

# Environmental Report 2017

—Toward the Toyota Environmental Challenge 2050—



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## Editorial Policy

Toyota Motor Corporation considers environmental issues to be one of its management priorities. Since 1998, we have published an annual Environmental Report to explain our environmental initiatives. From FY2016, the content of the report is presented in conformance with the six challenges defined under our long-term initiative, the Toyota Environmental Challenge 2050.

The Environmental Report is a specialized publication excerpted from the Sustainability Data Book. It covers only our environmental initiatives. For information on Toyota's CSR management and initiatives, please refer to our Sustainability Data Book 2017.

We have also published the Annual Report, in which Toyota shares with our stakeholders the ways in which Toyota's business is contributing to the sustainable development of society and the Earth on a comprehensive basis from a medium- to long-term perspective.

**Annual Report** [http://www.toyota-global.com/investors/ir\\_library/annual](http://www.toyota-global.com/investors/ir_library/annual)

**Securities Reports (Japanese text only)**  
<http://www.toyota.co.jp/jpn/investors/library/negotiable/>

**Sustainability Data Book 2017**  
<http://www.toyota-global.com/sustainability/report/sr/>

**U.S. SEC Filings**  
[http://www.toyota-global.com/investors/ir\\_library/sec/](http://www.toyota-global.com/investors/ir_library/sec/)

**Financial Results**  
[http://www.toyota-global.com/investors/financial\\_result/](http://www.toyota-global.com/investors/financial_result/)

**Corporate Governance Reports**  
[http://www.toyota-global.com/investors/ir\\_library/cg/](http://www.toyota-global.com/investors/ir_library/cg/)

**Environmental Report 2017**  
– Toward the Toyota Environmental Challenge 2050 –  
<http://www.toyota-global.com/sustainability/report/er/>

- The Toyota Official Website lists our initiatives not included in the above annual report.  
Sustainability <http://www.toyota-global.com/sustainability/>  
Environment <http://www.toyota-global.com/sustainability/environment/>  
Social Contribution Activities [http://www.toyota-global.com/sustainability/social\\_contribution/](http://www.toyota-global.com/sustainability/social_contribution/)

## Period Covered by Report

The data featured in this report covers the period from April 2016 to March 2017. For major ongoing initiatives, data from April 2017 onward is also included.

## Reference Guidelines

- “GRI Sustainability Reporting Guidelines,” Version 4 (G4)
- Ministry of the Environment of Japan “Environmental Reporting Guidelines” (FY2012 Version)

## Scope of Report

The report covers Toyota Motor Corporation (TMC)'s initiatives as well as the activities of consolidated subsidiaries and affiliates in Japan and overseas.

## About the Icons

- Third Party Assurance** Denotes data confirmed through Independent Practitioner's Assurance

## Company Profile

Company Name	Toyota Motor Corporation
President and Representative Director	Akio Toyoda
Company Address Head Office	1 Toyota-cho, Toyota City, Aichi Prefecture 471-8571, Japan 1-4-18 Koraku, Bunkyo-ku, Tokyo 112-8701, Japan
Tokyo Head Office	4-7-1 Meieki, Nakamura-ku, Nagoya City, Aichi Prefecture 450-8711, Japan
Nagoya Office	

Date Founded	August 28, 1937
Capital	635.4 billion yen (as of March 31, 2017)
Main Businesses	Motor Vehicle Production and Sales
No. of Employees (consolidated)	364,445 (as of March 31, 2017)

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# Highlights

## "A List" top ranking on CDP corporate climate change survey

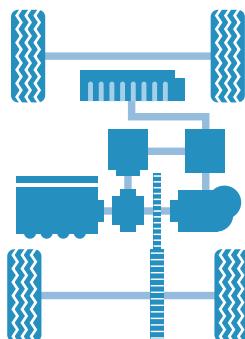
In the "CDP Climate Change Report 2016," which summarizes the CDP's<sup>\*1</sup> survey on corporate response to climate change, Toyota attained the organization's highest possible "A List" ranking.



<sup>\*1</sup> CDP: A UK-based nonprofit organization which acts on behalf of the world's institutional investors to request information disclosures from leading companies on climate change, water and forestry resources. CDP analyzes and assesses survey results, sharing the information with institutional investors.

Hybrid technologies in new Prius won the Energy Conservation Grand Prize at the

## FY2016 Minister of Economy, Trade and Industry Award



The hybrid technologies in the new Prius, Toyota's first car adopting TNGA<sup>\*2</sup>, won the Energy Conservation Grand Prize at the FY2016 Minister of Economy, Trade and Industry Award, the highest accolade from the sponsor, the Energy Conservation Center, Japan, in the product and business model category.

