li> <li>■ Reduces depletion of natural resources</li> </ul>
<b>2010-13 Ford Taurus SHO</b>	Seat fabric insert: 100 percent post-consumer recycled yarns	Miko Fabrics	<ul style="list-style-type: none"> <li>■ Reduces waste</li> <li>■ Reduces energy required for yarn manufacturing by 64 percent and manufacturing-related CO<sub>2</sub> emissions by 60 percent</li> <li>■ Uses only neutral, nontoxic dyes and no harmful solvents in the fabric manufacturing process</li> </ul>
<b>2010-13 Ford Taurus SEL</b>	Seat fabric insert: 25 percent post-industrial recycled yarns  Seat bolster fabric: 30 percent post-industrial recycled yarns	Aunde	<ul style="list-style-type: none"> <li>■ Reduces waste</li> <li>■ Reduces depletion of natural resources</li> </ul>
<b>2010-2014 Mustang Base Series</b>	Seat fabric insert: 18 percent post-industrial recycled yarns  Seat bolster fabric: 30 percent post-industrial	Sage Automotive Interiors, Guilford	<ul style="list-style-type: none"> <li>■ Reduces waste</li> <li>■ Reduces depletion of natural resources</li> </ul>

recycled yarns				
<b>2010-13 Ford F-150 XL, XLT &amp; FX4</b>	Seat fabrics: 25 percent post-industrial recycled yarns  FX4 model seat fabrics are 18 percent post-industrial yarns	Sage Automotive Interiors, Guilford, Aunde	▪ Reduces waste ▪ Reduces depletion of natural resources	
<b>2013 Ford Flex SE and SEL Series</b>	Seat fabric insert: 35 percent post-industrial recycled yarns	Sage Automotive Interiors, Aunde	▪ Reduces industrial waste ▪ Reduces depletion of natural resources ▪ Reduces energy consumption	
<b>2013 Ford Fusion S and SE Series</b>	Seat fabric bolster: 100 percent post-consumer and post-industrial recycled yarns  Seat fabric insert: 37 percent post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	▪ Reduces consumer and industrial waste ▪ Reduces depletion of natural resources ▪ Reduces energy consumption ▪ Uses closed-loop system for recycling manufacturing waste	
<b>2013 Ford Fusion Hybrid and Sport Series</b>	Seat fabric: 100 percent post-consumer and post-industrial recycled yarns	Sage Automotive Interiors, Unifi	▪ Reduces consumer and industrial waste ▪ Reduces depletion of natural resources ▪ Reduces energy consumption ▪ Uses closed-loop system for recycling manufacturing waste	

### Recycling Parts Removed During Vehicle Servicing

In Europe, we are recycling damaged parts collected by dealers. In the U.K., we are recycling bumpers that have been damaged in accidents or replaced in service. Ford dealers collect the bumpers, which are recycled into new bumpers and other plastic parts. Previously, dealers had to pay to dispose of these bumpers as waste. In the U.S., 2013 marked the 10-year anniversary of our Core Recovery Program, through which we have been reusing and recycling parts removed at dealership service centers for use in the production of new Ford vehicles. We have continually expanded the number of parts that we reuse or recycle through this program. The program works similarly to bottle-recycling programs available in many U.S. states. Ford dealership service centers are charged a fee when they order a new part from Ford, but this fee is refunded if the dealer recycles the old part through the Core Recovery Program. When we collect a part from a dealership, we determine whether it is fit for refurbishment and placement into a new Ford vehicle. Parts that can be remanufactured are cleaned, machined and tested to meet Ford quality standards before being used in new Ford vehicles. If a part cannot be remanufactured, we send it to a third party where it is broken down into small pellets that are eventually shipped back to Ford for use in the new-vehicle manufacturing process. During the last 10 years, the program has saved approximately 120 million pounds of vehicle waste from being buried in landfills or being sent to junkyards. In addition to reducing waste, this program has also saved Ford money.

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### Renewable Materials

Ford Motor Company has a long tradition of developing and using plant-based materials, which started with the company's founder, Henry Ford. Mr. Ford passionately believed in a partnership between industry and agriculture, each using the products of the other. In the 1940s, Ford vehicles used soybean oil in plastic body panels and paint, as well as wheat-straw-reinforced steering wheels. We continue this legacy today through an active renewable materials research and product development program. Ford is a recognized leader in bringing high-performance, durable, plant-based materials to millions of vehicles every year. The average Ford vehicle uses between 20 pounds and 40 pounds of renewable materials, depending on the vehicle size class. Almost 300 parts used across Ford's vehicles are derived from sources such as soybeans, cotton, wood, flax, hemp, jute and natural rubber.

Using renewable materials in our vehicles has many environmental, economic and performance benefits. For example:

- Reduced carbon dioxide (CO<sub>2</sub>) emissions
- Reduced vehicle weight, resulting in improved fuel efficiency and lower vehicle emissions
- Reduced use of petroleum and lower dependence on foreign oil
- Creation of new markets for agricultural products and additional revenue streams for farmers
- Reduced manufacturing energy requirements
- Reduced commodity and manufacturing costs

In 2013, we introduced several new renewable materials in Ford vehicles, all of which resulted from extensive internal research and partnerships with material experts in multiple industries. For example:

- A new composite plastic material reinforced with rice hulls was introduced in the wire harness of the 2014 Ford F-150. The rice hulls, which are a by-product of rice grains, are sourced from farms in the U.S.
- An industry first application of cellulose-reinforced plastic was introduced in the 2014 Lincoln MKX. This material, developed with Weyerhaeuser and Johnson Controls, is being used to replace fiberglass reinforcement in the center console. The cellulose fibers in this composite come from sustainably grown and harvested trees, and related by-products. The material reduces weight by approximately 6 percent and has a smaller carbon footprint than the glass-fiber reinforced plastic it replaces.
- A demonstration vehicle with interior fabrics using The Coca-Cola Company's PlantBottle® technology, which produces a plastic made from 30 percent plant-based materials. Ford researchers worked with Coca-Cola to adapt this technology, formerly only used in plastic packaging, for use in vehicle fabrics. The material was used for the seat fabric, headliner and door-panel inserts of a Fusion Energi plug-in hybrid vehicle. If PlantBottle interior fabrics were migrated across the majority of Ford's U.S. models, it would displace nearly 4 million pounds of petroleum-derived materials and save the equivalent of 295,000 gallons of gasoline and 6,000 barrels of oil.

Some of our other key renewable materials activities are described below.

### Soy-Foam and Soy-Oil Applications

In 2007, Ford was the world's first automaker to implement soy-based foam in seat cushions and seat backs. Since 2011, all Ford vehicles built in North America have soy foam in their seat cushions and backs. In addition, 75 percent of headrests produced in North America have soy foam, and the headliner on the Ford Escape is made from soy-based foam.

Ford currently has soy-foam seats in more than 15 million vehicles on the road, which reduces petroleum oil usage by more than 5 million pounds annually. Life cycle analyses that compare soy foams with traditional petroleum-based foams show a net decrease of 5.5 pounds of CO<sub>2</sub> per pound of soy oil used. Ford's use of soy foam reduces our annual CO<sub>2</sub> emissions by 20 million pounds – the annual equivalent of emissions from more than 1,500 typical American households. In addition, using soy foam decreases dependence on petroleum and increases the use of renewable agricultural commodities. Soy foam also offers the potential for cost savings as well as insulation from petroleum product price swings.

We continue to investigate new applications for soy foam, such as for underhood and energy-absorbing foams.

Ford and our supplier partner Recycled Polymeric Materials (RPM) continue to expand the use of new "green" seals and gaskets that incorporate both renewable soybean oils and post-consumer, recycled tires. This material is currently used in eight of our vehicle lines, including the Ford Focus, Fusion, Flex and Taurus. In 2013, the use of these greener gaskets and seals diverted approximately 112,000 pounds of used tires from landfills and has used approximately 64,000 pounds of soybean oil.

We have introduced plant-based castor oil foam in the instrument panel of the 2012 Ford Focus and 2013 Ford Escape. The castor-oil foam, which includes more than 10 percent renewable content, provides a more sustainable interior foam solution than petroleum-based foam. It also reduces scrap due to improved flow and processing characteristics, is more durable than the materials it replaces, and reduces production time by more than 40 percent.

### Natural Fiber Reinforced Plastics

We use renewable, natural-fiber materials to reinforce plastic and for other applications in vehicles. As described above, we introduced cellulose-reinforced plastic in the 2014 Lincoln MKX, the first application of this material in our industry, and new rice-hull-reinforced plastics in the wire harness of the 2014 Ford F-150. Other examples of natural-fiber materials in our vehicles include:

- **Lignotech**, a compression-molded polypropylene and wood material used in the door panels of the European Ford Focus and Fiesta.
- **Kenaf**, a tropical plant is used to reinforce compression-molded plastic in door parts. The Ford Mondeo and Escape use a mixture of 50 percent kenaf and 50 percent plastic in the interior door panels. The use of kenaf reduces the weight of the door bolsters by 25 percent, which translates into better fuel efficiency.
- **Wheat-straw-reinforced plastic** is used in the storage bins of the Ford Flex — the world's first application of this material. The use of wheat-straw-reinforced plastics in the Flex reduces our petroleum usage by some 20,000 pounds and our CO<sub>2</sub> emissions by about 30,000 pounds annually.

### Developing Future Renewable Materials

We continue to actively research and develop new renewable materials and applications at Ford's research centers around the world, and through partnerships with automotive suppliers and non-automotive partners. Some of our key research partnerships are outlined below.

- We are continuing to work with the Plant PET Technology Collaborative (PTC), a partnership with The Coca-Cola Company, H.J. Heinz Company, NIKE and Procter & Gamble to accelerate the development and use of 100 percent plant-based PET materials. The overall goals of the partnership are to research and develop commercial solutions for PET plastic made entirely from plants, and to drive the development of common methodologies and standards for the use of plant-based plastic, including life cycle analyses and universal terminology.
- Ford has forged a new partnership with the World Wildlife Fund along with The Coca-Cola Company, Danone, H.J. Heinz Company, Nestle, NIKE, Procter & Gamble and Unilever to launch the Bioplastic Feedstock Alliance (BFA). As the BFA's only automaker, Ford will work alongside other member brands to drive environmentally responsible, socially beneficial and economically viable production of bioplastic feedstock. Through the Alliance, Ford will strengthen its long-standing commitment to the environment by advancing research and development of bioplastics for use across its vehicle lineup.
- In conjunction with Ohio State University, Ford Research has initiated a project to develop sustainable sources of materials to replace synthetic rubber. We are looking at two sources – dandelion root and guayule (a plant grown in the Southwest U.S.) – as possible replacements for natural and synthetic rubber in our plastic and rubber parts. Ford is continuing to participate in a university- and industry-based collaborative effort called the Program of Excellence in Natural Rubber Alternatives, which we joined in 2012, to investigate and develop new technologies related to alternative sources for rubber and latex.
- Ford has also pioneered the use of modified soy oil in synthetic rubber, as a replacement for petroleum oil. This uses a Ford-patented technology to replace part of the petroleum oil with soy or modified soy oil in rubber formulations. It does not affect the base rubber material. Through funding provided by the United Soybean Board, Ford scientists have been researching the use of renewable oils in rubber formulations. Soy-based rubber parts – such as radiator deflector shields, air baffles, cup-holder inserts and floor mats – are under consideration for future Ford vehicle programs.

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## Lightweight Materials

We are actively pursuing the development and use of cutting-edge materials – including high-strength steels, lightweight metals such as aluminum and magnesium, and composite materials – to reduce the weight of our vehicles and improve their fuel economy without compromising safety or performance. For example, in 2014 we will introduce an all-new F-150 that makes extensive use of high-strength steels and aluminum. For more information on our use of lightweight materials, please see [Weight Reductions](#) in the Sustainable Technologies and Alternative Fuels plan section.

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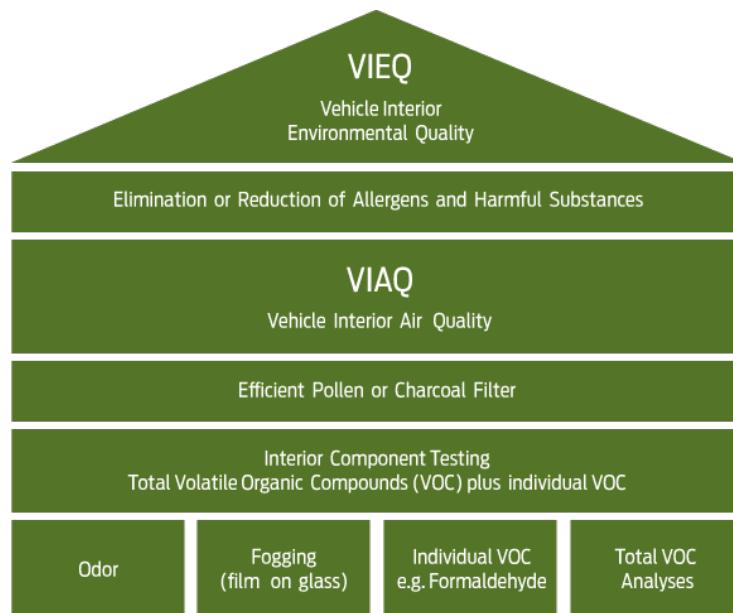
## Improving Vehicle Interior Environmental Air Quality and Choosing Allergy-Tested Materials

As part of our effort to deliver vehicles that are safe, green, smart and high quality, Ford is proactively addressing society's growing concern about vehicle interior environmental quality, including air quality and allergens. Consistent with our One Ford global integration plan, a global cross-functional team at Ford focuses on selecting interior materials to reduce allergens and volatile organic compounds. This team is committed to investigating and developing comprehensive global approaches and strategies to address issues relating to vehicle interior air quality. The team has established global design guidelines for materials and filtration, and is migrating those guidelines across Ford's product lines.

We are developing a set of vehicle interior air quality (VIAQ) specifications that require the consideration of the air quality and allergen impacts of the materials and components in our vehicles. Under this standard, engineers test materials used on components with direct skin contact for allergy issues. The complete VIAQ standards include requirements for fogging, odor, aldehydes, substances of concern, total carbon at the component level and air filtration. Many vehicles are also equipped with high-performance pollen filters to prevent allergenic pollens from entering the vehicle. Initially, the requirements were applied to European-based vehicles, and we are now phasing them into the U.S. We plan to implement them in our South American and Asia Pacific Africa operations in the future.

Looking ahead, we continue to monitor emerging requirements in all regions, and anticipate challenges with material selection, testing and development.

The following graphic shows our overall approach to improving vehicle interior environmental quality, including our allergen and VIAQ specifications.



Looking ahead, we are researching ways to use in-vehicle communication systems to help drivers monitor and maintain their own health and wellness. We want to change the paradigm that in-car connectivity systems such as SYNC® can only be used for information and entertainment purposes. We recently introduced an Allergy Alert® app for Ford SYNC AppLink™ that allows drivers to check current and upcoming pollen and other health-risk conditions with simple voice commands while keeping their hands on the wheel and eyes on the road. This app came out of research Ford began in 2012 to assess in-car health and wellness-connected services that could work with SYNC, such as medical device connectivity, cloud-based health management services and mobile app integration. As part of this research, we are

also working with Microsoft, Healthrageous and BlueMetal Architects to develop additional systems that extend health management into the personal vehicle in a nonintrusive fashion.

We are also working on systems that can use Ford's hands-free SYNC communication technology to capture biometric and vehicle data as the basis for real-time health and wellness advice and monitoring. For example, a driver could provide voice inputs, detailing important aspects of his or her health routine – such as the number of glasses of water consumed during the day, or what pills have been taken. Working with partner companies, the data received from the driver can be uploaded into the driver's approved health data cloud and processed with other health data to create visual reports the driver can access after having left the vehicle.

As part of our efforts to deliver healthy vehicle interiors, we are also researching microbial populations on vehicle interior surfaces with the goal of creating a cleaner, more aesthetically pleasing environment for our customers. Microscopic organisms, including mold and mildew, can spread over a variety of surfaces, leading to discoloration and even unpleasant odors. We worked with a team from the University of Michigan to evaluate the concentration and growth of microbes in vehicles. After identifying the hot-spot locations for microbial growth, we are now developing and testing part-coating formulations that could resist and potentially even reverse microbial growth, including silver-ion, ammonium salt and polyolefin wax with a nano-silver coating. Parts with the antimicrobial-treated coating are now undergoing real-world testing in a number of Ford development vehicles, and the coating is being evaluated for potential use in future Ford vehicle programs.

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# Eliminating Undesirable Materials

For more than 20 years, our Restricted Substance Management Standard has spelled out materials to be avoided or eliminated in Ford operations, and in the parts and materials provided by suppliers. This and other materials-management tools are helping us to meet and exceed customer expectations and ensure compliance with regulations.

## On this page

- ↓ Eliminating Mercury, Chromium and Lead
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## Eliminating Mercury, Chromium and Lead

Ford has eliminated the use of mercury-containing components, which can pose problems at the end of a vehicle's life. In 2001, we eliminated mercury-containing switches, which accounted for more than 99 percent of the mercury used in our U.S. vehicles. Since that time, we have continued to focus on mercury reduction, eliminating mercury in navigation system screens and family entertainment system screens, and reducing the use of mercury in high-intensity discharge headlamps. All Ford and Lincoln vehicles in all of our operating regions are now mercury free.

In addition, we helped to forge a collaboration between the U.S. Environmental Protection Agency (EPA), states, auto dismantlers, auto-scrap recyclers, steelmakers and environmental groups to recycle mercury switches from end-of-life vehicles. This effort was rolled out across the U.S. in 2007 and now has more than 9,400 participants joining the effort from the recycling industry. By the end of 2013, more than 6 tons of mercury from these switches had been recovered. An online database tracks the number of participants in the program as well as the number of switches collected by each state.

In Europe, an EU End-of-Life Vehicle Directive and a Battery Directive prohibit the use of the heavy metals lead, cadmium, hexavalent chromium and mercury, with limited exceptions. These regulations also include broad manufacturer responsibility for disposing of vehicle parts and substances, including taking vehicles back without charge for disposal and recycling requirements. This legislation has triggered similar regulatory actions around the globe, including, for example, in China and Korea and possibly in India in the near future. Ford is complying with all of these regulations.

Hexavalent chromium – "hex chrome" for short – is a corrosion coating (used, for example, on nuts, bolts and brackets in cars and trucks) that the U.S. Occupational Safety and Health Administration lists as a potential lung carcinogen. We did not wait for global regulations banning the use of hex chrome to take effect: We phased out its use worldwide. By 2007, Ford eliminated all hex-chrome-containing parts in Europe and North America. Replacement coatings have been thoroughly tested to ensure that they meet Ford's performance requirements.

In North America, Ford has also completed the transition away from lead wheel weights. In addition, Ford's Customer Service Division no longer offers lead wheel weights for sale to dealers, offering steel wheel weights instead.

Ford has joined the U.S. Environmental Protection Agency and other stakeholders in a commitment to reduce the use of lead in wheel weights through participation in the National Lead-Free Wheel Weight Initiative. Through this initiative, Ford has shared its experience with lead wheel weight phase-out with aftermarket wheel balancers, and encourages all stakeholders to discontinue the use of lead in wheel weights.

In mid-2003, Ford of Europe phased out lead in valve seats in all new vehicle models approved for launch in the European Union. Also in Europe, we phased out the use of lead wheel weights and reduced the lead content in aluminum in new and serviced vehicles in mid-2005, and phased out lead in pyrotechnic initiators by mid-2006. We further reduced the lead content in aluminum in 2008. A study by the Oeko Institute in Germany calculated that, between 2000 and 2005, life cycle emissions from lead had been reduced by 99.6 percent, from hexavalent chromium by 99.99 percent and from cadmium by 96 percent in Europe.

## Related links

[This Report](#)[→ Materials Management](#)

## External Websites

[→ REACH](#)

## Reducing Undesirable Chemicals

Ford is one of the first automotive companies to begin efforts to reduce a range of undesirable chemicals that are monitored by the EU, U.S. and Canadian governments. These chemicals include hexabromocyclododecane (HBCDD), a chemical that has been identified as a substance of concern under the European Union's REACH regulations (Registration, Evaluation, Authorization and restriction of Chemicals). Ford is also working to reduce decabromodiphenyl ether (decaBDE), another substance of concern that the U.S. EPA and Canadian EPA have proposed to regulate. Ford is working to eliminate these substances ahead of the timelines defined by governmental regulations by working with suppliers to develop new and "greener" alternative materials that will make our products more environmentally friendly. Ford is also leading industry efforts to eliminate undesirable substances by chairing several industrial association working groups on this topic including the U.S. Council for Automotive Research Substances of Concern Committee and the Automotive Industry Action Group Chemical Management and Reporting Group. We are also collaborating with global automotive manufacturers and suppliers to develop strategies and plans to eliminate undesirable chemicals across the automotive industry.

More and more countries are adopting chemical and substance-of-concern regulations like REACH. Turkey and Romania adopted their own versions of REACH in 2009; China adopted its own version in October 2010. In 2011, Japan adopted REACH-like regulations to manage their chemicals. South Korea adopted REACH regulations in 2013 and will begin implementation in 2015. In the U.S., proposed legislation to overhaul the Toxic Substances Control Act is currently under consideration in Congress. The state of California finalized a Safer Consumer Products law, which took effect in 2013. And in January 2009, the United Nations implemented regulations requiring a globally harmonized system of classification and labeling of chemicals.

Regulatory requirements for the phase-out of undesirable chemicals need to be prioritized and implemented in a workable manner. Government and industry resource constraints mean that not all chemicals of concern can be addressed at once. Moreover, manufacturers and suppliers need adequate lead time to identify replacement substances that are more environmentally friendly than the ones they replace, and also to design and engineer components that incorporate these new substances. Ford will continue to work with regulatory agencies to help develop rules that target the highest-priority chemicals first, and that drive steady progress toward the elimination of chemicals of concern in an effective and efficient manner.

For more on Ford's efforts to manage materials and chemicals, please see the [Materials Management](#) section.

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## End of Life

Automobiles are one of the most highly recycled consumer products in the world. All vehicles contain parts and materials – particularly iron, steel and aluminum – that can be recovered at the end of their useful lives. In North America, about 95 percent of vehicles that go out of registration are processed by a dismantler or scrap metal recycling facility, with approximately 86 percent of the vehicle by weight recovered for reuse, remanufacturing or recycling.

In theory, end-of-life vehicles are more than 95 percent recoverable. In practice, however, the cost in energy and labor to recover the final fractions often exceeds the value of the materials, and recent independently reviewed environmental studies suggest that such efforts offer no value to the environment. Ford focuses on achieving the highest economically viable and environmentally sound recovery percentage through a number of means, including selection of materials, labeling and providing information to dismantlers on materials and methods for treatment.

In the EU, automakers are required by EU Directive 2000/53/EC to ensure a cost-free take-back of vehicles (that they put on the market) at the end of their lives. This directive also requires that end-of-life vehicles (ELVs) are treated in an environmentally responsible manner. Since 2002, Ford has been at the forefront of providing return networks in the EU member states that have established regulations. Ford now has ELV take-back and recycling networks for Ford brand vehicles in 19 EU markets and participates in collective ELV recycling systems in another 10. Ford was the first major manufacturer in the U.K. to put in place a comprehensive plan that met the European Commission's ELV Directive. By working with Cartakeback.com, Ltd., we have a network of nearly 230 facilities providing unrivaled convenience to the last owner for the professional take-back, receipt and treatment of end-of-life vehicles.

In May 2007, Ford became one of the first European automakers to be certified in compliance with ELV requirements by demonstrating to external authorities that the Ford processes properly manage the reusability, recyclability and recoverability aspects of vehicles. In 2014, this certification was extended by another two years and now comprises all of Ford Motor Company operations globally. All Ford vehicles marketed in Europe are now certified as reaching recyclability of 85 percent and recoverability of 95 percent. An increasing number of vehicle models produced and designed in the U.S. are also following this approach. For example, all U.S. models exported to South Korea are providing self-certification documents meeting the 85 percent to 95 percent recoverability requirement.

Ford has participated in research into alternative treatments for end-of-life vehicles. Most of the plastic, foam and other nonmetal vehicle materials end up being shredded. Most of this "automotive shredder residue" (ASR) ends up going to landfill. We have been working to assess the environmental impacts of burning ASR for energy. Together with other European automotive manufacturers, we sponsored a fully ISO 14040-compliant life cycle assessment that showed that – from a purely environmental point of view – using recycled ASR for energy recovery is as beneficial as recycling it.

### Related links

External Websites

→ European End of Life Vehicles



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## Electrification: A Closer Look

Consumer interest in and demand for electrified vehicles (EVs) – which include hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs) and pure battery electric vehicles (BEVs) – have been growing. And recently, the rate of growth has increased significantly.

From 2000 to 2011 (i.e., the first 11 years that HEVs were available from major automakers in the U.S.), sales of EVs grew to just 2 percent of the total U.S. passenger vehicle market. But in 2012 and 2013, the market for EVs doubled; it now totals approximately 4 percent of U.S. passenger vehicle sales.

To meet this growing demand, most major automakers now offer some form of electrified vehicle. Ford offers six models, including three HEVs, two PHEVs and one BEV, as part of our “power of choice” strategy for delivering leading fuel economy for consumers regardless of what type of vehicle or powertrain technology they prefer. Sales of Ford’s EVs grew substantially in the past year. In 2013, Ford sold nearly 88,000 EVs, a record number for Ford. Also in 2013, Ford’s share of the overall EV retail market was 14.3 percent, up from 6.5 percent in 2012. Ford’s EVs are also making a significant contribution to reducing carbon emissions. As of late April 2014, owners of Ford’s plug-in electric vehicles, including the Focus BEV and Fusion and C-MAX Energi PHEVs, had driven approximately 114 million all-electric miles, resulting in an approximately 8 million kg reduction in carbon dioxide (CO<sub>2</sub>) compared to gasoline-powered miles<sup>1</sup>.

Utilities are also working to understand how to provide power to plug-in vehicles in a way that is more effective in meeting consumer needs, more efficient for electricity providers and more environmentally sound. And a variety of organizations are developing infrastructure for charging vehicles at homes, at work and in other public places.

Why the rise in interest and activity in EVs? As gas prices remain high, consumers are increasingly interested in alternative and less-expensive fueling options, such as electricity. In addition, the cost of EVs continues to come down, due in part to technology advances and increasing production volumes. Other benefits of EVs can include lower greenhouse gas (GHG) emissions during vehicle use, increased use of domestic energy sources, decreased pressure on petroleum stocks and reduced urban air pollution. With the advanced information technologies and “smart grids,” electrified automobiles can even improve the efficiency of the power grid – thereby lowering electricity costs – and facilitate the use of renewable energy sources, such as wind and solar.

Still, many challenges remain. For example, even though the purchase prices of EVs (especially HEVs) are beginning to become more competitive, the price premium over conventional vehicles remains significant. In addition, consumers continue to have concerns about the driving range of BEVs. And for EVs to achieve their full potential to cut lifecycle automotive GHG emissions, low-carbon electricity generation must make up a greater part of the total energy supply, and electric vehicles must become functioning parts of smart grids. Also, battery technologies are still evolving, and the cost of new-generation batteries remains high. We are also assessing supply-chain issues associated with the materials needed to manufacture batteries, including the availability of lithium and rare earth elements. Furthermore, customer demand for EVs must continue to grow for these vehicles to have a significant effect on overall transportation-sector emissions.

We discuss all of these issues in more detail throughout this section, which provides an overview of Ford’s electrification strategy. The section also compares different electrification technologies and their environmental benefits. For more detail on Ford’s electric-vehicle technologies and other fuel-efficiency, advanced powertrain and alternative-fuel technologies, please see the [Sustainable Technologies and Alternative Fuels Plan](#).



### LIVING THE ELECTRIC LIFESTYLE

To help drivers make the transition to electric vehicles (EVs), and get the most out of their EVs, we are offering more than just the vehicle. We are delivering a total electric vehicle lifestyle.

1. This CO<sub>2</sub> reduction value is a “net” well to wheels value based on the reduction in CO<sub>2</sub> emissions resulting from the greater efficiency of the electric versus the gasoline engine. But it also accounts for the fact that the grid electricity that is being used to recharge the vehicles also produces upstream CO<sub>2</sub> emissions. All-electric miles driven are calculated from data collected through the MyFord Mobile database.



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## Ford's Electrification Strategy

Ford foresees a future that includes different types of electrified vehicles (EVs), depending on customers' needs. There will not be a one-size-fits-all approach, but a diverse and smart range of applications of different types of electrified vehicle technologies. Our strategy includes the following elements.

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- ↳ "Power of Choice": Bringing a Range of Electrified Vehicles to Market
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### "Power of Choice": Bringing a Range of Electrified Vehicles to Market

EVs are an important part of Ford's overall sustainability strategy and delivering on our commitment to reduce the carbon dioxide (CO<sub>2</sub>) emissions of our fleet. We are pursuing an aggressive electrified-vehicle strategy that we call "power of choice." We believe that offering a range of electrified vehicles is the best way to reduce CO<sub>2</sub> emissions, deliver leading fuel economy across our lineup and meet different customers' transportation needs.

To do this, we are electrifying global vehicle lines rather than limiting development to a single, special electrified vehicle model. This allows our customers to choose from a variety of electrified vehicle powertrains – including hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs) and full battery electric vehicles (BEVs) – in a range of vehicle segments, including sedans, utility vehicles and luxury vehicles.



Ford Fusion Hybrid, Lincoln MKZ Hybrid, and Ford C-MAX Hybrid

In the U.S., we offer three HEVs: the Ford Fusion Hybrid, the Lincoln MKZ Hybrid and the new C-MAX Hybrid. In 2014, we plan to introduce a hybrid version of Ford Mondeo in Europe. These HEVs are ideal for customers who cover a range of distances in varied driving conditions. The most significant benefits come under urban stop-and-go driving conditions, in which braking energy is stored and reused. But these HEVs should also appeal to drivers who do a mix of city and highway driving. For more information about our hybrid vehicles and technology, please see the [Hybrid Electric Vehicles](#) section.



Ford Focus Electric

### Related links

[Ford Websites](#)[Plug into Ford](#)

In 2012, we launched the Focus Electric, a BEV version of the new Ford Focus, to retail customers in North America. We introduced this vehicle in Europe in 2013. By using innovative technologies, the Focus Electric can be fully charged in under four hours. The Focus Electric has an EPA-certified driving range of 76 miles on a single charge and can go up to 100 miles on a charge depending on driving habits. (The average driver in the U.S. drives approximately 45 miles a day, according to the Bureau of Transportation Statistics.) For more information about our battery electric vehicles and technology, please see the [Battery Electric Vehicles](#) section.



Ford C-MAX Energi and Ford Fusion Energi

In North America, we also sell two PHEVs: the C-MAX Energi, launched in 2012, and the Fusion Energi, a plug-in hybrid version of our all-new Fusion that launched in early 2013. For more information about our PHEVs and technology, please see the [Plug-In Hybrid Electric Vehicles](#) section.

All of our electrified vehicles use state-of-the-art lithium-ion batteries, as discussed in the [Battery Technologies](#) section.

Sales of our electrified vehicles are increasing, and Ford is the second-leading seller of electrified vehicles in the U.S. For calendar year 2013, we held 14.3 percent market share in the U.S. EV market, up from approximately 6.5 percent in 2012. In 2013 we sold 87,776 total EVs – a record number for Ford. EVs accounted for 3.5 percent of total company sales, up from 1.6 percent in 2012.

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## Using Global Platforms

We are basing our EV products on our highest-volume global platforms. This approach offers tremendous opportunities for production economies of scale. For example, the Focus Electric, C-MAX Energi and C-MAX Hybrid are based on Ford's next-generation compact, or "C-car" platform, and are being built alongside gas-powered Focus models at Ford's Michigan Assembly Plant. This plant is the first in the world to build vehicles with five different fuel-efficient powertrain technologies on the same line.

Globally, we expect to build as many as 2 million vehicles per year on the C-car platform. The new Fusion Hybrid and the Fusion Energi PHEV are based on our global mid-sized platform. This flexibility allows us to switch production between different vehicles as needed to meet changing consumer demand. We also share many of the electrified components between the different vehicles. These strategies are key to making electrified vehicles affordable.

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## Delivering a Complete Electrified-Vehicle Lifestyle

EVs have many advantages for consumers. But they may sometimes require owners to adjust their travel routines and driving habits, and may cause some new considerations to arise in regard to how a driver uses a car. For example, BEV drivers have to plan for their car to have enough charge to get to the next destination. BEV and PHEV drivers have to consider where they will charge their vehicles. Even HEV drivers can make changes to their driving routines to maximize the efficiency of their vehicles. To help drivers make the transition to EVs and get the most out of their EVs, we are offering more than just the vehicle. We are delivering a total electrified-vehicle lifestyle.

In the U.S., our electrified vehicles have advanced in-vehicle communications and innovative applications for wireless devices that help drivers maximize the efficiency and range of their vehicles. Our tools for BEVs and PHEVs also help drivers to find charging stations along their planned routes, and advise how far they can go until the next charge based on their own driving style. For example, our MyFord Mobile™ app, developed using MapQuest® and PlugShare technology, allows owners to control charging and other in-vehicle operations remotely. The app can "wake up" to preheat or precool the cabin while the car is plugged in, to help reduce battery usage for these energy-intensive functions. Owners can use MapQuest to find their way to a new destination and PlugShare to find public recharging stations. We have also

developed a comprehensive approach to vehicle charging that makes it fast, easy, affordable and environmentally responsible. Our goal is to deliver EVs that are as engaging, easy to use and empowering as other forms of consumer electronics like smartphones.

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## Improving the Electric Vehicle “Ecosystem”

The development and diffusion of EV technologies is a global challenge. It will take a collaborative approach of automakers, battery producers, suppliers, fuel producers, utilities, municipalities, educators and researchers, as well as policy makers, opinion shapers and consumers, to help us make the transition and realize the full benefits of electrification. We are collaborating with all of these players to develop an “electric vehicle ecosystem” that supports and enhances the operation of EVs and increases their benefits to customers and the environment.

Ford’s plan calls for strategic partnering with key suppliers who bring technical expertise, financial solidity and collaborative spirit. We believe that working with a range of partners will allow us to gain greater understanding of the connectivity of vehicles to the electric grid, promote the necessary infrastructure and bring down the costs of the technology to make it more accessible for consumers. We are partnering with companies that are already the best in their fields, instead of attempting to recreate products, services and technologies internally, to offer customers the best possible suite of electrified vehicle-related products, services and technologies. For example, we are working with municipalities across the U.S. to help them develop infrastructure to support EVs including public charging stations. And, we are working with a coalition of other automotive manufacturers and other stakeholders to develop technologies, standards and cost efficiencies to commercialize EVs.

In January 2013, Ford launched the MyEnergi Lifestyle project, a collaboration with representatives of the consumer-appliance, renewable-energy and power-management industries to demonstrate how plug-in vehicle technology can be applied across household appliances and renewable energy generation for an energy- and money-saving lifestyle. Current partners include Whirlpool, Easton, SunPower and Georgia Institute of Technology. Please see the longer “[Improving the Electric Vehicle Ecosystem](#)” for more information on our efforts in this area.

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## Bringing EVs to Market Thoughtfully

Ford is taking a proactive approach to making PHEVs and BEVs successful in the marketplace including efforts to help customers and dealers better understand the technology. For instance, we have developed extensive training materials to educate dealers’ sales personnel on the unique features and functionality of electric vehicles so that they are able to assist customers with their purchase decisions. As part of these preparations, dealers who sell BEVs and PHEVs are required to install two EV charge stations at their facilities – one in the service area and another in the customer-facing area. These dealers are also participating in a “green dealer on-site facility assessment” to identify energy- and cost-saving opportunities, with a goal to improve energy efficiency, lower operating expenses and reduce the dealership’s carbon footprint. For more information on our [“Go Green” dealer initiative](#), please see the Dealers section.

We have also developed websites, videos and brochures to help consumers understand our EV offerings and incorporate BEVs and PHEVs into their lifestyle. For example, our [“green vehicles”](#) website helps consumers understand the key features of and differences between electrified vehicle options, and our [www.plugintoford.com](#) site helps customers understand how to get the most from their electric vehicle. We have also developed videos on vehicle features such as MyFord Mobile, how to charge the vehicle or set the charge time, and how to have a charging station installed.

As part of our collaboration with dealers, utilities and local governments, Ford is helping to develop consumer outreach and education programs as well as share information on charging needs and requirements to ensure that the electrical grid can support customers’ needs. For example, we launched a “Go Further” test drive tour in 17 U.S. markets as part of this effort. This tour promotes Ford’s electric-vehicle strategy, solidifies our collaborations with local utilities and municipalities to make BEVs and PHEVs a success, and educates consumers about what to expect from electrified automobiles and what is needed from the public and private sector to support this new technology, all while giving them the opportunity to test-drive a Ford vehicle with fuel-efficient technology. In 2013, we also held consumer education events in key BEV and PHEV markets around the country; some were stand-alone Ford events and some were larger sustainable-lifestyle events in which we participated. These consumer education events included educational exhibits about Ford’s electrified-vehicle offerings, the benefits of BEVs and PHEVs, and recharging options, as well as live demonstrations of the MyFord Mobile technology and the opportunity to test-drive Ford vehicles.



Go Further

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# Comparing Electrification Technologies

Electrified vehicle (EV) technologies range from conventional gas-engine vehicles with a start-stop function (sometimes referred to as micro hybrids), to hybrid electric vehicles (HEVs), plug-in electric vehicles (PHEVs), and battery electric (or "all-electric") vehicles (BEVs). These technologies offer a range of benefits that can vary with driving conditions. We believe it is important to offer customers a range of fuel-efficient and reduced-emission vehicles, including efficient traditional gas-powered vehicles and electrified vehicle options. We are also committed to helping customers understand the relative advantages of different vehicle options based on their driving needs. We call this approach the "power of choice."

In a recent national survey, we found that nearly half of Americans are confused about green vehicle options, with 46 percent not knowing the difference between a hybrid, plug-in hybrid and all-electric vehicle. This Sustainability Report is one of the key mechanisms we use to inform customers about the different electrified vehicle options. Ford also has a [website explaining different fuel-efficient and alternative powertrain vehicles](#) including EVs to help consumers understand the key features of and differences between electrified vehicle options. And, we explain the range of interactive tools available to drivers of our electrified vehicles on our [www.plugintoford.com](http://www.plugintoford.com) website. We are also reinforcing our power-of-choice product offerings through a "Go Further" tour that helps consumers learn more about electrified vehicles in an engaging, interactive atmosphere. Through all of these communication channels, we seek to help customers decide what vehicle technology is best for them.

The table below provides a generalized overview of the relative benefits and impacts of these different electrified vehicle technologies, based on typical compact C-class vehicles similar to those Ford currently offers (e.g., the Ford Focus, C MAX Hybrid, C MAX Energi and Focus Electric). Because no single Ford model is available with all of these alternative propulsion concepts, these values are approximate for comparison purposes only and do not reflect values for actual products.

	Conventional Internal Combustion Engine Vehicle (ICEV)	Conventional ICEV with Stop-Start Technology <sup>1</sup>	Hybrid Electric Vehicle (HEV)	Plug-In Hybrid Electric Vehicle (PHEV)	Battery Electric Vehicle (BEV)
Technology overview	Traditional gas or diesel engine.	Traditional gas or diesel engine and powertrain with manual and automatic transmissions with stop-start capability, which shuts down the engine when the vehicle is stopped and automatically restarts it before the accelerator pedal is pressed to resume driving. Smart regenerative brake recharging improves fuel economy.	Uses both an internal combustion engine and an electric motor. Can run exclusively on battery power, exclusively on gas power or on a combination of both. Also has stop-start capability and regenerative braking.	Uses a high-capacity battery that can be charged from an ordinary household 120-volt (V) outlet or a 240V charging station. When the battery is depleted, the PHEV runs like a regular HEV. <sup>2</sup>	Uses only a battery-powered electric motor, no gas or diesel engine. Runs entirely on electricity from batteries, which can be charged from household outlets or specialized charging stations.
Ideal driving conditions	Flexible for a wide range of uses.	Flexible for a wide range of uses. Improved fuel economy in urban driving.	Flexible for a wide range of uses. Excellent urban fuel economy and improved highway fuel economy.	Flexible for a wide range of uses. Dramatically improved fuel economy. Suitable for customers who have access to a 120V outlet or 240V charging station at home and/or the office. Can provide approximately 20 miles in pure electric mode, but is flexible for longer trips as well.	Ideal for customers with access to a charging station at home or work who have shorter, predictable daily trips of less than 80 miles (between charges).

Technology Benefits/Costs Based on a Typical Compact or "C-class" Sedan<sup>3</sup>

<b>Fuel economy<sup>4</sup></b>	~31 mpg	~32 mpg	~40 mpg <sup>5</sup> combined city and highway	88 MPGe <sup>6</sup> (combined city and highway) in electric mode. ~38 MPG using gasoline in hybrid mode.	105 MPGe <sup>7</sup>
<b>Range on tank/charge<sup>8</sup></b>	~420 miles/tank	~430 miles/tank	~580 miles/tank	~550 miles on combined gas and electric power. More than 1,000 miles between visits to a gas station in typical use.	Up to 76 miles on a charge
<b>Fueling/charging time</b>	Minutes	Minutes	Minutes	Minutes for gasoline; 2.5 hours with a 240V outlet and 7 hours with a 120V outlet.	Up to four hours with a 240V outlet if equipped with a 6.6 kW charge port
<b>CO<sub>2</sub> emissions<sup>9</sup></b>					
<b>Well to tank<sup>10</sup></b>	~50 g/km	~50 g/km	~40 g/km	~40 g/km	n/a
<b>Tank to wheels<sup>11</sup></b>	~165 g/km	~160 g/km	~130 g/km	~135 g/km	n/a
<b>Electricity generation<sup>12</sup></b>	n/a	n/a	n/a	170 g/km	140 g/km
<b>Total CO<sub>2</sub><sup>13</sup></b>	~215g/km	~210 g/km	~170 g/km	~175 g/km <sup>14</sup>	~140 g/km
<b>Annual fuel cost</b>	~\$1,200–1,900 <sup>15</sup>	~\$1,200–1,900 <sup>16</sup>	~\$900–1,500 <sup>17</sup>	~\$750–\$1,050 (\$500–\$800 for gasoline + \$250 for electricity) <sup>18</sup>	~\$450 <sup>19</sup>

1. Some automakers consider this a form of hybrid vehicle. However, Ford views and is implementing these technologies as part of our strategy to improve the fuel economy of conventional internal-combustion engine vehicles. We assume start-stop technology can provide up to 6 percent fuel economy improvement in city driving.
2. Another type of PHEV, often called an Extended-Range Electric Vehicle, runs entirely on battery power until the battery is depleted, and then the onboard gas-powered engine runs to recharge the battery. The wheels are driven only by the electric motor, and the engine's sole purpose is to recharge the battery.
3. These numbers are for comparison purposes only. They are based on modeling and testing calculations and do not necessarily represent the numbers that would be achieved in real-world driving conditions, nor do they represent actual products that Ford currently makes or may produce.
4. The internal-combustion engine fuel-economy estimate is based on the calculation used by the U.S. Environmental Protection Agency to develop combined fuel-economy (city/highway) values for the labels affixed to new vehicles. The combined fuel-economy value is intended to represent the approximate fuel economy that most consumers can expect based on a typical mix of city and highway driving. Estimates for the other technologies are based on the metro-highway drive cycle used for the U.S. fuel-economy regulations. Fuel-economy calculations for all of the technologies are based in U.S. gallons and on U.S. drive cycles.
5. In general, HEVs deliver approximately 30–40 percent better fuel economy than comparably sized non-hybrids.
6. MPGe or miles per gallon equivalent for electric vehicles is calculated based on the 33.7 kWh energy content of a gallon of gasoline.
7. MPGe or miles per gallon equivalent for electric vehicles is calculated based on the 33.7 kWh energy content of a gallon of gasoline.
8. All estimates are based on a 13.5-gallon tank except for the BEV, which has no fuel tank.
9. In vehicles using internal combustion engines, the fuel feedstock is assumed to be E10, petroleum gasoline blended with 10% ethanol by volume.
10. Well-to-tank emissions represent the CO<sub>2</sub> generated by excavating feedstocks and producing and distributing the fuel.
11. Tank-to-wheels emissions represent the CO<sub>2</sub> generated by burning the fuel in the vehicle.
12. Electricity generation represents the CO<sub>2</sub> emitted by excavating feedstocks and generating and transmitting electricity, on average for the U.S. grid.
13. Total CO<sub>2</sub> is the sum of the well-to-tank, tank-to-wheels and electricity generation emissions. The PHEV total CO<sub>2</sub> emissions are weighted by the share of miles traveled in electric and gasoline modes.
14. Total CO<sub>2</sub> for the PHEV assumes an all-electric range of 20 miles and a utility factor of 48 percent (SAE J2841). The utility factor indicates the percentage of distance the vehicle is driven using electricity.
15. Based on 12,000 miles/year, 31 mpg and \$3–5/gallon.
16. Based on 12,000 miles/year, 32 mpg and \$3–5/gallon.
17. Based on 12,000 miles/year, 40 mpg and \$3–5/gallon.
18. Based on 12,000 miles/year, 48 percent in electric mode at 2.7 miles/kWh (EPA 37 kWh/100 miles, combined) and 12 cents/kWh, and 52 percent in gasoline-engine mode at 38 mpg and \$3–5/gallon.
19. Based on 12,000 miles/year, 3.1 miles/kWh (EPA 32 kWh/100 miles, combined) and 12 cents/kWh.



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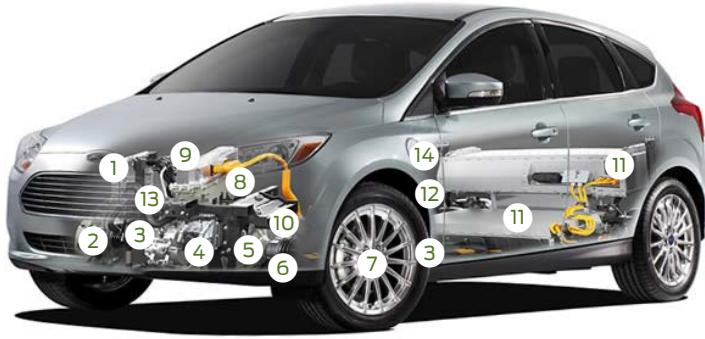
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# BEV Technology Overview

Below is a detailed look at the components that are used in the Ford Focus Electric, our battery electric vehicle (BEV).

## Ford Battery Electric Vehicle

1. Motor Controller and Inverter
2. High-Voltage Electric HVAC Compressor
3. Electric Water Pump
4. Traction Motor
5. Electric Power Steering
6. Transmission
7. Regenerative Braking
8. Electric Vacuum Pump
9. High-Voltage Electric Coolant Heater and Controller
10. Powertrain Control Module
11. Battery Pack
12. AC Charger
13. DC-DC Converter
14. Charge Port Light Ring



### 1 Motor Controller and Inverter

The motor controller monitors the motor's position, speed, power consumption and temperature. Using this information and the throttle command from the driver, the motor controller and inverter convert the DC voltage supplied by the battery to three precisely timed signals used to drive the motor.

### 2 High-Voltage Electric HVAC Compressor

The high-voltage air-conditioning system is specifically designed for electric-vehicle applications, drawing electrical energy directly from the main battery pack.

### 3 Electric Water Pump

The electric-drive water pump circulates coolant for the traction motor, inverters, battery and climate-control system.

### 4 Traction Motor

The traction motor performs the conversion between electrical and mechanical power. Electric motors have efficiencies three times higher than that of a standard gasoline engine, minimizing energy loss and heat generation.

### 5 Electric Power Steering

An electro-hydraulic steering pump was installed to assist a retuned steering rack. It is tuned to deliver the same driving dynamics as the gasoline-powered Focus.

### 6 Transmission

The transmission has the identical role as in a conventional gasoline-powered vehicle; however, it has different design considerations due to the higher RPM range available from the electric motor and the increased emphasis on efficient and silent operation. The transmission is a single-speed unit.

## 7 Regenerative Braking

More than 95 percent of the energy normally lost through braking can be recovered and stored in the battery.

## 8 Electric Vacuum Pump

The vacuum pump provides energy-efficient power-assisted braking.

## 9 High-Voltage Electric Coolant Heater and Controller

Heating systems are specifically designed for electric vehicle applications using energy-efficient technology to heat the coolant that circulates to the passenger car heater. Heat also may be circulated to the battery to optimize performance.

## 10 Powertrain Control Module

The powertrain control module monitors and controls each vehicle system, and manages the energy and mechanical power being delivered to the wheels to maximize range.

## 11 Battery Pack

The battery pack is made up of 86 cells for a total of 23 kWh of power. The batteries are liquid cooled. The pack includes an electronic monitoring system that manages the temperature and state of charge of each of the cells.

## 12 AC Charger

Power electronics are used to convert the off-vehicle AC source from the electrical grid to the DC voltage required by the battery, thus charging the battery to its full state of charge in a matter of hours. The current charger is air cooled. The production design will accommodate both 110 and 220 voltage sources.

## 13 DC-DC Converter

A DC-DC converter allows the vehicle's main battery pack to charge the on-board 12V battery, which powers the vehicle's various accessories, headlights and so forth.

## 14 Charge Port Light Ring

A standard SAE J1772 plug interface is used for charging. Ford's charge port "light ring" provides an external indicator of charging status.



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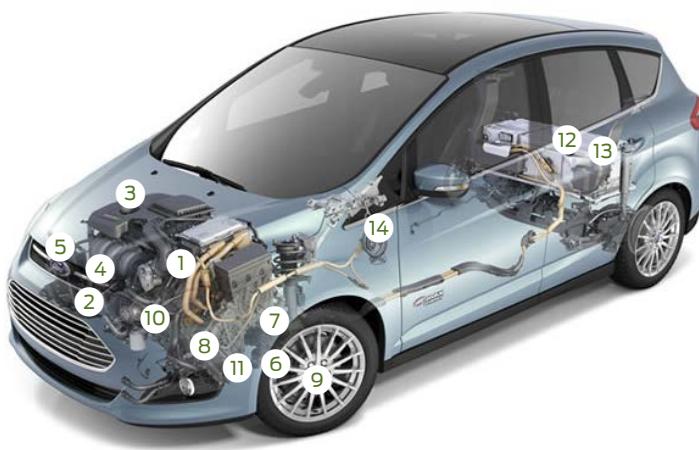
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# PHEV Technology Overview

Below is a detailed look at the components that are used in the Ford C MAX Energi, one of our plug-in electric vehicles (PHEV).

## Ford C MAX Energi Plug-In Hybrid

1. Inverter System Controller
2. Air Conditioning Compressor
3. 2.0L Atkinson-Cycle Gasoline Engine
4. Electric Water Pumps
5. Electric Heater
6. Electric Power Steering
7. Hybrid Transmission
8. Transaxle Oil Pump
9. Regenerative Braking
10. Electric Vacuum Pump
11. Engine Control Module
12. Advanced Lithium-Ion Battery Pack
13. Onboard Charger Module
14. Charge Port Light Ring



### 1 Inverter System Controller

The inverter system controller manages hybrid powertrain control, including DC-to-AC conversion, driving the electric motors in the transmission for optimal fuel economy while providing the performance drivers want.

### 2 Air Conditioning Compressor

Specifically designed for electrified-vehicle application, the compressor draws energy directly from the high-voltage battery pack, which allows the engine to turn off more frequently to save fuel while enabling cabin cooling to continue.

### 3 2.0L Atkinson-Cycle Gasoline Engine

This all-new, high-efficiency, advanced four-cylinder engine has independent variable camshaft timing and delivers fuel efficiency and performance.

### 4 Electric Water Pumps

The main electric water pump provides engine cooling. Smaller pumps provide inverter system controller cooling and heater core coolant circulation when the engine is off.

### 5 Electric Heater

The electric heater is an energy-efficient technology that heats coolant; it is specifically designed for use on electrified vehicles.

## 6 Electric Power Steering

The electric power steering is tuned to deliver class-leading steering feel. It also is available with the Active Park Assist feature.

## 7 Hybrid Transmission

The PHEV's hybrid transmission includes an electric traction motor capable of providing 88 kW of power, coupled with a generator in a powersplit transaxle. It provides an electronically controlled, continuously variable transmission function, which harmoniously manages power from the gasoline engine.

## 8 Transaxle Oil Pump

The oil pump provides powersplit transaxle cooling, which is required by increased electric-only driving.

## 9 Regenerative Braking

With the regenerative-braking technology, more than 95 percent of the energy normally lost through braking is recovered and stored in the battery via the electric drive.

## 10 Electric Vacuum Pump

The electric vacuum pump provides energy-efficient, power-assisted braking.

## 11 Engine Control Module

The engine control module manages engine control systems to maximize fuel economy and minimize emissions.

## 12 Advanced Lithium-Ion Battery Pack

The advanced lithium-ion battery pack provides total energy of 7.6 kWh with air cooling for thermal management. It also includes a control module that manages temperature and state of charge, and a DC-to-DC converter that provides 12V battery to power vehicle accessories (headlights, etc.).

## 13 Onboard Charger Module

Packaged in the battery pack, an onboard charger module converts AC utility power to DC battery storage energy.

## 14 Charge Port Light Ring

A standard SAE J1772 plug interface is used for charging. Ford's charge port "light ring" provides an external indicator of charging status.



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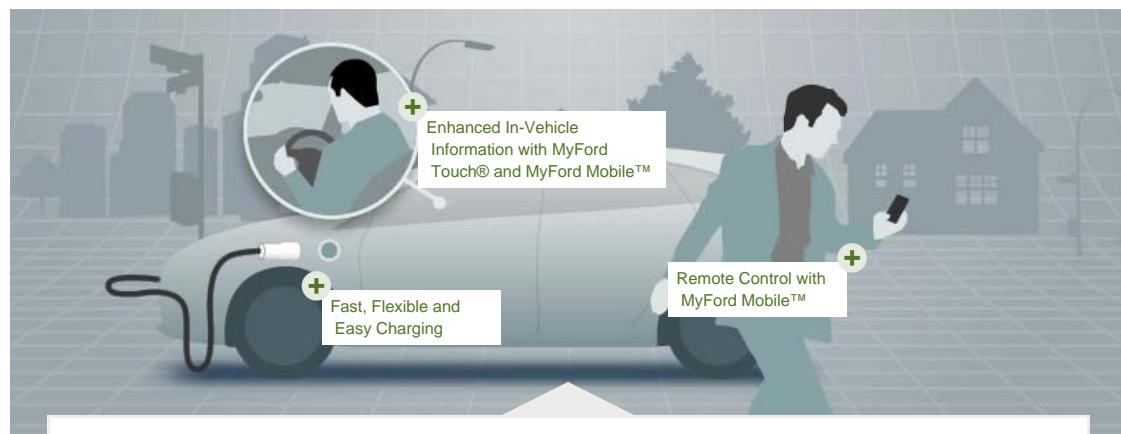
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Case Study: Ford Fleet  
Purchase Planner

Voice: John Fleming

## Living the Electric Lifestyle



### Enhanced In-Vehicle Information with MyFord Touch® and MyFord Mobile™



#### Remaining distance calculation

The MyFord Touch® system is customizable; it shows the distance to the next required charge point, among other options.



#### Remaining charge calculation

The Focus Electric will continuously analyze a driver's style, recalculate range and distance to required charge, and show how driving behavior affects the vehicle's energy "budget."



#### Efficiency coach

The Focus Electric will continuously analyze a driver's style and show how driving behavior affects the vehicle's energy "budget." The system can also coach drivers on how to drive more efficiently to maximize their electric driving range.



#### View power demands of vehicle accessories

The MyFord Touch system will provide vehicle data, such as the electrical demands of vehicle accessories – including air conditioning, which influences the electric driving range.



### Fast, Flexible and Easy Charging



#### Charging status display lights around port

We are making charging easier with an easy-to-read light ring around the charge port. When the plug is connected, the light loops around the port twice. The light ring then illuminates in quadrants as the vehicle charges.



#### Completely recharge at home in just four hours

The Focus Electric uses a 6.6 kW charger, which enables an at-home charge time of four hours when using a 240V charge station installed in the customer's garage. Ford branded Level 2 chargers, available from AeroVironment or Leviton, charge the vehicle more quickly than Level 1 stations, they allow drivers to plan vehicle charging to take advantage of lower "time-of-use" rates and they allow drivers to "precondition" the internal temperature of their vehicles while still plugged into the station.



#### Smart charge schedule charges during off-peak rates

U.S. drivers can customize charging preferences and times based on when utility rates are lowest in their area. Customers reduce their electricity costs by taking advantage of off-peak or other reduced utility rates without a complicated set-up process.

## Remote Control with MyFord Mobile™



### Remote locking and unlocking

Like any Ford vehicle equipped with MyFord Touch®, our electric vehicles allow drivers to remotely start the vehicle and remotely lock and unlock the car doors using their smartphone.



### Monitor your charge and receive alerts

Drivers can monitor the car's state of charge and current range, get alerts when it requires charging, remotely program charge settings and download vehicle data for analysis from their smartphone or a secure Ford website.



### Find charge stations

Working with MapQuest®, MyFord Mobile can communicate the location of a charge station to the Focus Electric using SYNC®'s Traffic, Directions and Information.



### Locate your vehicle

Like any Ford vehicle equipped with MyFord Touch, our electric vehicles allow drivers to locate the vehicle with GPS.



### Compare driving efficiency with friends

MyFord Mobile for EVs also adds a social element. Drivers can compare their driving efficiency to friends and other EV drivers.

To help drivers make the transition to electric vehicles (EVs), and get the most out of their EVs, we are offering more than just the vehicle. We are delivering a total electric vehicle lifestyle. In the U.S., for example, our EVs have advanced in-vehicle communications that help drivers maximize the efficiency and range of their vehicles, find charging stations along their planned routes, and know how far they can go until the next charge based on their own driving style. We have also enabled drivers to connect their smartphones to our vehicles so that they can control charging and other in-vehicle operations remotely. And, we have developed a comprehensive approach to vehicle charging that makes charging fast, easy, affordable and environmentally friendly. Our goal is to deliver electric vehicles that are as engaging, easy to use and empowering as other forms of consumer electronics like smartphones. Our "[Plug Into Ford](#)" website provides customers with an in-depth look at how to make the most of the electric-vehicle lifestyle.

## Enhanced In-Vehicle Information through SYNC® with MyFord Touch® and SmartGauge® with EcoGuide

We designed our battery electric (BEVs) and plug-in hybrid vehicles (PHEVs) to provide more electric range at full charge than most Americans will use each day. But we know that for BEVs, at least initially, driving range between charges will be an important factor for consumers. So we have designed in-vehicle communications to make on-board energy management a rewarding and fun part of the ownership experience.

In the U.S. and Canada, our electric vehicles include an enhanced version of SYNC with MyFord Touch – Ford's driver interface technology – that includes next-generation SmartGauge with EcoGuide. SmartGauge with EcoGuide gives drivers real-time feedback on the efficiency of their driving habits and tips on driving more efficiently through vehicle displays. The system also helps drivers plan the most environmentally responsible route and manage the battery-charging process. For example, the system can provide vehicle data such as the electrical demands of vehicle accessories – including air conditioning, which influences the electric driving range. It also provides information on the battery's state of charge, distance to charge points, "energy budget" and expected range surplus.

The system even analyzes individual driving styles, as well as climate control and other options, to provide tailored information about range and remaining charge. Drivers who drive slowly and smoothly have a greater electric range compared with more aggressive drivers. The Focus Electric continuously analyzes a driver's style, recalculates range and distance to required charge, and shows how driving behavior affects the vehicle's energy budget. The vehicle recognizes drivers by their key fobs so that the data provided takes into account their unique driving style. The system

can also coach drivers on how to drive more efficiently to maximize their electric driving range.



SYNC with MyFord Touch with next-generation SmartGauge gives drivers real-time feedback on the efficiency of their driving habits and tips on driving more efficiently.

MyFord Mobile™ also helps drivers plan their trip based on the available battery range and the location of charging stations. The trip-planning system integrates information about driving style and the driving efficiency "coach" to help drivers go farther on their remaining charge by maximizing regenerative braking, turning down the air conditioning or other efficient driving actions.

The Focus Electric's in-vehicle information is also customizable. For example, information can be viewed in three different modes: Energy Budget, which shows the remaining charge; Range, which shows the distance to the next required charge point; and Surplus View, which shows drivers how much energy or range they are saving by using different options and driving efficiently. The system also uses a variety of simple graphics like an energy "budget cup" and surplus energy "butterflies" and "growing leaves" that make it easy for drivers to quickly interpret information.

Finally, on our Energi plug-in hybrid vehicles, SmartGauge also includes EV+, a program that learns drivers' frequent destinations and adjusts how the electric power stored in the vehicle's high-voltage battery is used to power the vehicle. If EV+ determines the vehicle is within a radius of 1/8 mile, or 200 meters, of a frequent stop, the vehicle has increased capability to stay in electric-only mode, the internal combustion engine stays off, and an "EV+" light appears on the dashboard, further reducing fuel use.

### Remote Control with MyFord Mobile

Drivers in the U.S. and Canada can manage their Ford Focus Electric, C-MAX Energi and Fusion Energi remotely using the Ford-developed MyFord Mobile app. This app allows drivers to locate the vehicle with GPS, remotely lock and unlock the car doors using their smartphone. On our electric vehicles, the MyFord Mobile app provides a suite of additional remote communications. Working with MapQuest® and PlugShare, for example, the MyFord Mobile app can find the location of a charge station on the driver's smartphone and send that location to the Focus Electric using the SYNC services. For the Focus Electric, C-MAX Energi and Fusion Energi, the MyFord Mobile app uses PlugShare to provide users with the most comprehensive database of public charging stations in the U.S. and Canada. Drivers can also get instant vehicle status information, monitor the car's state of charge and current range, receive alerts when it requires charging, remotely program charge settings and review vehicle data for analysis – all using their smartphone or the MyFord Mobile website. Many of the vehicle's screens and control panels are integrated into the MyFord Mobile app's smartphone display, so that drivers can move seamlessly from their car to their phone displays.



The MyFord Mobile app provides a suite of remote communications features to help drivers manage their electric vehicles.

The MyFord Mobile app also allows drivers to program their vehicle to use electricity

from the grid to heat or cool the battery and cabin while the vehicle is still plugged in. This “preconditioning” of the vehicle’s temperature is a key strategy drivers can use to maximize their driving range.

The MyFord Mobile app for EVs also adds a social element by allowing drivers to compare their driving efficiency to that of friends and other EV drivers through seamless connections to popular social platforms like Facebook and Twitter. In addition, the system gives drivers virtual awards and badges for improvements in driving efficiency.

The remote vehicle monitoring and management features of MyFord Mobile were honored with the Best of Innovation Award at the 2012 International Consumer Electronics Show; they also won the 2013 IxDA (Interaction Design Association) Interaction Award for Optimizing category, which honors technologies that make daily activities more efficient.

For more information, see the [MyFord Mobile features video demonstration](#).

## Fast, Flexible and Easy Charging

Charging is one of the most important changes drivers have to get used to with a battery electric vehicle (BEV) or plug-in hybrid electric vehicle (PHEV). Customers typically choose from two common methods for charging their vehicles when at home. Level 1 charging uses a 110 volt (V) outlet, which is standard in most U.S. households or Level 2 charging, which sometimes requires installation of a new electrical circuit. All Ford plug-in vehicles come with a Level 1 charging cord, which fully charges a depleted C-MAX Energi or Fusion Energi in seven to eight hours. This charging can usually be completed overnight, which can take advantage of lower electricity prices. The Level 2 chargers, which use 240 volt circuits, are another charging option, which can have significant advantages particularly for pure battery electric vehicles like the Focus Electric. Level 2 charging stations charge the vehicle more quickly than a Level 1 station, meaning a full charge takes less time and even quick convenience charging while running errands can increase electric miles driven. They also allow drivers to plan vehicle charging to take advantage of lower “time-of-use” rates. And, they allow drivers to “precondition” the internal temperature of their vehicles while still plugged into the station, rather than using the vehicle battery to cool or heat the vehicle while driving, which will reduce the vehicle’s range. A survey commissioned by Ford in early 2014 shows that BEV<sup>1</sup> drivers are three times as likely to own Level 2 chargers compared to Level 1 chargers, while PHEV owners are more evenly divided between Level 1 and Level 2 chargers. We encourage PHEV and BEV drivers to install Level 2 chargers through our marketing materials, websites and dealer training as we believe the faster charging and other benefits will significantly influence customer satisfaction with plug-in vehicles.

We are working with AeroVironment and Leviton charge station providers to develop a Level 2 charging station program to help drivers maximize the benefits of their plug-in vehicles.

The Focus Electric is equipped with a 6.6 kW charger, which enables an at-home charge time of under four hours when using a 240V charge station installed in the customer’s garage. The 6.6 kW charger also allows drivers to get more range out of “quick-stop” charging during the course of their driving day. The Focus Electric can get approximately 30 miles of range per “charge hour,” while our C-MAX Energi and Fusion Energi can get approximately 15 miles per charge hour with their 3.3 kW charge port.

In the U.S., Ford EV drivers can also customize their charging preferences. Drivers can choose the times when their car is ready to go and set a charging schedule that dictates when the charging starts and stops to meet those needs. They can also control vehicle charging using Value Charging, a system that sets up charging times based on when utility rates are lowest in their area. With Value Charging, customers can reduce their electricity costs by taking advantage of off-peak or other reduced utility rates without a complicated setup process. Customers can thus “set it and forget it,” knowing their vehicle will only charge when utility rates are at their lowest. And, our faster charge times make it easier to get a complete charge within the time periods of the lowest utility rates. Our system also sends vehicle owners reminders if their vehicle is not plugged in for a programmed charge time or if their vehicle is unplugged or stops charging unexpectedly during charging. To our knowledge, Ford is the only automaker with a nationwide database of time of use and electrical rates. Our customers gain access to this by participating in MyFord Mobile.

We are also making charging easier with an easy-to-read “light ring” around the charge port. When the plug is connected, the light loops around the port twice to acknowledge a proper connection between the vehicle and the charging station. The light ring then illuminates in quadrants as the vehicle charges, where each quadrant lit represents 25 percent of the battery’s state of charge. Flashing quadrants signify that the charge is in progress. When the ring is solidly lit, the vehicle is fully charged. Drivers can also find out their vehicle’s state of charge by pressing a button on their key fob; in response, the light ring indicates the amount of charge by lighting the appropriate number of segments of the “light ring.”

Similar to our “power of choice” approach to providing customers a range of fuel-efficient and advanced technology vehicle options, we also offer drivers a range of

choices for charging their BEV or PHEV. In the U.S., our recently refined process gives drivers the choice of two charging station installation methods. Customers can opt to purchase the Ford-branded charging station from Leviton or AeroVironment and use an electrician of their choice. Or, customers can choose a full-installation option, in which installation services are provided by AeroVironment using an experienced national network of electricians who handle every aspect, from site survey to completed installation. With the full installation option, charging stations can be installed in one day, at a time and date selected by the customer.<sup>2</sup> The customer can use either a website or call center to schedule and track their purchase and installation. In Europe, we offer a similar service through a relationship with Schneider Electric. Electric vehicle buyers will be registered online at the dealership for a consultation to determine the appropriate installation based on their home electrical system.

- 
1. This includes drivers of mid-range BEVs with a range of 150 miles or less. It includes drivers of Ford and competitor BEVs.
  2. Assumes standard installation in an attached garage. Installation times may vary depending on site conditions and local permitting requirements. Other restrictions may apply. Contact installer for complete details.



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# Maximizing the Environmental Benefits of Electrified Vehicles

Pure battery electric vehicles (BEVs) are considered “zero emission” because they don’t release greenhouse gases or other pollutants during use. But that term can be confusing, because it takes electricity to charge the vehicle, and the power plant generating the electricity may also generate emissions. Electric vehicles do reduce pollutants generated by burning petroleum fuel in the vehicle, in proportion to the reduction in vehicle fuel consumption. However, replacing gasoline with electricity generated from coal, for example, results in emissions at the power plant, including carbon dioxide (CO<sub>2</sub>), nitrogen oxides, sulfur dioxide, volatile organic compounds, carbon monoxide and particulate matter. As a result, the environmental benefits of BEVs and plug-in hybrid electric vehicles (PHEVs) depend largely on the fuels used to power the electrical grid. Operating a PHEV or BEV on the current average U.S. electrical grid, which relies heavily on coal power, results in well-to-wheel emissions that are similar to those of a hybrid electric vehicle (HEV), but the emissions of BEVs, PHEVs, and HEVs are significantly better than vehicles powered by a traditional internal combustion engine. (See the well-to-wheels CO<sub>2</sub> emissions values on the [Comparing Electrification Technologies](#) page.)

In some regions, however, where electrical power is derived largely from cleaner sources, the emissions benefits of PHEVs and BEVs can be much greater, because renewable energy sources produce significantly fewer emissions than coal and natural gas. We believe that, over time, the emissions benefits of PHEVs and BEVs will continue to improve as states undertake efforts to improve the emissions profiles of their electrical grids. Already, many states have portfolio standards that require the use of renewable sources of electricity. “Smart grids” that include grid-to-vehicle communications would enable utilities to make even more efficient use of electricity supplies, potentially reducing emissions and electricity costs. (See MyEnergi Lifestyle for an example of how connected technologies can improve the efficiency of vehicles, homes and electric power generation.)

There has been some discussion regarding whether the additional GHG burdens associated with manufacturing electric vehicles outweigh their benefits while in operation. The U.S. Department of Energy has conducted an investigation of the “cradle-to-grave” (C2G) emissions associated with electric vehicles<sup>1</sup>. The C2G analysis encompasses resource extraction (cradle), transformation of resources into fuels and vehicles, vehicle operation, and vehicle end-of-life disposal and recycling (grave). The U.S. Department of Energy assessment concluded that for today’s plug-in vehicles, the battery cycle contribution to C2G GHG emissions is 1-8 percent and does not negate the environmental benefits of electrified vehicles.

We know that Ford EVs are already helping to reduce CO<sub>2</sub> emissions. As of late April 2014, Ford plug-in electric vehicles (the Focus Electric BEV and Fusion Energi and C-MAX Energi PHEVs) had been driven for approximately 114 million electricity-powered miles. These “all-electric” miles have resulted in a reduction of approximately 8 million kg of CO<sub>2</sub><sup>2</sup> compared to gasoline powered driving. Approximately every three days, Ford PHEV and BEV owners drive another million “all-electric” miles.

In 2014, we revealed a solar-powered C-MAX Energi PHEV concept vehicle. The solar C-MAX Energi concept charges its battery by collecting solar power instead of plugging into an electrical outlet. It uses a special concentrator that works like a magnifying glass to direct intense rays to solar panels on the vehicle’s roof. This rooftop solar system allows the C-MAX Solar Energi Concept to charge its battery without using the traditional electric grid. However, the vehicle still has a charge port, and can be charged by connecting to a charging station via cord and plug so that drivers retain the option to power up using the traditional electrical grid, if desired. With a full charge, the Ford C-MAX Solar Energi Concept is estimated to have the same total range as a conventional C-MAX Energi of up to 550 miles, including up to 20 electric-only miles. Internal Ford data suggest the sun could power up to 75 percent of all trips made by an average driver in a solar hybrid vehicle. This could be especially important in places where the electric grid is underdeveloped, unreliable or expensive to use. The Ford C-MAX Solar Energi Concept is estimated to reduce the annual greenhouse gas emissions a typical owner in the U.S. would produce by four

metric tons by using renewable power, the amount an average U.S. household produces in four months. This vehicle won the "Best in Show" award at the 2014 Consumer Electronics Show.

To help customers think through the relative life cycle carbon emissions of different vehicle options, Ford has developed a carbon emissions calculator. Currently used by Ford's National Account Managers with their fleet customers, this calculator helps customers assess the well-to-wheels emissions benefits and fuel costs of alternative fuel vehicles. For more information on this calculator, please see our [Ford Fleet Purchase Planner case study](#).

## Energy Security Benefits of Electrified Vehicles

The current energy demand for transportation is almost exclusively met by petroleum. Globally, approximately 94 percent of transportation energy demand is provided by petroleum. The near-complete dependence of a vital economic sector on what in many places is an import-dominated energy resource is clearly an issue of concern. One of the major benefits of increasing the proportion of electrified vehicles is that it will diversify the transportation energy demand and provide increased energy security. Hybrid electric vehicles (HEVs) reduce petroleum demand by increasing efficiency. PHEVs reduce petroleum demand by increased efficiency and also by switching some of the energy demand from petroleum to other sources. PHEVs offer flexibility in fuel choice, while BEVs remove the need for petroleum entirely.

The U.S. currently imports approximately 40 percent of its petroleum consumption, though this figure is declining as U.S. oil and gas production increases. The increased electrification of the U.S. vehicle fleet will decrease petroleum demand and accelerate the transition to a more energy-secure future.

## Maximizing Vehicle Efficiency

Electric vehicles are inherently more efficient than gasoline vehicles. In addition, electric vehicles do not consume energy while at rest or coasting, and approximately 95 percent of the braking energy is recaptured at each stop.

Ford has made it a priority to further maximize the efficiency of our electric vehicles. We optimized every system in the vehicle to ensure it would be as efficient as possible. In addition to using the latest technology for the battery and the rest of the electric-drive components, we have maximized efficiency through improved aerodynamics and low rolling resistance. And, we used our knowledge from two generations of hybrid electric vehicles to enhance the Focus Electric's range and efficiency through regenerative braking.

## Maximizing Driving Efficiency

Our in-vehicle information systems also help drivers to increase the distance they can go on a single charge and reduce the overall costs of operating an EV by helping them drive as efficiently as possible. Our electric vehicles can coach drivers on how to maximize efficiency by focusing on the "ABCs" of efficient driving: acceleration, braking and cruising. These tools also help drivers to maximize their driving range. See [Living the Electric Lifestyle](#) for more information. We are also working on future vehicle technologies that will help reduce emissions related to idling in congestion and driving unnecessarily to find parking. Up to 20 percent of a vehicle's lifetime emissions may come from driving around looking for a parking space. For more information on our work to develop new mobility solutions please see the [Mobility](#) section.

## Maximizing Charging Efficiency

As described previously, we are encouraging drivers to switch to Level 2 chargers to increase charging efficiency and driver satisfaction with their plug-in vehicles. However, many of the most important strategies for maximizing the efficiency and environmental benefits of electric vehicle charging require changes to the electrical grid and the fuels used to power it. While these issues are mostly beyond Ford's control, we are working with utilities and municipalities to make the most of electric vehicles' advantages, as discussed below. (See also the [Improving the Electric Vehicle Ecosystem](#) section.)

**Using Renewable Energy:** As the power-generation sector continues to improve its fuel mix, the environmental impact of driving a plug-in vehicle will diminish substantially – perhaps even toward zero. But adding more renewable fuel sources to electrical grids will take time. As this evolution takes place, smart vehicle-to-grid communication systems can help utilities better use the renewable energy sources that are accessible. For example, such systems can allow vehicles to charge when wind power is most available (usually at night) or during the day from solar arrays, depending on the renewable source available and its output.

In addition, home-based solar power is becoming more affordable. Solar power in general has dropped from approximately \$6 per watt of capacity in 2011 to \$2 to \$3 per watt in early 2013. In states with home solar power incentives, customers may be able to lease solar energy systems at a price that is lower than their current monthly electric bill, with no upfront cash.

Ford is working with utility partners to develop home-based solar recharging stations that will allow EV owners to obtain the power they need to charge their vehicles from renewable sources, even if the overall electricity grid has not changed. Our research shows that nearly 40 percent of EV customers either have solar power or plan to purchase it within a year. We have partnered with SunPower Corp. to offer customers the **Drive Green for Life** program, which includes a home rooftop solar system that can provide enough clean, renewable energy to offset the electricity used to charge the car. The 2.5 kW rooftop solar system is backed by a 25-year limited warranty and produces an average of 3,000 kilowatt hours of electricity annually. The high-efficiency panels generate approximately 50 percent more electricity than conventional panels and utilize a smaller footprint on the roof. The system is sized to provide the electricity needed to drive about 1,000 miles per month or 12,000 miles per year. We are working with SunPower to ensure that the unit is competitively priced. We are also providing additional incentives to customers who work with Ford dealers to start the process of getting this solar power system.

**“Smart Grids and Smart Charging”:** The development of smart grid technologies, which can provide utilities and customers with real-time information on energy use and energy prices, is a key enabler of the efficient integration of electric vehicles and grids, and an important strategy for maximizing EV efficiency and environmental benefits. Smart grids will help make the electrical grid and electrical vehicle charging more efficient by channeling vehicle charging to times when electrical grid resources are currently underutilized. Since demand for electricity fluctuates (generally peaking in the afternoon and dropping off at night), utilities typically use a mix of fuels and power plant types to meet demand. That means the environmental impacts of electric vehicle use will vary depending on where and when the vehicles are charged. During certain seasons and particularly at night, utilities generally have excess generation capacity – unused resources that create financial inefficiency. Charging PHEVs and BEVs during these off-peak hours, when this excess capacity is available, can increase the overall efficiency of the electric grid – potentially reducing CO<sub>2</sub> emissions, as well as the cost of electricity for all utility users. If PHEVs and BEVs are charged at peak times, that could create increased CO<sub>2</sub> emissions from power generation and also create demand for additional power plants. Utilities have a role to play in educating electrified-vehicle users and providing them with incentives to charge their vehicles at the most beneficial times.

Smart meters are a key element of smart grids. Smart meters allow two-way communication between homes and their electric utility, and also between “smart” equipment in customers’ homes (such as plug-in vehicles) and the utility. Smart meters facilitate “smart vehicle charging” during lower-cost, off-peak times.

**Value Charging:** Value Charging, a feature available on Ford’s electrified vehicles in the U.S., also helps to maximize the efficiency of charging and the environmental benefits of EVs. This system contains information on local utility rates and off-peak times to charge, which helps to prevent the need for infrastructure upgrades to support added energy demand and reduce the production of additional CO<sub>2</sub>. Ford will continue to work with utility partners and municipalities to help further develop systems to maximize the effectiveness of electric vehicles and their interaction with the electricity grid.

## A Holistic Environmental Approach

Reducing emissions and maximizing vehicle efficiency are just some of the elements of our strategy to maximize the environmental benefits of EVs. We are also using green power and green technologies to manufacture our EVs, as well as green materials in our electrified vehicles and charging stations.

The Michigan Assembly Plant, for example, which produces the Focus Electric, C-MAX Energi and C-MAX Hybrid, in addition to the standard gas-powered Ford Focus, is powered by one of the largest solar arrays in the state of Michigan. We partnered with DTE Energy to install this solar panel system at the plant. We are also working with DTE Energy to develop a stationary battery energy storage system that will store excess power produced by the solar array until it is needed in the plant. This battery storage system uses electric vehicle batteries that have reached the end of their useful lives in vehicles. This approach provides a second life for vehicle batteries, which reduces waste and maximizes the efficiency of solar power. The Michigan Assembly Plant also uses power generated from the methane released from decaying trash at a nearby landfill, which reduces emissions of this potent greenhouse gas. And the plant uses battery-electric-powered tugs, converted from diesel power, to move vehicles and parts around the plant. The tugs are powered directly from the solar array, and when not in use the remaining energy stored in the tug batteries is discharged into the 750 kW battery bank.



The Michigan Assembly Plant – which produces the Focus Electric, C MAX Energi, C MAX Hybrid and gas-powered Ford Focus – is powered by one of the largest solar arrays in the state of Michigan.

Ford is also using green materials in our HEVs, BEVs and PHEVs, as well as many of our other vehicles. For example, our existing HEVs use recycled-content seat fabrics. Since 2011, all of our U.S. vehicles, including our electrified vehicles, have used soy foam. For more information about our use of green materials in vehicles, please see the [Sustainable Materials](#) section.

1. Joseck, F., and Ward, J., Cradle to grave lifecycle assessment of vehicle and fuel pathways, DOE Program Record 14006, (2014). See [http://www.hydrogen.energy.gov/pdfs/14006\\_cradle\\_to\\_grave\\_analysis.pdf](http://www.hydrogen.energy.gov/pdfs/14006_cradle_to_grave_analysis.pdf).
2. This CO<sub>2</sub> reduction value is a “net” well to wheels value based on the reduction in CO<sub>2</sub> emissions resulting from the greater efficiency of the electric versus the gasoline engine. But it also accounts for the fact that the grid electricity that is being used to recharge the vehicles also produces upstream CO<sub>2</sub> emissions. All-electric miles driven are calculated from data collected through the MyFord Mobile database.



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## Improving Electrified Vehicle Affordability

The current cost to make plug-in vehicles is substantially higher than that of conventional vehicles, largely due to the cost of batteries. Depending on the price of electricity and gasoline, however, the energy cost to operate an all-electric car is in the range of 3 to 4 cents per mile, compared to about 8 to 16 cents per mile<sup>1</sup> for a conventional gasoline-powered vehicle. So, lower operating costs can help to offset the higher initial purchase price of electric vehicles (EVs).

To develop next-generation electrification technologies and electrified vehicles, automakers and their suppliers will need to invest billions of dollars. In addition, utilities will need to invest to increase electricity generation and transmission capacity, with generally higher costs for green electricity sources. Governments will also need to invest by encouraging and facilitating the development of technology and infrastructure, and providing incentives for consumers to buy EVs. At present, Ford is doing what it can to reduce the costs of manufacturing and operating EVs.

### Reducing Vehicle Production Costs

We have planned our electric vehicle strategy based on our highest-volume global platforms, which can help to reduce the costs of electric vehicles by creating economies of scale. For example, the Focus Electric, C MAX Hybrid and C MAX Energi plug-in hybrid are all based on our global C-platform, which we expect to underpin 2 million vehicles annually.

We are using best-in-class flexible manufacturing technology in our Michigan Assembly Plant, which produces the Focus Electric, C MAX Hybrid and C MAX Energi, as well as the gas-powered Focus. Flexible manufacturing allows us to switch production between different vehicles to meet changing customer demand without retooling our plant or assembly lines – a significant cost reduction. This is important in helping us respond nimbly to a changing market.

Ford is working with a range of battery suppliers and other partners to develop next-generation battery technologies that will help to bring costs down. Please see the [Battery Technologies](#) section for more information on advanced batteries for EVs.

### Reducing Vehicle Operation Costs

The fuel costs of battery electric vehicles (BEVs) are significantly lower than for gasoline-powered vehicles. EVs require less energy to move a given distance, compared to conventional gas-powered vehicles. The average price for residential electricity in the U.S. is about 12 cents per kilowatt-hour. The fuel cost to travel 80 miles in a Focus Electric with a combined fuel economy of 105 MPGe is about \$3. Driving 80 miles in a highly fuel-efficient, competitive gasoline-powered vehicle that gets 40 mpg would cost about \$8 (assuming \$4 per gallon of gasoline) – approximately three times more than the EV. If drivers use Ford's Value Charging, the cost of traveling 80 miles in the Focus Electric drops even further to approximately \$1 to travel 80 miles.

We are taking a range of steps to further reduce the operating costs of EVs to help offset their higher purchase price.

Through Value Charging, for example, we are helping EV owners find the most efficient times to charge their vehicles. This system helps customers reduce their electricity costs by taking advantage of off-peak or other reduced utility rates without a complicated setup process.

The MyFord Touch®-based in-vehicle communications systems on our electric vehicles, described in [Living the Electric Lifestyle](#), also help reduce EV operating costs by enabling drivers to maximize their driving efficiency and in-vehicle energy use.

Our BEVs will also have lower maintenance requirements than gas-powered vehicles. The Focus Electric eliminates more than two-dozen mechanical components that would normally require attention during the life of the vehicle. So, for example, drivers

won't have to change oil, oil filters, fuel filters or spark plugs, or worry about a worn out muffler or serpentine belt. Based on a regular oil change maintenance schedule, Focus Electric owners will save approximately \$500 over the 150,000-mile life of the vehicle on oil change costs alone.

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1. Assuming an energy consumption of about 3 to 4 miles/kWh at 12 cents/kWh for the electric vehicle, and a fuel economy of 40 miles/gallon at \$3 to \$5/gallon for the gasoline vehicle.



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# Battery Technologies

## Ford's Approach to Advanced Technology Batteries

All of Ford's newest electrified products use lithium-ion batteries, which offer a number of advantages over the nickel-metal-hydride batteries we used in the past. For example, they are generally 25 to 30 percent smaller and 50 percent lighter, making them easier to package in a vehicle.

The Focus Electric is powered by a lithium-ion battery system that utilizes cooled and heated liquid to regulate battery temperature, extend battery life and maximize driving range. The innovative thermal management technology helps the Focus Electric operate efficiently in a range of ambient temperatures. Advanced thermal management of lithium-ion battery systems is critical to the success of pure electric vehicles, because extreme temperatures can affect performance, reliability and durability.

We continue to research and develop improved battery technologies to make battery-powered vehicles even more efficient and affordable and allow them to go farther on a single charge. In 2013, we opened a new battery research center with the University of Michigan that allows Ford to collaborate with battery cell manufacturers, suppliers, university researchers and start-ups to test new battery concepts on a small scale that could be replicated for full production.

Ford is also assisting in developing end-of-life recycling infrastructure in the U.S. for nickel-metal-hydride and lithium-ion batteries, both of which are high-voltage batteries. For example, we are providing educational material on battery removal, transportation and recycling, as well as a call center for end-of-life vehicle dismantlers through the End of Life Vehicle Solutions Corporation (ELVS). (The ELVS, of which Ford is a participating member, was created by the automotive industry to promote the industry's environmental efforts in recyclability, education and outreach, and the proper management of substances of concern.) We are also connecting scrap buyers with dismantlers who have high-voltage batteries to recycle. In addition, Ford is working with DTE Energy to develop stationary energy storage systems from vehicle batteries that have reached the end of their useful life in vehicles. Ford engages with all the parties that handle end-of-life batteries, including customers, local authorities, emergency services (e.g., tow trucks and first responders), dealerships, independent workshops and garages and vehicle recyclers. Customers can recycle their batteries with local recyclers or bring them to any Ford or Lincoln dealer for no-cost recycling.

## Supply Chain Issues

As the widespread electrification of automobiles moves closer to reality, a new set of concerns is emerging regarding the environmental and social impacts of extracting and processing key materials needed to make electric vehicles. For example, there are concerns about rare earth metals, which are used in electric motors for vehicles, wind turbines and other advanced technologies; also, a better understanding of mining processes is required.

Significantly accelerating the production of electric vehicles is likely to require the use of much greater quantities of lithium and rare earth metals. Currently, production of these resources is concentrated in a few countries, including Chile, Bolivia and China, which has led to questions about the adequacy of the supply of these resources and the potential for rising and volatile prices as demand puts pressure on existing supplies. In addition, there are concerns about geopolitical risks posed by the limited availability of these materials. Could we be trading dependence on one limited resource (petroleum) for another? Finally, the use of water in the production of these materials needs to be considered.

We take these concerns very seriously. With scientists at the University of Michigan, we have conducted and published a study of lithium availability and demand. We found that there are sufficient resources of lithium to supply a large-scale global fleet of electric vehicles through at least the year 2100.<sup>1</sup> We conducted a study of rare earth element availability and demand with scientists at the Massachusetts Institute of Technology. We found that absent efficient reuse and recycling or the development of technologies which use lower amounts of dysprosium (Dy) and neodymium (Nd), following a path consistent with stabilization of atmospheric CO<sub>2</sub> at

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450 ppm might lead to an increase of approximately 700 percent and 2600 percent in the use of these two elements, respectively, over the next 25 years if their present needs in automotive and other applications are representative of the future needs.<sup>2</sup>

Ford generally does not purchase raw materials such as lithium and rare earth metals directly – they are purchased by our suppliers (or their suppliers) and provided to us in parts for our vehicles. As described in the [Supply Chain](#) section of this report, our contracts with suppliers require compliance with the legal requirements of Ford's Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility and the adoption of a certified environmental management system (ISO 14001). We are working in our supply chain to build the capability of our suppliers to provide sound working conditions in their operations. We ask the suppliers we work with to take similar steps with their suppliers. We are also working cooperatively with other automakers to extend this approach through the entire automotive supply chain.

As part of our [water strategy](#), we are working with colleagues at the Georgia Institute of Technology to evaluate the water requirements and impacts of powering vehicles with conventional fuels, biofuels and electricity. This work includes a study of the water requirements of lithium extraction and processing, which, based on our understanding of the extraction of lithium from brines in arid areas, we anticipate will be low.

We will continue to monitor and assess these issues for their potential impact on our electrification strategy and our sustainability commitments.

- 
1. P. Gruber, P. Medina, S. Kesler, G. Keoleian, M.P. Everson, T.J. Wallington, Global Lithium Availability: A Constraint for Electric Vehicles?, *J. Industrial Ecology*, 15, 760 (2011).
  2. E. Alonso, A.M. Sherman, T.J. Wallington, M.P. Everson, F.R. Field, R. Roth and R.E. Kirchain, *Environ. Sci. Technol.*, 46, 3604 (2012).



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## Improving the Electric Vehicle Ecosystem

We are collaborating with consumers, municipalities, utilities, and other supporting industries to develop an “electric vehicle ecosystem” that can support and enhance the operation of EVs and help deliver greater benefits to customers and the environment. For example, we are working with utilities and municipalities to address impacts of EVs on the electrical grid. We are also working with other industry partners to maximize the efficiency and benefits of charging EVs for vehicle owners.

### Working with Utilities and Municipalities

If EVs are charged during times of peak electricity demand, they may stress the current grid and require the construction of additional electricity supply. Furthermore, charging vehicles during peak demand would significantly reduce the operating cost benefits expected from electric vehicles. “Smart grid” technology that allows communication between recharging vehicles and the electrical grid provides a key opportunity to maximize recharging efficiency and minimize stress to the grid. Automakers and utilities must continue to work together to develop this “smart” vehicle-to-grid communication system. Overcoming these challenges will require significant collaboration between automakers, electric vehicle supply equipment manufacturers, electric utilities, regulatory agencies and legislators.

Because utilities and automakers have not had to work together in the past, effective collaboration requires developing new relationships and learning about each other’s business and regulatory challenges. For example, utilities and automakers have very different business models: utilities operate regionally and have little to no direct competition within their markets, while automakers operate and compete globally. Furthermore, automakers are primarily regulated at the national level, while utilities face more local and state regulations, which increases the difficulty of establishing a national strategy for vehicle-to-grid interaction. It will be important for automakers and utilities to understand and address these kinds of differences as they work together on vehicle electrification issues.

Initially, much of our work with utilities was focused on demonstration and testing projects to help develop the best path forward for large scale deployment of plug-in vehicles. From 2007 to 2012, Ford worked with the Electric Power Research Institute (EPRI) and several utilities on a U.S. Department of Energy funded project to assess the performance and charging options for plug-in hybrid electric vehicles (PHEVs). The projects included testing PHEVs in over 800,000 miles of real-world driving and conducting vehicle-to-grid connectivity testing with “smart meter” technology. Lessons learned from this testing, as well as from the entire demonstration, helped support the production introduction of our two plug-in hybrid electric vehicles: the Ford C-MAX Energi and the Ford Fusion Energi.

We are continuing this demonstration and testing work in Europe. In Germany, Ford is working with 12 other partners on the cognE-mobil program, using a fleet of 66 electrified vehicles – including Focus Electrics and C-MAX Energi plug-in hybrids – to conduct road testing. The partners are examining further aspects around e-mobility in the area of Cologne, integrating regional and supra-regional traffic and public transport. The goal of this project, is to examine interlaced and marketable solutions for electrically powered vehicles as well as the appropriate charging infrastructure in the Rhine Ruhr region. In addition to Ford, the partners include a local energy provider, a solar energy company, public transport providers, as well as a university and research agencies. This program is part of a much larger research effort in several German cities that is partly funded by the German government and involves multiple automakers, utility companies, universities and technology partners.

In the U.S., we are working with utilities, municipalities and states across the country to develop and facilitate the use of EV implementation best practices. For example, in 2013, we joined EV-related collaborative in California, Oregon, and Florida. These collaboratives include representatives from local government, utilities, automakers, and other industry players who are working to implement EVs. Some of the key issues we are working on with local utilities and municipalities include the following:

- **Time-of-use electricity rates:** We are encouraging utilities to adopt a “time-of-use” rate structure, which would enable them to charge different rates at different

times of the day based on overall electricity demand. Under a time-of-use structure, electricity rates would be lower at night when there is lower demand on the electrical grid. Since most EVs charge at night, this increases the benefits of electrified vehicles for consumers. For example, a 20-mile trip on electricity at national rates of 0.12 cents/kWh costs about \$1. If a customer is able to switch to a time-of-use rate, this trip could cost as little as 50 cents. Time-of-use rates also help utilities by giving customers an incentive to charge at times when electrical demand is already low, which helps to balance out utilities' electrical loads.

- **Maximizing the publicly accessible recharging infrastructure:** We are working with municipalities and utilities to develop additional public recharging stations and to encourage a thoughtful and holistic approach to planning for publicly accessible charging. PlugShare, a website that tracks publicly accessible charging stations, currently includes about 24,000 public charge stations in cities throughout the U.S. and Canada, up from about 16,000 in 2013 and just 5,000 a few years ago. This is an important step in fostering electrified vehicle use. However, the placement and design of publicly accessible charging stations requires careful consideration to maximize their usefulness to EV drivers. We are endorsing a holistic urban-planning approach to charging station development in which local officials actively plan the locations for publicly accessible EV charging based on traffic patterns and the locations of other charging stations. This kind of approach will result in charging locations that are used more often and will make more efficient use of investment dollars. We are also encouraging standard rules and signage for public refueling infrastructure that would tell drivers what type of charging is available, the hours when EVs can use charging stations, the length of time an EV can remain plugged in and how rules for charging stations are enforced.
- **Standards for private, third-party charging stations and the resale of electricity:** In many cases, publicly available refueling stations will be installed and run by private businesses, such as gas stations and restaurants. In most states, when a third party resells their electricity, as they would to an EV driver, they are considered a regulated utility and face the same stringent regulations a utility must follow. We are working with states to encourage updating regulations so that reselling electricity for transportation would not be subject to utility-like regulations. This will encourage the development of more publicly accessible recharging stations.
- **Home EV charging station permitting process:** Homeowners are required to get a permit from their municipality and/or utility to install a home EV charging station. Historically this process can take more than two weeks. We have been working with utilities and municipalities to encourage modifications to streamline the permitting process to make it easier and shorter for consumers.
- **Promoting EV incentives:** Through our work with cities and utilities, we have identified a range of actions that will help consumers make the transition to electrified vehicles – for example, infrastructure incentives to offset a portion of customer costs for hardware and installation.
- **Building codes for new construction:** We are working with municipalities to develop codes for new building construction that would make them "EV ready," with best practices such as wiring for EV chargers.

We are working on these issues in a variety of ways, including with utilities and municipalities in key EV markets across the U.S. We are also serving in a formal advisory role to utilities in several states. Ford is also an active member of the Electric Drive Transportation Association, an industry group that is working to implement EVs in the U.S. And, we are testifying before state legislatures around the country to endorse legislation that will facilitate the successful implementation of EVs.

Our collaborations with utilities and municipalities are yielding key lessons that we are incorporating into our continued efforts to make electrified vehicles successful in the real world. Some of the key learnings so far include the following:

- Electric vehicles provide additional impetus to develop smart communication systems between vehicles and grids. These systems will allow the consumer to know if and when lower electricity rates are available and help prevent additional loads on the infrastructure. Smart communication systems could alleviate the need for expensive infrastructure upgrades, the costs of which may be passed back to customers by utilities (e.g., if a transformer needs to be upgraded).
- Smart vehicle charging will require that utilities and automakers develop a common standard for vehicle-to-grid and grid-to-home meter communications. Currently, utilities tend to operate regionally, but electric vehicles will increase the need for common national and even international standards. We have worked to develop a common charging standard in the U.S., and we are now focused on fostering the development of an internationally common charging standard.
- Widespread use of electric vehicles will likely require that vehicle power consumption be measured separately from home electricity use, requiring either additional meters or smart meters. In addition, the pooling of electrified vehicles in a particular region may require upgrades to the transformers and/or substations that form the electrical grid in that area. Utilities are already installing smart meters at a rapid pace. There are interesting possibilities for vehicle-to-grid and vehicle-to-home power flow. However, there are also significant

challenges to making these possibilities a reality. For example, technical, safety, codes/standards compliance, legal, robustness and business case issues need further study prior to commercialization.

- Vehicle owners will likely want to be able to charge their vehicles at any geographic location and – in those cases where another payment method isn't used – have the cost applied to their home energy bill. In addition, vehicle identification and home meter association must be seamless for the customer. This kind of mobile or remote billing for vehicle charging services will require a paradigm shift in the utility industry's current billing processes and tools.
- Automakers and utilities both benefit from working together on outreach to local, state and federal regulators and legislators. Ford and our utility partners are already working with legislators and regulators on national standards for vehicle charging infrastructure, and incentives and strategies to bring costs down.
- Utilities and automakers need to work together to educate consumers about the differences between electric vehicles and traditional vehicles so that consumers understand how to make the most of electric vehicles and charging infrastructure.

We are also working to develop common charging technology for electric vehicles so that all electric vehicles will be able to use a common plug-in charging system for both AC and DC fast charging. In North America, the Society of Automotive Engineers, with Ford's participation, successfully developed and approved a standard charge connector and communication protocol, enabling all plug-in vehicles to use common charge points. This will be a key enabler for adoption in North America; the same connector is under consideration in other global markets.

## Expanding Workplace Charging

As part of our effort to expand EV charging infrastructure, we signed onto the U.S. Department of Energy's pledge to increase vehicle charging infrastructure available in workplaces across the country in January 2013. The Workplace Charging Challenge is a collaborative effort to increase the number of U.S. employers offering workplace charging by tenfold in the next five years. As part of this program we are installing 180 electric vehicle charging stations at nearly every Ford facility – including company offices, product development campuses and manufacturing facilities – in the U.S. and Canada throughout 2014. Our employees will be able to charge the all-electric Focus Electric and the Fusion Energi and C-MAX Energi PHEVs at the charge stations to increase the number of all-electric miles driven. The service will initially be free to employees for the first four hours of each day. Our workplace charger installation is different from other automotive companies' because the chargers will be networked together. As a result, Ford will be able to gather information on electrified vehicle use, such as the number of hours vehicles are charging and the amount of CO<sub>2</sub> reduced. Ford will work with GE as its network provider and supplier of electric vehicle charging stations.

## Working with Other Industries through the MyEnergi Lifestyle Project

The continued adoption of plug-in vehicles that share the same energy source (electricity) as the home creates a unique convergence between the transportation and residential sectors. In 2013 we launched the MyEnergi Lifestyle project to demonstrate how plug-in vehicle technology can be applied in conjunction with efficient household appliances and renewable energy generation for an energy- and money-saving lifestyle.

The Ford-led project, which currently includes Whirlpool, Eaton, Infineon, SunPower and the Georgia Institute of Technology, shows that more efficient and coordinated use of home electricity for appliances and electric vehicles can, on an annual basis, reduce a home's electricity use by up to 55 percent, reduce users' electricity bills by up to 60 percent, and reduce electricity-based home carbon dioxide emissions by up to 56 percent.

Initially, these results were based on computer simulation of an average American home developed in partnership with the Georgia Institute of Technology. The model compared two scenarios: (1) an average home with appliances from 1995, two gasoline vehicles with a fuel economy of 25 miles per gallon each, no solar power, and no intentional off-peak electricity usage, and (2) a home with 5 kW of SunPower solar panels installed on the roof, one gasoline vehicle replaced by a Ford Focus Electric, all appliances replaced by 2012 Whirlpool appliances (including refrigerator, hot water heater, dishwasher and clothes washer/dryer), and a shift in home energy usage (including EV charging) to take advantage of time-of-use (Value Charging) reduced rates.

Over the course of 2013, these model-based results were confirmed in the real world by families participating in this program. For example, one participating family realized more than \$1,200 saved in annual fuel costs with their C-MAX Energi. They expect to save more than \$300 annually from their new solar panel system and the system offsets more than 70 percent of the energy used in their home. They have also seen a more than 25 percent reduction in energy costs and CO<sub>2</sub> due to the installation of their new energy-efficient Whirlpool refrigerator.

In 2014, we upgraded the program to include battery storage technology to store power generated by solar panels or other renewable energy systems.

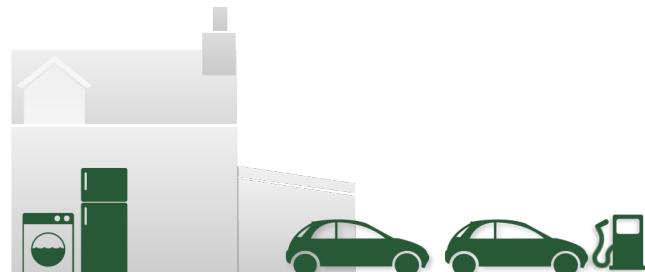
These improvements would be hugely significant if implemented on a broader scale. If every home in the U.S. were to implement these energy-saving technologies, it would be equivalent to eliminating the electricity usage of more than 32 million homes (or all the homes in California, New York state and Texas combined). For more information on this project please see [myenergilifestyle.com](http://myenergilifestyle.com)

## MyEnergi Lifestyle

New technology is enabling American families to reduce their electricity bills and CO<sub>2</sub> footprint by integrating a plug-in vehicle, energy-efficient appliances, renewable energy sources and cloud computing that takes advantage of lower off-peak electricity rates.

### Average U.S. home

11,000kWh  
of electricity used every year



### MyEnergi Lifestyle home

Reduces energy costs by  
**60%\***

If implemented in every home in the U.S., these technologies would save the equivalent of the electricity usage of 32 million homes, or approximately the total number of homes in California, New York, and Texas combined.



\* Comparing 1995 appliances and a 25 mpg vehicle to 2012 appliances and a Ford C-MAX Energi plug-in hybrid vehicle with value charging.



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## Greening Our Operations

We have adopted a rigorous and holistic approach to reducing the overall environmental impacts of our manufacturing facilities. As part of this strategy, we have established global facility environmental targets that address the range of our environmental impacts, including energy use, emissions, water use and waste generation. Our global, company-wide targets include:

- Reducing greenhouse gas emissions from our manufacturing facilities by 30 percent per vehicle produced from 2010 to 2025
- Reducing average energy consumption per vehicle produced by 25 percent globally from 2011 to 2016
- Reducing water use per vehicle produced by 30 percent between 2009 and 2015
- Reducing waste to landfill per vehicle produced by 40 percent between 2011 and 2016

We made progress toward meeting each of these goals in 2013 including:

- Reduced CO<sub>2</sub> emissions from our manufacturing facilities per vehicle produced by 9 percent compared to 2012.
- Reduced average energy consumed per vehicle produced by 4 percent compared to 2012.
- Reduced water use per vehicle produced by 5 percent compared to 2012, and met our 2015 target two years early.
- Reduced waste to landfill per vehicle produced by 14 percent compared to 2012.

This section reports on our facilities' environmental performance, including [operational energy use and greenhouse gas emissions](#), [non-CO<sub>2</sub> facilities-related emissions](#) (including volatile organic compounds), [water use](#), [waste management](#), [sustainable land use and biodiversity](#), [compliance](#) and [remediation](#).

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## Facilitating and Measuring Progress

In addition to our global, company-wide environmental performance goals, each Ford facility also has a comprehensive set of environmental targets and uses a detailed scorecard to report against these targets, so that we can track and accelerate improvements. Progress toward the targets is reviewed throughout the year by senior management at regular Business Plan Review meetings. In addition, these targets become part of the performance review metrics for every plant manager and regional manufacturing manager, as well as others in the management hierarchy up to the executive vice president of manufacturing and labor affairs. For more information on our overall sustainability governance, integration and management processes, please see the [Governance](#) section.

We have developed a series of tools and processes to manage environmental issues in our operations that help us facilitate and measure progress on key issues including energy use, water use, and waste generation and disposal. These tools help us accomplish four tasks that are central to advancing and measuring our progress on environmental issues:

- Setting corporate-, regional- and facility-level performance goals and targets;
- Managing internal and external goals, targets and regulations;
- Evaluating, standardizing and spreading the use of best practices across our facilities to help us meet performance goals; and
- Tracking performance using accurate and standard data to help us assess and improve performance.

## Environmental Operating System – managing environmental performance goals, targets and regulatory requirements

Ford's Environmental Operating System (EOS), which is fully aligned with the Ford Production System (FPS), provides a standardized, streamlined approach to maintaining compliance with all legal, third-party and Ford internal requirements, including government regulations, ISO 14001 and Ford's own environmental policies, and business plan objectives and targets. In addition to facilitating compliance with external regulations, the EOS also helps us develop and track internal environmental performance goals at the corporate, regional and facility level.

## Energy Management Operating System – managing energy-related goals, targets and performance improvements

In 2013, we finalized the global rollout of our Energy Management Operating System (EMOS). We developed this system to provide a common and global structure to support and maintain energy-reduction actions, to achieve the corporate goal of improving global energy use per vehicle produced by 25 percent between 2011 and 2016. The EMOS is our mechanism for integrating energy-efficient principles into the facility design, manufacturing/engineering processes, and operations of Ford Manufacturing, Office and Engineering facilities. The system is aligned with our Ford Production System (FPS) and ISO 14000/50001 principles, and it leverages existing lean manufacturing principles including Plan-Do-Check-Act (PDCA) protocols and Six Sigma tools.

Plant Energy Teams lead the implementation of the EMOS. At each plant, an energy management team develops a plant-level energy road map, which provides an overview of planned energy actions and a forecast of how well the plan will meet the corporate energy reduction objective. As an input to the road map, the energy team performs an "energy health assessment," which evaluates the plant's operational performance, provides comparisons to other plants, and provides a list of best practices the plant can use to improve energy efficiency. Plant startup and shutdown processes are a key area of focus for energy teams, as these processes have significant impacts on plant energy use and provide major opportunities for energy use reduction. The team is also responsible for "energy opportunity evaluations," which seek to identify additional opportunities to further improve energy efficiency beyond those provided in existing best practice lists. These additional efficiency

opportunities could be based on peculiarities of the specific plant or they could be new ideas that contribute to future best practices that might be implemented in other plants as well.

In addition to the Plant Energy Teams, the EMOS also includes three other teams of people working cooperatively to support the work of the Energy Teams:

- Facility Changes – this group is responsible for spreading best practices across Ford facilities by developing standards and specifications that are used in planning for the future (both facility and process) and getting the standards embedded into future product/project plans.
- Data Management – this group ensures robust and timely data for reporting and analysis to support Plant Energy Teams and other decision-makers.
- Energy Supply and Quality – this group addresses energy purchases to ensure reliable and low-cost energy

## Global Facilities Forum – developing global standards and best practices

In 2011, we established the Global Facilities Forum (GFF) to standardize processes for construction and refurbishment of Ford facilities. The GFF includes representatives from Ford's Environmental Quality Office, which oversees the environmental performance of Ford manufacturing facilities and Ford Motor Land Development Corporation (or "Ford Land") which manages the construction of all Ford-owned facilities and the maintenance of Ford's nonmanufacturing and commercial real estate facilities. The Forum also includes representatives from each of Ford's operating regions. Before establishing the GFF, each region and operating group within Ford maintained its own set of standards, which made it more difficult to capture, record, and spread best practices and lessons learned. The GFF develops and manages facility specifications and construction practices globally to achieve cost and sustainability objectives and spread best practices across our facilities. The GFF also prioritizes incorporating energy and sustainability objectives into building standards. Another key improvement of the GFF is a focus on life cycle costs, not just first or implementation costs. This facilitates the implementation of many energy-efficiency and other environmentally preferable strategies, as well as reducing total costs to the company. This standardization of best practices, especially environmental best practices, is becoming increasingly important as Ford continues significant investments in new facilities in Asia and refurbishing existing facilities in the United States.

## Facility Performance Improvement – setting goals and performance improvement plans for existing plants

We implement year over year, internal facility-level goals at our existing plants for environmental performance in key areas, energy use, carbon dioxide (CO<sub>2</sub>) emissions, waste to landfill, water, and volatile organic compound (VOC) emissions for assembly facilities and hydrocarbon use for powertrain facilities. Through this program we determine the Ford plant with the best performance in each of these areas and set annual improvement targets for other plants based on ultimately meeting this stretch goal. In addition to setting internal facility goals, we also develop a road map for each facility to help them meet these goals. For example, through this program, we identify best practices plants have used to achieve their excellent performance, we evaluate these best practices for replication at other facilities, and we communicate best practices through a "single point lesson" system. This process will be fully implemented globally in 2014.

## 100 Point Sustainability Program – setting goals and performance improvement plans for new or refurbished plants

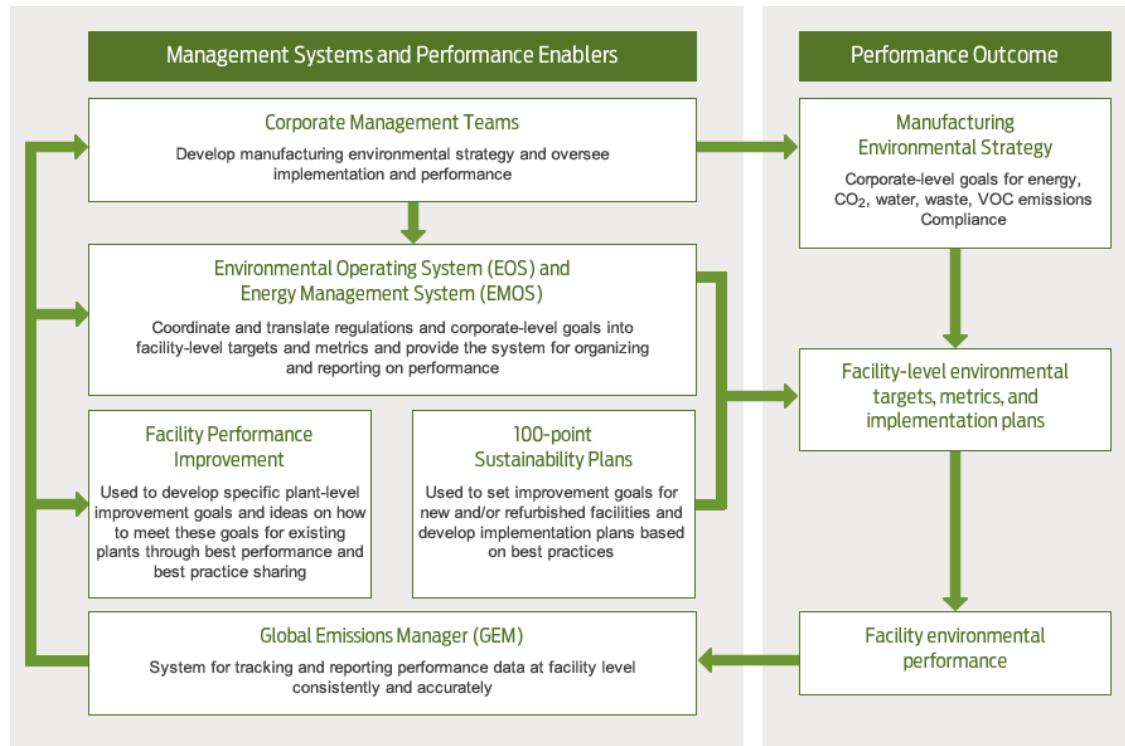
We use a 100 point sustainability program to incorporate environmental performance best practices into new plants, plants that are being renovated for a new vehicle programs, and plants that are otherwise being refurbished. We have established a rating system for each plant for each of several key environmental areas – energy, CO<sub>2</sub> emissions, water, waste to landfill, and VOC emissions for assembly facilities and hydrocarbon use for powertrain facilities – and a rating for each major action taken to achieve performance improvements in these areas. These initial ratings provide a baseline for future improvements and provide a way to prioritize different improvement actions. We then set point-based improvement targets for new plants and existing plants that are being retooled for a new vehicle program or otherwise being refurbished as part of the product development and budgeting process. These targets include a road map of specific actions to reach the sustainability point targets for each area.

## Global Emissions Manager – measuring performance to track progress

To facilitate performance tracking, we launched the Global Emissions Manager database (GEM) in 2007. This industry-leading database provides a globally consistent approach for measuring and monitoring environmental data, which helps

us track and improve our efforts to reduce water use, energy use, CO<sub>2</sub> emissions and the amount of waste sent to landfill. GEM also provides a library of environmental regulations relevant to each plant, significantly increasing the efficiency of tracking and meeting those regulations.

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## Operational Energy and Greenhouse Gas Emissions

Ford has been a leader in facilities-related greenhouse gas (GHG) and energy-use reductions, public reporting of our GHG emissions and participation in GHG-reduction and trading programs.

In 2010, we adopted a goal to reduce our facility carbon-dioxide (CO<sub>2</sub>) emissions by 30 percent per vehicle produced by 2025. This CO<sub>2</sub> goal, which is also based on our [stabilization commitment](#), complements our long-standing facility energy-use reduction targets. The U.S. Environmental Protection Agency (EPA) awarded Ford a Goal Setting Certificate for this strategy at its inaugural Climate Leadership Awards Ceremony. In 2012, Ford established a five-year objective to improve our operational energy use per vehicle produced by 25 percent globally by the end of 2016, based on a 2011 baseline normalized for weather and production.

### Performance

In 2013, we improved global energy efficiency of manufacturing facilities by 17.4 percent against a 2011 year baseline normalized for weather and production levels. Our total energy use for all of our facilities increased by 6 percent in 2013 compared to 2012 due to increased production, increased number of operating facilities, and colder weather, which increases the related energy demands. However, our total energy use per vehicle produced decreased by 4 percent in that timeframe, reflecting increased overall energy efficiency in our facilities.

Similarly, our total CO<sub>2</sub> emissions increased slightly from 2012 to 2013 by 0.6 percent. However, our CO<sub>2</sub> emissions per vehicle produced decreased by 9 percent during that period, again reflecting increased overall energy efficiency in our facilities. While our CO<sub>2</sub> emissions are linked to the amount of energy we use, they do necessarily increase or decrease by exactly the same amount due to variations in energy sources and related emissions factors. For example, in 2013, our total facilities energy use increased by 6 percent compared to 2012, while our total facilities CO<sub>2</sub> emissions increased by only 0.6 percent. We reduced our overall facilities-related CO<sub>2</sub> emissions by 51 percent, or 5 million metric tons, from 2000 to 2013. During this same period, we reduced facilities-related CO<sub>2</sub> emissions per vehicle produced by 46 percent.

Please see the Climate Change and the Environment [data section](#) for more detail.

### GHG Reporting Initiatives

Ford is officially "Climate Registered" after publishing its complete North American carbon inventory since 2010 with The Climate Registry (TCR), a voluntary carbon-disclosure initiative that links several state-sponsored GHG emissions-reporting efforts, including the California Climate Action Registry and the Eastern Climate Registry. Ford was the first automaker to join TCR and is one of only two automakers to be officially Climate Registered. As TCR members, we must demonstrate environmental stewardship by voluntarily committing to measure, independently verify and publicly report GHG emissions on an annual basis using the TCR's General Reporting Protocol.

In 2013, we became the first automaker to commit to voluntarily report our GHG emissions in India. We were also the first automaker to participate in GHG reporting initiatives in China, Australia, and Mexico. We also voluntarily report GHG emissions in the U.S., Canada, Argentina, Brazil, Taiwan and Venezuela.

Since 2005, GHG emissions from our European manufacturing facilities have been regulated through the EU Emissions Trading Scheme. These regulations apply to seven Ford facilities in the U.K., Belgium and Spain.

In the U.S., many of our facilities are subject to EPA GHG reporting requirements and submit reports as required. This EPA program requires submission of annual GHG emissions report by facilities with production processes that fall into certain industrial source categories, or that contain boilers and process heaters and emit 25,000 or more metric tons per year of GHGs.

Our participation in these reporting, emissions-reduction and trading schemes has

### Related links

[This Report](#)[→ Climate Change](#)

played an important role in accelerating our facilities' GHG emissions-reduction activities.

## Energy Management Initiatives

Ford is achieving energy-efficiency improvements and energy-use reductions using a variety of initiatives, many of which are described in this section. We regularly look for new technologies, approaches to the identification and definition of potential projects, funding mechanisms and means to implement plant energy-efficiency projects.

We are currently rolling out a **Global Departmental-Level Metering initiative (GDLM)** to collect electricity and natural gas consumption data at the plant level for all Ford plants globally. This system builds on the utility metering and monitoring system we have used in North America since 2007. The new GDLM program will also improve on the North American system by providing more detailed information down to the department level. We use this near real-time information to create energy-use profiles for plants and to improve decisions about nonproduction shutdowns and load shedding, which involves shutting down certain prearranged electric loads or devices when we reach an upper threshold of electric usage.

We are also upgrading and standardizing the **Building Management Systems** we use at our facilities to a new global standard. These information management initiatives will provide common reporting tools linked with production and other data sets, with facility maintenance and control systems. These efforts will greatly improve the amount of energy data we have, and the speed and quality of our energy analyses, which will help us identify energy-reduction opportunities more effectively and reduce the time required to make system changes.

In 2013, we finalized the global roll out of our **Energy Management Operating System (EMOS)**, which provides a common and global structure to support and maintain energy-reduction actions, to achieve the corporate goal of improving global energy use per vehicle produced by 25 percent between 2011 and 2016. For more information on the EMOS please see the [Facilitating and Measuring Progress](#) section. In North America, we continue to use **energy performance contracting** as a financing tool to upgrade and replace infrastructure at our plants, commercial buildings and research facilities. Through these contracts, Ford partners with suppliers to replace inefficient equipment, funding the capital investment over time through energy savings. Projects have been implemented to upgrade lighting systems, paint-booth process equipment and compressed air systems, and to significantly reduce the use of steam in our manufacturing facilities. We are also expanding the use of performance contracting to global facilities using global supplier partners to accomplish the 25 percent energy-efficiency improvement objective.

In 2013, we continued to focus on **lighting as a key area for energy use improvements**. Our [Global Facilities Forum \(GFF\)](#) also rolled out a new global lighting specification, which requires the use of LED technology for all general building lighting requirements. We will continue to update the specification to expand the use of LEDs as the technology advances and is proven effective for our key uses. We are also working to identify other "Mega" type projects to leverage single common actions such as lighting upgrades, compressor controls, steam conversion and enhanced Building Management Systems, in partnership with our global performance contracting partners.

Since 2000, Ford has invested more than \$250 million in **plant and facility energy-efficiency upgrades**. In 2013 alone, we invested more than \$5 million in energy-efficiency projects and significant energy-related upgrades were included in our global manufacturing system upgrades. We are working across divisions and regions to ensure that energy efficiency is being addressed in our daily operations and incorporated into the manufacturing processes and facilities, as part of our future vehicle program plans.

In 2013, Ford joined the **U.S. Department of Energy's (DOE) Better Buildings, Better Plants program**, a national partnership initiative to drive a 25 percent reduction in industrial energy intensity in 10 years against a 2011 baseline. Twenty-four of our U.S. plants are part of this initiative.<sup>1</sup> We have reduced energy intensity<sup>2</sup> by 9.44 percent since 2011 across these 24 plants. We have reduced energy intensity by more than 15 percent at six of the 24 plants and by more than 6 percent at over half of the participating plants since 2011. We've made this progress through a number of actions including: upgraded facility lighting systems, upgraded paint process systems, installed advanced computer controls on air compressors, updated heating systems, and aggressively curtailed energy use during extended production shutdown periods.

We are continuing to replicate Ford's state-of-the-art "**3-Wet**" **paint process**. This technology is called "3-Wet" because the advanced chemical composition of the paint materials used allows for the three layers of paint – primer, base coat and clear coat – to be applied while each layer is still wet, which eliminates the stand-alone primer application and dedicated oven required in the conventional painting process. The 3-Wet process also saves the electricity used by the blowers that are typically needed to circulate massive volumes of air through paint booths, and reduces the amount of natural gas needed to heat the air and ovens. As a result, 3-Wet painting reduces CO<sub>2</sub> emissions by 15 to 25 percent and volatile organic compound emissions by 10

percent compared to either conventional high-solids solvent-borne or waterborne systems.

In addition to these environmental benefits, this process maintains industry-leading quality and reduces costs. For example, 3-Wet reduces paint processing time by 20 to 25 percent, which correlates to a significant cost reduction. Ford's laboratory tests show that this high-solids, solvent-borne paint provides better long-term resistance to chips and scratches than waterborne paint systems. In short, the process delivers reduced costs per vehicle produced, reduced CO<sub>2</sub>, improved energy efficiency and improved quality.

Ford initially implemented the 3-Wet process at our Ohio Assembly Plant in 2007 in the U.S. Since then, we have expanded implementation across our global operations when we build new facilities or refurbish existing ones.

We have implemented the 3-Wet paint process at facilities in the United States, India, Romania, Mexico, China and Thailand. We now use the 3-Wet system at eight of our facilities globally and are expanding it to an additional four plants (two in North America, one in China and one in Spain). Three-Wet conversion will be considered for plant refurbishment actions being planned in line with the corporate business plan.

We are also implementing a number of heat recovery projects at Cologne and Saarlouis assembly plants, including heat recovery from paint oven exhaust stacks, air recirculation systems, and heat recovery from paint spray booths incorporating heat pump technology. We are also recovering waste heat from the air compressor plant to preheat the paint phosphate tank, and making modifications to plant heating and ventilation systems to establish better air recirculation control and temperature control. Wherever feasible, heat energy recovery will be measured by site building management systems. Through these measurements, we know that the Cologne paint oven exhaust stack system has already returned 7 GW-h since it began operation in October 2013. Heat recovery projects currently underway will deliver around 150 GW-h of energy savings per year from 2015 onward.

We are continuing implementation of a **new parts-washing system** developed in partnership with our supplier, ABB Robotics. Conventional parts-washing systems remove dirt chemically by spraying parts with high volumes of water and detergent at low pressure. Our new standard system, in contrast, cleans parts mechanically by moving them in front of specialized high-pressure nozzles with a robotic arm. This new system represents a significant leap forward in energy efficiency that also improves quality, flexibility, productivity and cost because it uses a smaller pump and lower operating temperatures. We are now using this technology as standard for all engine and transmission final wash applications globally, ensuring that the energy and cost savings will be realized by all future vehicle programs.

Other efforts to improve the energy efficiency of Ford's plant operations include:

- aggressively curtailing energy use during nonproduction periods, including a paint shop emissions abatement equipment shutdown plan at nine North American assembly plants that reduces energy use and related CO<sub>2</sub> emissions by approximately 5,000 tonnes per facility per year;
- installing optimized compressed air machines, which are a significant energy user in manufacturing facilities; and
- installing automated control systems on plant powerhouses and wastewater treatment equipment to increase energy and process efficiency.

- 
1. Louisville Assembly is excluded from this program because it was not operating in 2011.
  2. We calculate plant-level energy intensity slightly differently at different plants, depending on the operations performed there. Depending on the plant, Ford will calculate energy intensity in terms of source energy consumed (in MMBtus) divided by the number of vehicles produced, number of engines, or powertrain components produced. The percent change in energy intensity are tracked for each facility on both a monthly and annual basis. Ford normalizes its plant-level numbers to account for changes in production volume, and heating and cooling degree days. These metrics are rolled up to the corporate level, with a corporate-wide percent improvement in energy intensity calculated by taking a weighted average of the percent change in energy intensity at the individual facilities.



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## Renewable Energy

Ford is actively involved in the installation, demonstration and development of alternative sources of energy. We also purchase renewable energy indirectly from utilities. Ford used 23,650 kWh of direct (or self-generated) renewable energy and we purchased 936,291 kWh of indirect renewable energy in 2012, which is enough electricity to power seven assembly plants for one year.<sup>1</sup>

Ford's Dagenham Diesel Engine Assembly line in the U.K. was the first automotive plant in the world to obtain all of its electrical energy needs from two on-site wind turbines, which have been in operation since 2004. A third two-megawatt wind turbine was installed in 2011.

A few miles from Dagenham, Ford's Dunton Technical Centre is also powered by electricity from renewable sources. Since March 2009, electric power on the 270-acre site, which is home to a team of approximately 3,000 engineers, has been purchased from 100 percent renewable sources. The majority of the electricity, supplied by GDF, is sourced from a combination of hydro, wind and waste-to-energy generation, and replaces energy from traditional sources that would have produced an estimated 35,000 metric tons of carbon dioxide (CO<sub>2</sub>) emissions annually.

Since 2008, we have been sourcing renewable electricity to cover the full electric-power demand of our manufacturing and engineering facilities at our Cologne Plant in Germany. This includes the electricity needed for the assembly of the Ford Fiesta models at the plant. Through this initiative, the Company has reduced its CO<sub>2</sub> emissions by 190,000 metric tons per year. In 2012 a 1 MW photovoltaic installation on the roof of the Ford Customer Service Division warehouse in Merkenich was commissioned contributing further to our renewable-energy efforts.

In Wales, Ford's Bridgend Engine Plant was the first car manufacturing plant in Europe retrofitted with an integrated, grid-connected solar/photovoltaic installation. The system has been in operation since 1998.

In North America, examples of installed renewable-energy technologies include a photovoltaic array and solar thermal collector at the Ford Rouge Visitors Center. The adjacent Dearborn Truck Plant has a "living roof" system, which uses a thick carpet of plants to reduce the need for heating and cooling, while also absorbing rainwater. At the Lima Engine Plant in Lima, Ohio, a geothermal system provides process cooling for plant operations as well as air tempering for employee comfort. This system uses naturally cooled 40° F water from two abandoned limestone quarries located on the plant site. The installation cost was comparable to that of the traditional chiller and cooling tower design that it replaced. This award-winning project eliminates the emission of 4,300 metric tons of CO<sub>2</sub> each year. At our Michigan Assembly Plant we partnered with DTE Energy and the state of Michigan to build a solar photovoltaic array to provide power to the plant and to build an energy storage system to store energy produced by the solar array until it is needed. The energy is stored in a large battery system that in turn recharges electric material-handling vehicles used on-site. These vehicles were converted from diesel engines to electric vehicles to move parts between buildings at the site. The Michigan Assembly Plant also uses methane released from decaying trash at a nearby landfill to heat one of the buildings on-site, which reduces emissions of this potent greenhouse gas. In 2012, we installed a solar-powered trash compactor at our Michigan Proving Grounds in Romeo, Michigan, which compresses waste more efficiently than the previous one. The resulting compacted waste is sent to an incinerator where it is converted into power for local residents. Please see the [Waste](#) section for more information on this technology.

In Mexico, Ford's Hermosillo Stamping and Assembly Plant (HSAP) recently signed a contract to begin purchasing solar energy produced from a local solar farm. Beginning in late 2014, HSAP will purchase approximately 8 million kWh per year of solar energy, or about 6 percent of the facility's total energy requirements. The solar energy will reduce indirect CO<sub>2</sub> emissions from the facility by over 4,600 tons of CO<sub>2</sub> per year.

In India, we have been using solar thermal heating at the Chennai plant to heat water for cooking in the main cafeteria since 2011. Using this system, sterilized water is

pumped through thermal solar panels and then taken to the cafeteria for cooking at approximately 50° C higher than water that was previously used in cooking boilers. This system has reduced boiler diesel consumption by approximately 420 liters per day. The system is expected to pay for itself in four years.

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1. 2013 totals were not available at time of publication but will be included in next year's report.

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## Non-CO<sub>2</sub>, Facility-Related Emissions

We report on a variety of non-carbon dioxide (CO<sub>2</sub>) facility emissions in the [Climate Change and the Environment Data](#) section. In this section, we discuss how we are reducing emissions of volatile organic compounds (VOCs) at our facilities. VOCs are a significant aspect of Ford's manufacturing operations due to the size and number of paint shops that we operate.

Since 2000, Ford's North American operations have cut VOC emissions associated with the painting process (by far our largest source of VOC emissions) by 50 percent. In 2013, these operations emitted 16.8 grams of VOCs per square meter of surface coated, down from 18 grams in 2012. Because the control equipment used to reduce VOC emissions consumes significant amounts of energy, we have worked to identify innovative approaches to painting that meet cost, quality and production goals while allowing us to reduce energy use significantly and maintain environmental compliance.

Ford developed a Paint Emissions Concentrator (PEC) technology (formerly referred to as "fumes-to-fuel"), which uses a fluidized bed adsorber and desorber, and condensation equipment to collect and concentrate solvent emissions into liquid form. The intent of the technology is to collect a portion of the VOCs from the spray-booth exhaust, super-concentrate them in the paint emissions concentrator, then condense and store them on-site for use as fuel source. In this way, the solvent emissions are recycled back into the production process and overall VOC emissions are reduced. We are currently using this technology at our Oakville facility. In 2013, the Oakville PEC captured and recycled more than 17,000 gallons of solvent material.

Our PEC technology has the potential to reduce CO<sub>2</sub> emissions by 70 to 80 percent compared to traditional abatement equipment. PEC technology coupled with the recycling of collected solvents also has the potential to eliminate nitrogen oxide emissions compared to conventional abatement approaches, which involve the oxidation of the solvents. There is also the potential to reform the captured VOCs into hydrogen, which could be used as a fuel for fuel cells. We are working with a Canadian university to drive the development of the PEC technology and evaluate the potential for producing and using hydrogen fuel.

We are also continuing to use an innovative new windshield attachment process that reduces VOC emissions. The typical method to attach a windshield – used currently at Ford and throughout the industry – is to first wipe the glass with a solvent cleaner, and then apply a primer and adhesive to secure the windshield to the vehicle. However, this method releases a small amount of highly undesirable solvent emissions. Ford's new patented technology eliminates the use of the solvents that contain VOCs and simplifies the manufacturing process by reducing steps, such as wiping the glass clean. Ford is working with Plasmateat, an Illinois-based supplier, to implement the technology. The technology will be offered worldwide, first in equipment that Plasmateat plans to sell or lease to Ford, then to other automakers, the heavy-truck market, the motorhome and bus industries, and other customers who want to use it.

Finally, we are reducing VOC emissions with an innovative paint process called "3-Wet." This process reduces VOC emissions by 10 percent and has other environmental, financial and quality benefits. For more information on 3-Wet, please see the [Operational Energy and Greenhouse Gas Emissions](#) section.

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Voice: John Fleming

## Water Use

Water conservation is an integral part of Ford's sustainability strategy.

Many vehicle manufacturing processes require water, and water is used at every point in our supply chain. Our water-related risks come not only from being a direct water user, but from being a large purchaser of water-intensive materials, parts and components. Because this issue has increased in importance and focus for Ford in recent years, we now discuss it in its own separate [Water](#) section.

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# Waste Management

Ford's environmental goals include reducing the amount and toxicity of manufacturing-related wastes and ultimately eliminating the disposal of waste in landfills. Manufacturing byproducts include both hazardous and nonhazardous wastes. In 2013, we introduced a new plan to reduce waste sent to landfill by 40 percent on a per vehicle basis between 2011 and 2016 globally. We have already reduced global per vehicle waste to landfill by 40 percent from 2007 to 2011. In 2013, Ford facilities globally sent approximately 49,800 metric tons of waste to landfill, a reduction of 5.4 percent from 2012.

In 2013, Ford facilities globally generated approximately 43,000 metric tons of hazardous waste, which is comparable to our 2012 hazardous waste-generation levels, despite increased vehicle production. We reduced hazardous waste on a per vehicle basis by 7 percent compared to 2012 and by 27 percent over the last five years. Ford has chosen to target eliminating the landfill of hazardous waste first, because this provides the quickest and most cost-effective benefits to human health and the environment.

Ford's five-year global waste-reduction plan details how the company will lessen its environmental impact



## 5 Key Actions

### Invest

- Continue investing in new technologies that minimize waste

### Standardize

- Standardize how waste is tracked and sorted at each point

### Identify

- Identify the five largest volume sources of waste-to-landfill at each facility

### Partner

- Partner with suppliers to increase use of eco-friendly packaging

### Enable

- Enable local plants to affect waste management change

## Current waste mix



- Wastewater sludge
- Recovered paint solids
- Packaging waste
- Used oils and waste solvent
- Grinding swarf (metallic particles, abrasives and oils)
- Other wastes

### Fun fact

The Oakville Assembly Plant in Canada is the first Ford North American vehicle assembly plant to achieve zero waste to landfill status. Joining Windsor Engine Plant and Essex Engine Plant, now all Ford manufacturing operations in Canada send zero waste to landfill.

## Progress

Ford cut the amount of waste to landfill generated per vehicle produced globally from 33 pounds in 2009 to 18

## Goal

By 2016, Ford will reduce pounds of waste to landfill generated per vehicle globally to 15 pounds.



pounds in 2013.



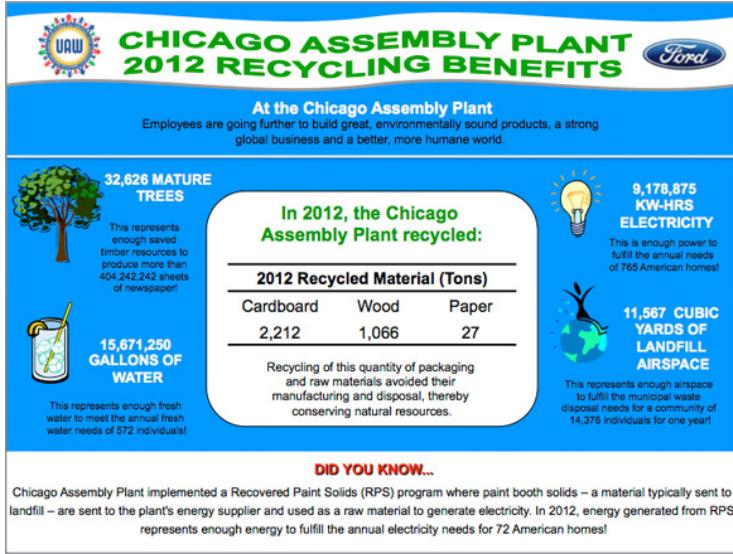
We will reach our new waste-reduction goal and continue to build on our past success in waste reduction through many programs, including:

- Identifying the five largest-volume waste to landfill streams at each plant, developing plans to reduce each and track progress
- Minimizing waste by leveraging the Ford production system – a continuously improving, flexible and disciplined common global production system that encompasses a set of principles and processes to drive lean manufacturing
- Improving waste-sorting procedures to make recycling and reuse easier
- Investing in new technologies that minimize waste, such as dry-machining
- Expanding programs that deal with managing specific kinds of waste, such as metallic particles from the grinding process and paint sludge

The following Ford facilities have achieved Ford's stringent definition of zero waste to landfill<sup>1</sup>:

- JMC Xiaolan
- Chennai Assembly
- Cologne Assembly
- Saarlouis Assembly
- Essex Engine
- Van Dyke Transmission
- Cologne Engine
- Cologne Die Cast
- Cologne Cotarko Forging
- Chennai Engine
- Windsor Engine
- Ford Thailand Manufacturing
- Bordeaux Transmission
- Engine Manufacturing Development Operations/Beech Daly Technical Center
- Michigan Proving Grounds
- Rawsonville
- Oakville Assembly

We are also improving the way we communicate our waste reduction success to employees as part of an effort to engage employees in further waste-reduction improvements. We are reporting not just waste-reduction and recycling totals, but how these numbers translate into more meaningful impacts like number of trees saved. An example of one of these communications is provided below.



Some other successes of our waste-reduction efforts in 2013 include the following:

- We continued to implement our minimum quantity lubricant (MQL) machining process (also called near-dry machining) that reduces waste by more than 80 percent for each engine we produce, also saving oil and water. We have now implemented this process at six plants in North America, Asia, and Europe. For more information on the water benefits of MQL, please see the [Water](#) section.
- Our Chennai Vehicle Assembly Plant improved the practices at their hazardous waste storage yard. By using Ford Production System principles to standardize the process, the plant was able to minimize environmental and safety hazards, meanwhile achieving economic benefits from proper waste segregation.
- We initiated efforts to recycle grinding swarf at U.S. and Canadian facilities. This pilot program has the potential to eliminate of 3 million pounds of waste sent to landfill each year.
- Ford of Mexico recycled 33,602 tonnes of aluminum, cardboard, paper, scrap metal, plastics, wood and glass.
- Cuautitlán Stamping and Assembly Plant recently implemented an innovative recycling project aimed at keeping car parts containers out of landfills by restoring them for delivery to various schools where they will be used as trash cans.
- Kentucky Truck Plant started to recycle bailed plastic, Tyvec-coated paper bails and five-gallon pails that were going to landfill. Now 14,500 pounds previously sent to landfill is now being captured for reclamation.
- Sterling Axle Plant began sending one third of their lapping compound, approximately 70,000 kg/year, for reblending in order to make new product for use at the plant instead of landfilling the material.
- Ford Argentina donated more than 4 tons of nonreturnable PET bottles to "Fundación Banco de Bosques" (Forest Bank Foundation) that aims to save native forests which are in danger of extinction.
- Kocaeli Assembly Plant is keeping 500 tonnes/year of municipal waste out of landfills by using it as an alternate fuel in cement kilns.

1. Waste to landfill is defined as all production waste sent to landfill, excluding episodic waste, and construction and demolition debris. Scrap metal is not included in waste to landfill.



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## Sustainable Land Use and Biodiversity

Our activities have the potential to affect land use, nature and biodiversity, directly and indirectly. Our real estate portfolio includes properties for manufacturing and office use. The construction and operation of these facilities have direct impacts on land.

Ford's most significant potential impacts on land and biodiversity are indirect, occurring elsewhere in our value chain or arising from the use of our vehicles. Indirect impacts include the extraction of raw materials to make vehicle parts, habitat fragmentation from road construction, localized pollution from vehicles and the potential effects of climate change on biodiversity.

Many of our facilities have taken steps to improve biodiversity and wildlife habitat on their land.

A highly visible example of Ford's commitment to sustainability can be seen on more than 70 acres of Ford-owned land throughout southeast Michigan, which is adorned with sunflowers and native prairie plantings. These plantings provide habitat for wildlife such as white-tailed deer, red fox, wild turkeys and coyote. All of these species have been spotted at Ford World Headquarters, which has about six acres of native prairie. These plantings also reduce mowing and fertilization costs. By replacing what otherwise would be traditional turf grass, the company saves approximately 30 percent on the costs of labor, gas and fertilizer. We also use native plants in our landscaping whenever possible, as they are better adapted to local conditions, and provide food and shelter for wildlife.

We continue to recycle our landscaping debris as compost in Ford-owned farm fields throughout southeast Michigan. By allowing our leaves, grass and plant clippings to collect and decompose throughout the summer, we are able to add more than 3,000 cubic yards of nutrient-rich compost to our fields in lieu of a synthetic, petroleum-based fertilizer each year.

We are also installing "smart" irrigation systems at some of our Dearborn (Michigan) properties. These systems use site conditions – such as soil and plant types, evapotranspiration rates and local weather data – to program watering only when it is needed. To date, systems at 49 sites have been completed and are providing water savings of just over 30 percent. Systems at the remaining five sites in our commercial property portfolio will be completed this year.

We are also reducing emissions produced in normal lawn maintenance by using propane-fueled mowers, which produce approximately 24 percent fewer greenhouse gas emissions, 20 percent fewer nitrogen oxide emissions, and 60 percent less carbon monoxide than gasoline-powered mowers. Propane also eliminates fuel spills that often occur during the refueling of traditional gas mowers, and propane is nontoxic and soluble in water. In addition to these environmental benefits, the vast majority of propane is domestically produced and it is less expensive than gasoline. Propane also increases mower engine life and reduces maintenance because it burns cleaner than gasoline, which further reduces maintenance costs and resource use. Fairlane Grounds, which provides lawn mowing services at Ford facilities in the Dearborn area, has already converted 10 mowers (or about a quarter of their mower fleet) to run on propane instead of gasoline. All future scheduled mower replacements will be propane mowers, until the entire fleet is propane-powered. In addition, Fairlane Grounds has piloted tested Ford F-350 trucks converted to run on propane by Roush CleanTech and is considering replacing a portion of its vehicle fleet with propane autogas-fueled units. An on-site propane fueling station for trucks and mowers has been installed.



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Case Study: Ford Fleet Purchase Planner

Voice: John Fleming

## Green Buildings

Ford is a leader in green building and is committed to the sustainable design of our facilities and landscapes using the basic principles of resource effectiveness, life cycle assessment, health, safety and environmental performance. In the past, we have included green building design principles into our buildings on a case-by-case basis. To help standardize and broaden our efforts in this area, we are currently developing corporate specifications for building new facilities that will focus on sustainability. These specifications require that new manufacturing facilities be designed and constructed using the best practices Ford has developed at plants all over the world. These standards will act to replicate best practices across our global operations, and create efficient and sustainable plants. We are coordinating this effort through our Global Facilities Forum, described in the [Facilitating and Measuring Progress](#) section. Some examples of best engineering practices that may be implemented in our new facilities include:

- Advanced water-treatment technologies, to allow the reuse of water and reduce water-supply requirements, water discharges, use of treatment chemicals and the generation of solid waste;
- Energy-saving technologies, such as advanced control of air compressors, high-efficiency lights, variable-drive electric motors, skylights and daylighting, and white roofing materials; and
- Advanced paint shop technologies, to reduce emissions, energy use and waste, including wet-on-wet paint and advanced automated paint application equipment.

Ford is a member of the U.S. Green Building Council (USGBC) and a supporter of its green building rating system, known as LEED® (Leadership in Energy and Environmental Design). The LEED system includes a series of standards used for certifying buildings as Silver, Gold or Platinum, and it is recognized as the industry standard for green building. Ford employees who are involved in the design, operation and maintenance of commercial and manufacturing facilities have obtained LEED Accredited Professional certification, which demonstrates their proficiency in the application of the LEED rating systems. Having this expertise in-house will continue to strengthen our knowledge and the speed at which we apply environmentally sustainable technologies and processes at our facilities.

Ford is evaluating existing buildings to achieve LEED certification. The LEED v3 Green Buildings, Operations and Maintenance rating system, or LEED GBOM, helps building operators measure operations, improvements and maintenance on a consistent scale, with the goal of maximizing operational efficiency while minimizing environmental impacts. The standards are intended to promote healthy and environmentally friendly buildings that are also durable, affordable and high-performing by focusing on six key areas: sustainable site management, water efficiency, energy and atmosphere impacts, materials and resource use, indoor environmental quality and innovations in operations.

Ford piloted the LEED Existing Building (LEED-EB) certification process on Corporate Crossings, an office building that Ford developed in 1999 in Dearborn, Michigan. In 2011 we achieved LEED-EB Silver Certification for this building, the first Ford Motor Company building certified under the LEED-EB program. We are now in the process of seeking LEED Existing Buildings: Operations and Maintenance (LEED-EBOM) certification for our Research and Innovation Center (RIC) in Dearborn. In March 2013, RIC entered the "performance period" of the certification process. During this period, actual building performance is measured for at least three months, after all of the changes we are making to the building and its operation to obtain certification credits are implemented. These changes include energy-efficiency technology upgrades, operational policies and staff training. We hope to have the RIC facility LEED-EBOM certified in 2014.

Based on these experiences, Ford is planning to seek certification of the balance of our portfolio of commercial office buildings through the USGBC's LEED for Existing Buildings: Operations and Maintenance Volume Program. We are initially working to

certify 25 buildings in Dearborn, Michigan, through this program. We hope to complete this certification process in 2015. The LEED Volume Program was designed by the USGBC to meet industry needs for a streamlined approach to certifying similar buildings and spaces. The program, through the use of prototype standards, allows organizations to simplify the LEED documentation for multiple buildings or spaces of a similar type or management.

Our goal is to assure that the green building practices, procedures, policies and initiatives we have already developed will meet USGBC LEED-EB standards and help create a comprehensive sustainability program for our portfolio of commercial office buildings.

Ford is also working to advance green building practices through partnerships with our building-related service providers. These partnerships help to educate service providers and provide a forum to exchange information on the concepts of sustainable design. For example, we have held training sessions on site selection, water efficiency, energy-use reductions, sustainable materials and resources, and indoor environmental quality.

We are also working with our dealers to help them improve the environmental performance of their facilities. For more information on our work to help "green" Ford and Lincoln dealerships, please see below and the [Dealers](#) section.

### Some examples of Ford's green building projects include:

#### **Ford World Headquarters Green Roof – Dearborn, Michigan**

In 2012, we refurbished a portion of the roof on our corporate world headquarters building in Dearborn, Michigan. As part of this effort, we installed 5,000 square feet of green roof on the building. This "living roof," which is made from multiple varieties of sedum plants, helps to reduce stormwater runoff from the building.



Ford World Headquarters Green Roof – Dearborn, Michigan

#### **Green Dealership – Dagenham Motors, Barking, United Kingdom**

Ford's Dagenham Motors dealership in Barking, England, recently built an all-new "green" dealership using the latest environmentally friendly materials and a number of sustainable and energy-saving features. The facility includes new and used car showrooms and a service center.

Water use at the facility is reduced by capturing rainwater runoff from the roof and storing it in a 3,500-gallon underground tank that supplies water for washing cars and flushing toilets. The rainwater-harvesting tank includes a UV sterilization unit, and inline contaminant and particulate filters that enable the water to be suitable and hygienic for hand washing. In addition, waste oil from cars that have been serviced is reused for heating the premises by fueling an integrated used-oil burner on the site. In addition, a wind turbine was installed to generate up to 10 percent of the site's electricity, and the facility used green construction practices. Approximately 1,800 square meters of non-hazardous soil that was excavated from the site during construction will be reused to landscape the site rather than being transported to landfill.

#### **Green Housekeeping Program**

Ford promotes the use of environmentally friendly products in the operation and maintenance of its facilities. One example of this is the continued expansion of our "green housekeeping" program. Through this program, we are working with our Tier 1 suppliers and contractors to promote the use of environmentally friendly cleaning practices and water-based products that help to reduce the impact of facility operations on the environment. Our cleaning service providers use highly concentrated, water-based chemicals with more efficient packaging, which significantly reduces product waste and the amount of fuel required to ship products. These green housekeeping practices are now in use throughout our North American manufacturing locations and commercial office buildings.

#### **Ford Rouge Center**

Ford's largest green-building initiative was the redevelopment of the 600-acre Ford Rouge Center in Dearborn, Michigan, into a state-of-the-art lean, flexible and sustainable manufacturing center. The focal point of the center, the Dearborn Truck Plant, boasts a 10.4-acre living roof, part of an extensive stormwater management system that includes bioswales and porous pavement to slow and cleanse the water. The Dearborn Truck Plant also features abundant skylights to maximize daylight in the facility. And, the Rouge Center features 100 acres of sustainable landscaping to help restore soils and support wildlife habitat.

### **Corporate Crossing (LEED-EB)**

In 2011 we achieved LEED Existing Building certification for our Corporate Crossing office building, located in Dearborn, Michigan. This is the first Ford facility to achieve this LEED rating.

### **Rouge Visitor Center (LEED-Gold)**

The redeveloped Ford Rouge Center includes the LEED-Gold certified Rouge Visitor Center, a 30,000-square-foot facility featuring two multiscreen theaters and an observation deck. The facility captures rainwater for plumbing and irrigation, and uses photovoltaic-solar panels to produce energy. In addition, "green screens" of shading vines cover some parts of the building to reduce energy use.

### **Fairlane Green (LEED-Gold)**

Ford has developed a 1-million-square-foot green retail center on its 243-acre industrial waste landfill in Allen Park, Michigan, earning the national Phoenix Award for excellence in brownfield development. In addition, Fairlane Green Phase I received the nation's first LEED-Gold certification for a core and shell retail development, for its use of retention ponds for irrigation, sustainable landscaping and white roofs, and for the preservation of natural areas. The buildings feature high-efficiency heating and cooling systems, added insulation and weather sealing, and efficient windows and doors.

### **Product Review Center (LEED-Silver)**

Ford's Product Review Center in Dearborn showcases Ford's latest products and green building principles. The LEED-Silver-certified building incorporates an innovative system to recycle water for irrigation and cooling, large windows to maximize daylight and extensive use of local and recycled materials.



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Case Study: Ford Fleet  
Purchase Planner

Voice: John Fleming

## Compliance

### Manufacturing Plants Notices of Violation

Ford received four notices of violation (NOVs) from government agencies in 2013: one in the U.S., one in Brazil, one in South Africa and one in Australia. The issuance of an NOV is an allegation of noncompliance with anything from a minor paperwork requirement to a permit limit, and does not mean that the company was noncompliant or received a penalty.

### Off-Site Spills

In 2013, no off-site spills occurred at Ford manufacturing facilities.

### Fines and Penalties Paid

In 2013, Ford paid no fines or penalties globally pertaining to environmental matters in our facilities.

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→ Ford U.S. CO<sub>2</sub> Tailpipe Emissions per Vehicle (Combined Car and Truck Fleet Average CO<sub>2</sub> Emissions)

→ Ford Europe CO<sub>2</sub> Tailpipe Emissions per Passenger Vehicle

→ Ford Europe CO<sub>2</sub> Tailpipe Emissions per Light Commercial Vehicle

→ Ford Switzerland CO<sub>2</sub> Tailpipe Emissions per Passenger Vehicle

### Tailpipe Emissions

→ Ford U.S. Average NOx Emissions

→ Ford U.S. Average NMOC Emissions

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### Operational Energy Use and CO<sub>2</sub> Emissions

→ Worldwide Facility Energy Consumption

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→ North America Volatile Organic Compounds Released by Assembly Facilities

→ Ford U.S. TRI Releases

→ Ford U.S. TRI Releases per Vehicle

→ Ford Canada NPRI Releases

→ Ford Canada NPRI Releases per Vehicle

→ Australia National Pollutant Inventory Releases (Total Air Emissions)

### Waste

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→ Waste to Landfill per Vehicle

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Voice: John Fleming

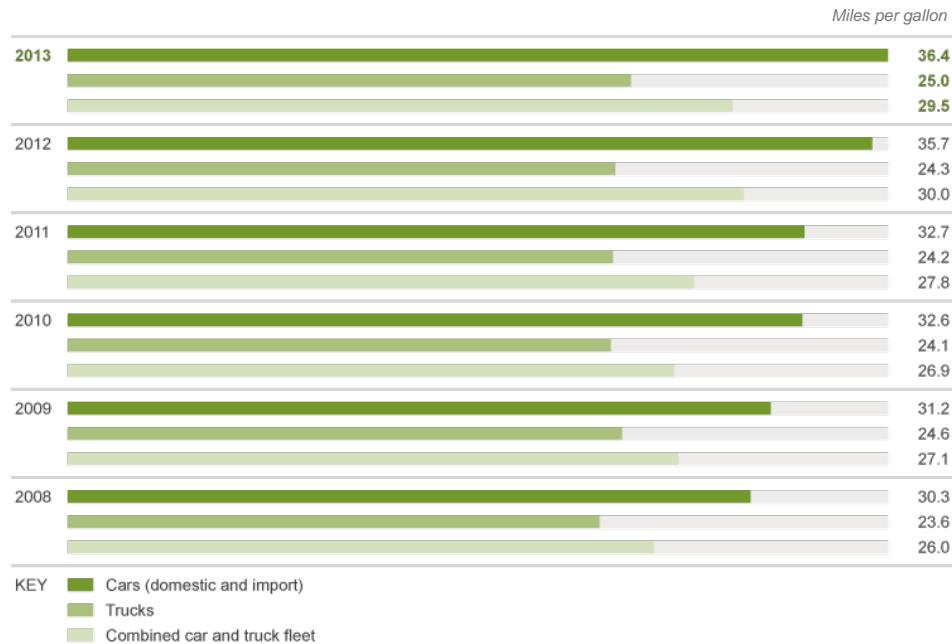
## Data: Fuel Economy and CO<sub>2</sub> Emissions

### Data on this page

- A. ↓ Ford U.S. Corporate Average Fuel Economy
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- E. ↓ Ford Switzerland CO<sub>2</sub> Tailpipe Emissions per Passenger Vehicle

[View all data on this page as charts | tables](#)

### A. Ford U.S. Corporate Average Fuel Economy



	2008	2009	2010	2011	2012	2013
Cars (domestic and import)	30.3	31.2	32.6	32.7	35.7	36.4
Trucks	23.6	24.6	24.1	24.2	24.3	25.0
Combined car and truck fleet	26.0	27.1	26.9	27.8	30.0	29.5

Third party rating

### Data notes and analysis

In 2013, we improved the average fuel economy of our car fleet by 2 percent, and of our truck fleet by 3 percent compared to 2012. However, our combined corporate average fuel economy declined by 1.7 percent in 2013 due to increased customer demand for trucks over cars.

### Related links

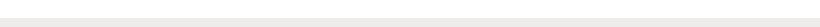
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### B. Ford U.S. CO<sub>2</sub> Tailpipe Emissions per Vehicle (Combined Car and Truck Fleet Average CO<sub>2</sub> Emissions)

Grams per mile

2013		302			
2012		297			
2011		318			
2010		329			
2009		326			
2008		340			
2008	2009	2010	2011	2012	2013
340	326	329	318	297	302

#### Data notes and analysis

Improvement is reflected in decreasing grams per mile. This is the second year that the CO<sub>2</sub> data has come directly from Ford's official Greenhouse Gas report. Under the One National Program regulation, 2012 MY is the first year where a separate greenhouse gas compliance report is required, in addition to the annual CAFE report. The CO<sub>2</sub> value includes FFV credits, but does not include credits/debits for air conditioning or off-cycle technologies or CH<sub>4</sub>/N<sub>2</sub>O compliance.

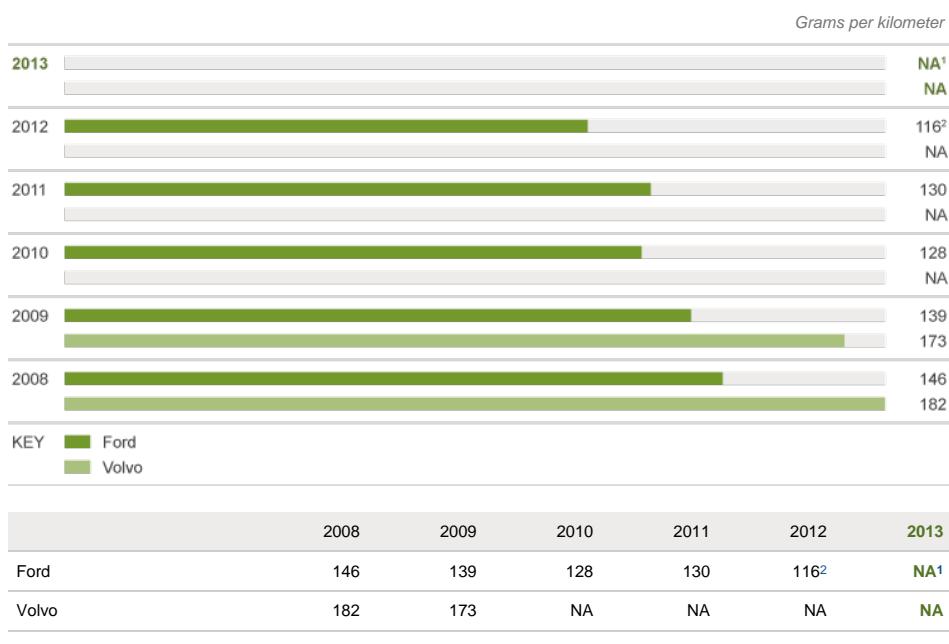
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### C. Ford Europe CO<sub>2</sub> Tailpipe Emissions per Passenger Vehicle



#### Data notes and analysis

- No data are yet available for 2013. Official 2013 data will be published by the European Commission in the fourth quarter of 2014.
- For 2012, final official data from the European Commission (EC) were published in November 2013 for passenger cars (vehicle category M1). For passenger cars, only 65 percent of the best-CO<sub>2</sub>-performing fleet vehicles is accounted in this data as part of the EC's phase-in plan. Improvement is reflected in decreasing grams per kilometer. These figures are based on production data for European markets. European and U.S. fleet CO<sub>2</sub> emissions are not directly comparable because they are calculated in different units and because they are assessed based on different drive cycles. In 2009, we switched from reporting European vehicle CO<sub>2</sub> emissions as a percent of a 1995 base to reporting actual fleet average CO<sub>2</sub> emissions, to parallel our reporting for other regions.

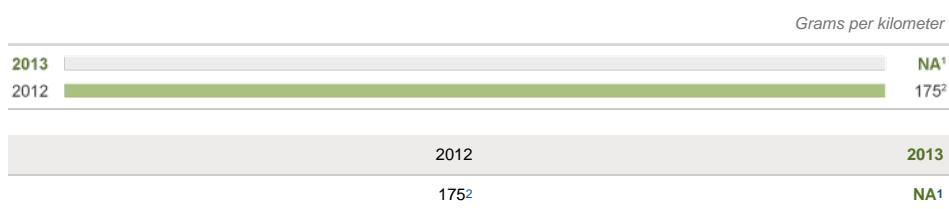
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### D. Ford Europe CO<sub>2</sub> Tailpipe Emissions per Light Commercial Vehicle



## Data notes and analysis

1. No data are yet available for 2013. Official 2013 data will be published by the European Commission in the fourth quarter of 2014.
2. For 2012, final official data from the European Commission (EC) were published in November 2013 for light commercial vehicles (vehicle category N1). For 2012, 70 percent of the best-CO<sub>2</sub>-performing light commercial vehicles are accounted for in this data. Note: For EC/Member State 2012 data it is evident that certain data were missing or manifestly incorrect. As a consequence, the 2012 data for light commercial vehicles should be considered incomplete. In 2014, official CO<sub>2</sub> monitoring will begin for light commercial vehicles (category N1). Between 2014 to 2017, the EC "phase-in rule" will be applied by increasing the fleet coverage accounted for in official fleet CO<sub>2</sub> data, starting with 70 percent of the lowest-CO<sub>2</sub> vehicles in 2014, and expanding to 75 percent in 2015 and 80 percent in 2016.

Improvement is reflected in decreasing grams per kilometer. These figures are based on production data for European markets. European and U.S. fleet CO<sub>2</sub> emissions are not directly comparable because they are calculated in different units and because they are assessed based on different drive cycles. In 2009, we switched from reporting European vehicle CO<sub>2</sub> emissions as a percent of a 1995 base to reporting actual fleet average CO<sub>2</sub> emissions, to parallel our reporting for other regions.

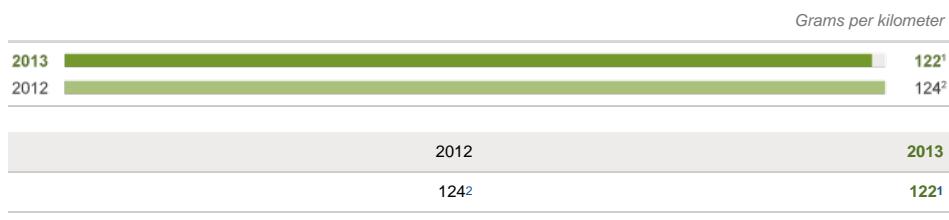
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## E. Ford Switzerland CO<sub>2</sub> Tailpipe Emissions per Passenger Vehicle



## Data notes and analysis

1. Preliminary 2013 data has been published. The 2013 data includes 75 percent of the best-CO<sub>2</sub>-performing fleet vehicles, as part of the Swiss phase-in plan.
2. In 2012, Switzerland introduced CO<sub>2</sub> monitoring using the same test methodology applied in Europe with stringent target line. The 2012 data only includes CO<sub>2</sub> monitoring for the second half of the year (Q3 & Q4). The 2012 data includes 65 percent of the best-CO<sub>2</sub>-performing fleet vehicles, as part of the Swiss phase-in plan.

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Case Study: Ford Fleet  
Purchase Planner

Voice: John Fleming

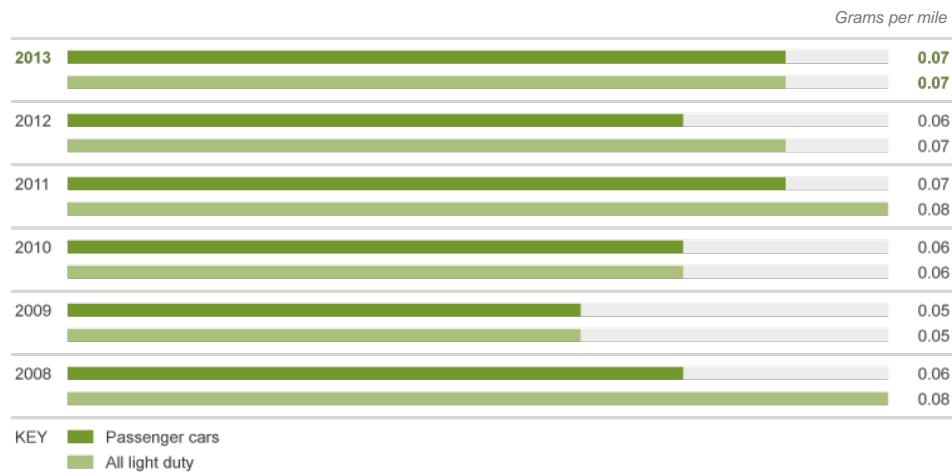
## Data: Tailpipe Emissions

## Data on this page

- A. ↓ Ford U.S. Average NOx Emissions
- B. ↓ Ford U.S. Average NMOG Emissions
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## A. Ford U.S. Average NOx Emissions

 [Reported to regulatory authorities \(EPA\)](#)

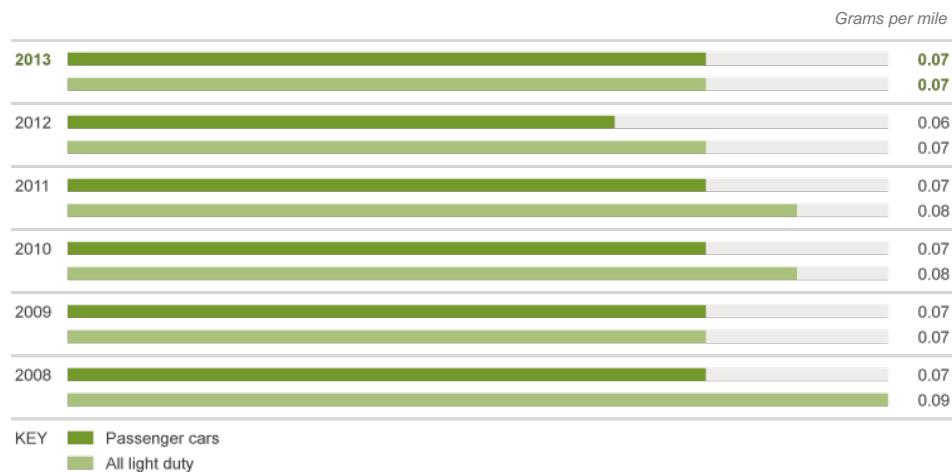
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## B. Ford U.S. Average NMOG Emissions



	2008	2009	2010	2011	2012	2013
Passenger cars	0.07	0.07	0.07	0.07	0.06	<b>0.07</b>
All light duty	0.09	0.07	0.08	0.08	0.07	<b>0.07</b>

 Reported to regulatory authorities ([EPA](#))

#### Data notes and analysis

NMOG = Non-Methane Organic Gases

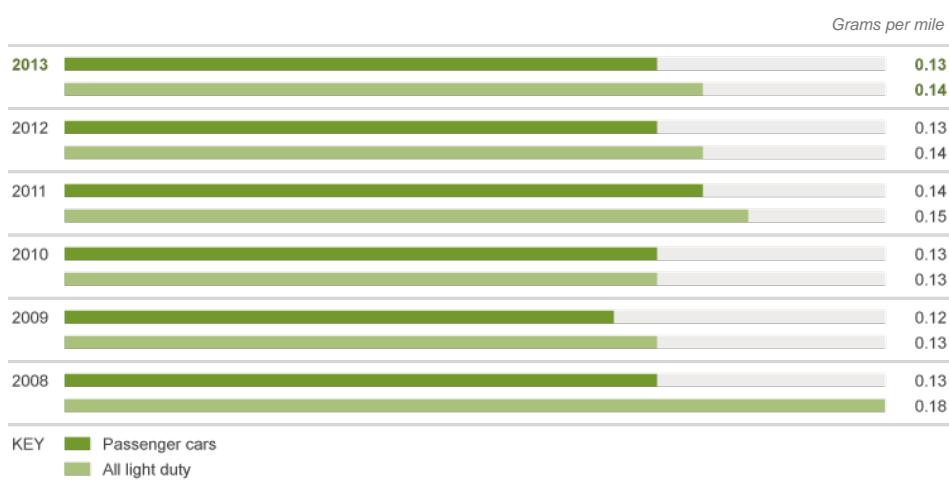
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### C. Ford U.S. Average Vehicle Emissions



	2008	2009	2010	2011	2012	2013
Passenger cars	0.13	0.12	0.13	0.14	0.13	<b>0.13</b>
All light duty	0.18	0.13	0.13	0.15	0.14	<b>0.14</b>

 Reported to regulatory authorities ([EPA](#))

#### Data notes and analysis

Average vehicle emissions are the smog-forming pollutants from vehicle tailpipes, characterized as the sum of [(NMOG + NOx emissions) x volume] for all products in the fleet.

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Emissions (VOC and Other)

Waste

Case Study: Ford Fleet Purchase Planner

Voice: John Fleming

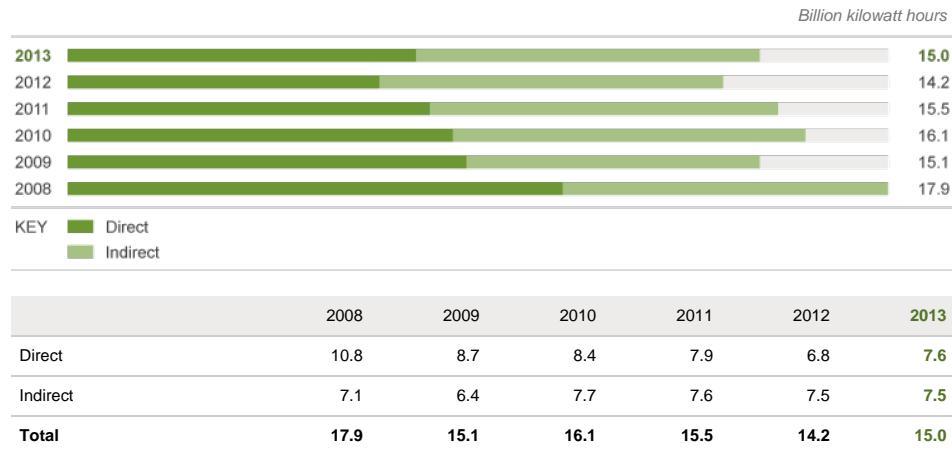
# Data: Operational Energy Use and CO<sub>2</sub> Emissions

## Data on this page

- A. ↓ Worldwide Facility Energy Consumption
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- E. ↓ Energy Efficiency Index

[View all data on this page as charts | tables](#)

## A. Worldwide Facility Energy Consumption



Data managed through the [Global Emissions Manager database](#)

## Data notes and analysis

Worldwide facility energy consumption increased from 2012 to 2013 due to increased production, use of additional facilities, and colder weather, which increased heating and cooling-related energy requirements. 2012 data was revised and restated to correct calculation errors.

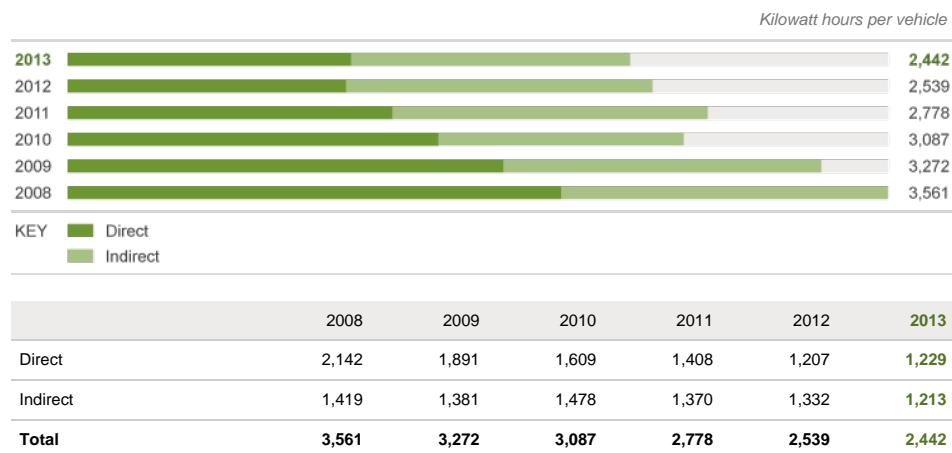
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## B. Worldwide Facility Energy Consumption per Vehicle



## Data notes and analysis

Worldwide facility energy consumption per vehicle produced decreased by 4 percent from 2012 to 2013, reflecting the greater efficiency of our production.

2012 data was revised and restated due to calculation errors.

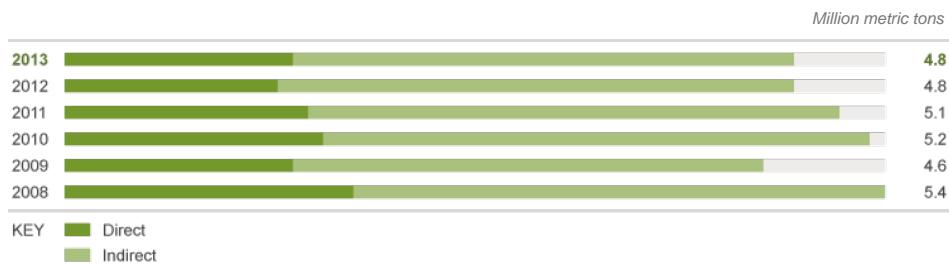
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## C. Worldwide Facility CO<sub>2</sub> Emissions



	2008	2009	2010	2011	2012	2013
Direct	1.9	1.5	1.7	1.6	1.4	1.5
Indirect	3.5	3.1	3.6	3.5	3.4	3.3
<b>Total</b>	<b>5.4</b>	<b>4.6</b>	<b>5.2</b>	<b>5.1</b>	<b>4.8</b>	<b>4.8</b>

Third party verified (North America and EU)<sup>1</sup>

Reported to regulatory authorities (EU). Voluntarily reported to emissions registries or other authorities in Argentina, Australia, Brazil, Canada, China, the Philippines, Taiwan and the U.S.

## Data notes and analysis

Worldwide facilities CO<sub>2</sub> emissions increased by 0.6% from 2012 to 2013 due to increased production. While our CO<sub>2</sub> emissions are linked to the amount of energy we use, and our energy and CO<sub>2</sub> emissions do move in the same direction, they do not necessarily increase or decrease by exactly the same amount. For example, in 2013, our total energy use increased by 6 percent compared to 2012, while our total CO<sub>2</sub> emissions increased by only 0.6 percent.

For 2013, national electricity factors were updated in accordance with internationally published GHG reporting protocols. 2012 data was revised to correct for calculation errors in total direct CO<sub>2</sub> emissions.

1. Sixty-one percent of Ford's global facility GHG emissions are third-party verified. All of Ford's North American GHG emissions data since 1998 are externally verified by The Financial Industry Regulatory Authority, the auditors of the NASDAQ stock exchange, as part of membership in the Chicago Climate Exchange. In addition, all of our European facilities impacted by the mandatory EU Trading Scheme are third-party verified.

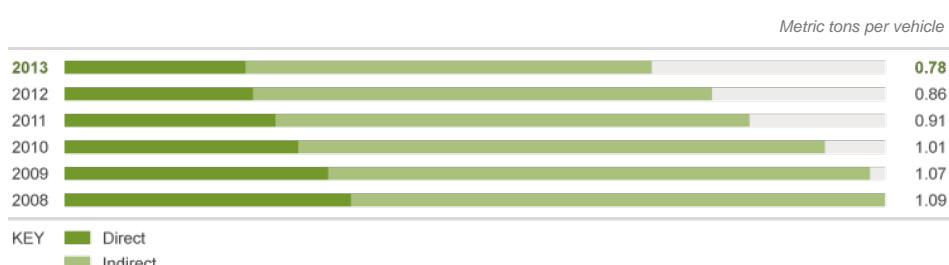
## Related links

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## D. Worldwide Facility CO<sub>2</sub> Emissions per Vehicle



	2008	2009	2010	2011	2012	2013
Direct	0.38	0.35	0.31	0.28	0.25	0.24
Indirect	0.71	0.72	0.70	0.63	0.61	0.54
<b>Total</b>	<b>1.09</b>	<b>1.07</b>	<b>1.01</b>	<b>0.91</b>	<b>0.86</b>	<b>0.78</b>

## Data notes and analysis

CO<sub>2</sub> emissions per vehicle declined for the fifth year, reflecting our focus on improving the energy efficiency of our operations. We are working to meet our goal of reducing global facility CO<sub>2</sub> emissions per vehicle by 30 percent by 2025 from a 2010 baseline. While our CO<sub>2</sub> emissions are linked to the amount of energy we use, and our energy and CO<sub>2</sub> emissions do move in the same direction, they do not necessarily increase or decrease by exactly the same amount. For example, in 2013, our total facilities energy use increased by 6 percent compared to 2012, while our total facilities CO<sub>2</sub> emissions increased by only 0.6 percent. For 2013, national electricity factors were updated in accordance with internationally published GHG reporting protocols. 2012 data was revised and restated to correct for calculation errors in total direct CO<sub>2</sub> emissions and the removal of Geelong Casting and Engine from the vehicle production number.

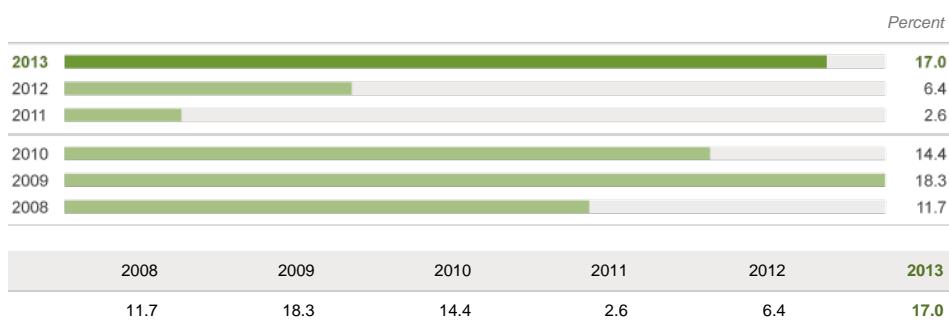
## Related links

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## E. Energy Efficiency Index



## Data notes and analysis

The energy efficiency index is a normalized indicator of energy used in our manufacturing facilities per vehicle produced based on a calculation that adjusts for typical variances in weather and vehicle production. The Index is set at 100 for the baseline year to simplify tracking annual improvements. In 2012, we expanded our energy efficiency to include global energy use data. In previous years, it only included energy use at North American facilities. In 2012, we also reset the baseline year to 2011. A year 2000 baseline was used through 2006; the baseline was reset to year 2010 starting in 2011. The year 2012 improvement indexed against the year 2011 baseline was 6.4, indicating a 6.4 percent improvement in global energy efficiency per vehicle from 2011 to 2012. Higher percentage reflects improvement. The year 2013 improvement indexed against the year 2011 baseline was 17 (%).

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Waste

Case Study: Ford Fleet Purchase Planner

Voice: John Fleming

## Data: Emissions (VOC and Other)

### Data on this page

- A. ↓ North America Volatile Organic Compounds Released by Assembly Facilities
- B. ↓ Ford U.S. TRI Releases
- C. ↓ Ford U.S. TRI Releases per Vehicle
- D. ↓ Ford Canada NPRI Releases
- E. ↓ Ford Canada NPRI Releases per Vehicle
- F. ↓ Australia National Pollutant Inventory Releases (Total Air Emissions)

[View all data on this page as charts | tables](#)

### A. North America Volatile Organic Compounds Released by Assembly Facilities



■ Data managed through the [Global Emissions Manager](#) database

### Data notes and analysis

VOC emissions in North America decreased by 6.7 percent between 2012 and 2013; we continue to exceed our goal of maintaining emissions at 24 grams per square meter of surface coated. We achieved this goal through, among other things, the use of mold-in-color plastics (which preclude the need for painting) and our fumes-to-fuel technology, which captures VOC emissions from our paint shops and uses them as an energy source.

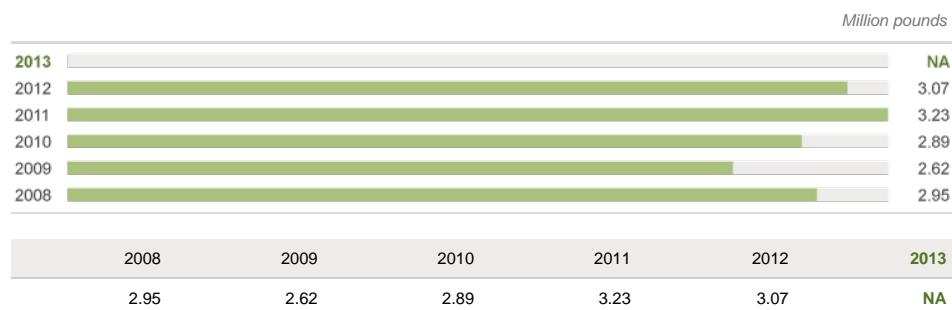
### Related links

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### B. Ford U.S. TRI Releases



✉ Reported to regulatory authorities (EPA)

### Data notes and analysis

Releases reported under the U.S. Toxics Release Inventory (TRI) are all in accordance with the law, and many of them are subject to permits. The data shown are the most recent reported to authorities.

Our U.S. TRI releases decreased from 2011 to 2012, reflecting the benefits of material and process changes. Though our U.S.

TRI did increase from 2010 to 2011, due to an increase in production, our U.S. TRI releases per vehicle has decreased consistently each year, reflecting more efficient production.

#### Related links

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## C. Ford U.S. TRI Releases per Vehicle



#### Data notes and analysis

Our U.S. Toxic Release Inventory releases per vehicle decreased from 2011 to 2012, the seventh year in a row we have reduced these emissions. These reductions were achieved through material and process changes.

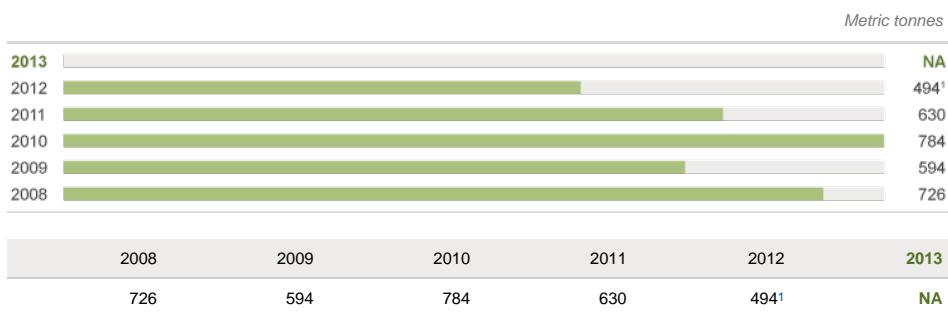
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## D. Ford Canada NPRI Releases



Reported to regulatory authorities ([Environment Canada](#))

#### Data notes and analysis

Releases reported under the Canadian National Pollutant Release Inventory are all in accordance with the law, and many of them are subject to permits. The data shown are the most recent reported to authorities.

Our Canada National Pollutant Release Inventory releases decreased from 2011 to 2012. These reductions were achieved through material and process changes.

1. This figure was restated for our 2011-12 report due to an arithmetic error.

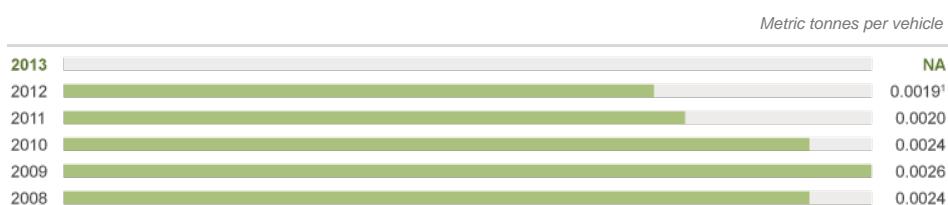
#### Related links

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## E. Ford Canada NPRI Releases per Vehicle



	2008	2009	2010	2011	2012	2013
	0.0024	0.0026	0.0024	0.0020	0.0019 <sup>1</sup>	NA

#### Data notes and analysis

The change in total NPRI releases (see above) resulted in the change in per vehicle releases. Releases reported under the Canadian National Pollutant Release Inventory are all in accordance with the law, and many of them are subject to permits. The data shown are the most recent reported to authorities.

Our Canada National Pollutant Release Inventory releases per vehicle continued to decrease from 2011 to 2012. These reductions were achieved through material and process changes.

1. This figure was restated for our 2011-12 report due to an arithmetic error.

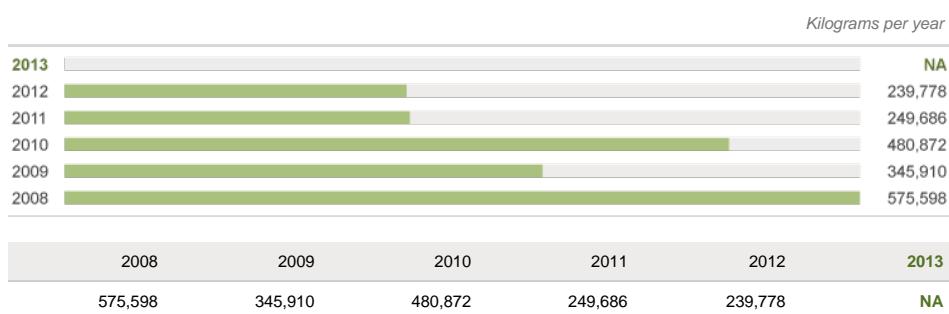
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## F. Australia National Pollutant Inventory Releases (Total Air Emissions)



Reported to regulatory authorities (NPI)

#### Data notes and analysis

Releases reported under the Australian National Pollutant Inventory are all in accordance with the law, and many of them are subject to permits. The data shown are the most recent reported to authorities.

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### > Waste

Case Study: Ford Fleet Purchase Planner

Voice: John Fleming

# Data: Waste

## Data on this page

- A. ↓ Regional Waste to Landfill
- B. ↓ Waste to Landfill per Vehicle
- C. ↓ Regional Hazardous Waste Generation
- D. ↓ Hazardous Waste Generation per Vehicle

View all data on this page as [charts](#) | [tables](#)

## A. Regional Waste to Landfill

Million kilograms

### Asia Pacific Africa<sup>1</sup>

2013	8.2
2012	8.8
2011	7.9
2010	7.4
2009	9.5
2008	9.1

### Europe<sup>2</sup>

2013	7.5
2012	7.7
2011	9.6
2010	11.4
2009	11.7
2008	19.3

### North America<sup>3</sup>

2013	30.8
2012	32.4
2011	38.1
2010	39.5
2009	34.3
2008	43.7

### South America<sup>4</sup>

2013	3.3
2012	3.8
2011	6.6
2010	7.6
2009	7.7
2008	8.8

	2008	2009	2010	2011	2012	2013
Asia Pacific Africa <sup>1</sup>	9.1	9.5	7.4	7.9	8.8	8.2
Europe <sup>2</sup>	19.3	11.7	11.4	9.6	7.7	7.5
North America <sup>3</sup>	43.7	34.3	39.5	38.1	32.4	30.8
South America <sup>4</sup>	8.8	7.7	7.6	6.6	3.8	3.3

Data managed through the [Global Emissions Manager database](#)

## Data notes and analysis

- In 2012, waste to landfill was restated for 2011 to correct for misclassifications in disposal and recycling codes. In 2011, waste-to-landfill data was restated for years 2007–2011 because casting sands (a type of waste) associated with the Geelong foundry (located in the Asia Pacific region) have been removed from the waste-to-landfill totals.
- In 2012, waste to landfill was restated for 2011 to correct for misclassifications in disposal and recycling codes.
- In 2012, waste to landfill was restated for 2010 and 2011 to correct for misclassifications in disposal and recycling codes. AutoAlliance International, our joint-venture plant in Flat Rock, Michigan that produces the Ford Mustang, is included beginning in 2009.

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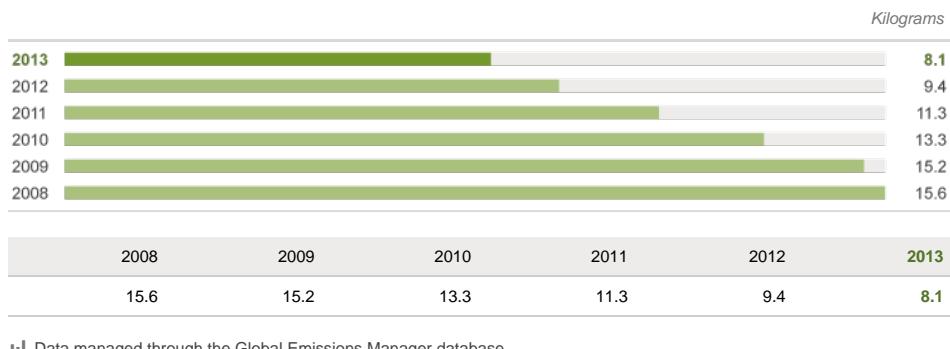
#### Related links

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## B. Waste to Landfill per Vehicle



■ Data managed through the [Global Emissions Manager database](#)

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#### Data notes and analysis

In 2012, waste to landfill per vehicle data was restated for 2010 and 2011 to correct for misclassifications in disposal and recycling codes.

In 2011, waste-to-landfill per vehicle data was restated for all years because casting sands (a type of waste) associated with Geelong foundry (located in the Asia Pacific region) and Taubate foundry (located in the South America region) have been removed from the waste-to-landfill totals for years 2007–2011.

AutoAlliance International, our joint-venture plant in Flat Rock, Michigan, which produces the Ford Mustang, is included beginning in 2009.

In 2013, we reduced waste to landfill on a per-vehicle basis by about 5.4 percent compared to 2012, which reflects our focus on reducing waste produced per unit of production. We decreased waste to landfill primarily through aggressive efforts to generate less waste and recycle more, and through the use of waste-to-energy incineration facilities.

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#### Related links

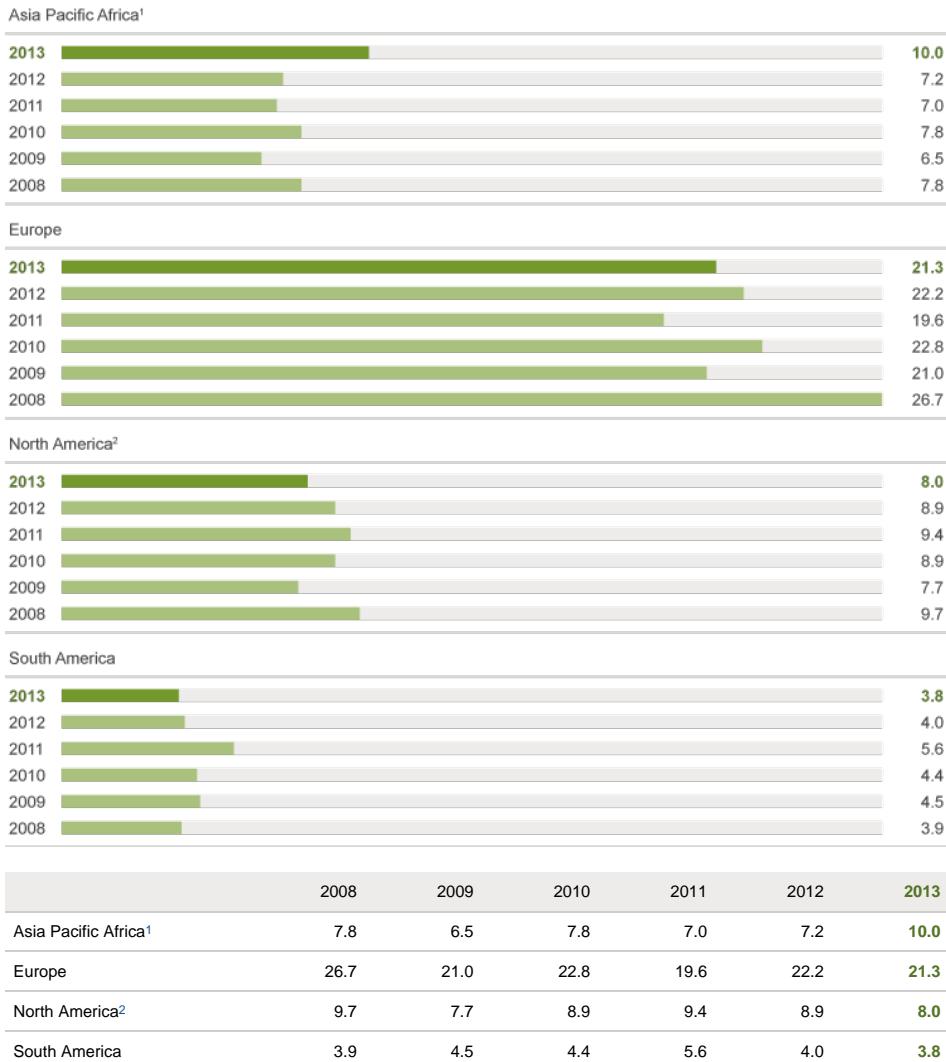
##### This Report

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## C. Regional Hazardous Waste Generation

Million kilograms



Data managed through the [Global Emissions Manager database](#)

#### Data notes and analysis

- In 2012, regional hazardous waste in Asia Pacific Africa for 2008, 2009, and 2010 was updated to reflect adjusted production.
- In 2012, regional hazardous waste in North America was restated for 2011 to correct for misclassifications in disposal and recycling codes.