<sup>\*2</sup> Toyota New Global Architecture (TNGA): Toyota's company-wide vehicle development framework. The goal of TNGA is to significantly improve the basic performance and marketability of Toyota vehicles by reforming and integrally redeveloping powertrain components and platforms.

## "Environmental Report 2016" won a Excellence Prize in the Global Warming Countermeasure Reporting Category at the 20th

Environmental Communication Awards sponsored by Ministry of the Environment of Japan and other organizations

Toyota has been widely acclaimed for setting highly-motivated environmental goals known as the Toyota Environmental Challenge 2050, and explaining clearly its specific initiatives and progress in achieving the goals, along with quantitative data.



## "A List" top ranking on CDP water management corporate survey for two consecutive years

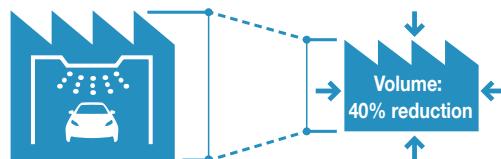
"CDP Water Report 2016" ranked Toyota in its highest possible "A List" ranking of corporate water management. Toyota was the only Japanese automaker to make the grade.



Toyota won the 63rd

## Okochi Memorial Production Prize

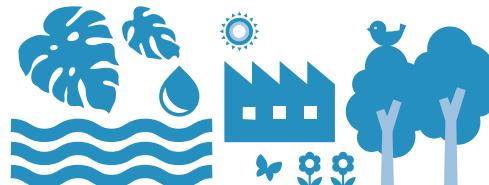
for developing a new car painting line that reduces environmental footprint



CO<sub>2</sub> emissions from car painting line reduced by 32% ↓

Granted by the Okochi Memorial Foundation, the Okochi Memorial Prize, which began in 1954, is one of the most prestigious industrial awards in Japan, as well as the application of production engineering and production technology. This marked the first time in 16 years that Toyota was awarded the prize.

## TMMIN's environmental initiatives recognized with The Best Indonesia Green Awards 2017



Indonesian production affiliate TMMIN won the Best Indonesia Green Awards 2017 from the sponsor, the La Tofi CSR School, at its 7th Indonesia Green Awards.

# Message from the President

## “Leaving this beautiful planet, our hometown, to the next generation”

Firstly, I would like to express my sincere gratitude for your continued support and understanding.

In recent years, we have seen an increasing number of terrible disasters, such as floods and heat waves, which is said to be the result of global warming. Countries around the world are now implementing initiatives to balance emission and absorption of CO<sub>2</sub> and other greenhouse gases in the second half of this century, which will help keep temperature increases at the target of less than 2°C.

At Toyota, we have been engaged in our business under the founding philosophy of contributing to society through car manufacturing. Because everything that we and our automobiles do in life generates CO<sub>2</sub> emissions, global warming, or CO<sub>2</sub> emissions, is the root issue to our lives.

Based on this understanding, we announced the Toyota Environmental Challenge 2050 in October 2015. Our goal is not just to contribute to keeping global warming below 2°C through zero CO<sub>2</sub> emissions, but to accelerate initiatives aiming for a positive impact on the Earth and society.

We have so far focused our efforts on developing eco-friendly vehicles such as hybrid vehicles, plug-in hybrid vehicles and fuel cell vehicles. In August 2017, we announced collaboration with Mazda Motor Corporation to explore joint development of technologies for the basic structure of competitive electric vehicles.

The reason behind this announcement is our earnest wish to leave this beautiful planet, our hometown, to the next generation, and to create a future mobility society that is an environment-friendly, safe, happy, and fun place to be.

In this period of great change, I would like to keep two “loves” in mind. Those are a love for cars and a love for hometown.

We kindly request the continued support and understanding of all our stakeholders.



September 2017

**Akio Toyoda**

President, Member of the Board of Directors  
Toyota Motor Corporation

A handwritten signature in black ink, appearing to read "Akio Toyoda".

# Toyota Environmental Challenge 2050

Toyota has promoted a wide range of initiatives to address increasingly severe global environmental issues, such as extreme weather phenomena attributed to greenhouse gas emissions, biodiversity depletion due to development, and water shortages caused by population growth.

The Toyota Environmental Challenge 2050 was announced in October 2015 as a means of contributing to the realization of a sustainable society. The challenge reaffirms our commitment to reducing the environmental burden of automobiles to as close to zero as possible, while developing measures to contribute to positive impact on the Earth and its societies.