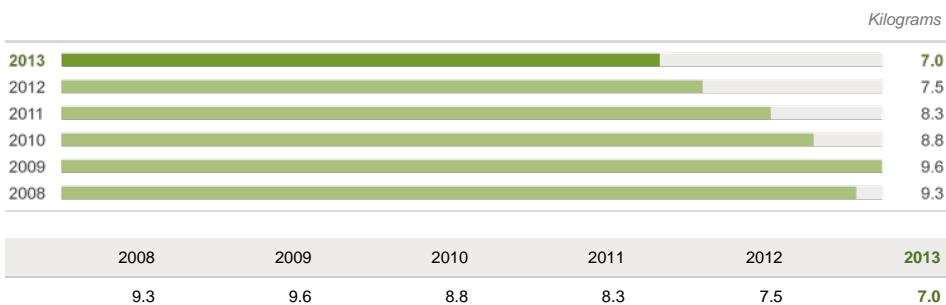
#### Related links

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## D. Hazardous Waste Generation per Vehicle



Data managed through the [Global Emissions Manager database](#)

#### Data notes and analysis

In 2012, hazardous waste per vehicle data was restated for 2011 to correct for misclassifications in disposal and recycling codes.

In 2011, hazardous waste to landfill data for 2010 and 2009 was restated due to corrections in the data.

We reduced hazardous waste on a per-vehicle basis by 7 percent compared to 2012 and by 27 percent over the last five years. Ford has chosen to target eliminating the landfill of hazardous waste first, because this provides the quickest and most cost-

effective benefits to human health and the environment.

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> Case Study: Ford Fleet Purchase Planner

Voice: John Fleming

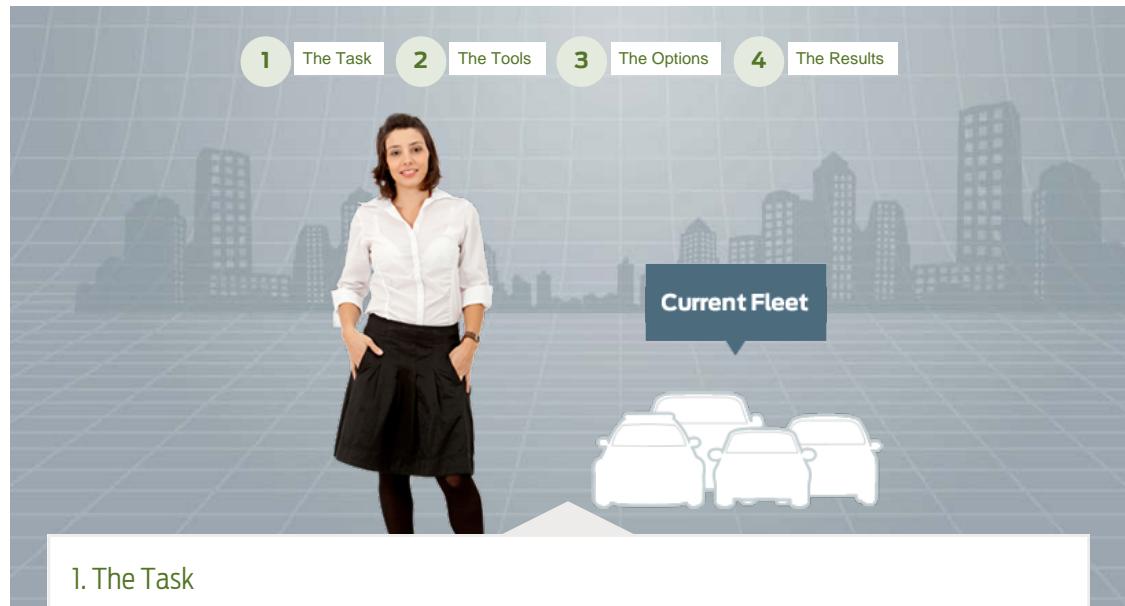
# Case Study: Ford Fleet Purchase Planner

1 The Task

2 The Tools

3 The Options

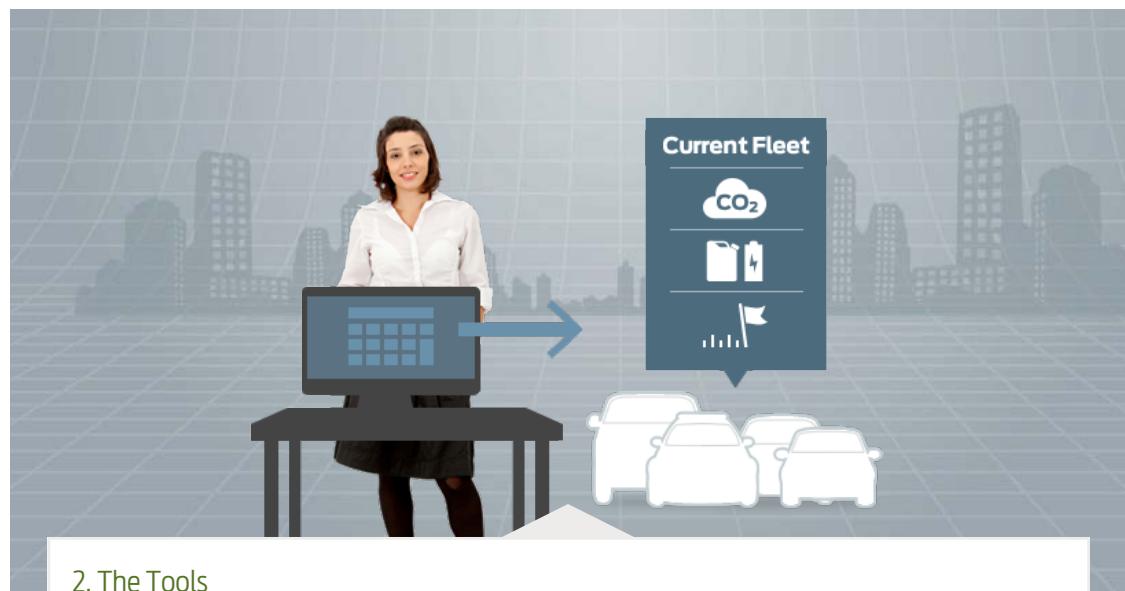
4 The Results



## 1. The Task

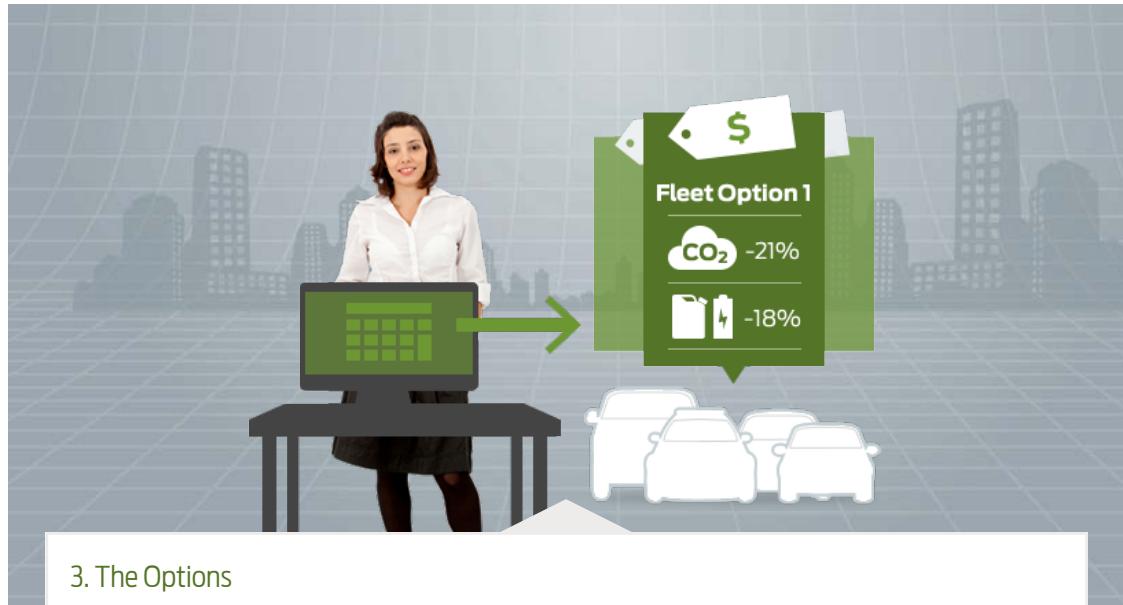
**Scenario:** Sam Smith is the Purchasing Manager for Green City, U.S.A.; she purchases about 100 new vehicles per year.

Her challenge is to help reduce the city's overall fleet emissions. She doesn't have the information she needs to assess the emissions of her current vehicle fleet and measure improvements over time. And, it's complicated and time-consuming to weigh the relative benefits and costs of so many alternative fuel and powertrain technologies to decide which are best for her fleet's drivers.



## 2. The Tools

Ford's suite of fleet purchasing tools helps Sam make an informed and effective decision. She can calculate the carbon dioxide (CO<sub>2</sub>) footprint of her existing fleet, including factors like local fuel costs, electricity costs, electricity sources, miles driven and driving patterns. The tools can also show her the emissions and fuel cost reductions she would get from buying EcoBoost®-powered vehicles, hybrids, plug-in hybrids or battery electric vehicles, rather than just conventional internal combustion engine vehicles.



### 3. The Options

Ford's Purchase Recommender gives Sam a range of vehicle purchase options. It makes a recommendation for the vehicle mix that will provide the greatest emissions reduction at the lowest cost. And, it makes additional recommendations for how she can lower her emissions even more, if she has a little flexibility with her budget.



### 4. The Results

Sam makes a proposal to her management about the best set of vehicles to buy. She explains the specific emission and fuel-cost benefits of different vehicle technologies. And, Sam knows the CO<sub>2</sub> footprint of her existing fleet so she can accurately measure how much she would improve it with her proposal, and how much progress she can make toward the city's sustainability goals.

The growth in eco-conscious vehicle options is great news for customers who want to reduce their environmental footprint and save money on fuel. However, all the new choices do make planning purchases more complicated. Customers now have to determine which vehicle technologies will have the greatest environmental and cost benefits for their specific driving needs. This is especially true for commercial and government fleet customers, who often buy large numbers of vehicles and have to meet a wide range of transportation requirements across a variety of different driving situations.

Researchers at Ford have developed a suite of tools, collectively called the Ford Fleet Purchase Planner™, to help fleet buyers weigh all their options. These tools help buyers choose the best vehicles from Ford's lineup to manage their costs and reduce their company's carbon footprint. Fleet customers work with their Ford account manager or a fleet analyst to use the Planner to build a custom fleet of Ford vehicles. Buyers are then able to change their hypothetical fleet until the vehicle mix meets their specific costs and environmental goals.

The Fleet Purchase Planner™ includes several tools. First, it offers an Emissions and Fuel Cost Calculator, which compares the CO<sub>2</sub> emissions and fuel cost of two vehicles or vehicle technologies based on their fuel economy and customer-specific factors such as annual miles driven, city versus highway driving conditions and local fuel prices. The results help our customers understand the relative benefits of different technologies, such as an EcoBoost engine compared with a hybrid vehicle; different fuels, like gasoline versus compressed natural gas or diesel; and, for plug-in vehicles, different electricity carbon footprints in different regions of the country. For example, for customers deciding where to place battery electric vehicles in their fleets, the Calculator shows that the Focus Electric emits about 70 g CO<sub>2</sub> equivalent/km using electricity from the low-

carbon California grid but more than twice as much, about 150 g CO<sub>2</sub> equivalent/km, in the more coal-intensive Southeast U.S.

But most fleets deal with hundreds or thousands of vehicles. Comparing all the available vehicle and technology replacement options for cost and sustainability across a fleet of many vehicles is a complex task. So, we developed additional tools to help fleets meet this challenge.

The Fleet CO<sub>2</sub> Footprint Status Calculator helps fleets calculate the carbon footprint of their current fleet. Customers provide a list of the Vehicle Identification Numbers (VINs) for all the vehicles in their fleet, and can customize this carbon footprint by adding in specific details on the locations of their vehicles, alternative fuels used, annual mileage, driving patterns and other criteria. This tool also calculates the annual fuel cost for the whole fleet. The CO<sub>2</sub> footprint and fuel cost become the baselines for evaluating the benefit of new vehicle purchases.

Finally, the Purchase Recommender helps fleet customers determine the right combination of replacement vehicles to meet their cost and environmental goals. Customers choose the type of cost they want to minimize: purchase price, purchase price plus fuel cost, or total cost of ownership. Then the Purchase Recommender calculates the exact combination of new vehicles they should buy to meet the same transportation needs as the vehicles they are replacing while minimizing their costs and CO<sub>2</sub> footprint. It also shows customers combinations of vehicles they could buy to make even greater reductions to the overall CO<sub>2</sub> footprint of their fleet, including the associated purchase price and fuel costs.

This tool is delivering benefits to Ford's fleet customers and the environment. By using this tool, KONE, a leader in elevator and escalator manufacturing, has decided to replace its fleet of 160 Ford Fusion cars with the new Fusion Hybrid by 2018, resulting in a reduction in KONE's carbon emissions of 850 metric tons – while also saving the company money.

The Ford Fleet Purchase Planner™ is part of Ford's larger commitment to using data and analytics to benefit our customers and the environment. The unique tool was among three finalists for the 2014 Innovative Applications in Analytics Award by INFORMS, the largest association for professionals in analytics. Ford also won the 2013 INFORMS Prize, which acknowledges a company's overall achievement in analytics.

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Case Study: Ford Fleet  
Purchase Planner

> Voice: John Fleming

## Voice: John Fleming

Executive Vice President, Global Manufacturing and Labor Affairs, Ford Motor Company

**“**There are any number of investments a company like ours can make to better manage its environmental footprint. But there's a balancing act when choosing which ones to implement. Sometimes it's an easy decision and the returns on investment are immediate. Other times, you have to take a much longer view and accept the fact that it will take time to realize the financial gains.”



Here at Ford, we take environmental considerations into account at every stage of manufacturing. At the most basic level, there's the issue of compliance. We want to be sure that what we do every day stays within the law and that we are operating as good neighbors.

But our efforts go well beyond mere compliance. We want our facilities to be the best in the world when it comes to our environmental footprint. Our Environmental Operating System, which offers a disciplined and common approach to manufacturing, is designed so that each of our facilities can learn from the others. We share best practices and apply leading technologies that help to minimize our impacts. We have also developed challenging improvement goals for all our operations in key environmental areas, such as our goal to reduce facility CO<sub>2</sub> emissions by 30 percent per vehicle produced from 2010 to 2025. And, we set specific annual improvement targets for every facility to make sure we meet or exceed these goals.

We have a standard set of environmental systems that are applied globally across all of Ford, enabling each of our 65 manufacturing facilities to operate under the same criteria when it comes to energy use and greenhouse gas emissions, water consumption and waste management. We monitor and measure our plants every day and, if problems are found, we immediately set to work to correct the issues.

Beyond incremental improvements, we are always looking for opportunities to make more substantive changes. When we're building new plants or revamping product lines, we explore all sorts of opportunities that can take our facilities to the next level – from management practices such as shutting down parts of the plant when not in use to more complex manufacturing improvements that use the latest in cutting-edge technologies.

In 2014, we're launching a historic number of products around the world. From the manufacturing perspective, we've been preparing for these launches since these new vehicles were in the earliest of development phases. It takes, on average, more than three years for a new vehicle to move from an initial concept to full production. Right from the start of a new product, we plan out a production road map that will allow us to build the vehicle in the most environmentally friendly way possible.

For every new vehicle we create, we follow a 100-point environmental checklist that helps us identify the production and facilities improvements we can make as we're pushing it through development. The same 100-point system is also used to pinpoint and evaluate environmental best practices at new plants as well as older plants that are getting a significant refresh. We rate each plant on four key environmental areas that we then use to set targets and improvement goals.

When we consider building a new plant, we look at the same issues no matter where we are thinking of locating the facility – air emissions, water usage, waste water and waste. But of course the emphases may vary depending on the local conditions.

One of our biggest areas of focus is water use. Water conservation is a bigger problem in some countries than others, but water consumption is a critical issue for the planet no matter where we operate. We are proud to say that we achieved our 30 percent per vehicle water reduction target two years ahead of schedule.

There are any number of investments a company like ours can make to better manage its environmental footprint. But there's a balancing act when choosing which ones to implement. Sometimes it's an easy decision and the returns on investment are immediate. Other times, you have to take a much longer view and accept the fact that it will take time to realize the financial gains. For example, we have given ourselves the task of reducing energy consumption per vehicle globally by 25 percent, from 2011 to 2016. Several projects we have completed – such as solar panels at our Michigan Assembly Plant and windmills in Europe – will take many years to recover the outlay of expenses. The fact that we are willing to invest in projects with a long-term return on investment shows that Ford is willing to take a broad view of our business. We want to be good

neighbors and we want to contribute to a better world.

Of course, we won't make an investment in a project that makes no business sense whatsoever. It has to have a relationship to the business but it doesn't necessarily have to pay back quickly for us to pursue it. In some cases, projects may have no payback at all but they help us to learn more cost-effective ways to make operational changes that will ultimately reduce our impacts.

There are many environmentally friendly projects we have instituted that I'm especially proud of – from the three-wet paint system, which reduces CO<sub>2</sub> emissions, improves energy and reduces volatile organic compounds (VOCs), to dry machining, which can save more than 280,000 gallons of water per year on a typical production line.

I was just 16 years old when I started as an apprentice at Ford in 1967 and I never left. We are so much more aware of our environmental impacts these days than we were back then and we have truly integrated environmental concerns into our business. Just think about our One Ford goal – great products, strong business and a better world. Forty years ago, we hardly focused on the negative impacts our company could have on our planet. Today, it's one of our top considerations.

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Case Study: Ford Manufacturing Water Saving Technologies

Case Study: Saving Water in Cuautitlán, Mexico

Voice: Brooke Barton



Water

We have focused on reducing our water impacts since 2000 when we first began setting year-over-year reduction targets. Since then, we have moved beyond merely reducing the water footprint of our own facilities to working more holistically outside our corporate walls, addressing water concerns in our supply chain and our broader communities.

Read more about [OUR APPROACH](#)



### OUR WATER STRATEGY

We believe that business has a key role to play in finding sustainable solutions to current and future global water challenges. As an industry leader with more than 180,000 employees worldwide and manufacturing facilities or distribution channels across six continents, our reach enables large-scale positive impact.

Read more about [OUR WATER STRATEGY](#)

### OUR GOALS AND PERFORMANCE PROGRESS



Goal: Cut the amount of water used to make each vehicle by 30% globally by 2015, compared to 2009.

We achieved our water reduction goal two years ahead of schedule. We will be updating our global manufacturing water strategy in 2014 and setting a new long-term target.



In 2014, we published our corporate water strategy, which builds upon our 2011 water strategy for our manufacturing operations.



Ford's water strategy aligns with the core elements of the CEO Water Mandate, which we endorsed in 2014.



Between 2000 and 2013, we reduced our total global water use by 61%, or more than 10 billion gallons.



Beginning in 2014, we will start asking our major suppliers – those we consider to be Tier 1 – to voluntarily report on their water use through CDP Water.

See more at [FORD'S GOALS, COMMITMENTS AND STATUS](#)



## A BASIC HUMAN RIGHT

We see water as far more than an environmental concern. Since 2012, Ford has recognized a basic human right to clean, affordable drinking water and adequate and accessible sanitation and, through our water strategy, seeks to uphold and respect that right.

Read more about [OUR EFFORTS](#)



## Case Study: [SAVING WATER IN CUAUTITLÁN, MEXICO](#)

Our manufacturing facility in Cuautitlán, Mexico, is located in a region of water scarcity. Over the years, facility managers have come up with some creative solutions to their natural environmental challenges, reducing water use per vehicle produced at this plant by almost 58% between 2000 and 2013.

Voice: **BROOKE BARTON**  
Director, Ceres Water Program

"A business with a 21<sup>st</sup> century mindset views water as part of an interconnected ecosystem that is impacted by a host of variables, including changes in our climate. Water is understood to be a shared good that doesn't just magically flow out of a pipe; it has a whole natural and engineered infrastructure supporting it."



## WATER USE

Although the making of vehicles is not especially water intensive, we use water in many key manufacturing processes in our plants, including vehicle painting, and water is used at every point in our supply chain.

Read more about [OUR WATER USE](#)



## SUSTAINABLE SOLUTIONS

In 2014, we are marking the 10<sup>th</sup> anniversary of the rebuilt Dearborn Truck Plant at the Ford Rouge Center, which was hailed as a model of sustainable manufacturing when we rebuilt it in 2004. The facility incorporates extensive natural storm water management systems and a green roof that was the largest in the world when it was installed.

## 2013 HIGHLIGHTS



### 5% reduction

in average amount of water used to make each vehicle between 2012 and 2013.



### 61% reduction

in total global water use between 2000 and 2013 – or more than 10 billion gallons.



### 2% target

water reduction per vehicle produced from 2013 to 2014.



### 250

approximate number of suppliers we are asking to complete the CDP Supply Chain water questionnaire.



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## Overview

Water scarcity and water quality degradation rank among the biggest threats facing our planet. According to the World Economic Forum's 2014 Global Risks report,<sup>1</sup> water crises – from floods to droughts to pollution – placed third among the most worrisome threats to businesses and governments, behind fiscal crises (first) and structurally high unemployment/underemployment (second).

At Ford, we have focused on reducing our water impacts since 2000 when we first began setting year-over-year reduction targets as part of our Global Water Management Initiative. Our efforts around water have evolved over the years; we have moved beyond merely reducing the water footprint of our own facilities to working more holistically outside our corporate walls, addressing water concerns in our supply chain and our broader communities.

In 2014 we published our corporate water strategy, which builds upon our 2011 water strategy for our manufacturing operations. The corporate water strategy is designed to effect substantial, sustainable and measureable impacts within our own facilities, across our supply chain and in our regions of operation.

We believe that business has a key role to play in finding sustainable solutions to current and future global water challenges. As an industry leader with more than 180,000 employees worldwide and manufacturing facilities or distribution channels across six continents, our reach enables large-scale positive impact.



## REDUCING WATER USE

We achieved our water reduction goal two years ahead of schedule.



## WE SUPPORT

## The CEO Water Mandate

Our water strategy aligns with the core elements of the [CEO Water Mandate, a private-public initiative](#) launched by the UN Secretary-General in 2007. Companies that support the CEO Water Mandate commit to implementing the framework's six core elements for water management and pledge to publicly report their progress annually. Ford endorsed the Water Mandate in 2014.

The Water Mandate's key elements are as follows:

- [Direct Operations](#)
- [Supply Chain & Value Chain](#)
- [Collective Action](#)
- [Public Policy](#)
- [Community Engagement](#)
- Transparency

Transparency underpins all of the other five areas. Across these five Water Mandate elements, we will develop communications and reporting channels that promote accountability. We will be transparent with key stakeholders, customers and the public by:

- publishing and sharing our company water strategy (including targets and results) in relevant corporate reports;
- publishing and sharing our global water usage for direct operations on both an absolute and per-vehicle produced basis; and
- being transparent in discussions with governments and other public authorities on water issues.

Together, these six elements will guide us toward a position of industry leadership.



We see water as far more than an environmental concern. Since 2012, Ford has recognized a basic human right to clean, affordable drinking water and adequate and accessible sanitation and, through this water strategy, seeks to uphold and respect that right. Our water strategy complements our overall human rights policy (Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility).

Our [analysis of Ford operations](#) shows that some of our facilities are located in regions where water supplies are already scarce. Global climate change also has the potential to further impact the quality and availability of water. We cannot be certain that we will always have access to water of the quantity and quality that our operations require. Our water strategy puts primary emphasis on our plants located in areas of water scarcity.

Ford is committed to conserving water and using it responsibly. We will address water challenges internally within our own operations and externally in communities where we operate and throughout our supply chain. We have committed to measurable actions to support our global water strategy, as described in each of the sections that follow below.

While we have demonstrated progress and positive global impacts through our efforts, we must also work collaboratively with other organizations on the world's water challenges. We are committed to continuous improvement through research and partnerships with other companies and organizations to develop improved best practices in responsible water stewardship.

Ford's environmental progress is evaluated at the highest levels of our company. The Board of Directors reviews our water-related progress annually. A cross-functional team from across Ford divisions – including our Environmental Quality Office and our Manufacturing, Purchasing, Research, and Community Relations functions – reviews water issues in a holistic way. In recent years, Ford has been meeting with a variety of groups – such as the Interfaith Center on Corporate Responsibility, the UN Global Compact, the U.S. State Department, Ceres and the Global Water Challenge – to gain a better appreciation of outside stakeholder perspectives.

- 
1. Source: World Economic Forum. From a list of 31 risks, survey respondents were asked to identify the five they were most concerned about. [Download the World Economic Forum survey](#)



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## Direct Operations

We aim to conserve water and use it responsibly. Although the making of vehicles is not especially water intensive, we use water in many key manufacturing processes in our plants, including vehicle painting, and water is used at every point in our [supply chain](#).

Water scarcity can have an appreciable impact on our manufacturing operations. Our water-related risks come not only from being a direct water user, but also from being a large purchaser of materials, parts and components that have used water in their manufacture.

We set a global manufacturing water-use-per-vehicle reduction goal of 30 percent by 2015, using a 2009 baseline. We have already achieved this goal – two years ahead of schedule. We will be updating our global manufacturing water strategy in 2014 and setting a new long-term target. Our target for 2014 is a reduction of 2 percent per vehicle produced from 2013. We will continue to reduce water impacts in our manufacturing plants worldwide by:

- seeking opportunities for continuous improvement using methodologies such as [water assessments](#);
- [evaluating and implementing innovative technologies](#) to reduce water use and increase water recycling in manufacturing operations, where feasible, and incorporating consideration of water availability and risk in technology implementation;
- ensuring all employees have access to potable water, sanitation and hygiene in our workplaces;
- working with key local stakeholders in the communities in which we operate; and
- meeting local quality standards or Ford global standards for wastewater discharge (whichever is more stringent).

In 2011, we built water reduction actions into our Environmental Operating System (EOS), which provides a globally standardized, streamlined approach to meeting all environmental requirements, including sustainability objectives and targets.

### Gauging Our Strategy

As we worked to develop our corporate water strategy, we wanted to gain some independent, critical insight into our water stewardship activities and our related public disclosures. Enter the [Ceres Aqua Gauge™](#), an Excel-based tool designed to help companies like ours assess water risk management approaches in areas ranging from policy development and data gathering to business planning and goal setting. Developed by Ceres, the World Business Council for Sustainable Development, Irbaris and the Investor Responsibility Research Center Institute, the Aqua Gauge analyzed our activities to provide an outside view of how we were performing relative to leading practice.

The initial assessments helped us understand how we could be more transparent and gave us insight into how our water strategy was being viewed by investors, stakeholders and customers. We then used the assessment to help us zero in on areas for improvement and leadership.

For example, the assessment told us that we are doing many of the right things already but could do a better job of communicating our approach and results. The assessment also revealed that we could do more to improve the company's extension of our water stewardship efforts into the supply chain.

After sharing the results with our senior executives, we now have a clearer understanding of how to improve our approach in 2014, where we stand, and where we need to go.

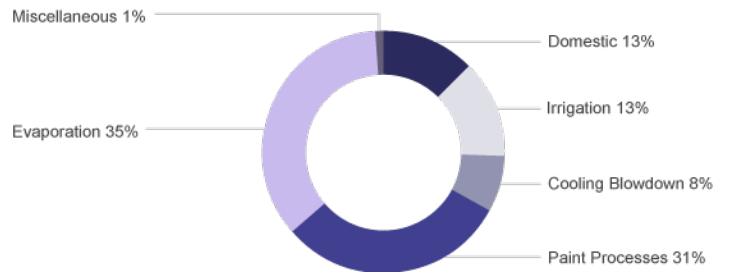
### Related links

#### This Report

→ [Greening Our Operations](#)

Read an [external perspective from the director of Ceres' Water Program](#) and an [article about our water workshop](#).

## Vehicle Assembly Plant Water Use



	%
Paint Processes	31
Cooling Blowdown	8
Irrigation	13
Domestic	13
Miscellaneous	1
Evaporation	35

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## Progress in Reducing Water Use

We began our Global Water Management Initiative in 2000, setting a target of 3 percent year-over-year reductions. In 2011, we announced a goal of reducing the amount of water used to make each vehicle by 30 percent globally from 2009 to 2015.

We have achieved this goal, two years ahead of schedule. We will be updating our global manufacturing water strategy in 2014 and setting a new long-term target. Our target for 2014 is a reduction of 2 percent per vehicle produced from 2013.

Between 2012 and 2013, we reduced the average amount of water used to make each vehicle by 5 percent. Between 2000 and 2013, we reduced our total global water use by 61 percent, or more than 10 billion gallons (see graphic below), by cutting the water we use in everything from cooling towers to washing parts to paint operations. (That's equivalent to the water used for 1 billion five-minute showers, based on figures from the U.S. Environmental Protection Agency, or enough to fill more than 15,000 Olympic-sized pools.) We decreased the total amount of water used around our global facilities from 64 million cubic meters per year to 25 million cubic meters.

### 10.6 billion gallons of water is:



the amount of water that flows over Niagara Falls in



equal to the amount of annual water use for about



16,000  
Olympic-size pools<sup>1</sup>



265 million  
loads of laundry<sup>2</sup>

**3.9 hours<sup>1</sup>**

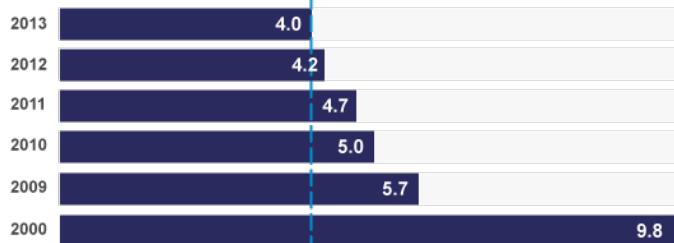
**99,000  
U.S. residences<sup>1</sup>**

We report on our progress in this annual Sustainability Report and through our participation in the CDP Water Disclosure, which we joined in 2010 – the first automaker to do so. We have also joined the U.S. Department of Energy's Better Plants Water Program as a pilot participant.

In 2013, we began tracking process water discharge at our manufacturing plants globally. Process water discharge is defined as the water used in manufacturing (including facility air conditioning) and released to the environment or discharged off-site. (It does not include sanitary sewage or storm water.) Tracking this metric will provide greater transparency around water usage within our facilities.

### Global Water Use per Vehicle Produced

Cubic meters per vehicle



\*2015 target of 4 cubic meters per vehicle

### Total Global Water Use



[Global water use broken down by source](#) can be found on the data page.

### Learning from Each Other

Wherever possible, we try to replicate best practices from one plant to the next. This is especially true when it comes to environmental improvements, such as water reducing technologies. Each of our plants develops an annual action plan of potential projects that could help them to reduce water and to achieve targets in line with our strategies. Project feasibility is assessed based on regulatory requirements, budget, cycle plans and other considerations.

The decisions for project implementation are based on many variables, including success of projects at other plants. Successful projects that can be replicated elsewhere are communicated across the company so that other facilities can learn from them and determine whether they would work in a different setting.

1. U.S. Environmental Protection Agency
2. California Energy Commission



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## Investing in New Technologies

Ford has successfully implemented many water-savings initiatives across our plants to shrink our water footprint. Wherever feasible, we take successful projects and mirror them in other locations. Our newest plants use a set of advanced and environmentally friendly technologies to dramatically cut water use. Many of these new systems require substantial capital investments, so we have been adding them on a rolling basis as we update equipment and bring new facilities online, especially in areas where water is more scarce.

For example, we have implemented a membrane biological reactor (MBR) and reverse-osmosis process to recycle water from our on-site wastewater treatment plants in a number of our global production facilities that are located in more arid regions. This allows us to avoid using high-quality water suitable for human consumption in our manufacturing processes. By doing so at plants in Chihuahua and Hermosillo, Mexico; Pretoria, South Africa; Chennai, India; and Chongqing, China, we have been able to reuse more than 976,000 cubic meters of water, which means we have not had to withdraw that water from the environment.

In Pretoria, for example, our \$2.5 million on-site wastewater treatment plant at the Silverton Assembly Plant is increasing the amount of water that can be reused by up to 15 percent. A similar system installed at the Chennai Assembly Plant allows the plant to recycle 100 percent of its water. And two assembly plants in Chongqing, China, added advanced water treatment equipment to improve recycling. One plant recycles an average of 100,000 gallons daily while the other recycles an average of 65,000 gallons daily.

We also continue to replicate new technologies, including a process known as "dry-machining" that lubricates cutting tools with a fine spray of oil, rather than the conventional "wet-machining" that required large amounts of metal-working fluids and water to cool and lubricate the tools. For a typical production line, dry-machining – also known as Minimum Quantity Lubrication (MQL) – can save more than 280,000 gallons of water per year.

Over the last few years, we have further expanded our use of MQL. We currently have the capability in six plants around the world – a number that will nearly double in the next few years. These plants are as follows:

- Changan Ford Engine Plant (China)
- Craiova Engine Plant (Romania)
- Cologne Engine Plant (Germany)
- Livonia Transmission Plant (Michigan, U.S.A.)
- Romeo Engine Plant (Michigan, U.S.A.)
- Van Dyke Transmission Plant (Michigan, U.S.A.)

MQL has other benefits in addition to water savings. It reduces the amount of oil needed to machine an engine or transmission by 80 percent or more to approximately 100 milliliters – or about half the size of an average drinking glass. And by avoiding the need for a coolant system across most engine production lines, MQL helps to reduce energy use. MQL also improves plant air quality by eliminating the airborne mist produced by traditional wet-machining.

We also have been pilot testing ways to save water at our cooling towers, which are one of the biggest water users at our plants. We're trying new technologies that soften the water so that there are fewer salts to cause equipment scaling. This allows us to reuse the water through the cooling towers many more times before the hardness requires us to bring freshwater in, reducing the amount of freshwater needed for cooling processes and comfort cooling.

### Related links

#### This Report

➔ [Greening Our Operations](#)

In 2014, we are marking the 10<sup>th</sup> anniversary of the rebuilt Dearborn Truck Plant at the Ford Rouge Center, which was hailed as a model of sustainable manufacturing when we rebuilt it in 2004. The facility incorporates extensive natural stormwater management systems and what was then the largest green roof in the world. (Studies have shown that the roof has reduced runoff by 42 percent.) As we invest in new and existing facilities globally, we have built on what we learned at the Ford Rouge Center and put in place other sustainable manufacturing technologies that use water more efficiently and provide environmental benefits.

For example, in 2012, we replaced a portion of the roof at our world headquarters in Dearborn, installing 5,000 square feet of green sedum on the west side of the building. Our Louisville, Kentucky, and Cuautitlán, Mexico, plants installed porous pavement systems in the parking areas to reduce the amount of stormwater runoff.

[Read more in the Environment section.](#)

## Water Assessments

While all of our plants measure incoming water use, we wanted to further define water usage within the plants. Therefore, we are conducting water assessments to help us gain a better understanding of our internal water usage. We began in 2012, hiring an outside consultant to conduct reviews at two assembly plants in the U.S. and one in Cologne, Germany. As of early 2014, we have conducted assessments at 12 global sites and continue to add new plants for assessment each year. We are in the process of evaluating the results to determine what measures can feasibly be taken to reduce water and save our company money at the same time.

The following plants have been evaluated under the project:

- AutoAlliance (Thailand)
- Changan Assembly 2 (China)
- Louisville Assembly (Kentucky, U.S.A.)
- Kentucky Truck Plant (U.S.A.)
- Cuautitlán Stamping and Assembly (Mexico)
- Hermosillo Stamping and Assembly (Mexico)
- Flat Rock Assembly Plant (Michigan, U.S.A.)
- Ohio Assembly (U.S.A.)
- Van Dyke Transmission Plant (Michigan, U.S.A.)
- Cologne Body and Assembly (Germany)
- Valencia Body and Assembly (Spain)
- Pacheco Stamping and Assembly (Argentina)



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## Operating in Water-Scarce Regions

Ford has been growing in many areas of the world where water access and availability are concerns. We have identified which of our operations are located in water-scarce regions using watershed-level data from the World Business Council for Sustainable Development's (WBCSD) Global Water Tool. Previously, we used country-level data in the Global Water Tool to analyze our operations. However, water availability is a local issue, and country-level data that averages the water availability across multiple watersheds may mask important regional variations. Therefore, we conducted the latest analysis using more detailed watershed-level data. According to our analysis, about 24 percent of our operations are located in regions that are considered to be at risk.

Our facilities in Mexico are located in water-scarce regions; our manufacturing facility in Cuautitlán, Mexico, for example, is already subject to water-withdrawal limitations. Several of our facilities in our Asia Pacific Africa region are in areas that are currently water scarce, or are expected to be in the near future.

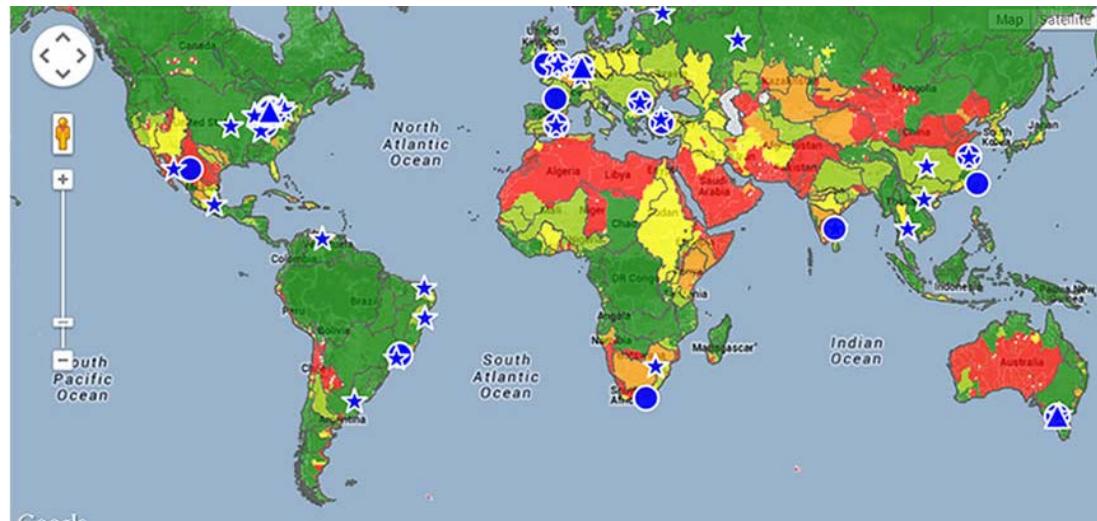
Ford also used the Global Water Tool to evaluate which of our operations are projected to be in water-scarce regions by 2025. According to the analysis, approximately 25 percent of our operations are projected to be in such regions. The WBCSD's free tool enables companies to map their facilities and assess several water-related risks. For more information on the tool and how it works, [see the WBCSD website](#).

## Related links

## This Report

→ [Greening Our Operations](#)

## Ford Operations: 2025 Projected Annual Renewable Water Supply per Person



Source: World Business Council for Sustainable Development's Global Water Tool (GWT) v2 uses several datasets. Annual renewable water supply per person projections for 2025 are obtained from the Pilot Analysis of Global Ecosystems: Freshwater Systems. Washington DC: WRI produced by C. Revenga, J. Brunner, N. Henninger, K. Kassem and R. Payne (2000).



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## Water Impacts, Risks and Opportunities

Historically, water has been a relatively inexpensive resource. But that's changing, and the cost of using water is expected to continue increasing in the coming decades. For a manufacturing company like ours, that could mean higher operating costs.

From a business perspective, it is important to strategically reduce water consumption now, before we see significant price increases or the implementation of further water use restrictions.

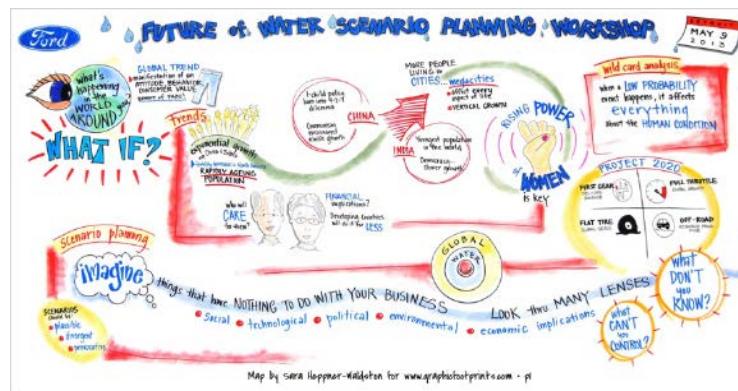
Increasing water scarcity means industrial needs can be at odds with community and environmental needs and could pose challenges to our commitments to both. Industrial facilities in water-scarce areas may have reduced access to water and/or may endure rising water costs. Working on solutions helps us to secure a "license to operate" in diverse global locations and can enhance our reputation in local communities.

As a company headquartered near one of the world's largest bodies of freshwater – the Great Lakes – it would be easy for us to take the resource for granted. In May 2013, we took steps to prepare for a water-scarce future, holding a "water futuring" workshop with approximately 20 participants, including outside stakeholders from universities and nongovernmental organizations, to examine "what if" scenarios about water in the years ahead. We wanted to uncover what the long-term implications are of water scarcity on Ford's manufacturing operations. Scenarios provide a tool to help us look outside our industry to understand shifts in social, technological, economic, environmental and political arenas. Since the future cannot be predicted, insights are derived by analyzing scenarios to influence strategy development. The idea is to contemplate multiple futures and develop sets of plans that work regardless of how the future unfolds.

During the workshop, participants talked through four scenarios for the year 2020. For example, what happens if water becomes a more precious commodity and resource, requiring governments to ration water allowances for agriculture? What would that do to food production? Or, what might a severe global financial crisis do to water infrastructure?

Following the water workshop, we began a gap analysis review of our current global manufacturing water strategy and will be updating it based on our findings.

The workshop may have set up fictional scenes for the future. But any one of them – not to mention plenty of others – have the potential to occur one day. We want to build resilient systems and processes that will help our company withstand any serious threats to future water insecurity. Thinking forward is critical if we want to proactively position our company for what may come ahead – both the possible challenges and opportunities.





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## Supply and Value Chains

Water is an important resource within our supply and value chains – from the makers of the parts and components that go into our vehicles to the dealers who sell our cars to the consumers who fill our vehicles with gas or diesel fuel, which require water to produce.

As part of our CEO Water Mandate commitments, we will work to reduce water impacts in our supply and value chains worldwide by:

- working with suppliers to understand the water intensity of raw materials;
- identifying and engaging suppliers in water-stressed regions where we operate, sharing water stewardship practices, and supporting actions to implement water efficiency improvements; and
- working with our dealership network on water-saving technology opportunities.

## Working with Suppliers

The nature of our business means that we are a large purchaser of water-intensive materials, parts and components. Like us, our suppliers face similar risks in terms of the increasing cost and competition for water and community concerns in water-scarce areas, and encouraging them to understand and manage their risks can help to make our supply chain more stable and resilient.

Beginning in 2014, we will start asking our major suppliers – those we consider to be Tier 1 – to voluntarily report on their water use through CDP Water as part of our efforts to better understand the water risks, implications and accounting within our supply chain. This builds upon the work we are already doing within the supply chain and is similar to the requests we already made of our suppliers for greenhouse gas emissions. We are asking both production and nonproduction suppliers who have been identified as having high water use and/or operate in highly water-stressed regions to complete the CDP Water questionnaire. The suppliers selected were based on literature-identified high water intensity materials and/or commodities such as the following:

- aluminum
- steel
- rubber
- carpets/textiles
- plastics
- coatings
- batteries/lithium

Once we understand which of our suppliers have the largest water footprints, we aspire to work with them to achieve reductions. Our goal is to teach our suppliers about the water savings initiatives we have implemented across our plants with hopes that they will implement some of our initiatives within their own facilities. These suppliers may, wherever feasible, take these successful initiatives and mirror them in other locations, and so on.

[See the Supply Chain section for more on our supplier work.](#)

## Working with Dealers

We have been working with our dealer communities on initiatives to help them save water (and energy) at their locations. Our ["Go Green" program](#) helps dealers improve environmental efficiency on their lots.

## Related links

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- ➔ Supply Chain
- ➔ Dealers



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Case Study: Ford Manufacturing Water Saving Technologies

Case Study: Saving Water in Cuautitlán, Mexico

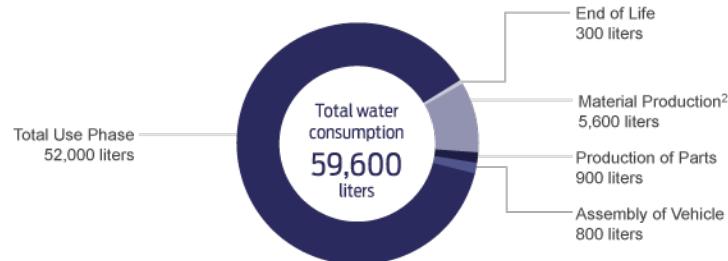
Voice: Brooke Barton

## Water Usages in the Vehicle Life Cycle

To better assess our water-related impacts, we have been working to quantify water consumption over the life of a typical light-duty vehicle in the U.S. The Georgia Institute of Technology's (Georgia Tech's) Sustainable Design and Manufacturing Program conducted a literature survey and analysis that included water used in material production, production of parts, vehicle assembly, vehicle use (fuel production and distribution) and vehicle disposal at end-of-life. Georgia Tech has also worked with Ford on a number of other multidisciplinary issues related to sustainable development.

The analysis found that the greatest water consumption occurs during the use phase. Although the car itself does not consume a lot of water, this is the most water-intensive period because of the water used to produce fuel. In the supply chain, the production and processing of materials (e.g., steel and aluminum) require the most water. Identifying which portions of the supply chain are most water intensive allows us to better assess the business risk associated with using suppliers in potentially water-stressed areas.

To improve our understanding of the water impacts from our products, we are currently estimating the freshwater withdrawal (i.e., use) and consumption for the life cycle of a model year 2012 Ford Focus. In this analysis, both direct and indirect water usages will be accounted for throughout the life cycle, based on a lifetime driving distance of 160,000 miles and the typical U.S. gasoline, E10, which includes 10 percent ethanol. A preliminary analysis has been completed. We will publish the results once they are verified.

Life Cycle Water Consumption<sup>1</sup>

Stage	Approximate Water Consumption (Liters)	Percentage
Material Production <sup>2</sup>	5,600	9%
Production of Parts	900	1.5%
Assembly of Vehicle	800	1.3%
Total Use Phase	52,000	87%
End of Life	300	0.5%
<b>Total</b>	<b>59,600</b>	<b>100%</b>

1. Source: B. Bras, F. Tejada, J. Yen, J. Zullo, T. Guldberg, Quantifying the Life Cycle Water Consumption of a Passenger Vehicle, SAE Technical Paper 2012-01-0646.

2. Indirect, upstream water consumptions were not included in the material production stage.

Water Consumption = Freshwater withdrawals that are evaporated

## Related links

## This Report

→ Greening Our Products

or incorporated in products and waste.

Water Use = All water that goes into a system. Most of this typically leaves the system as wastewater.



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## Collective Action and Public Policy

The water issue is a challenge too large for one company to tackle on its own. We must work toward large-scale collaborative action at the local, national and global levels if we want to identify and implement meaningful solutions. We are committed to continuous improvement through research and partnerships with other companies and organizations to develop improved best practices in responsible water stewardship.

We will collaborate with others, both public and private, to address water challenges (including access to water, sanitation and hygiene) while raising issue awareness by:

- striving to be recognized as an automotive industry leader within the core elements of the United Nations CEO Water Mandate;
- being actively involved in stakeholder platforms and efforts to address water challenges globally in the watersheds where we operate; and
- mobilizing positive action on water issues through efforts directed at employees, public and private stakeholders and the supply chain.

We also will collaborate with governments where we operate to promote sound water management practices for sustainability by:

- engaging with basin governance structures, where relevant, in countries and regions where we operate;
- collaborating with government affairs teams to tell our story and engage with governments on the formulation of regulation and the creation of market mechanisms to support water sustainability; and
- supporting water sustainability efforts in global and local policy discussions.

### Related links

[This Report](#)

→ [Governance](#)



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## Community Engagement

For many years, we have demonstrated our commitment to sound water management in our own operations, focusing on water efficiency, effluent quality and water reuse. But we also are committed to moving beyond our own fence-line to address water issues within our communities in which we operate. We are working with stakeholders to better understand issues around access to water and sanitation, especially in water-stressed communities.

We're investing in water stewardship projects around the world, especially in areas where access to potable water is limited. As we expand into new markets in more water-stressed regions, we are increasing our engagement with local communities on water issues.

Through our CEO Water Mandate commitments, we will work within the communities where we operate, as appropriate by location, to facilitate access to water, sanitation and hygiene, and promote sustainable management of water resources by:

- using outreach opportunities, such as the [Global Week of Caring](#) and [Ford Volunteer Corps' seasonal initiatives](#), to support water stewardship;
- exploring innovative, market-based approaches to community water programs; and
- documenting our journey through our annual corporate Sustainability Report.

In 2013, we increased our focus on water-related projects by funding a number of projects, including ones that provide clean drinking water facilities in disadvantaged parts of China and India. About 19 percent of all of our Global Week of Caring projects focused on water.

Our Ford Motor Company Volunteer Corps, meanwhile, is placing a priority on water-based community projects during our Global Week of Caring and Accelerated Action Days. In 2013, the Ford Fund supported 23 water-related projects in Australia, Brazil, China, Germany, India, Malaysia, Mexico, South Africa and Thailand. Projects ranged from cleaning up waterways and coastlines to providing new water pumps that will bring clean water to schools.

## Rainwater for Humanity

In the Kuttanad region of Kerala, India, residents must walk miles to access water from a community tap for drinking, cooking and bathing. The other option is to purchase expensive water from unreliable vendors.

Engineering students at Brown University in Providence, Rhode Island, had another idea. Thanks to a \$25,000 grant from the 2013 Ford College Community Challenge, 50 locally made rainwater harvesting tanks will be built as part of the Rainwater for Humanity project, a joint initiative between Brown and the School of Environmental Sciences at Mahatma Gandhi University in Kottayam, India. The tanks, which will collect rainwater in a region known for its significant rainfall, will serve three to five families apiece.

The catchment is self-sustaining and works on a pay-per-use vending system. Revenue generated covers operating costs, offsets the initial investment, and creates additional capital for future projects. Brown intends for the design to provide potable drinking water to 1,250 residents of rural villages in the region by the end of 2014.

## Related links

[This Report](#)[→ Communities](#)

[See the Communities section for more on Ford's volunteer programs.](#)



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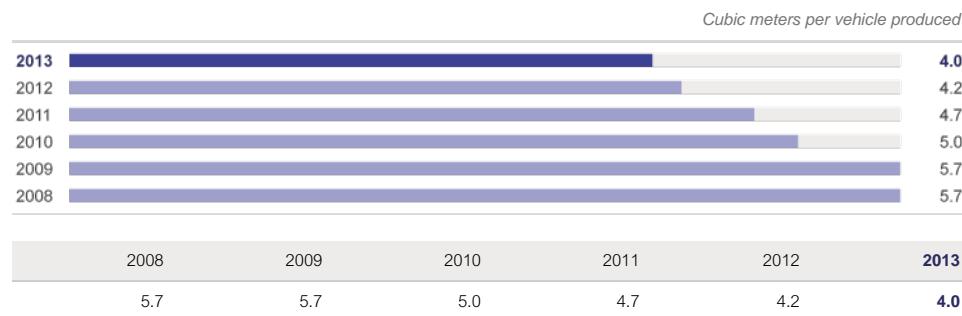
## Data

## Data on this page

- A. ↓ Global Water Use per Vehicle Produced
- B. ↓ Global Water Use by Source
- C. ↓ Regional Water Use
- D. ↓ Re-use from On-site Wastewater Treatment Plant
- E. ↓ Process Wastewater Discharge

View all data on this page as [charts](#) | [tables](#)

## A. Global Water Use per Vehicle Produced



Data managed through the [Global Emissions Manager database](#)

## Data notes and analysis

In 2013, we restated some historical data to account for divestiture of a facility.

## Related links

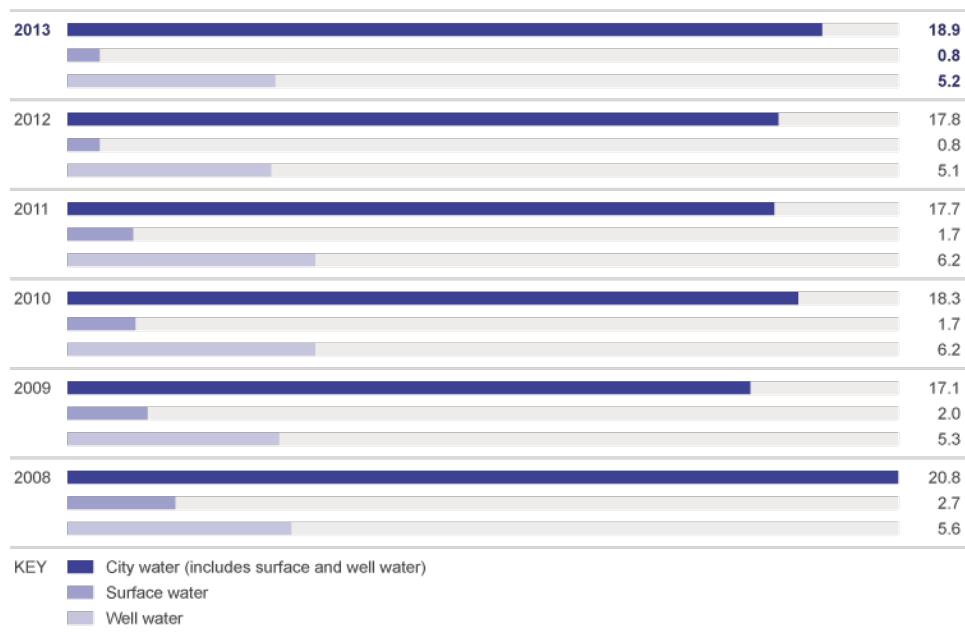
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## B. Global Water Use by Source

Million cubic meters



	2008	2009	2010	2011	2012	2013
City water (includes surface and well water)	20.8	17.1	18.3	17.7	17.8	<b>18.9</b>
Surface water	2.7	2.0	1.7	1.7	0.8	<b>0.8</b>
Well water	5.6	5.3	6.2	6.2	5.1	<b>5.2</b>

Data managed through the [Global Emissions Manager database](#)

#### Data notes and analysis

In 2013, we restated some historical data to account for divestiture of a facility.

#### Related links

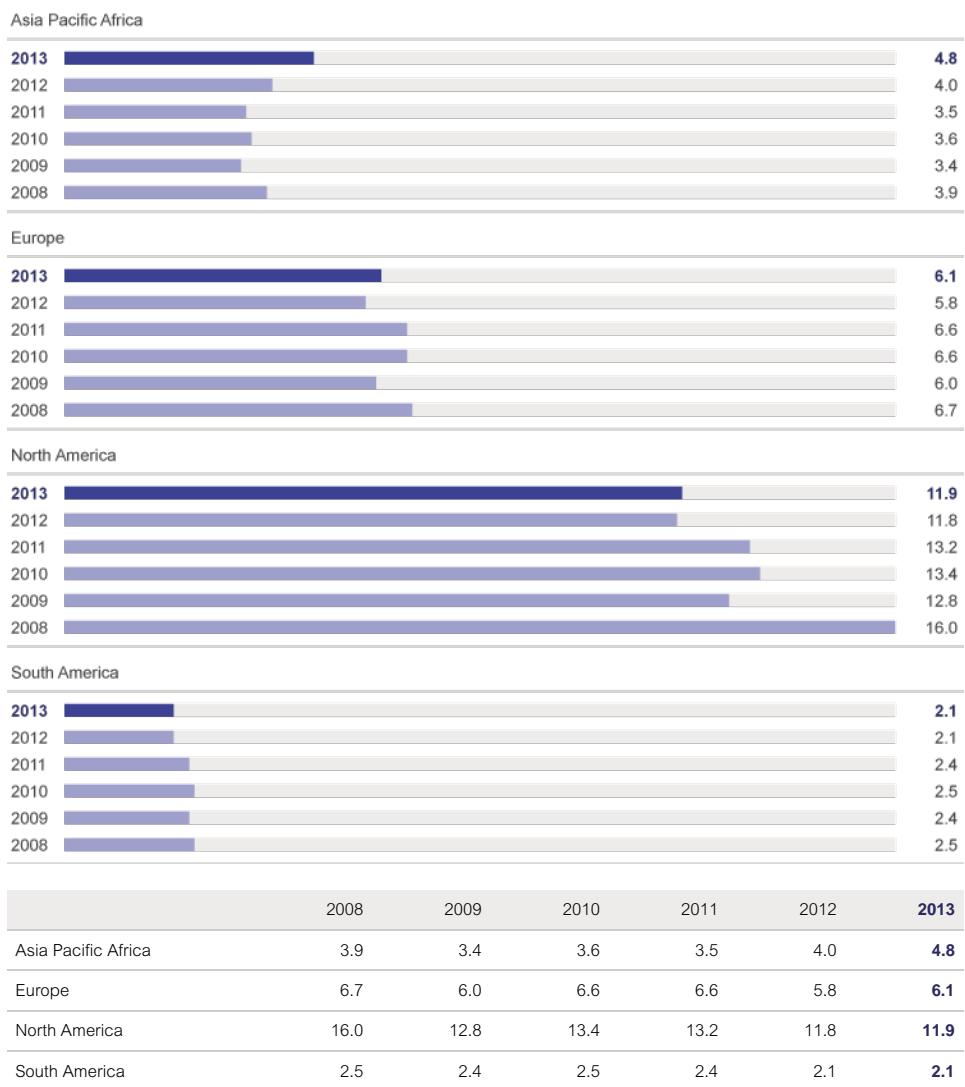
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## C. Regional Water Use

*Million cubic meters*



Data managed through the [Global Emissions Manager database](#)

#### Data notes and analysis

In 2013, we restated some historical data to account for divestiture of a facility.

#### Related links

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## D. Re-use from On-site Wastewater Treatment Plant



Data managed through the [Global Emissions Manager database](#)

#### Data notes and analysis

In 2013, we began tracking process wastewater discharge and water re-used from on-site wastewater treatment plants.

#### Related links

##### This Report

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## E. Process Wastewater Discharge

	<i>Million cubic meters</i>
2013	11.7
 Data managed through the <a href="#">Global Emissions Manager database</a>	

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### Data notes and analysis

In 2013, we began tracking process wastewater discharge and water re-used from on-site wastewater treatment plants. Process wastewater discharge does not include re-use of stormwater or sanitary.

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Voice: Brooke Barton

## Case Study: Ford Manufacturing Water Saving Technologies

Ford has already achieved its goal of decreasing water use per vehicle by 30 percent from 2009 to 2015. This graphic highlights some of the technologies that helped us reach our goal.

### 3-Wet Paint Technology

This technology enables consolidation of painting activities in an integrated booth, offering the potential to eliminate one booth water wash section, depending on plant design.



### Dry Paint Overspray System

This system eliminates water usage from the painting process, resulting in an 80 percent water savings for air conditioning/air tempering and 100 percent water savings from paint-over-spray separation, based on production volume of 158,000 units per year.



### Minimum Quantity Lubricant (MQL)

MQL uses an extremely small amount of oil versus conventional wet-machining. For a typical production line of 450,000 vehicles, MQL can save 282,000 gallons of water per year.



### Internal Water Metering

We are increasing usage of internal water metering to identify additional water saving opportunities and drive conservation behaviors to the department level. This has the potential to save approximately \$75,000 on average per plant globally.



### Cooling Tower Technology

Cooling towers are one of the biggest users of water at our plants. We're using new technologies such as electrolytic water softening to increase cooling tower cycles of concentration, thus lowering water consumption.



### Sustainable Stormwater Practices

Where opportunity presents itself, we continue to utilize sustainable stormwater management practices, such as vegetated roofs and porous pavers.



### Related links

#### This Report

→ [Greening Our Operations](#)



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## &gt; Case Study: Saving Water in Cuautitlán, Mexico

Voice: Brooke Barton

## Case Study: Saving Water in Cuautitlán, Mexico

Our manufacturing facility in Cuautitlán, Mexico, is located in a region of water scarcity.

Although there is adequate annual rainfall, the arid region does not have sufficient infrastructure to recover the water, and the underground water table is dropping by an average of three to four meters each year. The government has been forced to pump in water from other states to ensure there is enough for the area residents.

When we first built the Cuautitlán Stamping and Assembly Plant in 1964, it was one of few large industrial manufacturers in the area. Today, Ford is one of many international corporations doing business here. Our neighbors include several global beverage producers and chemical companies that typically require far greater amounts of water than auto manufacturers.

In the 1990s, the regional Cuautitlán government recognized that demand for water was outstripping supply. Officials began placing limits on water withdrawals and requiring stricter permitting processes. We began paying much closer attention to our water use at the facility.

Over the years, facility managers have come up with some creative solutions to their natural environmental challenges, reducing water use per vehicle produced at this facility by almost 58 percent between 2000 and 2013.

One thing we did recently to conserve water was install dedicated piping for potable water to ensure that we did not use potable water for anything other than human consumption. All other water used at the plants gets recycled. The dedicated piping has improved the quality of water for drinking and for use in food preparation at our plant cafeteria.

Several times the plant has been recognized by Ford's Environmental Quality Office for its innovations. In 2013, for example, the plant won Ford's Latin America Environmental Leadership Award for an initiative using ecological concrete. The facility replaced the asphalt and parking lots within the plant with ecological concrete, which allows rain to reenter the ground. This recharges the aquifer beneath the plant and helps prevent water scarcity in the city. The plant renovated an area of more than 9,700 square meters with ecological concrete, allowing the absorption of as much as 7.5 million liters of water per year.

Not only was the project beneficial for the community, it was also beneficial for Ford's own bottom line. Ecological concrete is less expensive than traditional concrete and is maintenance-free. As a result, this has saved the plant approximately \$40,000 a year in maintenance costs.

The Cuautitlán plant employs a number of other technologies, systems and tools to reduce water usage, including the following:

- [3-Wet paint technology](#), which enables consolidation of painting to eliminate one booth water wash section. The technology also provides significant energy savings.
- We are using a new chemical process in pre-treating the vehicles in preparation for painting, which improves the quality of the vehicles while saving water and energy at the same time. By replacing phosphates with a process that uses zirconium oxide, we are saving approximately 1,000 cubic meters of water per month.
- We use recycled water to irrigate the landscaping around our plant. This includes a grass soccer field that is provided for the use of our employees.

## Related links

## This Report

- ➔ [Greening Our Operations](#)



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> **Voice: Brooke Barton**

## Voice: Brooke Barton

Director, Ceres Water Program

 Ford has an opportunity to demonstrate leadership around water because, quite frankly, the auto industry has been a bit slow in making the shift to the 21<sup>st</sup> century water mindset. It's true that auto companies are not big direct users of water. But up and down its value chain, you see a far bigger footprint, from raw materials such as aluminum, which requires vast amounts of water to produce, to upstream water impacts of the fuels drivers use."



The Ceres Water Program was launched in response to a recognition that global water trends – availability challenges, quality threats and climate change, to name a few – required a bold rethinking of future water use. Ceres felt that companies needed to look at these issues from a broader risk and opportunity lens and do far more to plan for a water-scarce future.

The Water Program began analyzing how global water trends and drivers intersect with businesses, supply chains and product development. And we examined ways in which companies were reporting and disclosing their water strategies. Was the disclosure comprehensive? What data were they using? How is the company managing these risks? Ultimately, we wanted to set a higher bar for best practice in water risk management.

In the five years since we began the Water Program, we've seen a dramatic shift in corporate understanding around water and its implications for business. I call this the 21<sup>st</sup> century water stewardship mindset versus a 20<sup>th</sup> century one. With a 20<sup>th</sup> century mindset, if I asked a facility manager where the water came from, she might point to the pipe in the back of a factory. Her knowledge about the source of the water – Does it come from an aquifer? Does it come from a river? Who are the other major users of that water? – might not go any deeper. For much of the 20<sup>th</sup> century, many companies had the luxury of ample and inexpensive water supplies, so they didn't really have to think beyond the immediate source.

A business with a 21<sup>st</sup> century mindset views water as part of an interconnected ecosystem that is impacted by a host of variables, including changes in our climate. Water is understood to be a shared good that doesn't just magically flow out of a pipe; it has a whole natural and engineered infrastructure supporting it – and in many places, a very fragile one at that. Ford Motor Company is among a growing number of companies undergoing this shift in mindset. It realizes that it not only needs to be more efficient in using water, but also needs to consider what it can do beyond its factory walls to protect fresh water for the future.

Ceres has had a relationship with Ford for more than a decade. Our independently convened Ceres Stakeholder Committee, which advises Ford on its sustainability reporting and strategy, has identified global water issues, including access to water in the developing world and overall stability of water supplies, as increasingly important to Ford's business, especially as the company continues to expand into emerging markets.

The Stakeholder Committee has been active in bringing water concerns forward for Ford – even though it might not seem at first blush that water is a highly material issue for the auto industry. Recently, as Ford worked to expand its global water strategy, Ceres used our Aqua Gauge tool to assess Ford's water stewardship approach, including the company's water efficiency goals, and looked to see where there might be opportunities to strengthen and improve.

One of the key areas where we are pushing Ford is around supplier engagement and helping Ford's strategic suppliers to understand their own water risks. Another key priority is encouraging Ford to look beyond the fence-line to improve stewardship of rivers and watersheds, especially in emerging market countries. We also wanted to see how Ford would implement its commitment to respecting the human right to water. In other words, how is Ford operationalizing that commitment by minimizing its own impacts on water while investing in projects that can make a real difference?

Ford has an opportunity to demonstrate leadership around water because, quite frankly, the auto industry has been a bit slow in making the shift to the 21<sup>st</sup> century water mindset. It's true that auto companies are not big direct users of water. But up and down its value chain, you see a far bigger footprint, from raw materials such

as aluminum, which requires vast amounts of water to produce, to upstream water impacts of the fuels drivers use.

Companies like Ford should set water efficiency goals that prioritize water savings where water challenges are the biggest. A gallon saved in Michigan does not have the same environmental or social impact as a gallon saved in Mumbai. It's where a company is saving water that is the critical question.

One of the myopic ironies about water is that it tends to be cheapest in places where supply is most constrained. This perverse equation makes it difficult for companies to think of water as anything more than a monthly operating cost – and a cost that is minimal compared to energy use. But if companies only think of water in relation to price, then they're missing the full range of business interruption, supply chain and reputational risks. The value of water lies in assessing its opportunity cost – what would you do if it weren't available?

[Home](#) > [Water](#) > **Voice: Brooke Barton**

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### Vehicle Safety and Driver Assist Technologies

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Case Study: Electrified Vehicle Safety

Case Study: Driver Distraction

Voice: Pete Hardigan



## Vehicle Safety and Driver Assist Technologies

At Ford, we have a long history of developing and implementing new innovations that improve the safety performance of our vehicles. Back in 1955, for example, Ford became the first automaker to offer factory-installed safety belts. That legacy of innovation continues today.

Read more about [OUR HIGHLIGHTS](#)



## OUR VISION FOR THE FUTURE

The radar- and camera-based technologies we offer today are a first step toward our vision of automated vehicles that still keep the driver in the loop to take back control of the vehicle, if needed. We have also been working on separate technologies that will enable vehicles to communicate with one another and with roadway infrastructure. Automated and connected vehicles will help to make driving safer, reduce traffic congestion and lower emissions.

Read more about [ACCIDENT AVOIDANCE AND DRIVER ASSIST TECHNOLOGIES](#)

## OUR COMMITMENTS AND PERFORMANCE PROGRESS



**Commitment:** Design and manufacture vehicles that achieve high levels of performance in real-world safety and in public domain crash-testing programs and that offer innovative safety and driver assist technologies.

For the 2014 model year, nine Ford Motor Company vehicles earned the highest possible Overall Vehicle Score of five stars in the New Car Assessment Program (NCAP) of the U.S. National Highway Traffic Safety Administration. For the 2013 Insurance Institute for Highway Safety Awards, 13 Ford Motor Company vehicles earned Top Safety Picks.

---

See additional vehicle safety commitments at [FORD'S GOALS, COMMITMENTS AND STATUS](#)



## UNIVERSITY PARTNERSHIPS

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Ford collaborates with university partners on a broad array of research projects, including research into advanced safety technologies, and has more than 130 active projects globally. In 2013, we awarded 28 new research grants to 19 universities around the globe.

Read more about [OCCUPANT PROTECTION TECHNOLOGIES](#)



### Case Study: [PUBLIC DOMAIN RATINGS](#)

Safety regulations and public domain rating programs differ around the world, and they are constantly evolving in response to various regional factors.



### Case Study: [ELECTRIFIED VEHICLE SAFETY](#)

Because electrified vehicles (EVs) typically contain a battery with 300+ volts of power (compared to a 12-volt battery in a "regular" vehicle), first responders may need some special knowledge and skills to be able to safely address a vehicle crash involving an EV.



#### Case Study: [DRIVER DISTRACTION](#)

Studies indicate that approximately 10% of drivers are using their cell phones at any given time, which has heightened concerns about the potential for driver distraction.



Voice: [PETE HARDIGAN](#)

Director of Sustainability, Environment and Safety Engineering, Asia Pacific, Ford Motor Company

"Asia Pacific is a great example of our One Ford system at work ... We're taking processes and products from around the globe and we're introducing them in Asia while meeting all the differing regulatory requirements."



## POST-CRASH TECHNOLOGIES

SYNC®-equipped vehicles come with a nonsubscription call-for-help system called SYNC 911 Assist (in the U.S.) or Emergency Assistance (in Europe, China, India and Australia).

Read more about [POST-CRASH RESPONSE TECHNOLOGIES](#)



## DRIVER EDUCATION

Ford Driving Skills for Life (Ford DSFL), our flagship, free driver-education program, demonstrates our commitment to help new drivers to improve their motoring skills. Ford DSFL has been active in the United States and Asia, and in late 2013 we launched it for the first time in Europe.

Read more about [DRIVER EDUCATION](#)

## 2013 HIGHLIGHTS



### 16 countries

in which Ford Driving Skills for Life is training drivers.



### 5 stars

for adult protection in the most recent Latin NCAP, for the Ford EcoSport and Ford Focus.



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Case Study: Public Domain Ratings

Case Study: Electrified Vehicle Safety

Case Study: Driver Distraction

Voice: Pete Hardigan

## Highlights

Ford's recent safety and driver assist highlights include the following:

- For the 2014 model year, nine Ford Motor Company vehicles earned the highest possible Overall Vehicle Score of five stars in the New Car Assessment Program (NCAP) of the U.S. National Highway Traffic Safety Administration (NHTSA). These five-star vehicles include the Ford Focus, Focus Electric, Explorer, Taurus, Fusion, Fusion Energi and Transit Connect and the Lincoln MKS and MKZ.
- For the 2013 Insurance Institute for Highway Safety (IIHS) awards, 13 Ford Motor Company vehicles earned Top Safety Picks from the IIHS: the Ford Fiesta (sedan and hatchback), Focus, Fusion, Taurus, Edge, Explorer, Escape, Flex and F-150 (crew cab) and the Lincoln MKZ, MKS, MKT and MKX.
- Three of the 13 vehicles that were awarded IIHS Top Safety Picks also earned Top Safety Pick+ designations: the Ford Fusion and Focus, and the Lincoln MKZ.
- The Ford Fusion has now been an IIHS Top Safety Pick for six years in a row.
- In the 2013 Euro NCAP assessments, the Ford Tourneo Connect earned a five-star safety rating. In addition, the vehicle received the Euro NCAP's Best in Class recognition for the highest safety performance scores in the vehicle segment.
- The Ford Transit Custom and Tourneo Custom were the first van and "kombi" (i.e., multi-purpose vehicle), respectively, to achieve five-star ratings in the Euro NCAP heavy vehicle assessment. The Transit also received Euro NCAP's Best in Class recognition for the highest safety performance score in its segment.
- Ford has an industry-leading total of seven Euro NCAP Advanced rewards, for our Lane-Keeping Aid, Active City Stop, Forward Alert, Lane-Keeping Alert, MyKey®, Emergency Assistance and Driver Alert technologies.
- In the most recent Latin NCAP, the new Ford EcoSport and Focus both received five stars for adult protection.
- MyKey, Ford's innovative technology designed to help parents encourage their teenagers to drive more safely, is now in more than 6 million Ford and Lincoln vehicles on the road in the U.S. and is available on nearly all Ford Motor Company retail vehicles in North America.
- Our available rear-seat inflatable safety belts, launched on the 2011 Ford Explorer, are an automotive industry exclusive and have won numerous awards. For the 2014 model year, these safety belts are available in North America on several Ford and Lincoln vehicles.
- The availability of Lane-Keeping System, a driver assist feature, has been expanded in North America to include more vehicles, and it will be expanded further for the 2015 model year.
- Curve Control, a driver assist technology that helps slow the vehicle when it senses the driver is taking a curve too quickly, is now available on select vehicles in North America and Europe.
- Finally, in 2014 we performed our 20,000<sup>th</sup> vehicle crash test. Our first was in 1954, well before these tests were required by law.

#### Related links

##### This Report

- Accident Avoidance and Driver Assist Technologies
- Encouraging Safer Driving

##### Vehicle Websites

- Ford Fiesta
- Ford Focus
- Ford Focus Electric
- Ford Fusion
- Ford Fusion Energi
- Ford Taurus
- Ford Escape
- Ford Edge
- Ford Explorer
- Ford Flex
- Ford F-150
- Ford Transit Custom
- Ford Transit Connect
- Ford Tourneo Custom
- Ford Tourneo Connect
- Lincoln MKZ
- Lincoln MKX
- Lincoln MKS
- Lincoln MKT

##### External Websites

- European New Car Assessment Program
- Insurance Institute for Highway Safety
- Latin New Car Assessment Program
- U.S. National Highway Traffic Safety Administration's New Car Assessment Program



## Vehicle Safety and Driver Assist Technologies

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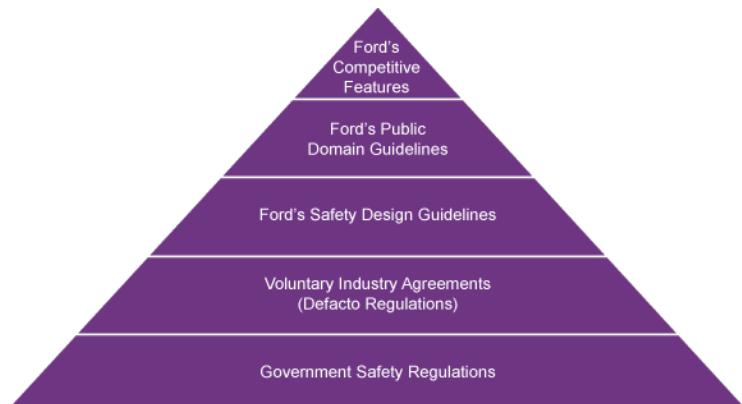
Voice: Pete Hardigan

## How We Manage Vehicle Safety

At Ford, we design and manufacture vehicles that achieve high levels of vehicle safety for a wide range of people over a broad spectrum of real-world conditions. Vehicle safety is overseen by our Vice President of Sustainability, Environment and Safety Engineering.

Real-world safety data, driver behavior, research, regulatory requirements and voluntary agreements provide much of the input into our safety processes, including our safety design guidelines (SDGs) and public domain guidelines (PDGs). (See graphic below.) The SDGs are Ford's stringent internal engineering design guidelines that exceed regulatory requirements and define additional requirements that are not regulated. The PDGs are Ford targets that focus specifically on helping to ensure that our vehicles earn high ratings in relevant public domain assessments (i.e., vehicle safety assessments performed by government or nonprofit entities).

Our PDGs are continually reviewed for possible revisions to address ongoing changes in major public domain vehicle testing programs around the world. See the [Public Domain Ratings case study](#) for information on this topic.



Internally, Ford utilizes engineering analyses, extensive computer modeling, and crash and sled testing to evaluate the performance of vehicles and individual components. These rigorous evaluations help to confirm that our vehicles meet or exceed regulatory requirements and our own even-more-stringent internal guidelines. Our state-of-the-art crash-test facilities include the Safety Innovation Laboratory in Dearborn, Michigan, and the extensive crash-test facilities in Merkenich, Germany, and Dunton, England. We also operate a high-tech, full-motion driving simulator in Dearborn called VIRTTEX, for VIRTUAL Test Track EXperiment.

## Haddon Matrix

We use the Haddon Matrix to take a holistic view of the factors that may affect vehicle safety. (The matrix was developed by William Haddon, a former administrator of the U.S. National Highway Traffic Safety Administration and also former president of the Insurance Institute for Highway Safety.) The Haddon Matrix illustrates how traffic safety can be the product of complex interactions among the driver, the vehicle and the driving environment.

The Haddon Matrix is used to look at crashes in terms of causal and contributing factors, including human behavior, vehicle safety and the driving environment. Each factor is then considered in the pre-crash, crash and post-crash phases. In the pre-crash phase, the focus is to help avoid the crash. In the crash and post-crash phases, the primary objective is to help reduce the risk of injury to occupants during and after a collision. In the post-crash phase, for example, the goal is to minimize the amount of time that elapses between the crash and when help arrives.

## Related links

### This Report

→ [Case Study: Public Domain Ratings](#)

			
	Human Behavior	Vehicle Safety	Environment
Pre-Crash Accident avoidance	<ul style="list-style-type: none"> <li>■ Research</li> <li>■ Education</li> <li>■ Advocacy</li> </ul>	<ul style="list-style-type: none"> <li>■ Crash avoidance technologies</li> <li>■ Security</li> </ul>	<ul style="list-style-type: none"> <li>■ Road design for accident avoidance</li> <li>■ Traffic control</li> </ul>
Crash Occupant protection	<ul style="list-style-type: none"> <li>■ Technology and proper use</li> </ul>	<ul style="list-style-type: none"> <li>■ Restraints</li> <li>■ Structures that absorb and reduce crash energy and intrusion</li> </ul>	<ul style="list-style-type: none"> <li>■ Road design for injury mitigation</li> <li>■ Research</li> </ul>
Post-Crash Injury mitigation	<ul style="list-style-type: none"> <li>■ Telematics</li> </ul>	<ul style="list-style-type: none"> <li>■ Post-crash notification</li> </ul>	<ul style="list-style-type: none"> <li>■ Emergency medical services</li> </ul>
Examples of Ford Actions	<ul style="list-style-type: none"> <li>■ SYNC® technology</li> <li>■ MyFord Touch® driver connect technology</li> <li>■ MyKey®</li> <li>■ Ford Driving Skills for Life</li> </ul>	<ul style="list-style-type: none"> <li>■ Accident avoidance features</li> <li>■ Inflatable safety belts</li> <li>■ Roll Stability Control®</li> </ul>	<ul style="list-style-type: none"> <li>■ Accident research</li> <li>■ Development of "vehicle-to-infrastructure" communication systems</li> </ul>

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## Encouraging Safer Driving

Driver behavior is a key contributing factor in many vehicle crashes.<sup>1</sup> We at Ford have developed and support an array of programs and technologies that help to encourage safer behavior on the roadways, for both experienced and novice drivers.

Ford Driving Skills for Life (Ford DSFL), our flagship, free, driver-education program, also demonstrates our commitment to help new drivers to improve their motoring skills. Ford DSFL was established in 2003 by Ford Motor Company Fund and Community Services, in partnership with the Governors Highway Safety Association (GHSAs) and a panel of experts, to teach newly licensed teen drivers skills for safe driving – beyond what they learn in standard driver education programs. [The Ford DSFL website](#) includes an array of free resources for novice drivers, including an interactive Web-based training called The Academy.

In the U.S., Ford DSFL has been focusing on teen drivers through five signature programs:

- **The Ford DSFL National Tour:** In 2013 the Ford DSFL National Tour reached out to more teens, parents and educators than ever before. This included nearly 30 days of hands-on training throughout the United States. During these visits, teens are invited to hands-on driving clinics utilizing specially equipped vehicles. The clinics offer multifaceted activities that build skills in four key areas: driver distraction, speed/space management, vehicle handling and hazard recognition. In 2014, the Ford DSFL tour will travel to more than 20 cities in the U.S. and Europe.
- **Taking the Lead:** Our Taking the Lead program – co-sponsored by Ford Motor Company Fund and Community Services, Westfield Insurance, the GHSAs and Allegheny County Pretrial Services – brings a one-hour presentation on safe driving to high school assemblies. The assemblies include a question-and-answer segment with a panel of experts.
- **Operation Teen Safe Driving:** Operation Teen Safe Driving is sponsored in partnership with the Illinois Department of Transportation, the Secretary of State and the state police. The program gets Illinois high school students directly involved in safe driving behaviors by challenging them to develop and implement teen safe driving community-awareness campaigns using Ford DSFL resources. Since the program's launch in 2007, teen vehicle crash deaths in Illinois have decreased 55 percent.
- **Strive 4 a Safer Drive (S4SD):** Launched in 2011, Strive 4 a Safer Drive provides funding to Michigan schools to assist in creating peer-to-peer traffic safety campaigns. The campaigns seek to educate classmates and the community about teen safe driving through various activities. Modeled after Operation Teen Safe Driving, S4SD is sponsored by Ford Motor Company Fund and Community Services, the Michigan Office of Highway Safety Planning and AAA Michigan.
- **Be in the Zone:** The Be in the Zone program focuses on improving teen driver safety among rural youth in Tennessee through peer-generated anti-texting campaigns. Be in the Zone was launched in partnership with the Monroe Carell Jr. Children's Hospital at Vanderbilt University in 2011.

In our Asia Pacific markets, Ford DSFL is aimed at novice drivers of all ages. In this region the program places equal emphasis on safe driving and eco-driving, as customers are interested in both. Approximately 14,000 drivers in this region were trained in 2013. In 2014, we will continue the program in mainland China, India, Taiwan, Thailand, Indonesia, Vietnam and the Philippines, as well as expand to Malaysia and Myanmar, to train another 15,000 people. More than 77,000 people have been trained in the Asia Pacific region since the program began. (See the [Pete Hardigan voice](#) for more about Ford DSFL in Asia Pacific.)

In late 2013, we launched Ford DSFL for the first time in Europe. Ford will invest €1.5

## Related links

This Report

→ Voice: Pete Hardigan

## Ford Websites

→ Ford Driving Skills for Life

## External Websites

→ Operation Teen Safe Driving

→ Strive 4 a Safer Drive

million in the first year of this program alone to provide free, hands-on training to 5,000 young drivers in France, Germany, Italy, Spain and the U.K., and to thousands more online through The Academy. In 2014, Ford DSFL will be launched in several additional European countries.

In total, Ford DSFL is training drivers to be safer in 16 countries around the globe and plans to grow to 23 before 2015.

On the technology side, the Ford MyKey® system is an innovative technology designed to help parents encourage their teenagers to drive more safely. MyKey is now in more than 6 million Ford and Lincoln vehicles on the road in the U.S. MyKey allows owners to program a key that can limit the vehicle's top speed to one of several preset values and also can invoke SYNC's Do Not Disturb feature, which sends incoming phone calls and text messages to the paired phone's mailbox. MyKey encourages safety belt usage by enabling Ford's Belt-Minder® to chime every minute indefinitely until both of the front passengers are buckled in, rather than ceasing after five minutes, and also through a "no belt/no tunes" feature that mutes the audio system until the belt is buckled. In addition, MyKey provides a low-fuel warning earlier than the standard vehicle setting; sounds speed-alert chimes; and will not allow manual override of other safety systems. MyKey is available on nearly all Ford Motor Company retail vehicles in North America, and its availability is expanding to other regions.

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1. U.S. Department of Transportation, National Highway Traffic Safety Administration, [National Motor Vehicle Crash Causation Survey: Report to Congress](#) (Washington, DC: U.S. DOT, July 2008).



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## Accident Avoidance and Driver Assist Technologies

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A variety of Ford technologies, in addition to each vehicle's handling and braking capabilities, can assist drivers by helping to control the vehicle or alerting the driver to potential collisions. Also, these technologies can support routine driving tasks by improving comfort and reducing demands on the driver. Driver assistance technologies will continue to advance to include semi-automated capabilities, providing drivers more assistance in certain situations, such as when changing lanes, in traffic jams or on freeway trips. The driver will always remain in the loop to take control, if required.

### Ford Technologies

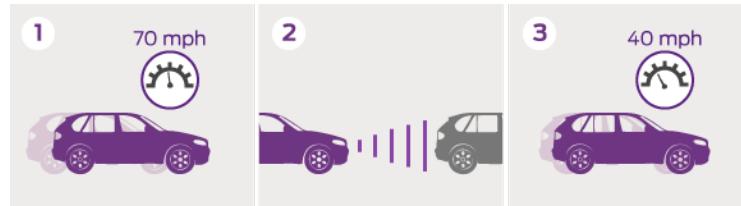
The following accident avoidance and driver assist technologies are offered on Ford vehicles today.

### Adjustable Speed Limiter Device



**Adjustable Speed Limiter Device (ASLD)** allows the driver to set a speed limit that cannot be exceeded by standard gas pedal operation. The driver can override the limit, however, by pressing the accelerator pedal beyond normal usage limits (>90 percent pedal travel). ASLD is offered on select Ford Motor Company vehicles in Europe and China.

### Adaptive Cruise Control



**Adaptive Cruise Control (ACC)** helps drivers maintain a preset distance from the vehicle they are following, using a radar module mounted at the front of the vehicle that measures the gap and closing speed to the vehicle ahead. The system automatically adjusts the speed of the car to help maintain a preset distance from the vehicle in front. If the radar sensor becomes blocked by snow, ice or mud, the driver receives a notice of reduced or suspended functionality. ACC is available on select Ford and Lincoln vehicles in North America. In Europe and China, ACC is available with another technology called Distance Alert. Distance Alert helps the driver to keep a proper distance from the vehicle ahead by providing a visual warning if the driver-selected following distance is exceeded.

### Related links

[This Report](#)

↳ [Our Blueprint for Mobility](#)

### External Websites

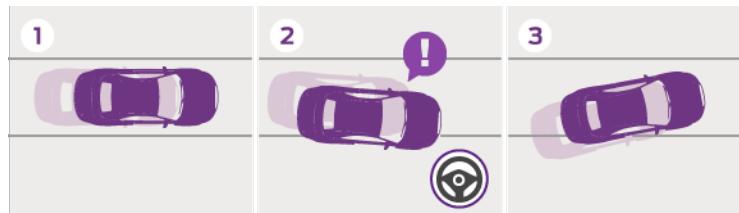
- ↳ [DRIVE C2X](#)
- ↳ [interact!Ve](#)
- ↳ [National Highway Traffic Safety Administration](#)
- ↳ [Vehicle Infrastructure Integration Consortium](#)

## Forward Collision Warning with Brake Support



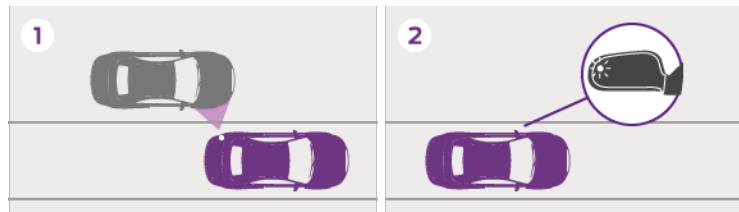
Ford's **Forward Collision Warning with Brake Support** technology uses the same radar module as Adaptive Cruise Control to detect range and speed. Forward Collision Warning with Brake Support activates a visual and audible warning when the system detects a high risk of collision with the vehicle in front. In addition, the brake system is pretensioned and the "servo boost" assistance system is modulated to provide faster brake performance (e.g., as soon as the driver lifts the gas pedal), if required by the driver. As with ACC, if the sensor becomes blocked, the driver receives a notice of reduced or suspended functionality. This technology is available on certain Ford and Lincoln vehicles in North America and Europe.

## Lane-Keeping System



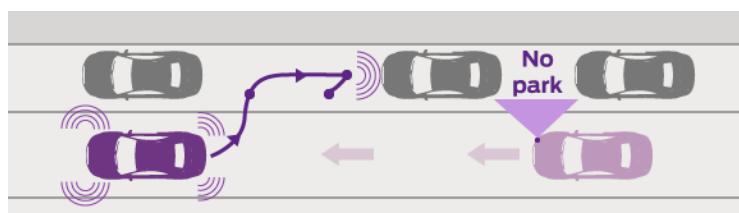
Our **Lane-Keeping System** consists of three elements to help a driver maintain proper lane position: Driver Alert, Lane-Keeping Alert and Lane-Keeping Aid. Using a small, forward-facing camera behind the inside rearview mirror, the system "looks" down the road, monitoring lane lines. Driver Alert computes a "vigilance level" and displays it in the instrument cluster upon request. If the vigilance level falls below a certain level (e.g., if the driver gets tired), visual and audible warnings are given. Lane-Keeping Alert is designed to warn the driver, via a three-pulse vibration in the steering wheel, when the front-view camera detects that an unintentional lane departure is happening. Lane-Keeping Aid goes a step further, applying a steering torque in the direction the driver needs to steer to keep the vehicle in the current lane. Lane-Keeping System is available on select Ford and Lincoln vehicles in North America and Europe. On some European Ford vehicles, Lane-Keeping Alert and/or Driver Alert are available separately.

## Blind Spot Information System with Cross-Traffic Alert



**Blind Spot Information System (BLIS) with Cross-Traffic Alert (CTA)** uses rear corner-mounted, side- and rear-looking radar that detect other vehicles around the car and illuminate an indicator lamp in the side-view mirrors when driving forward. When backing out of a parking space, the same sensors can detect vehicles approaching from the sides, illuminate the indicator lamp in the side view mirror, provide a text alert in the cluster and sound a warning chime. BLIS with CTA is available on certain Ford and Lincoln vehicles in North America; BLIS without CTA is available in Europe and Asia Pacific.

## Active Park Assist



**Active Park Assist** uses ultrasonic sensors, while the driver is slowly driving near parking spots, to measure the distance between cars. When a suitable parking space

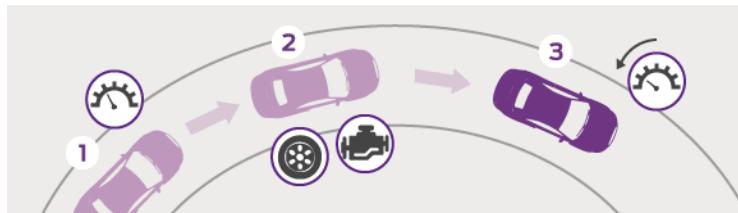
is found, Active Park Assist can steer the car into the parking space while the driver controls the shifting, accelerator and brake. Active Park Assist is available on certain Ford and Lincoln vehicles in North America and Europe.

#### Rear View Camera



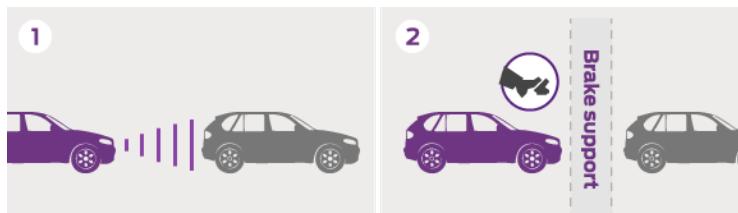
Our **Rear View Camera** transmits an image of what is behind the vehicle when it is shifted in reverse. Rear View Camera is available on every Ford and Lincoln vehicle in North America and several Ford vehicles in Europe.

#### Curve Control



**Curve Control** is designed to sense when a driver is taking a curve too quickly. In those situations, it rapidly reduces engine torque and can apply four-wheel braking, slowing the vehicle by up to 10 mph in about a second. The technology is designed to be effective on wet or dry pavement, and is expected to be helpful when drivers are entering or exiting freeway ramps with too much speed. A majority of Ford's North American products will offer Curve Control by 2015. It is currently available on one vehicle in Europe.

#### Active City Stop



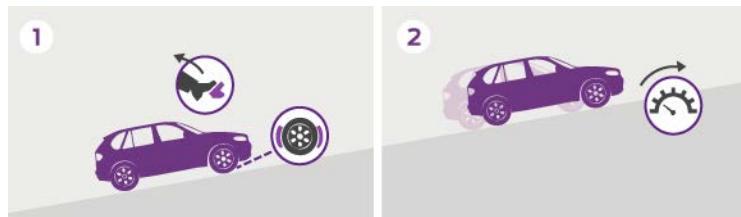
Using a forward-looking radar sensor, **Active City Stop** is designed to detect objects in front of the car and constantly calculate the braking force required to avoid a collision. If the estimated braking force exceeds a given level without the driver responding, the danger of a collision is considered imminent and the system automatically reduces throttle input and applies the car's brakes. The system is designed for speeds of 30 to 50km/h (19 to 31 mph). Active City Stop is available on select Ford vehicles in Europe.