## ① Achieving Zero CO<sub>2</sub> Emissions: Challenge of Achieving Zero



## Benefitting the Earth: Net Positive Impact Challenge

### 1 CO<sub>2</sub> 0

#### New Vehicle Zero CO<sub>2</sub> Emissions Challenge

Reduce global average CO<sub>2</sub> emissions from new vehicles by 90% from Toyota's 2010 global level

##### Actions

Accelerate widespread use of next-generation vehicles to save energy and utilize a diverse range of fuels

- Accelerate global expansion of hybrid vehicles and plug-in hybrid vehicles
- Accelerate widespread use of fuel cell, electric, and other zero-emissions<sup>\*1</sup> vehicles

<sup>\*1</sup> Zero emissions: Complete elimination of harmful exhaust gas emissions. In recent years, zero emission vehicles refer to EVs and FCVs, which do not emit CO<sub>2</sub> at all. In the environment field, zero emission means complete elimination of incinerated waste and landfill waste.

### 4 CO<sub>2</sub> 0



#### Challenge of Minimizing and Optimizing Water Usage

Minimize water consumption and implement wastewater management based on individual local conditions

##### Actions

Reduce water consumption in existing production processes as well as introducing technologies that reduce industrial water consumption through rainwater use and improving water recycling rates

- Manage wastewater quality by complying with strict standards, improving the local environment by returning clean water

### 2 CO<sub>2</sub> 0

#### Life Cycle Zero CO<sub>2</sub> Emissions Challenge

Completely eliminate all CO<sub>2</sub> emissions from the entire vehicle life cycle

##### Actions

Reduce CO<sub>2</sub> emissions along the entire vehicle life cycle, from materials production, parts and vehicle manufacturing to driving and disposal stage

- Reduce CO<sub>2</sub> emissions during materials production by developing and expanding use of low-emission materials
- Promote eco-friendly actions through wider use of recycled materials

### 5 CO<sub>2</sub> 0



#### Challenge of Establishing a Recycling-based Society and Systems

Promote global deployment of End-of-life vehicle treatment and recycling technologies and systems developed in Japan

##### Actions

Establish a recycling-based society with four key features: use eco-friendly materials; use auto parts longer; develop recycling technologies; and manufacture vehicles from End-of-life vehicles

Two global projects started in 2016:

- Toyota Global 100 Dismantlers<sup>\*2</sup> Project
- Toyota Global Car-to-Car Recycle Project

<sup>\*2</sup> Dismantlers: Auto-dismantling businesses operators

### 3 CO<sub>2</sub> 0

#### Plant Zero CO<sub>2</sub> Emissions Challenge

Achieve zero CO<sub>2</sub> emissions at all plants by 2050

##### Actions

At all production plants, develop and adopt low-CO<sub>2</sub> technologies and implement daily *kaizen*, while promoting the use of renewable energy and hydrogen

- Reduce energy consumption to one third or less by simplifying and streamlining production processes and taking innovative energy-saving measures
- Adopt renewable energies at plants, including the use of wind power produced on-site at our Tahara Plant by around 2020

### 6 CO<sub>2</sub> 0



#### Challenge of Establishing a Future Society in Harmony with Nature

Connect nature conservation activities beyond the Toyota Group and its business partners among communities, with the world, to the future

##### Actions

Enhance Toyota's long-standing nature conservation activities in the areas of nature fostering, environmental grants, and environmental education

Develop three "connecting" projects started in 2016, sharing our know-how and environmental experiences

- Connecting communities: Toyota Green Wave Project
- Connecting with the world: Toyota Today for Tomorrow Project
- Connecting to the future: Toyota ESD<sup>\*3</sup> Project

<sup>\*3</sup> ESD: Education for Sustainable Development

## Processes to Identify and Implement the Key Challenges (Materiality)

Environmental challenges may involve both business risks and opportunities. It is therefore essential to identify key challenges (materiality) from both risk and opportunity perspectives when formulating a long-term vision. In order to grasp the potential risks and business opportunities, Toyota has collected information, analyzing and identifying environmental challenges from the standpoints of their importance for both stakeholders and our business.

For the implementation phase, we have created the Sixth Toyota Environmental Action Plan to carry out the company-wide specific initiatives to accomplish the Six Challenges under the Toyota Environmental Challenge 2050.

### Step 1

#### Collect and Analyze Information

We examined a wide range of global trends in collecting and analyzing information. These include scientific predictions for the environment in 2050, global frameworks and policy trends, development in emerging countries, major index from external rating agencies, and world leaders' remarks on environmental issues at G7 Summits. This broad examination provided us with an understanding of macroeconomic trends and important needs of societies, leading us to grasp potential risks and opportunities.

### Step 2

#### Identify Environmental Challenges (Materiality)

We identified environmental challenges (materiality) through analysis of both the external and internal environments. Our analysis of the external environment is derived from ESG investor and research organization surveys and major indices, along with communication with stakeholders including international organizations, NGOs, and consumers, while the internal analysis is based on the Guiding Principles at Toyota, the Toyota Earth Charter, and discussions among internal related divisions.

### Step 3

#### Identify Key Challenges (Materiality)

We identified the key environmental challenges (materiality) by considering two aspects, which are the influence on stakeholders, and impacts on our potential business risks and opportunities. This helped us prioritize the importance of key challenges.

### Step 4

#### Toyota Environmental Challenge 2050 Approval, Regular Review, and Information Disclosure

High priority challenges for both stakeholders and Toyota were formulated in the Toyota Environmental Challenge 2050 (Six Challenges) and approved by the Corporate Planning Meeting, which decides our medium- to long-term strategies. Steady implementation of our challenges requires management's recognition of environmental activities as potential business opportunities and effective investments, in addition to involving Group companies to strengthen collaboration with our business partners. We will review and evaluate our action plans on a regular basis.

## The Sixth Toyota Environmental Action Plan: Action Plan to Implement the Six Challenges

The Toyota Environmental Action Plan defines the Toyota Earth Charter in specific corporate activities to ensure steady progress of our goals. We created the First Toyota Environmental Action Plan in 1993, followed by a review every five years afterwards to implement our plans.

The Sixth Toyota Environmental Action Plan clearly defines the initiatives to be implemented between FY2016 and 2020 in order to meet the Six Challenges of the Toyota Environmental Challenge 2050.

Toyota will contribute to the sustainable development of society and the Earth in harmony with the global environment through *monozukuri* (manufacturing), car manufacturing, providing products and services.

# FY2016 Review of the Sixth Toyota Environmental Action Plan

Area	FY2016 Results Overview
<b>Low Carbon</b> (Climate Change, CO <sub>2</sub> )	<p><b>Challenge 1:</b> We are working to reduce global average CO<sub>2</sub> emissions from new vehicles through improved environmental performance of vehicles and expanded vehicle lineups.</p> <p>In addition to the steady sales of hybrid vehicles (HVs), the second-generation Prius PHV was launched to accelerate development and widespread adoption of plug-in hybrid vehicles (PHVs).</p> <p>For electric vehicles (EV), we have established the development structure for early launch of new models.</p>
	<p><b>Challenge 2:</b> In the area of vehicle development, we subjected eight vehicle models sold in Japan to life cycle assessment using Eco-VAS<sup>*1</sup>. CO<sub>2</sub> emissions from Prius PHV were reduced by 5 percent compared with the previous model.</p> <p>In the area of logistics, we promoted <i>kaizen</i> measures to reduce CO<sub>2</sub> emissions.</p> <p><small>*1 Eco-VAS (Eco-Vehicle Assessment System): Comprehensive environmental impact assessment system throughout the entire vehicle development process based on the concept of life cycle assessment (LCA) from vehicle production and use to disposal stages. The aim of Eco-VAS is to serve as a valuable environmental management tool for chief engineers.</small></p>
	<p><b>Challenge 3:</b> We made steady progress reducing CO<sub>2</sub> emissions in production activities by developing and applying new technologies on a global scale and implementing shop-oriented initiatives in order to smoothly roll out improvements. As we change and update our production lines, we are deploying simplified and streamlined technologies developed in each shop, such as the new painting line adopted for the Prius production. We actively promoted our ESCO activities that support energy-saving activities in our plants.</p>
<b>Recycling</b> (Resources, Water)	<p><b>Challenge 4:</b> For effective water use, we introduced reduction technologies at plants around the world along with water saving activities. Since water-related issues and measures differ depending on regional conditions, we formulated the Toyota Water Environment Policy as a common approach. In accordance with this policy, we evaluate our impact on the water environment from a range of perspectives, including water volume and quality. We defined the Challenge prioritized plants, and we are now working to introduce necessary measures.</p>
	<p><b>Challenge 5:</b> In the area of production, we promoted reductions in the volumes of collected dust from molding process and sludge. In the area of logistics, we introduced simplified and returnable<sup>*2</sup> packaging and wrapping materials. These efforts led to a steady reduction in the amount of waste and packaging and wrapping materials. In the area of resources recycling, we issued guidelines for End-of-life vehicle recycling laws prior to legislation and created a manual on appropriate treatment of waste oil, fluid, and HFC generated from End-of-life vehicles. In Vietnam and Thailand, we launched establishment of End-of-life vehicle proper treatment systems. In Japan, we reinforced the capacity for collecting and recycling batteries from End-of-life vehicles, and made steady progress on remanufacturing HV batteries for stationary use and others.</p> <p><small>*2 Returnable: To enable used packaging materials to be returned to original shipping points for reuse.</small></p>
<b>Harmony with Nature</b>	<p><b>Challenge 6:</b> Under the Toyota Green Wave Project, TMC and its affiliates established the All-Toyota Harmony with Nature Working Group and held joint events.</p> <p>Under the Toyota Today for Tomorrow Project, we announced our partnerships with IUCN<sup>*3</sup> and WWF<sup>*4</sup>, and received positive feedback.</p> <p>In the Toyota ESD Project, the Toyota Shirakawa-Go Eco-Institute reached 190,000 cumulative visitors and strengthened its educational programs for children for the future.</p> <p><small>*3 IUCN (International Union for Conservation of Nature): Founded in 1948 through an international initiative, International Union for Conservation of Nature is a global nature conservation network comprising nations, government agencies, and non-governmental organizations.</small></p> <p><small>*4 WWF: World Wide Fund for Nature</small></p>
<b>Management</b>	<p><b>Environmental Management:</b> In response to occurrence of minor environmental non-compliance issues and complaints, we reinforced our proactive prevention measures, and conducted full implementation and standardization of past measures.</p> <p>Regarding initiatives with suppliers, we have completed the revision of our purchasing guidelines worldwide. In the area of sales and services, we promoted the formulation of regional environmental guidelines.</p> <p>We worked on the improvement of information disclosure and our Environmental Report 2016 received the Excellence Prize in the Global Warming Countermeasure Reporting Category of the 20th Environmental Communication Awards.</p>