#### Traffic Sign Recognition



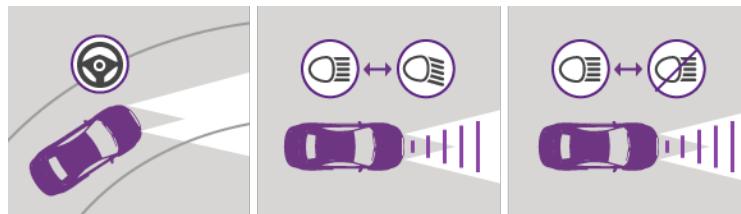
With **Traffic Sign Recognition**, a front camera recognizes speed signs that use the standards of the Vienna Convention on Road Signs and Signals. The identified speed is then indicated in the instrument cluster to inform the driver of the speed limit. If activated, the cluster will also warn the driver if the speed limit is exceeded. Traffic Sign Recognition is available in Europe.

#### Hill Start Assist



**Hill Start Assist** helps the driver when starting the vehicle on an uphill gradient by holding the brakes while the driver moves his foot from the brake pedal to accelerator pedal. This system is available standard on most new Ford Motor Company vehicles in North America and Europe.

### Advanced Front Lighting



Several types of advanced front lighting are now available on Ford Motor Company vehicles, including the following:

**Steerable headlights** are designed to use inputs from the steering wheel to turn the headlamps, so the driver can get a better view while negotiating a curve. Steerable headlights are offered on most new Lincoln products.

**Automatic high beam control** allows the driver to use the high beam to improve visibility. The system uses a forward-facing camera to detect vehicles ahead and automatically deactivates the high beam. Automatic high beam control is offered on most new Ford vehicles in North America and Europe.

**Glare-free headlamps** are designed to provide improved visibility during nighttime driving by using LED headlamps and input from a forward-facing camera to detect vehicles ahead. The system selectively switches off the LEDs to prevent glare for oncoming drivers. Glare-free headlamps are available in Europe.

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### Vision for the Future

The radar- and camera-based technologies described above are a first step toward Ford's vision of automated vehicles that still keep the driver in the loop to take back control of the vehicle, if needed. We are continuing to develop technologies that allow for more semiautomated capabilities.

At the same time, we have been working on separate technologies that will enable "connected" vehicles – that is, vehicles that can communicate with one another and with roadway infrastructure using advanced Wi-Fi signals or dedicated short-range communications on secured channels. By communicating with each other and the world around them, these vehicles will be a key element of the integrated transportation ecosystem we envision in our [Blueprint for Mobility](#).

In our long-term vision of a future with vehicles that are both automated and connected, driving will be safer, traffic less congested and greenhouse gas emissions lower. Such vehicles will be able to warn drivers if their vehicle is on a path to collide with another vehicle at an intersection, when a vehicle ahead stops or slows suddenly, or when a traffic pattern changes on a busy highway. By reducing collisions, connected vehicles will ease traffic delays, which will save drivers both time and fuel. Gridlock will also be avoided through a network of connected vehicles and infrastructure that processes traffic information and suggests less-congested routes to drivers.

Admittedly, this vision will likely not be realized for many years. Many technological details remain to be worked out, and drivers will need to become comfortable with the idea of giving up some measure of driving control to their vehicle, which will not happen quickly. In the United States in early 2014, however, the connected vehicle concept got a significant boost when the National Highway Traffic Safety Administration (NHTSA) announced it intends to complete ongoing research and begin working on a regulatory proposal for light vehicles that will require "vehicle-to-vehicle" communication devices in new vehicles.

## Collaborative Research

In order to progress from current technologies to our long-term vision of connected and automated vehicles, we are conducting collaborative research with a variety of public, private and academic entities.

In December 2013, for example, we unveiled a Ford Fusion Hybrid automated research vehicle that will enable us to further test current and future sensing systems and driver assist technologies. Our goal is to advance the development of new technologies that can then be applied to the company's next generation of vehicles. The research is being conducted jointly with the University of Michigan and State Farm®. In addition, in January 2014, we announced new research projects with the Massachusetts Institute of Technology and Stanford University to research and develop solutions to some of the technical challenges surrounding automated driving.

For a number of years, the U.S. Department of Transportation (USDOT) has been coordinating two automaker research coalitions relating to connected vehicles. The first is the Crash Avoidance Metrics Partnership (CAMP), a group of eight automakers that focuses on the technical aspects of connected vehicles; the second is the Vehicle Infrastructure Integration Consortium (VIIC), a group of nine automakers that focuses on the policy aspects of connected vehicles.

CAMP has been working on the technical standards necessary for all motorized vehicles on the connected vehicle network to be interoperable. This technical partnership included the world's first government-sponsored driving clinics in 2011 and expanded to include a year-long field trial beginning in late 2012. The field trial included data collection on approximately 3,000 vehicles that were communicating with each other. USDOT is currently analyzing data from this field trial and is expected to publish a report in 2014. The field trial was instrumental in supporting NHTSA's decision to support and eventually require vehicle-to-vehicle communications, as discussed above.

The VIIC is working on the significant practical and policy challenges, such as security, privacy and the allocation of risk and liability, that will need to be addressed before the vision of a connected vehicle network can become a reality.

In Europe, we are contributing to the European harmonization and standardization of wireless communication systems and applications within the framework of the DRIVE C2X project, which is co-funded by the European Commission. DRIVE C2X is the acronym for "DRIVing implementation and Evaluation of C2X communication technology in Europe" (C2X refers to "car-to-car and car-to-infrastructure" communication). This project kicked off in January 2011 and is planned to run until mid-2014. It brings together more than 40 stakeholders, such as vehicle manufacturers, suppliers, universities and public authorities from all over Europe. Within the framework of DRIVE C2X, field operational tests in a real-world environment have been conducted over the course of six to nine months in seven test sites across Europe.

One of these test sites is located in Frankfurt/Main, Germany, and is closely linked to a national research initiative called Safe Intelligent Mobility – Test Field Germany, or simTD for short. Ford contributed to this joint project, which brought together relevant stakeholders of the German automotive industry and concluded successfully in June 2013. simTD was one of the world's first large-scale field operational tests of cooperative systems. Over six months, 120 vehicles from six automakers were driven more than 1.6 million kilometers. Ford contributed with 20 Ford S MAX vehicles equipped with innovative vehicle-to-infrastructure technology. Within simTD, 500 drivers tested and validated more than 20 functions targeting traffic safety, efficiency and comfort. Ford led the development of the Emergency Electronic Brake Light warning functionality. The project was supported in part by the German government.

Also in Europe, we have been one of 29 partners in the Accident Avoidance by Active Intervention of Intelligent Vehicles (interactIVe) research project, led by the Ford European Research Center in Aachen, Germany. This consortium sought to support the development and implementation of accident avoidance systems, and consisted of seven automotive manufacturers, six suppliers, 14 research institutes and three other stakeholders. The European Commission covered more than half of the €30 million budget. During the 42-month duration of interactIVe, the partners tested the performance of prototype safety systems through active intervention, including automated braking and steering in critical situations, with the aim of avoiding collisions or at least mitigating impact severity in accidents. The final event of InteractIVe in November 2013 took place in Aachen and at Ford's Lommel Proving Ground, with live vehicle demonstrations.



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## Occupant Protection Technologies

Many factors influence a vehicle's crash performance, including the design of the vehicle's structure (i.e., its ability to absorb impact energy) and the use of passive safety equipment such as air bags to supplement safety belts. Ford's commitment to advancing the state-of-the-art in vehicle safety includes research and development of technologies that further enhance occupant protection in a wide variety of crash circumstances.

## Ford Technologies

Ford is using more advanced materials than ever, including ultra-high-strength steels, plastics and composites, and aluminum. Increased use of these materials helps us design vehicle structures with enhanced crash energy management while reducing overall vehicle weight – even as we add more features, equipment and safety devices. For example, the all-new [Ford F-150](#) uses aluminum alloys extensively in its body and truck bed. In Europe, the Ford B MAX extensively uses high-strength steels in its body shell and doors.

Safety belts remain the most important vehicle safety technology available. Beginning with the 2011 Ford Explorer, Ford brought to market the world's first automotive rear inflatable safety belts, which resulted in several prestigious awards for technological achievement. The rear inflatable safety belts combine the attributes of traditional safety belt and air bag technologies to help further reduce the risk of head, neck and chest injuries for rear-seat passengers. In everyday use, the inflatable belts operate like conventional safety belts and are safe and compatible with infant and child safety car and booster seats. Rear-seat inflatable safety belts are available on selected vehicles in North America.

## Vision for the Future

Ford has a long history of research into passive safety, or helping protect occupants in the event of a crash. We continue to pursue research and advanced engineering in passive safety, and we participate in and sponsor passive safety research at colleges and universities, in addition to internal projects. Also, we publish our major research findings on this topic in peer-reviewed and other scientific journals.

## Collaborative Research

Ford continues to collaborate with other automotive companies on precompetitive safety projects to enhance the safety of the driving experience and develop future technologies.

## U.S. Council for Automotive Research

For example, we collaborate with General Motors and Chrysler through the various safety-related working groups, committees and councils of the U.S. Council for Automotive Research (USCAR). These include the Safety Technical Leadership Council (Safety TLC), the Occupant Safety Research Partnership (OSRP) and the Crash Safety Working Group (CSWG).

The OSRP performs research, development, testing and evaluation on anthropomorphic test devices (ATDs), commonly known as crash test dummies. Projects planned for 2014 include evaluation of new child ATDs, continued work on a new adult, side-impact ATD, evaluation of a new pedestrian leg form, and evaluation of a new average male ATD, called THOR, developed by the U.S. National Highway Traffic Safety Administration (NHTSA). The OSRP evaluations provide a measure of repeatability, reproducibility, biofidelity, usability and durability. The evaluations are meant to ensure that new ATDs are truly scientific instruments capable of simulating the responses of human occupants in crashes.

The CSWG conducts and directs precompetitive research on crash-related safety

## Related links

## This Report

→ Case Study: The New F-150

## Vehicle Websites

→ Ford B MAX

## External Websites

→ U.S. Council for Automotive Research

→ Center for Child Injury Prevention Studies

issues, with a current focus on issues associated with aspects of advanced, alternate-fueled, energy-efficient vehicles. In 2013, the working group completed the development of crash-test procedures for live lithium-ion battery testing collaboration with Sandia National Laboratories. The working group also wrote a technical paper entitled "Idealized Vehicle Crash Test Pulses for Advanced Batteries" that was subsequently accepted for publication by SAE International. The CSWG has begun work on a new exploratory project aimed at developing new modeling capabilities to address current voids in crash simulation of advanced lightweight materials. This project should be an enabler for USCAR members in their development of advanced lightweight vehicles.

### National Science Foundation's Center for Child Injury Prevention Studies

Ford continues to support research at the National Science Foundation (NSF) Center for Child Injury Prevention Studies (CChIPS) at the Children's Hospital of Philadelphia and University of Pennsylvania. CChIPS is an NSF Industry/University Cooperative Research Center. Participants include seven automotive companies, NHTSA, Consumer Reports, automotive suppliers, child-seat manufacturers, insurance companies and a crash-test dummy manufacturer.

In addition to helping fund the work, Ford scientists and engineers help to select the research projects pursued by CChIPS researchers each year and even serve as mentors for projects that need automakers' vehicle safety expertise. Current projects include, among others, a study to explore ways to provide real-time, in-vehicle, positive reinforcement of appropriate teen driving behaviors; a study to develop a better understanding of pediatric brain injury in automobile crashes; and a study to compare child crash dummies to pediatric volunteer subjects in low-speed crash simulations.

### University Partnerships

Ford collaborates with university partners on a broad array of research projects, including research into advanced safety technologies, and has more than 130 active projects globally. In recent years, we have fine-tuned the objectives of our grant-providing University Research Program (URP), moving away from pure exploratory and long-term research and toward highly collaborative projects focused on innovations with more near- and mid-term implementation potential. We have also substantially expanded activity with our strategic alliance partner schools: the University of Michigan, the Massachusetts Institute of Technology, Stanford University and RWTH Aachen University.

In 2013, Ford awarded 28 new URP grants to 19 universities around the globe. Recipient schools in the United States included Wayne State University, Michigan State University, Ohio State University, University of Michigan, University of Minnesota, Washington State University, Pennsylvania State University, Central Michigan University and Northeastern University. In Europe, new URP grants were awarded to RWTH Aachen University and Koc University. In the Asia Pacific region, grants were awarded to Shanghai Jiao Tong University, Tsinghua University, Beijing Institute of Technology, Zhejiang University, Chongqing University in China; University of Melbourne and Deakin University in Australia; and India Institute of Technology Madras in India. Our recently unveiled Automated Fusion Hybrid research vehicles have been collaboratively developed in partnership with the University of Michigan with supporting projects at MIT and Stanford. In 2014, we expect to substantially increase our collaborative university activities globally with significant new projects in safety and sustainability.

The following are specific examples of current safety-related projects sponsored by Ford's Global Research and Advanced Engineering Organization:

- Wayne State University's Bioengineering Department is evaluating surrogates for child lateral impact crash testing. Child crash-test dummies for side impact evaluation of vehicles are a recent development. Their designs are based on scaling from adults, but children have unique biomechanical properties and are not just small adults. This project seeks to understand how the new child crash-test dummies perform in simulated side impact crashes and how to improve their design.
- The University of Michigan is working on the performance characterization and modeling of lithium-ion batteries subjected to deformation under crash loading, as well as the development of multiphysics modeling capability to include mechanical, thermal and electrical effects.
- RWTH Aachen University is working on the development of advanced crash simulation methodology. This research seeks new methods to predict and accurately assess the crash performance of vehicle structures made with advanced materials.
- Tianjin University of Science and Technology is helping Ford to develop the world's first human body mathematical model of a six-year-old child. Data from

CT scans of a representative six-year-old child were used to determine the physical geometry of the skeleton and internal organs. This data was then used to develop a mathematical representation in the virtual world of a human six-year-old child. When completed, this model may help Ford scientists and engineers better understand how injury to children occurs in vehicle crashes and research ways to reduce risk of injury to children in those crashes.

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## Post-Crash Response Technologies

One method of assisting emergency responders to reach the scene of a vehicle crash quickly is through in-vehicle emergency call systems, also called post-crash notification. These systems can help occupants to summon assistance in an urgent situation.

### Ford Technologies

**SYNC®** is Ford's in-car connectivity system that provides a way for drivers to use cell phones and MP3 players through voice commands while keeping their eyes on the road and hands on the wheel. SYNC-equipped vehicles in the U.S., Europe and other regions of the world come with an occupant communications capability called **SYNC 911 Assist** (in the U.S.) or **Emergency Assistance** (in Europe, China, India and Australia). This is a nonsubscription call-for-help system. In the event of a severe crash, the ability to directly contact the local emergency operator could be critical, for both the vehicle occupants and first responders. While any cell phone alone could be used in an emergency situation, SYNC can assist in placing a call to an emergency operator and provide GPS location information to help locate the vehicle. SYNC places an emergency call if an airbag is deployed or the fuel pump shutoff is activated as a result of an accident – when a phone is turned on, previously paired via Bluetooth and properly connected to SYNC. SYNC gives the occupants a choice as to whether or not to make the emergency call, and places the call if the occupant does not respond after a short time. Using SYNC's voice capabilities, Emergency Assistance alerts emergency service providers in the correct local language.

The **SOS-Post Crash Alert System™**, which is standard equipment on most Ford and Lincoln vehicles, is another advance in post-crash safety technology. The SOS-Post Crash Alert System automatically sounds the horn (except in Europe where horn activation is not allowed) and activates the emergency flashers in the event of an air bag deployment or safety belt pre-tensioner activation. In addition, the vehicle doors automatically unlock subsequent to an air bag deployment or safety belt pretensioner activation, to aid in rescue. The system is designed to alert passersby and first responders to the vehicle's location.

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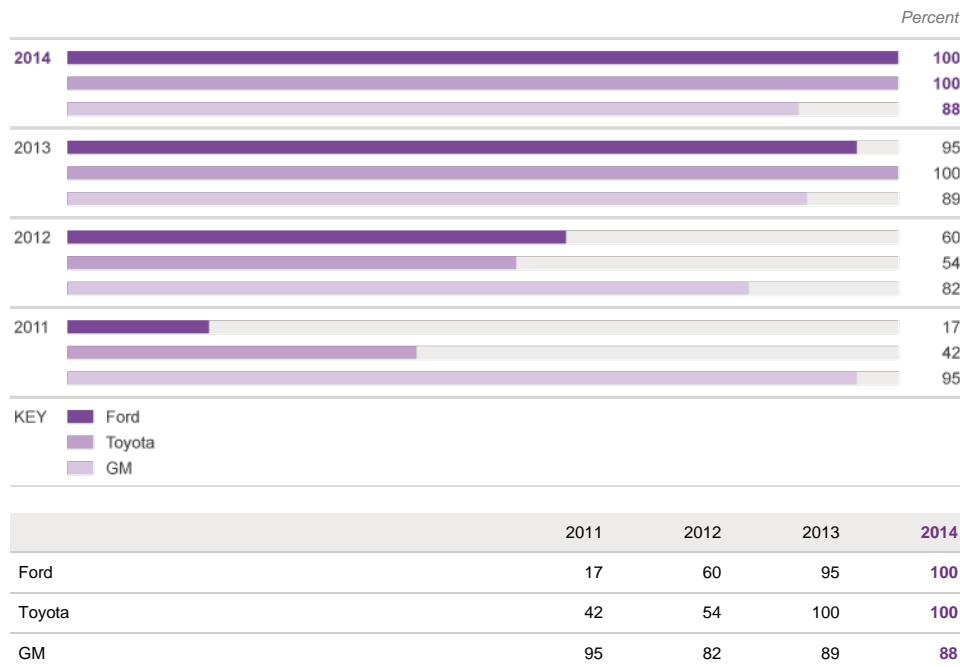
## Data on this page

- A. ↗ Percent of Nameplates Achieving 4-star or Better NCAP Overall Vehicle Score (OVS)
- B. ↗ Percent of Nameplates Achieving 5-star NCAP Overall Vehicle Score (OVS)
- C. ↗ Percent of Nameplates Achieving IIHS Top Safety Pick by Manufacturer
- D. ↗ U.S. Safety Recalls
- E. ↗ Euro NCAP (2013 Ratings)

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## A. Percent of Nameplates Achieving 4-star or Better NCAP Overall Vehicle Score (OVS)

Data are for the model year noted.

Third party rated ([NHTSA](#))

## Data notes and analysis

Beginning with the 2011 model year the National Highway Traffic Safety Administration (NHTSA) significantly changed its New Car Assessment Program (NCAP) and added a new metric, the Overall Vehicle Score (OVS), a calculation based on data from frontal crash, side crash, and rollover evaluations. We are simplifying our metrics and reporting NHTSA's OVS. For detailed information on the NCAP system, see [www.safercar.gov](#), and in particular <http://www.safercar.gov/staticfiles/toolkit/pdfs/faq.pdf> (pdf, 218Kb).

## Related links

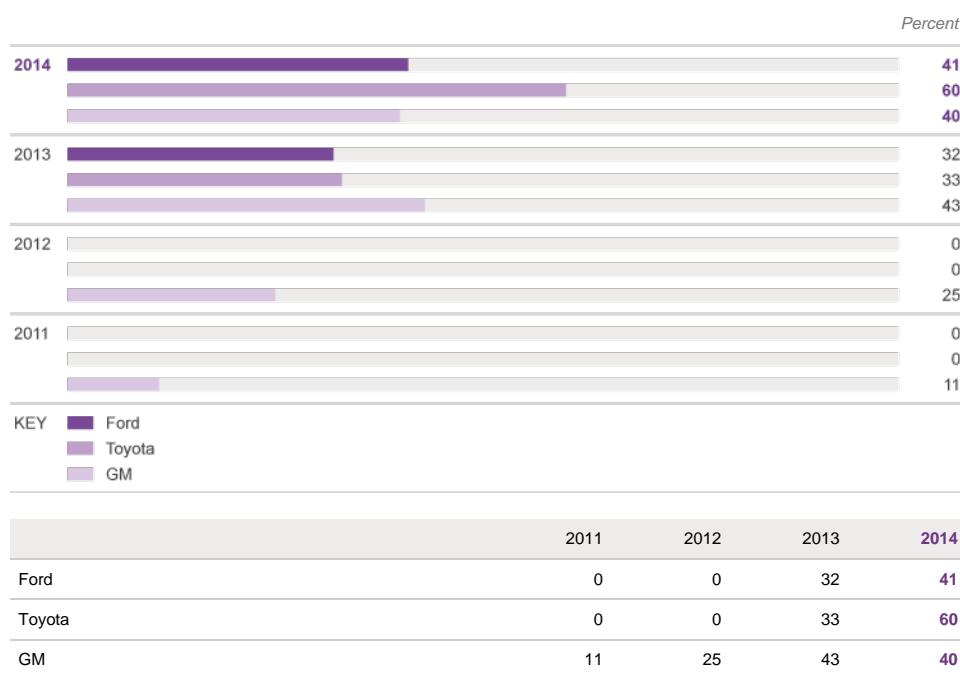
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## B. Percent of Nameplates Achieving 5-star NCAP Overall Vehicle Score (OVS)

Data are for the model year noted.



Third party rated (NHTSA)

### Data notes and analysis

Beginning with the 2011 model year the National Highway Traffic Safety Administration (NHTSA) significantly changed its New Car Assessment Program (NCAP) and added a new metric, the Overall Vehicle Score (OVS), a calculation based on data from frontal crash, side crash, and rollover evaluations. We are simplifying our metrics and reporting NHTSA's OVS. For detailed information on the NCAP system, see [www.safercar.gov](http://www.safercar.gov), and in particular <http://www.safercar.gov/staticfiles/toolkit/pdfs/faq.pdf> (pdf, 218Kb).

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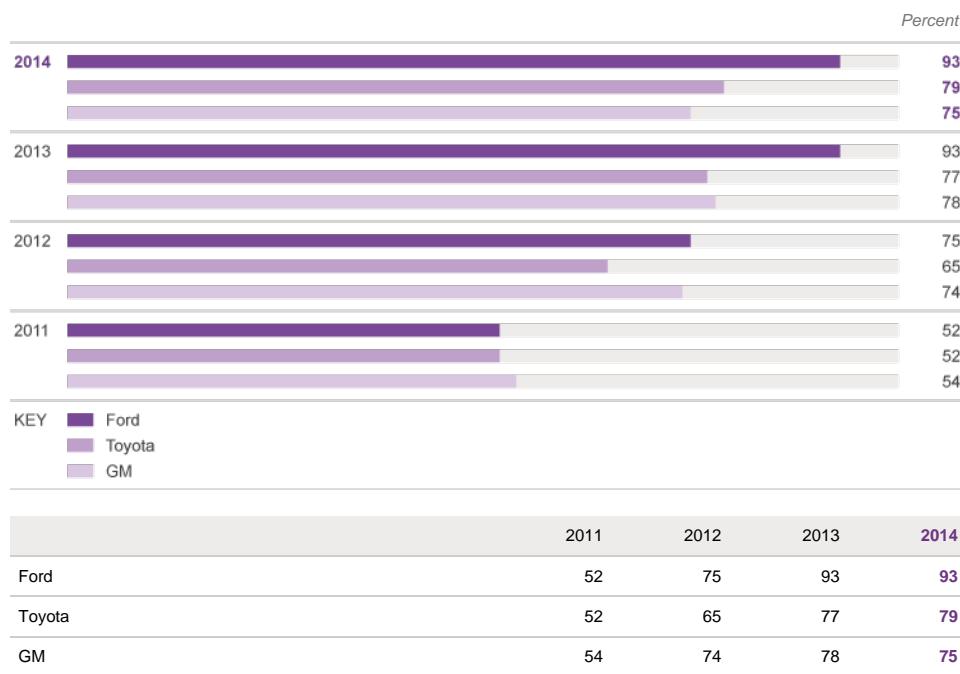
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## C. Percent of Nameplates Achieving IIHS Top Safety Pick by Manufacturer

Data are for the model year noted.



### Data notes and analysis

To earn an Insurance Institute for Highway Safety (IIHS) Top Safety Pick (TSP), a vehicle must receive "good" ratings in front, side, roof strength, and head restraint assessments. In 2013, IIHS began awarding Top Safety Pick+ (TSP+) for vehicles earning good ratings in all four of the above-mentioned evaluations plus at least an "acceptable" rating in a new small overlap frontal crash. In addition to the TSP awards, Ford received two TSP+ awards for 2013 MY vehicles. For detailed information on the IIHS's testing procedures, see <http://www.iihs.org/ratings/>.

### Related links

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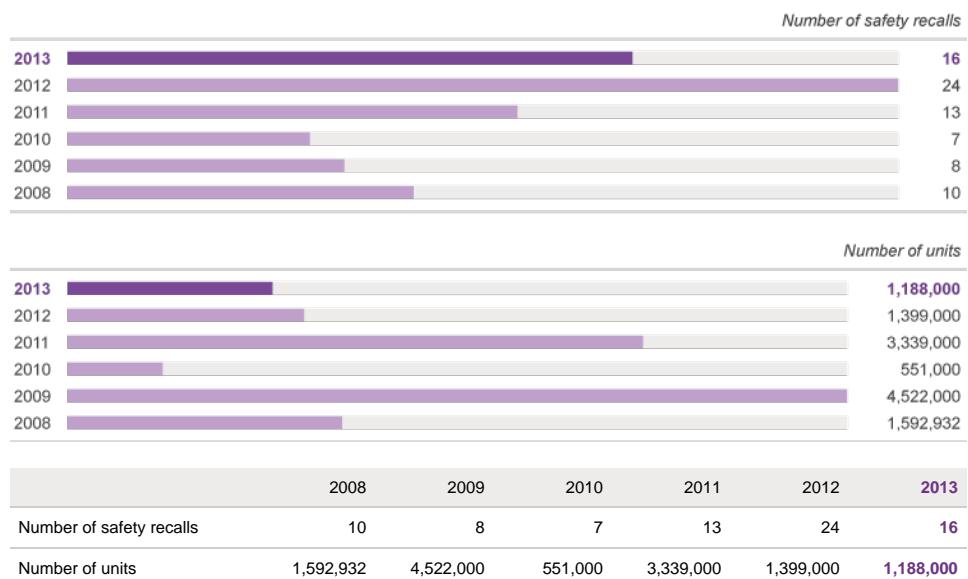
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#### External Websites

- ➔ [IIHS](#)

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## D. U.S. Safety Recalls



 [Reported to regulatory authorities \(NHTSA\)](#)

### Data notes and analysis

Three of the 2012 calendar year safety recalls were reported by NHTSA in January 2012, although they were approved by the Company in December 2011. Additionally, three other 2012 calendar year safety recalls were supplements to safety recalls that were originally approved by the Company in 2010 and 2011.

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## E. Euro NCAP (2013 Ratings)

*Overall percentage*



	Industry Low	Industry High	Industry Average	Ford results
Small Family Car	67	85	75	Ford EcoSport: 70
Small MPV	67	83	75	Ford Tourneo Connect: 83

Third party rated ([Euro NCAP](#))

### Data notes and analysis

EuroNCAP combines all assessed criteria to an overall “fulfillment percentage” ranging from 0 percent to 100 percent. Star ratings are dependent on the fulfillment percentage. Currently a 75 percent or higher is required for a 5-star rating. In addition to the star ratings, five Ford vehicles received “Euro NCAP Advanced” rewards for new safety technologies in the 2012 ratings. For additional information, go to [www.euroncap.com](#).

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- [Euro NCAP](#)

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## Case Study: Public Domain Ratings

Safety regulations and public domain rating programs differ around the world, and they are constantly evolving in response to various regional factors. The public domain rating programs that perform vehicle crash testing and other assessments have regularly updated their testing protocols and evaluation criteria to reflect the needs of the region. In the past two years, several of these programs have markedly revised their vehicle rating systems, making it increasingly difficult to achieve the highest ratings. The changes have also caused the testing protocols to become even more inconsistent and divergent between regions. Some of the changes include the addition of new assessment items (such as different-sized dummies in different seating positions), different or more-stringent crash evaluation criteria, and greater emphasis on accident avoidance and driver assist features. A major challenge for a global automotive company like Ford is that the complexities of these evolving programs may initiate a demand for different vehicle technology offerings in different markets.

In addition, New Car Assessment Program (NCAP) systems are being launched in regions where they have not existed in the past. This is partly due to the influence of a new nonprofit organization based in London called Global NCAP that is promoting the establishment of NCAPs around the world. They have already helped to develop a Latin NCAP system, which is now rating vehicles in Mexico and South and Central America. In 2012, a new ASEAN NCAP was launched in Malaysia.

In the U.S., the NCAP program of the U.S. National Highway Traffic Safety Administration (NHTSA) includes a 35 mph (56 km/h) full frontal impact test, a side impact test consisting of a moving barrier and a rigid pole, and a static stability rating. NHTSA also provides an overall vehicle score (a "star" rating, from one to five stars) representing a combination of the vehicle's front, side and rollover ratings.

Evaluations conducted by the Insurance Institute for Highway Safety (IIHS) include a 40 mph (64 km/h) frontal offset (40 percent overlap) crash test, a side crash test with a higher barrier, a roof strength test, plus evaluations of head restraints in a rear-impact simulation. To earn a Top Safety Pick from the IIHS, a vehicle must receive "good" ratings in the front, side, roof and head restraint assessments. Beginning in the 2013 program, the IIHS added a small (25 percent) overlap frontal test, simulating minimum engagement or an impact with a narrow object, to their Top Safety Pick rating system. Vehicles that perform at a "good" or "acceptable" level in this new small offset test will earn an IIHS Top Safety Pick+ award. For 2014, a "good" or "acceptable" level in this new small offset test is required to earn an IIHS Top Safety Pick. In addition to the 2014 Top Safety Pick criteria, a minimum "Basic" rating in the new IIHS Forward Crash Prevention protocol required to earn an IIHS Top Safety Pick+ award.

Euro NCAP conducts a 64 km/h (40 mph) frontal offset (40 percent overlap) crash, a side crash and a side pole impact, as well as pedestrian protection and child safety evaluations. Recent changes to the Euro NCAP include updated pedestrian protection and speed assistance protocols. Like NHTSA, Euro NCAP also gives each vehicle an overall star rating representing a combination of individual assessments. In addition to publishing the main vehicle ratings, Euro NCAP has added an Advanced Rewards program to recognize certain safety and accident avoidance technologies that are not currently rated under their protocols. Euro NCAP has also announced significant changes to its rating system between 2014 and 2016. These changes are far-reaching and include a stronger focus on accident avoidance and driver assist features, new and revised crash tests and dummies, and changes to the assessments for pedestrian and child safety.

The emerging testing and assessment methods being developed by Global NCAP are based on existing protocols – typically those from Euro NCAP. In 2013 Latin NCAP introduced significant changes to their program affecting areas such as child restraints, child dummies, applicability of the ratings, fitment rates for safety equipment, seat belt reminders and new requirements for five-star ratings. In addition, revisions to the China and Australasian NCAP programs are planned in stages and began taking effect in 2011. In 2012, changes to China NCAP included increasing the offset frontal impact test speed from 56 km/h to 64 km/h, the introduction of whiplash assessments and the inclusion of rear dummy assessments in the ratings. The Australasian NCAP has published a rolling, five-year "road map" detailing changes they plan to introduce through to the end of 2017. These include whiplash and roof-strength assessments and increased



A full-vehicle crash test.

requirements for accident avoidance and driver assist technologies.

Thus, even though Ford vehicles are safer than ever, individual vehicle crash ratings achieved for the 2011 model year and beyond should not be compared to ratings achieved prior to 2011. ([See the Data page.](#))

In addition, while some of the basic test methods are similar in the global evaluation programs, each program varies in the ways in which vehicle ratings are determined. This means that for an identical car, achieving the highest rating in one region or evaluation program does not guarantee the same result in another region or program.

Just as rating programs vary by region, so do regulations, road infrastructure, the competitive landscape and other factors that can influence real-world safety. We work to understand all of these variables and to deploy and offer safety features that meet the needs of the region. And we continue to invest in new technologies to prepare for future societal needs. At Ford, we strive to make technology available on a wide range of our products, even as we remain competitive in the markets in which Ford vehicles are sold. This approach promotes greater societal benefits through broad market acceptance of new technologies, which ultimately improves real-world safety.

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#### Related links

##### External Websites

- [Australasian New Car Assessment Program](#)
  - [China New Car Assessment Program](#)
  - [Global New Car Assessment Programme](#)
  - [Insurance Institute for Highway Safety](#)
  - [Latin New Car Assessment Program](#)
  - [U.S. National Highway Traffic Safety Administration](#)
  - [European New Car Assessment Programme](#)
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Voice: Pete Hardigan

## Case Study: Electrified Vehicle Safety

Anyone who owns an electrified vehicle (EV) can attest that the experience of driving an EV is essentially the same as that of a “regular” vehicle powered by an internal combustion engine. Certainly no special skills are needed to operate EVs such as hybrids, plug-in hybrids or pure battery electric vehicles.

Under the hood, however, EVs are, in fact, different from non-electrified vehicles in at least one important respect: they contain a battery with 300+ volts of power, whereas a regular vehicle has just one 12-volt battery.

And that means that first responders – the firefighters, police officers and emergency medical technicians who show up at the scene of a crash site – may indeed need some special knowledge and skills to be able to safely address a vehicle crash involving an EV.

“It’s not uncommon for first responders to need to update their skills and procedures in response to new technologies,” said Domenico Gabrielli, vehicle safety engineer in Ford’s Automotive Safety Office. “For instance, the advent of high-strength steels and new types of airbags required a modification of tools and procedures. Likewise, in recent years the industry has been focused on educating first responders about EVs.”

For example, we and other EV manufacturers have developed special Emergency Responder Guides for each of our electric vehicles. These guides include information on how to identify a Ford EV, locate the high-voltage system, disconnect it, and move and store the disabled vehicle, among other key tasks. Also, over the years, we have actively supported firefighters’ hands-on crash-response procedure training events, through the donation of EVs and the attendance of Ford technical personnel.

In 2010, we began working with the National Fire Protection Association (NFPA) to help reach more first responders and educate them about electric vehicles. We take part in conferences on the topic that are jointly hosted by the NFPA and the Society for Automotive Engineers (SAE). We also solicited (and incorporated) the NFPA’s feedback on our Emergency Responder Guides.

The NFPA has since developed a website for first responders, where our and other automakers’ guides are housed. Also, the NFPA developed the Emergency Field Guide – a quick reference guide that summarizes the key information that first responders need for all makes and models of EVs.

“Our comprehensive training programs – both classroom-based and online – have reached at least 35,000 first responders,” said Andrew Klock, senior project manager at the NFPA. “And the classroom programs are ‘train-the-trainer’ courses, so we know the lessons taught there are being cascaded out to many, many more first responders.”

The NFPA is also working with the Fire Protection Research Foundation, which is currently conducting a study on high-voltage battery fires and best practices for extinguishment. That work is funded in part by the Alliance of Automobile Manufacturers, of which we are a member.

Ford has also been involved in the SAE’s efforts to develop recommended standard procedures for first responders regarding EVs involved in crashes. Several Ford engineers served on the committee that developed the procedures, which were published in February 2013.

“It’s important to note,” said Gabrielli, “that automakers and government regulatory agencies have worked hard to ensure that EVs are safe in the event of a crash.” All EVs in the U.S., for instance, must comply with the National Highway Traffic Safety Administration’s regulations governing the safety of EVs. Ford also complies with similar regulations in force in other countries around the world.

Ford also has internal guidelines for EVs, governing all aspects of battery safety and crash protection. In our EVs, for example, the high-voltage battery is housed in a strong steel casing, which helps to provide protection in addition to the car’s overall safety structure. “From the beginning, our electrified vehicles are designed for safety,” said Gabrielli.



2014 Ford Fusion Energi

First responders have long been used to addressing the risks associated with “regular” vehicle crashes, which may involve the spillage of large quantities of flammable liquid. EVs have unique issues that first responders also need to learn how to handle. But we’re confident that the efforts of Ford and others in the industry are helping to ensure that first responders have the information they need to do their jobs safely.

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#### Related links

##### This Report

- [Electrification: A Closer Look](#)

##### External Websites

- [National Fire Protection Association](#)
  - [Society for Automotive Engineers](#)
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Voice: Pete Hardigan

## Case Study: Driver Distraction

Smart phones and other portable electronic devices (e.g., MP3 music players) are commonplace in our modern society. The public has become accustomed to using these devices everywhere – at home, on the street, in restaurants, at the office, while shopping, and – of most interest to Ford's safety researchers – while driving. Indeed, studies by the National Highway Traffic Safety Administration indicate that approximately 10 percent of drivers are using their cell phones at any given time, which has heightened concerns about the potential for driver distraction.

Ford agrees that this is an important safety issue, and we have taken steps to address it. We also believe that continued research is needed to better understand the complex interactions involved in this issue, and we are participating in that research.

Some entities have recommended a total ban on the use of cell phones – both hand-held and hands-free – while driving, citing studies that concluded there's no difference in driver behavior whether using hand-held or hands-free phones. In many of those laboratory studies, participants in simulated driving situations were observed while being asked to engage in in-depth conversations on challenging or emotional subjects, such as the latest political scandal or a near-death experience. Such intense and lengthy discussions can indeed be distracting.

Naturalistic driving studies – in which study participants' driving performance, "eye glance behavior," driving environment and in-vehicle activities are observed and recorded over weeks or months in real-world situations – have revealed different results. For example, naturalistic studies by the University of Michigan Transportation Research Institute found that, when immersed in real traffic conditions, drivers using cell phones by and large exhibit prudent driving behavior.

Naturalistic driving research has found that visual distraction, not cognitive distraction, is the main safety concern in the real world. In fact, researchers from the Virginia Tech Transportation Institute (VTTI) found that 80 percent of all crashes, and 65 percent of all near-crashes, involved the driver looking away from the forward roadway just prior to the onset of the incident. These researchers summarized their findings in this way: "... it is a rare case that a crash occurs while the driver's eyes are on the forward roadway, regardless of any other 'cognitive demand' that they might be engaged in."

Beyond this, there exists a considerable body of published research that indicates the superiority of hands-free voice interfaces as compared to hand-held or visual/manual interfaces for the same tasks of command or data entry. These studies show advantages in driver performance, eye glance behavior toward the roadway, and object and event detection when the driver can keep eyes on the road and hands on the wheel.

For over a decade, Ford has been focused on the issue of driver distraction, and we've taken steps to enhance driving safety for those who use cell phones and other telematics devices while driving.

Ford's SYNC® technology, our voice-activated in-car connectivity system, has been shown to significantly enhance the ability of drivers to attend to the driving task while using cell phones and music players. Ford researchers found that SYNC substantially reduces drivers' eyes-off-road time and improves lane-keeping, speed maintenance, and object and event detection response times, when compared to hand-held devices for the same tasks. Our research evaluated driver performance, not driver behavior in the real world, and our findings are consistent with the research conducted by VTTI, which we believe indicates that SYNC helps to enhance highway safety overall.

Ford recognizes that drivers will in fact use cell phones and music players while driving, and that text messaging will continue to increase in popularity. Text messaging is a particular concern, as it requires significant time looking away from the roadway to do it. Ford's SYNC system addresses this concern as well: when a text message arrives, it does not display that message but instead reads it aloud through text-to-speech technology. In addition, SYNC allows the driver to potentially respond via speech-to-text rather than manually keying-in a reply.

We believe that ongoing education is needed to help drivers understand the importance of focusing on the



Ford SYNC®

driving task and keeping their hands on the wheel and eyes on the road. Ford plans to continue to work with the government and other safety-related groups to discuss measures that can effectively reduce driver distraction and improve driving safety. We also plan to participate in continued research that can further our understanding of safe driving and help spread the message of safe driving.

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#### Related links

##### External Websites

- ➔ [U.S. National Highway Traffic Safety Administration](#)
  - ➔ [Virginia Tech Transportation Institute](#)
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> **Voice: Pete Hardigan**

## Voice: Pete Hardigan

Director of Sustainability, Environment and Safety Engineering, Asia Pacific, Ford Motor Company

 Safety regulations can vary significantly from market to market, but we meet and exceed all requirements where we operate. Public domain assessment programs also vary. There are currently five different New Car Assessment Programs (NCAPs) in Asia, with a sixth one in development. Moreover, the protocols within these NCAPs can change very frequently, often with very little lead time."



One of my primary roles at Ford Motor Company is to make sure that our vehicles meet all safety and environmental regulations in the Asia Pacific region. In doing so, it's important to keep in mind that Asia isn't just one market. It's an enormously diverse area that includes some countries with highly developed transportation networks and experienced drivers, other countries with underdeveloped infrastructure and many novice drivers. Improving safety requires addressing three key elements: **human behavior, vehicle safety and the environment**.

On the human behavior front, one of the most fundamental occupant safety factors is safety belt use. Safety belt use is relatively low in Asia Pacific markets. Traveling around Asia, one frequently sees passengers moving around inside vehicles and even children standing up in moving vehicles. Data is very clear that the use of safety belts is key to reducing the occurrence of injuries and fatalities in the event of an accident.

In Asia, a unique challenge is the sheer number of first-generation drivers on the roads. In developing Asian markets in particular, more and more people are able to afford vehicles and are taking to the roads for the first time. Many of these drivers are the first in their families to own or even drive a car or truck, so there is no tradition of learning the basics of how to drive from one's parents. Novice drivers have an increased crash risk because they may not possess judgment related to driving skills that comes with experience. These new drivers may underestimate the implications of their driving behaviors and have greater potential to engage in multiple tasks, such as texting while driving.

That's why we work hard to help educate and provide drivers in Asia with better training. Our Driving Skills for Life program has helped to train 77,000 licensed drivers in 330 cities across eight different Asia Pacific markets. In the U.S., the program focuses on teenage drivers. But in emerging markets, we focus on novice drivers of every age.

Driver training is one element of our three-pronged, integrated approach to safety at Ford. The second element incorporates safety and driver assist technology – building technologies into our vehicles to help drivers avoid accidents or mitigate the impacts when accidents do occur.

With respect to vehicle safety, our goal is to design vehicles that achieve a high level of safety for a wide range of people, over a broad spectrum of real-world conditions. Ford applies a set of basic safety tenets and technologies that we build into our vehicles globally. Our Safety Design Guidelines (SDGs) are design targets intended to enhance the already extensive company efforts to provide vehicles that exhibit a high level of safety. Safety is one of our core brand pillars, representing some of the key things customers care about and the work we do to deliver our One Ford plan. Our Public Domain Guidelines (PDGs) focus specifically on helping to strengthen Ford brands globally in relevant public domain assessments.

Safety regulations can vary significantly from market to market, but we meet and exceed all requirements where we operate. Public domain assessment programs also vary. There are currently five different New Car Assessment Programs (NCAPs) in Asia, with a sixth one in development. Moreover, the protocols within these NCAPs can change very frequently, often with very little lead time. Our SDGs and PDGs are some of the enablers that assist our vehicles in meeting their design targets.

The third element focuses on the road environment – what can Ford, along with other manufacturers and governments, do to help improve transportation infrastructures? This latter element requires input and action from many groups of stakeholders. It is clear, however, that enhancing motor vehicle safety requires a holistic view focusing on all three elements.

In the U.S. and Europe, there are hundreds of millions of vehicles on the roads with record-low rates of fatalities. This is the result of focusing on all three elements: human behavior, vehicle safety and the environment. It will be important to take the experiences from the U.S. and Europe and understand how they might be adapted to the unique circumstances in Asia Pacific.

For Ford, Asia Pacific is a great example of our One Ford system at work, and we would not be as successful as we are without our global One Ford team. We're taking processes and products from around the globe and we're introducing them in Asia while meeting all the differing regulatory requirements.

It is very exciting to work in the region and I am proud to be a part of such a great global company.

(For more on vehicle globalization, see the [John Fleming](#) voice.)

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Year in Review



Our Blueprint for  
Sustainability



Financial Health



Climate Change and the  
Environment



Water



Vehicle Safety



Supply Chain



People



Ford Around the  
World

### Supply Chain

Overview

Supply Chain Profile

▼ Creating a Sustainable Supply Chain: Ford's Overall Approach

▼ Human Rights in the Supply Chain: Ford's Approach

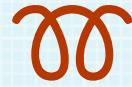
▼ Sustainable Raw Materials

▼ Supply Chain Environmental Management

Supplier Diversity Development

Data

Voice: Kelly Katynski



## Supply Chain

Ford's suppliers are critical allies in helping us to achieve success in the marketplace and meet our sustainability goals. The basis of our work with suppliers is the Ford Code of Human Rights, Basic Working Conditions and Corporate Responsibility, which applies to our own operations as well as our \$100 billion supply chain.

Read more about [OUR APPROACH TO SUPPLY CHAIN SUSTAINABILITY](#)



## OUR APPROACH TO CONFLICT MINERALS

To the extent conflict minerals (tin, tungsten, tantalum and gold) are contained in our products, it is Ford's goal to use DRC conflict-free minerals while continuing to support responsible in-region mineral sourcing from the Democratic Republic of the Congo (DRC) and adjoining countries. Our suppliers are expected to conduct due diligence to understand the source of the conflict minerals used in Ford products, source responsibly, and not knowingly provide products containing minerals that contribute to conflict.

Read more about [CONFLICT MINERALS](#)

## OUR GOALS AND PERFORMANCE PROGRESS



**Goal:** Encourage our key production suppliers to introduce codes of conduct aligned with international standards and Ford's Code of Human Rights, Basic Working Conditions and Corporate Responsibility; develop robust management and compliance systems to support their codes; and extend these expectations to their own suppliers.

Approximately 80% of our production Aligned Business Framework (ABF) suppliers have demonstrated that they have codes of conduct in place that are aligned with international standards. Approximately 45% of our ABF production suppliers have demonstrated that they have met all three Ford milestones.



**Goal:** Help suppliers build their capacity to manage supply chain sustainability issues through factory-level and management training on working conditions, human rights, ethical business practices and environmental responsibility; and require participating suppliers to cascade training information to their own employees and suppliers.

In 2013, we trained more than 230 Ford suppliers in Brazil, Mexico, Turkey, Romania and South Africa.<sup>1</sup> The global total of Ford suppliers trained since program inception is nearly 2,100.<sup>2</sup>



**Goal:** Assess the carbon footprint of Ford's supply chain to inform the development of a broad-based carbon management approach for our supply chain.

We surveyed 145 suppliers in 2013 (up from 135 in 2012, 128 in 2011 and 35 in 2010) regarding greenhouse gas emissions, and achieved an 89% voluntary response rate.



**Goal:** Source at least 10% of U.S. purchases from minority- and women-owned businesses annually.

We purchased \$6.5 billion in goods and services from approximately 250 minority-owned suppliers and \$1.8 billion in goods and services from more than 150 women-owned businesses, our fourth consecutive year of improvement.

See more at [FORD'S GOALS, COMMITMENTS AND STATUS](#)



## ASSESSING SUPPLIERS

Human rights and working conditions is a prime area of focus for our sustainability work with suppliers. Since 2003, we have conducted more than 900 third-party audits of existing and prospective Tier 1 suppliers in 21 countries on issues relating to ethics and human rights and working conditions.

Read more about [ASSESSING SUPPLIERS](#)



### FORD'S APPROACH TO CREATING A SUSTAINABLE SUPPLY CHAIN

We promote long-term relationships with our suppliers and seek alignment with them on sustainability-related issues such as human rights, working conditions and environmental responsibility. We leverage our supply chain to make a positive impact in the markets in which we do business.



Voice: **KELLY KATYNSKI**

Supply Chain Sustainability Manager, Conflict Minerals Compliance, Ford Motor Company

"Not all mining from the Congo is contributing to conflict. There are many responsibly run operations whose workers depend on mining of these minerals to support their families. It is important that actions taken by Ford and our suppliers do not disadvantage responsible mining operations in the region."



## LOGISTICS OPERATIONS

Ford's physical logistics operations provide the safe and efficient transport of parts from our suppliers to our manufacturing plants and of finished vehicles from the end of our assembly lines to our dealerships. Although logistics accounts for a relatively small percentage of our vehicles' total lifecycle emissions, we are working hard to maximize the efficiency of these operations to reduce their environmental impact.

Read more about [LOGISTICS OPERATIONS](#)



## SUPPLIER DIVERSITY

Ford launched its Supplier Diversity Development program in 1978 with the goals of supporting minority- and women-owned businesses, creating business opportunities for diverse suppliers to grow into profitable enterprises, and further strengthening the Ford supplier network to reflect the company's workforce and customer base. Since that time, we have sourced more than \$70 billion to minority-, women- and veteran-owned businesses.

Read more about [SUPPLIER DIVERSITY](#)

## 2013 HIGHLIGHTS



**485,000**

of our suppliers' workers have been impacted by our supply chain sustainability training program since its inception in 2006.



**6**

the number of work groups Ford chairs or co-chairs at the Automotive Industry Action Group, or AIAG, a North American, member-based, nonprofit industry group specializing in supply chain issues.

- 
1. Trainings in Brazil, Mexico, Turkey and South Africa were joint industry trainings coordinated through AIAG. Trainings in Romania were held in conjunction with CSR Europe.
  2. This figure includes suppliers trained in Ford-led and joint industry trainings.

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Voice: Kelly Katynski

## Overview

The automotive supply chain is one of the most complicated of any industry. Automakers like us rely on thousands of suppliers to provide the materials, parts and services necessary to make our final products. (See [Supply Chain Profile](#).) Many suppliers serve numerous automakers, and each of those suppliers, in turn, has multiple suppliers. There are often six to 10 levels of suppliers between an automaker and the source of raw materials that eventually enter the manufacturing process. The breadth, depth and interconnectedness of the automotive supply chain make it challenging to effectively manage business and sustainability issues.

In today's economic environment, achieving lower costs, improving quality and meeting sustainability goals require an unprecedented level of cooperation with suppliers, as well as strong supplier relationships. Ford and its suppliers must work jointly to deliver great products, have a strong business and make a better world.

This section describes our overall approach to developing a sustainable supply chain, including building strong relationships with our suppliers, developing supplier capability to manage sustainability issues, and collaborating with others in our industry on supply chain sustainability. It also describes our efforts to:

- Support human rights and working conditions in our supply chain;
- Address forced labor and human trafficking in supply chains and the California Transparency in Supply Chains Act of 2010 (SB657);
- Promote environmental sustainability in our supply chain;
- Address conflict minerals in our supply chain;
- Promote diversity among our suppliers; and
- Reduce the environmental impacts of our logistics operations.



### [ASSESSING SUPPLIERS](#)

Since 2003, we have conducted more than 900 third-party audits of existing and prospective Tier 1 suppliers on issues relating to ethics and human rights and working conditions.



### [SUPPLIER DIVERSITY DEVELOPMENT](#)

In 2013, we exceeded our goal to source at least 10% of U.S. purchases from minority- and women-owned businesses annually.



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Voice: Kelly Katynski

## Supply Chain Profile

### Production

Products that become part of the vehicle

**60+**

Countries in which suppliers are located



**1,100+**

Supplier companies (Tier 1)



**36**

Emerging markets in which suppliers are located



**4,100+**

Supplier manufacturing sites (Tier 1)



**21**

Countries considered to have risks of substandard working conditions. These countries were identified as higher risk based on consultation with nongovernmental organizations, other companies with human rights experience, local Ford operations and various media and government reports



**130,000**

Parts currently being manufactured



**65**

Ford manufacturing sites



### Non-Production

Products and services that do not become part of the vehicle, such as construction, computers, industrial materials, health care, machinery, transportation, advertising

**11,000+**

Supplier companies



**650+**

Non-production commodities



### Total global buy

**\$100+ billion<sup>1</sup>**



1. This figure was accidentally understated in this section of last year's report at \$75 billion. The actual figure for 2012 was \$90 billion.



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## Creating a Sustainable Supply Chain: Ford's Overall Approach

At Ford, we promote long-term relationships with our suppliers and seek alignment with them on sustainability-related issues such as human rights, working conditions and environmental responsibility. We work to ensure that Ford and our suppliers have management systems in place to mitigate potential risks, ensure continuity of supply and improve the overall sustainability of the complex global automotive supply chain. Our aim is to leverage our supply chain – and our industry – to make a positive impact in the markets in which we do business.

We take a three-pronged approach to creating a sustainable supply chain and managing sustainability issues throughout our supply chain:

- Building strong relationships with suppliers and engaging strategic suppliers:** Strong relationships improve our ability to encourage and influence the sustainability goals and management processes of our suppliers. We base supplier relationships on open communication, clear expectations and consistent requirements and processes. We have developed an Aligned Business Framework (ABF) with our most strategic suppliers, which helps to improve quality, drive innovation and encourage shared commitment to sustainability goals. We work with our ABF suppliers at the corporate level to align and enhance approaches on a range of sustainability issues.
- Developing shared commitment and supplier capability:** We seek to foster a shared commitment to sustainability throughout our supply chain and to help our suppliers build the capability they need to manage sustainability issues internally and throughout their own supply chains. We do this through dialogue and engagement, training, contract requirements, compliance assessments and, where necessary, remediation at individual factories.
- Working on cross-industry initiatives:** To influence and achieve lasting change at all levels of the automotive supply chain, we are leading in this work with our counterparts in the automotive industry to develop common approaches on a full range of sustainability issues. We do this work through the Automotive Industry Action Group and other industry and cross-industry initiatives.

[Home](#) > [Supply Chain](#) > **Creating a Sustainable Supply Chain: Ford's Overall Approach**

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## Expanding Impacts on Our Supply Chain

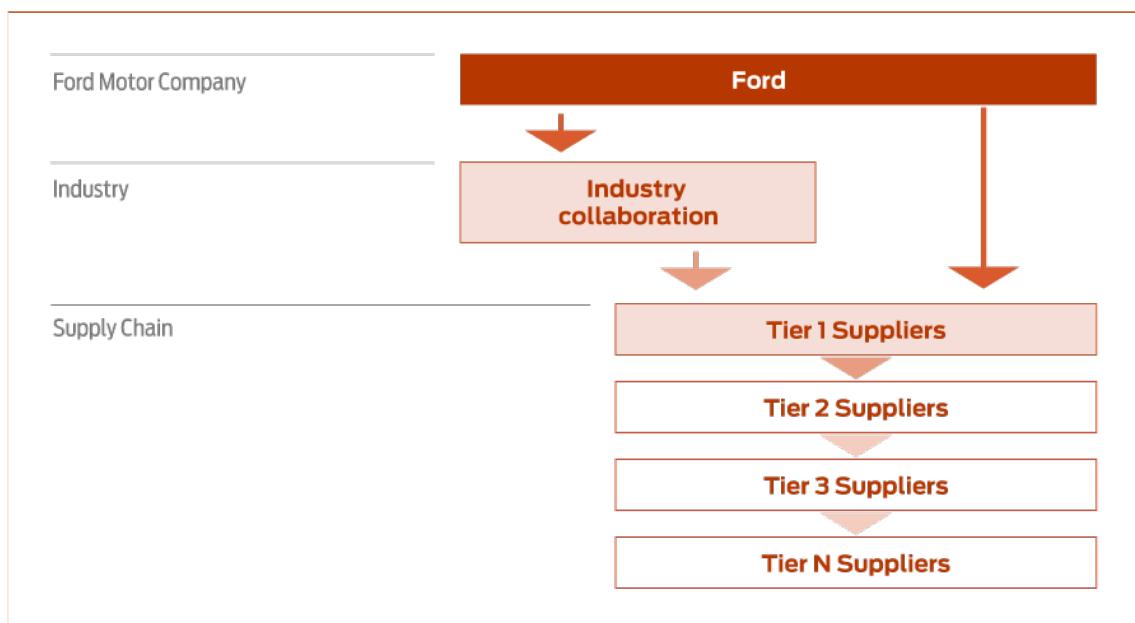
The graphic below illustrates how we are working toward our vision using a [three-pronged approach](#) to expand our impact throughout our supply chain and the industry as a whole. We work on multiple levels to increase the impact of our efforts.

Initially, we focused on working toward our sustainability vision within our own operations. For example, we began our work on human rights and working conditions by developing our own code of conduct for these issues, training our own workforce and assessing our own facilities. But we also work to deliver our goals and vision throughout our supply chain by collaborating with other manufacturers in the industry and working with our suppliers. We work with others in our industry to develop common expectations and guidance for suppliers and to provide consistent training. All of our direct (Tier 1) suppliers are subject to our Global Terms and Conditions, which require that both our own suppliers and their sub-tier suppliers meet specific sustainability expectations. Additionally, we provide training to our Tier 1 suppliers to help them build their capability to manage sustainability issues, and we require that our suppliers cascade the training to their own suppliers. We also perform assessments of supplier facilities to ensure compliance.

## Related links

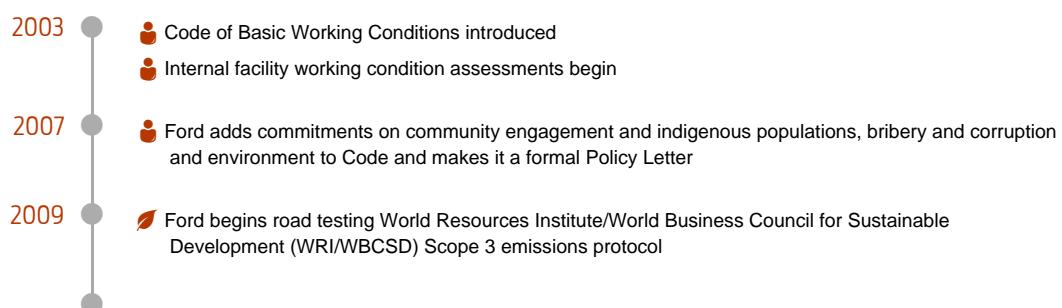
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**Key:** Human rights and working conditions Conflict minerals Supplier environmental management

### Ford Motor Company



2010	<ul style="list-style-type: none"> <li>▲ Ford begins raw materials supply chain transparency analysis</li> <li>▣ Ford surveys 35 suppliers on greenhouse gas (GHG) emissions</li> <li>▢ Ford completes road testing of WRI/WBCSD Scope 3 emissions protocol</li> </ul>
2011	<ul style="list-style-type: none"> <li>▲ Ford begins Organisation for Economic Co-operation and Development (OECD) conflict minerals due diligence process</li> <li>▲ Ford asks suppliers to begin reporting conflict minerals</li> <li>▣ Ford expands supplier GHG survey to 128 suppliers</li> </ul>
2012	<ul style="list-style-type: none"> <li>● Ford renames Code of Human Rights, Basic Working Conditions, and Corporate Responsibility reflecting additional content additions</li> <li>▲ Ford expands conflict mineral tracking and data analysis</li> <li>▢ Ford expands supplier GHG survey to 135 suppliers</li> </ul>
2013	<ul style="list-style-type: none"> <li>▣ Ford expands supplier GHG survey to 145 suppliers</li> <li>● Ford continues facilities assessments of suppliers in high risk countries</li> </ul>
2014+	<ul style="list-style-type: none"> <li>▲ Ford submitted first Securities and Exchange Commission (SEC) report on conflict minerals</li> <li>▢ Ford expands supplier CDP reporting to include both GHG and water</li> <li>● Ford continues facilities assessments of production suppliers in high-risk countries and begins pilot assessments of non-production suppliers</li> </ul>

## Industry Collaboration

2005	<ul style="list-style-type: none"> <li>● Ford initiates industry work group on working conditions and human rights</li> </ul>
2006	<ul style="list-style-type: none"> <li>● Joint industry, Automotive Industry Action Group (AIAG) led supplier trainings begin in select countries</li> </ul>
2007	<ul style="list-style-type: none"> <li>● Joint industry supplier trainings continue</li> </ul>
2010	<ul style="list-style-type: none"> <li>● Joint industry supplier trainings continue</li> <li>▲ Ford helps form AIAG industry work group on conflict minerals</li> <li>▢ Ford helps develop AIAG supplier GHG survey tool</li> </ul>
2011	<ul style="list-style-type: none"> <li>● Joint industry supplier trainings continue</li> <li>● Ford works with CSR Europe as a founding member of the European Automotive Working Group on Supply Chain Sustainability</li> <li>▲ Ford joins the Public Private Alliance for Responsible Minerals Trade (PPA) Governance Committee</li> </ul>
2012	<ul style="list-style-type: none"> <li>● Joint industry supplier training content expanded to include ethical business practices and environmental sustainability</li> <li>▲ Ford helps develop conflict mineral and smelter information collection tool with AIAG</li> </ul>
2013	<ul style="list-style-type: none"> <li>● Joint AIAG and CSR led industry supplier trainings continue</li> <li>▢ Ford becomes PPA Governance Committee member</li> </ul>
2014+	<ul style="list-style-type: none"> <li>● Joint AIAG and CSR led industry supplier trainings continue</li> </ul>

## Supply Chain

### Tier 1 Suppliers

2004	<ul style="list-style-type: none"> <li>● Sustainability requirements added to production supplier contracts</li> <li>● Supplier facility working conditions assessments begin</li> <li>● Ford supplier working conditions training begins</li> </ul>
2005	<ul style="list-style-type: none"> <li>● Sustainability requirements added to non-production supplier contracts</li> <li>● Supplier facility assessments continue</li> </ul>
2006	<ul style="list-style-type: none"> <li>● Ford helps suppliers build management capacity on human rights issues</li> <li>● Supplier facility assessments continue</li> </ul>
2007	<ul style="list-style-type: none"> <li>● Ford adds sustainability management expectations to Aligned Business Framework, for strategic</li> </ul>



### Tier 2 Suppliers





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## Building Stronger Relationships

Building strong relationships with suppliers is central to our ability to create a sustainable supply chain. Without strong relationships, we lessen our ability to influence the sustainability goals and management processes of our suppliers. We base our relationships with suppliers on open communication, clear expectations and consistent requirements and processes.

We work to maintain these relationships by:

- Deploying a single, global product-creation process that combines aggressive execution of product plans with minimal variances
- Enhancing process and part stability, commonality and reusability
- Providing real-time performance data to our supply base
- Providing suppliers with greater access to senior Ford managers in small group settings
- Improving order fulfillment
- Engaging suppliers in discussions about process stability, incoming quality and corporate responsibility

## Engaging Strategic Suppliers Through Our Aligned Business Framework

In addition to the efforts we make to build relationships with all of our suppliers, we engage even more robustly with our most strategic suppliers, through our Aligned Business Framework (ABF). We introduced the ABF for our most strategic suppliers in 2005, to improve quality, drive innovation and help us encourage shared commitment to sustainability goals. Through our ABF program, we help our Tier 1 suppliers develop the capability to manage their own supply chain sustainability issues.

We sign bilateral agreements with our ABF suppliers that comprehensively and formally spell out business commitments. For example, ABF suppliers must commit to manage and assure proper working conditions and responsible environmental management in their facilities and their supply chains. All suppliers, including our ABF suppliers must adhere to our [Global Terms and Conditions](#). Requiring suppliers to commit to these terms reduces the risk of operational or reputational issues that could affect production and provides the basis for Ford to work with suppliers to ensure responsible behavior throughout our supply chain. See the [Building Shared Commitment and Capability Throughout Our Supply Chain](#) section for more on how we engage ABF suppliers on sustainability issues.

## Ford's ABF Suppliers

As of May 2014, the ABF network included 106 companies, including 80 production and 26 nonproduction suppliers from around the world. Minority- and women-owned suppliers make up more than 10 percent of the total.

## ABF Production Suppliers

- Akebono
- Asahi Glass Co. Ltd.
- Autoliv
- Automotive Lighting
- Autoneum
- Axalta
- BASF Corporation
- Johnson Controls Inc. (JCI)
- Johnson Matthey
- Kautex Textron GmbH & Co. KG
- Key Safety Systems
- Kiekert
- KSPG Group
- Lear Corporation

- Benetler Automobiltechnik GmbH
- BorgWarner Inc.
- Bosch
- Brembo
- Brose
- Central Glass America Inc.
- Continental Tires
- Cooper-Standard Automotive Inc.
- Dakkota\*
- Dana Holding Corporation
- Delphi
- Denso
- Detroit Manufacturing Systems\*
- Detroit Thermal Systems\*
- Diamond Electric Mfg. Group
- Citic Dicastal Wheel Manufacturing
- Eisenwerk Brühl GmbH
- Faurecia
- FCC (Adams) LLC
- Federal-Mogul Corporation
- Flex-N-Gate\*
- Foster
- GETRAG Ford Transmissions (Getrag/Ford Joint Venture)
- GKN
- Grupo Antolin\*
- Hankook
- Hella
- Hitachi-Clarion
- HUSCO Automotive
- IAC
- Inalfa Roof Systems
- Inergy
- Linamar
- Magna International Inc.
- MANN+HUMMEL
- Martinrea International
- Maxion Wheels
- Metalsa
- Michelin Automotive Tires
- Mitsubishi Electric USA
- Muhr und Bender KG
- Neapco
- Nemak
- PPG Industries
- Panasonic (Sanyo)
- Piston Automotive\* LLC
- Pirelli Tires
- Prime Wheel\*
- Ronal Wheels
- Samvardhana Motherson Group
- Sharp
- Sonavox Audio Solutions
- Superior Automotive
- Takata Holdings Inc.
- Tenneco Inc.
- Thai Summit America Corporation
- Thyssen Krupp AG
- Toyoda Gosei
- Trelleborg
- TRW Automotive
- Umicore Group
- Valeo
- Visteon Corporation
- Webasto
- Yazaki Company
- ZF International

### **ABF Non-Production Suppliers**

- Active Aero Services
- Aristeo
- Blue Hive
- Cisco Systems Inc.
- Cross Country Automotive Services
- Devon Industrial Group\*
- Durr
- EWI Worldwide
- Ewie\*
- Federal Express FedEx
- Global Parts & Maintenance
- Gonzalez Production Systems\*
- Imagination
- Kajima Overseas Asia Pte Ltd
- KUKA Automation Company
- MAG Automation
- Microsoft
- MSX International
- Penske Corporation
- Percepta
- Roush Enterprises
- Team Detroit
- Union Pacific
- UniWorld Group\*
- Waldbridge
- Zubi Advertising\*

\*represents Minority- or Women-owned Business Enterprise



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## Building Shared Commitment and Capability

## On this page

- ↳ Setting Requirements for Sustainability Issues in Our Supplier Contracts and Guides
- ↳ Going Further with Our ABF Suppliers
- ↳ Supplier Corporate Responsibility Recognition of Achievement Award

## Related links

## This Report

- ↳ Policy Letters and Directives

It is important that our suppliers share our commitment to environmental and social responsibility. Shared commitment improves the flow and quality of information critical to continuity of supply and compliance with regulations. Shared commitment helps to ensure efficiency and quality throughout the supply chain, and it helps us avoid risks to our operations and reputation that can arise due to substandard practices in our supply chain.

We encourage our suppliers to manage sustainability issues and risks within their own operations and supply chains, and we provide them with tools to build the capability to do this. For example, we have developed in-depth resource guides and sponsored presentations by subject matter experts on issues such as human rights, working conditions and greenhouse gas emissions. We have provided worksheets on emissions tracking and reporting and on code of conduct development. We are sharing training materials we have developed (discussed below), as well as information and guidance on our compliance and training processes. Finally, we have committed to working with suppliers to help resolve issues and concerns.

While we provide training and guidance to suppliers on a range of sustainability issues, we have developed a detailed training program on human rights and working conditions issues. The program includes training and follow-up assessments, and requires remediation of substandard practices as necessary. This program is described in more detail in [Human Rights in the Supply Chain: Building Supplier Capability Through Localized Training and Collaboration](#).

Ford's ability to assess and influence the sustainability performance of our supply chain decreases the further suppliers are removed from us. It is challenging, for example, to influence and assess our Tier 1 suppliers' third- or fourth-tier suppliers. Fortunately, many of our Tier 1 suppliers are major multinational companies that already have the capability to implement and manage sustainability initiatives for their own operations and their own supply chains. Thus, we work hard to align these Tier 1 suppliers to our sustainability goals and rely on them to help us maintain a clear and consistent message as far down our supply chain as possible.

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## Setting Requirements for Sustainability Issues in Our Supplier Contracts and Guides

The basis of our sustainability work with suppliers is the Ford Code of Human Rights, Basic Working Conditions and Corporate Responsibility. We first adopted this Code in 2003 and then formally issued it as [Policy Letter 24](#) in 2007. The Code addresses workplace issues such as working hours, child labor, forced labor including human trafficking, nondiscrimination, freedom of association, and health and safety, as well as environmental issues and other topics. Though this Code applies directly to our own operations, we seek to do business with companies that have standards consistent with our Code. In 2012, Policy Letter 24 was revised to specifically communicate our encouragement of suppliers to adopt and enforce similar policies for their suppliers and subcontractors and given its current title: Code of Human Rights, Basic Working Conditions and Corporate Responsibility.

We incorporate requirements about sustainability management in our Global Terms and Conditions, the contract to which every supplier doing business with Ford is subject. This core contract dictates our prohibition of the use of forced labor, child labor and physical disciplinary abuse. These requirements were added in January 2004 for production suppliers and in September 2005 for all others. The Global Terms and Conditions also prohibit any practice in violation of local laws. In addition, we require suppliers to comply with certain fundamental protections for all employees that may, in some instances, exceed standards set by the local law. We also extend these expectations to subcontractors and ask our suppliers to extend the same expectations to their suppliers. In addition, the Global Terms and Conditions serve to:

- Set the expectation that suppliers will work toward alignment with our Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility in their own operations and their respective supply chains in the areas of harassment and discrimination, health and safety, wages and benefits, freedom of association, working hours, bribery and corruption, community engagement and environmental responsibility;
- Make clear Ford's right to perform third-party site assessments to evaluate supplier performance; and
- Communicate that Ford can terminate the relationship for noncompliance or for failure to address noncompliance in a timely manner.

Our Global Terms and Conditions are accompanied by Supplier Social Responsibility and Anti-Corruption, and Environmental Requirements Web-Guides, which further outline our expectations. For example, the supplier social responsibility guide that covers human rights and working conditions amplifies the expectations set out in the Terms and Conditions, provides specific guidance and recommendations for self-assessments and informs suppliers to the availability of factory-level training. In April 2012, we reissued these Guides with extensive edits, such that clearer guidance is provided on due diligence for conflict free sourcing, business ethics, anti-corruption actions, environmental specifications for engineering and working conditions expectations. As part of our annual review process, updated Web-guides will be published in July 2014. Material updates for 2014 include updated language for conflict free sourcing (Social Responsibility and Anti-Corruption Web-Guide) and inclusion of the green chemistry legislation (Environmental Web-Guide).

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## Going Further with Our ABF Suppliers

For our strategic Aligned Business Framework (ABF) suppliers – which supply more than 65 percent of our annual buy – we have developed a rigorous process for managing sustainability issues that builds on the requirements for sustainability issues in our supplier contracts and guides and also goes further. The intent is for our ABF suppliers to wholly own responsibility for sustainability expectations and performance in their supply chain.

We encourage our ABF suppliers to develop a shared commitment to our sustainability goals and effective systems for managing sustainability issues through a three-phase developmental process:



### Verify Supplier Code of Conduct

We ensure that our ABF suppliers have, or develop, a code of conduct aligned with our Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility.



### Training and Compliance

We provide training as needed to our ABF suppliers and ask them to conduct their own internal trainings to ensure that their employees understand their code of conduct. We also ask suppliers to develop a rigorous compliance process supporting their code.

### Extending Expectations to Their Supply Chain

Finally, we ask our ABF suppliers to extend our shared

# 3

sustainability goals and expectations to their own suppliers, expanding the impact of our sustainability goals throughout the multiple tiers of our supply chain.

Ford's global Supply Chain Sustainability team implemented a detailed review process at each of these three phases, or milestones. To date, approximately 80 percent of our Production ABF suppliers have demonstrated that they have codes of conduct in place that are aligned with international standards, and approximately 45 percent of our ABF Production suppliers have demonstrated that they have met all three Ford milestones – that is, they have aligned codes of conduct in place supported by robust management systems governing their own operations and their supply chain. Through our work with ABF suppliers, we have identified key success factors that enable companies to make progress in managing sustainability issues in their own supply chains, including:

1. the identification of executive decision makers to coordinate cross-functional efforts;
2. the support of executive management and/or the Board of Directors; and
3. implementation support from Ford in the form of discussion facilitation and/or individual or regional in-person meetings.

The extension of human rights, working conditions and environmental expectations to the ABF companies' own supply base has proven to be the biggest challenge, given their resource constraints and general lack of expertise and knowledge of the issues. The tools and guidance created by work groups at the Automotive Industry Action Group, and by the United Nations Global Compact, have been useful to our ABF suppliers in their development of sustainable supply chain systems.

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## Supplier Corporate Responsibility Recognition of Achievement Award

For several years, Ford has recognized supplier companies that demonstrate leadership in environmental and social performance with a corporate responsibility award. Suppliers must meet several criteria, including ISO 14001 certification at all manufacturing sites, an operational code of conduct aligned with international standards, an exemplary material management reporting record and demonstration of overall sustainability leadership by incorporating environmental and social considerations into their business.

In May 2014, Ford selected two winners for the 2013 Corporate Responsibility Recognition of Achievement Award: Laird Technologies headquartered in St. Louis, Missouri and Maersk Line headquartered in Copenhagen, Denmark.

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## Industry and Cross-Industry Collaboration

We believe that collaborative action within our industry allows us to more effectively influence all levels of the automotive supply chain. We also work collaboratively with other industries when relevant; for example, we are working proactively with companies from many industries on conflict minerals.

## Collaborating within the Automotive Industry

We primarily work through the Automotive Industry Action Group, or AIAG. The AIAG is a North American, member-based, nonprofit industry group specializing in supply chain issues. AIAG supports industry efforts to establish a seamless, efficient and responsible supply chain. Member companies donate the time of individuals to work at the AIAG, which operates as a noncompetitive, open forum that is intended to develop recommendations and best practices for reducing complexity and ensuring alignment on common issues across the industry. We work on supply chain sustainability issues through the AIAG's Corporate Responsibility Steering Committee. This committee currently focuses on five main issues: global working conditions, conflict minerals, greenhouse gases, chemicals management and reporting, and health care value.

Through AIAG, Ford and other member companies are focusing on five key issues:

- Exploring an industry response to conflict minerals sourcing and transparency challenges;
- Providing common guidance and tools for responsible procurement;
- Continuing to expand a factory-level supplier training program for a responsible supply chain;
- Increasing supplier ownership of corporate responsibility issues through an expansion of engagement opportunities; and
- Developing resources and networks that will ensure the successful communication of responsible procurement expectations throughout the automotive supply chain.

For all work streams, the AIAG and member companies are actively reaching out to others in the automotive supply chain, including global automakers and heavy truck manufacturers, industry associations and major automotive suppliers, as well as participating in cross-sectoral initiatives. Broader participation will be needed to achieve the vision of an industry-wide approach to promoting supply chain sustainability.

Please see the AIAG website for more about the [corporate responsibility accomplishments and ongoing work of the industry through the AIAG](#).

## Cross-Industry Collaboration

In addition to our work through the AIAG, Ford is helping to address common issues of environmental and social responsibility in the automotive supply chain through active participation in several cross-industry associations and corresponding work groups, including:

- **The UN Global Compact Advisory Group on Supply Chain Sustainability.** This advisory group seeks to develop and promote tools and guidance for businesses on key issues and best practices in developing sustainable supply chains. Ford is one of approximately 20 stakeholders in this invitation-only group, and one of only two automotive companies. As part of this work we are one of the lead developers of an online portal of tools and resources designed to assist business practitioners in embedding sustainability in supply chains.
- **CSR Europe Automotive Working Group on Supply Chain Sustainability.** In

## Related links

## External Websites

- AIAG
- UN Global Compact Advisory Group on Supply Chain Sustainability
- CSR Europe
- Conflict-Free Sourcing Initiative
- Public Private Alliance for Responsible Minerals Trade

2011, Ford joined with seven other major automakers and CSR Europe, a leading European business network for corporate social responsibility, to create this working group. The primary goals of the group are to share experiences and information on sustainability issues in the automotive supply chain; develop and apply common tools; work together on common projects in order to improve sustainability in supply chains; and send a common message to supply chains concerning sustainability activities and requirements.

- We participate in several cross-industry organizations on the issue of **conflict minerals** including the Conflict-Free Sourcing Initiative, Multi-Stakeholder Group and the Public-Private Alliance for Responsible Minerals Trade. Our work in these organizations is described in more detail in the [Conflict Minerals](#) section.

## Industry and Cross-Industry Leadership

We approach our supply chain initiatives with complete transparency, sharing best practices, challenges and opportunities with others in our industry. We have also led the development and sharing of best practices on key supplier issues within our industry and other industries. For example, we have sought membership and leadership roles at relevant supply chain working groups and issue organizations. Some of these memberships and leadership positions include:

- Ford staff chair or co-chair six AIAG committees:
- Corporate Responsibility Steering Committee,
- Global Working Conditions Initiative,
- Chemical Management and Reporting Group,
- Greenhouse Gas Emissions,
- Environmental Sustainability Advisory Group,
- Health Care Task Force, and
- Ford also contributes an “executive on loan” to the AIAG to support the industry’s work and share what we have learned from working on these issues within our own operations.
- Member of CSR Europe’s European Automotive Working Group on Supply Chain Sustainability
- Member of Conflict-Free Sourcing Initiative – a cross-industry organization focused on conflict minerals. We are active participants in this organization’s Conflict-Free Smelter Program, which is helping to encourage smelters to participate in the conflict free certification process.
- Member of the Governance Committee of the Public-Private Alliance for Responsible Minerals Trade (PPA), through which we are helping to develop solutions for identifying and tracking conflict free minerals in the Democratic Republic of Congo and surrounding region.



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## Human Rights in the Supply Chain: Ford's Approach

Human rights and working conditions is a prime area of focus for our sustainability work with suppliers. We aim to ensure that everything we make – or others make for us – is produced consistent with local law and our Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility. This can be challenging, as we have less control in suppliers' facilities than in our own, particularly at the sub-tier level (i.e., our suppliers' suppliers), where the risk for substandard working conditions is often heightened. For this reason, we have defined our approach carefully and involve suppliers, other automakers, governments, nongovernmental organizations (NGOs) and other stakeholders.

The legal structures governing human rights and working conditions, and the level of enforcement, vary widely across the countries in which we operate. Respecting human rights and working conditions in the supply chain is ultimately our suppliers' responsibility and we would like governments to play the lead role in enforcing compliance with laws. As customers, however, we have an active role to play in supplier development.

Since we began work with our suppliers to ensure alignment with our Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility, our approach has emphasized building capability throughout the supply chain to manage human rights and working conditions effectively. Our primary focus has been on training and education regarding human rights and working conditions issues and the associated management systems.

We also use third-party assessments of individual supplier factories to verify performance and progress. Our assessments are announced and coordinated with the supplier and Ford business owners. We do not typically conduct unannounced audits, as the intent of our program is to work collaboratively with our suppliers to improve their operations.

Our long-term vision is for our industry as a whole to work together to ensure that high expectations surrounding human rights and working conditions are met throughout the supply chain. We began promoting cross-industry collaboration in North America and have extended these efforts to include global manufacturers. Our view is that all participants in the automotive supply chain – from the original equipment manufacturers (OEMs) such as Ford, to the suppliers themselves, to the government agencies that set and enforce the regulations governing operations – must be involved to make these efforts sustainable in the long run. Such collective action will not only minimize costs and increase efficiency for OEMs and suppliers alike, but will lead to better results than if individual companies take steps in isolation.

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## Building Supplier Capability through Localized Training and Collaboration

The primary focus of our work on human rights and working conditions in our supply chain is building capability among our suppliers to responsibly manage working conditions. We began by developing a training curriculum for Ford suppliers in high-priority countries and surrounding areas. (See [Working Conditions Program Focus Countries](#) box below.) Initially, we based the trainings on Ford's own Code of Basic Working Conditions and implemented them ourselves at our supplier facilities.

We recognized from the outset, however, that a joint effort with other automakers would reach a greater number of suppliers more efficiently – as many of those suppliers are shared across multiple automakers. This collaboration allows OEMs to be more successful in embedding a comprehensive approach to address working conditions throughout the automotive supply chain. In 2005, to formalize the approach, we initiated a work group within the Automotive Industry Action Group (AIAG) and recruited other automakers in North America, Asia and Europe to participate.

We have since worked with other automakers through the AIAG to develop a set of guidance statements that establish a shared industry voice on key working conditions issues and a training program for industry suppliers. Initially the industry guidance statements and trainings covered human rights and working conditions issues such as child labor, forced labor, freedom of association, harassment and discrimination, health and safety, wages and benefits, and working hours. We have since expanded the training topics to include business ethics and environmental responsibility.

AIAG and CSR Europe recently aligned on a common set of guiding principles to enhance sustainability performance in the supply chain. Through the member companies of both AIAG and CSR, 14 automakers (including Ford) have aligned to the common principles. This collaboration provides a common voice on these important issues among multiple OEMs across regions. For more information on these common principles please see: [AIAG Corporate Responsibility Guidance Statements](#) and [CSR Europe Guiding Principles](#).

### Supplier Training Program

Most of our supplier training is now implemented through the AIAG or CSR in conjunction with other automakers. However, we continue to supplement AIAG- and CSR-led trainings done in conjunction with other automakers with Ford-specific workshops as needed.

### Where Trainings Occur

Beginning in 2007, the sponsoring OEMs launched joint factory-level training workshops in China and Mexico. We have added locations since that time. To date, the expanded trainings have been implemented in Argentina, Brazil, China, India, Mexico, Romania, Russia, Thailand, Turkey and Venezuela.

Locations for trainings are chosen through discussion and agreement by the AIAG or CSR member companies. The launch of each series of in-country trainings involves participation by OEM representatives and Tier 1 suppliers as well as local industry associations and government support where possible. At Ford, we develop our recommendations for training locations with a focus on the 21 countries we have identified as having higher risks of substandard human rights and working conditions (see [Human Rights and Working Conditions Program Focus Countries](#) box below). Among those countries, we prioritize our recommendations for training locations based on production and sourcing trends, sales trends and relative perceived risk based on the input of human rights groups, other companies' experience and other geopolitical analysis. We periodically review our list of priority countries in

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#### This Report

- Data: Working Conditions Training and Assessment Status for Supply Chain

#### External Websites

- AIAG
- CSR Europe

comparison with our global sourcing footprint. We are reviewing these countries again in 2014.

### **What Training Sessions Include**

Training sessions are customized to align with the unique laws, customs, cultures and needs of each location. Generally, the following human rights, working conditions and environmental responsibility issues are addressed:

- Harassment and discrimination
- Health and safety
- Wages and benefits
- Working hours
- Child labor
- Forced labor
- Freedom of association
- Key areas of environmental responsibility, including energy and greenhouse gas emissions, waste, regulatory requirements, environmental testing, and employee, subcontractor and supplier training
- Environmental management systems and continuous improvement
- Environmental performance of products

Training workshops emphasize how these topics are covered in local legal standards, in the industry guidance developed by participating automotive OEMs, and in international best practices. Both the industry guidance and international best practices shared in the training sessions may exceed local laws. The trainings also include strategies for developing management systems to ensure compliance in each topic area. The sessions address the business benefits of promoting social and environmental responsibility, including protecting and enhancing brand reputation, improving quality and productivity, and avoiding costs associated with employee turnover, absenteeism, injury and illness.

The training sessions are generally day-long interactive workshops facilitated by qualified trainers and involving multiple automotive suppliers. Training sessions are structured to provide participants with a solid understanding of customer expectations, local law, best practices and sustainability management systems.

Training sessions generally target managers from the human resources, health and safety, and legal departments of participating companies. The sessions use a “train-the-trainer” approach to expand the scope and impact of the training. Participating suppliers are required to cascade the training materials to management and all personnel within their own company as well as to their direct suppliers. Ford requires confirmation that the training information was cascaded to the entire factory population and suppliers within four months of the training session.

In 2010, the automakers collaborating at the AIAG launched an online training program on supply chain working conditions and responsible procurement targeted at purchasing and supply chain management professionals. This Web-based training is offered free of charge to suppliers of the five OEMs participating in the AIAG training program. The training has also been deployed internally at a number of the sponsoring OEMs for their own global purchasing and supply chain staffs.

### **2013 Trainings Completed**

In 2013, we held joint industry trainings through AIAG in Brazil, Mexico, South Africa and Turkey. We also held trainings in Romania in conjunction with CSR Europe. More than 230 Ford suppliers attended these classroom sessions. These trainings included both in-person classroom training sessions and e-learning trainings.

To date, we have conducted approximately 145 training sessions globally, attended by nearly 2,100 supplier companies. (This figure includes dedicated Ford supplier training sessions conducted with the AIAG as well as industry training sessions in which Ford participated along with the AIAG and other automakers.) Because attendees are required to subsequently cascade the training and expectations to the entire factory population and suppliers, these trainings indirectly reach even more companies and individuals. Through this cascading process, the training of suppliers globally since the inception of the program has impacted more than 2,900 supplier representatives, who in turn have cascaded the training information to nearly 25,000 supplier managers and more than 485,000 individual workers as well as over 100,000 sub-tier supplier companies .

Suppliers trained in 2013 have now moved on to the process of self-assessing their facilities for compliance with local law and Ford expectations and communicating expectations to their own workers and their suppliers.

In 2014 we plan to conduct additional supplier training sessions in conjunction with either AIAG or CSR in Brazil, China, India, Mexico, Russia and Turkey. Where possible, these courses will be open to any interested company; thus Tier 1 suppliers will have the option of asking their own suppliers to attend. The intent is, once again, to increase the scope of impact of the training sessions and push human rights and working conditions expectations further down the supply chain.

## Next Steps in Industry Training

As the AIAG initiatives develop and mature, Ford will maintain a leadership position in our work with the supply chain. We will continue to conduct our own training programs in countries not covered by AIAG programs. We will also seek further opportunities to strategically leverage our audit data and training processes to enhance our overall approach to human rights, working conditions and environmental responsibility in the automotive supply chain.

In 2014, we expanded our training program to include non-production suppliers. We are currently piloting training non-production suppliers and assessing if the production training process requires any modifications to meet the needs of non-production suppliers.





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## Assessing Suppliers

Since 2003, we have conducted more than 900 third-party audits of existing and prospective Tier 1 suppliers in 21 countries on issues relating to ethics, human rights and working conditions. The audits provide feedback to Ford and suppliers about how well suppliers are meeting legal requirements and Ford's expectations. The audits also provide insight into the effectiveness of our training programs. The audits consist of a detailed questionnaire, a document review, factory visits, and management and employee interviews, and are conducted by external, qualified social auditors. We have set a goal to expand audits to at least 25 percent of our production suppliers for high-priority countries in each of our major operating regions.

In 2013, we conducted audits focusing on our 21 target countries. The findings from the 2013 audits were generally consistent with those we had previously conducted. We have analyzed the data from our audits and identified the following most prevalent audit issues in all regions:

- Emergency preparedness and response
- Working hours
- Occupational safety

Identification of these issues will allow us to expand and tailor our efforts to address the issues that are most prevalent in our supply base.

The findings from Ford's 2013 supplier audits included:

- No evidence of forced labor or physical disciplinary abuse
- In some cases, a lack of appropriate timekeeping systems, and thus a failure to pay correct overtime wages
- In some cases, a failure to pay the correct local minimum wage or overtime
- Working hours violations related to overtime and, in some instances, lack of a required day off. In some cases, this overtime is a chronic issue resulting from poor capacity planning, but more often it occurs periodically during peak production periods.
- Some health and safety issues including inadequate emergency systems
- Various emergency preparedness issues including inadequate emergency systems and failure to conduct required fire drills
- Some occupational safety issues including inconsistent use of personal protective equipment and inadequate lighting
- A general need to clearly define policy on harassment and discrimination
- A general need to clearly define policies on gift giving and accepting kickbacks, bribes, commissions etc. in some locations
- Limited cases of restricted workers doing hazardous work
- In some cases, limited or restricted access to appropriate documentation regarding subcontracted labor and privacy policies

Freedom of association has been difficult to verify. While all assessed suppliers have either union representatives or a grievance process, there may be issues we have not been able to identify through our assessment process.

Another common finding is that suppliers often lack fully developed management systems – including continual improvement processes – to support compliance over time. This finding has validated our training approach, which continues to emphasize management systems at both the corporate and factory levels.

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- ➔ Data: Working Conditions Training and Assessment Status for Supply Chain

If any issues are identified during an audit, suppliers are required to complete corrective action plans, which Ford reviews and approves. The corrective action plans outline how a supplier will resolve the issues and include clear responsibility and timelines for completion. Assessments cannot be considered "closed" until any violations of local laws and regulations are resolved and until the supplier has responded in writing with an action plan for improving management systems and policies to avoid future issues. We return to the facility within 12 to 24 months as required to confirm resolution of the issues. Suppliers who continue to be out of compliance with Ford expectations and/or local laws are at risk of being removed from Ford's supply base.

The audit tool that Ford uses with Tier 1 suppliers has been an important means for furthering our understanding of both the issues and the root causes for noncompliance. If issues are identified or allegations made of a sub-tier supplier, Ford makes our assessment tool and guidance available to our responsible Tier 1 supplier. In this way, we hope to affect positive change more broadly and enable our suppliers to effectively manage their supply base.

In 2014, we will expand our audits to non-production suppliers. We are initially piloting the audit process with non-production suppliers to understand if we need to modify the process for the unique needs of non-production companies.

We constantly monitor approaches developed by other organizations and industries in order to incorporate what they have learned into our approach. We will continue to work with direct suppliers to help create ownership of human rights and working conditions within those supplier organizations. Clear, consistent communication and further business integration of processes that support responsible working conditions throughout the supply chain will be a key component of our continued work.



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## Sustainable Raw Materials

As automobiles incorporate more advanced technologies, the material content of vehicles becomes more varied. Ford has a long history of seeking to use sustainable materials in our products and source from suppliers that demonstrate sustainable business practices, including respect for human rights and the environment. Although the majority of what we buy is parts and assemblies used directly in vehicles, there is a need to take a closer look at the farthest reaches of the supply chain, including raw material extraction.

The extraction of raw materials can have significant social and economic impacts, both positive and negative. Extractive processes for raw materials can create employment and economic growth, but they also have the potential to disrupt or displace communities and endanger public health. Raw material extraction may result in environmental impacts, such as water scarcity, air and water pollution, and waste generation that must be minimized and mitigated. If the extraction is managed by unscrupulous operators, workers risk exploitation, and other economic, social and environmental risks are multiplied. In addition, the concentration of strategic materials in a limited number of locations can present significant geopolitical risks to companies all along the supply chain.

Most raw materials are not supplied directly to Ford; rather, they are provided to our suppliers or our suppliers' suppliers. On average, raw materials pass through six to 10 suppliers before reaching Ford. This makes tracing the source of raw materials very challenging. We have analyzed several select raw materials to identify sustainability risks and opportunities related to extraction, use and end-of-life treatment.

Overall, our approach to promoting sustainable raw material supply chains includes the following:

- **Advancing transparency in our supply chain** by working to better understand the relative material content of our products. We strive to know, where possible, the original source of the raw materials that reach us through our supply chain, and to know and influence our direct suppliers' responsible sourcing policies and practices.
- **Engaging with policy makers and global stakeholders.** We have been invited by the U.S. State Department, the International Labour Organization, the United Nations Global Compact, the Organisation for Economic Co-Operation and Development and the Interfaith Center for Corporate Responsibility to participate in forums on eradicating forced labor, child labor, trafficking and other issues that can result from abuses in the extractive sector.
- **Collaborating with others in our industry** and related industries through the Automotive Industry Action Group (AIAG), United States Council for Automotive Research (USCAR) and other forums to promote effective industry-wide approaches.
- **Promoting the recycling of materials** by maximizing the economic viability of recycling, where feasible.
- **Seeking flexibility of supply** through the proactive identification of potential supply and material alternatives. In those instances where the continued use of a material or supplier is impossible or misaligned with Ford's stated values, we will explore the potential of a responsible viable alternate source or material.

Public awareness of the potential and actual risks regarding raw material extraction has increased, due to investor interest, campaigns by nongovernmental organizations (NGOs), media coverage and greater access to information. In addition, there have been growing calls for transparency in raw material supply chains, in order to inform investors' evaluations of risk and to help governments and NGOs monitor and address key issues.

Communication is a key aspect of due diligence for responsible sourcing, and we are continuing to fine-tune all aspects of our communication in this area. Historically, we have voluntarily shared some information with stakeholders through direct communications and through this Sustainability Report. We increasingly face mandates for public disclosure statements, such as those required by the California Transparency in Supply Chains Act of 2010 and the Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 1502 (Conflict Minerals). This Sustainability Report will continue to be our primary means of communication with the general public and other stakeholders on supply chain sustainability. We also communicate our positions and requirements directly to our suppliers through our contract terms, written communications on our expectations, and regular supplier meetings. We reinforce our positions and expectations in communications between suppliers and Ford Purchasing and Quality personnel. We also hold training sessions on these issues at AIAG or CSR industry forums.

Certain raw material issues are of particular concern to Ford, and in this section we address three areas in more detail:

- [Conflict minerals](#)
- [Forced labor and human trafficking in supply chains and the California Transparency in Supply Chain Act of 2010 \(SB657\)](#)
- [Rare earth elements](#)



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- ↓ Conflict Minerals Industry and Cross-Industry Leadership Efforts
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## External Websites

- OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas
- Conflict-Free Sourcing Initiative

## Conflict Minerals Background

On August 22, 2012, the U.S. Securities and Exchange Commission (SEC) adopted the final rule to implement reporting and disclosure requirements concerning conflict minerals, as directed by Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010. The congressional mandate was designed to further the humanitarian goal of ending violent conflict in the Democratic Republic of the Congo (DRC) and adjoining countries.

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## Our Journey

Our approach to managing conflict minerals compliance is consistent with our supply chain sustainability approach, and we are working closely with our suppliers to increase supply chain transparency. We are many layers removed from the smelters and refiners in our supply base, therefore, we must survey our direct suppliers and request our suppliers, in turn, to survey their suppliers until the point many layers down in the supply chain where the smelters or refiners of the 3TG (tantalum, tin, tungsten, and gold) are known. Once the smelters or refiner are identified and reported to us, we then work with a cross-industry group called Conflict-Free Sourcing Initiative (CFSI) to determine if the smelters reported by our supply chain have been confirmed to be conflict free. In order to be confirmed as conflict free, the smelters and refiners must pass an independent third-party audit.

Since it is important to develop industry and cross-industry solutions, we work with the Automotive Industry Action Group (AIAG) to develop tools and processes to help educate our suppliers. We also participate in the cross-industry smelter outreach program to encourage smelters to join CFSI. Finally, we are active participants in the Public Private Alliance (PPA) and Multi-Stakeholder Group (MSG) to develop in-region solutions for certified conflict free minerals. While it may take years to get to the level of transparency that we desire, we are committed to the journey.

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## Definitions

- "3TG" means tantalum, tin, tungsten and gold
- "Conflict minerals" means gold as well as Columbite-Tantalite (coltan), cassiterite, wolframite, or their derivatives, which are limited to tantalum, tin and tungsten
- "DRC conflict free" means that a product does not contain conflict minerals necessary to the functionality or production of that product that directly or indirectly finance or benefit armed groups in the Democratic Republic of the Congo or an adjoining country

## Supplier Conflict Minerals Reporting Requirements

Starting in May 2014, and annually thereafter, Ford is required to comply with the SEC's conflict minerals reporting requirements, including filing a specialized disclosure report (Form SD) and conflict mineral report with the SEC that describes our due diligence efforts. All suppliers globally that provide parts contained in Ford vehicles, service parts, or other parts sold by Ford are required to support this effort. Specifically, suppliers are required to complete an annual Conflict-Minerals Reporting Template (CMRT) to identify whether products they manufacture or contract to manufacture for Ford (including, for these purposes, all of our subsidiaries and joint ventures that produce Ford-badged vehicles) contain any conflict minerals necessary to the functionality or production of their products. If any conflict minerals are contained in any product supplied to Ford, the supplier is required to report the names of the smelters or refiners used to process the minerals. We assess the status of the smelters and refiners in our supply chain utilizing the audit information available through CFSI.

When reporting, we encourage our suppliers to use the Organization for Economic Co-operation and Development (OECD) Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas to conduct due diligence on the chain of custody of the conflict minerals provided to Ford.

Reference the OECD website for the current [OECD Due Diligence Guidance](#) document.

## Conflict Minerals Policy

Suppliers are expected to comply with Ford's Conflict Minerals policy.

### Conflict Minerals Policy

To the extent tin, tungsten, tantalum, and gold are contained in our products, it is Ford's goal to use DRC conflict free minerals while continuing to support responsible in-region mineral sourcing from the Democratic Republic of the Congo and adjoining countries. As defined in Rule 13p-1 of the Securities Exchange Act of 1934 (the "Rule"), "DRC conflict free" means that a product does not contain conflict minerals necessary to the functionality or production of that product that directly or indirectly finance or benefit armed groups in the Democratic Republic of the Congo or an adjoining country.

Our suppliers are expected to conduct due diligence to understand the source of the conflict minerals used in Ford products, source responsibly, and not knowingly provide products containing minerals that contribute to conflict as described in the Rule. Suppliers are required to comply with Ford's annual conflict minerals reporting requirements and are encouraged to use validated DRC conflict free smelters and refiners for procurement of tin, tungsten, tantalum, and gold contained in Ford products.

The information provided by our suppliers is used to conduct our due diligence including assessing reports for completeness and consistency. We compare the smelter list provided by our suppliers with the [Conflict-Free Sourcing Initiative \(CFSI\)](#) list of compliant smelters to determine which smelters are DRC conflict free. Information provided by our suppliers is used in the development of our SEC filing documents.



An initiative of the EICC and GeSI

## Our In-Scope Suppliers for 2013

In designing our Reasonable Country of Origin Inquiry ("RCOI"), we have focused on direct suppliers in either of the following two categories ("in-scope suppliers"):

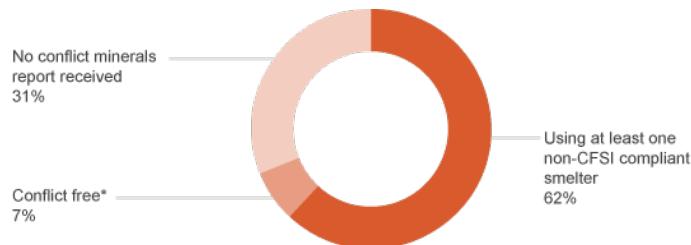
1. Suppliers of components or parts to our assembly plants if such suppliers have reported in the International Material Data System ("IMDS") that their components or parts contain 3TG; or

2. Suppliers that in the aggregate represent the top 80 percent of our expenditures for direct components and parts.

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## Our Metrics for 2013 Calendar Year Reporting

### In-Scope Supplier Response Statistics



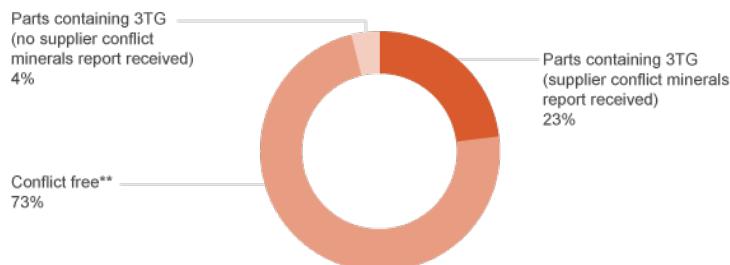
Goal:

**100%**

Supplier Response Rate

\*Conflict free is a combination of suppliers providing parts without 3TG and suppliers providing parts with 3TG sourced responsibly

### Base Part Number Status from In-Scope Suppliers\*



In 2013, less than 1% of parts containing 3TG are from suppliers that exclusively use CFSI-compliant smelters.

\*Part information based on supplier information reported in IMDS

\*\*Conflict free is a combination of parts without 3TG and parts using conflict free 3TG sourced responsibly

### Smelter Details

Ford's supply chain includes 189 identified smelters based on supplier-submitted reports for calendar year 2013 (as of April 9, 2014).

[Ford's 2013 Smelter List](#)

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## Conflict Minerals Industry and Cross-Industry Leadership Efforts

We have led the development and sharing of best practices on key supplier issues within our industry and other industries. For example, we have sought membership and leadership roles at relevant conflict minerals working groups and organizations. Some of these memberships and leadership positions include:

- AIAG – Ford is an active participant in the Automotive Industry Action Group (AIAG), leading efforts to develop processes and tools to educate suppliers and improve reporting consistency.
- CFSI – We are an active member of the Conflict-Free Sourcing Initiative (CFSI), participating in cross-industry smelter outreach efforts to identify true smelters and encourage smelter participation in the audit program.
- MSG – Ford participates in Multi-Stakeholder Group (MSG) efforts to develop actions that can lead to improvement in the Congo and that can contribute to the development of efficient solutions to obtain conflict free materials from the Congo.
- PPA – Ford actively serves on the Governance Committee of the Public Private Alliance (PPA) to contribute to the development of in-region solutions for certified conflict free minerals.
- IMDS – We request our suppliers to expose the use of 3TG fully when reporting product content in the International Material Data System (IMDS). We encourage other companies to adapt an aligned approach to IMDS reporting expectations.

## Conflict Minerals Measurable Goals for the Future

As we continue on our conflict minerals journey, we have set the following measurable goals for the future:

- 100 Percent response rate from in-scope suppliers for annual reporting
- Year-over-year improvement in the percent of suppliers providing smelter lists
- Year-over-year improvement in the percent of suppliers using CFSI compliant conflict free smelters
- Participate in CFSI Smelter Outreach efforts to identify true smelters and encourage smelters to participate in the CFSI audit process



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## Ford's 2013 Smelter List

Ford's supply chain includes 189 identified smelters based on supplier-submitted reports for calendar year 2013 (as of April 9, 2014)<sup>1,2</sup>.

Metal	Smelter Name	Smelter ID
GOLD	Aida Chemical Industries Co. Ltd.	CID000019
GOLD	Allgemeine Gold-und Silberscheideanstalt A.G.	CID000035
GOLD	Almalyk Mining and Metallurgical Complex (AMMC)	CID000041
GOLD	AngloGold Ashanti Córrego do Sítio Minerção	CID000058
GOLD	Argor-Heraeus SA	CID000077
GOLD	Asahi Pretec Corporation	CID000082
GOLD	Asaka Riken Co Ltd	CID000090
GOLD	Atasay Kuyumculuk Sanayi Ve Ticaret A.S.	CID000103
GOLD	Aurubis AG	CID000113
GOLD	Bangko Sentral ng Pilipinas (Central Bank of the Philippines)	CID000128
GOLD	Bauer Walser AG	CID000141
GOLD	Boliden AB	CID000157
GOLD	Caridad	CID000180
GOLD	CCR Refinery – Glencore Canada Corporation	CID000185
GOLD	Cendres & Métaux SA	CID000189
GOLD	Chimet S.p.A.	CID000233
GOLD	China National Gold Group Corporation	CID000242
GOLD	Chugai Mining	CID000264
GOLD	Colt Refining	CID000288
GOLD	Daejin Indus Co. Ltd	CID000328
GOLD	DaeryongENC	CID000333
GOLD	Daye Non-Ferrous Metals Mining Ltd.	CID000343
GOLD	Do Sung Corporation	CID000359
GOLD	Doduco	CID000362
GOLD	Dowa	CID000401
GOLD	FSE Novosibirsk Refinery	CID000493
GOLD	Guangdong Jinding Gold Limited	CID002312
GOLD	Heimerle + Meule GmbH	CID000694
GOLD	Heraeus Ltd. Hong Kong	CID000707
GOLD	Heraeus Precious Metals GmbH & Co. KG	CID000711
GOLD	Hunan Chenzhou Mining Industry Group	CID000767
GOLD	Hwasung CJ Co. Ltd	CID000778
GOLD	Inner Mongolia Qiankun Gold and Silver Refinery Share Company Limited	CID000801
GOLD	Ishifuku Metal Industry Co., Ltd.	CID000807
GOLD	Istanbul Gold Refinery	CID000814
GOLD	Japan Mint	CID000823
GOLD	Jiangxi Copper Company Limited	CID000855

GOLD	Johnson Matthey Inc	CID000920
GOLD	Johnson Matthey Ltd	CID000924
GOLD	JSC Ekaterinburg Non-Ferrous Metal Processing Plant	CID000927
GOLD	JSC Uralectromed	CID000929
GOLD	JX Nippon Mining & Metals Co., Ltd.	CID000937
GOLD	Kazzinc Ltd	CID000957
GOLD	Kennecott Utah Copper LLC	CID000969
GOLD	Kojima Chemicals Co., Ltd	CID000981
GOLD	Korea Metal Co. Ltd	CID000988
GOLD	Kyrgyzaltny JSC	CID001029
GOLD	L'azurde Company For Jewelry	CID001032
GOLD	Lingbao Jinyuan Tonghui Refinery Co. Ltd.	CID001058
GOLD	LS-NIKKO Copper Inc.	CID001078
GOLD	Luoyang Zijin Yinhui Metal Smelt Co Ltd	CID001093
GOLD	Materion	CID001113
GOLD	Matsuda Sangyo Co., Ltd.	CID001119
GOLD	Metalor Technologies (Hong Kong) Ltd	CID001149
GOLD	Metalor Technologies (Singapore) Pte. Ltd.	CID001152
GOLD	Metalor Technologies SA	CID001153
GOLD	Metalor USA Refining Corporation	CID001157
GOLD	Met-Mex Peñoles, S.A.	CID001161
GOLD	Mitsubishi Materials Corporation	CID001188
GOLD	Mitsui Mining and Smelting Co., Ltd.	CID001193
GOLD	Moscow Special Alloys Processing Plant	CID001204
GOLD	Nadir Metal Rafineri San. Ve Tic. A.Ş.	CID001220
GOLD	Navoi Mining and Metallurgical Combinat	CID001236
GOLD	Nihon Material Co. LTD	CID001259
GOLD	Ohio Precious Metals, LLC	CID001322
GOLD	OJSC "The Gulidov Krasnoyarsk Non-Ferrous Metals Plant" (OJSC Krastvetmet)	CID001326
GOLD	OJSC Kolyma Refinery	CID001328
GOLD	PAMP SA	CID001352
GOLD	Prioksky Plant of Non-Ferrous Metals	CID001386
GOLD	PT Aneka Tambang (Persero) Tbk	CID001397
GOLD	PX Précinox SA	CID001498
GOLD	Rand Refinery (Pty) Ltd	CID001512
GOLD	Royal Canadian Mint	CID001534
GOLD	Sabin Metal Corp.	CID001546
GOLD	SAMWON METALS Corp.	CID001562
GOLD	Schone Edelmetaal	CID001573
GOLD	SEMPSA Joyería Platería SA	CID001585
GOLD	Shandong Zhaojin Gold & Silver Refinery Co. Ltd	CID001622
GOLD	So Accurate Group, Inc.	CID001754
GOLD	SOE Shyolkovsky Factory of Secondary Precious Metals	CID001756
GOLD	Solar Applied Materials Technology Corp.	CID001761
GOLD	Sumitomo Metal Mining Co., Ltd.	CID001798
GOLD	Tanaka Kikinzoku Kogyo K.K.	CID001875
GOLD	The Great Wall Gold and Silver Refinery of China	CID001909
GOLD	The Refinery of Shandong Gold Mining Co. Ltd	CID001916
GOLD	Tokuriki Honten Co., Ltd	CID001938
GOLD	Tongling nonferrous Metals Group Co.,Ltd	CID001947
GOLD	Torecom	CID001955

GOLD	Umicore Brasil Ltda	CID001977
GOLD	Umicore SA Business Unit Precious Metals Refining	CID001980
GOLD	United Precious Metal Refining, Inc.	CID001993
GOLD	Valcambi SA	CID002003
GOLD	Western Australian Mint trading as The Perth Mint	CID002030
GOLD	YAMAMOTO PRECIOUS METAL CO., LTD.	CID002100
GOLD	Yokohama Metal Co Ltd	CID002129
GOLD	Yunnan Copper Industry Co Ltd	CID000197
GOLD	Zhongyuan Gold Smelter of Zhongjin Gold Corporation	CID002224
GOLD	Zijin Mining Group Co. Ltd	CID002243
TANTALUM	Changsha South Tantalum Niobium Co., Ltd.	CID000211
TANTALUM	Conghua Tantalum and Niobium Smeltry	CID000291
TANTALUM	Duoluoshan	CID000410
TANTALUM	Exotech Inc.	CID000456
TANTALUM	F&X Electro-Materials Ltd.	CID000460
TANTALUM	Global Advanced Metals	CID000564
TANTALUM	H.C. Starck Group	CID000654
TANTALUM	Hi-Temp	CID000731
TANTALUM	Jiujiang JinXin Nonferrous Metals Co., Ltd.	CID000914
TANTALUM	Jiujiang Tanbre Co., Ltd.	CID000917
TANTALUM	Kemet Blue Powder	CID000963
TANTALUM	King-Tan Tantalum Industry Ltd	CID000973
TANTALUM	Metallurgical Products India (Pvt.) Ltd.	CID001163
TANTALUM	Mineração Taboca S.A.	CID001175
TANTALUM	Mitsui Mining & Smelting	CID001192
TANTALUM	Ningxia Orient Tantalum Industry Co., Ltd.	CID001277
TANTALUM	Plansee	CID001368
TANTALUM	RFH Tantalum Smeltry Co., Ltd	CID001522
TANTALUM	Solikamsk Metal Works	CID001769
TANTALUM	Taki Chemicals	CID001869
TANTALUM	Tantalite Resources	CID001879
TANTALUM	Telex	CID001891
TANTALUM	Ulba	CID001969
TANTALUM	Zhuzhou Cement Carbide	CID002232
TIN	Alpha	CID000292
TIN	China Rare Metal Materials Company	CID000244
TIN	CNMC (Guangxi) PGMA Co. Ltd.	CID000278
TIN	Cooper Santa	CID000295
TIN	CV Serumpun Sebalai	CID000313
TIN	CV United Smelting	CID000315
TIN	EM Vinto	CID000438
TIN	Estanco de Rondônia S.A.	CID000448
TIN	Fenix Metals	CID000468
TIN	Gejiu Non-Ferrous Metal Processing Co. Ltd.	CID000538
TIN	Gejiu Zi-Li	CID000555
TIN	Huichang Jinshunda Tin Co. Ltd	CID000760
TIN	Jiangxi Nanshan	CID000864
TIN	Kai Unita Trade Limited Liability Company	CID000942
TIN	Linwu Xianggui Smelter Co	CID001063
TIN	Liuzhou China Tin	CID001070
TIN	Malaysia Smelting Corporation (MSC)	CID001105

TIN	Metallo Chimique	CID001143
TIN	Mineração Taboca S.A.	CID001173
TIN	Minmetals Ganzhou Tin Co. Ltd.	CID001179
TIN	Minsur	CID001182
TIN	Mitsubishi Materials Corporation	CID001191
TIN	Novosibirsk Integrated Tin Works	CID001305
TIN	O.M. Manufacturing (Thailand) Co., Ltd.	CID001314
TIN	OMSA	CID001337
TIN	PT Artha Cipta Langgeng	CID001399
TIN	PT Babel Inti Perkasa	CID001402
TIN	PT Bangka Putra Karya	CID001412
TIN	PT Bangka Tin Industry	CID001419
TIN	PT Belitung Industri Sejahtera	CID001421
TIN	PT Bukit Timah	CID001428
TIN	PT DS Jaya Abadi	CID001434
TIN	PT Eunindo Usaha Mandiri	CID001438
TIN	PT Karimun Mining	CID001448
TIN	PT Mitra Stania Prima	CID001453
TIN	PT Prima Timah Utama	CID001458
TIN	PT REFINED BANGKA TIN	CID001460
TIN	PT Sariwiguna Binasentosa	CID001463
TIN	PT Stanindo Inti Perkasa	CID001468
TIN	PT Tambang Timah	CID001477
TIN	PT Timah	CID001482
TIN	PT Tinindo Inter Nusa	CID001490
TIN	Rui Da Hung	CID001539
TIN	Soft Metais, Ltda.	CID001758
TIN	Thaisarco	CID001898
TIN	White Solder Metalurgia e Mineração Ltda.	CID002036
TIN	Yunnan Chengfeng Non-ferrous Metals Co.,Ltd.	CID002158
TIN	Yunnan Tin Company, Ltd.	CID002180
TUNGSTEN	A.L.M.T. Corp.	CID000004
TUNGSTEN	Chongyi Zhangyuan Tungsten Co Ltd	CID000258
TUNGSTEN	Dayu Weiliang Tungsten Co., Ltd.	CID000345
TUNGSTEN	Fujian Jinxin Tungsten Co., Ltd.	CID000499
TUNGSTEN	Ganzhou Huaxing Tungsten Products Co., Ltd.	CID000875
TUNGSTEN	Ganzhou Non-ferrous Metals Smelting Co., Ltd.	CID000868
TUNGSTEN	Global Tungsten & Powders Corp.	CID000568
TUNGSTEN	Guangdong Xianglu Tungsten Industry Co., Ltd.	CID000218
TUNGSTEN	HC Starck GmbH	CID000683
TUNGSTEN	Hunan Chenzhou Mining Group Co	CID000766
TUNGSTEN	Hunan Chun-Chang Nonferrous Smelting & Concentrating Co., Ltd.	CID000769
TUNGSTEN	Japan New Metals Co Ltd	CID000825
TUNGSTEN	Kennametal Fallon	CID000966
TUNGSTEN	Kennametal Huntsville	CID000105
TUNGSTEN	Tejing (Vietnam) Tungsten Co., Ltd.	CID001889
TUNGSTEN	Wolfram Bergbau und Hütten AG	CID002044
TUNGSTEN	Wolfram Company CJSC	CID002047
TUNGSTEN	Xiamen Tungsten Co., Ltd	CID002082
TUNGSTEN	Zhuzhou Cemented Carbide Group Co Ltd	CID002236

1. Smelter information based on recognized smelters or refiners with a Conflict-Free Sourcing

Initiative (CFSI) assigned identification number. All CFSI information referenced is current as of April 9, 2014.

2. Specific smelters and refiners providing materials that end up in our products cannot be identified with certainty due to suppliers' company-level reporting. Our metrics reflect CFSI-compliant smelter and refiner information reported to us by our suppliers.



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Voice: Kelly Katynski

## Forced Labor and Human Trafficking in Supply Chains

In the automotive industry, it is difficult to assure that the extraction and original production of raw materials is done responsibly, because these processes occur so far up our supply chain and, therefore, are far outside of Ford's direct control. Nonetheless, we are actively engaging with our industry, stakeholders and direct suppliers to address the risk of human rights abuses, including forced labor and human trafficking, deep in our supply chain.

A range of products and materials sourced from specific geographies have been identified and described by the U.S. Department of Labor as posing potential human rights concerns. Included on this list is charcoal from Brazil, which can be used to make pig iron, a key ingredient in steel production.

We take a proactive approach to addressing human rights concerns associated with these materials. Our response to the discovery that charcoal made with slave labor had entered our supply chain provides an example of how seriously we take this issue. It also exemplifies our approach to addressing the issue.

In 2006, Ford discovered that charcoal produced in Brazil with the use of slave labor had found its way into our supply chain through our purchase of pig iron. When we learned of the situation, we immediately stopped sourcing from the site that was identified in the investigation, but we continued dialogue with the supplier and helped them to develop management systems until such time as the supplier could ensure it was not supporting forced labor in the supply chain for pig iron. We then identified all potential points of entry for pig iron in the Ford value chain and engaged with all relevant suppliers, seeking assurances from them that forced labor was not employed anywhere in their value chain. This included an intensive mapping of five to six tiers of suppliers (including importers, exporters and trading companies) (see pig iron supply chain illustration below). We also requested additional detail regarding our Tier 1 suppliers' systems for safeguarding human rights throughout their operations, including procurement. We continue to remain vigilant on this and other potential opportunities for slave labor or human trafficking to occur in our supply chain.

In addition to working with our suppliers to ensure responsible procurement of this material, we also work with the U.S. State Department, the International Labour Organization and the governing committee of the Brazil's National Pact to Eradicate Slave Labour to seek multilateral solutions that will help to validate information and improve transparency. Ultimately, we hope to enable responsible purchasing decisions throughout the supply chain.

## Pig Iron Producers



## California's Transparency in Supply Chains Law

Beginning in 2012, many companies manufacturing or selling products in the state of California are required to disclose their efforts (if any) to address the issue of forced labor and human trafficking, per the California Transparency in Supply Chains Act of 2010 (SB 657). This law was designed to increase the amount of information made available by companies, thereby allowing consumers to make better, more informed choices regarding the products they buy and the companies they choose to support.

Forced labor and human trafficking can take many forms, including child labor. Our Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility, makes it clear that we will not tolerate forced labor or child labor in our operations and we conduct internal audits of our manufacturing locations to ensure compliance. We have instituted a number of actions to safeguard against human rights abuses, including forced labor in our supply chain. For example:

- **We regularly assess risk related to human trafficking and forced labor associated with our supply base.** Our preliminary assessment is based upon geography, the commodity purchased, the level of manual labor required for part/assembly production, the supplier's ownership structure, supplier quality performance and the nature of the business transaction. This risk assessment is performed by Ford with input from external stakeholders.
- **Our Global Terms and Conditions forbid the use of forced labor, child labor and physically abusive disciplinary practices.** Our definition of forced labor is inclusive of trafficking, and this was made explicit in the 2012 revisions to our Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility. Ford's purchase orders require suppliers to certify compliance with our prohibition of forced labor, child labor and physical disciplinary abuse as part of our Global Terms and Conditions that govern the purchase by Ford of goods and services from suppliers. We reserve the right to terminate our relationship with a supplier if issues of noncompliance with our policies are discovered and/or noncompliance is not addressed in a timely manner.
- **We conduct training and capability building.**
  - We regularly conduct internal training on our Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility with our Global Purchasing staff, including management and supplier quality teams. Additional training is conducted regarding our Supply Chain Sustainability Program, including coverage of the Code and our Global Working Conditions Program, emphasizing the role of our buyers and supplier quality engineers in responsible decision making.
  - Ford requires suppliers in high-risk markets to attend training that increases awareness of Ford's requirements and legal requirements, including those related to forced labor and child labor. The training enables management systems that will ensure compliance over time. We conduct this training at Ford where necessary but increasingly with other automakers in the industry through the Automotive Industry Action Group (AIAG) or CSR Europe.

- Ford and other automakers at the AIAG have funded and created a training for buyers and supply chain managers on supply chain sustainability. This training addresses issues including supply chain risk assessments, policy and supplier contract development and other actions that can be taken to ensure that forced labor and child labor do not enter the automotive supply chain.
- **We regularly conduct audits of at-risk Tier 1 supplier factories to monitor compliance with Ford expectations and legal requirements.** These audits are independent and announced. We choose which facilities to audit based upon our risk assessment as described above. Following audits, suppliers are required to complete corrective action plans, which Ford reviews and approves. The corrective action plans outline how a supplier will resolve issues uncovered in audits and include clear responsibility and timelines for completion. We continue to regularly work with the supplier to resolve the identified issues – and, depending on the severity of the issue identified, we will return to the facility within 12 months to confirm resolution. Our supply chain work has demonstrated to us that the risk for issues such as forced labor and child labor (as well as other human rights and working conditions issues) are relatively low for Tier 1 suppliers. The risk increases, however, the further down the tiers of suppliers toward the source of the raw materials. Ford does not have visibility or direct access to these suppliers for the purpose of verification, and thus we work with our Tier 1 suppliers as well as other industries, non-governmental organizations (NGOs) and governments to explore the options for appropriate validation systems.

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## Rare Earth Elements

"Rare earth elements" (REEs) are a set of 17 chemical elements in the periodic table. Though many of these elements are not actually rare, their geochemical properties make it difficult to find them in concentrated forms that can be extracted for use easily or economically. REEs have been used in conventional internal combustion vehicles for many years in small quantities. However, electrified vehicles – including hybrids, plug-in hybrids and full electric vehicles – use larger quantities of REEs in magnets in their electric motors and in their more complicated battery systems. As electrified vehicle production increases, the importance of the supply and production of certain rare earth metals is growing in importance to automotive companies.

REEs pose both economic and sustainability challenges. The growing demand for REEs has called into question future supply and material costs. They are also a concern due to the geographic concentration of supply and environmentally unsustainable mining practices.

## Ford's Approach to Rare Earth Elements

Ford has taken a proactive approach to understanding and minimizing the issues associated with REEs in our vehicles. We began by assessing the amount of REEs in our vehicles and where they occur. This is, in fact, a very challenging task because REEs are used in small quantities, in a large number of components, and by suppliers far upstream in the supply chain. We estimate that approximately 0.44 kg of REEs are used in a typical conventional sedan, with approximately 80 percent of the rare earth content in magnets. Conventional vehicles primarily use neodymium, which is used in batteries and magnets, and cerium, which is used mainly in catalytic converters. Relatively larger amounts of REEs – primarily neodymium and dysprosium – are used in full hybrid electric vehicles (HEVs). A typical HEV sedan with a nickel-metal-hydride battery uses approximately 4.5 kg of rare earth metals. HEVs with lithium-ion batteries contain approximately 1 kg of REEs. We have assessed the likely use of REEs in a variety of cleaner energy and vehicle future scenarios that meet the goal of climate stabilization, based on maintaining atmospheric CO<sub>2</sub> at 450 ppm. Use of REEs will increase significantly as more electrified vehicles and wind energy are used as these technologies require much higher amounts of neodymium (Nd) and dysprosium (Dy). Specifically, our studies suggest that, in the absence of efficient reuse and recycling, or the development of technologies which use lower amounts of Dy and Nd, there could be an increase of more than 700 percent and 2,600 percent for Nd and Dy, respectively. We are still evaluating the REE content in plug-in hybrid electric and full battery electric vehicles.

Our primary focus in addressing REEs thus far has been to reduce the need for them in our electrified vehicle battery systems. Our third-generation hybrid system significantly reduces the use of REEs compared to nickel-metal hydride batteries and other lithium-ion battery systems. We have reduced the use of dysprosium by approximately 50 percent in the electric machine permanent motor magnets used in our hybrid system. This new technology reduces the cost of our hybrid systems by 30 percent, largely by reducing the use of dysprosium, which is the most expensive REE used in electric motor magnets. The new system is also 50 percent lighter and 25 to 30 percent smaller than previous-generation hybrid batteries, contributing to better fuel efficiency. We expect this new hybrid battery technology will save up to 500,000 pounds of rare earth metals annually.

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## Supply Chain Environmental Management

Ford has worked with our suppliers for decades to improve the environmental sustainability of their products and processes – and to gain their support in improving our own sustainability performance. We were the first automaker to require our suppliers to certify their environmental management systems to the globally recognized standard ISO 14001.

Today, we remain committed to providing suppliers with a range of support and assistance based on our expertise and experiences. We regularly engage with our suppliers on sustainability issues, and we have developed initiatives to improve our understanding of environmental impacts and practices in several areas, including greenhouse gas emissions, materials management and logistics.

For example, we are working to better understand the carbon footprint of our supply chain by surveying our suppliers on their greenhouse gas emissions. We have expanded the number of suppliers we include in this survey each year; we surveyed 145 suppliers in 2013 and plan to expand this to significantly more suppliers in 2014.

In 2014, we are also beginning to assess our suppliers' water footprint. We are surveying a subset of our Tier 1 suppliers through the CDP Water program. We are prioritizing which suppliers we include in both our CDP greenhouse gas and water surveys based on a variety of criteria including suppliers with higher GHG or water intensity, strategic suppliers and supplier location. We ultimately plan to include all of our ABF suppliers as well as other Tier 1 suppliers who represent a significant portion of our annual purchases and suppliers who have been identified as having high water use and/or operate in highly water stressed regions. For more information about our corporate water strategy, please see the [Water](#) section.

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## Supplier Environmental Management

At Ford, our aim is to integrate sustainability throughout our supply chain. We require third-party ISO 14001 certification for all production suppliers with manufacturing facilities. In addition, ISO 14001 certification is expected of non-production supplier facilities if the supplier has a manufacturing site or a non-manufacturing site with significant environmental impacts that ships products to Ford. We also encourage our suppliers to require their own suppliers to implement environmental management systems.

Our supplier contracts specify environmental requirements covering a range of issues, such as reducing or eliminating materials of concern, using Design for Sustainability principles, increasing the use of sustainable materials and using materials that will improve vehicle interior air quality. We ask suppliers to use recycled materials whenever technically and economically feasible. (For more on our use of recycled materials, see the [Sustainable Materials](#) section.) We look for opportunities across our organization to purchase environmentally superior goods and services. For example, we now require that our new personal computer purchases be certified as meeting comprehensive environmental criteria.

## Supplier Engagement on Environmental Sustainability

As we do for other important issues such as human rights, we take a three-pronged approach to engaging with suppliers on environmental sustainability issues. We work with individual supplier factories; with key suppliers' corporate management; and in cooperation with other automakers to influence practices across the automotive supply chain.

## Supplier Factories

As mentioned above, each Tier 1 manufacturing site providing parts to Ford is required to have ISO 14001 certification. Since 2012, our supplier training programs have included content on our expectations for environmental management (in addition to covering human rights and working conditions issues). We believe this will help build supplier capability to manage these issues effectively. This content expansion aligns our training activity with our updated Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility and other supplier expectations and guidelines.

## Engagement with Suppliers' Corporate Management

As part of our Aligned Business Framework (ABF), ABF suppliers commit to managing and ensuring responsible environmental management in their facilities and in their supply chain. We regularly address current and emerging environmental issues and solutions with ABF suppliers at periodic meetings and in regular communications. Please see [Going Further with Our ABF Suppliers](#) for information on this topic.

## Industry Collaboration

We work in industry forums to encourage common approaches to the supply chain challenges of our industry. For example, we have been integrating environmental sustainability and greenhouse gas management issues into our work with the Automotive Industry Action Group (AIAG), and a Ford representative co-chairs the AIAG Greenhouse Gas (GHG) work group. Through the AIAG, we helped to establish common industry guidance and a reporting format for GHG emissions which will be used by global automakers and Tier 1 suppliers. Our initial 2010 survey and results heavily influenced the AIAG guidance and reporting format, as Ford was the only automaker exploring Scope 3 GHG emissions and related risks and opportunities at that time. Ford continues to be a leader within the automotive

industry in supplier engagement on GHG emissions management and reporting. For more information on our supplier greenhouse gas program, please see [Supplier Greenhouse Gas Emissions](#).

In 2013, we also helped to form and now co-chair the AIAG's new Environmental Sustainability Advisory Group. The new group will monitor key environmental issues in the industry and help to develop common metrics, standards and benchmarks, in an effort to improve both the effectiveness and the efficiency of member companies' and industry groups' sustainability efforts. The new group will educate suppliers and manufacturers in the industry about key environmental issues and serve as an industry "think tank" on environmental sustainability.

Since 2007 we have been a member of the Suppliers Partnership for the Environment, an innovative partnership between automobile original equipment manufacturers, their suppliers and the U.S. Environmental Protection Agency. This partnership works to create new and innovative business-centered approaches to environmental protection and provides a forum for small, midsize and large automotive and vehicle suppliers to work together, learn from each other and share environmental best practices.

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## Supplier Greenhouse Gas Emissions

We continue to work to better understand the carbon footprint of our supply chain, as well as the risks and opportunities of greenhouse gas (GHG) regulation and climate change for our suppliers and, by extension, for our company. For our own products and operations, we have a comprehensive commitment and strategy to reduce GHG emissions, as detailed in the Climate Change section of this report, which enhances our competitiveness. We hope to help promote similar competitiveness throughout the automotive supply chain. The findings of our GHG emission surveys of suppliers, described below, suggest that many of our suppliers are already setting their own emissions-reduction goals or are considering it. We will continue to work with and encourage our suppliers to set their own energy-efficiency goals or GHG-reduction targets and to track our suppliers' GHG emissions management progress over time.

## Ford's Supply Chain GHG Emissions Survey

In 2010, Ford launched a pilot project to better understand our suppliers' GHG emissions using the Carbon Disclosure Project (CDP) Supply Chain Program questionnaire. The CDP's questionnaire gathers qualitative and quantitative information about the suppliers' management of climate risks and emissions. From the success of this pilot, we have been using and expanding the CDP survey ever since. Our goal is to better understand the carbon footprint of our supply chain and to use the data to create a broad-based carbon management approach for our supply chain.

In 2013, we surveyed 145 suppliers to understand their greenhouse gas emissions, compared to 135 in 2012, 128 in 2011 and 35 in 2010. The 145 suppliers surveyed accounted for more than 50 percent of our 2012 annual purchases of \$90 billion. We also included select non-production suppliers, such as logistics and information technology suppliers in this survey. In 2014, we plan to expand this survey to include an even larger number of key production and non-production suppliers, and we will survey suppliers about both GHG emissions and water.

When determining which suppliers to survey in our greenhouse gas survey we used a variety of criteria, including:

- The GHG intensity of the suppliers' activities or commodities supplied,
- The strategic nature of the business relationship with Ford, and
- The geographic footprint of the supplier's global operations.

From the supplier data we have collected since 2011, Ford was found to be a leader in all three major report categories: managing relationships with suppliers, developing and implementing a sustainable supply chain strategy, and managing risks and opportunities.

We achieved an overall response rate of 89 percent in 2013, again exceeding our internal objectives for this round of voluntary surveys. This response rate also significantly exceeds the average supplier response rate for all companies participating in the CDP's Supply Chain Program, which was 44 percent in 2011, 39 percent in 2012, and 51 percent in 2013. We believe that our high response rate was achieved through the active support and training Ford provided to suppliers throughout the process – support that included webinars, guidance documents and one-on-one technical assistance.

The findings from this year's survey are summarized in the box below. Overall, we continued to find that, for the most part, our suppliers are engaged in the issue of climate change and are working to reduce their GHG emissions. However, there was still wide variability in suppliers' readiness to measure, report on and actively manage

## Related links

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GHG emissions.

## Scope 3 Greenhouse Gas Accounting and Reporting

Scope 3 greenhouse gas emissions include all of the upstream and downstream emissions generated by a company's supply chain, from raw material extraction to end-of-life disposal or recycling. Assessing these emissions is extremely challenging, as it includes emissions generated by processes and entities far from Ford's own operations and direct suppliers. The World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD) finalized a new Scope 3 (Corporate Value Chain) GHG Emissions Standard in 2011 to help companies with this difficult task. The standard provides a step-by-step methodology for companies to quantify and report their Scope 3 GHG emissions in 15 different categories of emission-generating activities across their entire value chain, upstream and downstream of their own operations. It is intended to be used in conjunction with the GHG Protocol Corporate Accounting and Reporting Standard, which provides companies with a methodology for reporting emissions from their own operations.

Ford road-tested the new Scope 3 protocol in 2010 as part of the WRI/WBCSD's development process. The direct supplier emissions we assess in our current supplier GHG surveys are only one element of the WRI/WBCSD Scope 3 standard. However, we are using elements of the WRI/WBCSD Scope 3 standard to assess our full supply chain emissions, to help us develop a comprehensive approach to supply chain emissions management, and to help our suppliers develop GHG management plans. We are currently working to integrate our supplier GHG survey results into a broader analysis of complete Scope 3 GHG emissions.

### Some Key Findings from Our 2013 Supplier GHG Survey

Of the suppliers responding...

A large majority of suppliers have active greenhouse gas emissions-reduction programs.

More than

**71 percent**

(up from 65 percent the previous year) have set greenhouse gas emissions-reduction targets, and more than 85 percent have active emissions-reduction initiatives. In general, more Ford suppliers have continued to respond that they have set intensity-based targets rather than absolute targets.

Nearly

**50 percent**

of suppliers reported making investments in emissions reduction initiatives.

More than

**50 percent**

reported achieving cost savings related to reducing emissions.

A large majority of suppliers track and report on their greenhouse gas emissions

More than

**80 percent**

track and report on their greenhouse gas emissions.

Suppliers are working to provide their customers (e.g., Ford) with ways to reduce their overall supply chain GHG emissions.

More than

**40 percent**

of suppliers have a strategy for engaging their own supply chain on GHG emissions issues.

Nearly  
**60 percent**

are reporting Scope 3 emissions; However, there is still variability in the completeness of the 15 Scope 3 emissions categories they report.

In 2014, we will further expand our supplier environmental assessments. We will increase the number of suppliers we ask to respond to the CDP Supply Chain greenhouse gas survey. We will also ask these supplies to complete the CDP Supply Chain water questionnaire as part of our efforts to better understand water risks and implications to our supply chain. We are selecting the expanded group of suppliers to complete these surveys based on a range of criteria including higher greenhouse gas and/or water impacts of the products and materials they supply, their strategic importance to Ford, and the geographic footprint of their operations. We will work closely with these suppliers to ensure improvements in data quality that will result in a more robust baseline of emissions data. We will also continue reviewing survey results and prioritizing opportunities to partner with select suppliers on energy-efficiency training and management programs when possible.

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## Materials Management

We are working with our suppliers to increase their use of sustainable materials and eliminate undesirable materials. While Ford has already made great strides in using more sustainable materials in our products (as discussed in the Sustainable Materials section), we can expand these efforts by systematically working with our suppliers on these issues. Toward that end, we are developing Commodity Business Plans and other materials purchasing strategies that require the use of sustainable materials. For example, we developed a purchasing strategy for recycled plastic resins and Commodity Business Plans for relevant parts that require the use of post-consumer recycled plastics.

More and more countries are adopting regulations governing the use of materials, chemicals and substances of concern. In 2007, for example, the European Union adopted REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals). The goal of the REACH legislation is to improve the protection of human health and the environment through better and earlier identification of the intrinsic properties of chemical substances. All manufacturers operating in Europe must provide information on the properties and safe handling of their chemical substances to a central database in Helsinki, Finland. In addition, the legislation calls for the progressive substitution of the most dangerous chemicals, once suitable alternatives have been identified. REACH provisions will be phased in over 11 years.

Turkey and Romania adopted their own versions of REACH in 2009; China adopted its own version in October 2010. In 2011, Japan also adopted REACH-like regulations to manage their chemicals. South Korea will adopt REACH regulations in 2013 and will begin implementation of K-REACH in 2015. In the U.S., the Senate and House both proposed bills in 2010 to overhaul the Toxic Substances Control Act, which was first enacted in 1976. The state of California finalized the Safer Consumer Products (green chemistry) law in 2013, and announced its initial list of priority product in March 2014. This law will require manufacturers of selected products sold in California to identify safer alternatives to a potential range of 1,200 chemicals known to be harmful to public health and the environment. The California law will also phase in a requirement that manufacturers whose products are on the priority products list for containing identified chemicals of concern must conduct an alternative assessment and replace the chemicals of concern with safer alternatives. Or, they must explain to state regulators why the chemicals of concern are needed and warn consumers, or undertake steps to mitigate the public's exposure to those substances. The initial priority product list did not contain any auto or auto component related parts, however Ford's Global Materials Management Program is continuing to monitor this regulation and any future priority product additions to ensure an effective and efficient way for Ford to be a leader among auto companies in managing materials and meeting these types of global chemical and environmental regulations.

Governments are also developing and implementing regulations governing the use of conflict minerals. In August 2012, for example, the U.S. Security and Exchange Commission (SEC) issued a final ruling for conflict minerals regulations. The increasing focus on conflict minerals and other critical raw materials issues has injected an additional concern into materials management: Not only is it important to consider the properties of the materials we use, but also their origin and the conditions under which they were extracted and processed. Ford is working with other affected companies and industries to develop processes for collecting conflict minerals use and source information. Ford's existing materials management tools have also been instrumental to our ability to collect and analyze information about conflict minerals in our own products and supply chain. (See the [Sustainable Raw Materials](#) section for more detail on Ford's approach to conflict minerals.)

### Materials Management Processes and Tools

Even before REACH-type regulations were adopted, Ford was managing materials

**Related links****This Report**

→ [Sustainable Materials](#)

**External Websites**

→ [REACH](#)

across the vehicle lifecycle as part of our Global Materials Management Program. For many years, Ford has had a Restricted Substance Management Standard (RSMS), which was developed to reduce and eliminate the use of substances of concern in our vehicles and plants. The first of its kind in the industry, this standard was originally developed to address both regulated substances and materials Ford voluntarily chose to eliminate from our vehicles and plants. The RSMS process is embedded in Ford's Global Product Development System, our company-wide vehicle design and production system.

We use a set of processes and tools to assist us in communicating materials- and substance-related requirements to suppliers, and in tracking the materials and substances that they use in the parts they manufacture. These tools include the Global Material Approval Process (GMAP), which handles all materials processed in Ford's plants; Global Material Integration and Reporting (GMIR), a materials tracking tool for our engineers and suppliers; and the International Material Data System (IMDS), a reporting system used by multiple automakers and all tiers of suppliers.

The IMDS was developed by seven auto manufacturers (including Ford) in 1997 to handle the tracking, review and reporting of all vehicle components and service parts from all suppliers. Thirty-nine companies globally are now official members. The IMDS is a Web-based system used internationally by suppliers to report on the substances and materials contained in parts for our vehicles. Ford has cooperated with other automakers to align reporting requirements for restricted substances and to analyze the data provided. This helps us to identify substances and materials of concern and target them for elimination. Ford is also leveraging the IMDS to identify risks associated with conflict minerals and other critical raw materials.

Ford vehicle programs use the IMDS to report 100 percent of materials and all the required substance data to fulfill or comply with all governmental regulations and requirements, including end-of-life vehicle directives in the China, the EU, Japan, South Korea and Taiwan; REACH in the EU and other countries; and recent Conflict Mineral and other critical raw material reporting initiatives. The IMDS will also provide essential data and information needed to meet the incoming California Safer Consumer Products (green chemistry) Regulations.

To further help our suppliers manage their materials and substance data Ford developed and launched the GMIR. Through the GMIR Supplier Portal, Ford lists all the parts that require reporting by suppliers; we also list suppliers' reporting and certification status. Thus the system allows every supplier to monitor its reporting status and understand which parts are required to be reported. This two-way communication helps clarify a very complex materials management task and saves time and money for Ford and our suppliers.

For non-dimensional materials (such as paint and adhesive) that are shipped directly to Ford plants, Ford uses GMAP – an electronic tool aimed at simplifying the global materials approval process. The GMAP process allows suppliers to use electronic transactions to submit their Material Safety Data Sheets and composition data. Internally, Ford approvers communicate their decisions of approval or rejection electronically. This new process saves time and ensures better-quality data for complying with government regulations and Ford policies.

In response to the REACH legislation, Ford has developed additional systems to track and manage the use of chemicals. And, Ford has taken a leadership position in implementing REACH. For example, Ford has been a key member of the Global REACH Automotive Task Force and was the first chair of this task force. Ford is also the chair of the AIAG's REACH Advisory Committee and USCAR Substance of Concern committee. Ford has also been working to create an industry-wide and global working group for automakers to work on eliminating undesirable chemicals.

Ford has made great progress in complying with REACH. For example, we created a REACH manager position and formed a REACH task force to manage relevant activities, including conducting REACH inventory studies and generating all required reports for customers and consumers. In addition, we have worked extensively with our suppliers to ensure their compliance with REACH thus far. Ford's existing Global Materials Management Program has made it much easier for Ford and our suppliers to comply with these new requirements. Using these systems, for example, Ford conducted the "substances of very high concern" inventory studies required by REACH and generated all required reports for consumers and governmental agencies. In addition, we have added all of the "substances of very high concern" to our own Restricted Substances Management Standard; this ensures that we will get the necessary reporting from our suppliers and ensures Ford will comply with REACH and similar regulations.

We have used our Global Materials Management (GMM) tools and processes to meet the new requirements like California's Safer Consumer Products (Green Chemistry) law. The "chemicals of concern" list recently published as part of this law was incorporated in our GMM tools for reporting and analysis. We will use the materials and substances data collected in our GMM databases for the Alternative

Assessments required by the new California regulations.

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## Logistics Operations

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Ford's physical logistics operations provide the safe and efficient transport of parts from our suppliers to our manufacturing plants (our "inbound" freight) and of finished vehicles from the end of our assembly lines to our dealerships (our "outbound" freight). Although logistics accounts for a relatively small percentage of our vehicles' total lifecycle emissions, we are working hard to maximize the efficiency of these operations to reduce their environmental impact. This work is managed by Ford's Material Planning and Logistics (MP&L) organization, which is the department responsible for designing and operating our global transportation networks and for engineering high-quality and efficient packaging to protect parts in transit.

## Green Logistics

In our MP&L organization, green logistics is the centerpiece of our environmental programs. We focus our green logistics efforts on three main areas:

1. quantifying our freight greenhouse gas (GHG) emissions,
2. reducing those greenhouse gas emissions and
3. improving the sustainability of our packaging materials.

Since freight emissions and fuel usage are so closely tied, our focus on emissions reduction also encourages actions that help us achieve other environmental goals as well, such as improving air quality and reducing traffic flows.

Ford MP&L has an international global approach to coordinating our green logistics activities. We have subject-matter experts in each of our four operating regions (Europe, North America, Asia Pacific Africa, and South America), and we have a central green logistics intranet site to assist in standardizing our procedures and communicating best practices.

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## Freight GHG Emissions Reporting

Understanding and quantifying our freight carbon dioxide (CO<sub>2</sub>) emissions is important for a number of reasons, including:

- Helping us to understand our overall environmental impacts,
- Enabling us to prioritize actions to reduce emissions,
- Allowing us to calculate the full carbon footprint of our supply chains,
- Providing data for the overall lifecycle carbon footprint of our vehicles, and
- Providing data to respond to customer inquiries.

We began to develop CO<sub>2</sub> reporting metrics in 2006 for our European inbound road and rail freight operations in conjunction with our European lead logistics provider, DHL. After carrying out a study with Cologne University masters students to identify

the best approach, we expanded our reporting to include transportation networks in North America, South Africa, India and Australia. We have also expanded our reporting to include additional modes of transportation such as ocean freight, using methods developed by our transatlantic lead logistics provider, UTi.

In 2012, we began collecting freight emission data in China from our joint venture, Changan Ford, and its trucking providers. Early results from this effort, which includes both inbound and outbound logistics, suggest emissions are being reduced per vehicle shipped. Data from all regions is collated in our global performance scorecard, which is regularly reviewed by senior management. We continually update our reporting methods to follow evolving international best practices. For example, we now account for emissions of other greenhouse gases such as nitrous oxide (N<sub>2</sub>O) and methane, in addition to CO<sub>2</sub>, in our overall GHG emissions estimates. We also continually update our data sources. For example, we are now using newly published CO<sub>2</sub> data from the Clean Carrier Working Group to improve the accuracy of our ocean freight emission calculations.

Tracking transport emissions allows us to study the impacts of different sourcing patterns. Our MP&L function is working closely with Purchasing on value stream mapping projects to help us compare the transportation and manufacturing footprints in different source locations.

Ford is taking an active role in the development of new reporting processes for automotive freight emissions. In 2011, we were a road-tester of the World Resource Institute and the World Business Council for Sustainable Development's new Greenhouse Gas Protocol Scope 3 reporting standards, which cover freight CO<sub>2</sub> reporting. We have since worked with the Automotive Industry Action Group (AIAG) in North America to encourage others in the industry to adopt these standards and help to provide relevant training. In Europe, we were part of the U.K. Department for Transport's Low Carbon Transport Supply Chain Steering Group, which published Guidance on Measuring and Reporting Greenhouse Gas Emissions. We also led a project to produce new reporting guidelines for Odette International, the European automotive supply chain standards organization. In Asia, we participated in the inaugural Green Freight China seminar in Beijing, run jointly by Clean Air Asia and the Chinese government.

We believe it is important for our logistics providers to have policies on CO<sub>2</sub> issues. Since 2011, we have involved our major North American and European logistics service providers in our annual Carbon Disclosure Project Supply Chain Survey as part of our effort to encourage them to have strategies to improve the sustainability of their operations. We are working closely to support our French carriers in fulfilling their obligations following the introduction of mandatory freight transport emissions reporting in France in October 2013.

For more information on our supply chain greenhouse gas initiatives, please see [Supplier Greenhouse Gas Emissions](#).

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## Freight Emissions Reduction

Freight emissions are influenced by a wide range of factors including the mode of freight (road, rail, sea, etc.), to the efficiency of the vehicles, barges, and other equipment that is used to move parts and products, the design of the freight network and the packaging we use. The graphic below highlights the complexity of freight systems and factors influencing freight-related emissions.

### Influences on Freight CO<sub>2</sub> Emissions

#### Freight Mode

- Road
- Rail
- Barge / Short Sea
- Ocean

#### Network Design

- Network Planning
- Location of Hubs
- Utilization

#### Packaging

- Materials
- Pack Density
- Empties Management

#### Equipment

- Engine Design
- Fuel Type
- Trailer Design<sup>1</sup>
- Operating Practices
- Driving Skills

#### Facilities

- Building Design
- Energy Sources
- Energy Conservation
- Operating Practices

#### Miscellaneous

- Launch Support
- Contingency Actions
- Emergency Air Freight

Our most effective leverage point in this system is in terms of reducing emissions is improving the design and operation of our transportation to increase the use of greener modes of transport (such as rail and water), to reduce miles traveled, and to increase vehicle utilization.

In general, we contract and manage our own freight networks rather than have freight contracted by our suppliers. This gives us better control and allows us to optimize collections and deliveries across all pick-up points and destinations, minimizing the total amount of transport required.

Our freight emissions-reduction efforts generally focus on reducing the number of vehicle miles traveled to deliver our inbound parts and outbound vehicles, as well as improving route efficiencies and switching to lower-emission transport methods. Some of the specific strategies we use to reduce freight emissions include:

- Using regional distribution centers to coordinate deliveries and reduce the number of vehicles collecting materials from suppliers that are destined for multiple factories;
- Using “milk run” routes, where groups of collection points can be visited by a single truck, to minimize the number and length of journeys required;
- Developing contracts with our freight providers that encourage them to carry third-party freight on return journeys rather than returning home empty, which not only gives us a cost benefit but reduces overall traffic on the roads;
- Maximizing the use of lower-emission transport modes such as rail, river and short sea transport, instead of road transport. It has been estimated that switching from road to rail can reduce CO<sub>2</sub> emissions by 40 percent and it reduces road congestion;
- Using “SWAP bodies” – standard freight rail containers that can be lifted onto dedicated road trailers to expand our ability to use rail freight where possible on a given journey and road transport as needed;
- Improving packaging to allow us to carry more cargo in fewer trips; and
- Improving load density, or the number of finished vehicles carried per conveyance, which lowers the number of conveyances employed and reduces the amount of fuel consumed. Improving the fuel efficiency of our transportation fleet by using the latest engine technologies, improving vehicle aerodynamics, and training drivers on more fuel-efficient driving practices

The following projects undertaken by our global MP&L teams help to illustrate the range of activities involved in reducing our freight emissions:

- At our Rawsonville plant, the Ford-owned transport fleet is accredited to the EPA SmartWay program for using the best practices in tractor technologies and driver training.
- At the Kentucky Truck Plant we made routing improvements for distribution of vehicles to the west coast resulting in an annual reduction of 2.5 million rail miles.
- We improved the load ratio of F-150 trucks that are loaded on railcars from the Dearborn Truck, Melvindale, New Boston and Kansas City Assembly plants, reducing our railcar requirement by more than 100 railcars and 85,000 rail miles annually.
- At the Cuautitlan Assemble Plant in Mexico we implemented short sea moves as part of the multi-modal distribution network, eliminating the need to transport 20,000 vehicles annually by rail from Cuautitlan to U.S. East Coast.
- In our Asia Pacific region, we are implementing projects in 2014 to increase the use of rail freight in lieu of road, which will save a significant number of truck movements each year.

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## Packaging

Ford MP&L's Packaging Engineering department focuses on designing, procuring and optimizing packaging on a part-by-part basis to best suit the components being moved and the transport required.

Packaging has environmental impacts throughout its lifecycle, including materials usage, transportation and waste disposal. Over years of testing, tracking and performance improvement, we have confirmed that the best strategy to eliminate material waste and optimize freight efficiency is to use durable and returnable packaging for all but the longest supply chains.

We have developed a standard range of packaging that not only protects parts and

makes them easy to handle at the assembly line, but also allows maximum storage density during transportation, thereby minimizing transport requirements. We review the packaging of production trial parts to assess opportunities to increase packing density prior to the full-volume launch of a product.

One of the benefits of standardizing packaging is that it makes packaging interchangeable between suppliers and programs. In Europe, we have contracts with third-party specialist packaging providers to control the issue, collection and pooling of standard packaging for our suppliers. This pooling greatly reduces transport requirements, as the packaging can be shipped to where it is next required rather than always having to return it to the supplier who last used it.

Currently, our European operations use 90 percent reusable containers, and we are seeking to increase that amount. For example, we are working to develop more direct routing for parts to our St. Petersburg, Russia, plant so that it is viable to use returnable packaging. We are also introducing returnable steel racks for many of our new transatlantic shipments that previously would have been shipped in disposable material.

We are working closely with packaging suppliers to take advantage of new developments. In Spain, for example, we are introducing dedicated designs that include foldable internal packaging that avoids the need for disposable material. It is also lighter and easier to handle than conventional standardized returnable packaging.

The European powertrain packaging team is introducing a novel approach to packaging returns. The empty packaging is broken down into small chips that are then returned in sacks to be remade into new packaging close to the original supplier location. This dramatically reduces the volume of the return shipments, and thereby the transportation costs and emissions.

An example from our Asia Pacific region is their implementation of returnable packaging for hazardous material shipments, such as of air bags from Europe to China. Previously this part had been handled by air shipment, but now it can be shipped by sea, giving considerable savings in emissions.

We are now working globally to share best practices between regions and drive consistency in packaging for future global vehicle programs. Ford's latest packaging guidelines require that supplier-provided packaging supports corporate sustainability goals by seeking a neutral or positive environmental footprint through zero waste to landfill and use of 100 percent recycled, renewable or recyclable materials.

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## The Evolution of Green Logistics

Going forward, our strategy is to continually expand and consolidate our CO<sub>2</sub> reporting and reduction initiatives. Within Ford MP&L, environmental considerations form a key part of our business plan, with metrics in place and with objectives to introduce more rail and short sea routes instead of road freight. We are actively establishing dialogues with our major carriers and service providers to share ideas and methods, with the aim of pushing our green logistics to new levels of collaborative best practice.

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- 
1. Including aerodynamics, tyres, oils etc.



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Voice: Kelly Katynski

## Supplier Diversity Development

Ford remains strongly committed to working with and developing supplier companies that are owned by minorities, women and veterans. Our Supplier Diversity Development office works with business leaders, trade associations and community-based organizations that represent the interests of diverse businesses.

Our annual goal is to source at least 10 percent of U.S. purchases from minority-, women-, and veteran-owned businesses. In 2013, Ford purchased \$6.5 billion in goods and services from approximately 250 minority-owned suppliers and \$1.8 billion in goods and services from more than 150 women-owned businesses and \$600 million from veteran-owned companies. Our 2013 results demonstrated the fourth consecutive year of improvement and exceeded our sourcing goals for both minority- and women-owned suppliers.

Ford launched its Supplier Diversity Development program in 1978 with the goals of supporting minority businesses, creating business opportunities for diverse suppliers to grow into profitable enterprises and further strengthening the Ford supplier network to reflect the company's work force and customer base. In the early 1990s, women suppliers were added and in 2013, veterans were included in our Supplier Diversity Development program. Since 1978, we have sourced more than \$74 billion to minority-, women-, and veteran-owned businesses.

Ford's diverse suppliers are playing an important role in the company's revitalized and expanding portfolio of high-quality, safe, fuel-efficient products equipped with smart technologies. The following are examples of the success of our supplier diversity program:

- **ABEL Services LLC**, a woman owned company based in Louisville, KY, is a general contracting and construction management company. For the last six years, ABEL Construction Company has supported Ford Motor Company's Louisville Assembly Plant and Kentucky Truck Plant. ABEL is a member of the United States Green Building Council.
- **Husco Automotive**, a Hispanic company based in Waukesha, Wisconsin, produces engine controls such as actuators used for variable camshaft-timing components across various Ford vehicles. These controls improve the vehicles' gas mileage and reduce pollutants.
- **SET Enterprises, Inc.**, an African American and Veteran owned company based in Warren, Michigan, provides blanking and slitting services to support multiple vehicle lines including the Ford Explorer and Ford Escape at the Chicago Assembly Plant.
- **SourcePro Inc.**, an Asian-Indian owned company that has expanded its service offering with Ford from Inventory Management to new model program data analysis and bill of material scrubbing. Spare parts management programs have helped to drive accurate and timely part specifications and have been utilized globally to drive inventory optimization.

In 2013, Ford received many awards for our diversity efforts including:

- The Women's Business Enterprise National Council named Ford a Top Corporation for Women for the second consecutive year. The award honors the company's best-in-class practices to proactively integrate women-owned businesses into its supply chain at all levels. Ford was the first automaker to earn this honor in 2011.
- The Michigan Minority Supplier Development Council awarded Ford Corporation of the Year for Supplier Diversity for the fourth consecutive year.
- Asian Pacific American Chamber of Commerce named Ford the Corporation of the Year.
- Black EOE Journal named as the Ford Best of the Best Top Supplier Diversity

**Related links****This Report**

- ➔ Data: Total Purchases from Minority-owned Businesses – United States
- ➔ Data: Total Purchases from Women-owned Businesses – United States

Program.

- *DiversityBusiness* magazine named Ford to their list of America's Top Organizations for Multicultural Business Opportunities for 2013. We have been on the list since 2001.
- *HispanicBusiness* magazine awarded Ford the Top Supplier Diversity Program.
- *Hispanic Network Magazine* named Ford in their Best of the Best for both Top Diversity Employers and Top Supplier Diversity Programs for Hispanics.
- The U.S. Hispanic Chamber of Commerce named Ford to its "Million Dollar Club," a group of 39 corporations recognized for outstanding support for Hispanic suppliers.
- MBN USA listed Ford on their MBN USA Corporate 100 for supporting diverse enterprises and understanding of the positive impact supplier diversity makes on the economy.
- *MBN USA Magazine* listed Ford in its 2013 Corporate 101 Award for Supplier Diversity.
- *Women's Enterprise USA Magazine* listed Ford in their 2013 100 Corporations of the Year for supplier diversity.
- Professional Women's Network named Ford on their Best of the Best lists for Top Employers for Women and Top Supplier Diversity.
- *U.S. Veterans Magazine* named Ford Best of the Best for Supplier Diversity.

Our record of minority supplier development has earned Ford a seat at the Billion Dollar Roundtable (BDR), an exclusive group of 18 companies that purchase a minimum of \$1 billion annually from diverse suppliers. The BDR encourages corporate entities to continue growing their supplier diversity programs by increasing commitment and spending levels each year.

Several Ford personnel also won awards for their individual efforts to foster supplier diversity in 2013. For example:

- Hau Thai-Tang, Group Vice President, Global Purchasing
  - Outstanding Men of Women's Business Enterprise 2013 by *WE USA Women's Enterprise Magazine*, an annual award recognizing men who support Women's Business Enterprise development initiatives at the highest level.
- Tony Brown, former Group Vice President, Global Purchasing (retired July 2013)
  - Top 75 Men in Corporate Supplier Diversity by *Motor Trends* magazine
- Marcella McCullough, Manager of Supplier Diversity Development was awarded
  - One of the 18 Influential Women in Diversity & HR by *Diversity Canada Magazine* for continuing to open doors for women, aboriginals, and visible minorities
  - Champion of Diversity by *DiversityPlus Magazine*
- Carla Traci Preston, Director of Supplier Diversity Development was awarded:
  - National Advocate of the Year by the Michigan Minority Supplier Development Council, which acknowledges the individual who goes above and beyond normal requirements and helps develop, sustain and/or significantly aid in the advancement of minority businesses.
  - Top 50 Women in Corporate Supplier Diversity by *WE USA Women's Enterprise Magazine*. As part of WE USA's the Year of the Woman celebration, WE USA recognized 50 movers and shakers whose acumen, tenacity and influence helped define and deploy supplier diversity initiatives in the past and will continue to shape corporate procurement for generations of entrepreneurs to come.
  - Top 25 Women in Power Impacting Diversity by *DiversityPlus Magazine*. The 2013 Women in Power play critical roles in companies adapting to a rapidly changing business environment, in which diversity, innovation, and creativity are the keys to success. The women are recognized because of the way they use their abilities to bring diversity into organizations.

Ford earned these awards for developing and driving innovative best practices across our organization that result in productive business partnerships with minority and women entrepreneurs and valuable products and services for their customers.

We are unwavering in our commitment to incremental year-over-year percentage increases in sourcing from diverse suppliers. We encourage similar actions across our supply chain. In 2013, more than 400 of our largest Tier 1 suppliers purchased \$2.57 billion from minority- women-and veteran-owned enterprises in support of Ford business.

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### A. Working Conditions Training and Assessment Status for Supply Chain

Working Conditions Assessments (as of 12/31/13)	Americas	Asia Pacific	Africa	Europe	Global Total
Average violations per assessment	10.8	11.1	10.9	10.9	<b>10.8</b>
Assessments completed to date	322	501	92	92	<b>915</b>
Follow-up assessments completed to date (third party and/or internal)	411	539	109	109	<b>1,059</b>

Working Conditions Training (as of 12/31/13)	Americas	Asia Pacific	Africa	Europe	Global Total
Training sessions conducted to date	68	52	26	26	<b>146</b>
Total number of attending companies	852	873	339	339	<b>2,064</b>
Total number of trained managers (attendees)	1,373	966	581	581	<b>2,920</b>

Working Conditions Training (Scope of Impact: Supplier-Submitted Data as of 12/31/13)	Global Total
Training cascade to management, individuals trained	<b>25,176</b>
Training cascade to workforce, individuals trained	<b>488,472</b>
Communication to suppliers, number of sub-tier companies	<b>102,773</b>

### Data notes and analysis

In 2013, the training and assessment data has been updated to reflect a consistent calculation methodology, however certain figures may be slightly lower than 2012.

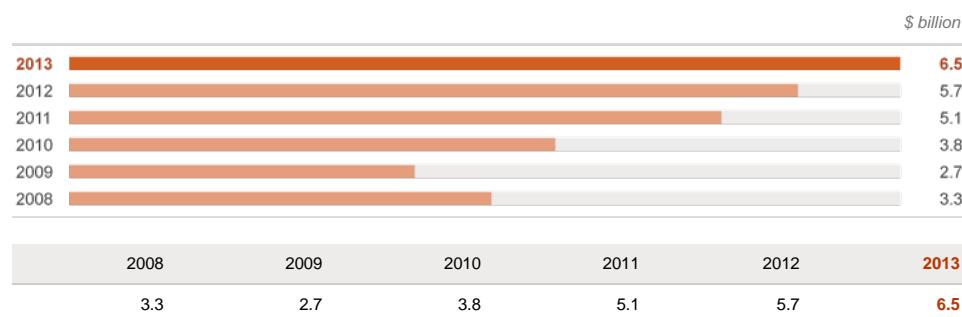
### Related links

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- ➔ [Human Rights in the Supply Chain: Ford's Approach](#)

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### B. Total Purchases from Minority-owned Businesses – United States



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#### Data notes and analysis

In 2013, Ford purchased \$6.5 billion in goods and services from approximately 250 minority-owned suppliers. Our 2013 results demonstrated the third consecutive year of improvement and exceeded our sourcing goals for minority-owned suppliers.

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#### Related links

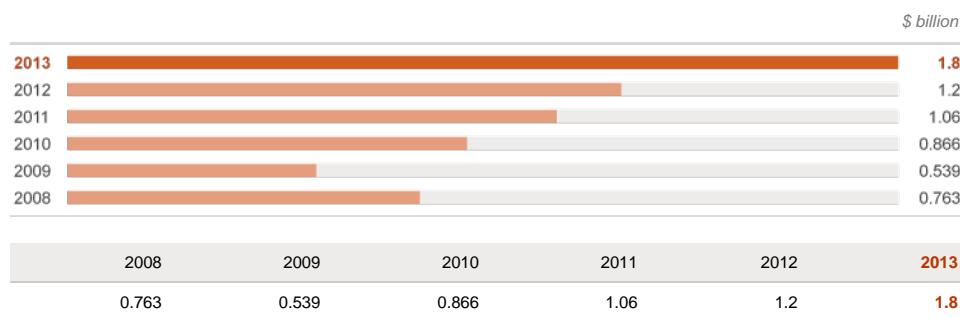
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### C. Total Purchases from Women-owned Businesses – United States



#### Data notes and analysis

In 2013, Ford purchased \$1.8 billion in goods and services from more than 150 women-owned businesses. Our 2013 results demonstrated the third consecutive year of improvement and exceeded our sourcing goals for minority- and women-owned suppliers.

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## Voice: Kelly Katynski

Supply Chain Sustainability Manager – Conflict Minerals Compliance, Ford Motor Company

 We are still in the process of identifying the origins of tin, tantalum, tungsten and gold (3TG) in our supply chain. At this point, there is one thing that we can say with certainty: All of our vehicles contain 3TG. Tin, for example, can be found in any number of vehicle-related components, from seat cushions to electronics to windshield glass."



Before talking about conflict minerals and Ford's supply chain, I'd first like to provide some background on my journey at Ford. I have been with Ford for 25 years and began working in Supply Chain Sustainability in 2012. Since then, I have gained an appreciation for all of Ford's efforts to ensure we are doing the right thing. I am inspired by Bill Ford's commitment to sustainability and I am excited to be contributing to the good work Ford is doing to protect the environment and to respect human rights around the world.

When I was selected as the lead person responsible for Ford's conflict minerals compliance, I quickly dove into all of the written materials I could get my hands on. In addition to the 350-plus pages of conflict minerals legislation mandated here in the U.S., I read about the human atrocities happening in the Congo. I also began engaging with the Automotive Industry Action Group and other multi-stakeholder groups to learn from others. The question I kept asking myself was this: How could this type of suffering be taking place? And, even more important, what can we, as a company, do about it? This explains how my sustainability journey started and it has been exciting and rewarding ever since.

Now, let me dive into the subject at hand – conflict minerals and the efforts Ford is undertaking to help end the violence in the Congo. The four minerals in question – cassiterite, columbite-tantalite, wolframite and gold, whose common derivatives are tin, tantalum, tungsten and gold (3TG) – can be mined all over the world. In the Democratic Republic of the Congo and adjoining countries, the mining of these minerals is frequently used to fund violent conflict and contributes to significant humanitarian abuses.

Not all mining from the Congo is contributing to conflict, however. There are many responsibly run operations whose workers depend on mining of these minerals to support their families. It is important that actions taken by Ford and our suppliers do not disadvantage responsible mining operations in the region.

My role here at Ford is to make sure that our company is sourcing these minerals responsibly, and that we are fulfilling the new mandatory reporting requirements of the U.S. Securities and Exchange Commission (SEC). Starting in May 2014, and annually thereafter, we are required to determine if our products contain 3TG and, if so, we must conduct due diligence to determine where the minerals are coming from and if they are sourced responsibly. We must file a specialized disclosure (Form SD) and conflict mineral report with the SEC describing our due diligence efforts.

It's hard to express what an enormous undertaking this is for a company with a supply chain as broad, as deep and as complex as ours. We are layers removed from the smelters and refiners in our supply chain; therefore, we must survey our direct suppliers and request our suppliers, in turn, to survey their suppliers until the point many layers down in the supply chain where the smelter or refiner of the 3TG is known. Once the smelters or refiners are identified and reported to us, we then work with the cross-industry Conflict-Free Sourcing Initiative to determine if the smelters have been confirmed to be conflict free. Smelters must pass an independent third-party audit to earn such a designation.

It is imperative that industries, governments and nongovernmental organizations work collaboratively to develop workable solutions that make a meaningful difference in this human rights crisis. I believe Ford is demonstrating leadership by helping to develop robust reporting and validation infrastructure leading to increased supply chain transparency.

We are still in the process of identifying the origins of 3TG in our supply chain. At this point, there is one thing that we can say with certainty: All of our vehicles contain 3TG. Tin, for example, can be found in any number of vehicle-related components, from seat cushions to electronics to windshield glass.

Thankfully, we have not, to date, identified any products that contain conflict minerals that have contributed to conflict in the Congo; however, more work is required to identify the origin of all of the 3TG in our products.

We want to do our part and fully support the humanitarian goal of ending violent conflict in the Congo. I am proud to be the team leader driving this important effort. ([Read more about our conflict minerals work.](#))

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Voice: Jim Vella



## People

Maintaining strong and open communications and engagement with the people our activities affect – from our own employees and the dealers who sell our vehicles to our customers and our broader communities – plays an important role in our One Ford goal of delivering profitable growth for all.

Read more about [OUR APPROACH](#)



## INVESTING IN THE “STEM” PIPELINE

Our company's future success is dependent upon innovating the technologies that not only meet, but exceed, the demands of our customers. It is critical that we develop a pipeline of technically trained professionals and that we create opportunities for students to become more engaged in the fields of science, technology, engineering and math (STEM).

Read more about [OUR STEM STRATEGY](#)

## OUR GOALS AND PERFORMANCE PROGRESS

Goal: Fatalities target is always zero.



In 2013 we marked the third year since 1918 without an employee work-related fatality.



In 2013 we created nearly 6,500 jobs in the U.S., including 3,300 salaried positions, and planned to hire more than 6,000 employees in Asia in 2014 to meet the growing demand for fuel-efficient, high-tech vehicles.



We paid record profit-sharing payments to about 47,000 eligible U.S. hourly employees in early 2014.



We support our communities through strategic investments and volunteer efforts. In 2013, Ford contributed \$37.7 million, and 25,000 Ford employees and retirees volunteered more than 150,000 hours.



Nearly half of our 3,263 U.S. dealers have enrolled in our "Go Green" program, which encourages dealers to implement energy efficiency initiatives.

See more at [FORD'S GOALS, COMMITMENTS AND STATUS](#)



## DIVERSITY AND INCLUSION

Henry Ford saw the wisdom of creating a diverse workforce, long before such a concept was embraced by other business leaders. A century later, we continue to attract a highly skilled workforce that reflects diversity across culture, ethnicity, race, perspective, age, religion, physical ability and sexual orientation. We are committed to the advancement of women and minorities in our operations.

Read more about [OUR DIVERSITY EFFORTS](#)



Case Study: [HIRING TALENT IN ASIA PACIFIC](#)



Voice: [JIM VELLA](#)

Ford's expansion in Asia Pacific is unprecedented. Starting around five years ago, we saw the huge potential for growth in Asia and began an extraordinary ramp-up of new manufacturing facilities, especially in China, India and Thailand, to meet consumer demand for our vehicles. But how do you build the pipeline of talented people necessary to run and manage operations that seem to be exploding virtually overnight? You start with a comprehensive talent strategy.

President, Ford Motor Company Fund and Community Services

"Employee engagement is critical to our success. Employees want to be engaged with their communities and enjoy the opportunity to give back. We can truly make a much bigger impact on social issues when we combine our financial resources with our people resources."



## INVESTING IN OUR COMMUNITIES

Ford has been supporting community efforts since our founding more than 100 years ago. For us, it is not just about donating money. It's also about building partnerships and working with others to address the difficult challenges so many people are facing.

Read more about [OUR WORK WITH COMMUNITIES](#)



## ENGAGING WITH DEALERS

Our dealers are a source of strength. They are a critical part of our success and important economic contributors to their communities. They represent the face of Ford to our customers and communities and provide employment, tax support, leadership and customer service.

Read more about [OUR DEALERS](#)



## CUSTOMER ENGAGEMENT

Maintaining good relationships with our customers is one of our most important activities. We engage in two-way communication with our customers in a variety of ways, including social media.

Read more about [OUR APPROACH TO CUSTOMER ENGAGEMENT](#)

## 2013 HIGHLIGHTS



**\$3.5 million**  
the equivalent of in-kind  
corporate contributions through  
our employee volunteerism.



**181,000 +**  
Ford employees worldwide.



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Maintaining strong and open communications and engagement with the people our activities affect – from our own employees and the dealers who sell our vehicles to our customers and our broader communities – plays an important role in our One Ford goal of delivering profitable growth for all.

Positive relationships with employees and business partners help us to improve efficiencies, cost and quality, and better enable us to develop and innovate. An engaged and motivated work force can strengthen our business, allowing us to attract and retain the best people. Effective two-way dialogue with our customers, dealers and other stakeholders helps us to understand and deliver the products that customers want.

This section of our report focuses on the people who interact with our company in different ways – the [employees](#) who work for us; the [dealers](#) who sell and lease our vehicles; the individuals who live and work in the [communities](#) in which we operate; and the [customers](#) who purchase our products. (Information on our suppliers can be found in the [Supply Chain](#) section. Information on our investors can be found on the [Ford investor](#) website. The [stakeholder engagement](#) section of this report provides an overview of our stakeholders and how we interact with them.)

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## Workplace

In 2013 and early 2014, we made progress in a number of areas related to our employees. For example, we:

- Created nearly 6,500 jobs in the U.S., including 3,300 salaried positions, and planned to hire 6,000 employees in Asia in 2014 to meet the growing demand for fuel-efficient, high-tech vehicles.
- Negotiated collective bargaining agreements with labor unions in 17 countries globally.
- Made record profit-sharing payments to approximately 47,000 eligible U.S. hourly employees.
- Continued our work in projects to develop a strong pipeline of employees in science, technology, engineering and math (STEM) fields.
- Continued to win recognition for our diversity efforts.
- Marked a year of zero employee work-related fatalities and a lost-time injury rate that was lower than the industry average.

To learn about our commitments in some of these areas, see our [Goals and Commitments](#) table.

### Renewing Our HR Systems

Our One Ford business model requires an integrated approach to how we manage talent. Developing talent on a regional and global scale requires common processes, robust work force planning and real-time data to support the business as we adapt to an ever-changing global environment.

For years, however, Ford had been working on a fragmented and outdated set of systems that made it challenging for our human resources (HR) teams to coordinate across multiple regions. We are now in the process of developing a global leading-edge HR technology platform for our entire salaried work force of approximately 60,000 people across all Ford business units.

By building a global technology platform, we'll gain more insights into our work force and how we can better meet the needs of our people and of our business. We will be better able to support our people with online leading-edge processes, and enable better decision-making to fully leverage our global talent base.

The new platform, which is being implemented in phases through 2016, will help us provide better long-range work force planning for our business. It allows us to manage employee data with standard sets of criteria across all of our global operations while respecting data privacy concerns. Getting all of these data points into the new system is a daunting task as we convert historical information and keep track of sensitive data in line with required security levels and data privacy legislation around the world.

The platform also includes a new employee development component, known as Career Navigator, which was rolled out on a pilot basis to 11,000 employees globally in 2013, and launched to all 60,000 salaried employees globally in 2014. Career Navigator is a technologically innovative tool that integrates all of our professional development processes in one place and enables quality, data-driven discussions between employees and supervisors. Other new technology components include global reporting, work force planning and analytics, and compensation planning.



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## Employees

Here at Ford, our employees are the drivers behind our successes, including our planned launch schedule of 23 new or significantly refreshed vehicles for 2014 – the most aggressive in our history. As we continue to witness surging global demand for our products, we rely ever more deeply on the skills and talents of our dedicated work force of some 181,000 individuals.

Ensuring a great place to work requires an understanding of [employee satisfaction](#) and what employees value about being part of Ford Motor Company. We engage our work force as individuals and foster [leadership development](#) in a [diverse](#) environment where people feel valued and included. We're focused on developing a skilled and motivated team – the essence of Ford – while providing a [safe](#), respectful and inclusive environment.

Our current manufacturing expansion is the fastest and strongest we have experienced in 50 years. To fuel this growth, we are hiring in North America and Asia Pacific and are exploring new strategies to develop a pipeline of future talent, especially in technological fields. We must keep investing in the intellectual and human capital that drives our ability to innovate and compete.

In North America, we created more than 14,000 jobs during 2012 and 2013 alone as part of our largest hiring initiative since the beginning of the new millennium. In 2013, we announced we would hire more than 3,000 salaried employees in the U.S. – 80 percent of them technical professionals to work in product development, manufacturing, quality and information technology. We expect to hire approximately 6,000 employees in Asia Pacific in 2014, the vast majority of them hourly employees.

Wherever possible, we aim to share our successes with our employees. In the U.S., for example, we paid record profit-sharing payments to about 47,000 eligible U.S. hourly employees.

Although we grew in U.S. and Asian markets, we had to realign our business in [Europe](#) to address overcapacity issues. This resulted in the closure of two U.K. plants in July of 2013. We also reached agreement to close our plant in Genk, Belgium, at the end of 2014. Meanwhile, we announced plans to exit manufacturing in Australia by October 2016. The Australia action will result in approximately 1,200 job losses. We recognize the impacts that these closures will have on the communities and we will look to maximize redeployment of those positions wherever we can. Realistically, however, we believe those opportunities will be limited.

## Employment Data

As of December 31, 2013, we employed approximately 181,000 individuals globally – 10,000 more than at the end of 2012. Substantially all of the hourly employees in our Automotive operations are represented by unions and covered by collective bargaining agreements. In the United States, approximately 99 percent of these unionized hourly employees in our Automotive sector are represented by the UAW<sup>1</sup>. Approximately 1.5 percent of our U.S. salaried employees are represented by unions. Most hourly employees and many non-management salaried employees at our operations outside of the United States are also represented by unions. These unions are key partners with Ford in providing a safe, productive and respectful workplace. For more information about our collective bargaining agreements, please refer to our [Form 10-K](#).

## Global Employment Numbers

Number of employees

## Related links

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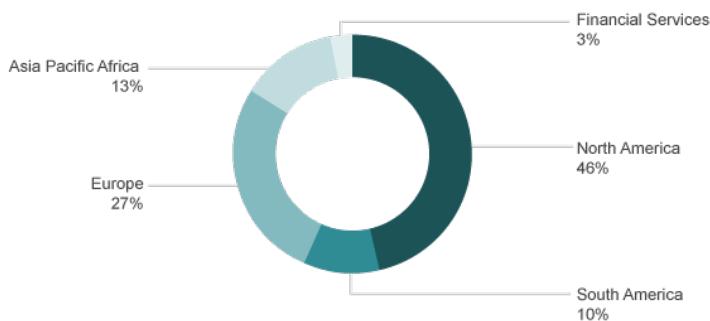
→ Financial Health

2013	181,000
2012	171,000
2011	164,000
2010	164,000
2009	177,000

2009	2010	2011	2012	2013
177,000	164,000	164,000	171,000	<b>181,000</b>

All figures as of year-end.

## Global Workforce 2013<sup>2</sup>



	Percent
North America	<b>46</b>
South America	<b>10</b>
Europe	<b>27</b>
Asia Pacific Africa	<b>13</b>
Financial Services	<b>3</b>

1. UAW originally stood for United Auto Workers; the full name today is the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America.

2. Numbers do not add to 100 percent due to rounding.

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Case Study: A Comprehensive Talent Management Strategy in Asia Pacific

Voice: Jim Vella

## Supporting One Ford

While we have many types of employees and work arrangements, all of our employees together create a skilled and motivated team aligned around our overall One Ford objectives. Our One Ford plan aligns our efforts toward a common definition of success: having One Team, One Plan and One Goal for an exciting, viable Ford that delivers profitable growth for all. One Ford also provides consistent goals and expectations for employees – whether they work in the U.S., China or one of our other global locations – with a clear focus on the skills and behaviors we must demonstrate to accomplish our goals. All members of our global team are held accountable for incorporating One Ford into their daily work.

We have integrated One Ford into our people processes to support employee development and drive accountability for moving the company forward while demonstrating expected behaviors that are fundamental to the success of One Ford:

- **F: Foster Functional and Technical Excellence**
- **O: Own Working Together**
- **R: Role Model Ford Values**
- **D: Deliver Results**

Over the last few years, implementing the One Ford plan has meant that we have focused our people strategies on four key goals: creating a great place to work; developing a capable and effective work force; aligning our organizational structure with our global business footprint; and providing the “people-related” processes to support our work force. That One Ford approach was extended into our [Go Further](#) campaign, which embodies our commitment to our customers. One Ford is our road map and plan, while Go Further is the promise behind our efforts.

### Related links

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Voice: Jim Vella

## Attracting Talent

In the U.S. especially, automakers must compete for talent, and we have stepped up our efforts to find the best and the brightest to join our team. We are in the midst of the largest hiring initiative in more than a decade as we continue to ramp up our production to meet growing consumer demand.

To attract potential salaried candidates, in 2013 we launched a new recruiting campaign with a large social media element. Titled "The Distance Between You and an Amazing Career Has Never Been Shorter," the campaign encourages candidates to bring their talents to Ford and contribute to serving customers through innovative solutions. We created the campaign to highlight that Ford team members are leading the way in imagination and creation. We wanted a fresh and innovative image that illustrates that our employees are as important to Ford as the vehicles they create.

Our message to job candidates is simple: Bring your talents to Ford and help us build an even greater future.

The new initiative engages job candidates on the three major social network sites that we use for attracting employees – Facebook, Twitter and LinkedIn, as well as our Ford corporate careers website. We have been creating [profile videos of current Ford employees](#) to showcase to job seekers the different types of positions available at our company.

In addition to an expanded online presence, we are stepping up our recruitment efforts on college campuses since about one-third of our annual hires come from colleges and universities. We recently opened the new Ford Talent Center in Dearborn, Michigan, where we can provide better interview experiences for potential hires while showcasing our company's rich history and exciting products.

In 2014, we will be increasing the number of college interns we bring to our operations by approximately 20 percent. This is primarily attributed to an increased need for interns in our engineering and other technical areas to meet the needs of our customers. Our internship program is one of the key ways that we find and develop talent.

In 2013, we announced we would hire 3,000 salaried employees in the U.S. – 800 more than previously expected. With only a 2.7 percent voluntary quit rate among current employees, the majority of these jobs are new positions. Of the 3,000 new jobs, roughly 2,400 of them were technical professionals to work in product development, manufacturing, quality, purchasing and information technology. Engineers and technical professionals are in as much demand as our vehicles.

In addition to the salaried hires, we announced in April 2013 that we would hire an additional 2,000 hourly workers at our Kansas City Assembly Plant to help meet demand for our Ford F-150 truck. In November, we announced we would add about 350 new jobs at our Buffalo Stamping Plant. We have pledged to create 12,000 hourly jobs in the U.S. by 2015.

During 2013, we made significant improvements to the "on-boarding" process for newly hired employees. These improvements include more information up front about Ford, streamlined office logistics (such as laptop distribution on the first day of work) and benefits enrollment within a few days.

The updated corporate orientation program is designed to give new employees better insight into our history and our global reach while forging new connections with other new employees and with corporate leaders. In 2013, 1,200 new employees attended three on-boarding events, and 99 percent of participants said they felt the events met their expectations.

Compensation and benefit programs are an important part of the company's employment relationship, which also includes challenging and rewarding work, growth and career development opportunities, and being part of a leading company with a diverse work force and great products. Ford is a global company with a consistent compensation and benefits framework that is affordable to the business.

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## Investing in the STEM Pipeline

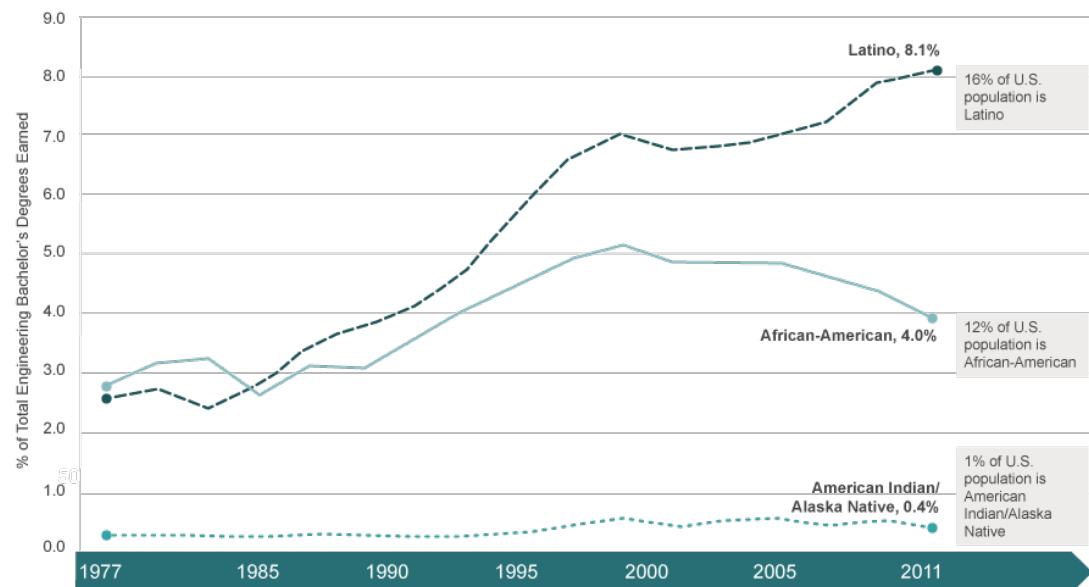
Our company's future success is dependent upon innovating the technologies that not only meet, but exceed, the demands of our customers. And exceeding those expectations will only happen with the right talent. The problem is that the automotive industry is facing severe shortages of students and recent graduates entering the work force with the skills and knowledge necessary to propel our business forward, particularly in technological fields.

It is critical that we develop a pipeline of technically trained professionals and that we create opportunities for students to become more engaged in the fields of science, technology, engineering and math (STEM). The situation is particularly acute in the United States. According to a recent survey by the Program for International Student Assessment, U.S. students ranked 24<sup>th</sup> in the world in their understanding of science and 31<sup>st</sup> globally in math.

Meanwhile, the percentage of degrees awarded in STEM disciplines is on the decline. For example, enrollment in engineering degrees is expected to fall to just 5.5 percent of all college majors by 2020 – about half of what it was in 1995.

Adding to the problem, minorities and women are underrepresented in the field. While Latinos make up about 16 percent of the U.S. population, they comprise just 8 percent of those earning engineering degrees. African-Americans, who make up 12 percent of the overall population, make up only 4 percent of those earning engineering degrees. And while the rate of women earning engineering degrees is steady, the rate of minority women is declining, particularly among African-American women.

% of Total Engineering Bachelor's Degrees Earned 1977–2011



Source: National Action Council for Minorities in Engineering, Inc. (NACME), 2013. 2013 NACME Data Book. Retrieved from <http://www.nacme.org/research-publications>.

Those statistics relate only to those who would be entering the work force in the next few years. Among those who are currently teenagers – the employees of the future – just 17 percent of students express high interest and demonstrate strong proficiency in STEM careers. We need to get more students interested – and maintain their interest.

And many of those who do choose STEM careers are often unaware that the auto

industry offers innovative and collaborative careers beyond core engineering. Despite our exciting technical innovations, we often must compete for talent with the high-tech companies of Silicon Valley and continue to fight perceptions of an aging industry. In truth, however, these days we are as much a technology company as an auto company.

So what are we doing about it? In recent years, we have stepped up our efforts with a new strategy that is supporting STEM initiatives in a more holistic way. Our STEM strategy recognizes the importance of a strong governance structure with leadership that supports the strategy with resources to ensure it remains sustainable. To that end, we have councils at various levels of the company that engage many sectors of our business. We ensure that our current and future initiatives are aligned, using data and metrics to drive actions and decisions on where we will invest in the future. Finally, we know we're not in this alone, so it's vital to stay connected to stakeholders who are active partners. These include external organizations already working on great STEM initiatives, as well as our own employees who are passionate about securing the future of Ford and the overall automotive industry.

We have developed programs that promote awareness, hands on learning and STEM educational opportunities and support teams in established programs such as FIRST Robotics and vehicles teams at select universities.

We support several programs that build STEM skills, as described below.

## High School Science and Technology Program (HSSTP)

For 30 years, Ford's HSSTP program has given students in southeast Michigan the opportunity to spend time on the Ford campus meeting with scientists, engineers and technicians to see how science and engineering can have real-world applications. Participating students spend six Saturday morning sessions at Ford's Research and Innovation Center in Dearborn with Ford employees who volunteer their time to some 200 students a year.

The program gives us a chance to promote science and engineering, and reach out to students to encourage them to consider new career options. Students who attend at least five of the sessions are eligible to apply for summer internship positions.

Some of the participants have ultimately become Ford employees. Angela Harris, for example, participated in HSSTP when she was in high school in 1998. She did an internship at Ford that summer and then came to Ford as a full-time employee in 2003 after graduating from the University of Michigan with a bachelor's degree in chemical engineering.

"I don't think I would have known to go into chemical engineering if I hadn't had the opportunity to do the internship here at Ford," said Harris, who now works as a research engineer in biomaterials and plastics. "Most people don't start their careers when they're 16 years old, so it's been an interesting journey for me."

Philip Lechowicz, a research engineer and member of Ford's electrification team, also attended the HSSTP and did an internship at Ford when he was a student at Adlai Stevenson High School in Livonia, Michigan, in 2000. "It's a very good opportunity to get real-world experience versus the typical textbook instruction you get in the classroom," he said. "The Ford HSSTP experience proved to be an invaluable asset throughout my undergraduate and graduate university studies, and was a springboard to enter the engineering work force."

We have been exploring how we can replicate this successful program in other geographic areas beyond just southeast Michigan.

## Ford Next Generation Learning (Ford NGL)

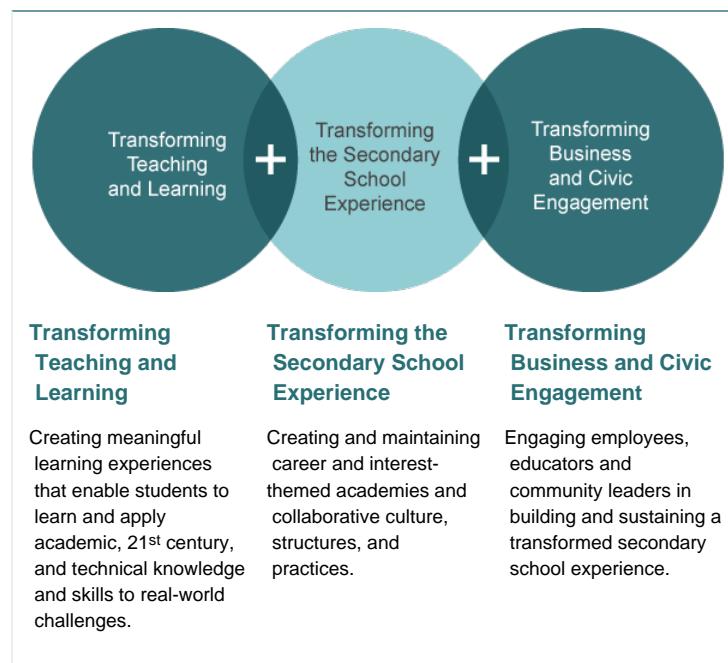
Ford NGL mobilizes educators, employers and community leaders to prepare a new generation of high school students for college, careers and life. The program, which was launched by the Ford Motor Company Fund in 2006, provides dollars, coaching, mentoring and technical support to more than 20 communities in the U.S. to establish "career academies" that allow students to learn their academics through the lens of a career which, in turn, makes learning more relevant and meaningful. These career academies are developed to align with the work force and economic development needs of a city or region. A large majority of the academies focus on STEM careers.

Ford NGL evolved out of the Ford Partnership for Advanced Studies (PAS), which officially launched in 2004 as a high school curriculum focused on helping teachers to engage students in more project-based learning. The Ford NGL program goes beyond working with a small group of teachers in a high school. Instead, the program addresses how a district or region of districts can transform their high schools into career academies that use real-world, project-based lessons tied to a potential career. Our experience and research show that it takes a community to make real change, and our approach blends the expertise of stakeholders across the communities where the Ford NGL program is in place. Three distinct but interconnected strands comprise the Ford NGL framework, which enables whole communities to design and carry out a long-term plan for revitalizing education (see graphic below).

The public school system in Nashville, Tennessee, for example, has seen a tremendous boost in its graduation rates since it became a Ford NGL community. With 12 high schools and more than 16,000 students, the program has set up a total of 78 career academies that focus on topics ranging from engineering to aerospace to music production. The graduation rate jumped from 58 percent in 2005 to 75 percent in 2013.

"This is the most holistic and systematic approach to the transformation of high schools that we've seen as it creates a way for local employers, post-secondary partners and civic leaders to support education in very meaningful and systemic ways," says Cheryl Carrier, executive director of Ford NGL.

Through programs like NGL, we're now focusing even more strongly on developing a pipeline of future talent in the U.S. who are prepared for STEM careers and greater success in whatever careers they choose to pursue.





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## Employee Satisfaction

Each year, we ask our work force to participate in the Global Pulse and Engagement (Pulse) survey to gain insight into employees' overall satisfaction with the company, their jobs, diversity and other aspects of their workplace experience. We encourage our employees to provide candid feedback, and we benchmark results and participation externally. Results of the survey are incorporated into our business planning review processes. Improving Pulse scores is an annual performance objective for many of our senior managers.

In 2013, 70 percent of our salaried employees across the globe participated in the survey, which included a total of 55 multiple-choice questions across 12 dimensions of workplace life, including training and development, diversity, and workplace safety practices. The results of the 2013 survey were highly favorable, with 11 of the dimensions improved over 2012 and one unchanged.

The Employee Satisfaction Index (ESI) section of the survey, which asks employees questions such as whether they feel valued at work or whether they believe they are rewarded for their job performance, increased 4 percentage points from 2012. Considered the bellwether of employee satisfaction, Ford's ESI score is 8 percentage points above the company's benchmark, which is comprised of a group of Fortune 500 companies.

Within the ESI, the highest score – 14 percentage points above the external benchmark – was for the question that asked employees whether they feel satisfied with the information they receive from management on what's going on with the company. Three of the four questions that improved most in 2013 were from the ESI category.

The 2013 survey also showed overall success in that 47 of the 55 questions showed improvement in 2013 and eight questions remained flat.

In 2013, we conducted a global survey of our hourly employees for the second time. The objective was to increase participation levels and collect feedback from our hourly work force and to compare data to the baseline metrics collected in the prior year. The survey measured the effectiveness of the One Ford strategy and its impact on employee satisfaction, and guided continuous improvement efforts in our manufacturing operations. Plant locations in 13 countries participated, generating feedback from more than 43,000 employees. The survey included a minimum of 20 questions that were consistent with questions asked in the salaried Pulse survey. Regions could add more questions as needed. The most favorable responses were around company mindset, quality work practices and training. ESI results in 2013 were down 7 points, although base participation almost doubled from 2012. Improvement efforts will continue to focus on the effective implementation of our overall Ford Production System, which encompasses safety, quality, delivery, cost, people, maintenance and environment. Read more in the [Health and Safety](#) section of this report.

As part of our efforts to increase satisfaction, we are constantly improving our strategies for fostering open dialogue with employees. Read more in the [Employee Engagement](#) section.

In addition, each year following the survey, we send managers and supervisors throughout Ford a report that shows how their specific teams and/or plants responded to the questions on the survey. The goal is for the managers and supervisors to then meet with their work groups, discuss the results, and develop action plans for improvement.

For more information on the [Pulse survey](#), see the Data section of this report.



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## Employee Engagement

Keeping our employees engaged with our company overall, and encouraging them to stay connected with their peers and their communities, is an essential component of our people strategy here at Ford. We know there is a strong benefit to the business when employees are engaged with their work and encouraged to be creative and innovative. A more engaged work force helps us to attract – and retain – the talent we need to be an industry leader.

We believe it's important to communicate with our work force in ways that are open and transparent. We do so through a variety of interactive forums, from "town hall" meetings to intranet surveys and chats, from joint labor-management committees to diversity councils. We also use several publications, such as plant newsletters and our @Ford magazine, to communicate the latest information on the state of the company and our products. In recent years, we have also increased our use of social media applications, such as Facebook, to inform and connect with our employees.

This annual Sustainability Report, and the [high-level executive summary](#) we produce, are also designed to engage employees and inform them of our efforts in our most material sustainability issues. The summary is distributed to employees who receive the @Ford magazine. Employees who are more engaged in sustainability can help us further advance our goals.

For our hourly employees, we work closely with their unions to develop agreements and governance plans over changes in our operations (e.g., reorganizations, plant shutdowns, employee transfers and reductions). Joint labor/management committees are set up at each plant to give employees an opportunity to influence working conditions and practices. Manufacturing operations rely on an aligned and capable organization to engage teams of hourly workers. They strive to build cars and trucks that are "Best in World" and constantly look for opportunities to improve our processes and products.

For our salaried employees, most of whom are not covered by union agreements, we have a strong Code of Conduct and comprehensive Policy Letters and Directives covering topics, including diversity, relevant to our employees. We also practice regular two-way communication with all employees through webcasts, executive Q&A sessions between senior leadership and staff who wouldn't typically have face-to-face meetings with top-level management, quarterly "town hall" meetings, manager-to-employee business cascades, surveys and informal communications. We survey our salaried employees twice annually using the Global Pulse and Engagement survey.

Our employees are also our customers, and they can be strong ambassadors for our products. In Michigan, information sessions called "Go Further Employee Events" are held to give employees the opportunity to view, learn about and test drive yet-to-be-released vehicles. This lets the employees see how our products are meeting the needs of customers, while providing factual information about the vehicles. Our employees can then promote the vehicles to their friends and families, which, in turn, can increase sales and help to strengthen the Ford brand.

Our Employee Resource Groups also conduct a number of events and initiatives each year to engage our employees, provide product insights and reach out to our communities. (See the [Promoting a Diverse and Inclusive Workforce](#) section for more on these groups.)

We believe it's important to engage our people within the communities in which we operate. Each year, we offer ways for thousands of our employees and retirees to participate in volunteer programs. We see these programs as not only critical to helping those in need, but pivotal to inspiring and energizing our employees around volunteerism and community service. Through these community initiatives, we support teamwork and build a sense of shared purpose and commitment. For more information, see the [Communities](#) section.

What's one good way to engage employees? By sharing work experiences with loved ones. The Chicago Stamping Plant's Diversity Team recognized that manufacturing employees seldom have the opportunity to share their work with their families. So they created a new campaign "Bring Your Work to Your Family" – a riff on "Bring Your Kids to Work Day." A prime feature of the campaign was a book they produced called "The ABCs of the Chicago Stamping Plant," which covers all aspects of the plant from A to Z. The book also includes family recipes, family trees, historical facts and many pictures, along with an article on the plant's longest-tenured UAW<sup>1</sup> employee. The plant also organized a Family Fun Day and Open House that gave families an opportunity to check out the plant first-hand – something most of them had never been able to do. The event included a plant tour, monster truck exhibition, old and new vehicle displays, a kid's fun area and musical entertainment.

- 
1. UAW originally stood for United Auto Workers; the full name today is the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America.



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## Leadership Development

Employee development is crucial to delivering our vision of building great products that contribute to a better world. The most important thing we can do is stay focused on creating a skilled and motivated work force. We do that by investing in our employees, strengthening their technical and leadership skills and recognizing them for delivering results that cultivate success. Our company is in growth mode, making it even more essential for us to expand the capabilities of our people. Our vision is to be recognized for world-class learning and development excellence.

In 2013, we assembled a team to determine our learning and development strategic priorities and structure for a truly global learning organization. As a company with operations around the world, we need certain standards and processes for developing leaders who can take Ford to the next levels of performance. We have been standardizing, simplifying and integrating talent-management processes; implementing global competency frameworks; and enhancing leadership development programs for experienced managers.

In growth markets such as Asia, we need [a hands-on development approach](#) that is integrated with our human resource (HR) talent management system as we look to develop a pipeline of talent.

We want to create a learning culture, where employees are able to continuously learn new things and adapt to change. Anywhere from 70 to 80 percent of what we learn is not in a classroom. Because of that, we focus on "blended learning," which is a combination of classroom, self-study, relationships and experience.

We have developed a new set of competency frameworks to help Ford salaried employees determine where they are in their development and to map out individual plans for themselves to improve their capabilities. Individual Development Plans, or IDPs, enable employees to meet current and future goals while maximizing performance in their current assignments. Using the IDP, employees work with their managers to help them identify strengths and areas for improvement, and then create customized plans for their individual developmental needs.

The competency framework is a part of our efforts to build a culture of continuous improvement, with employees taking active roles in their own professional development and the success of our business.

We provide a comprehensive range of learning and development resources that align with One Ford and the key competencies required to support each functional area. These resources include virtual, Web-based and classroom training, experiential learning, special projects, task forces, mentoring and coaching, social networking, team "lunch and learn" and other similar workshops. All of these seek to foster functional and technical excellence, encourage teamwork, promote Ford values and enhance our ability to deliver results.

Development at Ford falls into two categories: functional/technical and leadership. Each skill team/function offers learning solutions tailored to their skill team/functional competencies. We offer global leadership development programs, including the following: the Global Leadership Summit, which is aimed at executives and general managers; the Global Executive Leadership Program, which is geared toward directors and senior managers; and the Experienced Leader Program, aimed at middle management. We also offer the Salaried Supervisor Institute/Program (SSI) for new or experienced leaders who want to enhance their One Ford skills. One Ford is designed to build our employees' individual capability as well as our organization's capability to drive the business forward.

All of our leadership programs focus on the following key areas:

- self insight
- developing others
- team effectiveness
- building relationships

- operating in a global environment
- creating a leadership environment

Similar to our vehicle development strategy, our learning and development strategy has been to leverage our global scale and standardize as much as possible at all levels of the organization.

One of our key principles is that development is for all employees. Across our global manufacturing operations, we offer standardized "Process Coach and Team Leader" training to equip our front-line production leadership with the competencies needed to successfully foster teamwork, and achieve plant and business goals and objectives.

### Easing Toward Retirement

The Phased Retirement Program (PRP) was first piloted in 2011 and has been offered in the U.S. each year since. The voluntary program allows retirement-eligible employees to work halftime at full pay for a period of six months immediately prior to exiting the company. The program is an effective tool for mentoring and transferring important knowledge while transitioning employees into retirement.

One retiring employee who participated in the program in 2013 called PRP "a great way to prepare for the future while I left the company I love." His manager, meanwhile, found it equally beneficial.

"Because this role is unique within Ford, it was especially important to have a successful handoff, and PRP was a key enabler," she said.



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## Diversity and Inclusion

Henry Ford saw the wisdom of creating a diverse work force, long before such a concept was embraced by other business leaders. A century later, we continue to attract a highly skilled work force that reflects diversity across culture, ethnicity, race, perspective, age, religion, physical ability and sexual orientation. We are committed to the advancement of women and minorities in our operations.

Throughout the history of Ford Motor Company, inclusion has been as much a part of the company's success as the products our diverse employee base has created. Ford is a leader in diversity and inclusion, and both remain key business strategies. Our diversity makes us a better and stronger company, by bringing in fresh ideas, perspectives, experiences and life responsibilities, and by fostering a truly collaborative workplace.

In 2013, approximately 27 percent of our U.S. work force (including both hourly and salaried) were members of minority groups and 22 percent were female. Among our global salaried work force, 74 percent were male and 26 percent were female. Among managerial positions globally (defined as middle management and above), 17 percent were female. More information on our U.S. work force by minority groups and gender can be found in our [Engagement and Community data](#).

On our 16-member board of directors, two are women and two are members of minority groups. Of our 42 corporate officers, four are women and eight identify themselves as minorities.

In recent years, Ford has received hundreds of diversity awards from a wide variety of publications and organizations that recognize the value we place on building a diverse and inclusive culture. Our employees also recognize Ford's efforts in this area. According to our 2013 Pulse survey, 87 percent of our workers globally believe Ford's management is committed to diversity. This is up from 86 percent in 2012 and is one of the highest scores on Pulse survey topics. On the global hourly survey, 71 percent responded favourably to the question: "Having a diverse work force contributes to the company's success."

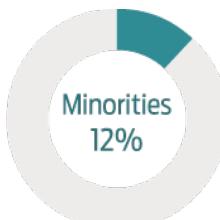
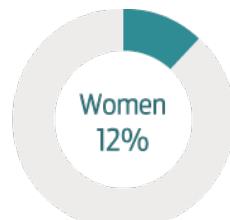
If we want to continue delivering market-leading features and technologies that will appeal to an increasingly diverse customer base, we must ourselves reflect that diversity. Serving a global customer base requires employees with different viewpoints and perspectives, all working together as members of a skilled and motivated team.

In the U.S., for example, female buyers are outpacing males among the millennial generation – the first time that has ever happened. Women account for 55 percent of all millennial purchasers, compared to 40 percent among the baby boomer generation. Our research indicates that women in key developing markets will follow, resulting in millions more female customers around the globe.

At Ford, we are focusing on women as a key demographic as we launch our biggest product expansion in our history – 23 new or significantly refreshed vehicles to market in 2014, including 16 in North America. We especially need talented women to develop and market our vehicles if we want to reach this key demographic.

Read more about [Ford's history of diversity and inclusion](#).

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## Promoting a Diverse and Inclusive Workforce

Our definition of diversity includes all those things that make each of us unique individuals. Our backgrounds, opinions, experiences, perspectives and life situations are just some of the distinctions we bring to the global workplace. At Ford, a diverse and inclusive environment fosters skilled and motivated people working together globally to drive business results in support of One Ford.

We integrate our diversity strategy into our business through the following strategic areas of focus:

- **Leading the way** – The executive leadership team, led by our CEO, champions diversity and inclusion at Ford. To enable us to work together effectively across the global enterprise, the leadership team ensures that diverse perspectives are integrated into business objectives and key human resources processes.
- **Supporting our diverse work force and strengthening our external partnerships** – Ford currently supports a number of employee networks, including 11 Employee Resource Groups (ERGs) that help to foster diversity and inclusion. These include groups for employees of African ancestry; Hispanic, Asian Indian, Chinese and Middle Eastern employees; veteran and active military employees; employees dealing with disabilities; female professionals; working parents; gay, lesbian, bisexual and transgender employees; and the Ford Interfaith Network, which brings together separate affinity groups for Christians, Jews, Muslims, Hindus and other faiths. A number of the groups have chapters in our business units throughout the world. In addition to supporting our employees, these ERGs organize community volunteer activities and provide us with an opportunity to better understand the consumer needs and wants of individuals of diverse backgrounds. Some of their recent initiatives include mentoring students from local schools, assisting the homeless and sending care packages to our military overseas. Our Ford Hispanic Network, for example, partnered with Ford Credit to teach financial literacy workshops in local high schools and community organizations. Our Veterans Network participates in veteran career fairs and works with the Wounded Warrior program.
- **Fostering a respectful and inclusive environment** – Ford's commitment to inclusion is incorporated into One Ford expected behaviors and communicated in ongoing forums such as "town hall" meetings and training. Every year since 1999, we've held a Global Diversity & Inclusion Awards nomination process to recognize individuals and teams who have exhibited the inclusive One Ford behaviors critical to our success as a company. Winners are recognized by their leaders and highlighted in our internal newsletters and social media sites in a year-long process. The participation of our employees from around the world in this nomination process continues to grow. For 2013, our CEO and other senior executives honored 36 teams and individuals from Australia, Brazil, China, Germany, India, Mexico, Spain, Taiwan, Thailand, Venezuela, the U.K. and the U.S.
- **Supporting work/life flexibility** – We encourage employees and managers to discuss both business and personal goals. Work/life flexibility creates a competitive advantage and addresses the needs of our global, multi-generational work force. Ford Digital Worker is a global information technology program that supports One Ford and enhances employees' ability to work remotely. Ford's efforts to provide employees with tools such as WebEx, Instant Messenger and enhanced mobile access capability have increased employee productivity and satisfaction. Flexibility solutions vary depending upon locations, teams and employees. Examples include the following:
  - In the U.S., a significant number of the salaried work force occasionally uses "flextime," which allows employees to vary their daily work times. We have approximately 3,000 employees on formal work programs that involve telecommuting, part-time work and compressed work arrangements. Many more employees develop informal arrangements with their supervisors for occasional work-from-home opportunities. Our Flexible Work Network provides "flex mentors" to help advise employees on effective ways to work differently.
  - In Europe, we offer a variety of flexible working patterns. In the U.K. and Germany, for example, we support part-time working and telecommuting

and, at some locations, offer child-care facilities for the children of our employees.

- In Canada, our many programs include "Summer Hours," which give employees an opportunity to work with their managers to identify a compressed work-week schedule during the summer months.
- Several countries within Ford South America have established programs aiming to leverage work/life flexibility, including flexible work locations.

Other employee resources include employee assistance programs, "mothers' rooms" for nursing mothers in some of our global locations, meditation rooms and wellness initiatives.

## Policies and Grievance Procedures

Ford Motor Company is an equal opportunity employer committed to a diverse and inclusive work force. We have long-standing policies clearly stating that discrimination or harassment in the work environment because of race, religion, color, age, sex, national origin, disability status, sexual orientation, gender identity or protected veteran status is a violation of the company's nondiscrimination policies, and Ford has a commitment to zero tolerance of this type of behavior. These policies apply to all individuals, including part-time and supplemental employees, and agency resources. Ford understands its responsibility to foster a respectful work environment free of harassment or discrimination at all levels of the organization. We take this responsibility seriously and thoroughly investigate any claim of violation(s).

Our collective bargaining agreements address this issue and allow union-represented employees the right to use the grievance process. Ford's Code of Human Rights, Basic Working Conditions and Corporate Responsibility (Policy Letter #24) directly addresses the issue of respect and inclusion, as do the following additional global Policies and Directives:

- Local Equal Employment Opportunity Policy Statement
- Policy Letter No. 2: "Relationships with Employees"
- Policy Letter No. 6: "Equal Opportunity and Affirmative Action"
- Directive B-110: "Anti-Harassment/Zero Tolerance"

Across the globe, a number of internal avenues are available to employees who wish to make and/or document a complaint. These processes are communicated to all employees through the Open Door policy, which is explained in Policy Letter No. 2, and through various policies posted online. The Open Door process, available to all employees, facilitates the resolution of work-related issues. These avenues include:

- Reporting the incident or concern to a supervisor or any other member of management;
- Filing a complaint with the local human resources office;
- Contacting the human resources representative at the division office or Personnel Relations at World Headquarters in Dearborn, Michigan;
- Calling a hotline, through which concerns may be raised; and
- In the U.S., using peer review, which is an internal alternative dispute resolution process.

Also in the U.S., the company has long-standing, strong relationships with the U.S. Equal Employment Opportunity Commission and state civil rights agencies. We stand committed to cooperating with those civil rights agencies that provide resources to the people of our diverse communities in an effort to eliminate discrimination and harassment in the workplace.

Within the U.K. we have a highly robust, comprehensive Dignity at Work policy that sets out the expected standards of behavior and what steps can be taken if there are infringements on the high standards. All employees are trained on the content of the policy, with further training for supervisors and managers who investigate allegations of harassment and/or bullying.



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## Diversity and Inclusion Awards

We have received hundreds of awards in the last few years from publications and organizations that recognize the value we place on our employees and our ability to work inclusively. Specific diversity awards given in 2013/14 include the following:

- America's Ideal Employers – Universum
- Best Companies for Diversity – *Hispanic Business Magazine*
- Best of the Best – *Hispanic Network Magazine*
- Best of the Best – *Professional Women's Magazine*
- Best of the Best – *U.S. Veterans Magazine*
- Best of the Best – Top Diversity Employers – *Black EOE Journal*
- Best Places to Work – Human Rights Campaign
- Corporate 100 – *Minority Business News*
- Corporation of the Year – Asian Pacific American Chamber of Commerce
- Top 100 Employers – *Latino 100*
- Top 50 Employers – *Equal Opportunity Magazine*
- Top 50 Employers – *Minority Engineer Magazine*
- Top 50 Employers – Workforce Diversity for IT & Engineering Professionals
- Top Corporation for Women Owned Businesses – Women's Business Economic National Council
- Top Corporations – *Women's Enterprise USA Magazine*
- World's Most Attractive Employers – Universum
- World's Most Innovative Companies – *Fast Company*

For a listing of corporate responsibility and governance awards for our company, see the [Awards and Recognitions](#) section.



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## Workplace Health and Safety

### Ford Motor Company Vision for Health and Safety

Our vision is to achieve zero fatalities and no serious injuries, and to protect and continually improve the health of our work force.

At Ford, we aim to create a safe workplace with zero fatalities and no serious injuries. We want to demonstrate leadership in safety – not just within manufacturing, but within all industries around the globe. We have made strong and steady progress, with overall injury rates dropping to a tenth of the levels of 1999, when we revamped our formal safety program. But we're still not where we want to be, and we know we have more work to do.

Our top executives and managers remain committed to ensuring that our people stay safe and healthy while working as part of our One Ford team. We have adjusted management compensation to be more heavily weighted to drive safety culture improvements. Our Board of Directors, for example, reviews our company's health and safety performance as part of CEO Alan Mulally's annual assessment.

Safety is integrated into all aspects of our business. Our Safety Operating System (SOS), which is part of our overall manufacturing strategy, provides for the health and safety of our employees through empowered teams of people working together. Safety is one of the core components of the Ford Production System, along with quality, delivery, cost, people, maintenance and environment. A strong safety record is good for our employees and good for our business.

In recent years we have been especially focused on changing the work force culture within our plant operations to ingrain the importance of safety in all of our people, no matter their role. We're leveraging the One Ford philosophy of working together, caring for each other and creating a supportive environment.

We know that to manage health and safety effectively, we must maintain good relationships with all stakeholders. Globally our unions share our commitment to a safe working environment and have been our partners at every step of the Health and Safety Leadership effort and other health and safety programs. We also maintain important external relationships with regulatory agencies, professional organizations and suppliers. In the U.S., formal partnerships among Ford, the UAW<sup>1</sup>, the U.S. Occupational Safety and Health Administration and its state counterparts are a visible example.

The "health" part of health and safety remains a key driver for Ford. We recognize the impact that health issues such as heart disease, diabetes, smoking and obesity can have on the well-being of our employees, as well as on the cost of providing health care to our work force in the U.S. By helping employees to prevent serious diseases and effectively manage chronic conditions, we can have a positive impact on our employees' quality of life and our bottom line.

For more about our workplace safety systems, see the corresponding pages on [Health and Safety Governance](#); [Safety Culture and Accountability](#); [Safe Conditions](#); [Health as a Strategic Advantage](#); and [Our 2013 Safety Performance](#).

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1. UAW originally stood for United Auto Workers; the full name today is the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America.



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## Health and Safety Governance

We have comprehensive governance systems for health and safety management. Our overarching Occupational Health and Safety (OHS) policy is established through a corporate Policy Letter and Directives. In addition, global OHS standards cover all health and safety topics, including safety, ergonomics, occupational hygiene, toxicology and clinical operations.

Often the most efficient and cost-effective way to reduce safety and ergonomic risks in the manufacturing process is to engineer them out upfront. Our global manufacturing engineering teams use the latest technology of "virtual manufacturing" to predict and eliminate risks during the design stage. We also have a global process to ensure that all materials used in our factories are safe for our people. [Learn more about our materials management processes](#).

We review safety regularly at the plant level and in regional OHS committees. Our president and CEO, and our senior operating team, review safety performance as part of their regular business plan reviews, as does the global Manufacturing Operating Committee.

Within manufacturing we use an assessment process that is aligned with the Global Ford Production System. The process includes an integrated assessment that evaluates safety, quality, delivery, cost, people, maintenance and environmental operating systems, while recognizing their interdependencies.

Non-manufacturing sites conduct yearly self-assessments of their OHS risks and performance. All sites must respond to a series of safety questions that have been integrated into the Ford General Auditor's Office basic audit review program.

Ford faces workplace health and safety challenges similar to those of many multinational manufacturing companies. These challenges include establishing and reinforcing high, common expectations for the safety of our employees and our contractors worldwide. Most of our manufacturing facilities have joint union/management safety committees that guide the development and implementation of safety programs in their operations. At least 75 percent of the company's work force globally are covered by local health and safety committees. This includes the entire manufacturing work force and some staff organizations.

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## Safety Culture and Accountability

We've been able to make some significant improvements in the safety of our operations over the last decade, with a substantial decline in the rates of injuries. We have improved our management systems, engineered out known safety risks wherever possible, and augmented our training. But getting to the next level – and our goal of zero fatalities and serious injuries – means we must change the culture of our work force. Today, the major safety challenge at Ford is improving employee adherence to existing safety procedures and improving employee awareness to recognize and eliminate hazards.

In 2013, we marked our third consecutive year of zero fatalities among Ford employees. However, we unfortunately experienced three fatalities among contractors – one in Chicago, one in India and one in Russia. As a result, we are putting greater focus on changing the culture of safety not only of our own employees, but also of the service contractors we hire to clean our facilities, remove trash and scraps, cook meals in cafeterias and maintain equipment, among other outsourced tasks.

### Contractor Safety Culture

We are pleased that we have not had a fatality of one of our own Ford employees for three consecutive years. Yet, we continued to experience service contractor fatalities and serious injuries on our property. It is unacceptable to us that anyone would be killed or seriously injured while working at one of Ford's locations.

Ultimately, safety is the responsibility of the service contractors we hire to perform certain tasks on our behalf. However, we believe we can do more to elevate the importance of safety among our service contract organizations. We want to be sure that the service contractors we hire – and there are hundreds of them worldwide – have the proper training and credentials and that they are making safety a top priority.

The service contractor fatalities in India and Russia occurred while individuals were doing routine activities. While we at Ford cannot directly control their actions, we can do more to push our service contractors toward the highest safety standards.

In 2013, we updated our required safety standards for service contractors so they are now similar to what we already use for construction contractors that we hire to build or renovate Ford facilities. We now require that each service contractor have someone accountable for safety at the contractor organization. And, we're now assigning a Ford employee to be the dedicated safety liaison and person responsible for each service contractor at each location.

We will put even greater focus on service contractor safety in 2014.

### Changing Our Safety Culture

With our own employees, meanwhile, we continue to take a more emotional approach to safety, and we believe it's been making an impact. On December 26, 2009, one of our employees died in a tragic accident at Ford's Kentucky Truck Plant in Louisville. Ronald Cassady's death shattered the tight-knit plant and profoundly impacted our company.

The following year, we produced a documentary about Cassady – a 16-year Ford veteran who died of injuries after a 220-pound steel beam fell on top of him. The video, which was translated into multiple languages for required viewing by tradespeople at all of our manufacturing facilities, focuses on Cassady's friends, coworkers and family as they share the painful details of that horrific December day.

The video made a big impression on our people. And in the years since, we have been producing more videos that tell real-life stories of employees who were injured – or who had a close call – on the job. Some of the "Faces of Safety" videos include images of a worker's family to remind our people that when they ignore the rules of safety on the job, they're not just putting themselves at risk – they're putting the

futures of their loved ones at risk too.

Our target audience for the videos is skilled tradespeople – the employee category that is at highest risk for serious injuries. These are the individuals who troubleshoot equipment, make repairs and retool the manufacturing lines during a plant shutdown. Eight of our last 10 fatalities – including Ron Cassady – occurred during maintenance activities. Approximately 20 percent of our employees are in the skilled trades. Yet they have represented 80 percent of our fatalities.

Many serious injuries occur during plant shutdowns or other intense periods of major change. In the U.S., shutdowns typically take place in December and July of each year as we prepare our facilities for new vehicle models. From 2011 through 2013, our shutdown periods showed excellent safety results.

As part of our cultural shift, we're also now working more closely with the UAW<sup>1</sup> and use positive reinforcement to further encourage plant work teams toward safety successes.

## Reinforcing Accountability

We establish accountability for health and safety performance through business planning, policy deployment and scorecard processes, which set targets and assign responsibility for meeting those targets. Business operation and plant managers are responsible for health and safety in the operations they manage, and their performance in this area is a factor in their incentive compensation. In addition, safety performance is included in the scorecards of salaried employees as appropriate, including those of the CEO and business unit leaders.

As our safety programs have strengthened, we have looked for ways to increase the accountability of all workers so they not only follow the rules and procedures for themselves, but they also look out for their coworkers. Our safety data demonstrates to us that the majority of injuries are the result of individuals failing to follow established safety protocols. We have increased training programs to ensure that workers understand what is required of them and to further build accountability into individual safety performance.

We use multiple communication channels to reinforce safety messages, from our internal video broadcast system to messages from senior executives. In addition to regular safety talks, we periodically hold safety stand-downs that shut down production at our plants to focus attention on a safety message. We can communicate nearly instantaneously with health and safety specialists worldwide, alerting those at similar facilities when a significant accident occurs, so they can take appropriate preventive action.

### Safety Surveys

For the first time in 2013, we conducted safety surveys of manufacturing employees in all of our U.S. locations. Sponsored and supported by a joint UAW-Ford initiative, the 15-minute survey from the National Safety Council (NSC) asks employees 50 questions related to their perceptions of safety at our company. We first began the survey on a pilot basis in 2012 in four locations. (Our Pulse survey, described below and in the [Employee Satisfaction](#) section, includes a standard set of safety questions for our global hourly work force.)

The somewhat shocking results of the 2013 surveys told us that employees do not think we're doing as good a job with safety as we think we are. The NSC, which surveys 550 companies and has more than 2 million responses in its database, ranks organizations in relation to other survey participants. The survey results were a real wake-up call in comparison to the results of the best companies in the database. We are now analyzing the results to better understand why assembly workers have less positive survey results than workers at stamping, powertrain or transmission plants.

The survey results show us that our people perceive we aren't doing enough to prevent injuries. We believe, however, that this perception stems from the fact that we are not doing an adequate job of communicating our safety improvements so our people understand how we have been improving processes to minimize risks.

Approximately 60 percent of all manufacturing employees filled out the paper-and-pencil surveys.

We also address safety questions in the general employee Pulse survey. The results of this survey, combined with audits, and routine gathering and sharing of performance data, provide a comprehensive picture of health and safety performance trends, as well as early warning of conditions that could lead to a decline in performance. The results of the 2013 Pulse survey show that the vast majority of Ford salaried employees – 88 percent, compared with 87 percent in 2012 – give safety a positive rating.

1. UAW originally stood for United Auto Workers; the full name today is the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America.

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## Safe Conditions

Many factors contribute to safe working conditions, including the design and maintenance of the facility and its equipment, effective work processes, and appropriate safeguards for potentially hazardous conditions. We use a variety of processes and programs to assess and manage risks. When potential hazards cannot be addressed through engineering, we use personal protective equipment and procedural controls to help prevent accidents and exposures.

We use internal and external benchmarking to drive health and safety improvements. Internal benchmarking helps us learn from plants that have demonstrated exemplary results and share the key leadership attributes that drive occupational health and safety excellence. Our annual President's Health and Safety Award program is used to identify the global best practices for replication.

External benchmarking on injury performance and safety processes serves to challenge our facilities to achieve best-in-class performance and document effective injury performance and management processes. For example, we participate in a multi-industry group of companies that shares information and best practices on safety performance. Participants include several auto industry peers as well as companies in a broad range of industries, from health care to aerospace.

### Meeting the Competition

The safety of our employees, contractors and visitors transcends the competitive spirit that exists at Ford, GM and Chrysler. In fact, the top safety leaders at each company routinely meet to discuss safety concerns, share ideas and develop methods to ensure people working in or visiting our facilities remain safe.

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## Health as a Strategic Advantage

The continued good health of our work force and their families remains a priority for the company. Our approach to employee health and, in particular, U.S. health care, is rooted in our core business and our Employment Value Proposition. We are committed to the ongoing evaluation and improvement of programs that promote the good health, well-being, longevity and productivity of our work force. Our vision is knowledgeable, motivated people who stay well and receive appropriate, efficient health care services. Since families tend to share health habits – good and bad – promoting health among our employees contributes to healthier communities.

In the U.S., health care availability and affordability continue to be of concern, as demonstrated by the national health care reform effort. To mitigate our health care-related costs, maximize worker productivity and improve the overall health of our communities, we are committed to health and wellness programs that maintain or increase the health status of our employees and their families. We provide resources and tools to educate employees to help them make sound choices about health care services and coverage. This will help them become better health care consumers.

Salaried workers in the U.S. who participate in a health risk appraisal and meet with their primary care physicians to better understand their health status are rewarded with lower insurance deductibles. In 2013, more than 80 percent of salaried employees and retirees met the objectives of this program and increased their awareness of personal health improvement opportunities.

For our hourly work force, we are partnering with the UAW<sup>1</sup> and Southeast Michigan health care providers to pilot a two-year program called the Enhanced Care Program. The goal of the program is to provide care that treats overall health and leads to a better quality of life. Through a personalized care approach, the program looks for ways to help with current chronic, manageable health care needs (including asthma, diabetes, coronary artery disease, congestive heart failure and chronic obstructive pulmonary disease) and to prevent future problems when possible. The pilot is expected to help us deliver better health care to our employees while helping to lower total health care costs.

Participating patients have access to a personal health care nurse who works closely with a patient and his or her doctor to coordinate care and achieve the patient's personalized health goals. Patients can contact their personal care nurses by phone, email or in person – as frequently as needed and at no additional cost.

We expect 1,200 to 1,500 active UAW members and non-Medicare retired members to join the voluntary pilot.

We are also collaborating with other large payers, health plans and government agencies by:

- Participating in regional health care quality measurement and public reporting initiatives, with potential data sharing and funding assistance from the government; Promoting the development of health care initiatives that aim to improve or change the dynamic of the health care marketplace; and
- Developing new programs to improve the health of employees and family members who are affected by chronic diseases.

Globally, we remain committed to the One Ford health care strategy. Our goal is to build a culture of wellness that lets people perform at the top of their game at work, at home and into retirement. Our efforts are tailored to meet local health priorities and to ensure that our people receive quality health care when they need it. We focus on health screenings, educational programs and promotional campaigns. We use global health metrics (such as percentage of population at low, medium and high risk for disease) to assess the health of our work force and track the results of our programs. Through our U.S. and global health initiatives, we are confident we will be successful in improving the health of our work force and managing our health care cost obligations in an efficient manner.

1. UAW originally stood for United Auto Workers; the full name today is the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America.

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## Our 2013 Safety Record

The year 2013 marked the third year since 1918 in which we did not have an employee work-related fatality. Tragically, however, we did experience fatalities of contractors in Chicago, India and Russia. Our primary objective remains zero fatalities on Ford property.

Overall, our safety record improved compared to 2012. A major safety indicator – the lost-time case rate – was at 0.44, a nearly 14 percent improvement from the 2012 rate of 0.51. We experienced 131 serious injuries among our direct and joint venture employees, compared to 139 the previous year. Most of these injuries should have been prevented.

While we are pleased that we did not have a fatality among any of our own employees, we recognize that we must remain vigilant. In 2013, we had 426 high-potential reported events that could have resulted in more serious consequences, but did not. Each of the incidents was investigated, resulting in many global preventive measures. While this number may seem high, we see it as a sign of higher organizational awareness of potential risks and a willingness to share information with others so the same events do not happen elsewhere.

We have been encouraging all employees to alert management to every injury or hazard, no matter how small, so that we can learn from every mistake, take corrective actions and create a safer workplace for everyone. We continue working in a collaborative way with the UAW<sup>1</sup> to change the culture so that individuals are motivated to take greater responsibility and ownership for addressing any safety risks and unsafe behaviors.

As we have rebounded from the economic downturn, our plants are making more vehicles than they were in recent years. Given the relative activity levels and relative rates of lost time and serious injury, our U.S. operations have the greatest opportunity for improvement of any of our locations worldwide.

We continue the process of upgrading our information technology to create a common global system for tracking workplace injuries, incidents and causal factors. Having a common system to record incidents will allow us to conduct much more detailed analyses of each event and, as a result, improve overall performance.

We're also continuing to work to develop a common global approach to the use of personal protective equipment. The new data-gathering system will allow us to make comparisons and analyze trends among injuries so we can identify which personal equipment result in fewer injuries.

For more information, see the [Workplace Safety](#) data page of this report.

### Going Fork-Free

Forklifts pose one of the biggest hazards in a manufacturing plant. The risks can be many, including a higher potential for accidents when forklifts and people share the same travel zones within a facility.

We have made a commitment to go "fork-free" in our new assembly plants. In Thailand, for example, the \$450 million facility we opened in Rayong in 2012 was one of the latest to use trolleys instead of forklifts to transport parts to workers on the manufacturing lines. Other plants in Europe, Mexico and Chongqing, China, have also eliminated the use of forklifts. Our manufacturing plant teams are applying additional strategies and new programs to eliminate the need for a forklift to deliver any material to assembly production lines.

1. UAW originally stood for United Auto Workers; the full name today is the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America.



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## Dealers

Our dealers are a source of strength. They are a critical part of our success and important economic contributors to their communities. They represent the face of Ford to our customers and communities and provide employment, tax support, leadership and customer service. As of year-end 2013, our 3,263 Ford and Lincoln dealers in the U.S. employed 170,000 individuals, with an annual payroll in excess of \$7 billion. Worldwide, we had 11,772 Ford and Lincoln dealerships as of year-end 2013.

As part of our continuing efforts to improve the Ford retail customer experience and to create loyal advocates of our products and services, in 2013 we launched the Ford Trustmark Facility Assistance Program working collaboratively with our U.S. Ford dealers to improve dealership facilities. In addition, we continue to work with our Lincoln dealers to focus our mutual efforts on the transformational change necessary to meet the high expectations of the luxury customer, including upgrading dealership facilities and the services provided at those dealerships.

On average, U.S. Ford dealers were more profitable last year than in 2012, as higher demand for our new and freshened models increased new vehicle sales. U.S. Lincoln dealers were also more profitable on average than in 2012, with increased used vehicle, parts, service and body shop sales.

## Engaging with Dealers

Dealer relations are a key priority for us. The Ford and Lincoln Dealer Council provides a forum for open dialogue between Dealer Council members and Ford. Through the Council process, dealers can voice their concerns, needs and ideas for working more productively as a team. Also, dealers annually identify their priorities, which are published along with Ford management responses, providing transparency to the discussions between the company and its dealers.

To ensure that communication lines remain open, Dealer Council members also participate as members of Ford's National Dealer Advisory Panels. The current Dealer Advisory Panels, and the topics they address, are as follows:

- **Commercial Truck Advisory Board (CTAB)** – sales, marketing and product programs
- **Consumer Experience Committee (CEM)** – consistency of consumer experiences across interactions with Ford and dealers, warranties and other consumer issues
- **Customer Viewpoint Advisory Panel (CVP)** – customer satisfaction rating system, Viewpoint survey
- **Dealer Product Advisory Committee (DPAC)** – current and future product cycle plan, including lineup, design, styling and color/trim options
- **Fixed Operations Strategic Advisory Board (FOSAB)** – fixed operations business growth opportunities such as service departments
- **Ford Credit Dealer Advisory Board** – vehicle financing and competitiveness
- **FordDirect Dealer Advisory Board** – new digital consumer lead products and services
- **Government Affairs Committee** – advice to Ford Motor Company's Government Affairs office on federal and state automotive legislative issues that have major implications to the business and industry
- **Marketing Dealer Advisory Board (MDAB)** – vehicle packaging strategy, advertising creative, incentive programs for Ford
- **Parts and Service Manager Advisory Committee (PSMAC)** – fixed operations programs, including employee recognition/retention
- **Retail Experience of the Future (REOF)** – online vehicle search engines, and third-party aggregators (e.g. Google, Cars.com, TrueCar) of Web-based vehicle searches and sales leads
- **Training Advisory Board (TAB)** – dealership employee training and recognition.

The feedback gathered through these interactions has helped us develop programs,

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change policies and enhance processes to improve the customer ownership experience and other significant elements of dealers' businesses.

In addition to the feedback provided through the Dealer Council and advisory panels, dealer satisfaction is measured in various ways, including the biannual survey of the National Automobile Dealers Association (NADA) as well as day-to-day interaction with our dealers. Approximately 54 percent of our Ford dealers and 52 percent of Lincoln dealers provided feedback through the summer 2013 NADA survey process. We remained consistent in many areas in this survey compared with our winter 2012 record improvements, including in our Regional Sales, Service and Parts Personnel rankings. In addition, Ford Motor Credit Company Capability rankings exceeded the industry and previous scores in nearly every category. Finally, Value of Franchise, Product Quality, Competitiveness, Policies and Procedures, and Vehicle Incentives also showed favorable results.

## Dealer Diversity

Diversity and inclusiveness are part of Ford's DNA, and growing a strong minority presence in our dealerships remains a key focus. At year-end 2013, Ford had 164 minority-owned dealerships, which represents 5 percent of our 3,263 U.S. Ford and Lincoln dealerships. At Ford, we continue to work with our Ford Minority Dealers Association (Ford MDA) to sustain and strengthen the current minority dealer portfolio with dedicated resources to increase profitability. Together we are directing efforts toward growing the minority ranks of dealership management and employment to better reflect the community and to facilitate a greater number of future Minority Dealer principals.

## Dealer Sustainability Program

We are continuing to expand the "Go Green" Dealer Sustainability Program we launched in 2010. The goal of the "Go Green" program is simple: to collaborate with dealers to implement cost-effective ways to improve the energy efficiency of their facilities. To enter the program, dealers undergo an energy assessment to identify opportunities to reduce their overall carbon footprint and lower their energy costs.

Dealers can participate in the "Go Green" program through the Ford Electric Vehicle (EV) program. As we expand our EV offerings and certified dealer network, dealers can undergo a "Go Green" energy assessment as part of the process of becoming a certified EV dealer. Beginning in 2013, dealers can also participate through the Ford Trustmark Facility Assistance Program, which encourages and assists dealerships in upgrading their physical operations to the new "Trustmark" branded Ford facilities. Through the "Trustmark" program, dealers undergo an energy assessment as part of the approval process for obtaining renovation assistance from Ford Motor Company.

Ford established an Energy Team to manage the energy assessments, and we partnered with Harris Lighting and New England Energy Management (NEEM), Inc. – global leaders in energy consulting – to complete the actual assessments. The Ford Energy Team also reviews the dealerships plans for their new facilities.

As of the end of 2013, nearly half of our 3,263 U.S. dealers had enrolled in the "Go Green" program as part of the EV and "Trustmark" programs. Through the "Go Green" energy assessments performed, dealers realize the tremendous opportunities that exist for implementing green technology and achieving significant annual cost savings.

For more information on Ford's EV dealer certification process, please see the [Electrification section](#).



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## Salute to Dealers

Ford annually recognizes dealers' outstanding contributions to their communities through its "Salute To Dealers" program. The program was established in 2001 to demonstrate our commitment to dealers who provide outstanding products and services, and improve the lives of those in need. These remarkable honorees and nominees are selected from a field of thousands of Ford and Lincoln dealers across the globe.

Ford is very proud of the contributions made by the dealers who are nominated for this award and the 100 men and women who have been selected as Salute To Dealers honorees since the program's inception. Considering the high-quality and community spirit of our dealer body, this is a tribute to their hard work and dedication to make the world a better place.

Our 2014 awards recognized the following dealer principals for their unparalleled generosity and commitment to their communities:

### Randall L. Reed, Randall Reed's Planet Ford, Humble, Texas, U.S.A.

Randall Reed is very passionate about supporting his community and believes that he should focus on giving back at every available opportunity. His humble beginnings are a driving force for that commitment. Reed is a huge advocate for the needs of children and local education, having donated his time and unending resources to the Humble ISD Education Foundation. One example is his Teacher of the Year award that provides a new vehicle to the deserving winner. Reed is now expanding the program to eight different cities. When an elementary school playground burned to the ground, he donated the funds to rebuild it. Reed's support for the school district's special needs students includes donating computers and vehicles to a program where teens with disabilities are mentored by high school students. His community outreach extends to a local project that provides funds for mammograms for women who otherwise could not afford them. Additionally, he raises much needed funds for the Village Learning Center, which offers essential services for young adults with disabilities and their families. Randall Reed's generous spirit of giving and caring has set a commendable example for others in and around his community.

### Sujeet Singh Gehlot, Gehlot Ford, Ajmer District, Rajasthan, India

Sujeet Singh Gehlot and his wife Pratibha are dedicated to supporting a number of important charitable and social causes in their region. Their motto in life is "always be ready to help the needy." One example is their involvement, including hands-on and financial support, for Shubda, a special school that offers a variety of activities for mentally challenged children including vocational training. Their work there has helped in shifting the attitudes of local citizens about the potential these children possess. They have been instrumental in helping impoverished children to obtain a better education at a State Primary School by providing essential supplies to the students. The Gehlots also secured and help maintain a large water tank for drinking water for the students, which aided greatly in the school's day-to-day operations in an otherwise water-strained region. They established a Thalassemia foundation for children affected with this rare blood disorder. Personal inspiration for this cause comes from their son, who also suffers from this disorder. Other local efforts include the construction of, and ongoing support for, an old-age home, local blood donation drives and many activities of the same type. Their work with these and countless other charitable endeavors, typifies the Gehlots focus and compassion for giving back to their community.

### William J. Kindle, Kindle Ford-Lincoln, Cape May Court House, New Jersey, U.S.A.

Bill Kindle is a devoted and long-time supporter of local organizations, national charities and families in need. He is actively involved with the HERO Campaign for Designated Drivers, a foundation that seeks to end drunk-driving tragedies by promoting the use of safe and sober designated drivers. Every year his dealership supports the HERO walk fundraiser, attracting thousands of people and critical funding for the organization. Kindle is also dedicated to preserving the marine mammal population. Every year, he sponsors a motorcycle ride to save turtles from being run over by cars during the hatching season. He also supports the Marine

Mammal Stranding Center which responds to thousands of calls for distressed whales, dolphins, sea turtles and seals. Kindle's love of flying is more than just a hobby. He is a volunteer pilot for Angel Flight Northeast, an organization that provides free air transportation to families in need of critical medical care. Everything from fuel to expenses, as well as his time, is donated by Kindle. Other activities include volunteering the use of his dealership for drive-thru flu shots, fundraising for the Boy Scouts and donating vehicles to disadvantaged families in the community. Bill Kindle is selflessly committed to making a difference in the lives of residents along the southern New Jersey Shore.

**Cam Clark , Cam Clark Ford, Airdrie, Alberta, Canada**

Cam Clark has unwavering passion and commitment to the local community as shown by his lengthy list of charitable contributions, and his dedication of time and resources to the many causes he supports. He is particularly interested in helping the youth in his area. Clark is actively involved with the Kids Cancer Care Foundation of Alberta and contributes both to the Boys & Girls Club of Airdrie and Stephen's Backpacks Society for children in need, both local causes which ensure that children are provided with an opportunity to succeed. He also partnered with the Rocky View School Division to create a Mechanics Training Center at his dealership which provides educational opportunities to students sharing a passion for automotive mechanics. Clark's generosity included a significant donation to help create a Community Learning Center. The Center provides learning experiences to children of all ages and offers critical services like child and family support, day care and before-and after-school care. Clark also contributes to Ups and Downs – Calgary Down Syndrome Association, an organization that provides a medium for families with children suffering from Down syndrome to unite, share experiences and work together to advocate for rights and acceptance. He also served as a director for the Calgary Stampede, a very special event that typifies western heritage and values. Cam Clark has immersed himself into the Airdrie community, displaying a rare compassion for giving that is a model for others.

**Randy Nehring, Sioux Falls Ford Lincoln, Sioux Falls, South Dakota, U.S.A.**

Randy Nehring and the dealership team make giving back to the community of Sioux Falls a priority within the dealership. A cause they are very committed to, through various organizations, is the fight against cancer. One example is their involvement with Be Bold Wear Gold campaign with the Children's Miracle Network. This organization unites families in the fight against childhood cancer, and raises awareness of the importance of finding a cure. Another event the dealership has had a long-standing, active involvement with is the Avera Race Against Breast Cancer, an annual 5K event that raises funds for equipment, research, education and patient services for those battling the disease. They also continue their commitment with a fundraiser, The Big Grape, which is an annual wine and food event that raises money for pediatric oncology. A 10-year commitment for the cause demonstrates their dedication in the fight against cancer. As a family business, children are an important cause for the dealership to support. Along with active involvement in the foundation, the dealership is a generous donor to Make-A-Wish, an organization that grants special wishes to children with life threatening illnesses throughout South Dakota. The dealership, as well as the Nehring family personally, sponsors Wish children annually. They remain involved with the foundation by contributing to fundraising events throughout the year, such as a local golf tournament. Randy Nehring believes that giving back to the community where his family plans to live forever is a gift, the gift of giving.

**Divonsir (Zico) Cardoso, Autoeste Veiculos Ltda., Foz do Iguacu, Parana, Brazil**

Divonsir Cardoso is a tireless advocate and supporter of numerous social causes in his community. One of these is his commitment to re-socializing incarcerated prisoners and adequately preparing them for their return to society as meaningful contributors. Cardoso's involvement includes sponsoring a technical training program, building a library and supplying computers and other critical supplies. Mr. Cardoso has also been instrumental in supporting Uopeccan, a cancer hospital in a nearby city, through his tireless fundraising efforts with other entrepreneurs in the region as well as his personal visits to the hospital. He also makes significant financial donations to Lar Dos Idosos, a home for the elderly. Not only does he donate money to this home, he actively participates in their many events. He also participates in the Association BEIT ABBA, for recovering addicts of alcohol and drugs. Mr. Cardoso is involved with the St. Vincent de Paul Society, Casa de Maria School and with initiatives that alleviate the suffering of others, especially the socially and economically disadvantaged. Mr. Cardoso's compassion for giving is ever-present and a true model for others in his community.



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## Communities

With the same excitement with which we release products, we provide support to the communities in which we live, work and play. Our community support remains independent from, but aligned with, our company goals and our One Ford plan. One of the outputs of One Ford is to build a better world, and so reaching out and providing assistance to our communities is an essential part of what we do.

Ford has been supporting community efforts since our founding more than 100 years ago. For us, it is not just about donating money. It's also about building partnerships and working with others to address the difficult challenges so many people are facing. Our community activities are guided by the same sustainability and business priorities that also guide our business, including water, human rights and driving safety. We also focus on helping communities meet basic needs (such as food and shelter), supporting development programs, aiding with emergency and disaster response, and assisting in improving educational opportunities. We believe, as Henry Ford did when he founded Ford Motor Company, that our company is only as strong as the communities where our employees and customers live and work.

This section describes our approach to [community engagement](#) and [investing in the communities](#) in which we operate.

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# Engaging with Communities

To create and sustain an effective community relations function, we look at the needs of the communities in which we operate around the world and focus on those needs. We also recognize that we must embed community issues into our core business practices and manage them with the same rigor as other aspects of our business.

Several trends have reshaped our industry and our company in recent years, including increased competition globally and changing markets for our products. The bulk of future sales growth is expected to occur in emerging economies. In response, Ford is increasing its footprint in emerging markets: We are expanding or building new plants at seven locations in the Asia Pacific region and we are hiring employees across that region. Ford and other companies are also expanding our supply chain in these lower-cost emerging markets. These changes are affecting not only how we manage our operations, but also how we engage with and affect the communities in which we operate.

In recent years, we have taken steps to develop a more integrated approach to managing the different dimensions of our community involvement. Our goal is to more closely connect our traditional community relations programs, community impact assessment processes and key sustainability priorities such as human rights, access to water and driving safety. To address these changes, we have refocused our community efforts to reflect the global nature of our business, while recognizing that Michigan is our headquarters state and will always remain an important part of our focus. (Please see "[Expanding Our Global Reach](#)" for more information on how we are globalizing our approach to community projects.)

Whether doing business in Michigan or Malaysia, we seek to respect and make a positive contribution to our host communities. Operating in emerging economies, however, does bring with it some new community issues for us to understand and manage.

One of these issues is human rights. Specifically, we must ensure that our products, no matter where they are made, are manufactured under conditions that demonstrate respect for the people who make them. We also must respect the rights of people living in the communities around our facilities, as well as our suppliers' facilities, who may be affected by those operations. We view respect for human rights not only as a core operational issue, but also a key to maintaining the trust and respect of local communities. That trust is critical if we want to continue to operate and sell our products in those locations. In 2003, we released our Code of Basic Working Conditions reinforcing that our behaviors and actions as a company must include a focus on issues outside the walls of our plants and facilities. This Code is formalized as part of our business practices as Policy Letter 24: Code of Human Rights, Basic Working Conditions and Corporate Responsibility. It addresses important working conditions and human rights issues including working hours, child labor, forced labor, engagement with communities and indigenous populations, bribery and corruption, and environment and sustainability. We assess Ford owned and operated facilities on several key community issues and evaluate engagement with members of the local community. (See the [Governance section](#) for more on this topic.) Policy Letter 24 also extends to our supply chain by enforcing similar policies for our suppliers and their subcontractors consistent with our Global Terms and Conditions for suppliers. (See the [Supply Chain section](#) for more information on this topic).

As we expand into new markets in more water-stressed regions, we are also expanding our engagement with local communities on water issues. We have developed a comprehensive water strategy based on both environmental and social risks and opportunities in local communities where we operate. For more information on this topic see the [Water section](#) of this report. Over time, we also want to link all of these efforts with our development of new products and services to meet the unique mobility needs of communities in emerging markets. (See the [Mobility section](#) for more on this topic.) In our view, this approach will not only increase efficiencies, but also maximize our impact and effectiveness.

As we seek to embed these and other key issues and values into our business practices, we are also giving them life through our investments in communities through strategic contributions and volunteer efforts. For example, our commitment to

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human rights isn't just a corporate policy governing our business practices, it is also the driving force behind many of our community projects. Baby Safe, a project we helped fund in South Africa, provides one example. Through this project, we helped to fund an anonymous system through which mothers can safely leave babies they cannot care for with organizations who can care for them and help find them homes. Before the Baby Safe program was implemented, unwanted babies were frequently left to die. The remainder of this section, which describes our community investment programs and projects, helps to illustrate how we are following through on our One Ford commitment to contribute to a better world through our philanthropic and volunteer efforts.

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## Investing in Communities

Ford Motor Company has a long legacy of compassion. More than 100 years after the company began, we continue to touch lives. Our commitment to supporting local communities through strategic investments and volunteer efforts has remained unwavering.

Investing in communities is more than the right thing to do; it's also smart business. Our global company is only as strong as the local communities in which our employees and customers live and work, so it is in our mutual interest that we work with communities to make meaningful contributions to improve the quality of life. For example, our volunteer efforts help to build stronger communities, which in turn strengthen local economies. In addition, community projects help to strengthen the name of Ford and enhance purchase consideration for future buyers. Supporting volunteerism among our employees also helps to build workplace morale.

We invest in communities in three primary ways: through direct corporate charitable giving, through our company's community relations arm (formally known as Ford Motor Company Fund and Community Services), and through the Ford Volunteer Corps, which organizes the volunteering efforts of thousands of Ford employees and retirees across our global operations.

In 2013, Ford contributed \$37.7 million (over \$7 million more than in 2012). Of that amount, \$26.3 million was in the form of grants awarded by the Ford Motor Company Fund; the remainder was direct corporate giving.

## The Ford Motor Company Fund and Community Services

The Ford Motor Company Fund and Community Services (or Ford Fund) is a nonprofit organization responsible for the company's philanthropy and volunteer efforts. It is funded by contributions from Ford Motor Company. The goals of the Ford Fund today are the same as they were when Henry Ford II founded it 60 years ago: to support programs that effect change in our communities and improve the quality of life in the communities in which Ford does business. It supports organizations in four strategic areas: driver safety, education, community life and corporate volunteerism. In 2013, we increased our focus on water-related projects in support of Ford's overall [water strategy](#). For examples of the Ford Fund's programs and projects in 2013, please see [Ford's Community Projects Around the World](#). (The Ford Foundation, meanwhile, is a separate entity from the Ford Motor Company. No member of the Ford family nor Ford Motor Company management is on the Ford Foundation Board of Trustees.)

## Ford Volunteer Corps

We encourage our employees to participate in programs that build stronger communities through the Ford Volunteer Corps. Volunteerism has been an integral part of Ford Motor Company since its creation in 1903. The Ford Volunteer Corps operates across six continents to strengthen the communities in which our employees and customers live and work. Ford Motor Company offers its salaried employees two paid workdays per year to volunteer in the community. Since 2012, the Volunteer Corps has included both salaried and hourly employees. We are in the process of expanding the Ford Volunteer Corps program to include Ford's UAW<sup>1</sup>-represented work force, adding another avenue to these employees who already have a long tradition of volunteering through other channels.

During 2013, some 25,000 Ford employees and retirees in 31 countries and 16 states provided more than 150,000 hours of work on more than 1,400 community service projects – the equivalent of \$3.5 million in-kind corporate contributions. Many of these volunteer projects received mini-grants from the Ford Fund to help

## Related links

### Ford websites

- Ford Motor Company Fund and Community Services
- Ford Volunteer Corps

The Ford Volunteer Corps sponsors activities all year, and around the globe. However, we also seek to focus our efforts through two intense volunteer programs: Ford's Global Week of Caring and our four annual Accelerated Action Days.

## Global Week of Caring

Ford's Global Week of Caring is one of the cornerstone programs of the Ford Volunteer Corps. It includes a week of volunteer events across all of Ford's operating regions. In 2013, our eighth year with this program, over 13,000 Ford employee and retiree volunteers participated in nearly 300 projects in 31 countries and 16 U.S. states. Ford contributed \$315,000 in grants to help fund supplies needed by volunteers to complete their projects. This year's Global Week of Caring included building temporary shelters for homeless children in China, renovating a community youth center in Germany, providing clean drinking water facilities in disadvantaged parts of India and South Africa, participating in environmental restoration activities in Australia, as well as a range of community, education and environmental projects in the U.S. Specific projects are described by region in the interactive project map above. For examples of some of our Global Week of Caring projects in 2013, please see [Ford's Community Projects Around the World](#).

## Accelerated Action Days

Accelerated Action Days (AAD), another key program of the Ford Volunteer Corps, are concentrated one-day volunteer efforts to meet critical needs identified by our nonprofit partners. In 2013, we held four Accelerated Action Days that included over 1,000 Ford volunteers in 12 states and approximately \$200,000 in donations to support their projects. Additional highlights of the 2013 Accelerated Action Days include the following:

- On our hunger-focused AAD, more than 600 Ford volunteers cooked and served meals, sorted food and stocked shelves, and made deliveries to feed individuals in need in partnership with nonprofit food banks, shelters and care centers. This day also included a coat and jacket collection drive for children.
- During our community and environment AAD, Ford volunteers planted community gardens, restored natural areas for wildlife habitat, and assisted in environmental education projects. This day also included an e-waste collection drive.
- As part of the children and families AAD, more than 600 Ford volunteers painted shelters, renovated homes and family centers, and built storage facilities for a wide range of nonprofit organizations among other activities. This day also included a drive to collect disposable diapers and formula for families in need.

On our community-building AAD, Ford volunteers refurbished parks and public spaces, built and rehabilitated homes and residential facilities, constructed playground equipment and play spaces, and did other community-building projects at partner nonprofit organizations.

In addition, we help to maximize the effectiveness of our volunteering efforts and facilitate employee volunteering through a "volunteer matchmaking" software system designed and launched by the Ford Volunteer Corps. Through this system, our nonprofit partners can tell us when they need help and what help they need most, and employees sign up online for volunteer opportunities based on their interests and availability. We are continuing to expand the system to strengthen data-collection capabilities – especially in our non-U.S. operating regions – and to enhance the employee user experience.

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1. UAW originally stood for United Auto Workers; the full name today is the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America.



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# Ford's Community Projects Around the World

Community Life

Education

Driving Safety



We organize our community investment activities around our three strategic priorities: [community life](#), [education](#) and [driver safety](#). We developed these priorities to focus our efforts, and intensify the benefits of our community investments. We also focus on these areas in ways that help us to make the most of our financial contributions, as well as the unique skills of our company and employees.

Click on the icons above for examples of our programs and projects from around the world in each of these focus areas.

## Community Life

Helping to strengthen the communities in which we operate is a core priority for Ford – and has been since Henry Ford started the company over 100 years ago. We work closely with communities to understand what their needs are and how we can contribute to improving community life. This is by far the broadest of our strategic priorities and includes efforts focused on hunger relief and poverty alleviation, community infrastructure improvements, and support for elderly, disabled and other under-served populations. Community life also includes our investments in environmental initiatives and efforts to improve water conservation and access to clean drinking water.

Some examples of our community life programs and projects from around the world include the following:

### Shanghai, China

In Shanghai, China, during our Global Week of Caring, 100 Ford employees volunteered approximately 800 hours to help the Shanghai Homeless Children Protection Center (HCPC) at Jiangong University and Minhang Community Public Center on several projects for homeless children. Ford volunteers worked with a team of experts to identify homeless children on the street and offered them support; built temporary homes for older homeless children; ran activities for children under 15 living at the centers; and shared the children's stories on social media platforms to inform residents of the realities of homeless youth in Shanghai. HCPC rescues over 500 homeless children annually. It is Shanghai's oldest and largest specialized state-run orphanage and has been used by the central government as a model for orphanages throughout the country. Children are rescued who were abandoned at the train station, stores and hospital; others with physical handicaps have been found in dumpsters, public restrooms or rice paddies.



### Pretoria, South Africa

In Pretoria, South Africa, as part of our Global Week of Caring, six Ford volunteers used a mini-grant from the Ford Fund as well as 48 hours of their time to purchase and install a "PlayPump" at a local school yard. The PlayPump will provide clean water to the school and the entire community. Using this system, borehole water, which is pumped as children play on a roundabout, is stored in a 2,500 liter tank. In South Africa hundreds of schools have no clean drinking



water. Girls frequently miss school as they must walk long distances to collect water for their families. In addition, water sources are often not sanitary and waterborne illness is common. The PlayPump will provide clean drinking water for the entire community and allow girls to attend school.

#### United States

In the U.S., Ford has supported the American Red Cross mission for more than 30 years. In 2013, the Ford Fund and Ford Motor Company contributed over \$1.4 million to support disaster relief and service to military families. Ford pledges support in advance of major disasters, ensuring that the Red Cross is adequately prepared for an immediate response for disasters of all sizes. In addition, Ford provides funding for emergency preparedness youth education programs and vehicle donations. As part of the Red Cross Service to the Armed Forces, the Ford Fund has provided over 250 Ford Blue Oval Scholarships for veterans and their families to receive certified nurse-assistant training for careers in health care.

#### United States

In the U.S., through the Ford Community Corps, we created a network of six Michigan colleges and universities that work with Ford to create new service learning initiatives that recognize scholastic achievement while encouraging service to the community. Unlike traditional volunteer programs, Ford Community Corps programs seek to match student know-how with specific nonprofit needs, connecting teams of students with work-related projects created by local nonprofit organizations. This allows students to provide more value to their nonprofit partners, while at the same time gaining valuable work-related skills and experience. In 2013, the program supported 59 projects and 225 students resulting in over 8,500 volunteer hours positively impacting more than 14,000 people.

#### India

In rural India, our Sustainable Urban Mobility with Uncompromised Rural Reach (SUMMUR) program, which began in 2012, seeks to improve women and children's access to health programs through the use of a Ford vehicle that has been specially modified to allow its Ford SYNC® system to transmit data, turning the vehicles into mobile medical labs. Using these vehicles, over 100 doctor visits have been completed, more than 20 health camps completed, and over 10,000 kilometers (6,213 miles) traveled. This program has facilitated safe deliveries for 41 high-risk pregnant women. By the end of February 2013, the program had visited 44 villages and reached more than 3,100 people to facilitate community awareness programs about maternal and child health care.

#### China

Conservation and Environment Grants, China (CEGC) is the company's flagship philanthropic program in China, focused on supporting grassroots environmental/sustainability nongovernmental organization (NGO) leaders and their organizations. Over the past 14 years, Ford of China has awarded RMB 16.1 million (U.S. \$2.6 million) in grants to 325 grassroots environmental leaders and NGOs. In 2013, a Ford Fund investment allowed Ford of China to expand the CEGC program, linking it to employee volunteerism and to rewarding environmental NGOs that seek to make environmental protection part of the everyday lives of people in communities, allowing communities to become leaders in their own environmental protection.

#### China

In 2012, the Ford Fund with Ford of China launched the Level Up! initiative, designed to build the organizational capacity of over 100 grassroots environmental NGOs in China. Through this program, more than 70 percent of environmental groups in Beijing, Shanghai and Kunming are undergoing significant organizational change and development. Efforts include workshops and training for grassroots environmental leaders, coaching and mentoring projects, capacity-building training and development, and assistance in building grassroots support networks for more than 100 NGOs.

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## Education

We believe that education is a building block for success for everything else in our communities. Education creates a sustainable society. Without a sustainable society, we don't have a sustainable company for employees, customers, investors or dealers. We have developed a range of ongoing education programs, and we focus on education in our Volunteer Corps projects. For example:

#### Kuluszyn, Poland

In Kuluszyn, Poland, as part of our Global Week of Caring, 50 Ford volunteers spent 500 hours providing support to the 35 children living at the Falbogi State Orphanage in Eastern Poland as part of a long-term project that began in 2009. The goal is to give the 35 children tools, knowledge, supplies, equipment and experiences so they can plan for their future and make educated choices for their adult life. The orphanage is isolated in a rural area and children rarely leave the property except for school trips that are funded by Ford volunteers. Also, they have very limited access to the internet due to lack of equipment. Volunteers used a mini-grant from the Ford Fund to create a small computer room including two desks equipped with a desktop computer, software, printer and scanner to help children develop necessary skills and help them to find a job in future. Ford volunteers also provide relevant

computer and Internet skill training to help children gain practical skill sets that they need to succeed in their post-orphanage years.

### 📍 Cologne, Germany

In Freiluga, Cologne, Germany, Ford volunteers spent over 100 hours building an outdoor environmental education interactive classroom. Volunteers built a wooden garden house to dry herbs, cleaned the garden area, and cut down overgrown bushes and grass. As a result of these efforts, dozens of children now have an updated, hands-on, outdoor classroom devoted to teaching about protecting and enjoying the environment.



### 📍 São Paulo, Brazil

In São Paulo, Brazil, as part of our Global Week of Caring, 23 Ford volunteers worked with the Guarda Mirim Institution, which provides administrative assistant training to 15- to 17-year-olds from humble backgrounds. The students are placed with companies as apprentices. Ford employees pioneered a development forum program to help broaden their view of the professional opportunities that will be available to them. Each term, 500 students benefit from this program.



### 📍 United States

Our Ford Blue Oval Scholars program awards hundreds of scholarships to students throughout the U.S. The program includes a Web-based initiative that links scholarship winners together through an online portal, allowing them to connect with Ford and others in a variety of ways. The program also sponsors an annual "Heart Behind the Oval" scholarship contest that recognizes and rewards students making a difference in their communities. In 2013, the Ford Fund awarded more than \$1 million in college scholarships. For more information on the program, please see <https://www.fordscholars.org/scholarships>.

### 📍 United States

The Ford College Community Challenge invites college partners to work with their local communities to put together innovative, student-led proposals that use the school's resources and capacity to address a social need or problem in the local community. Proposals must address the Challenge's theme – Building Sustainable Communities – in an innovative way, and must also address the issue of alternative energy and its role in building a sustainable community. In 2013, the Ford Fund awarded \$225,000 to nine projects. Since the program began in 2008, we have awarded \$1.6 million to build sustainable communities. For more information on the program and projects it has funded, please see <https://www.fordscholars.org/ford-college-community-challenge>.

### 📍 United States

Ford Next Generation Learning (Ford NGL), the Ford Fund's flagship education program, mobilizes educators, employers and community leaders to develop a new generation of young people who will graduate from high school prepared for both college and careers. Ford NGL improves teaching and learning, promotes the development of career- and interest-themed high schools to better serve students, and aligns business and civic engagement in education to improve student and work-force outcomes. Through this program we work with national, regional and local partners to prepare young people to compete successfully in higher education and in the global, 21<sup>st</sup> century economy. For more information on Ford NGL, please see the [Investing in the STEM pipeline](#).

### 📍 United States

Through the Henry Ford Academies (HFA) program, Ford has replicated its award-winning small high school model – which we started with the original Henry Ford Academy, located on the grounds of The Henry Ford in Dearborn, Michigan – in Detroit and San Antonio. Students at these schools benefit from the new HFA model curriculum, which is thought to be the first in the nation to focus explicitly on innovation and creativity.

### 📍 United States

Ford Driving Dreams Through Education program is a competitive, grant-based initiative in partnership with the League of United Latin American Citizens (LULAC). The initiative allows LULAC councils throughout the country to implement localized programs to address high school dropout prevention in their communities. To date, 36 communities have been positively impacted by the program. Building on the success of Ford Driving Dreams Through Education, Ford developed the Ford Driving Dreams Tour. The program raises awareness about the importance of education by energizing youth, broadening community-wide support and providing resources for area schools and students. Through scholarships, motivational student assemblies, peer-to-peer support and an innovative contest, the signature program motivates students to graduate from high school on time and enroll in college. The pilot program launched in 2012 and targets schools with high Latino student populations. It has visited 15 high schools in Irving, Dallas and Fort Worth, Texas, and Miami, Florida. It is scheduled to visit additional high schools for the 2014-2015 school year. To date, the initiative has reached nearly 25,000 students.

### 📍 Mexico

Since 1966, Ford of Mexico's employee and dealer civic committee has funded the Ford of Mexico School Building Program, to build elementary schools that provide quality education to children living in underprivileged areas. So far, the program has built 212 schools in nearly every state of Mexico. More than 1.6 million children have graduated and 150,000 children attend Ford Schools every day. They also sponsor a Quality in Education Program that provides education and sports programs for children, parents and educators. This program includes computer skills

## Driving Safety

As an automotive company, the safety of drivers and pedestrians is an obvious priority for us. The [Ford Driving Skills for Life \(DSFL\)](#) program is the centrepiece of our efforts to improve driver safety.

### Worldwide

The Ford Fund continues to support safe driving through its award-winning DSFL program, a free safe-driving curriculum that has trained hundreds of thousands of drivers through Web-based and in-person driving sessions. In 2013, the program celebrated 10 years in operation. In the U.S. the program focuses on teen drivers. It was developed by Ford, the Governors Highway Safety Association and a panel of safety experts to address the No. 1 killer of teens in the U.S. – traffic crashes. In 2013, Ford DSFL reached more teens, parents and educators than ever before through new awareness campaigns, high school assembly programs, social media promotions and nearly 30 days of hands-on training throughout the United States. Ford DSFL is the nation's most comprehensive driving skills program, with free professional driver instruction, a Web-based curriculum, state grants and free materials. Since 2003 in the U.S., Ford DSFL has hosted hands-on training in 40 states and Puerto Rico, and conducted programming in thousands of schools. Ford DSFL continued to expand internationally, launching in five new countries: France, Germany, Italy, Spain and the United Kingdom. The programs in Europe trained more than 1,300 novice drivers and we plan to add more countries in 2014. Programs also grew in Asia Pacific, which also plans to add two new countries to its Ford DSFL footprint. In total, Ford DSFL is training drivers to be safer in 16 countries around the globe and plans to grow to 23 countries before 2015.

### Worldwide

We also focus on driving safety in our Volunteer Corps projects. For example in Chennai, India, 15 Ford volunteers spent 102 hours organizing a Driving Skills for Life sessions for 500 recruits of the Mechanical Transport Training Institute Air Force station in Avadi, Chennai, to help improve driving safety in the area.



## Expanding our Global Reach

As we continue to expand our business in new markets across the globe, we are also expanding our community investment and volunteering efforts internationally. In 2013 we continued to expand our global reach through our Operation Better World Program. Launched in 2012, Operation Better World is a coordinated, strategic approach to how Ford engages with communities everywhere that we do business. In 2013, we expanded the program from India and China to South America, Mexico and Europe. Through this program, Ford Fund works with NGO partners in four key areas: education, auto safety, community needs and sustainability (with a focus on water). The Ford Fund works to ensure that programs meet local community needs, align with the One Ford business plan, have a measurable impact and, where possible, can be replicated in other markets. This grassroots engagement in the community is implemented and led by the local Ford teams in each region.

## Ford Motor Company Direct Charitable Contributions, Sponsorships and Employee Donations

In addition to the projects described in the graphic above, the list below highlights some of Ford Motor Company's primary direct charitable contributions and sponsorships.

- For more than 20 years, Ford has been involved in helping find a cure for type 1 diabetes. We are the largest global sponsor of JDRF, the leading global organization focused on type 1 diabetes research. Ford employees organize and participate in a wide range of fundraising activities each year and we raise funds through corporate initiatives like vehicle auctions. We have raised over \$40 million for JDRF.
- Ford has been a major supporter of the United Way both nationally and in Southeastern Michigan for many years. In 2013-14, Ford Chief Operating Officer Mark Fields was the chair of the United Way for the Southeastern Michigan chapter's fundraising campaign. In this capacity, he helped to raise over \$40 million for the regional chapter, a 14 percent increase from the previous year and the largest year-over-year increase for United Way in Southeastern Michigan in 17 years. In 2013-14, Ford contributed \$7.4 million to United Way for Southeastern Michigan, including employee, UAW<sup>1</sup>, retiree and corporate

contributions. Ford gave a total of \$9 million to United Way chapters across the country, including Southeastern Michigan in 2013-14 to support numerous community-based social services organizations.

- Ford has a long history of working with disabled American veterans. Ford is a major contributor to the Jesse Brown Memorial Youth Scholarship Program including funding scholarships to students who volunteer at local Veterans Administration medical centers. For over a decade Ford has also been a sponsor of the National Disabled Veterans Winter Sports Clinic, which allows hundreds of disabled veterans to go the mountains of Colorado to participate in adaptive winter sports. In 2013, Ford donated funds for Disabled American Veterans (DAV) to purchase seven new vehicles for its headquarters and the DAV Transportation Network, in addition to providing \$45,000 to the DAV's youth volunteer scholarship program.
- We continue to expand our Ford Mobile Food Pantries program, which helps social service organizations in Southeast Michigan collect and distribute food to those in need. In 2013, Ford helped the Mobile Food Pantries to serve more than 1.1 million meals in Southeast Michigan, and to provide more than 3.5 million meals over the last three years. Since the program began in 2009, we have donated 35 vans for food collection and delivery nationwide, including 13 vans in Southeastern Michigan.
- Ford has also been a long-time supporter in the fight against breast cancer. For 20 years, Ford has been a National Race Series sponsor of the Susan G. Komen Race for the Cure® and has dedicated more than \$120 million to the cause in donations and in-kind gifts. Ford's commitment goes well beyond the October race; it lasts 365 days a year and focuses on raising awareness, support and donations for this cause, including apparel that is sold on [fordcares.com](http://fordcares.com). This specially designed "Warriors in Pink®" clothing and accessory line is dedicated to those fighting this disease, and 100 percent of net proceeds go to the fight against breast cancer. Since 2006, we generated more than \$5.6 million from apparel sales for the cause. In addition, more than 75,000 Ford employees and thousands of dealership employees are involved in races and supporting the cause in their local communities. In 2012, Warriors in Pink expanded the family of charities we work with to include the Young Survival Coalition, the Dr. Susan Love Research Foundation and The Pink Fund in addition to the Susan G. Komen Race for the Cure. Consumers can designate which of these charities they help by selecting the charity of their choice at checkout. We also introduced nine female and two male survivors as part of our Models of Courage program. The inspirational stories of these survivors can be found on [fordcares.com](http://fordcares.com).
- Ford volunteers raised \$500,000 for the March of Dimes. Ford Vice President Jim Tetreault and UAW Vice President Jimmy Settles served as UAW/Ford sponsors for the 2013 March for Babies campaign. Over the past nine years, the UAW/Ford team has raised more than \$3.5 million.
- Ford volunteers raised nearly \$380,000 for the National Multiple Sclerosis Society's Michigan Chapter in 2013, exceeding their 2012 donation by over \$60,000. We were also named #1 Corporate Sponsor in Michigan and were recognized by the Circle of Distinction award by the organization.

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1. UAW originally stood for United Auto Workers; the full name today is the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America.



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# Assessing the Larger Benefits of Our Community Engagement

It is challenging to assess the larger benefits of our community engagement and investments to the communities in which we operate. We know the dollar amounts of projects we fund and charitable contributions we make. And we know the number of hours our employees volunteer in their local communities through Ford-sponsored projects. For 2013, these numbers were substantial: We contributed to community projects, including nearly a half a million dollars in mini-grants to support our employee volunteer projects, and Ford employees volunteered over 150,000 hours. However, these numbers are just the "inputs"; they don't adequately convey the larger positive impact of our efforts.

We are trying to improve our ability to measure this larger positive impact. For example, we believe that our volunteer efforts in 2013 positively impacted more than 2 million people. At this point, our understanding of the larger impact of our projects is often anecdotal. However, these anecdotes are still important and inspiring. For example, we know that by building wells in India and South Africa, through our [Global Week of Caring](#) projects, we have enabled girls in local villages, who would otherwise have to walk miles to gather water for their families, to attend school instead.

We will continue to try to improve our ability to measure these kinds of larger impacts in years to come.

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## Customers

Our customers' wants and needs continue to evolve. We monitor consumer trends and develop and promote products to fit certain market segments. In recent years, we have paid particular attention to the growing demand for more fuel-efficient and cleaner vehicles.

We are also working to understand the unique and changing needs of our customers in urban and emerging markets, where congestion, air pollution, traffic safety issues and social inequalities add a new range of challenges to delivering personal transportation solutions. The [Mobility Solutions](#) section discusses our efforts to understand and address these challenges.

As the marketplace becomes more diverse, we are also working to better reach multicultural audiences, particularly in the United States. We have made dedicated efforts to market Ford and Lincoln products to African-American and Hispanic customers, including developing Spanish advertising programs targeting the U.S. Hispanic market. We have also been a leader in the development of in-language, Internet-based advertising programs. Our Spanish website, [es.ford.com](http://es.ford.com), is one of the most extensive in the industry. And, we were among the first to use Google with Spanish search programs.

This section discusses how we [engage with customers](#), [understand customer needs](#), [build customer awareness of our products](#) and [increase customer awareness of environmental issues](#).

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Maintaining good relationships with our customers is one of our most important activities. We provide a variety of means for customers to reach us, including mail, email and toll-free phone. We reach out to customers and potential customers through focus groups and other market research, and we track customer satisfaction.

We also gather online, consumer-generated content to learn what consumers are saying about both our company and the industry in general. Increasingly, customers are using these electronic media – including websites, discussion groups, blogs and social networks – to research, discuss and problem-solve topics related to their current vehicles and those they are interested in purchasing. In recent years, we have been participating more actively in this social media arena, monitoring consumer-generated content found online. Summary reports are compiled based on what we find and gather online, to convey what consumers are saying about our company and our products. These reports are shared throughout the company – from brand managers and product development engineers all the way up to senior-level management.

In addition to listening to what customers are saying online, we are also increasingly sharing information and engaging in discussions through social media. Social media allows for more two-way engagement with customers, so we can both listen to and understand our customers' wants and needs, and build their awareness of our company and products. For more information on how we are using social media to engage with customers please see the [Building Customer Awareness](#) section. For more on our social media guidelines for employees, please see the [Governance](#) section of this report.

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## Understanding Customer Needs

We must keep pace with consumers' evolving wants and needs in order to remain competitive. We monitor global market trends, shifting consumer interests, and social and political developments to identify issues that are likely to affect our consumers, our industry and our company. We rely on a global network of internal and external experts to ensure that we have a wide-ranging, comprehensive perspective on consumer trends and how they will affect consumers' future choices about vehicles and mobility. We apply these trend analyses throughout our marketing, product development, research and design organizations to guide future product and technology developments.

Our marketing experts use an intensive research and analysis process to understand who our potential customers are, what they value and what they want in a vehicle. We define a "brand DNA" and a "target customer" for each of our main brands and products. The brand DNA and target customer profiles go beyond simple demographic information such as age, gender and income; we build complete profiles of our target customer, including information such as what they like to do, what music they listen to and where they shop. Using a fully developed, typical customer as the focus for vehicle development brings our market research data to life and keeps everyone on the product development team focused on designing a vehicle that meets customers' needs and desires.

We develop our target customer profiles based on psychological traits and archetypes that transcend national characteristics and country-specific customer desires. This is a critical part of our drive to develop truly global vehicles that appeal to customers in multiple markets. Toward this end, we are focusing more on the emotional and psychological elements of how customers choose their vehicles as well as the traditional economic criteria of price and features. In addition to developing vehicles that deliver best-in-class features and price for value, our goal is to develop vehicles that fulfil the dreams and aspirations of each target customer group. We believe this approach not only helps us to understand our customers better, it also helps us to develop vehicles that capture the imaginations, dreams and loyalty of our customers across the globe. Of course, we are keenly aware that economic pressures can push the boundaries of brand loyalties, and we need to work to continue to build vehicles that customers can afford.

We know that we cannot predict the future. However, we can prepare for a broad range of possibilities through "futuring" exercises that help us to ensure we have robust strategies in place, whatever the future might bring. Therefore, in addition to product- and brand-specific market research, we have an office dedicated to tracking shifts in social, technological, economic, environmental and political arenas. In 2013, we again made our global customer trends research public in "Looking Further with Ford", a report revealing insights about consumer habits and behaviors expected to shape 2014 and beyond. This trends report leverages years of research and collaboration with thought leaders from around the world. By publishing it, we hope to spur further discussion, inspire deeper insights and showcase the innovative and thoughtful side of Ford Motor Company.

"Looking Further with Ford" presents a series of micro trends that will influence the market landscape in 2014 and beyond, none of which are specific to the automotive industry. The underlying purpose of the trend work is to understand the forces affecting what is happening in social, technological, economic, environmental and political arenas as a means to better anticipate the future wants, needs and desires of consumers. This collection of trends reveals recurring themes of mindfulness; in the context of increasing pace of change, we are reevaluating our relationships with the world around us in terms of technology, the environment, and how and where we spend our time. Some examples of the trends we are seeing include the following:

- **The Sustainability Blues:** People are becoming increasingly aware of the importance of "going blue" as we are "going green," and becoming more aware of sustainability challenges related to water, one of our most precious and pressured resources. In the last century, global water use per person has doubled, while global population has tripled, paving the road for serious issues with water scarcity. Today, one in seven people worldwide do not have access to

quality drinking water. South America, South Africa and South East Asia are among the areas that suffer the most. Within the regions, women and children spend up to three hours a day seeking out water sources for their communities. In 2012, Ford announced a comprehensive water strategy based on an analysis of risks and opportunities throughout our value chain from environmental and social perspectives. As part of this strategy, we will reduce water-use-per-vehicle by 30 percent from 2009 to 2015.

- **The Quiet Riot of Innovation:** Innovation and new technologies are occurring at an ever increasing rate. The increasing pace of change is being driven in part by new tools that allow individuals to take their ideas for new products from dream to reality more effectively like open-sourcing of new technologies and self-financing mechanisms. This trend is reflected in the ever-increasing pace at which we as a company are introducing new products and technologies. We will launch 23 all-new or significantly refreshed products globally in 2014, more than doubling our global product launches in 2013. We are also taking advantage of open sourcing to develop new tools for customers. For example, in 2013, we held an open competition to develop new fuel-efficiency apps for drivers on our SYNC in-vehicle communication system through Open XC, open-source connectivity platform.
- **The Old School Trend:** In the face of political shifts, economic malaise and increasing pace of technological breakthroughs, some customers find themselves longing for the "good ol' days" when things were seemingly kinder, gentler and simpler. Not surprisingly, products and experiences that evoke a sense of nostalgia or romantic view of the past do quiet well in the marketplace. For instance, when Ford revealed the 50<sup>th</sup> anniversary of the Ford Mustang we were delighted to discover it has some 5 million Facebook fans worldwide. Even in markets where the Mustang has never been sold, people were drawn in by its rich history and heritage.
- **Micro-Moments and the Myth of Multitasking:** As customers continue to feel increasingly busy and information and entertainment become increasingly accessible, people are trying to make the most of every moment. Using smartphones and other devices people are engaging in "micro-moments" in which they consume bite-sized pieces of information and entertainment anytime they can in order to save up larger chunks of time later to fulfil more meaningful goals. On the other hand, the Myth of Multitasking trend reveals that only 2 percent of the population are effective multi-taskers. For the remaining 98 percent, multitasking can do more harm than good. Studies show that while working, being distracted by incoming calls and emails can lower one's IQ by 10 points. Ford is providing technologies to help customers make the most of every moment while also helping them avoid the pitfalls of excessive multitasking. [SYNC® with AppLink](#) helps drivers make the most of their drive time by providing hands-free access to music, phones, and other information while on the road. But we are also working on ways to ensure that connections with technology while driving remain safe and that drivers can block out distracting information. For example, [Ford's MyKey® Do Not Disturb](#) feature can be used to stop text messages and phone conversations from occurring while the driver is in motion. We are also working on a Digital Workload Estimator which will be able to block out technology when traffic conditions and health readings determine that outside interference would increase driver stress levels.
- **Vying for Validation:** Social media continues to have profound effects on our society. "Selfies," or pictures taken of oneself usually using a mobile phone camera, have become so ubiquitous that the online Oxford Dictionary added it to their lexicon late last year. It is difficult to judge how accurate or authentic people's online personas are when people worldwide readily admit that they paint a better picture of their lives on social media than it is in reality. In response to the growing importance of social media, Ford is engaging with customers through social media, giving them opportunities to share their experiences and opinions. For example, our [Ford social website](#) allows customers and Ford employees to engage in a dialogue about Ford vehicles including feedback on our products, recommendations for new products, and experiences they have had with their Ford vehicles. We also have established social media guidelines to ensure that Ford employees do "keep it real" in their discussions of the company on social media. For more information on these guidelines, please see the [Governance](#) section.



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## Building Customer Awareness

One important goal of our marketing and communications activities is to increase consumers' knowledge of our products and our corporate performance. We are particularly focused on improving consumers' awareness of the company's quality, safety, environmental and social performance. We use a wide range of communication methods to share information about Ford with potential customers and to get feedback from drivers. This Sustainability Report is one key element of that strategy. We also engage in two-way communications with consumers and other stakeholders through a variety of stakeholder engagement forums.

In 2012 we introduced a new global brand promise, which is summarized by the phrase "Go Further." Put simply, Go Further represents our culture and what makes Ford different from any other automaker. It promises that we are always going to go further to deliver a strong business that builds great products for a better world. While Go Further is used for marketing and advertising, it is much more than a tagline. It's about how Ford employees deliver ingenious products, make them available to everyone and believe in serving each other, our customers and our communities.

These communication efforts – coupled with delivering products of world-class quality, with world-class fuel economy, technology and other features – are paying off. From 2012 to 2013, we saw increases in favorable opinion for our brands in Germany, South Africa, and the U.K. We saw increases in purchase consideration for our brands in Germany, Mexico, South Africa, and Thailand. Some of the increases were quite large. For example, from 2012 to 2013 favorable opinion increased by 4 percentage points in South Africa, and purchase consideration increased by 11 percentage points in Thailand, 7 percentage points in South Africa.

In the U.S. market, fuel economy continues to be a top consideration for new vehicle shoppers. Advertising communications in 2013 were focused on telling Ford's fuel economy story with a specific focus on increasing awareness of EcoBoost®. The EcoBoost engine provides an "AND" solution by combining power and fuel efficiency. Ford nameplates were featured in the "AND not OR" campaign, which showed why a vehicle that gives an AND solution is so much better than having to choose between this OR that. By the end of 2013, familiarity of EcoBoost had increased by 25 percent compared to 2012.

We track consumers' familiarity with, opinion and consideration of, and shopping and purchase intentions in regard to our vehicles as part of our brand value and awareness tracking. Tracking these elements helps us to understand how consumers view our vehicles and where we need to focus our product development and communications efforts to improve consumers' perceptions of and interest in our vehicles.

## Social Media

Social media continues to be a mainstream communication channel, providing a relevant, quick and organic way to connect with consumers in the spaces they most like to visit. We continue to use established social media platforms such as Facebook, Twitter, Instagram, YouTube and Vine, while staying connected with the continuous entry of new platforms. We also engage with influencers within those platforms to build conversation, awareness and excitement about Ford products.

Ford was the first automaker to reveal vehicles via social media. We have been an innovator in this space by launching and publicizing vehicles through programs like Escape Routes, a campaign that combined social media and a primetime television reality show, and Fiesta Movement, an ongoing campaign using real Fiesta drivers as "agents" who fulfil special missions with their Fiestas each month and report on those missions through social media channels. We continued the Fiesta Movement program to support the launch of the 2014 Fiesta. For this campaign, we gave 100 social media influencers a 2014 Fiesta and everything they needed to undertake monthly missions based on themes such as Social Advocacy, Travel, Gaming and Adventure. Fiesta Movement Agents created, filmed and shared each mission in their own authentic voice. These missions as well as other communications that the agents socialized reached tens of millions of followers, via YouTube, Twitter,

Instagram and other social media platforms. Through this program, social advocates created over 14,000 pieces of content, delivering information to more than 3 billion potential users.<sup>1</sup>

We continue to actively use Twitter to engage with consumers on all matters, including customer service. We answer questions, provide information and give customers help when needed. The volume of requests we have handled through our @FordService Twitter account has more than tripled in three years, and our customer satisfaction rates for communications through this platform are 92 percent or higher. Twitter also remains the best resource for real-time assessment of what people are saying about us and provides us with a valuable platform for listening.

## Other Nontraditional Marketing

We use a range of other nontraditional marketing and communications efforts to increase awareness of our products and engage consumers and stakeholders. Through our Drive One campaign in North America, for example, we offer opportunities for people to experience our vehicles firsthand. The goal of Drive One is to encourage people who might not otherwise be considering a Ford product to see for themselves what we offer. Drive One is based on our belief that, when people drive our vehicles, they will have more positive opinions of our products and will be more likely to buy them. The campaign highlights Ford's four key brand pillars: safety, quality, green technologies and smart technologies.

We believe that supporting causes that are important to our customers is a key way to show our commitment to social responsibility and strengthen our community ties. We emphasize this approach through the "Drive One 4 UR School" and "Drive 4 UR Community" campaigns, started in 2007 and 2012 respectively. Through these programs, participants test-drive a new Ford vehicle and help raise money for their local high school or local nonprofit organization. Ford donates up to \$6,000 per event to fund school and nonprofit activities. These programs have been successful at both raising money for local organizations and raising consideration of Ford products. The programs have raised more than \$20 million for schools and nonprofit organizations since their inception. Feedback from participants shows that both purchase consideration and favorable opinion of the Ford brand improved after participating in the program.

Ford's interaction with NBC and The Tonight Show with Jimmy Fallon provide another example of our nontraditional marketing efforts. Mr. Fallon mentioned interest in purchasing a new truck during a broadcast, and Ford was first to respond to the call via Twitter. Mr. Fallon agreed that the F-150 King Ranch was the truck he wanted. Fallon then began a week-long contest to decide who he would buy the truck from featuring Ford sales consultants from Ford dealerships across the U.S. The winner of the contest earned the chance to sell Fallon the all-new 2015 F-150. Leveraging digital and social communications in tandem with broadcast television, the programming achieved many viewer impressions. During one particular 60-minute period, the promotion garnered nearly 26 million impressions via Twitter alone. This prelaunch effort provided tremendous exposure for an upcoming product.

## Traditional Advertising

Finally, we use traditional advertising to inform consumers about our products and our corporate performance. We use three primary advertising strategies: corporate-level communications about Ford Motor Company, advertising about our brands and specific products, and dealer-level product advertising. The goal of these advertising strategies is to sell vehicles. But just as important, we are aiming to increase general awareness about the excellence of our products and our corporate performance among people who are not yet in the market for a vehicle. To develop new products, we respond to market demands through our market research and product development efforts. Through our advertising, we hope to increase interest in and preference for our vehicles and our company, based on the excellence of our products and the positive actions of the company.

As part of our One Ford transformation, we are working to improve the effectiveness of our advertising communications by involving dealers more closely in the development of our advertising strategies. Dealers communicate with our customers every day, and they have special knowledge about consumers' needs and wants. We included our dealers from the start in our Drive One campaign. In fact, prior to developing Drive One, we sought input from our entire Ford dealer body, and that feedback informed the campaign's development. Together we arrived at a campaign that works at the corporate, brand, product and dealer levels.

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1. This includes agent content used with paid media platforms.



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Voice: Jim Vella

# Increasing Consumer Awareness of Environmental Issues

Ford is also working to increase consumer awareness of key vehicle-related environmental issues, including how drivers can help to improve the environmental performance of their own vehicles.

We offer consumers a “[fuel-efficient vehicle options](#)” website that explains our different electrified vehicle technologies and options. The site provides jargon-free explanations of the differences between hybrid electric vehicles, plug-in hybrid vehicles and all-electric vehicles, including details on the technologies that make them possible, such as battery chemistry, charge ports and regenerative braking. The site is part of Ford’s relentless effort to educate consumers about the choices offered by the company’s range of electrified vehicles and to help potential buyers determine which electrified option might best suit their specific driving habits and needs. Consumers who visit the site can review videos, text and cutaway diagrams that illustrate the differences between vehicles such as the Ford Fusion Hybrid, the Ford Focus Electric and planned Ford plug-in hybrids. The site does not offer opinions on which vehicle technology is better. Rather, it provides clear explanations about how gasoline, hybrid, plug-in hybrid and all-electric vehicles work, to help consumers decide which vehicle could be the best option for them. We also launched a [Plug Into Ford](#) website, which provides customers with an in-depth look at how to make the most of the electric vehicle lifestyle. Read more about our electric vehicles in our [Electrification](#) section.

We have developed a suite of purchasing tools to help fleet customers understand the most cost effective way to reduce the carbon emissions of their vehicle fleet, to understand the relative life cycle carbon emissions and fuel savings of different vehicle options, and to recommend specific vehicle purchase plans to achieve cost and emissions reduction goals. See our case study for [more information on these purchasing tools](#).

We are also educating drivers about environmental issues while they drive. For example, Ford’s advanced in-vehicle system – SYNC® with MyFord Touch™ – offers an array of real-time information on fuel-economy performance that can coach drivers to get more miles to the gallon and save on fuel costs. For example, SYNC with MyFord Touch enables drivers to monitor and track their vehicle’s real-time fuel-economy performance and mile-per-gallon averages for the past five, 10 and 30 minutes. In addition, the SYNC with MyFord Touch map-based navigation system offers an Eco-Route option that quickly calculates the most fuel-efficient route a driver can take to get from point A to point B.

In the U.S., our hybrid and other electrified vehicles offer a SmartGauge® with EcoGuide instrument cluster tool, which provides real-time fuel-economy data and promotes fuel-efficient driving by showing a graphic of growing leaves and flowers as drivers’ fuel efficiency improves. We launched a similar system in Europe called Ford EcoMode. Similar to EcoGuide, EcoMode helps educate the driver to achieve improved real-world fuel economy. It was first introduced on the Ford Focus ECOneric and will be implemented as an option in more European Ford models in the future.

For more information on how we are using in-vehicle information technology to help drivers improve their fuel efficiency, please see the [Vehicle Fuel Efficiency and CO<sub>2</sub> Emissions Progress and Performance](#) section.

We have also developed eco-driving tips that help drivers improve their fuel economy. We provide these tips on our website and through a Ford Driving Skills for Life online training program. We started providing eco-driving training in 2000 in Europe and have since expanded it to the U.S. and Asia. For more information on our eco-driving training programs, please see the [Vehicle Fuel Efficiency and CO<sub>2</sub> Emissions Progress and Performance](#) section.



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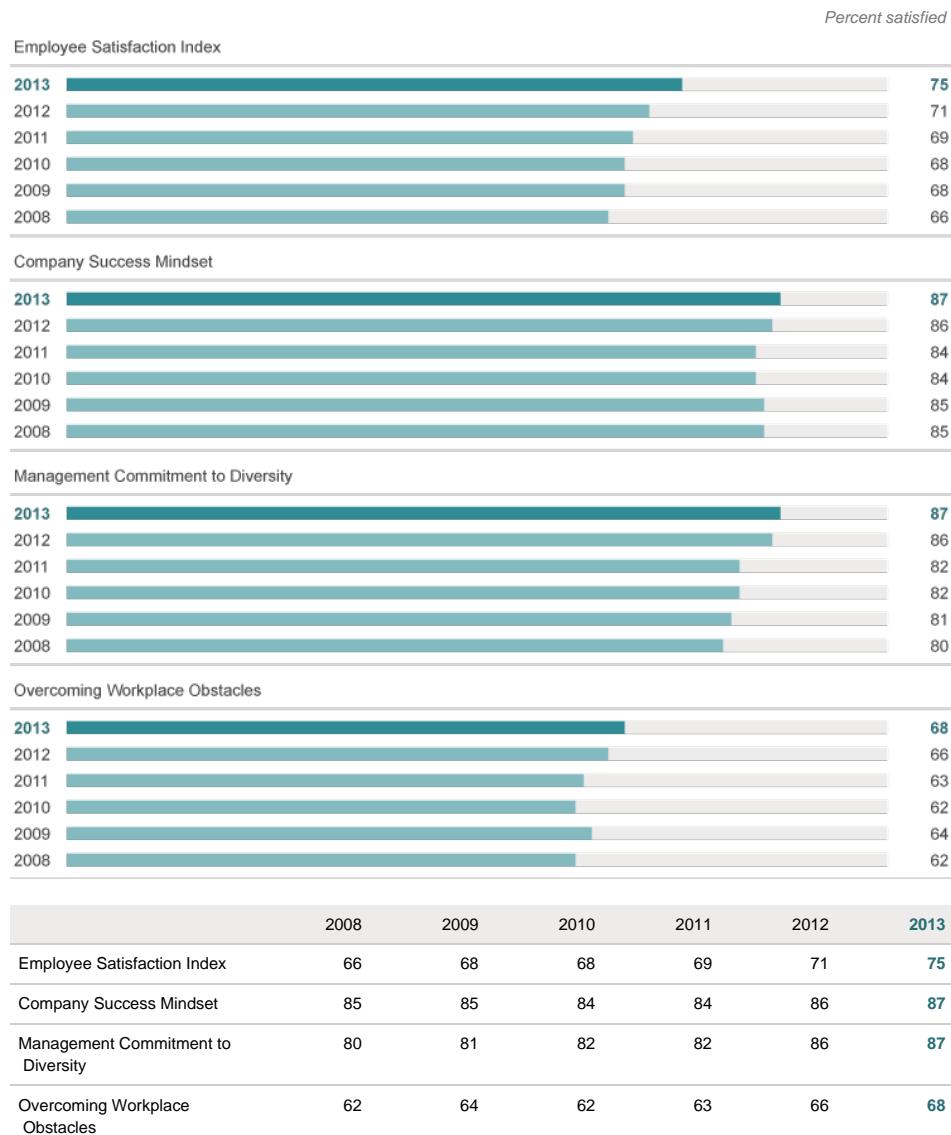
## Data: Engagement and Community

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View all data on this page as [charts](#) | [tables](#)

### A. Employee Satisfaction, Pulse Survey



## Data notes and analysis

Each year, we ask our salaried workforce to participate in the [Pulse survey](#) to gain insight into employees' overall satisfaction with the company, their jobs, diversity and other aspects of workplace satisfaction. In 2013, the Employee Satisfaction Index continued a 10-year trend of scores equal to or better than the prior year. The topic of Management Commitment to Diversity continued a seven-year trend of scores equal to or better than the prior year.

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## B. Overall Dealer Attitude

	Relative ranking on a scale of 1–100 percent					
	2008	2009	2010	2011	2012	2013
Ford (winter/summer score)	69/68	71/80	83/85	84/82	84/83	<b>84/85</b>
Lincoln <sup>1</sup> (winter/summer score)	66/64	66/71	71/62	61/64	68/67	<b>76/78</b>
Industry (winter/summer score)	73/72	70/74	75/78	80/81	81/81	<b>81/81</b>

### Data notes and analysis

1. Ford stopped production of Mercury with the 2011 model year. Beginning in 2011, the dealer satisfaction data for Lincoln dealers no longer include Mercury dealers.

Overall dealer attitude is measured by the National Automobile Dealer Association (NADA) Dealer Attitude Survey. Scores are for the winter and summer respectively of the year noted.

Approximately 54 percent of our Ford dealers and 52 percent of Lincoln dealers provided feedback through the 2013 NADA survey process. We remained consistent in many areas in this survey compared with our 2012 record improvements, including in our Regional Sales, Service and Parts Personnel rankings. In addition, Ford Motor Credit Company Capability rankings exceeded the industry and previous scores in nearly every category. Finally, Value of Franchise, Product Quality, Competitiveness, Policies and Procedures, and Vehicle Incentives also showed favorable results.

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## C. Employment by Business Unit



	2008	2009	2010	2011	2012	2013
Automotive	203,000	169,000	157,000	157,000	165,000	<b>175,000</b>
Financial Services	10,000	8,000	7,000	7,000	6,000	<b>6,000</b>
<b>Total</b>	<b>213,000</b>	<b>177,000</b>	<b>164,000</b>	<b>164,000</b>	<b>171,000</b>	<b>181,000</b>

Reported to regulatory authorities

### Data notes and analysis

All figures as of year-end. Historical employment figures from some years have been rounded and/or restated to align with financial reporting documents.

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## D. U.S. Employment of Minority-group Personnel and Women at Year-end

Percent

## Minority-group personnel – total



## Minority-group personnel – salaried



## Minority-group personnel – hourly



## Women – total



## Women – salaried



## Women – hourly



	2008	2009	2010	2011	2012	2013
Minority-group personnel – total	24	24	24	24	26	<b>27</b>
Minority-group personnel – salaried	23	23	22	22	23	<b>24</b>
Minority-group personnel – hourly	24	24	25	25	28	<b>29</b>
Women – total	23	23	22	22	22	<b>22</b>
Women – salaried	32	31	29	28	28	<b>27</b>
Women – hourly	18	17	18	18	19	<b>20</b>

Reported to regulatory authorities

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## E. Global Salaried Employees by Gender

Percent

2013

KEY Male  
Female

	2013
Male	74.3
Female	25.7

#### Data notes and analysis

For 2013, Ford began publicly reporting global salaried employees by gender.

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## F. Global Workforce by Region

Percent

2013

KEY North America  
South America  
Europe  
Asia Pacific Africa  
Financial Services

	2013
North America	46
South America	10
Europe	27
Asia Pacific Africa	13
Financial Services	3

Reported to regulatory authorities

#### Data notes and analysis

Numbers do not add to 100 percent due to rounding.

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## G. Voluntary Quit Rate by Major Markets (Salaried Employees)

Percent

2013

United States	1.4
Canada	1.2
Mexico	2.7
Brazil	2.4
Germany	0.5
United Kingdom	1.1
China	4.2
India	4.7
Thailand	9.5

#### Data notes and analysis

For 2013, Ford began publicly reporting voluntary quit rate by major markets.

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## H. Women in Middle Management and Above Positions by Region

	Percent
	2013
Americas	19.1
Asia Pacific Africa	16.7
Ford Credit	21.5
Europe	10.8
Global	17.0

## Data notes and analysis

In 2013, Ford began publicly reporting women in middle management positions by region.

## Related links

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## I. Corporate Officers by Gender and Minorities

	Percent
	2013
Male	90.5
Female	9.5
Minorities	19.0

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## J. Board of Directors Composition by Gender and Minorities

	Percent
	2013
Male	88.2
Female	11.8
Minorities	11.8

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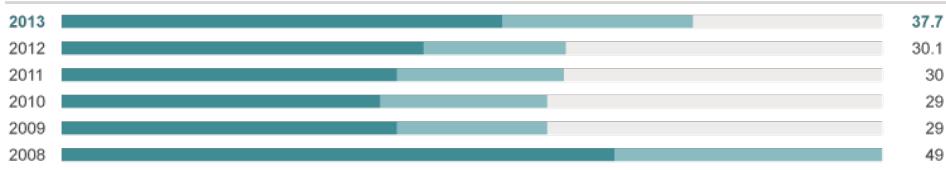
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## K. Charitable Contributions

\$ million



KEY     Ford Motor Company Fund  
      Corporate

	2008	2009	2010	2011	2012	2013
Ford Motor Company Fund	33	20	19	20	21.6	<b>26.3</b>
Corporate	16	9	10	10	8.5	<b>11.4</b>
<b>Total</b>	<b>49</b>	<b>29</b>	<b>29</b>	<b>30</b>	<b>30.1</b>	<b>37.7</b>

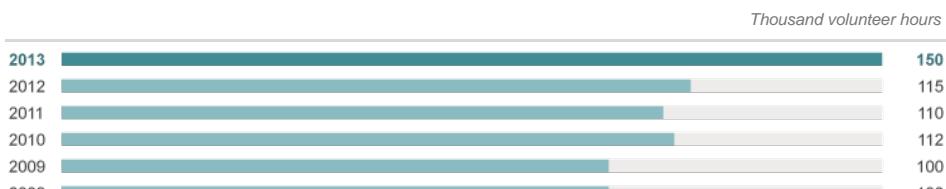
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## L. Volunteer Corps



2008	2009	2010	2011	2012	2013
100	100	112	110	115	<b>150</b>

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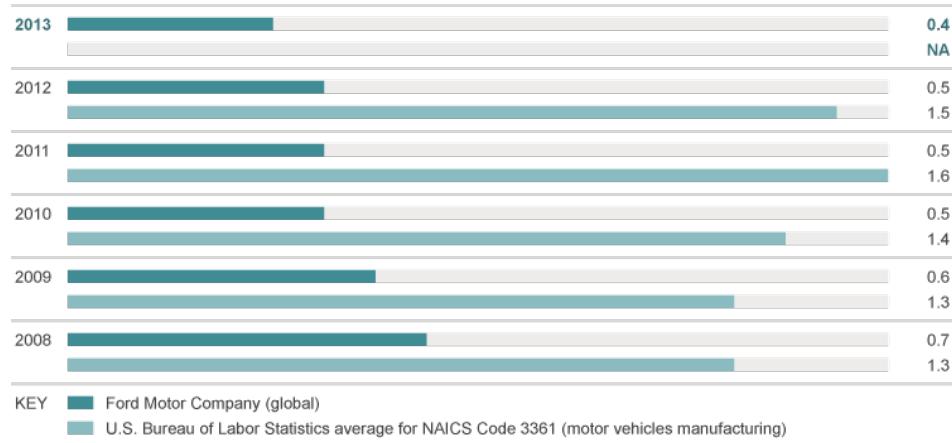
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### A. Global Lost-time Case Rate (per 100 Employees)

Cases with one or more days away from work per 200,000 hours



	2008	2009	2010	2011	2012	2013
Ford Motor Company (global)	0.7	0.6	0.5	0.5	0.5	0.4
U.S. Bureau of Labor Statistics average for NAICS Code 3361 (motor vehicles manufacturing)	1.3	1.3	1.4	1.6	1.5	NA

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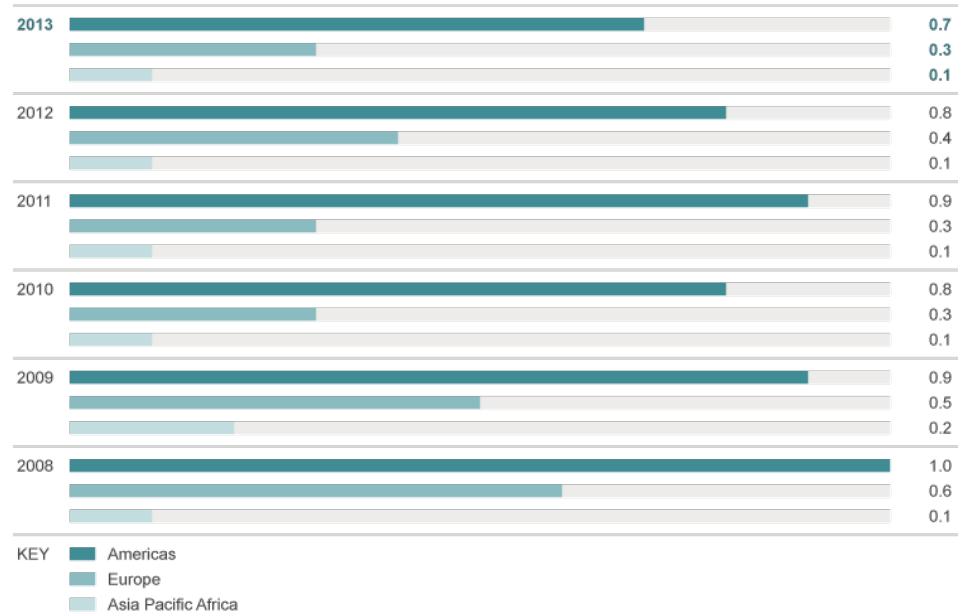
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### B. Lost-time Case Rate by Region (per 100 Employees)

Cases with one or more days away from work per 200,000 hours



	2008	2009	2010	2011	2012	2013
Americas	1.0	0.9	0.8	0.9	0.8	<b>0.7</b>
Europe	0.6	0.5	0.3	0.3	0.4	<b>0.3</b>
Asia Pacific Africa	0.1	0.2	0.1	0.1	0.1	<b>0.1</b>

Reported to regulatory authorities

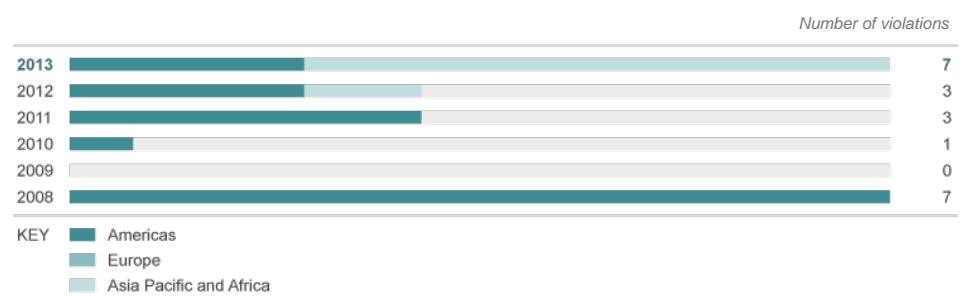
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## C. Workplace Health and Safety Violations



	2008	2009	2010	2011	2012	2013
Americas	7	0	1	3	2	<b>2</b>
Europe	0	0	0	0	0	<b>0</b>
Asia Pacific Africa	0	0	0	0	1	<b>5</b>
<b>Total</b>	<b>7</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>7</b>

#### Related links

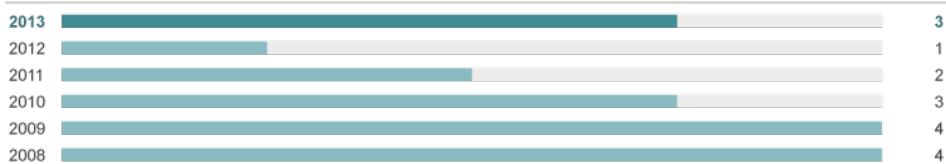
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## D. Global Fatalities

*Number of fatalities*



2008	2009	2010	2011	2012	2013
4	4	3	2	1	3

#### Data notes and analysis

Global fatalities data include Ford employees and contractors.

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Voice: Jim Vella

## Case Study: A Comprehensive Talent Management Strategy in Asia Pacific

Ford is no stranger to Asia Pacific and our history in the region runs long and deep. We sold Model As in Japan and India as early as 1905 and 1907, respectively, and Model Ts in China in 1913. In 1929 in Yokohama, Japan, we opened what was at the time considered a state-of-the-art manufacturing facility, boasting Asia's first moving assembly line.

But today's expansion in the region is unprecedented. Starting around five years ago, we saw the huge potential for growth in Asia and began an extraordinary ramp-up of new manufacturing facilities, especially in China, India and Thailand, to meet consumer demand for our vehicles.

But how do you build the pipeline of talented people necessary to run and manage operations that seemed to be exploding virtually overnight? You start with a comprehensive talent strategy that focuses on acquisition, retention and engagement – with a bit of lending on the side.

Kamali Rajesh, who has been with Ford for more than 13 years, took on the role of head of recruitment and learning and development for Asia Pacific in 2011 when Ford's expansion was firmly accelerating. Establishing a thorough strategy was imperative for our company to achieve our predicted 70 percent growth in the region over a decade – much of it in China.

"You can't accomplish your growth strategies if you don't have the people to back it up," Rajesh says. "We needed to develop a comprehensive talent strategy to support the business to deliver the growth."

Keep in mind that we've been hiring between 1,000 and 1,500 salaried employees each year in Asia Pacific for the past two to three years. That's a lot of talent to attract, develop and retain.

The stakes were – and still are – high. In China in particular, the environment for talent is incredibly competitive and the voluntary quit rate for manufacturing companies as a whole hovers around 15 percent. Employees are like customers; if you don't take care of them, someone else will.

In Asia Pacific, we have been working hard to develop, engage and retain our talent, which is reflected in Ford's lower-than-industry voluntary quit rate of approximately 5 percent (See more voluntary quit rate information in data table below.) and our steady increase in job offer acceptance rate (currently at 93 percent).

Rajesh was Asia Pacific's first director for recruitment – a new position for Ford – and her team got to work immediately by carving out what she calls the "Four Bs" of human resources: buy, build, borrow and bond. The buy, or recruitment strategy, includes campus hires, experienced hires and executive hires. Although Ford historically likes to promote from within, in Asia Pacific there simply haven't been enough individuals available to come up through the local ranks, necessitating a greater number of hires from other companies.

In 2013, we embarked on a unique campus recruitment initiative as part of the "buy" phase – first in China and later in India. We used childhood photographs of current employees to add a more personal touch. (See photos below). The campaign was a big hit, leading to a near doubling in the job application rate and a bigger pool of qualified candidates. To help recent graduates adjust to their new working environments, we offer a two-year training program that transitions students from campus life to corporate life. Approximately 300 individuals take part in this each year.



Next comes the "build" strategy, which focuses on developing the functional and leadership skill sets needed for a global company. We have a variety of learning and development programs, from classroom experiences to mentoring and on-the-job development opportunities, all of which are helping to grow the skills of our new employees and build a high-performing and capable organization.

The "borrow" strategy is necessary because we don't have the bench strength of people we need in the region

to oversee the building of new plants and production of new vehicle lines. So we borrow Ford talent from other regions who are essentially on loan to our Asian facilities for a few years at a time.

Rajesh sees the borrowing phase as an essential and integral part of our talent strategy, helping to fill the skill gap while also grooming emerging talent. Work force development is accelerated by the presence of experienced international employees who are guiding, teaching and coaching the new hires.

"The more we are successful with our buy and build strategy, the quicker we will catch up on our talent gap so we can reduce our reliance on the borrow strategy in the future," Rajesh says.

The last leg of the strategy is "bond," or the employee engagement element. Ford does not have the same historic reputation in Asia as it does in Detroit, for example, where many young people grow up wanting to work for Ford or have families with employment history with the company. Given this challenge, we must work doubly hard to position Ford as an employer of choice in Asia Pacific. We must earn the emotional investment of our people so they choose to stay with Ford and help us build a long legacy in Asia for the future.

Our commitment to creating and sustaining a corporate culture that is engaging and where employees feel like part of the Ford family is a key value proposition and a differentiating factor in this competitive marketplace.

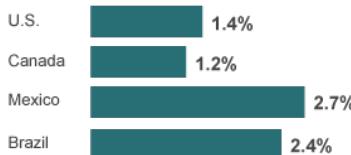
We have a lot to celebrate and be proud about, including several recent employee engagement awards in Asia Pacific (see box below). But there is much more to accomplish in support of our exploding regional growth. We believe our comprehensive "four Bs" strategy will be a critical enabler as we build and support our growing operations in Asia Pacific.

#### Recent HR Awards and Recognitions in Asia Pacific

- Asia Pacific Top 50 IDEAL® Employers – Universum
- China Top 100 IDEAL® Employers (2013 and 2014) – Universum
- China Best 100 Human Resource Management Award – 51job Inc. China
- Best Employee Engagement Program Award – 51job Inc. China
- Best CSR Program Award – 51job Inc. China
- China Top 10 Ideal Employer for 2014 Graduates – Nanjing University of Aeronautics and Astronautics Career Center
- Ford Lio Ho: Corporate Role Model, Friendly Workplace –Taoyuan County Government, Taiwan

#### 2013 Voluntary Quit Rates (salaried employees)

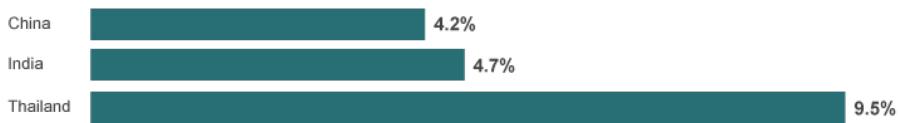
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> **Voice: Jim Vella**

## Voice: Jim Vella

President, Ford Motor Company Fund and Community Services

**“Even during our most difficult financial times, we continued to emphasize community and volunteerism. That was obviously a very difficult situation for a company that was losing billions of dollars and letting people go. But despite these challenges, Ford’s leadership team felt that giving back to the community is part of who we are.”**



Our founder Henry Ford believed that he could not build a strong business without a strong society and a strong community. That commitment has manifested itself over the decades in a number of ways, including through the volunteer work performed by our employees and through the Ford Motor Company Fund, which is focused on building strong communities everywhere we do business.

It's one thing to say that volunteerism is in the DNA of a company. It's another to be able to point to philanthropic relationships that have lasted generations. Case in point: Our relationship with Disabled American Veterans (DAV) dates back to 1922, when Henry Ford donated Model T's to transport wounded soldiers to the organization's second annual convention. We have supported this organization every year since.

Our efforts today are a logical extension of Henry Ford's early vision, and having Henry's great grandson, Bill Ford, at the helm of the company has pushed us even further. Bill Ford created the Ford Volunteer Corps after a devastating tsunami hit the Asia Pacific region in 2005. Bill asked us how we were responding, and we told him we had contributed \$1 million toward relief efforts. He said, "That's what every company does," and planted the seed for the corps. Our first Volunteer Corps project helped to rebuild fishing villages, schools and community centers that were destroyed by the tsunami. Today, the Volunteer Corps organizes thousands of our employees in projects all around the globe.

Even during our most difficult financial times, we continued to emphasize community and volunteerism. That was obviously a very difficult situation for a company that was losing billions of dollars and letting people go. But despite these challenges, Ford's leadership team felt that giving back to the community is part of who we are. We prided ourselves on being a good neighbor. And, with the auto industry as a whole in serious trouble, our neighbors needed us more than ever.

Having fewer resources meant we had to reconsider our charitable efforts because we couldn't be all things to all people. We assessed the community needs and evaluated how they aligned with our business. As a result, today we focus on three key issues: community life (which might include hunger relief, health, veterans support and other areas), education and automotive safety.

We also look at the unique contributions that Ford can make, rather than simply donating money. For example, we turned our Transit Connect vehicles into mobile food pantries to deliver food to people in the suburbs of Detroit – individuals who had not historically needed such services. We used our extensive experience in material handling and logistics to become much more efficient at recovering and delivering food in quantities that would make a meaningful difference.

Education is another top priority for Ford Motor Company Fund because it is a building block for success. If you have a strong education, you can get a job at Ford or in other industries that build wealth and create a sustainable society. Without a sustainable society, we don't have employees, we don't have customers, we don't have dealers and we don't have shareholders.

We're paying particular attention to developing STEM (science, technology, engineering and math) skills. From a parochial industry view, we need skilled employees to work at Ford and within our supply base to develop our next generation of products. From a broader perspective, our society as a whole needs more people to develop science and technology skills.

Our third area of focus is automotive safety. There is nothing more important to our company than the safety of our employees and our customers. Through our Driving Skills for Life program, we are teaching young people how to be safer behind the wheel. In emerging markets, such as China and India, the program focuses on first-time drivers – whether they are adults or teens.

Through all of our efforts, we work closely with our dealers, who truly are the face of Ford and are essential to helping us identify community needs.

One of the challenges of any community giving program is measuring impact and effectiveness. For example, we can tally how many meals we deliver to families in need – about 2 million in Michigan in 2013. But do we know if the kids we fed did better because they went to class on full stomachs? The entire nonprofit sector struggles with understanding such measurements. What we do know is that, over time, if we invest with the right partners and continue to do so strategically, we will make a difference in people's lives.

Employee engagement is critical to our success. Employees want to be engaged with their communities and enjoy the opportunity to give back. We can truly make a much bigger impact on social issues when we combine our financial resources with our people resources. It's not just about writing a check. It's about having our people there to help meet basic needs.

Ford is in the midst of its biggest global expansion in more than 50 years, adding jobs and facilities in both traditional and emerging markets. As our company grows, our community engagement work is growing with it. The outreach of the Ford Motor Company Fund will be an important part of building our brand and reputation.

Ford has been part of our communities through good times and bad, including depressions and world wars. In the U.S. especially, many people view Ford and our dealerships as a vital part of their communities. That's a unique attribute of this company. By engaging our people and our dealers on a one-to-one basis within our communities, we are more than a business. We are honoring Henry Ford's original vision of community support, and at the same time building on the company's legacy of giving back.

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## Ford Around the World

Around the world, Ford aims to deliver profitable growth for all. In all of our regions, we are taking actions to reduce the environmental impact of our products and facilities, support positive social change and ensure economic viability for long-term growth. Through the end of 2013, our business was organized into four regional segments: North America, South America, Europe, and Asia Pacific Africa.<sup>1</sup>



## GEARING UP FOR GROWTH IN ASIA PACIFIC AFRICA

The Asia Pacific Africa region is our fastest-growing market. China and India, in particular, are expected to continue to experience rapid and substantial growth in the next 10 years. In 2013, we introduced eight new vehicles in the region.

Read more about [FORD ASIA PACIFIC AFRICA](#)



## PROVIDING CONSUMER CHOICE IN SOUTH AMERICA

We continue to offer our customers in South America a wide range of choices, including the new generation Ford Fusion Hybrid. We are also adapting our global vehicles with advanced flex-fuel technology, enabling the use of locally produced ethanol.

Read more about [FORD SOUTH AMERICA](#)

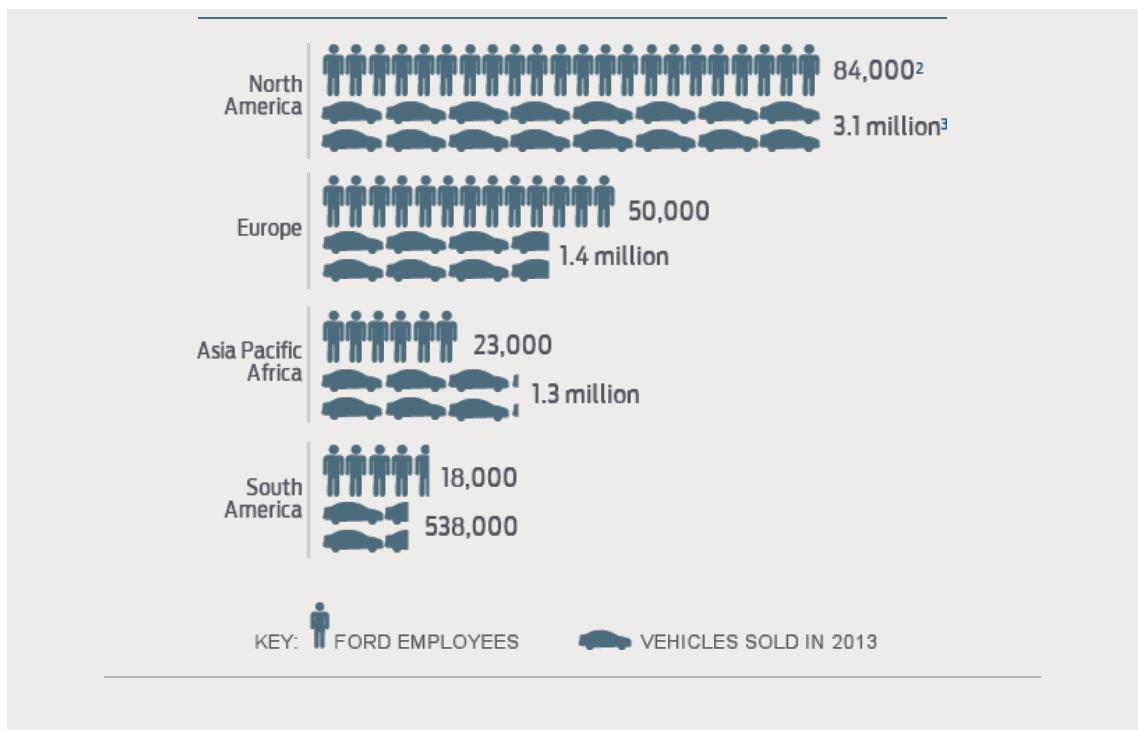


## REDUCING EMISSIONS IN EUROPE

Ford offers one of the broadest low-carbon-dioxide (CO<sub>2</sub>) vehicle portfolios in Europe, including our ECOnetic lineup of low-CO<sub>2</sub> vehicles with diesel powertrains, as well as vehicles powered by our advanced EcoBoost® gasoline engines. We began offering the all-electric Ford Focus Electric in Europe in 2013, and we will launch the C-MAX Energi plug-in hybrid and a hybrid version of the Mondeo in 2014.

Read more about [FORD OF EUROPE](#)

## OUR REGIONS AT A GLANCE



1. In 2014, we realigned our regional operating structure to create a new business unit – Middle East and Africa. In future years, we plan to begin reporting based on this new regional structure.
2. Employment figures are as of year-end 2013 and do not include employees of Ford Motor Credit or our unconsolidated joint ventures.
3. Vehicle sales numbers are wholesales.



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## Ford Asia Pacific Africa

Our Asia Pacific Africa (APA) region encompasses 11 markets – Australia, New Zealand, Japan, China, Taiwan, India, Thailand, Indonesia, the Philippines, Vietnam and South Africa – on three continents. The fastest-growing markets for automobiles are in rapidly developing countries like China and India. We expect 60 to 70 percent of our growth in the next 10 years to come from the Asia Pacific Africa region. Accordingly, we have increased (and are planning to increase further) our dealer networks and manufacturing capacity in the region. For example, we and our unconsolidated joint venture affiliates opened two new plants in China in 2013, and currently are building six additional plants in the region – four in China and two in India – all as part of our plan to reach production capacity of 2.7 million vehicles by mid-decade. These new state-of-the-art, highly-flexible manufacturing facilities will help us reach the goal of increasing worldwide sales to about 8 million vehicles per year by mid-decade.

### 2013 Performance Highlights

- Achieved record revenue, wholesales and market share in Asia Pacific Africa; full-year 2013 pre-tax profit at \$415 million, up \$492 million compared with 2012
- Launched eight new vehicles in the region
- Launched two new plants in China, building six new plants in China and India
- Made the fuel-efficient EcoBoost® engine available on 10 vehicles in APA
- Unveiled the all-new Ford Mustang
- Announced plan to expand research and engineering capability in China
- Invested more than US\$1.8 million in community projects to help build a better world
- Trained approximately 14,000 drivers through Ford Driving Skills for Life
- Adopted the 16-hour paid Community Service Leave policy in all Asia Pacific markets
- Plan to hire 6,000 new employees in 2014

### Awards

- Asia Pacific Top 50 IDEAL™ Employers – Universum
- China Top 100 IDEAL™ Employers (2013 and 2014) – Universum
- China Best 100 Human Resource Management Award – 51job Inc. China
- Best Employee Engagement Program Award – 51job Inc. China.
- Best CSR Program Award – 51job Inc. China
- China Top 10 Ideal Employer for 2014 Graduates – Nanjing University of Aeronautics and Astronautics Career Center
- Ford Lio Ho: Corporate Role Model, Friendly Workplace – Taoyuan County Government, Taiwan
- Ford Lio Ho: Excellent Enterprise Award – Green & Environmental Protection – Taoyuan County Government, Taiwan
- Advanced technology product in Vietnam for EcoBoost® Engine – Ministry of Science and Technology, Vietnam
- Golden Dragon Award, Vietnam's most prestigious business accolade — the Vietnam Economic Times Newspaper, Ministry of Planning and Investment, Ministry of Information and Communications, Vietnam Union of Scientific and Technology Associations, and the Vietnam Economic Association.
- Top Vietnam Service Brands Award (Green & Sustainable) – Ministry of Industry

& Trade, Vietnam

In addition:

- The Ford EcoSport was the most awarded vehicle in India, with 30 awards
- The Ford Figo was ranked highest in dependability in the Premium Compact Car segment in India by JD Power

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## Ford Asia Pacific Africa Welcome

 Here in Asia Pacific Africa, we are at an exciting time of rapid growth. And we want sustainability to go hand in hand with growth."

**Dave Schoch**, President, Ford Asia Pacific Africa



2013 was another year of records for Ford Asia Pacific Africa. We continued to make great progress in delivering our plan and our sustainability commitments related to our vehicles, our manufacturing sites and our engagement with local communities.

We achieved record market share in the region, with the successful launch of the Ford Kuga, Explorer, EcoSport, Fiesta, Mondeo, Focus ST, Fiesta ST and the refreshed Transit. Our full-year wholesale volume was up 30 percent to 1.34 million units. The Ford Focus was the best-selling nameplate in China for the second year in a row.

We opened the Changan Ford engine plant and Jiangling Motor Corporation Xiaolan Plant, and are building six new plants in China and India; we announced plans to expand our research and development facility in Nanjing, China, boosting the number of employees by more than 50 percent through 2018. We plan to add approximately 200 new employees each year, bringing the number of R&D employees in China to around 2,000 people.

On the environmental front, we have also made a big difference in 2013:

- We now offer 10 exciting vehicles in the region available with the EcoBoost® engine, up from four in 2012. The attractive combination of enhanced power and reduced emissions drove sales of EcoBoost vehicles up 250 percent in Asia Pacific Africa.
- We cut the amount of water used to make each vehicle by 15 percent in the region. Ford's Chennai Plant recycles 100 percent of its waste water, while Ford's Chongqing Assembly Plant 1 and Plant 2 (CAF1 and CAF2) in China both added advanced water treatment equipment to improve recycling. CAF1 recycled 93,000 tons of water in 2013 alone, and CAF2 reused 180,000 tons of water in vehicle production processes.
- We cut the energy used in our plants for producing each vehicle by more than 21 percent compared with 2011. All our plants have implemented the Energy Management Operating System, which helps us to do the same for less.

With the continuous support from the Ford Fund, we are bringing our Better World efforts to a new level. We offered free training to 14,000 new drivers through our Ford Driving Skills for Life program in Thailand, Indonesia, the Philippines, Vietnam, China, India, Taiwan and South Africa. We executed nine Operation Better World projects in India to help local people get better access to clean water, health care and education. We increased our support to green NGOs in China through the Conservation and Environmental Grants, China program, and Level Up!. During the Ford Global Week of Caring in September, 5,900 Ford employees and business partners across the region volunteered about 36,000 hours to work on more than 80 projects to help local communities.

Here in Asia Pacific Africa, we are at an exciting time of rapid growth. And we want sustainability to go hand in hand with growth. We are committed to continuing on our journey to build great products, a strong business and a better world, and deliver profitable and sustainable growth for all.

**Dave Schoch**  
President, Ford Asia Pacific Africa



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## Financial Health

### Snapshot: Ford in Asia Pacific

**\$6.7 billion**

Total Asia Pacific Africa investment by 2015<sup>1</sup>

**4**

New plants under construction in China

**2**

New plants under construction in India

**50**

New Ford vehicles and powertrains to region by 2015

**15**

New cars and SUVs to China by 2015

**6,000**

New hires in region for 2014

**49 million**

Anticipated annual vehicle sales in the Asia Pacific Africa region by 2020

### Related links

#### This Report

- [Financial Health](#)
- [Focus on Asia](#)
- [Case Study: Saving Lives in Rural India](#)
- [Case Study: A Comprehensive Talent Management Strategy in Asia Pacific](#)

Asia offers tremendous opportunities for our company. The fastest-growing markets for automobiles are in rapidly developing countries, especially China and India. China will remain the largest car market in the world for the foreseeable future, and India is projected to be the third-largest market in the world for the coming decade. By 2020, annual vehicle sales in the Asia Pacific Africa region will likely reach 49 million vehicles, with about 32 million of them in China.<sup>2</sup>

We estimate that 60 to 70 percent of Ford's growth in the next 10 years will come from this part of the world. Today, one in every five vehicles we sell globally is in Asia Pacific. By 2020, it will be one in three. Between now and the end of the decade, there will be a total driving age population of 2 billion in Asia Pacific, including 1.15 billion in China and 500 million in India, with their average annual income beyond the vehicle ownership threshold level (equal to approximately \$5,000 per capita GDP<sup>3</sup>).

To keep pace with this enormous growth, we are building new plants and expanding existing ones, hiring workers, growing our dealer networks, and further developing our supply chain across China, India and Thailand.

We are investing \$6.7 billion in Asia Pacific and currently employ some 23,000 people

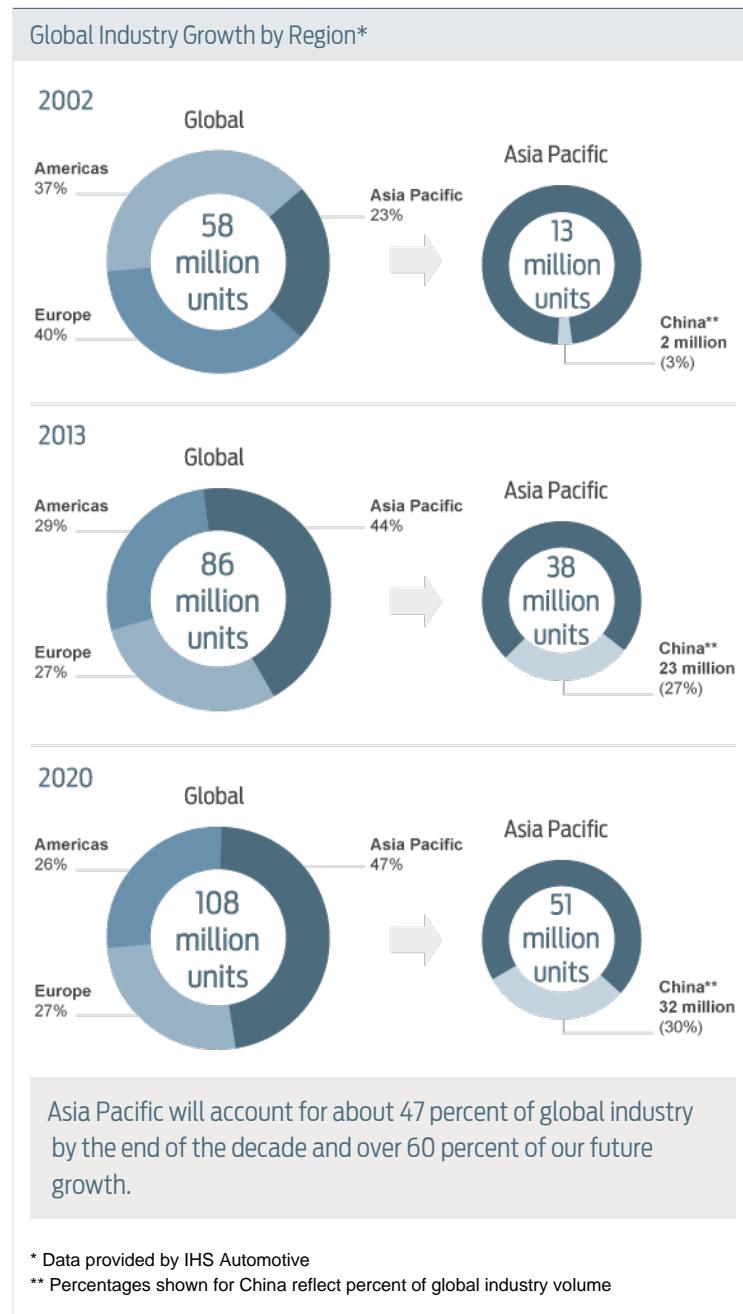
in our wholly owned and consolidated joint ventures in the region. We are building or have recently opened 10 new plants in Asia Pacific – seven in China, two in India and one in Thailand. By 2015 we'll have the capacity to produce 2.7 million vehicles in the region.

In 2014, we will open our Changan Ford Automobile (CAF) Chongqing #3 Assembly Plant and CAF Chongqing Transmission Plant in Chongqing, China – our largest manufacturing concentration outside of Michigan.

To fuel all of this growth, we plan to hire about 6,000 employees in Asia Pacific in 2014, the majority of them hourly. We also have announced plans to expand our research and development facility in China, where we now have our regional headquarters, boosting the number of employees by more than 50 percent through 2018. We plan to add approximately 200 new employees each year, bringing the number of research and development employees to around 2,000 people.

Our strategy in Asia Pacific continues to be to grow aggressively with an expanding portfolio of global products with manufacturing hubs in China, India and Thailand.

Our market share in the region was a record 3.5 percent for 2013, up by 0.7 percentage points compared with 2012. The improvement was driven by China, where our market share for the full year rose to a record 4.1 percent, up by 0.9 percentage points compared with 2012.

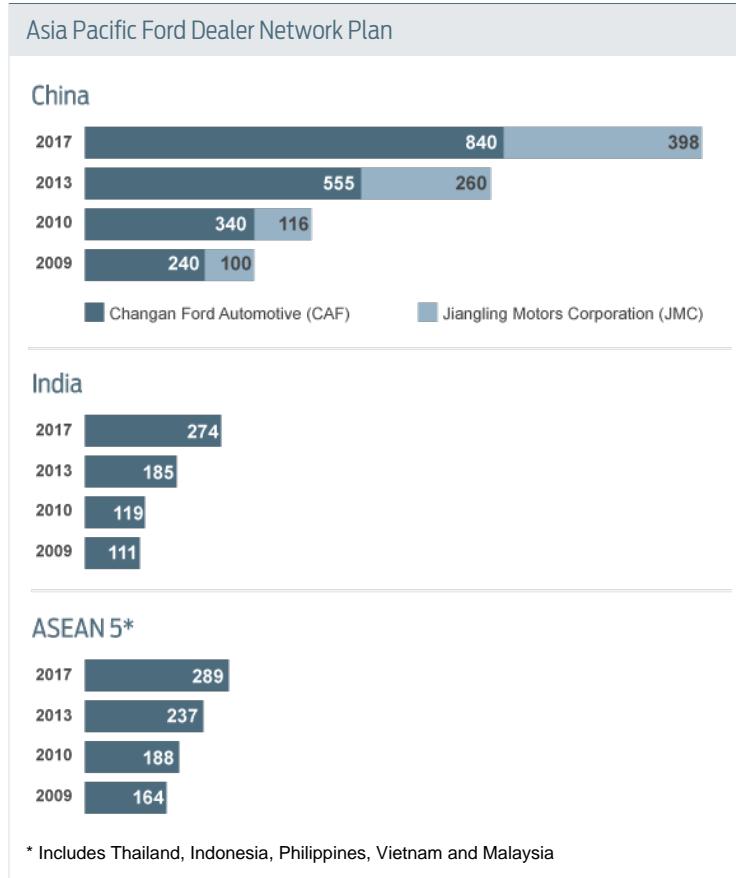


In China, we manufacture and sell passenger vehicles through our joint venture Changan Ford Automobile (CAF), in which we have a 50 percent stake. Commercial vehicles like the Ford Transit are manufactured and sold through Jiangling Motors

Corporation (JMC). Ford owns a 32 percent stake in JMC.

In 2013, we added about 100 dealers in China, bringing the total number of Ford dealers in China to over 600. This doesn't include new Lincoln dealers in China, which we are in the process of recruiting. We will be bringing the Lincoln portfolio to China in the second half of 2014 to tap into the luxury car segment in one of the world's most important auto markets.

In India, meanwhile, the number of dealers is projected to grow by 22 percent between 2013 and 2015. India is becoming a global export hub for Ford.



Small cars account for 57 percent of our Asia Pacific Africa industry sales volume and are anticipated to continue to benefit from favorable government policies. According to industry consultancy IHS Automotive , the Ford Focus was the best-selling nameplate in China in 2012 and 2013. The Ford Focus sold 403,640 wholesales in China in 2013, up 36 percent from 296,360 wholesales in 2012. We have continued this success with the introduction of the all-new Ford EcoSport in 2013. The EcoSport is based on Ford's global B-car platform, like the Fiesta, and was developed from a previous-generation model that has proved extremely popular in South America since its launch in 2003.

At the same time, we know that our long-term success in these developing and revitalizing economies will depend on our offering new types of mobility solutions that are sustainable and tailored to the unique needs of these markets. Our [Blueprint for Mobility](#) is aimed at ensuring we do just that. During 2012, for example, we kicked off a novel project in the region of Chennai, where we have manufacturing operations. The project, called SUMURR (Sustainable Urban Mobility with Uncompromised Rural Reach), made use of a Ford Endeavour that was designed to handle difficult terrain and traverse areas previously unreachable by four-wheeled vehicles. Medical professionals traveled in the Endeavour to reach their patients and to transport those patients to clinics. The health care teams also could use their laptops and cell phones to connect – via a wireless connection – to doctors and medical records. In all, 41 pregnant women delivered healthy babies thanks in large part to the Ford pilot project. SUMURR ultimately reached another 3,100 people as our partners traveled to 54 villages to build community awareness on issues of maternal and child health. Following the success of the pilot, we're exploring similar programs in other parts of rural India and in other countries where we have manufacturing operations. Ford invested about \$250,000 directly in the project, plus significantly more in terms of the time and expertise of our staff.

For a discussion of our global economic impact and financial health, please see the [Financial Health](#) section, including a [Focus on Asia](#), and more about our [SUMURR project](#). You can also read more about our talent attraction strategy in the People section [Case Study: A Comprehensive Talent Management Strategy in Asia-Pacific](#).

- 
1. In U.S. dollars for the time period of 1995 through 2015.
  2. IHS Automotive
  3. In 2005 constant dollars at the purchasing power parity exchange rate.

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## Ford Asia Pacific Africa

# Climate Change and the Environment

At Ford, we have been working for many years to reduce the environmental impacts of our vehicles and operations.

For example, we are doing our part to prevent or reduce the potential for environmental, economic and social harm due to climate change. We have a science-based strategy to reduce greenhouse gas (GHG) emissions from our products and operations that focuses on doing our share to stabilize carbon dioxide (CO<sub>2</sub>) concentrations in the atmosphere. We are on track to meet the central elements of our strategy: For each of our new or significantly refreshed vehicles, we will continue to offer a powertrain with leading fuel economy, and we are reducing GHG emissions across our global product portfolio.

We're delivering on this commitment in our Asia Pacific Africa (APA) region by introducing small cars, fuel-efficient gasoline engines and alternative-fueled vehicles. In China, we have announced that Ford will bring 20 new engines and transmissions to the country and improve fuel economy by up to 20 percent (compared to 2010) by 2015.

In Asia Pacific Africa, we are launching more vehicles equipped with the EcoBoost® engine in response to growing consumer demand for more fuel-efficient vehicles. We will offer EcoBoost engines in 20 vehicles in Asia Pacific Africa by mid-decade, a five-fold increase from 2012. In 2013, EcoBoost was available in 10 vehicles in the region. The 1.0L I-3 EcoBoost was introduced in the region for the first time on the Ford Fiesta, available in Australia, China, New Zealand, Taiwan and ASEAN, and on the Ford EcoSport, available in Australia, China, India and New Zealand. Also in 2013, the 1.5L I-4 EcoBoost was available on the new Mondeo in China, making it the first vehicle at Ford to include the newly introduced 1.5L EcoBoost engine. We also offer the 1.6L and 2.0L I-4 EcoBoost variants on the Edge, Kuga, Mondeo, Falcon, Focus ST and Fiesta ST. In March 2014, Ford's joint venture, Changan Ford Automobile Co., Ltd. (CAF), began producing 1.0L EcoBoost engines at a new engine plant in Chongqing to power the Ford Fiesta and EcoSport vehicles built for China.

The fuel-efficient EcoBoost engines are being well received by our customers in the Asia Pacific Africa region. In 2013, sales of EcoBoost-equipped vehicles in the region rose by 250 percent compared to 2012. Seventy-seven percent of the Ford Mondeos and 90 percent of the Ford Edges sold in China are equipped with EcoBoost engines.

In China, Ford will upgrade its entire powertrain portfolio with 20 advanced engines and transmissions to support its aggressive plan to introduce 15 new vehicles to China by mid-decade. These advanced, fuel-efficient technologies – including turbocharging, direct injection, twin independent variable camshaft timing (Ti-VCT) and six-speed transmissions – will deliver more than a 20 percent improvement in fuel economy to Ford's passenger vehicle fleet in China by 2015, which represents a key part of Ford's near-term sustainability goals in China.

In India, we are also continuing to introduce vehicles with excellent fuel economy. In 2013, we introduced the all-new Ford EcoSport with a 1.0L EcoBoost, the first vehicle in India to have this technology. We also continue to offer the Ford Fiesta – powered by TDCi diesel powertrain developed for India – that delivers class-leading fuel economy and reduced CO<sub>2</sub> emissions. This builds on fuel economy leadership established with the Ford Figo, launched in March 2010, which has two engine options: a best-in-class, fuel-efficient 1.4L TDCi diesel and a very competitive 1.2L gasoline engine. In Australia, we introduced the 1.0L EcoBoost on the Fiesta and all-new EcoSport. We also offer EcoBoost versions of the Ford Mondeo, Falcon, Fiesta ST, Focus ST and Kuga. Also in Australia, we offer our EcoLPi liquid-injection liquefied petroleum gas (LPG) system for the Falcon, providing customers with the most advanced LPG technology on the market. The Falcon EcoLPi fuel system improves fuel economy by 12 to 15 percent, while also improving power by approximately 27 percent over the prior LPG Falcon model.

#### Related links

##### This Report

- Climate Change and the Environment
- Asia Pacific Policy

As a technology leader in biofuels, Ford will continue to develop and introduce flex-fuel vehicles that meet market needs throughout the APA region. All current Ford models are compatible with ethanol blends of 10 percent (E10), with the Ford Focus and Ford Escape compatible with ethanol blends of 20 percent (E20).

We are also addressing non-CO<sub>2</sub> tailpipe emissions in the region. Since 2010, our new gasoline-fueled passenger vehicles have been designed to comply with China IV requirements (based on Euro 4 standards). China began implementing more recent European standards (Euro 5) in Beijing in 2013. Korea and Taiwan have adopted very stringent U.S.-based standards for gasoline vehicles and European-based standards for diesel vehicles. Japan, which has unique standards and test procedures, began implementing more stringent standards in 2009. Ford is working to comply with all of these standards using a variety of approaches, including on-board diagnostics and after-treatment technologies.

In terms of facility-based emissions, we monitor greenhouse gas emissions at our plants, and we were the first automaker in China to voluntarily report greenhouse gas emissions at our plants. In 2013, Ford became the first automaker to join the voluntary Greenhouse Gas Reporting Program in India, a joint effort between the World Resources Institute, The Energy and Resources Institute and the Confederation of Indian Industry. One way we're reducing greenhouse gas emissions is by bringing new technology into the plants, such as the "3-Wet High Solids" paint process, which allows multiple coats of paint to be applied without having to bake each one dry first. This saves an enormous amount of energy in the drying process, reduces CO<sub>2</sub> emissions and cuts the amount of waste chemicals produced. The Chongqing 2 Plant, Jiangling Motor Corporation Xiaolan Plant, India Chennai Plant and Ford Motor Thailand Plants used this and other initiatives to reduce the carbon footprint of their manufacturing. Ford's upcoming new integrated facility in Sanand, Gujarat, in northwest India will employ the most efficient and environmentally friendly technologies, including Ford's rotational dip technology and the 3-Wet process, dramatically improving paint quality, depth and durability, as well as significantly reducing volatile organic compound emissions, CO<sub>2</sub> emissions and waste.

For a discussion of our global climate change impacts, policies and commitments, please see the [Climate Change and Environment](#) section.



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## Ford Asia Pacific Africa Vehicle Safety

At Ford, we design and manufacture vehicles that achieve high levels of vehicle safety for a wide range of people over a broad spectrum of real-world conditions.

In our Asia Pacific Africa region, the Ford Kuga and EcoSport have received five-star ratings in the China New Car Assessment Program (C-NCAP) testing. The Fiesta also received a five-star rating in the inaugural ASEAN NCAP. And the Kuga earned a five-star rating in the Australasian NCAP.

We have developed an array of programs and technologies that help to encourage safer behavior on the roadways for both experienced and novice drivers. For example, Ford Driving Skills for Life (DSFL), Ford's driver education program, demonstrates our commitment to help new drivers to improve their driving skills. In our Asia Pacific Africa markets, Ford DSFL is aimed at novice drivers of all ages. In this region the program places equal emphasis on safe driving and eco-driving, as customers are interested in both. Approximately 14,000 drivers in this region were trained in 2013. In 2014, we will continue the program in mainland China, India, Taiwan, Thailand, Indonesia, Vietnam and the Philippines, as well as expand to Malaysia and Myanmar, to train another 15,000 people. More than 77,000 people have been trained in the Asia Pacific region since the program began.

The Ford DSFL training addresses the local driving environment and specific needs of drivers in each Asian market. In China, for example, Ford DSFL added a segment on the use of child safety seats after a new regulation went into effect there. In Indonesia, Thailand and several other Asia countries, sessions were added tailored for female drivers. In Vietnam, Ford DSFL launched a "No Honking" campaign to reduce the adverse effects on road safety of the prevalent and inappropriate use of vehicle horns. Ford DSFL also launched campaigns in India and China inviting drivers to "pledge to drive safe;" this campaign will expand into more countries in 2013. (See the [Pete Hardigan](#) voice for more about Ford DSFL in Asia Pacific Africa.)

In 2013, we also rolled out the Future of Safety Tour with an event in the Philippines to promote road safety among consumers and encouraging safe driving. In addition, we demonstrated Ford's advanced technologies to highlight our commitment to safety.

See the [Vehicle Safety and Driver Assist Technologies](#) section for more on our vehicle safety technologies and activities.

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- ➔ [Vehicle Safety and Driver Assist Technologies](#)
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##### External Websites

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## Ford Asia Pacific Africa Supply Chain

The automotive supply chain is one of the most complicated of any industry. Automakers like us rely on thousands of suppliers to provide the materials, parts and services necessary to make our final products. In today's economic environment, achieving lower costs, improving quality and meeting sustainability goals require an unprecedented level of cooperation with suppliers, as well as strong supplier relationships. Ford and its suppliers must work jointly to deliver great products, have a strong business and make a better world.

The basis of our work with suppliers is the Ford Code of Human Rights, Basic Working Conditions and Corporate Responsibility, which applies to our own operations as well as our \$100 billion supply chain. The Code addresses workplace issues such as working hours, child labor and forced labor, as well as nondiscrimination, freedom of association, health and safety, the environment and other issues.

We work to ensure that Ford and our suppliers have management systems in place to mitigate potential risks, ensure continuity of supply and improve the overall sustainability of the complex global automotive supply chain. Our aim is to leverage our supply chain – and our industry – to make a positive impact in the markets in which we do business.

We take a three-pronged approach to creating a sustainable supply chain and managing sustainability issues throughout our supply chain:

- Building strong relationships with suppliers and engaging strategic suppliers,
- Developing shared commitment and supplier capability, and
- Working on cross-industry initiatives.

In 2013, we held joint industry trainings through the Automotive Industry Action Group (AIAG) in Brazil, Mexico, South Africa and Turkey. We also held trainings in Romania in conjunction with CSR Europe. More than 230 Ford suppliers attended these classroom sessions. These trainings included both in-person classroom training sessions and e-learning trainings.

To date, we have conducted approximately 145 training sessions globally, attended by nearly 2,100 supplier companies. (This figure includes dedicated Ford supplier training sessions conducted with the AIAG as well as industry training sessions in which Ford participated along with the AIAG and other automakers.) Because attendees are required to subsequently cascade the training and expectations to the entire factory population and suppliers, these trainings indirectly reach even more companies and individuals. Through this cascading process, the training of suppliers globally since the inception of the program has impacted more than 2,900 supplier representatives, who in turn have cascaded the training information to nearly 25,000 supplier managers and more than 485,000 individual workers as well as over 100,000 sub-tier supplier companies.

Suppliers trained in 2013 have now moved on to the process of self-assessing their facilities for compliance with local law and Ford expectations and communicating expectations to their own workers and their suppliers.

In 2014, we plan to conduct additional supplier training sessions in conjunction with either AIAG or CSR in Brazil, China, India, Mexico, Russia and Turkey. Where possible, these courses will be open to any interested company; thus Tier 1 suppliers will have the option of asking their own suppliers to attend. The intent is, once again, to increase the scope of impact of the training sessions, and push human rights and working conditions expectations further down the supply chain.

For a discussion of our global commitment to supply chain sustainability and detail on

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the status of our working conditions assessments, please see the [Supply Chain](#) section.

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Ford Asia Pacific Africa

## Water

At Ford, we have focused on reducing our water impacts since 2000 when we first began setting year-over-year reduction targets as part of our Global Water Management Initiative. Our efforts around water have evolved over the years; we have moved beyond merely reducing the water footprint of our own facilities to working more holistically outside our corporate walls, addressing water concerns in our supply chain and our broader communities.

We are conducting water assessments to help us gain a better understanding of our internal water usage. As of early 2014, we have conducted assessments at 12 global sites including Changan Assembly 2 in China and AutoAlliance in Thailand, and continue to add new plants for assessment each year. We are in the process of evaluating the results to determine what measures can feasibly be taken to reduce water and save our company money at the same time.

Ford has successfully implemented many water-saving initiatives across our plants to shrink our water footprint. For example, we have implemented a membrane biological reactor and reverse-osmosis process to recycle water from our on-site wastewater treatment plants in a number of our global production facilities that are located in more arid regions. This allows us to avoid using high-quality water suitable for human consumption in our manufacturing processes. By doing so at plants in Chihuahua and Hermosillo, Mexico; Pretoria, South Africa; Chennai, India; and Chongqing, China, we have been able to reuse more than 976,000 cubic meters of water, which means we have not had to withdraw that water from the environment.

In Pretoria, for example, our \$2.5 million on-site wastewater treatment plant at the Silverton Assembly Plant is increasing the amount of water that can be reused by up to 15 percent. In the Chennai Assembly Plant we have been able to recycle 100 percent of our industrial waste water back into the process by using a three-stage reverse-osmosis technique and mechanical evaporation. And two assembly plants in Chongqing, China, added advanced water treatment equipment to improve recycling. One plant recycles an average of 100,000 gallons daily while the other recycles an average of 65,000 gallons daily.

We continue to replicate new technologies, including a process known as "dry-machining" that lubricates cutting tools with a fine spray of oil, rather than the conventional "wet-machining" that required large amounts of metal-working fluids and water to cool and lubricate the tools. For a typical production line, dry-machining – also known as Minimum Quantity Lubrication, or MQL – can save more than 280,000 gallons of water per year. We currently have the capability in six plants around the world including Changan Ford Engine Plant – and this number will nearly double in the next few years.

We're also investing in water stewardship projects around the world, especially in areas where access to potable water is limited. As we expand into new markets in more water-stressed regions, we are increasing our engagement with local communities on water issues. In 2013, we increased our focus on water-related projects by funding a number of projects, including ones that provide clean drinking water facilities in disadvantaged parts of China and India. For example, in India we piloted an initiative to provide safe drinking water to the community around our upcoming manufacturing facility in Sanand Gujarat in partnership with Ahmedabad-based nongovernmental organization, Saath Charitable Trust. The first phase of the initiative will ensure safe drinking water for close to 1,500 children between the age of three to six years, covering 18 villages in Sanand with the aim to progressively expand to 70 villages.

Our Ford Motor Company Volunteer Corps, meanwhile, is placing a priority on water-based community projects during our Global Week of Caring and Accelerated Action Days. In 2013, the Ford Fund supported several water-related projects in Asia Pacific

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Africa, including in Australia, China, India, Malaysia, South Africa and Thailand. Projects ranged from cleaning up waterways and coastlines to providing new water pumps that will bring clean water to schools.

For a discussion of our global commitment to water issues, please see the [Water](#) section.

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## Ford Asia Pacific Africa Community

Ford Motor Company has a long legacy of compassion. More than 100 years after the company began, we continue to touch lives. Our commitment to supporting local communities through charitable contributions and volunteer efforts has remained unwavering.

As we continue to expand our business in new markets across the globe, we are also expanding our community investment and volunteering efforts internationally. In 2013, we continued to expand our global reach through our Operation Better World program. Launched in 2012, Operation Better World is a coordinated, strategic approach to how Ford engages with communities everywhere that we do business. In 2013, we expanded the program from India and China to South America, Mexico and Europe. Through this program, the Ford Fund cooperates with nongovernmental organization partners in four key areas: education, auto safety, community needs and sustainability (with a focus on water). The Ford Fund works to ensure that programs meet local community needs, align with the One Ford business plan, have a measurable impact and, where possible, can be replicated in other markets. This grassroots engagement in the community is implemented and led by the local Ford teams in each region.

Throughout the Asia Pacific Africa region, Ford has made a positive impact on communities and the environment through Operation Better World initiatives such as the annual Conservation and Environmental Grants China program, Level Up!, the Global Week of Caring and the Ford Driving Skills for Life program, which teaches drivers about fuel efficiency as well as safety (as discussed in the [Vehicle Safety](#) section).

Conservation and Environment Grants, China (CEGC) is the company's flagship philanthropic program in China, focused on supporting grassroots environmental/sustainability nongovernmental organization (NGO) leaders and their organizations. Over the past 14 years, Ford of China has awarded RMB 16.1 million (U.S. \$2.6 million) in grants to 325 grassroots environmental leaders and NGOs. In 2013, Ford Fund investment allowed Ford of China to expand the CEGC program, linking it to employee volunteerism and to rewarding environmental NGOs that bring environmental protection and participation into the everyday lives of people in communities, allowing communities to become leaders in their own environmental protection.

In 2012, Ford Fund with Ford of China launched the Level Up! initiative, designed to build the organizational capacity of over 100 grassroots environmental NGOs in China. Through this program, over 70 percent of environmental groups in Beijing, Shanghai and Kunming are undergoing significant organizational change and development. Efforts include workshops and training for grassroots environmental leaders, coaching and mentoring projects, capacity-building, training and development, and assistance in building grassroots support networks for more than 100 NGOs.

Ford's Global Week of Caring is one of the cornerstone programs of the Ford Volunteer Corps. It includes a week of volunteer events across all of Ford's operating regions. Activities in 2013, our eighth year, included building temporary shelters for homeless children in China, providing clean drinking water facilities in disadvantaged parts of India and South Africa, participating in environmental restoration activities in Australia, as well as a range of community, education and environmental projects around the world. While it is difficult to measure the larger positive impact of these actions, we know, for example, that by building wells in India and South Africa through our Global Week of Caring projects, we have enabled girls in local villages, who would otherwise have to walk miles to gather water for their families, to attend school instead. Our [People](#) section contains a full list of our Global Week of Caring and other volunteerism efforts in the Asia Pacific Africa region and elsewhere.

In early 2014, we also announced the Happy Schools program at the Jaipur Literature

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Festival in India. The Happy Schools program aims to improve access to holistic education in primary schools by addressing gaps in academic support, health and nutrition. Ford will partner with NGOs working in the field of education to collectively conceptualize and design a social intervention model that will address the identified gaps. In the initial phase, a pilot model will be created and implemented in select government primary schools in close proximity to Ford's areas of operations — Tamil Nadu, Gujarat and Haryana.

For a discussion of our global commitment to our stakeholders, please see the [People](#) section.

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## Ford of Europe

Ford of Europe is responsible for producing, selling and servicing Ford-brand vehicles in 50 individual markets, and employs approximately 50,000 employees at its wholly owned facilities, or approximately 67,000 people when joint ventures and unconsolidated businesses are included. Ford of Europe operations include a Ford Customer Service Division and 22 manufacturing facilities (13 wholly owned or consolidated joint venture facilities and nine unconsolidated joint venture facilities), as well as Ford Motor Credit Company. The first Ford cars were shipped to Europe in 1903 – the same year Ford Motor Company was founded. European production started in 1911.

## 2013 Performance Highlights

- We began offering the all-electric Ford Focus Electric in Europe in 2013, and we will launch the C MAX Energi plug-in hybrid and a hybrid version of the Mondeo in 2014.
- The Ford Focus 1.0L EcoBoost® has become the first non-hybrid gasoline family car in Europe to break the 100 g/km carbon dioxide (CO<sub>2</sub>) barrier. The Focus 99 g/km, extends to 13 the line-up of vehicles that deliver CO<sub>2</sub> emissions of less than 100 g/km, and also is Ford's most fuel-efficient family gasoline car ever – returning 4.3 l/100 km (65.7 mpg)<sup>1</sup>.
- We achieved 10 percent of the planned 25 percent manufacturing energy savings throughout Europe.
- In the 2013 European New Car Assessment Program (Euro NCAP) assessments, the Ford Tourneo Connect earned a five-star safety rating. In addition, the vehicle received the Euro NCAP's Best in Class recognition for the highest safety performance scores in the vehicle segment.
- Ford has an industry-leading total of seven Euro NCAP Advanced rewards, for our Lane-Keeping Aid, Active City Stop, Forward Alert, Lane-Keeping Alert, MyKey®, Emergency Assistance and Driver Alert technologies.
- In late 2013, we launched Ford Driving Skills for Life (DSFL) for the first time in Europe. Ford will invest €1.5 million in the first year of this program alone to provide free hands-on training to 5,000 young drivers in the U.K., Germany, France, Spain and Italy, and to thousands more through our online program, The Academy.

## Awards

- Our 1.0L EcoBoost engine was named International Engine of the Year in 2012 and 2013 by a panel of auto journalists.
- This engine was also awarded with the Paul Pietsch Award 2013 for technological innovation by a panel of all 31 editors-in-chief of *Auto Motor & Sport* and all partner magazines around the world.
- This engine has earned another major accolade: the Society of Motor Manufacturers and Traders Award for Automotive Innovation 2013.
- The Ford Fiesta with 1.0L EcoBoost was named Clean City Car of the Year 2013 in Belgium.
- In Italy we were presented with the Campus MENTIS\* Company Award in recognition of our contribution to education and social responsibility through Ford DSFL. The award honors innovative education projects that engage young Italians.
- In Germany in early 2013, we received an Engagement of the Year 2012 award from the state of North Rhine-Westphalia. This award honors Ford's Community Involvement Program in Germany as a role model for corporate citizenship.

1. The declared fuel consumption and CO<sub>2</sub> emissions are measured according to the technical requirements and specifications of the European Regulations (EC) 715/2007 and (EC) 692/2008 as last amended. Fuel consumption and CO<sub>2</sub> emissions are specified for a vehicle variant and not for a single car. The applied standard test procedure enables comparison between different vehicle types and different manufacturers. In addition to the fuel efficiency of a car, driving behavior as well as other nontechnical factors play a role in determining a car's fuel consumption and CO<sub>2</sub> emissions. CO<sub>2</sub> is the main greenhouse gas responsible for global warming. Results in miles per gallon (mpg) also correspond to this European drive cycle and are stated in imperial gallons. The results may differ from fuel economy figures in other regions of the world due to the different drive cycles and regulations used in those markets.

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## Welcome

“For us, sustainability is not just the right thing to do but a core part of our business strategy.”

**Stephen Odell**, Executive Vice President, Ford Motor Company, and President, Ford of Europe, Middle East and Africa



Sustainability is a key priority as we continue to build toward creating a profitably growing business in Europe. This is perhaps most evident in the surge of new vehicles we are launching both now and in the next few years. This year alone we will launch 10 new vehicles in Europe.

These new vehicles are being launched with some of the most fuel-efficient engine technology in the industry – especially our advanced EcoBoost® gasoline engines, which offer leading fuel economy, while also delivering a fun and engaging driving experience.

Ford's fuel-efficient 1.0L EcoBoost engine – voted International Engine of the Year in both 2012 and 2013 – is already available on eight Ford nameplates, from the Fiesta to the Grand C-MAX, and will be available in three further vehicles by the end of 2014. With the arrival of the new Ford Focus later this year, we also will introduce a new fuel-efficient 1.5L EcoBoost engine, which directly benefits from the advanced combustion technologies pioneered by the 1.0L EcoBoost.

We started our electrification journey in Europe in 2013 with the Focus Electric. This will be joined in the market this year by the C-MAX Energi plug-in hybrid and the Mondeo Hybrid, bringing the proven Ford “powersplit” hybrid technology to Europe for the first time. In our manufacturing facilities, we have implemented a new energy management operating system, which will enable us to reach energy savings in assembly of about 25 percent on a per-vehicle basis by 2016. This will help us to reduce both our carbon-dioxide footprint and our energy costs.

We also remain actively involved in the communities around all of our Ford sites in Europe. In so doing, we contribute to positive social and economic development, benefiting both our employees and other community members.

For us, sustainability is not just the right thing to do but a core part of our business strategy. With smart and sustainable manufacturing solutions and an exciting selection of technologically advanced, fuel-efficient vehicles, we are putting in place the foundations that ensure our long-term business success in Europe.

**Stephen Odell**

Executive Vice President, Ford Motor Company, and President, Ford of Europe, Middle East and Africa

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## Financial Health

In Europe, we are in the process of implementing our transformation plan as announced in late 2012. Our actions are designed to increase cost efficiencies, address manufacturing overcapacity, accelerate product development and introduction, and strengthen our brand. The Europe transformation plan continues to progress well and the business unit remains on track to achieve profitability in 2015. Read more about our [European market](#).

We know that our long-term success will depend on our offering new types of mobility solutions that are increasingly sustainable and tailored to the unique needs of different regional markets. In 2013, along with Schaeffler, we demonstrated the Fiesta-based eWheelDrive car, a driveable research vehicle that could lead to improvements in urban mobility and parking by making possible smaller, more agile cars. Powered by independent electric motors in each of the rear wheels, eWheelDrive technology offers space under the hood that in conventional cars is occupied by the engine and transmission, and in electric cars by a central motor. This technology could in the future support the development of a four-person car that only occupies the space of a two-person car today. At the same time, eWheelDrive steering system designs could enable vehicles to move sideways into parking spaces – a potential breakthrough as cities become more populated and congested. Read more about our [sustainable mobility strategy](#).

For a discussion of our global economic impact and financial health, please see the [Financial Health](#) section.

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## Climate Change and the Environment

At Ford, we have been working for many years to reduce the environmental impacts of our vehicles and operations.

For example, we are doing our part to prevent or reduce the potential for environmental, economic and social harm due to climate change. We have a science-based strategy to reduce greenhouse gas (GHG) emissions from our products and operations that focuses on doing our share to stabilize carbon dioxide (CO<sub>2</sub>) concentrations in the atmosphere. We are on track to meet the central elements of our strategy: For each of our new or significantly refreshed vehicles, we will continue to offer a powertrain with leading fuel economy and we are reducing GHG emissions across our global product portfolio.

### Vehicles

Ford offers one of the broadest low-CO<sub>2</sub> vehicle portfolios in Europe. Our efforts to improve fuel efficiency are paying off. Preliminary data shows that we have reduced the average CO<sub>2</sub> emissions of our European car fleet by around 18 percent between the 2007 and 2013 calendar years.<sup>1</sup>

#### EcoBoost® Engines and ECOneric Technology

In Europe, we are doubling production capacity at our Cologne, Germany, engine plant to more than 1,000 engines a day. This is in response to robust demand for the 1.0L EcoBoost engine, which was named International Engine of the Year in 2012 and 2013 by a panel of auto journalists. The Cologne plant has also begun production of the 1.0L EcoBoost for the North American market.

We offer three EcoBoost gasoline engines in Europe: the 2.0L, 1.6L and 1.0L. EcoBoost engines use turbocharging and direct-injection technology to produce levels of performance that are usually associated with larger-capacity engines. The 1.0L EcoBoost, for example, offers the power of a traditional 1.6L gasoline engine but with a CO<sub>2</sub> level as low as 99 g/km. In Europe, the 1.0L EcoBoost is available in the Ford Fiesta, B MAX, EcoSport, Focus, C MAX, Grand C MAX, Transit and Tourneo Connect; it also will be offered in the Transit Courier, Tourneo Courier and Mondeo. In early 2014, the Ford Focus became the first non-hybrid gasoline family car in Europe to break the 100 g/km CO<sub>2</sub> barrier when equipped with the revised 100 PS version of the 1.0L EcoBoost engine.

We offer three ECOneric vehicles, ultra-low-CO<sub>2</sub> versions of selected Ford diesel vehicles that leverage several advanced, fuel-saving technologies. In early 2014, for example, the Ford Fiesta ECOneric has been updated to reach CO<sub>2</sub> emissions of 85 g/km offering fuel economy of 3.3L/100 km. This model includes a range of Ford technology features, including revised gear ratios; a special aeropack to improve aerodynamics (comprising undershield wheel deflectors and low rolling resistance tires); a variable oil pump; a more efficient air conditioner, cooling fan and alternator; as well as friction and combustion improvements in the engine. It also features Auto Start-Stop, smart regenerative charging, EcoMode and a shift indicator light. In addition, the Focus ECOneric is available offering a fuel economy of 3.4L/100 km and just 88 g/km CO<sub>2</sub>.

#### Electrification

In the summer of 2013, Ford added its first all-electric passenger car to the successful Focus lineup in Europe by introducing the Ford Focus Electric. In 2014, based on our success with electrified vehicles in North America, we will introduce further electrified vehicles in Europe, including the C MAX Energi and the Mondeo Hybrid.

In Germany, Ford is working with 12 other partners on the cognE-mobil project, using a fleet of electrified vehicles – including Focus Electrics and C MAX Energi plug-in hybrids – to conduct road testing. This program is part of a much larger

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research effort in several German cities that is partly funded by the German government and involves multiple automakers, utility companies, universities and technology partners. Now in its second phase, the project focuses on charging infrastructure improvements; the use of renewable power, electric carsharing and e-cabs; networking effectively with public transport; and public perception and safety.

We believe these kinds of collaborative efforts across sectors are essential for ensuring customer-focused products that provide the right value. They also help to ensure that the infrastructure is in place to support these types of vehicles.

## Eco-Driving Information and Training

Ford has demonstrated that drivers who practice “eco-driving” can improve their fuel economy by an average of 24 percent. Eco-driving tips are available to the public on Ford’s website, and online training is available through the Ford Driving Skills for Life (DSFL) program. In addition, a Web-based eco-driving program has been available to all U.S. salaried Ford employees since 2006.

Ford began work on the eco-driving concept in 2000, when we first offered an eco-driving program through our German dealerships, in partnership with the German Federation of Driving Instructor Associations and the German Road Safety Council. That program, which continues today, trains drivers in smarter and greener driving skills, and vehicle maintenance habits. It uses specially trained and certified instructors to run programs for several target groups, including fleet drivers and customers. By the end of 2013 more than 17,000 German drivers had been “eco-trained” through this program.

In 2013, Ford continued to support the ECOWILL project, which stands for Eco-Widespread Implementation for Learner Drivers and Licensed Drivers. Ford has been the only automotive industry member active in this project since it began in 2010. This project, which concluded as scheduled in April 2013, was based on the premise that eco-driving can reduce CO<sub>2</sub> from motoring and improve road safety without making it less fun to drive. ECOWILL succeeded in meeting two primary goals:

- A mass roll-out of high-quality/standardized short duration eco-driving trainings. Ford operates one-hour courses with professional driving instructors as part of this goal, and
- Promoting the education and testing of eco-driving for learner drivers in regular driving school under the leadership of EFA, the European driving school association.

Thanks to this project, approximately 32,000 new drivers were “eco-trained,” and more than 10,000 already-licensed drivers received this training. The project resulted in many benefits that will continue on after its formal conclusion. For example, the eco-driving training developed through this program was added to driver training programs required in all European countries. ECOWILL also influenced the creation of many national eco-driving and road safety initiatives and resulted in a successful eco-driving coaching methodology that can be used in other programs.

From 2010 to 2013, Ford also contributed to a European research project called eCoMove. Through this project, Ford and 32 partner organizations developed and tested vehicle-to-driver communications technologies focused on reducing CO<sub>2</sub> emissions from road transport by reducing inefficiencies in driver behavior. In field tests, the new technologies resulted in a 15 percent improvement in fuel economy and CO<sub>2</sub> emissions. As part of this project, Ford tested an accelerator pedal that provides tactile feedback to the driver and an associated dashboard display that coaches drivers on more fuel efficient driving behavior. The system provides drivers with information about approaching road conditions that can help drivers make more efficient driving choices, such as slowing down earlier and more slowly. The system also helps drivers time their speed to reach traffic lights when they will be green to avoid unnecessary stopping and accelerating. This new driver assistance system leverages existing Ford technologies including traffic sign recognition, advanced map information, and car-to-car and car-to-infrastructure communications to help drivers prepare for or avoid road congestion and changes in topography.

## Sustainable Manufacturing

In early 2012, Ford of Europe announced our five-year sustainable manufacturing strategies for water, landfill waste and emissions. The ambitious targets embedded in these strategies would see the average Ford vehicle using 30 percent less water and creating 70 percent less waste to landfill in manufacturing over the next five years. We also plan to reduce the amount of energy it takes to manufacture a vehicle by 25 percent before 2016.

Through early 2014, we have achieved 10 percent of the planned 25 percent energy savings throughout Europe. These savings have been accomplished through the introduction of an Energy Management Operating System (EMOS). Plant Energy Teams have been created at all Ford production facilities in Europe to implement

EMOS. In our plant in Cologne alone, about 50 gigawatt hours have been saved since the beginning of EMOS. A new heat recovery systems installed in the paintshop in 2013, where car bodies are dried at temperatures of up to 150 degrees Celsius, has reduced energy consumption by 2,600-megawatt hours and saved about €100,000. A data documentation pilot project has also been launched at our Cologne plant with similar monitoring schemes being introduced in Valencia, Bridgend and Saarlouis. It enables energy consumption comparisons to be made not only with other Ford locations, but also with the competition. Other projects aimed at saving energy include compressed air dryers, which remove the moisture from the compressed air, improving paint quality. These replace previous dryers dating back to 1986, saving about 210,000 euros per year.

For a discussion of our global climate change impact and commitments, please see the [Climate Change and Environment](#) section. For a discussion of our global commitment to water issues, please see the [Water](#) section.

- 
1. The final 2013 calendar-year fleet-wide CO<sub>2</sub> emissions data for our European fleet will be available in November 2014. For all years, these data do not include Volvo.

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At Ford, we design and manufacture vehicles that achieve high levels of vehicle safety for a wide range of people over a broad spectrum of real-world conditions.

In the 2013 European New Car Assessment Program (NCAP) assessments, the Ford Tourneo Connect earned a five-star safety rating. In addition, the vehicle received the Euro NCAP's Best in Class recognition for the highest safety performance scores in the vehicle segment. The Ford Transit Custom and Tourneo Custom were the first van and "kombi" (i.e., multipurpose vehicle), respectively, to achieve five-star ratings in the Euro NCAP heavy vehicle assessment. The Transit also received Euro NCAP's Best in Class recognition for the highest safety performance score in its segment.

Ford has an industry-leading total of seven Euro NCAP Advanced rewards, for our Lane-Keeping Aid, Active City Stop, Forward Alert, Lane-Keeping Alert, MyKey®, Emergency Assistance and Driver Alert technologies.

## Encouraging Safer Driving

Driver behavior is a key contributing factor in many vehicle crashes.<sup>1</sup> We at Ford have developed and support an array of programs and technologies that help to encourage safer behavior on the roadways, for both experienced and novice drivers.

In late 2013, we launched Ford Driving Skills For Life (DSFL) for the first time in Europe. Ford will invest €1.5 million in the first year of this program alone to provide free hands-on training to 5,000 young drivers in the U.K., Germany, France, Spain and Italy, and to thousands more online through The Academy. In 2014, Ford DSFL will be launched in several additional European countries.

## Collaborative Research

In order to progress from current technologies to our long-term vision of connected and automated vehicles, we are conducting collaborative research with a variety of public, private and academic entities.

In Europe, we are contributing to the European harmonization and standardization of wireless communication systems and applications within the framework of the DRIVE C2X project, which is co-funded by the European Commission. DRIVE C2X is the acronym for "DRIVing implementation and Evaluation of C2X communication technology in Europe" (C2X refers to "car-to-car and car-to-infrastructure" communication). This project kicked off in January 2011 and is planned to run until mid-2014. It brings together more than 40 stakeholders, such as vehicle manufacturers, suppliers, universities and public authorities from all over Europe. Within the framework of DRIVE C2X, field operational tests in a real-world environment have been conducted over the course of six to nine months in seven test sites across Europe.

One of these test sites is located in Frankfurt/Main, Germany, and is closely linked to a national research initiative called Safe Intelligent Mobility – Test Field Germany, or sim™ for short. Ford contributed to this joint project, which brought together relevant stakeholders of the German automotive industry and concluded successfully in June 2013. sim™ was one of the world's first large-scale field operational tests of cooperative systems. Over six months, 120 vehicles from six automakers were driven more than 1.6 million kilometers. Ford contributed with 20 Ford S MAX vehicles equipped with innovative vehicle-to-infrastructure technology. Within sim™, 500 drivers tested and validated more than 20 functions targeting traffic safety, efficiency and comfort. Ford led the development of the Emergency Electronic Brake Light warning functionality. The project was supported in part by the German government.

Also in Europe, we have been one of 29 partners in the Accident Avoidance by Active

## Related links

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- Vehicle Safety and Driver Assist Technologies
- Case Study: Public Domain Ratings

## External Websites

- Global NCAP
- EuroNCAP

Intervention of Intelligent Vehicles (interactIVe) research project, led by the Ford European Research Center in Aachen, Germany. This consortium sought to support the development and implementation of accident avoidance systems, and consisted of seven automotive manufacturers, six suppliers, 14 research institutes and three other stakeholders. The European Commission covered more than half of the €30 million budget. During the 42-month duration of interactIVe, the partners tested the performance of prototype safety systems through active intervention, including automated braking and steering in critical situations, with the aim of avoiding collisions or at least mitigating impact severity in accidents. The final event of InteractIVe in November 2013 took place in Aachen and at Ford's Lommel Proving Ground, with live vehicle demonstrations.

See the [Vehicle Safety and Driver Assist Technologies](#) section for more on our vehicle safety technologies and activities.

- 
1. U.S. Department of Transportation, National Highway Traffic Safety Administration, *National Motor Vehicle Crash Causation Survey: Report to Congress* (Washington, DC: U.S. DOT, July 2008).



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## Ford of Europe Supply Chain

The automotive supply chain is one of the most complicated of any industry. Automakers like us rely on thousands of suppliers to provide the materials, parts and services necessary to make our final products. In today's economic environment, achieving lower costs, improving quality and meeting sustainability goals require an unprecedented level of cooperation with suppliers, as well as strong supplier relationships. Ford and its suppliers must work jointly to deliver great products, have a strong business and make a better world.

The basis of our work with suppliers is the Ford Code of Human Rights, Basic Working Conditions and Corporate Responsibility, which applies to our own operations as well as our \$100 billion supply chain. The Code addresses workplace issues such as working hours, child labor and forced labor, as well as nondiscrimination, freedom of association, health and safety, the environment and other issues.

We work to ensure that Ford and our suppliers have management systems in place to mitigate potential risks, ensure continuity of supply and improve the overall sustainability of the complex global automotive supply chain. Our aim is to leverage our supply chain – and our industry – to make a positive impact in the markets in which we do business.

We take a three-pronged approach to creating a sustainable supply chain and managing sustainability issues throughout our supply chain:

- Building strong relationships with suppliers and engaging strategic suppliers
- Developing shared commitment and supplier capability
- Working on cross-industry initiatives

In 2013, we held joint industry trainings through the Automotive Industry Action Group (AIAG) in Brazil, Mexico, South Africa and Turkey. We also held trainings in Romania in conjunction with CSR Europe. More than 230 Ford suppliers attended these classroom sessions. These trainings included both in-person classroom training sessions and e-learning trainings.

To date, we have conducted approximately 145 training sessions globally, attended by nearly 2,100 supplier companies. (This figure includes dedicated Ford supplier training sessions conducted with the AIAG as well as industry training sessions in which Ford participated along with the AIAG and other automakers.) Because attendees are required to subsequently cascade the training and expectations to the entire factory population and suppliers, these trainings indirectly reach even more companies and individuals. Through this cascading process, the training of suppliers globally since the inception of the program has impacted more than 2,900 supplier representatives, who in turn have cascaded the training information to nearly 25,000 supplier managers and more than 485,000 individual workers as well as over 100,000 sub-tier supplier companies.

Suppliers trained in 2013 have now moved on to the process of self-assessing their facilities for compliance with local law and Ford expectations, and communicating expectations to their own workers and their suppliers.

In 2014 we plan to conduct additional supplier training sessions in conjunction with either AIAG or CSR in Brazil, China, India, Mexico, Russia and Turkey. Where possible, these courses will be open to any interested company; thus Tier 1 suppliers will have the option of asking their own suppliers to attend. The intent is, once again, to increase the scope of impact of the training sessions, and push human rights and working conditions expectations further down the supply chain.

For a discussion of our global commitment to supply chain sustainability and detail on

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the status of our working conditions assessments, please see the [Supply Chain](#) section.

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## Workplace

Our employees are crucial to delivering our vision of building great products that contribute to a better world.

We completed the planned closures of two manufacturing facilities in the U.K. in 2013, and we will close our Genk, Belgium, manufacturing facility at the end of 2014.

We recognize the impact our actions have on many employees and their families, and we have been working together with all stakeholders as we make these difficult changes to our business in Europe. In total, 6,200 positions or about 13 percent of Ford's European work force are affected by the plant closures in 2013 and 2014, including the salaried head-count reduction equivalent of 400 positions in late 2012. Wherever possible, we have been achieving employee reductions through enhanced employee separation programs and, with regard to our U.K. facilities, voluntary means and redeployment to other Ford locations. Read more about our [European market](#).

## Communities

Ford Motor Company has a long legacy of compassion. More than 100 years after the company began, we continue to touch lives. Our commitment to supporting local communities through strategic investments and volunteer efforts has remained unwavering.

As we continue to expand our business in new markets across the globe, we are also expanding our community investment and volunteering efforts internationally. In 2013 we continued to expand our global reach through our Operation Better World program. Launched in 2012, Operation Better World is a coordinated, strategic approach to how Ford engages with communities everywhere that we do business. In 2013, we expanded the program from India and China to South America, Mexico and Europe. Through this initiative, Ford Fund works with nongovernmental organization (NGO) partners in four key areas: education, auto safety, community needs and sustainability (with a focus on water). The Ford Fund works to ensure that programs meet local community needs, align with the One Ford business plan, have a measurable impact and, where possible, can be replicated in other markets. This grassroots engagement in the community is implemented and led by the local Ford teams in each region.

Throughout Europe, Ford has made a positive impact on communities and the environment through Operation Better World initiatives such as the Community Involvement Program, Global Week of Caring and the Ford Driving Skills for Life (DSFL) program, which teaches drivers about fuel efficiency as well as safety (as discussed in the [Vehicle Safety](#) section).

In 2000, Ford in Germany launched the Community Involvement Program, which connects Ford employees to opportunities for volunteering in the community. As of year-end 2013, nearly 11,000 Ford employees had volunteered through this program, working on some 1,400 projects and dedicating more than 175,000 working hours. In the record year 2013 alone, we supported approximately 145 volunteering and community projects through this volunteering program. This is a all-time high within 13 years of engagement. Also a record: 960 employees each contributed up to 16 hours of their time, funded by Ford, totaling 15,000 hours and more than ever before. We also provided five Ford Transit vans to support 74 additional community projects. The vans were driven a total of 61,000 km.

In Germany in early 2013, Ford received an "Engagement of the Year 2012" award from the state of North Rhine-Westphalia. This award honors Ford's Community Involvement Program in Germany as a role model for corporate citizenship. The prize money was donated to the nonprofit school project Gandhi Award in Cologne, which

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aims to foster and reward diversity at schools, conflict management and volunteering. Ford actively supports Gandhi Award activities, for the first time in Cologne in July 2013.

Also in 2013, Ford of Europe volunteers went out into the community as part of the Ford Global Week of Caring. Our [People](#) section contains a full list of our [Global Week of Caring and other volunteerism efforts in Europe and elsewhere](#).

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## Ford South America

Ford's principal markets in South America include Brazil and Argentina; we were the fourth-largest automaker in both markets in 2013. Brazil's economy and demographics – with growing per-capita income, low vehicle ownership rates and a young population – have helped its automotive market to more than double since 2002. These favorable factors are expected to continue to contribute to growth in vehicle sales in Brazil.

## 2013 Performance Highlights

In the past year:

- We introduced global products, such as the Ford Focus, with additional global products to come.
- We continued our largest-ever five-year investment in the region, committing \$2.07 billion by 2015 to accelerate the delivery of more fuel-efficient, high-quality vehicles.
- Ford Argentina celebrated its 100<sup>th</sup> anniversary. Over our 100 years of continued presence in the country, Ford has established a lasting bond with the Argentinians by offering high-quality, innovative products. We have contributed to the community's development with steady investment, quality job generation and long-term, sustainable development through our education programs.
- The new Ford Fiesta received an "A" rating for fuel efficiency in the [new Brazilian fuel-efficiency labeling system](#).
- We were the first automaker to participate in Campus Party Brazil, the biggest technology festival in Brazil.

## Awards

- The new Focus was the most recognized product of the year, collecting awards from automotive press associations in Brazil, Argentina and Latin America, as well as Brazilian television journalists. The awards included "Best Mercosur Car of 2014" by Motorpress magazine.
- The Ford Fusion Hybrid was named "Car of the Year" in Brazil by readers of EXAME magazine, one of the main technology-oriented publications in Brazil.
- The new Ford Ranger was recognized in Brazil by Jornal do Carro (Best Medium Pickup), Carro magazine (Best Cars – Pickup), Best Cars website (Best Medium/Large Pickup) and as best purchase by Quatro Rodas and Autoesporte (one of the most recognized auto magazines).
- Steven Armstrong, Ford South America president, was selected "Executive of the Year" by Autoesporte magazine.
- Ford of Venezuela built the highest-quality vehicles among all Ford facilities around the world, according to the 2013 second-quarter customer satisfaction survey conducted by the Global Quality Research System (GQRS). This research compares quality data between Ford facilities globally, and reflects that vehicles produced in the Valencia plant have a satisfaction level of 91 percent. That means that for every 10 cars produced, nine customers are very satisfied with the product they bought. This fact puts the quality of Venezuelan vehicles at the top of the ranking when compared to the rest of Ford facilities.
- For the ninth-consecutive year, Selecciones magazine (a Readers' Digest publication) honored Ford with its "Trusted Brand" award. The award is based on a poll in which consumers chose their favorite brands.



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“ Every year, Ford has made important sustainability progress. Our South America region, for example, consistently advances in line with our One Ford plan, which is enabling us to offer consumers a lineup of vehicles consisting entirely of global products by 2015.”

**Stephen Armstrong**, President, Ford South America



We are all responsible for creating the world we want for ourselves, and for future generations. So we must ask ourselves, what are we doing to make the world a better place?

That question is pertinent not just for individuals, but for organizations, since organizations can contribute significantly to sustainable development.

Every year, Ford has made important sustainability progress. Our South America region, for example, advances in line with our One Ford plan, which is enabling us to offer consumers a lineup of vehicles consisting entirely of global products by 2015. Consumers will benefit from models that meet global standards for technology, safety, comfort and design. These vehicles also meet high environmental standards, as evidenced by their excellent performance in tests performed by CONPET/Inmetro, a Brazilian program that measures the efficiency of vehicles' fuel consumption.

We are also improving the sustainability of our production processes. The modernization of Ford plants in South America has resulted in several environmental benefits, such as reductions in water and energy consumption. The new paint process used in the production of the Ford Fiesta in Sao Bernardo, for example, uses fewer solvents and has fewer potentially harmful emissions.

Ford South America's implementation of our global One Ford strategy has also allowed us to demonstrate the capability of local engineering, with the development of a second global product at the Ford Development Center in Brazil. Our engineers work as a team, contributing ideas and solutions that allow Ford to be recognized as an innovative brand in our region.

Because the health and well-being of our employees is also important to our business, we launched a health program called Viva Bem that benefits all of our employees in South America. Viva Bem focuses on four pillars of health: movement, nutrition, health promotion and zero dependency.

Ford South America also continues to support initiatives that seek to promote the well-being of the communities in which we operate. It is rewarding to see the difference our employees can make by donating their time and skills to programs aimed at creating a more equal society. We have opened the doors of our plants to disadvantaged students, for example, so they can gain firsthand experience with the automotive industry. And we support institutions that provide basic items, such as food, clothing and medicine, to improve the lives of the needy.

Last year, our Ford South America Operations continued to deliver major achievements, and we will do our best to ensure we are recognized, more and more, as an efficient company with a truly sustainable future.

Best regards,

**Stephen Armstrong**  
President, Ford South America



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## Financial Health

In 2013, Ford's automotive pre-tax profit was the highest in more than a decade, with about break-even results in South America. Our South American pre-tax profits were substantially lower than a year ago, in part due to higher costs and unfavorable exchange. However, our 2013 market share for South America increased slightly compared to 2012. Brazil and Argentina are our highest-volume South American markets; our market shares for these two countries are shown in the table below.

### South American Market Share

Major Markets	2013 Combined Car and Truck Market Share (%)	Percentage Points Better/(Worse) than 2012 (%)
Total South America	9.3	0.3
Brazil	9.4	0.3
Argentina	12.6	0.3

In South America, we are investing in global platforms to deliver global products, with 18 product actions (i.e., new or remodeled products) in 2013. Our strategy is focused on improving both quality and customer experience. In 2013, Ford South America began offering versions of our global small and midsize vehicles, including Fiesta- and Focus-sized small cars and utilities, and Fusion- and Mondeo-sized midsize cars and utilities, as well as compact pickups and commercial vans.

Brazil is the world's fourth-largest auto market and is a critical piece of Ford's global strategy. Going forward, we are making our largest-ever five-year investment in our Brazil operations, committing \$2.07 billion (USD) or R\$4.5 billion by 2015 to accelerate the delivery of more fuel-efficient, high-quality vehicles and offer a lineup that consists of 100 percent global products. Other investments include:

- \$1.2 billion to increase the capacity of our Camaçari Plant, develop a new global vehicle (the Ford EcoSport), and modernize our Troller Plant, and R\$400 million (\$184 million) to build the first engine plant in the Northeast of Brazil.
- \$230 million in modernization and expansion of the Taubaté Engine and Transmission Plant.
- \$308 million from 2007 to 2013 in heavy truck operations, including production of the extra-heavy-duty Cargo truck.
- \$368 million for production of the new Fiesta hatchback global vehicle in São Bernardo do Campo.
- \$34 million to produce the Fiesta sedan in the Valencia Assembly Plant.
- \$200 million (including \$60 million invested in supply chain development to improve local parts sourcing) to produce the new Focus, creating 300 new jobs.

We implemented several exciting product launches in South America in 2013, including the Fusion flex-fuel, the new Fiesta hatch and sedan, the new Focus, the new Kuga, the Fusion Hybrid and the new global line of Cargo (Cargo 2042 and Cargo 2842) trucks for the heavy-duty segment. In 2014 we also began production of two F-series trucks, the F-350 and F-400.

We know that our long-term success in the developing and revitalizing economies of South America will depend on our company offering new types of mobility solutions that are increasingly sustainable and tailored to the unique needs of these markets. The section on our [sustainable mobility strategy](#) describes how we are aiming to do just that.

For a discussion of our global economic impact and financial health, please see the

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## Climate Change and the Environment

At Ford, we have been working for many years to reduce the environmental impacts of our vehicles and operations.

For example, we are doing our part to prevent or reduce the potential for environmental, economic and social harm due to climate change. We have a science-based strategy to reduce greenhouse gas (GHG) emissions from our products and operations that focuses on doing our share to stabilize carbon dioxide (CO<sub>2</sub>) concentrations in the atmosphere. We are on track to meet the central elements of our strategy: For each of our new or significantly refreshed vehicles, we will continue to offer a powertrain with leading fuel economy, and we are reducing GHG emissions across our global product portfolio.

In South America, we are improving fuel economy by introducing some of the efficient engine and transmission technologies currently used in North America, and by offering technologies compatible with the widespread use of biofuels in Brazil. We offer our EcoBoost® engine on the Ford Mondeo in Argentina and the Ford Fusion in Brazil.

We are continuing to implement the new, more-efficient Sigma engine, which improves efficiency compared to current engines through reduced internal friction and improved electronic throttle controls. We have also improved the gearing ratios, aerodynamics and rolling resistance of our South American models, further increasing fuel economy. In Brazil, our Ford EcoSport, a B-Segment SUV, is a fuel-economy leader in its segment. In 2013 in Brazil, we launched the new Ford Fiesta, which received an "A" rating for fuel efficiency in the [new Brazilian fuel-efficiency labeling system](#). Ford also received a Seal of Excellence award for the Fusion Hybrid and the 2014 Fiesta 1.6L TiVC in Brazil. These awards are given to vehicles in the top 20 percent for fuel economy, regardless of vehicle segment or type.

Over the past few years, we have successfully implemented a large number of fuel-efficiency technologies in our B- and C-sized vehicle segments, which make up approximately 80 percent of the Brazilian market. These include twin independent variable cam timing engines and direct-injection engines, Battery Management Systems, smart alternator systems and dual-clutch automatic transmissions.

Aligned with our global standards and the Brazilian New Automotive Regime (Inovar-Auto) – a federal government measure that aims to stimulate investment in the Brazilian auto industry – Ford Brazil is focusing on achieving fuel-efficiency targets and investing in engineering. Also in Brazil, newly introduced fuel economy and CO<sub>2</sub> emission [regulations](#) will speed up the introduction of new fuel-efficiency technologies.

Ford is also using recycled and/or natural material in our vehicles in South America. All vehicles locally produced use 5 to 7 kg of recycled PET plastic in the form of carpets, ceiling linings, wheel boxes and acoustic blanket carpeting. And, the instrument panel of the new Cargo trucks is made with sisal natural fiber.

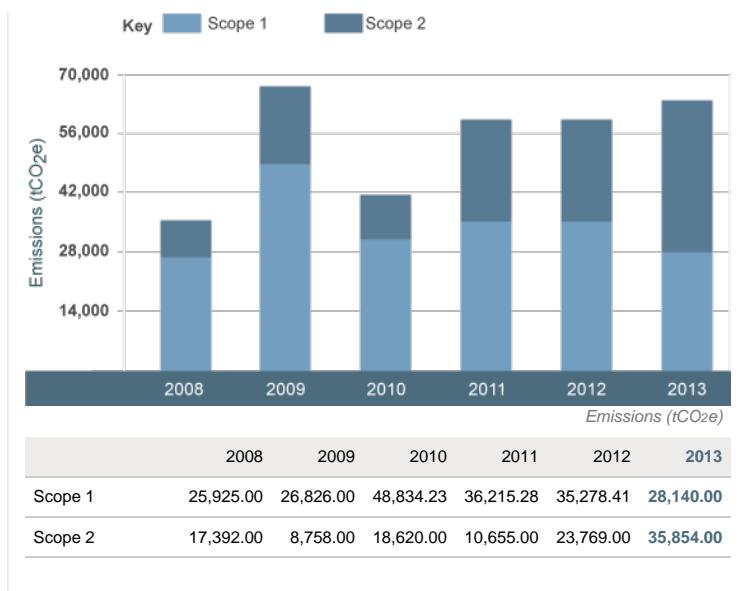
We are the first automobile company in Brazil to voluntarily report our facilities' GHG emissions to the Brazilian Greenhouse Gas Protocol. As a participant and one of the founders of the Protocol, we have conducted an inventory of our facility emissions and have set reduction goals. The results of the inventory can be seen in the graph below. While our reported GHG emissions per unit of production for 2013 showed an increase of approximately 3% from 2012, this can be explained mainly due to the 2013 electricity CO<sub>2</sub> emission factor (Scope 2) increase of 40% from 2013. While production increased by approximately 17%, indirect electricity consumption increased by less than 7% and direct energy consumption increased by less than 1%.

## Historical Emissions by Scope

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We are also strengthening our environmental management systems in our facilities. In 2013 our Valencia Plant was successfully audited for compliance with ISO 140001:2004. Valencia also received an Instituto Municipal del Ambiente certification, which confirms our compliance with Venezuelan environmental legislation. In Venezuela, our environmental management is supported by an Environment Cross-Functional Team, a group of employees who undertake sustainability initiatives and educate other employees. We have also reduced volatile organic compound emissions and water pollution as a result of the introduction of paint robots to the production process. At São Bernardo do Campo, we completed a high-bay lighting retrofit project, which improves the work environment and saves energy.

Recycling at our plants is also a priority. As a result, solid waste at our Valencia Plant facility has been reduced by 20 percent in the last three years. In Argentina, many materials used in the production process are recycled. For example, vegetable oil used in the kitchens is used for biodiesel, and the profit is donated to a neighborhood dining hall for children. Unused office paper and bottle lids are donated to the Garrahan Children's Hospital Foundation. Plastic PET containers are recycled to benefit the Forest Bank Foundation, a nonprofit organization focused on restoration, conservation and wise management of native species in Chaco and Formosa. Through this initiative, Ford Argentina contributed to the preservation of 150,000 square meters of forest in the Impenetrable Chaqueño area, which will become the new La Fidelidad National Park.

Other initiatives include an environmental education program for public and private school students and a restoration and landscape project, among others. Hosted by Ford Camaçari, students visit the Environmental Education Center and participate in activities and talks related to permaculture. At São Bernardo do Campo, employees participated in a restoration and landscape project. Over 1,700 seedlings of native Atlantic forest species were planted, returning an important stretch of riparian vegetation to the city.

For a discussion of our global environmental impact, climate change impact, policy and commitments please see the [Climate Change and Environment](#) section.



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## Vehicle Safety

At Ford, we design and manufacture vehicles that achieve high levels of vehicle safety for a wide range of people over a broad spectrum of real-world conditions.

In the most recent Latin NCAP,<sup>1</sup> the new Ford EcoSport and Focus both received five stars for adult protection. The EcoSport and Focus are the first vehicles produced in South America to earn a five-star ranking from the international safety rating organization.

The new EcoSport brings advanced systems for both passive and active protection, to prevent accidents and ensure that the vehicle is in control under various driving conditions. The EcoSport comes with front airbags as standard, offers curtain side airbags as optional and is the only vehicle in its category capable of having child seats installed according to the ISOFIX standard. (ISOFIX is the global standard for child safety seat attachment points.)

The Focus is recognized for its advanced design security and vehicle dynamics. In addition to an ultra-rigid safety cell protected by crumple zones, its arsenal includes dual airbags, front seatbelts with a pretensioned limiter and anti-lock brakes with electronic brake distribution and cornering brake control.

As part of our Traffic Safety and Environmental Care program, Ford Argentina organized two campaigns for customers, so they could check their safety features before going on summer and winter holidays. Special stands were located in visible locations around Buenos Aires. The stands were equipped with the mechanical materials needed, and trained technicians attended to the customers who took their vehicles for a free diagnosis. The mechanical checkup included suspension monitoring, alignment, brakes and emissions as well as proper performance of lights and the replacement of windshield wiper fluid. These actions are part of Ford Argentina's commitment to our customers' safety and accident prevention. In addition, several safety awareness conferences were held in public places.

See the [Vehicle Safety and Driver Assist Technologies](#) section for more on our vehicle safety technologies and activities.

1. Several public and private agencies around the world perform crash testing of vehicles and publish safety ratings, however these rating systems are relatively new in South America. Recently, New Car Assessment Programs (NCAPs) are being launched in regions where they have not existed in the past. This is partly due to a new nonprofit organization based in London called [Global NCAP](#) that is promoting the establishment of NCAPs around the world. Global NCAP developed a [Latin NCAP](#) system, which is now providing ratings on vehicles in South and Central America.

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- [Vehicle Safety and Driver Assist Technologies](#)
- [Case Study: Public Domain Ratings](#)

#### External Websites

- [Global NCAP](#)
- [Latin NCAP](#)



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## Supply Chain

The automotive supply chain is one of the most complicated of any industry. Automakers like us rely on thousands of suppliers to provide the materials, parts and services necessary to make our final products. In today's economic environment, achieving lower costs, improving quality and meeting sustainability goals require an unprecedented level of cooperation with suppliers, as well as strong supplier relationships. Ford and our suppliers must work jointly to deliver great products, have a strong business and build a better world.

The basis of our work with suppliers is the Ford Code of Human Rights, Basic Working Conditions and Corporate Responsibility, which applies to our own operations as well as our \$100 billion supply chain. The Code addresses workplace issues such as working hours, child labor and forced labor, as well as nondiscrimination, freedom of association, health and safety, the environment and other issues.

We work to ensure that Ford and our suppliers have management systems in place to mitigate potential risks, ensure continuity of supply and improve the overall sustainability of the complex global automotive supply chain. Our aim is to leverage our supply chain – and our industry – to make a positive impact in the markets in which we do business.

We take a three-pronged approach to creating a sustainable supply chain and managing sustainability issues throughout our supply chain:

- Building strong relationships with suppliers and engaging strategic suppliers
- Developing shared commitment and supplier capability
- Working on cross-industry initiatives

In 2013, we held joint industry trainings through the Automotive Industry Action Group (AIAG) in Brazil, Mexico, South Africa and Turkey. We also held trainings in Romania in conjunction with CSR Europe. These trainings included both in-person classroom training sessions and e-learning trainings. More than 230 Ford suppliers attended the classroom sessions.

To date, we have conducted approximately 145 training sessions globally, attended by nearly 2,100 supplier companies. (This figure includes dedicated Ford supplier training sessions conducted with the AIAG as well as industry training sessions in which Ford participated along with the AIAG and other automakers.) Because attendees are required to subsequently cascade the training and expectations to the entire factory population and suppliers, these trainings indirectly reach even more companies and individuals. Through this cascading process, the training of suppliers globally since the inception of the program has impacted more than 2,900 supplier representatives, who in turn have cascaded the training information to nearly 25,000 supplier managers and more than 485,000 individual workers as well as over 100,000 sub-tier supplier companies.

Suppliers trained in 2013 have now moved on to the process of self-assessing their facilities for compliance with local law and Ford expectations, as well as communicating expectations to their own workers and their suppliers.

In 2014 we plan to conduct additional supplier training sessions in conjunction with either the AIAG or CSR in Brazil, China, India, Mexico, Russia and Turkey. Where possible, these courses will be open to any interested company; thus Tier 1 suppliers will have the option of asking their own suppliers to attend. The intent is, once again, to increase the scope of impact of the training sessions and push human rights and working conditions expectations further down the supply chain.

For a discussion of our global commitment to supply chain sustainability and detail on

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the status of our working conditions assessments, please see the [Supply Chain](#) section.

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## Water

At Ford, we have focused on reducing our water use since 2000, when we first began setting year-over-year reduction targets as part of our Global Water Management Initiative. In Brazil over the last five years, we achieved a 23 percent reduction in absolute water consumption and 16 percent reduction per vehicle produced, representing a total of 307 million liters of water saved. Our efforts around water have evolved over the years; we have moved beyond merely reducing the water footprint of our own facilities to working more holistically outside our corporate walls, addressing water concerns in our supply chain and our broader communities.

We are conducting water assessment pilot projects to help us gain a better understanding of our usage. As of early 2014, we have conducted assessments at 12 global sites, including Pacheco Stamping and Assembly in Argentina, and we continue to add new plants for assessment each year. We are in the process of evaluating the results to determine what measures can feasibly be taken to reduce water and save our company money at the same time.

For a discussion of our global commitment to water issues, please see the [Water](#) section.

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## People

Here at Ford, our employees are the drivers behind our successes, including our planned launch of 23 new or significantly refreshed vehicles for 2014 – the most aggressive launch schedule in our history. As we continue to witness surging global demand for our products, we rely ever more deeply on the skills and talents of our dedicated work force of some 181,000 individuals.

## Workplace

## Wellness

In late 2013 we launched "Programa Viva Bem," with the goal of improving the quality of life of Ford and non-Ford employees and their relatives.

The program is based on four pillars: movement, nutrition, health promotion and zero dependence. The aim of Viva Bem is to provide information and foster a healthy lifestyle.

This program reduces absenteeism while reflecting positively on Ford's social commitment. It also reinforces the image of Ford South America as an employer with a quality-of-life orientation and as an overall great place to work.

## Training

Our company's future success is dependent upon technically trained professionals. Therefore it is critical that we develop a pipeline of such professionals and that we create opportunities for students to become more engaged in the fields of science, technology, engineering and math (STEM). During 2013, a few of the educational programs that were available for employees, or to develop the next generation of employees, included the following:

- In Brazil, Ford and Instituto Mauá de Tecnologia signed a technical cooperation agreement for product development and engineering education, creating new partnership opportunities for research and technology development.
- In Venezuela, an online English program, English for Everybody, was launched, with the objective of providing a flexible learning tool for all employees to learn or improve their English skills. In addition, specialized courses were offered to cover the English development needs of particular employees.
- In order to improve the professional and personal development of employees at the Valencia Plant, 341 workers participated in 16 different courses and workshops, such as finance for non-finance personnel, effective communications, effective presentations, and advanced and intermediate Microsoft Excel.
- In Venezuela, a number of online and in-person training sessions were offered, on safety, legal and health matters to provide employees with tools that allow them to maintain and improve their working conditions. Employee participation in these sessions was high, with 93 percent attendance out of 1,322 employees invited.
- In Argentina, a new classroom for seventh-year students was opened at the Henry Ford Technical School, and the school's facilities were renovated with cutting-edge technology. In addition, an open science fair took place at the school for the local community. The Henry Ford Technical School was founded in 1965 by Ford Argentina with the aim of contributing to society by providing technical education, which is key to local industry development. The school is located inside the Pacheco Plant and has educated 43 classes of technicians since its founding. Many of the graduates are Ford Argentina's employees.
- Alongside the Henry Ford Technical School is CENS 451, a high school for adults who have not completed their education. This school offers classes in the

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afternoons and evenings to accommodate work schedules.

- During the past 14 years, between 20 and 30 advanced students from a school in the same district as the Pacheco Plant have worked as trainees in different areas of the plant, in order to gain professional experience.
- We offer guided tours of our Pacheco Plant to educational institutions, so that students can see some of our production processes. In 2013, more than 2,000 visitors from 70 different schools and universities took guided tours.

## Diversity

If we want to continue delivering market-leading features and technologies that will appeal to an increasingly diverse customer base, we must reflect that diversity ourselves. Serving a global customer base requires employees with different viewpoints and perspectives, all working together as members of a skilled and motivated team.

At Ford, we are focusing on women as a key demographic as we launch our biggest product expansion in our history – 23 new or significantly refreshed vehicles to market in 2014. We especially need talented women to develop and market our vehicles if we want to reach this demographic. In Brazil, for example, female engineers and technicians are playing a key role in designing and engineering our global platforms. Also, in Brazil and Argentina, Ford celebrated International Women's Day. In Argentina, a special gift was sent to key female influencers, media journalists and celebrities. Ford Brazil and Venezuela paid tribute to female employees by highlighting their work in key areas of new projects.

For a discussion of our global commitment to our stakeholders, please see the [People](#) section.

## Communities

Ford Motor Company has a long legacy of compassion. More than 100 years after the company began, we continue to touch lives. Our commitment to supporting local communities through charitable contributions and volunteer efforts has remained unwavering.

As we continue to expand our business in new markets across the globe, we are also expanding our community investment and volunteering efforts internationally. In 2013, we continued to expand our global reach through our Operation Better World program. Launched in 2012, Operation Better World is a coordinated, strategic approach to how Ford engages with communities everywhere we do business. In 2013, we expanded the program from India and China to South America, Mexico and Europe.

Through this program, the Ford Fund cooperates with nongovernmental organization partners in four key areas: education, auto safety, community needs and sustainability (with a focus on water). The Ford Fund works to ensure that programs meet local community needs, align with the One Ford business plan, have a measurable impact and, where possible, can be replicated in other markets. This grassroots engagement in the community is implemented and led by the local Ford teams in each region.

Through employee-led initiatives, as well initiatives like the Global Week of Caring and the Henry Ford Environmental Awards, Ford has made a positive impact on communities and environmental issues throughout South America.

During 2013, employee-led initiatives included the following:

- Ford employees at the São Bernardo do Campo Plant, São Paulo state, provided Easter treats for underprivileged children in kindergartens and orphanages in the region. Around 150 Easter eggs were distributed at three institutions.
- In celebration of Mother's Day, Ford Brazil's employees at the São Bernardo do Campo Plant collected disposable diapers for children in need. In Venezuela, 50 baskets with essential baby supplies were taken to the Maternidad del Sur hospital for underprivileged young mothers.
- Ford's employees at São Bernardo do Campo held a "22<sup>nd</sup> Friends Meeting," which brought together about 130 people to celebrate the friendship born between professionals from different areas and different teams from the company. The event promoted interaction among employees and collected donations for the institution CAJEC, which supports children and adolescents with cancer.
- Tatuí Proving Ground (TPG) hosted the TPG first bike tour, led by a local team, in which the employees and service providers had the opportunity to ride through the grounds of the plant. The event reinforced the importance of employee health, but also contributed to the community as over 80 toys were collected for donation to many underprivileged children. As the BIKE TOUR took place on

December 1 , World AIDS Day, the event also included a lecture delivered by Dr. Luiz Carlos Saladini, the medical coordinator of the Proving Ground.

- The Henry Ford Environmental Award is a prestigious award that has been granted for 11 years to recognize exceptional projects and initiatives that prioritize environmental protection. "Californian Red Earthworm: Integral Eco-Farms" was the project that received the award on 2013.
- Ford volunteers at Valencia helped to create a magical Christmas for sick children. Wearing Santa's uniforms, they first took a walk through the plant's administrative building and delivered Christmas wishes to all employees. Then, they visited the oncology unit of the Carabobo Hospital and donated presents to more than 160 children and adolescents with cancer.
- Ford employees in Venezuela donated medicine, diapers and other disposable hygiene products to support the Fundación Martins program. This institution supports disabled children and adolescents.
- Ford of Venezuela, together with the local basketball team Trotamundos de Carabobo, sponsored a basketball championship in which underprivileged children from the Valencia community had the opportunity to learn from professional players on the court. The initiative was supported by the Children's Basketball Federation of Venezuela.
- Since 1968, Ford Argentina has developed – along with its dealers – the Education for a New Tomorrow Program, an educational program for rural schools. The program's main objective is to help local communities by opening or reopening schools by providing safe and drinkable water, electricity, low-cost maintenance design, security and comfort solutions and eco-friendly facilities. All materials used in the design and building are recycled and recyclable, and energy is provided by renewable sources, such as the installation of hot water systems using solar collectors, among other eco-friendly options. Since the renewal of the program in 2002, Ford Argentina and its dealers –which work as school sponsors — have succeeded in reopening 20 schools. In 2013, two new schools were opened in the northern region of Argentina.
- During the month of June, a special day was dedicated for employees to donate blood. More than 20 volunteers participated.
- Many hourly employees at the Pacheco Plant raised funds and received donations for rural schools from different regions of the country. During 2013, these groups managed to travel more than 45,000 kilometers in 53 trips organized during weekends. The schools that received these donations belonged to vulnerable communities located in the provinces of Salta, Formosa, Gran Chaco, Santiago del Estero and Entre Ríos.
- Ford Argentina Trucks has prepared a Cargo truck for donation campaigns. The truck was designed to carry donations along with Si! Foundation, a nonprofit organization that helps people living in the streets in vulnerable places of all over the country.

### Global Week of Caring

In 2013, Ford South America participated in the eighth Global Week of Caring, an initiative that encourages employees to take part in community projects worldwide:

- The volunteer actions began with the presence of Odontomóvel, a mobile dental office, in Tatuí, where the Ford Proving Ground is located. The dental office, which is installed on a Ford Cargo 815 chassis, performed more than 50 free procedures to the local population. The Ford Citizenship Committee also collected about 600 kg of food, donated to Recanto do Bom Velhinho, a nursing home, as part of Global Week of Caring.
- In Camaçari, Bahia, employees from the Ford Industrial Complex delivered oral hygiene kits to the Emanuel Childcare Institute.
- At the Taubaté plant, Ford workers carried out a professional development forum for about 50 students from the Juvenile Guard, an institute that prepares adolescents from 15 to 17 years of age for the Brazilian job market. Ford employees presented lectures on subjects such as communication, behavior and self-development, as well as providing career testimonials.
- In Venezuela at the Valencia Plant, a group of volunteers visited a retirement home called Mi Viejo Antonio and took essential products such as medicines, food, mattresses, pillows and disposable hygiene products to support the institution, with cares for underprivileged elderly citizens.
- In Argentina, volunteers from different areas of the company built houses along with the nonprofit organization Habitat for Humanity.

Explore a [full list](#) of our Global Week of Caring and other volunteerism efforts in South America.



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Preparing this report is a valuable opportunity for us to assess and improve upon our economic, environmental and social progress and performance.

To continue to do so, we need your feedback.

### Write:

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Dearborn, MI 48126  
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### Email:

[sustaina@ford.com](mailto:sustaina@ford.com)

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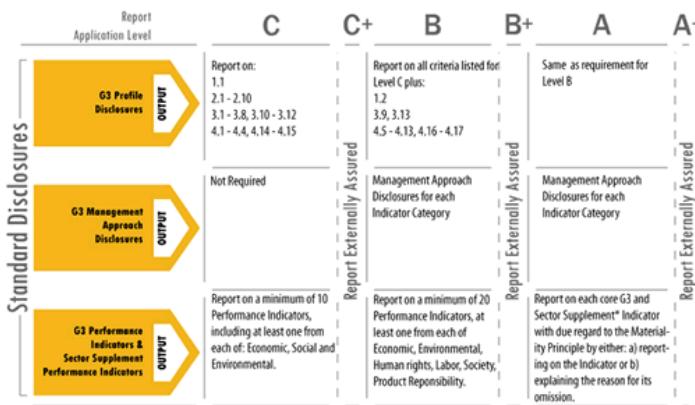
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## GRI Index

This report is aligned with the Global Reporting Initiative (GRI) G3 Sustainability Reporting Guidelines released in October 2006, at an application level of A. To locate the elements and information contained within the guidelines, use the index below. For a detailed explanation of the indicators, visit the [GRI website](#).



### Related links

#### External Websites

- Global Reporting Initiative

### Key

- Yes, this indicator is reported on
- This indicator is partially reported on
- No, this indicator is not reported on

Additional indicators are shown in **bold**

## Part I: Profile Disclosures

### 1. Strategy and Analysis

Profile Disclosure and Description	Status	Links	Notes
1.1 Statement from the most senior decisionmaker of the organization (e.g., CEO, chair or equivalent senior position) about the relevance of sustainability to the organization and its strategy.	■	<ul style="list-style-type: none"> <li>→ Letter from William Clay Ford, Jr. (Executive Chairman)</li> <li>→ Q&amp;A with Alan Mulally (President and CEO)</li> <li>→ Letter from Robert Brown (Vice President, Sustainability, Environment and Safety Engineering)</li> </ul>	
1.2 Description of key impacts, risks and opportunities.	■	<ul style="list-style-type: none"> <li>→ Letter from William Clay Ford, Jr.</li> <li>→ Q&amp;A with Alan Mulally</li> <li>→ Letter from Robert Brown (Vice President, Sustainability, Environment and Safety Engineering)</li> <li>→ Our Strategy</li> <li>→ Sustainability Strategy</li> <li>→ Materiality Analysis</li> <li>→ Materiality Matrix</li> <li>→ Our Value Chain and Its Impacts</li> <li>→ Ford Future Competitiveness</li> <li>→ Mobility Solutions</li> <li>→ Mobility Challenges and Opportunities</li> <li>→ Climate Change - The Issue</li> <li>→ Climate Change Risks and Opportunities</li> <li>→ Ford's Science-Based CO<sub>2</sub> Targets</li> <li>→ Water Impacts, Risks and Opportunities</li> </ul>	

### 2. Organizational Profile

Profile Disclosure and Description	Status	Links	Notes
2.1 Name of the organization.	■		Please see 2013 <a href="#">Form 10-K</a> page 1
2.2 Primary brands, products and/or services.	■		Please see 2013 <a href="#">Form 10-K</a> page 2-3

2.3	Operational structure of the organization, including main divisions, operating companies, subsidiaries and joint ventures.	■		Please see 2013 <a href="#">Form 10-K</a> page 2-3
2.4	Location of organization's headquarters.	■		Please see 2013 <a href="#">Form 10-K</a> page 1
2.5	Number of countries where the organization operates, and names of countries either with major operations or that are specifically relevant to the sustainability issues covered in the report.	■		Please see <a href="#">List of Operations Worldwide</a>
2.6	Nature of ownership and legal form.	■	→ Shareholder Services	
2.7	Markets served (including geographic breakdown, sectors served and types of customers/beneficiaries).	■	→ 2013 Sales and Highlights → Data: Market Share and Sales	Please see 2013 <a href="#">Form 10-K</a> pages 6–10. More detailed information on our products and services is reported on in our annual financial reporting, including our <a href="#">10-K</a> and <a href="#">Annual Report</a> .
2.8	Scale of the reporting organization, including: number of employees; net sales (for private sector organizations) or net revenues (for public sector organizations); total capitalization broken down in terms of debt and equity (for private sector organizations); and quantity of products or services provided.	■	→ Financial Health → Employees → Our Financial Health	Information on our scale is reported on in our annual financial reporting, including our <a href="#">10-K</a> and <a href="#">Annual Report</a> .
2.9	Significant changes during the reporting period regarding size, structure, or ownership including: the location of, or changes in operations, including facility openings, closings, and expansions; and changes in the share capital structure and other capital formation, maintenance and alteration operations (for private sector organizations).	■	→ Focus on Asia → Focus on Europe	Please see 2013 <a href="#">Form 10-K</a> page 2 for a list of changes to our reportable segments.
2.10	Awards received in the reporting period.	■	→ Diversity and Inclusion Awards → Operational Energy and Greenhouse Gas Emissions → Vehicle Safety and Driver Assist Technologies - Highlights → Supplier Diversity Development → Ford of Europe → Ford Asia Pacific Africa → Ford South America	

### 3. Report Parameters

#### Report Profile

Profile Disclosure and Description	Status	Links	Notes
3.1 Reporting period (e.g., fiscal/calendar year) for information provided.	■	→ Year in Review	
3.2 Date of most recent previous report (if any).	■	→ Year in Review	
3.3 Reporting cycle (annual, biennial, etc.).	■	→ Year in Review	
3.4 Contact point for questions regarding the report or its contents.	■	→ Year in Review → Contact	

#### Report Scope and Boundary

Profile Disclosure and Description	Status	Links	Notes
3.5 Process for defining report content, including: determining materiality; prioritizing topics within the report; and identifying stakeholders the organization expects to use the report.	■	→ Year in Review → Materiality Analysis → Stakeholder Engagement	
3.6 Boundary of the report (e.g., countries, divisions, subsidiaries, leased facilities, joint ventures, suppliers). See GRI Boundary Protocol for further guidance.	■	→ About This Report	
3.7 State any specific limitations on the scope or boundary of the report (see completeness principle for explanation of scope).	■	→ About This Report	
3.8 Basis for reporting on joint ventures, subsidiaries, leased facilities, outsourced operations and other entities that can significantly affect comparability from period to period and/or between organizations.	■	→ Year in Review → Governance → Stakeholder Engagement - Employees → Working Conditions in Ford Plants → Our 2013 Safety Record → Data - Financial → Data - Climate Change and the Environment → Data - Water → Data - Vehicle Safety → Data - Supply Chain → Data - People	
3.9 Data measurement techniques and the bases of calculations, including assumptions and techniques underlying estimations applied to the compilation of the Indicators and other	■	→ Year in Review → Data - Financial → Data - Climate Change and the Environment	

information in the report. Explain any decisions not to apply, or to substantially deviate from, the GRI Indicator Protocols.

- Data - Water
- Data - Vehicle Safety
- Data - Supply Chain
- Data - People

3.10	Explanation of the effect of any re-statements of information provided in earlier reports and the reasons for such re-statement (e.g., mergers/acquisitions, change of the base years/periods, nature of business, measurement methods).	■	<ul style="list-style-type: none"> <li>→ Year in Review</li> <li>→ Data - Financial</li> <li>→ Data - Climate Change and the Environment</li> <li>→ Data - Water</li> <li>→ Data - Vehicle Safety</li> <li>→ Data - Supply Chain</li> <li>→ Data - People</li> </ul>
3.11	Significant changes from previous reporting periods in the scope, boundary or measurement methods applied in the report.	■	<ul style="list-style-type: none"> <li>→ Reporting and transparency</li> </ul>

## GRI Content Index

Profile Disclosure and Description	Status	Links	Notes
3.12 Table identifying the location of the Standard Disclosures in the report.	■	→ GRI Index	

## Assurance

Profile Disclosure and Description	Status	Links	Notes
3.13 Policy and current practice with regard to seeking external assurance for the report. If not included in the assurance report accompanying the sustainability report, explain the scope and basis of any external assurance provided. Also explain the relationship between the reporting organization and the assurance provider(s).	■	→ Assurance	

## 4. Governance, Commitments, and Engagement

### Governance

Profile Disclosure and Description	Status	Links	Notes
4.1 Governance structure of the organization, including committees under the highest governance body responsible for specific tasks, such as setting strategy or organizational oversight.	■	<ul style="list-style-type: none"> <li>→ Sustainability Strategy</li> <li>→ Governance</li> <li>→ Governance and Management Structures</li> <li>→ Sustainability Governance and Integration</li> </ul>	
4.2 Indicate whether the Chair of the highest governance body is also an executive officer (and, if so, their function within the organization's management and the reasons for this arrangement).	■	→ Governance and Management Structures	
4.3 For organizations that have a unitary board structure, state the number of members of the highest governance body that are independent and/or non-executive members.	■	→ Corporate Governance - Board of Directors	
4.4 Mechanisms for shareholders and employees to provide recommendations or direction to the highest governance body.	■	<ul style="list-style-type: none"> <li>→ Ethical Business Practices</li> <li>→ Promoting a Diverse and Inclusive Workforce</li> </ul>	
4.5 Linkage between compensation for members of the highest governance body, senior managers and executives (including departure arrangements), and the organization's performance (including social and environmental performance).	■	<ul style="list-style-type: none"> <li>→ Letter from Robert Brown</li> <li>→ Sustainability Strategy</li> <li>→ Manufacturing</li> <li>→ Sustainability Governance and Integration</li> </ul>	
4.6 Processes in place for the highest governance body to ensure conflicts of interest are avoided.	■	→ Ethical Business Practices	
4.7 Process for determining the qualifications and expertise of the members of the highest governance body for guiding the organization's strategy on economic, environmental, and social topics.	■	→ Corporate Governance - Board of Directors	
4.8 Internally developed statements of mission or values, codes of conduct and principles relevant to economic, environmental and social performance and the status of their implementation. Explain the degree to which these are applied across the organization in different regions and departments/units; and relate to internationally agreed standards.	■	<ul style="list-style-type: none"> <li>→ Our Strategy</li> <li>→ Sustainability Strategy</li> <li>→ Ethical Business Practices</li> <li>→ Policy Letters and Directives</li> <li>→ Environmental Management</li> <li>→ Working Conditions in Ford Plants</li> <li>→ Sustainable Materials</li> <li>→ Supporting One Ford</li> <li>→ Promoting a Diverse and Inclusive Workforce</li> </ul>	
4.9 Procedures of the highest governance body for overseeing the organization's identification and management of economic, environmental and social performance, including	■	<ul style="list-style-type: none"> <li>→ Letter from Robert Brown</li> <li>→ Sustainability Strategy</li> <li>→ Public Policy</li> </ul>	

relevant risks and opportunities, and adherence or compliance with internationally agreed standards, codes of conduct and principles.

- Climate Change Governance
- Sustainability Governance and Integration

4.10 Processes for evaluating the highest governance body's own performance, particularly with respect to economic, environmental and social performance.

- Corporate Governance - Board of Directors

## Commitments to External Initiatives

Profile Disclosure and Description	Status	Links	Notes
4.11 Explanation of whether and how the precautionary approach or principles is addressed by the organization. Article 15 of the Rio Principles introduced the precautionary approach. A response to 4.11 could address the organization's approach to risk management in operational planning or the development and introduction of new products.	■		The precautionary principle is the idea that if the consequences of an action are unknown, but are judged to have some potential for major or irreversible negative consequences, then it is better to avoid that action. We do not formally apply the precautionary principle to decision making across all of our activities. However, it has influenced our thinking. For example, in addressing climate change as a business issue, we have employed this principle. In addition, we assess and manage environmental, safety, supply chain, operational and other risks as described throughout this report.
4.12 Externally developed economic, environmental and social charters, principles or other initiatives to which the organization subscribes or endorses.	■	<ul style="list-style-type: none"> <li>→ Policy Letters and Directives</li> <li>→ Sustainability Strategy</li> <li>→ Reporting and Transparency</li> <li>→ Progress in Reducing Water Use</li> </ul>	
4.13 Memberships in associations (such as industry associations) and/or national/international advocacy organizations in which the organization: has positions in governance bodies, participates in projects or committees; provides substantive funding beyond routine membership dues; or views membership as strategic.	■	<ul style="list-style-type: none"> <li>→ Participation in the Policy-Making Process</li> <li>→ Key Partners</li> <li>→ Operational Energy and Greenhouse Gas Emissions</li> <li>→ Choosing More Sustainable Materials</li> <li>→ Eliminating Undesirable Materials</li> <li>→ Partnerships and Collaboration</li> <li>→ Improving the Electric Vehicle Ecosystem</li> <li>→ Encouraging Safer Driving</li> <li>→ Accident Avoidance and Driver Assist Technologies</li> <li>→ Occupant Protection Technologies</li> <li>→ Case Study: Electrified Vehicle Safety</li> <li>→ Leadership Development</li> <li>→ Safe Conditions</li> <li>→ Dealers</li> <li>→ Industry and Cross-Industry Collaboration</li> <li>→ Building Supplier Capability through Localized Training and Collaboration</li> </ul>	

## Stakeholder Engagement

Profile Disclosure and Description	Status	Links	Notes
4.14 List of stakeholder groups engaged by the organization. Examples of stakeholder groups are: communities; civil society; customers; shareholders and providers of capital; suppliers; and employees, other workers and their trade unions.	■	<ul style="list-style-type: none"> <li>→ Our Strategy</li> <li>→ Our Value Chain and Its Impacts</li> <li>→ Stakeholder Engagement</li> </ul>	
4.15 Basis for identification and selection of stakeholders with whom to engage.	■	<ul style="list-style-type: none"> <li>→ Our Strategy</li> <li>→ Overview of the Analysis Process</li> <li>→ Stakeholder Engagement</li> <li>→ People</li> <li>→ Engaging with Communities</li> <li>→ Customers</li> <li>→ Supply Chain</li> </ul>	
4.16 Approaches to stakeholder engagement, including frequency of engagement by type and by stakeholder group.	■	<ul style="list-style-type: none"> <li>→ Overview of the Analysis Process</li> <li>→ Participation in the Policy-Making Process</li> <li>→ Engaging with These Stakeholders</li> <li>→ Engaging with Communities</li> <li>→ Engaging Customers</li> <li>→ Understanding Customer Needs</li> <li>→ Building Customer Awareness</li> <li>→ Creating a Sustainable Supply Chain: Ford's Overall Approach</li> <li>→ Building Stronger Relationships</li> <li>→ Building Shared Commitment and Capability</li> </ul>	
4.17 Key topics and concerns that have been raised through stakeholder engagement, and how the organization has	■	<ul style="list-style-type: none"> <li>→ Materiality Matrix</li> <li>→ Overview of the Analysis Process</li> </ul>	

responded to those key topics and concerns, including through its reporting.

- Assurance
- Downloads
- Voice: John Fleming (Executive Vice President, Global Manufacturing and Labor Affairs, Ford Motor Company)
- Voice: Brooke Barton (Director, Ceres Water Program)
- Voice: Pete Hardigan (Director of Sustainability, Environment and Safety Engineering, Asia Pacific, Ford Motor Company)
- Employee Satisfaction
- Safety Culture and Accountability
- Dealers
- Customers
- Understanding Customer Needs
- Voice: Kelly Katynski (Supply Chain Sustainability Manager – Conflict Minerals Compliance, Ford Motor Company)
- Supplier Greenhouse Gas Emissions
- Voice: Jim Vella (President, Ford Motor Company Fund and Community Services)

## Part II: Disclosures on Management Approach

### Economic

Aspects	Status	Links	Notes
Economic performance	■	<ul style="list-style-type: none"> <li>→ Ford's Goals, Commitments and Status</li> <li>→ Performance Summary</li> <li>→ Financial Health</li> <li>→ Data - Financial</li> <li>→ Our Value Chain and Its Impacts</li> <li>→ Investing in Communities</li> <li>→ Our Financial Health</li> </ul>	
Market presence	■	<ul style="list-style-type: none"> <li>→ 2013 Sales and Highlights</li> <li>→ Market Share and Sales</li> <li>→ Product Competitiveness</li> </ul>	
Indirect economic impacts	■	<ul style="list-style-type: none"> <li>→ Our Value Chain and Its Impacts</li> <li>→ Our Financial Health</li> <li>→ The Lincoln Motor Company</li> <li>→ New Models of Mobility</li> <li>→ Ford Motor Credit Company</li> </ul>	

### Environmental

Aspects	Status	Links	Notes
Materials	■	<ul style="list-style-type: none"> <li>→ Sustainable Materials</li> <li>→ Choosing More Sustainable Materials</li> <li>→ Eliminating Undesirable Materials</li> </ul>	
Energy	■	<ul style="list-style-type: none"> <li>→ Ford's Goals, Commitments and Status</li> <li>→ Performance Summary</li> <li>→ Greening Our Operations</li> <li>→ Greening Our Products</li> </ul>	
Water	■	<ul style="list-style-type: none"> <li>→ Ford's Goals, Commitments and Status</li> <li>→ Performance Summary</li> <li>→ Water</li> <li>→ Overview</li> <li>→ Progress in Reducing Water Use</li> </ul>	
Biodiversity	■	<ul style="list-style-type: none"> <li>→ Sustainable Land Use and Biodiversity</li> </ul>	
Emissions, effluents and waste	■	<ul style="list-style-type: none"> <li>→ Climate Change</li> <li>→ Beyond CO<sub>2</sub></li> <li>→ Choosing More Sustainable Materials</li> <li>→ Waste Management</li> </ul>	
Products and services	■	<ul style="list-style-type: none"> <li>→ Choosing More Sustainable Materials</li> <li>→ Greening Our Products</li> <li>→ Applying Life Cycle Analysis</li> </ul>	
Compliance	■	<ul style="list-style-type: none"> <li>→ Eliminating Undesirable Materials</li> <li>→ End of Life</li> <li>→ A Portfolio Approach</li> </ul>	

→ Fuel

Transport	<ul style="list-style-type: none"> <li>■ → Supplier Greenhouse Gas Emissions</li> <li>■ → Logistics Operations</li> </ul>
Overall	<ul style="list-style-type: none"> <li>■ → Ford's Goals, Commitments and Status</li> <li>■ → Performance Summary</li> <li>■ → Life Cycle Analysis</li> <li>■ → Increasing Consumer Awareness of Environmental Issues</li> </ul>

## Social: Labor Practices and Decent Work

Aspects	Status	Links	Notes
Employment	■	<ul style="list-style-type: none"> <li>→ Employees</li> <li>→ Employee Engagement</li> <li>→ Salute to Dealers</li> </ul>	
Labor/management relations	■	<ul style="list-style-type: none"> <li>→ Ford's Goals, Commitments and Status</li> <li>→ Performance Summary</li> <li>→ Employees</li> <li>→ Promoting a Diverse and Inclusive Workforce</li> <li>→ Communities</li> <li>→ Engaging with Communities</li> <li>→ Investing in Communities</li> <li>→ Working Conditions in Ford Plants</li> <li>→ Policy Letters and Directives</li> </ul>	
Occupational health and safety	■	<ul style="list-style-type: none"> <li>→ Ford's Goals, Commitments and Status</li> <li>→ Performance Summary</li> <li>→ Workplace Health and Safety</li> <li>→ Health and Safety Governance</li> <li>→ Our 2013 Safety Record</li> <li>→ Safety Culture and Accountability</li> <li>→ Safe Conditions</li> </ul>	
Training and education	■	<ul style="list-style-type: none"> <li>→ Leadership Development</li> </ul>	
Diversity and equal opportunity	■	<ul style="list-style-type: none"> <li>→ Diversity and Inclusion</li> <li>→ Promoting a Diverse and Inclusive Workforce</li> <li>→ Dealers</li> </ul>	

## Social: Human Rights

Aspects	Status	Links	Notes
Investment and procurement practices	■	<ul style="list-style-type: none"> <li>→ Ford's Goals, Commitments and Status</li> <li>→ Performance Summary</li> <li>→ Communities</li> <li>→ Governance</li> <li>→ Water</li> <li>→ Engaging with Communities</li> <li>→ Policy Letters and Directives</li> <li>→ Investing in Communities</li> </ul>	
Non-discrimination	■	<ul style="list-style-type: none"> <li>→ Engaging with Communities</li> <li>→ Policy Letters and Directives</li> </ul>	
Freedom of association and collective bargaining	■	<ul style="list-style-type: none"> <li>→ Promoting a Diverse and Inclusive Workforce</li> <li>→ Policy Letters and Directives</li> </ul>	
Child labor	■	<ul style="list-style-type: none"> <li>→ Engaging with Communities</li> <li>→ Policy Letters and Directives</li> </ul>	
Forced and compulsory labor	■	<ul style="list-style-type: none"> <li>→ Engaging with Communities</li> <li>→ Policy Letters and Directives</li> </ul>	
Security practices	■	<ul style="list-style-type: none"> <li>→ Policy Letters and Directives</li> </ul>	
Indigenous rights	■	<ul style="list-style-type: none"> <li>→ Communities</li> <li>→ Engaging with Communities</li> <li>→ Policy Letters and Directives</li> </ul>	

## Social: Society

Aspects	Status	Links	Notes
Community	■	<ul style="list-style-type: none"> <li>→ Ford's Goals, Commitments and Status</li> <li>→ Performance Summary</li> </ul>	

	► Communities ► Engaging with Communities ► Investing in Communities
Corruption	► Governance ► Policy Letters and Directives ► Ethical Business Practices
Public policy	► Public Policy ► Participation in the Policy-Making Process ► Public Policy Positions ► Climate Change Policy and Partnerships
Anti-competitive behavior	► Policy Letters and Directives
Compliance	► Governance and Management ► Policy Letters and Directives ► Ethical Business Practices

## Social: Product Responsibility

Aspects	Status	Links	Notes
Customer health and safety	■	► Ford's Goals, Commitments and Status ► Performance Summary ► How We Manage Vehicle Safety ► Encouraging Safer Driving ► Accident Avoidance and Driver Assist Technologies ► Occupant Protection Technologies	
Product and service labelling	■	► End of Life	
Marketing communications	■	► Dealers ► Building Customer Awareness ► Increasing Customer Awareness of Environmental Issues	
Customer privacy	■	► Ford Motor Credit Company	
Compliance	■	► Ethical Business Practices ► Case Study: Public Domain Ratings	

## Part III: Performance Indicators

### Economic

#### Economic Performance

Profile Disclosure and Description	Status	Links	Notes
EC1 Direct economic value generated and distributed, including revenues, operating costs, employee compensation, donations and other community investments, retained earnings and payments to capital providers and governments.	■	► Financial Health ► Data - Financial ► Our Value Chain and Its Impacts ► Investing in Communities ► Our Financial Health	Information related to operating costs is referenced as "automotive costs of goods sold" in the Company's Annual Report on <a href="#">Form 10-K</a> . Information related to payments to providers of capital is referenced as "cash paid interest expenses" and "stockholder dividends" in the Company's Annual Report on <a href="#">Form 10-K</a> . Ford does not report on employee compensation and does not intend to do so in the future because the information is proprietary.
EC2 Financial implications and other risks and opportunities for the organization's activities due to climate change.	■	► Climate Change Risks and Opportunities ► Ford's Climate Change Strategy ► The "CO <sub>2</sub> Model": The Science Behind Our Scientific Approach ► Climate Change Strategic Principles ► Greening Our Products ► Quantifying Our Environmental Impacts ► Sustainable Technologies and Alternative Fuels Plan ► Choosing More Sustainable Materials ► Water Impacts, Risks and Opportunities ► Operating in Water-Scarce Regions ► Dealers	
EC3 Coverage of the organization's defined benefit plan obligations.	■	► Our Financial Health	For our retirees, we have two principal qualified defined benefit retirement plans in the U.S. The Ford-UAW Retirement Plan covers hourly employees represented by the UAW, and the General Retirement Plan covers substantially all other Ford employees in the U.S. hired on or before December 31, 2003. We established,

effective January 1, 2004, a defined contribution plan generally covering new salaried U.S. employees hired on or after that date. Other U.S. and non-U.S. subsidiaries have separate plans that generally provide similar types of benefits. We report on contributions to, and the funded status of, our pension plans in our Annual Report on [Form 10-K](#).

EC4 Significant financial assistance received from government.

Incentives from U.S. and non-U.S. governmental entities, in the form of tax rebates or credits, grants, and loans, are recorded in the financial statements in our Annual Report on [Form 10-K](#).

## Market Presence

Profile Disclosure and Description	Status	Links	Notes
<b>EC5</b> Range of ratios of standard entry-level wage compared to local minimum wage at significant locations of operation.	■		
EC6 Policy, practices, and proportion of spending on locally based suppliers at significant locations of operation.	■	<ul style="list-style-type: none"> <li>→ Engaging with Communities</li> <li>→ Creating a Sustainable Supply Chain: Ford's Overall Approach</li> <li>→ Supplier Diversity Development</li> </ul>	<p>Ford uses local suppliers everywhere we operate, and in several localities in which we operate, suppliers set up operations nearby to support Ford operations. In addition, the local economic development model described is aligned with our Supplier Diversity Development initiatives. Attributes of our Supplier Diversity Development initiatives include: economic development rationale, local employment opportunities and workforce development, supplier development and a considerable financial history of purchases from minority- and women-owned companies. These initiatives operate exclusively in the U.S. and are driven in part by compliance with federal requirements. Globally, a mandated Black Economic Empowerment Program also drives supplier development and local employment for Ford in South Africa. Ford does not track the proportion of spending on locally based suppliers at significant locations of operation because local sourcing has not appeared as an important issue in our materiality analyses.</p>
EC7 Procedures for local hiring and proportion of senior management hired from the local community at locations of significant operation.	■	<ul style="list-style-type: none"> <li>→ Engaging with Communities</li> </ul>	<p>Ford doesn't track this information, because our materiality analysis determined that the procedures used for local hiring and proportion of senior management hired from the local community is not a material issue. However, Ford's recruiting initiatives are designed to be inclusive and hire from all segments of the diverse populations and communities in which we live and work. Opportunities for employment and advancement are available on a non-discriminatory basis – without regard to race, color, religion, age, gender, sexual orientation, national origin, handicap or veteran status. We take affirmative action in accordance with the law to have minorities and women represented appropriately throughout the workforce and to provide qualified handicapped persons, disabled veterans and veterans of the Vietnam era opportunity for employment and advancement.</p>

## Indirect Economic Impacts

Profile Disclosure and Description	Status	Links	Notes
EC8 Development and impact of infrastructure investments and services provided primarily for public benefit through commercial, in-kind or pro bono engagement.	■	<ul style="list-style-type: none"> <li>→ Our Value Chain and Its Impacts</li> <li>→ Our Financial Health</li> <li>→ Case Study: Saving Lives in Rural India</li> <li>→ Community Engagement</li> <li>→ Case Study: Electrified Vehicle Safety</li> <li>→ Investing in Communities</li> <li>→ Ford Motor Company Fund and Community Services</li> <li>→ Ford Volunteer Corps</li> </ul>	
<b>EC9</b> Understanding and describing significant indirect economic impacts, including the extent of impacts.	■	<ul style="list-style-type: none"> <li>→ Our Value Chain and Its Impacts</li> <li>→ The Lincoln Motor Company</li> <li>→ Product Competitiveness</li> <li>→ New Models of Mobility</li> <li>→ Ford Motor Credit Company</li> <li>→ Focus on Europe</li> <li>→ Focus on Asia</li> <li>→ Applying Life Cycle Analysis</li> </ul>	

## Environmental

## Materials

Profile Disclosure and Description	Status	Links	Notes
EN1 Materials used by weight or volume.	■	<ul style="list-style-type: none"> <li>→ Applying Life Cycle Analysis</li> <li>→ Our Value Chain and Its Impacts</li> <li>→ Sustainable Materials</li> <li>→ What is in a Vehicle?</li> <li>→ Choosing More Sustainable Materials</li> <li>→ Sustainable Raw Materials</li> <li>→ Rare Earth Elements</li> <li>→ Materials Management</li> </ul>	In our materiality analysis, the use of sustainable materials appears as a significant issue, and we provide extensive coverage of that issue. However, accounting for the amount of every material used has not been identified as a material issue for internal or external stakeholders.
EN2 Percentage of materials used that are recycled input materials.	■	<ul style="list-style-type: none"> <li>→ Sustainable Materials</li> <li>→ Choosing More Sustainable Materials</li> <li>→ End of Life</li> </ul>	We report on our use of recycled materials and our efforts to increase recycled content in our vehicles. However, accounting for the exact percentage of recycled materials used in all of our vehicles has not been identified as a material issue for internal or external stakeholders.

## Energy

Profile Disclosure and Description	Status	Links	Notes
EN3 Direct energy consumption by primary energy source.	■	<ul style="list-style-type: none"> <li>→ Data - Operational Energy Use and CO<sub>2</sub> Emissions</li> </ul>	We do not currently aggregate energy use by source on a global basis. However, we will provide that information within the next three reporting cycles.
EN4 Indirect energy consumption by primary source.	■	<ul style="list-style-type: none"> <li>→ Data - Fuel Economy and CO<sub>2</sub> Emissions</li> </ul>	To generate our greenhouse gas emission estimates we use indirect energy conversion factors from the WRI/WBCSD Greenhouse Gas Reporting Protocol or local regulations, if required (such as by the U.S. EPA). However, estimating and aggregating the fuel sources for our indirect energy use is not considered material to our business because we actively manage both energy use and greenhouse gas emissions and do not control the sources of indirect energy we purchase.
EN5 Energy saved due to conservation and efficiency improvements.	■	<ul style="list-style-type: none"> <li>→ Data - Operational Energy Use and CO<sub>2</sub> Emissions</li> <li>→ Greening Our Operations</li> <li>→ Operational Energy and Greenhouse Gas Emissions</li> <li>→ Renewable Energy</li> <li>→ Green Buildings</li> </ul>	
EN6 Initiatives to provide energy-efficient or renewable energy-based products and services, and reductions in energy requirements as a result of these initiatives.	■	<ul style="list-style-type: none"> <li>→ Life Cycle Analysis</li> <li>→ Greening Our Products</li> <li>→ Sustainable Technologies and Alternative Fuels Plan</li> <li>→ Improving Fuel Economy</li> <li>→ Migration to Alternative Fuels and Powertrains</li> <li>→ Vehicle Fuel Efficiency and CO<sub>2</sub> Emissions Progress and Performance</li> <li>→ Electrification: A Closer Look</li> <li>→ Dealers</li> </ul>	
EN7 Initiatives to reduce indirect energy consumption and reductions achieved.	■	<ul style="list-style-type: none"> <li>→ Life Cycle Analysis</li> <li>→ Greening Our Products</li> <li>→ Improving Fuel Economy</li> <li>→ Migration to Alternative Fuels and Powertrains</li> <li>→ Vehicle Fuel Efficiency and CO<sub>2</sub> Emissions Progress and Performance</li> <li>→ Electrification: A Closer Look</li> </ul>	

## Water

Profile Disclosure and Description	Status	Links	Notes
EN8 Total water withdrawal by source.	■	<ul style="list-style-type: none"> <li>→ Data - Water</li> </ul>	
EN9 Water sources significantly affected by withdrawal of water.	■	<ul style="list-style-type: none"> <li>→ Water Usages in the Vehicle Life Cycle</li> </ul>	
EN10 Percentage and total volume of water recycled and reused.	■	<ul style="list-style-type: none"> <li>→ Investing in New Technologies</li> </ul>	

## Biodiversity

Profile Disclosure and Description	Status	Links	Notes
EN11 Location and size of land owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity	■	<ul style="list-style-type: none"> <li>→ Sustainable Land Use and Biodiversity</li> </ul>	We believe that protecting biodiversity is an important issue, and we report on our efforts to

value outside protected areas.

increase and protect wildlife habitat. However, this issue was not identified as material in our analysis because Ford facilities, once established, do not routinely disturb land, wildlife or biodiversity. In siting new facilities, we conduct a due diligence process and an environmental impact assessment, both of which consider potential impacts on biodiversity.

EN12	Descriptions of significant impacts of activities, products, and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas.	<input type="checkbox"/> <a href="#">→ Sustainable Land Use and Biodiversity</a>	This issue is not material, please see EN11 for more detail.
<b>EN13</b>	Habitats protected or restored.	<input type="checkbox"/> <a href="#">→ Sustainable Land Use and Biodiversity</a> <a href="#">→ Remediation</a>	
<b>EN14</b>	Strategies, current actions, and future plans for managing impacts on biodiversity.	<input type="checkbox"/> <a href="#">→ Sustainable Land Use and Biodiversity</a> <a href="#">→ Remediation</a>	
<b>EN15</b>	Number of IUCN Red List species and national conservation list species with habitats in areas affected by operations, by level of extinction risk.	<input type="checkbox"/>	

## Emissions, Effluent, and Waste

Profile Disclosure and Description	Status	Links	Notes
EN16 Total direct and indirect greenhouse gas emissions by weight.	<input type="checkbox"/>	<a href="#">→ Quantifying our Environmental Impacts</a> <a href="#">→ Applying Life Cycle Analysis</a> <a href="#">→ Ford's Greenhouse Gas Emissions</a> <a href="#">→ Supplier Greenhouse Gas Emissions</a> <a href="#">→ Data - Operational Energy Use and CO<sub>2</sub> Emissions</a>	
EN17 Other relevant indirect greenhouse gas emissions by weight.	<input type="checkbox"/>	<a href="#">→ Data: Fuel Economy and CO<sub>2</sub> Emissions</a>	
<b>EN18</b> Initiatives to reduce greenhouse gas emissions and reductions achieved.	<input type="checkbox"/>	<a href="#">→ Applying Life Cycle Analysis</a> <a href="#">→ Greening Our Operations</a> <a href="#">→ Operational Energy and Greenhouse Gas Emissions</a> <a href="#">→ Renewable Energy</a> <a href="#">→ Non CO<sub>2</sub>, Facility-Related Emissions</a> <a href="#">→ Improving Fuel Economy</a> <a href="#">→ Migration to Alternative Fuels and Powertrains</a> <a href="#">→ Vehicle Fuel Efficiency and CO<sub>2</sub> Emissions Progress and Performance</a> <a href="#">→ Electrification: A Closer Look</a>	
EN19 Emissions of ozone-depleting substances by weight.	<input type="checkbox"/>	<a href="#">→ Data - Emissions (VOC and other)</a>	
EN20 NO <sub>x</sub> , SO <sub>x</sub> and other significant air emissions by type and weight.	<input type="checkbox"/>	<a href="#">→ Applying Life Cycle Analysis</a> <a href="#">→ Data - Tailpipe Emissions</a>	
EN21 Total water discharge by quality and destination.	<input type="checkbox"/>	<a href="#">→ Progress in Reducing Water Use</a>	Significant discharges to water by type are not currently tracked at the corporate level. The large majority of wastewater discharges are treated before discharge. The Company is collecting baseline data on discharges to municipal wastewater treatment plants, and this data will be reported as soon as practical, likely beginning in 2015.
EN22 Total weight of waste by type and disposal method.	<input type="checkbox"/>	<a href="#">→ Data - Waste</a> <a href="#">→ Waste Management</a>	This is an area in which Ford is increasing its tracking and reporting. We currently report on waste by type, categorized into hazardous and nonhazardous. We also report on waste disposal to landfill. With our new GEM database, we are now tracking waste disposal methods beyond landfill (i.e., recycling, reuse, compost, incineration, other.) With this new data-tracking tool, we will be able to more report fully on this metric in the next few years.
EN23 Total number and volume of significant spills.	<input type="checkbox"/>	<a href="#">→ Compliance</a>	
<b>EN24</b> Weight of transported, imported, exported, or treated waste deemed hazardous under the terms of the Basel Convention Annex I, II, III and VIII, and percentage of transported waste shipped internationally.	<input type="checkbox"/>	<a href="#">→ Waste Management</a>	
<b>EN25</b> Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the reporting organization's discharges of water and runoff.	<input type="checkbox"/>		

## Products and Services

Profile Disclosure and Description	Status	Links	Notes
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EN26	Initiatives to mitigate environmental impacts of products and services, and extent of impact mitigation.	■	<ul style="list-style-type: none"> <li>→ Applying Life Cycle Analysis</li> <li>→ Greening Our Operations</li> <li>→ Choosing more Sustainable Materials</li> <li>→ Eliminating Undesirable Materials</li> <li>→ Water Usage in the Vehicle Life Cycle</li> </ul>
EN27	Percentage of products sold and their packaging materials that are reclaimed by category.	■	<ul style="list-style-type: none"> <li>→ Choosing More Sustainable Materials</li> <li>→ Logistics Operations</li> </ul> <p>We are committed to reducing waste and increasing recycling of the waste we generate as well as to using recycled content materials in our vehicles. However, because our vehicles are sold with very limited packaging, the reclamation of our product packaging is not a material issue.</p>

## Compliance

Profile Disclosure and Description	Status	Links	Notes
EN28 Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations.	■	<ul style="list-style-type: none"> <li>→ Environmental Management</li> <li>→ Compliance</li> <li>→ Eliminating Undesirable Materials</li> </ul>	

## Transport

Profile Disclosure and Description	Status	Links	Notes
EN29 Significant environmental impacts of transporting products and other goods and materials used for the organization's operations, and transporting members of the workforce.	■	<ul style="list-style-type: none"> <li>→ Supplier Greenhouse Gas Emissions</li> <li>→ Logistics Operations</li> </ul>	

## Overall

Profile Disclosure and Description	Status	Links	Notes
EN30 Total environmental protection expenditures and investments by type.	■	<ul style="list-style-type: none"> <li>→ Operational Energy and Greenhouse Gas Emissions</li> <li>→ Supplier Environmental Management</li> </ul>	

## Social: Labor Practices and Decent Work

### Employment

Profile Disclosure and Description	Status	Links	Notes
LA1 Total workforce by employment type, employment contract and region.	■	<ul style="list-style-type: none"> <li>→ Data - Engagement and Community</li> <li>→ Ford Asia Pacific Africa</li> <li>→ Ford of Europe</li> <li>→ Ford South America</li> </ul>	The number of employees by region can be found in Ford's Annual Report on <a href="#">Form 10-K</a> .
LA2 Total number and rate of employee turnover by age group, gender and region.	■		Age and gender turnover is proprietary information.
LA3 Benefits provided to full-time employees that are not provided to temporary or part-time employees, by major operations.	■	<ul style="list-style-type: none"> <li>→ Employees</li> </ul>	

### Labor/Management Relations

Profile Disclosure and Description	Status	Links	Notes
LA4 Percentage of employees covered by collective bargaining agreements.	■	<ul style="list-style-type: none"> <li>→ Stakeholder Engagement - Employee</li> <li>→ Employees</li> </ul>	
LA5 Minimum notice period(s) regarding operational changes, including whether it is specified in collective agreements.	■	<ul style="list-style-type: none"> <li>→ Focus on Europe</li> </ul>	Ford fully complies with applicable requirements for minimum notice periods regarding operational changes.

## Occupational Health and Safety

Profile Disclosure and Description	Status	Links	Notes
LA6 Percentage of total workforce represented in formal joint management-worker health and safety committees that help monitor and advise on occupational health and safety programs.	■	<ul style="list-style-type: none"> <li>→ Stakeholder Engagement - Employees</li> <li>→ Health and Safety Governance</li> </ul>	Ford faces workplace health and safety challenges similar to those of many multinational manufacturing companies. These challenges include, for example, establishing and reinforcing high, common expectations for the safety of our employees worldwide. Most of our manufacturing facilities have joint union/management safety committees that guide the development and implementation of safety programs in their operations. Approximately 75 percent of the Company's workforce globally are covered by the health and safety committees. This includes the entire manufacturing workforce and some staff organizations.
LA7 Rates of injury, occupational diseases, lost days and absenteeism, and number of work-related fatalities by region.	■	<ul style="list-style-type: none"> <li>→ Our 2013 Safety Record</li> <li>→ Data - Workplace Safety</li> </ul>	Absenteeism is covered by collective bargaining agreements, which vary. The data are not tracked

centrally. Rates of absenteeism were not identified as a material issue in our materiality analysis.

LA8	Education, training, counseling, prevention, and risk-control programs in place to assist workforce members, their families or community members regarding serious diseases.	■	<a href="#">→ Health as a Strategic Advantage</a>
LA9	Health and safety topics covered in formal agreements with trade unions.	■	<a href="#">→ Safety Culture and Accountability</a> <a href="#">→ Workplace Health and Safety</a>

## Training and Education

Profile Disclosure and Description	Status	Links	Notes
LA10 Average hours of training per year per employee by employee category.	■	<a href="#">→ Ethical Business Practices</a> <a href="#">→ Leadership Development</a>	We provide information on employee training programs relevant to sustainability; however, our materiality analysis did not identify the average hours of training per employee as a material issue.
LA11 Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings.	■	<a href="#">→ Leadership Development</a> <a href="#">→ Focus on Europe</a>	
LA12 Percentage of employees receiving regular performance and career development reviews.	■	<a href="#">→ Leadership Development</a>	

## Diversity and Opportunity

Profile Disclosure and Description	Status	Links	Notes
LA13 Composition of governance bodies and breakdown of employees per category according to gender, age group, minority group membership, and other indicators of diversity.	■	<a href="#">→ Corporate Governance - Board of Directors</a> <a href="#">→ Data - Engagement and Community</a>	Employment information by age group is proprietary information.
LA14 Ratio of basic salary of men to women by employee category.	■	<a href="#">→ Diversity and Inclusion</a>	

## Social: Human Rights

### Strategy and Management

Profile Disclosure and Description	Status	Links	Notes
HR1 Percentage and total number of significant investment agreements that include human rights clauses or that have undergone human rights screening.	■	<a href="#">→ Policy Letters and Directives</a> <a href="#">→ Expanding Impact on Our Supply Chain</a> <a href="#">→ Sustainable Raw Materials</a>	
HR2 Percentage of significant suppliers and contractors that have undergone screening on human rights and actions taken.	■	<a href="#">→ Supply Chain - Data</a> <a href="#">→ Supply Chain Profile</a> <a href="#">→ Assessing Suppliers</a> <a href="#">→ Sustainable Raw Materials</a> <a href="#">→ Conflict Minerals</a>	
HR3 Total hours of employee training on policies and procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained.	■	<a href="#">→ Ethical Business Practices</a> <a href="#">→ Building Supplier Capability through Localized Training and Collaboration</a>	

### Non-Discrimination

Profile Disclosure and Description	Status	Links	Notes
HR4 Total number of incidents of discrimination and actions taken.	■	<a href="#">→ Diversity and Inclusion</a> <a href="#">→ Engagement and Community Data</a>	This is proprietary information.

### Freedom of Association and Collective Bargaining

Profile Disclosure and Description	Status	Links	Notes
HR5 Operations identified in which the right to exercise freedom of association and collective bargaining may be at significant risk, and actions taken to support these rights.	■	<a href="#">→ Promoting a Diverse and Inclusive Workforce</a> <a href="#">→ Policy Letters and Directives</a>	

### Child Labor

Profile Disclosure and Description	Status	Links	Notes
HR6 Operations identified as having significant risk for incidents of child labor, and measures taken to contribute to the elimination of child labor.	■	<a href="#">→ Policy Letters and Directives</a> <a href="#">→ Engaging with Communities</a>	

### Forced and Compulsory Labor

Profile Disclosure and Description	Status	Links	Notes
HR7 Operations identified as having significant risk for incidents of forced or compulsory labor, and measurements to contribute	■	<a href="#">→ Policy Letters and Directives</a> <a href="#">→ Engaging with Communities</a>	

to the elimination of forced or compulsory labor.

- [Forced Labor and Human Trafficking in Supply Chains](#)

## Security Practices

Profile Disclosure and Description	Status	Links	Notes
<b>HR8</b> Percentage of security personnel trained in the organization's policies or procedures concerning aspects of human rights that are relevant to operations.	<input type="checkbox"/>		

## Indigenous Practices

Profile Disclosure and Description	Status	Links	Notes
<b>HR9</b> Total number of incidents of violations involving rights of indigenous people and actions taken.	<input type="checkbox"/>		

## Social: Society

### Community

Profile Disclosure and Description	Status	Links	Notes
<b>SO1</b> Nature, scope, and effectiveness of any programs and practices that assess and manage the impacts of operations on communities, including entering, operating and exiting.	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"><li>→ <a href="#">Engaging with Communities</a></li><li>→ <a href="#">Investing in Communities</a></li><li>→ <a href="#">Encouraging Safer Driving</a></li></ul>	

### Corruption

Profile Disclosure and Description	Status	Links	Notes
<b>SO2</b> Percentage and total number of business units analyzed for risks related to corruption.	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"><li>→ <a href="#">Governance</a></li><li>→ <a href="#">Policy Letters and Directives</a></li></ul>	
<b>SO3</b> Percentage of employees trained in organization's anti-corruption policies and procedures.	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"><li>→ <a href="#">Ethical Business Practices</a></li></ul>	
<b>SO4</b> Actions taken in response to incidents of corruption.	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"><li>→ <a href="#">Ethical Business Practices</a></li></ul>	

### Public Policy

Profile Disclosure and Description	Status	Links	Notes
<b>SO5</b> Public policy positions and participation in public policy development and lobbying.	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"><li>→ <a href="#">Public Policy</a></li><li>→ <a href="#">Participation in the Policy-Making Process</a></li><li>→ <a href="#">Public Policy Positions</a></li><li>→ <a href="#">Climate Change Policy and Partnerships</a></li></ul>	
<b>SO6</b> Total value of financial and in-kind contributions to political parties, politicians and related institutions by country.	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"><li>→ <a href="#">Participation in the Policy-Making Process</a></li></ul>	

### Anti-Competitive Behavior

Profile Disclosure and Description	Status	Links	Notes
<b>SO7</b> Total number of legal actions for anti-competitive behavior, anti-trust and monopoly practices and their outcomes.	<input checked="" type="checkbox"/>		Legal actions are described in the Company's Annual Report on the <a href="#">Form 10-K</a> .

### Compliance

Profile Disclosure and Description	Status	Links	Notes
<b>SO8</b> Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with laws and regulations.	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"><li>→ <a href="#">Compliance</a></li></ul>	Additional information on fines for noncompliance with laws and regulations can be found in the Company's Annual Report on the <a href="#">Form 10-K</a> on pages 58–60.

## Social: Product Responsibility

### Customer Health and Safety

Profile Disclosure and Description	Status	Links	Notes
<b>PR1</b> Life cycle stages in which health and safety impacts of products and services are assessed for improvement, and percentage of significant products and services categories subject to such procedures.	<input checked="" type="checkbox"/>	<ul style="list-style-type: none"><li>→ <a href="#">Product Development</a></li><li>→ <a href="#">Applying Life Cycle Analysis</a></li><li>→ <a href="#">Improving Vehicle Interior Environmental Quality and Choosing Allergy-Tested Materials</a></li><li>→ <a href="#">Eliminating Undesirable Materials</a></li><li>→ <a href="#">Vehicle Safety and Driver Assist Technologies</a></li><li>→ <a href="#">Case Study: Public Domain Ratings</a></li><li>→ <a href="#">Case Study: Electrified Vehicle Safety</a></li><li>→ <a href="#">Case Study: Driver Distraction</a></li></ul>	

<b>PR2</b> Total number of incidents of non-compliance with regulations and voluntary codes concerning health and safety impacts of products and services, by type of outcomes.	<ul style="list-style-type: none"> <li>► Customer Satisfaction and Quality</li> <li>► Product, Quality and Service</li> <li>► Vehicle Safety - Data</li> </ul>	Additional information on fines for noncompliance with laws and regulations can be found in the Company's Annual Report on the <a href="#">Form 10-K</a> on pages 58–60.
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## Products and Service Labeling

Profile Disclosure and Description	Status	Links	Notes
PR3 Type of product and service information required by procedures, and percentage of significant products and services subject to such information requirements.	■		Ford's vehicles are subject to numerous labeling requirements that vary by country, region and state. We maintain compliance through our normal product requirement compliance systems. For example, in the U.S., window stickers on new vehicles provide fuel economy and crash test ratings, the percentage of vehicle content from the U.S. and Canada and major sources of foreign parts. We report on safe and efficient use of the product in vehicle manuals. In Europe, we use an Eco-label that goes beyond legal requirements and also inform customers in the driver's manual about the impact of air conditioning on real-world fuel economy. Eco-labels also discuss substances that might produce an environmental or social impact. Ford of Europe also reports on disposal of products. In the U.S., Ford makes vehicle dismantling guides available.
PR4 Total number of incidents of non-compliance with regulations and voluntary codes concerning product and service information and labeling, by type of outcomes.	□		
PR5 Practices related to customer satisfaction, including results of surveys measuring customer satisfaction.	■	<ul style="list-style-type: none"> <li>► Product Competitiveness</li> <li>► Customer Satisfaction and Quality</li> <li>► Global and Regional Quality Improvements</li> <li>► Dealers</li> <li>► Customers</li> <li>► Engaging Customers</li> <li>► Understanding Customer Needs</li> </ul>	

## Marketing Communications

Profile Disclosure and Description	Status	Links	Notes
PR6 Programs for adherence to laws, standards, and voluntary codes related to marketing communications, including advertising, promotion and sponsorship.	■	<ul style="list-style-type: none"> <li>► Policy Letters and Directives</li> <li>► Dealers</li> </ul>	
PR7 Total number of incidents of non-compliance with regulations and voluntary codes concerning marketing communications, including advertising, promotion and sponsorship by type of outcomes.	□		Information on all legal proceedings and incidents of noncompliance can be found in the Company's Annual Report on the <a href="#">Form 10-K</a> .

## Customer Privacy

Profile Disclosure and Description	Status	Links	Notes
PR8 Total number of substantiated complaints regarding breaches of customer privacy and losses of customer data.	□	<ul style="list-style-type: none"> <li>► Ford Motor Credit Company</li> </ul>	

## Compliance

Profile Disclosure and Description	Status	Links	Notes
PR9 Monetary value of significant fines for non-compliance with laws and regulations concerning the provision and use of products and services.	■		Information on all legal proceedings and incidents of noncompliance can be found in the Company's Annual Report on the <a href="#">Form 10-K</a> .



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## UNGC Index

In 2008 Ford joined the United Nations Global Compact, which endorses a framework of principles in the areas of human rights, labor and the environment. We continue to be committed to the principles and are actively implementing them as detailed in this report.

**Alan R. Mulally**

President and Chief Executive Officer, June 2014

**Related links****External Websites**→ [United Nations Global Compact](#)

### Human Rights

UNGC Principle	Report Links	Notes
1. Businesses should support and respect the protection of internationally proclaimed human rights.	→ Policy Letters and Directives → Working Conditions in Ford Plants → Engaging with Communities	
2. Businesses should make sure that they are not complicit in human rights abuses.	→ Policy Letters and Directives → Human Rights in the Supply Chain → Sustainable Raw Materials	

### Labor Standards

UNGC Principle	Report Links	Notes
3. Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.	→ Employees → Policy Letters and Directives	
4. Businesses should uphold the elimination of all forms of forced and compulsory labor.	→ Policy Letters and Directives → Engaging with Communities → Forced Labor and Human Trafficking in Supply Chains → Human Rights in the Supply Chain: Ford's Approach	
5. Businesses should uphold the effective abolition of child labor.	→ Policy Letters and Directives → Engaging with Communities → Human Rights in the Supply Chain: Ford's Approach	
6. Businesses should uphold the elimination of discrimination in respect of employment and occupation.	→ Policy Letters and Directives → Supplier Diversity Development	

### Environment

UNGC Principle	Report Links	Notes
7. Businesses should support a precautionary approach to environmental challenges.	→ Climate Change	The precautionary principle is the idea that if the consequences of an action are unknown, but are judged to have some potential for major or irreversible negative consequences, then it is better to avoid that action. We do not formally apply the precautionary principle to decision making across all of our activities. However, it has influenced our thinking. For example, in addressing climate change as a business issue, we have employed this principle. In addition, we assess and manage environmental, safety, supply chain, operational and other risks as described throughout this report.
8. Businesses should undertake initiatives to promote greater	→ Policy Letters and Directives	

environmental responsibility.

- Climate Change
- Sustainable Materials
- Greening Our Operations
- Greening Our Products
- Progress in Reducing Water Use
- Waste Management

- 
9. Businesses should encourage the development and diffusion of environmentally friendly technologies.

- Lifecycle Analysis
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  - Vehicle Fuel Efficiency and CO<sub>2</sub> Emissions Progress and Performance
  - Electrification: A Closer Look
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## Anti-Corruption

UNGC Principle	Report Links	Notes
10. Businesses should work against corruption in all its forms, including extortion and bribery.	<ul style="list-style-type: none"><li>→ Governance</li><li>→ Ethical Business Practices</li><li>→ Policy Letters and Directives</li></ul>	

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## Glossary

<b>ABF</b>	Aligned Business Framework, Ford's strategy for working more closely with key suppliers
<b>ACC</b>	Adaptive Cruise Control, a technology that helps drivers maintain a safe distance from the vehicle in front of them
<b>ADFSO</b>	Aggressive Deceleration Fuel Shut-Off, a technology for improving fuel efficiency
<b>AIAG</b>	Automotive Industry Action Group, a U.S.-based association of automotive OEMs, suppliers and service providers
<b>Annual Report on Form 10-K</b>	An audited annual financial report required by the U.S. Securities and Exchange Commission containing more detailed information about the Company's business, finances and management than the annual report
<b>APA</b>	Asia Pacific Africa, a Ford region
<b>B car</b>	Generic term for a small or subcompact car (e.g., the size of a Ford Fiesta)
<b>BEV</b>	Battery electric vehicle, a vehicle that has no internal-combustion engine and does not use any onboard gasoline; instead, it runs on a high-voltage electric motor
<b>Biodiesel</b>	A diesel alternative made from vegetable oils obtained from oil seeds, including soy, canola, palm and rapeseed, or from animal fat
<b>BLIS</b>	Blind Spot Information System, a technology that uses radar sensors to help inform the driver when a vehicle is detected in the blind spot zone
<b>Blueprint for Sustainability</b>	Several years ago, this term was introduced at Ford to describe the actions we are taking to achieve outstanding fuel economy and reduce greenhouse gas emissions from our products. Now we use the term more broadly to describe our sustainability strategy as a whole, in recognition of the fact that our important sustainability issues are part of a complex system that interconnects our products, plants and people and the communities in which we operate.
<b>BMS</b>	Battery Management System, a Ford technology that improves the efficiency of a vehicle's electrical system
<b>BPR</b>	Business Plan Review meetings, one of Ford's key management processes
<b>CAA</b>	U.S. Clean Air Act
<b>CAFE</b>	Corporate Average Fuel Economy, a U.S. regulation requiring auto companies to meet certain sales-weighted average fuel economy levels for passenger cars and light trucks and report these numbers annually
<b>CAMP</b>	Crash Avoidance Metrics Partnership, an association of original equipment manufacturers, suppliers and the U.S. government conducting pre-competitive research on active safety features
<b>C car</b>	Generic term for a compact car (e.g., the size of a Ford Focus)
<b>CDP</b>	Carbon Disclosure Project, a nonprofit organization to which Ford and other companies report their greenhouse gas emissions and water use
<b>Ceres</b>	A network of investors, environmentalists and other public interest groups that works with companies and investors to address sustainability challenges
<b>CAF</b>	Our Chinese joint venture, formerly known as Changan Ford Mazda Automobile Co. Ltd., (FMA) and recently restructured as Changan Ford Automobile Corporation, Ltd. (CAF) to increase our ownership percentage
<b>CNG</b>	Compressed natural gas, a type of alternative fuel
<b>CO<sub>2</sub></b>	Carbon dioxide, a primary greenhouse gas
<b>DfS</b>	Design for Sustainability, a tool for bridging the gap between product development and environmental and social issues
<b>DOE</b>	U.S. Department of Energy
<b>E85</b>	A fuel blend of 85 percent ethanol and 15 percent gasoline
<b>EcoBoost®</b>	Ford engine technology that uses turbocharging, direct injection and reduced displacement to increase fuel economy and performance while reducing CO <sub>2</sub> emissions
<b>ECOnetic</b>	A line of European Ford model vehicles with reduced CO <sub>2</sub> emissions
<b>Electrification</b>	The process of developing the technology and infrastructure necessary to replace traditional oil-based vehicle fuels with electricity
<b>ELV</b>	End-of-life vehicle; an EU Directive requires manufacturers to take back ELVs and ensure environmentally sound recycling and disposal
<b>EMOS</b>	Ford's Energy Management Operating System, a mechanism for integrating energy-efficient principles into the facility design, manufacturing/engineering processes, and operations of Ford Manufacturing, Office and Engineering facilities
<b>Environmental aspects</b>	The elements of an organization's activities, products and services that can interact with the environment
<b>EOS</b>	Ford's Environmental Operating System, which is integrated with ISO 14001 and used for driving environmental compliance

<b>EPA</b>	Environmental Protection Agency, a U.S. government agency
<b>EPAS</b>	Electric power assisted steering, a technology that boosts fuel economy and decreases CO <sub>2</sub> emissions
<b>ERGs</b>	Ford's Employee Resource Groups, affinity networks at the Company that are intended to foster diversity and inclusion
<b>ESI</b>	Employee Satisfaction Index, eight questions on Ford's annual Pulse survey of employees
<b>Ethanol</b>	A gasoline alternative, typically derived from plant material (e.g., corn, sugar cane, sugar beets); can also be made from petroleum. Plant-derived ethanol is also sometimes called bio-ethanol.
<b>EU</b>	European Union
<b>Euro 4, Euro 5, Euro 6</b>	Europe's tailpipe emissions standards; Euro 5 standards have been completely phased in for light-duty vehicles in Europe as of January 1, 2012. Euro 6 standards have been developed and will be applied beginning in September 2014.
<b>EV</b>	Electrified vehicle, a generic term for any vehicle that is powered – at least in part – by an electric motor
<b>EVP</b>	Employment Value Proposition, defined as why people choose a given employer and then stay with that employer.
<b>FCV</b>	Fuel cell vehicle, a vehicle that uses an onboard fuel cell to create electrical power through a chemical reaction based on hydrogen fuel
<b>Ford DSFL</b>	Ford Driving Skills for Life, our driver education program
<b>FFV</b>	Flexible fuel vehicle, a vehicle that can be run on any blend of unleaded gasoline with up to 85 percent ethanol
<b>Flexible manufacturing</b>	The use of common platforms and shared manufacturing technologies that allow a single plant to make multiple models and switch relatively rapidly between them, allowing faster response to changing customer demand
<b>FoE</b>	Ford of Europe, a Ford region
<b>FPS</b>	Ford Production System, a continuously improving, lean, flexible and disciplined common global production system
<b>FSAO</b>	Ford South America Operations – a Ford region
<b>Fuel cell</b>	A type of power plant that generates electricity by combining oxygen and hydrogen, and can be used in different sizes and configurations to power vehicles or buildings
<b>Fuel economy</b>	The distance that can be traveled on a single gallon of fuel
<b>Fuel efficiency</b>	The amount of fuel (in ton-miles-per-gallon) needed to move a vehicle of a certain weight a certain distance
<b>GEM</b>	Ford's Global Emissions Manager database, used for measuring, monitoring and recording environmental data
<b>GHG</b>	Greenhouse gas, for example carbon dioxide (CO <sub>2</sub> ), nitrous oxide (N <sub>2</sub> O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF <sub>6</sub> ) or water vapor
<b>GMAP</b>	Ford's Global Material Approval Process, a materials management process
<b>Go Further</b>	Ford's new global brand promise to express what we stand for as a Company
<b>GPDS</b>	Global Product Development System, Ford's system for integrating product development with manufacturing
<b>GQRS</b>	Global Quality Research System, which tracks "Things Gone Wrong" and is Ford's primary quality survey
<b>GRI</b>	Global Reporting Initiative, a multistakeholder process and independent institution whose mission is to develop and disseminate globally applicable sustainability reporting guidelines
<b>GTDI</b>	Gasoline turbocharged direct injection
<b>HEV</b>	Hybrid electric vehicle; a full hybrid can run exclusively on battery power, exclusively on gas power or on a combination of both
<b>IIHS</b>	Insurance Institute for Highway Safety, a U.S.-based nonprofit organization
<b>IMDS</b>	International Material Data System, a materials reporting system used by multiple automakers
<b>ISO 14001</b>	The leading global environmental management system standard, developed by the International Organization for Standardization
<b>JDRF</b>	The leading global organization focused on type 1 diabetes research
<b>JMC</b>	Jiangling Motors Corporation, Ltd., one of Ford's joint ventures in China
<b>LEED</b>	Leadership in Energy and Environmental Design, the "green building" rating system of the U.S. Green Building Council
<b>LEV</b>	Low Emission Vehicle, a level of standards for tailpipe emissions (hydrocarbon, carbon monoxide and oxides of nitrogen) enforced in California and states that have adopted California standards
<b>LEV program</b>	The unique vehicle emissions program adopted by California for the control of tailpipe and evaporative emissions that provides several sets of emissions standards
<b>Life cycle assessment</b>	Process of assessing the environmental, social and economic impacts of a product system over its entire life cycle, from cradle to grave, including material production, product manufacture, product use, product maintenance and disposal at end of life
<b>LPG</b>	Liquefied petroleum gas (also known as propane or Autogas), a type of alternative fuel
<b>MAP</b>	Michigan Assembly Plant, a Ford facility has been transformed from a large SUV factory into a modern, flexible small-car plant
<b>Materiality</b>	<i>Materiality</i> as used in this sustainability report does not share the meaning assigned to this concept for purposes of financial reporting. For the purposes of this report, we consider material information to be that which is of greatest interest to, and which has the potential to affect the perception of, those stakeholders who wish to make informed decisions and judgments about the Company's commitment to environmental, social and economic progress.
<b>MPGe</b>	A mile-per-gallon equivalency metric for electrified vehicles

<b>MQL</b>	Ford's Minimum Quantity Lubricant machining process
<b>MY</b>	Model Year, the manufacturer's annual production period which includes January 1 of the calendar year. For example, production of 2013 model year vehicles might begin in June 2012 and end in May 2013, but could start as early as January 2, 2012, and end as late as December 2013. We report fuel economy by model year because that is how it is reported to government agencies, and therefore, this data corresponds to what is available in the public domain.
<b>NADA</b>	National Automobile Dealers Association, an industry association of car and truck dealers
<b>NCAP</b>	New Car Assessment Program, a term commonly used to denote an official, independent vehicle testing and/or rating system. Separate NCAPs now exist in the United States, Europe, Australia, China, and Central and South America.
<b>NEDC</b>	New European Driving Cycle, the testing procedures used to determine compliance with government fuel economy and emissions requirements.
<b>NGO</b>	Nongovernmental organization
<b>NHTSA</b>	National Highway Traffic Safety Administration, a U.S. government agency
<b>NMOG</b>	Non-methane organic gases
<b>NOV</b>	Notice of violation (e.g., from a regulatory agency)
<b>NPRI</b>	National Pollutant Release Inventory (Canada), similar to U.S. TRI
<b>OEM</b>	Original equipment manufacturer
<b>OHS policy</b>	Ford's Occupational Health and Safety policy
<b>One Ford</b>	Ford's accelerated restructuring plan; One Team unified in pursing One Plan to deliver One Goal: An exciting, viable Ford
<b>OSRP</b>	Occupant Safety Research Partnership, a group within the U.S. Council for Automotive Research that researches and develops advanced crash test dummies and other pre-competitive safety systems
<b>PAS</b>	Ford's Partnership for Advanced Studies, our flagship education program
<b>PDGs</b>	Public Domain Guidelines, internal Ford guidelines that focus on ensuring that our vehicles earn top marks in public domain assessments
<b>PEC</b>	Paint Emissions Concentrator, formerly called "fumes-to-fuel", a technology that concentrates VOC emissions from the painting process by approximately 1,500:1, allowing VOCs to be burned as a fuel source.
<b>PHEV</b>	Plug-in hybrid electric vehicle, a vehicle similar to an HEV in that it is equipped with both an electric battery and a gas-powered engine; however, PHEVs are equipped with a high-capacity battery that can be charged from an ordinary household outlet
<b>PowerShift</b>	Ford's fuel-efficiency-boosting, six-speed, dual-clutch transmission system
<b>PPA</b>	Public-Private Alliance for Responsible Mineral Trade, a joint initiative among governments, companies and civil society to support supply chain solutions to conflict minerals challenges
<b>PSI</b>	Product Sustainability Index, a tool used by Ford of Europe to incorporate life cycle analysis into product development
<b>Pulse survey</b>	Ford's annual, voluntary survey of salaried-employee satisfaction
<b>PZEV</b>	Partial Zero Emission Vehicle, a vehicle standard that is part of the LEV II Program
<b>QOS</b>	Ford's global Quality Operating System, used in our manufacturing to develop, measure and continuously improve robust processes
<b>REACH</b>	Registration, Evaluation, Authorization and Restriction of Chemical Substances (EU legislation)
<b>REEs</b>	Rare Earth Elements, a suite of mined materials widely used in consumer and automotive electronics
<b>RFS</b>	Renewable Fuel Standard, a provision within the U.S. Energy Independence and Security Act of 2007 requiring a significant increase in the use of biofuels
<b>SDGs</b>	Safety Design Guidelines, Ford's stringent internal engineering design targets
<b>Six-speed transmission</b>	A transmission using six gears, for improved fuel economy compared to typical four-speed transmissions
<b>SQDCPME Scorecard</b>	A scorecard that helps us keep focused on the vital components of a sustainable business: Safety, Quality, Delivery, Cost, People, Maintenance and Environment
<b>Stakeholder</b>	Anyone who is impacted or believes they are impacted by the operations or practices of the Company, including customers, employees, business partners, shareholders, governments, communities and nongovernmental organizations. Some also consider the environment a stakeholder.
<b>Sustainability</b>	A business model that creates value consistent with the long-term preservation and enhancement of environmental, social and financial capital. Also, meeting the needs of the present without compromising the future.
<b>Sustainable Technologies and Alternative Fuels Plan</b>	Ford's product strategy, outlining the near-, mid- and long-term steps we are taking to develop and deploy vehicle and fuel technologies to implement our blueprint for sustainability
<b>SULEV</b>	Super Ultra-Low Emission Vehicle, a level of standards for tailpipe emissions enforced in California and states that have adopted California standards
<b>SUMURR</b>	Sustainable Urban Mobility with Uncompromised Rural Reach, a pilot program successfully launched in India that is finding ways to use Ford vehicles and connected technologies to address critical social needs, such as health care
<b>SUV</b>	Sport utility vehicle
<b>Tank-to-wheels CO<sub>2</sub> emissions</b>	A subset of well-to-wheels CO <sub>2</sub> emissions; includes the CO <sub>2</sub> generated by burning the fuel in the vehicle
<b>TCR</b>	The Climate Registry, a voluntary carbon-emissions reporting project
<b>TGW</b>	"Things Gone Wrong," a metric measured by the Global Quality Research System (GQRS)
<b>Tier 1 Suppliers</b>	Suppliers sourcing directly to our assembly plants

<b>Tier 2 Suppliers</b>	Suppliers not sourcing directly to our assembly plants
<b>Tier 2 and Tier 3 Emissions Standards</b>	The U.S. federal program, starting with the 2004 model year, to control vehicle emissions standards. Tier 3 emissions standards, which are more stringent than Tier 2 standards, were proposed in 2013.
<b>TRI</b>	Toxics Release Inventory, an inventory of releases and transfers of certain chemicals that are required to be reported to the U.S. government
<b>TÜV Rheinland</b>	A German-based product-testing company
<b>UAW</b>	The International Union, United Automobile, Aerospace and Agricultural Implement Workers of America
<b>UNGC</b>	United Nations Global Compact, a global policy initiative through which businesses agree to align their operations with 10 principles in the areas of human rights, labor, environment and anti-corruption
<b>URP</b>	University Research Program, a Ford program for collaborating with researchers at more than 100 universities worldwide
<b>V2I</b>	Vehicle-to-infrastructure communications, technologies that enable vehicles to "talk" to roadway infrastructure (such as traffic lights) via advanced Wi-Fi signals or dedicated short-range communications
<b>V2V</b>	Vehicle-to-vehicle communications, technologies that enable vehicles to "talk" to each other via advanced Wi-Fi signals or dedicated short-range communications
<b>VIAQ specifications</b>	Ford's Vehicle Interior Air Quality specifications, which require the consideration of the air-quality and allergen impacts of the materials and components in our vehicles
<b>VOCs</b>	Volatile organic compounds, compounds that vaporize (become a gas) at relatively low temperature
<b>WBCSD</b>	World Business Council for Sustainable Development
<b>Well-to-tank CO<sub>2</sub> emissions</b>	A subset of well-to-wheels CO <sub>2</sub> emissions; measures the CO <sub>2</sub> generated by excavating the feedstocks and producing and distributing the fuel or electricity
<b>Well-to-wheels CO<sub>2</sub> emissions</b>	Accounts for emissions from the vehicle itself, as well as CO <sub>2</sub> emissions resulting from the production and distribution of fuel
<b>WET</b>	Water Estimation Tool, a Ford software program that helps facilities to predict their water usage
<b>WHO</b>	World Health Organization, the international organization providing leadership on global health matters
<b>WRI</b>	World Resources Institute, a U.S.-based nonprofit organization
<b>ZEV</b>	Zero Emission Vehicle, the lowest level of standards for vehicle emissions enforced in California and states that have adopted California standards

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