## FY2016 Review of the Sixth Toyota Environmental Action Plan (details)

✓✓ : Steady progress toward FY2020 target  
 ✓ : Issues exist, but FY2020 target is expected to be met  
 – : FY2020 target is not expected to be met

	Action Items	Specific Actions and Goals	FY2016 Results	Action Items Evaluation																															
<b>(1) New Vehicle Zero CO<sub>2</sub> Emissions Challenge</b>																																			
Low carbon (climate change, CO <sub>2</sub> )	1. Develop technologies to achieve the best fuel efficiency performance	<ul style="list-style-type: none"> <li>Reduction rate in average CO<sub>2</sub> emissions from new vehicles globally by over 22% from 2010 global level as of 2020                             <ul style="list-style-type: none"> <li>- Develop high-performance powertrain through TNGA and introduce it in steps</li> <li>- Achieve further high-performance development of HVs and expand their deployment</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Reduction rate in average CO<sub>2</sub> emissions from new vehicles globally (Japan, U.S., Europe, and China)                              The FY2016 results were down 11.9% from the FY2010 level. We are promoting initiatives toward meeting our 2020 goal by developing low-CO<sub>2</sub>-emitting engines and transmissions through TNGA, making further improvements in the environmental performance of HVs, and expanding the product lineup                         </li> </ul>	✓✓																															
	2. Promote development of next-generation vehicles using electric power and widespread adoption according to their features	<ul style="list-style-type: none"> <li>HV: Promote higher performance and expand the lineup to broaden consumer adoption of HVs, aim to reach annual HV sales of 1.5 million units and cumulative sales of 15 million units by 2020</li> <li>PHV: Establish PHV as core electric vehicle in support of fuel diversification and develop higher-performance PHVs and promote widespread adoption</li> <li>EV: Promote technology development for short-distance purposes in combination with low-carbon traffic systems</li> <li>FCV: Promote activities to further reduce cost, achieve greater compactness and durability, and strengthen product appeal toward effective use of hydrogen as an important future energy source</li> </ul>	<ul style="list-style-type: none"> <li>HV: Making steady progress toward meeting the targeted number of units sold, by making further improvements in the environmental performance and expanding the product line-up                              (In FY2016, we launched three new hybrid models in Japan (Vitz, CH-R, and Lexus LC 500h) HVs account for 43% of the Toyota vehicles sold in Japan and 15% globally)                         </li> </ul> <table border="1"> <thead> <tr> <th>Region</th><th>Item</th><th>Base year</th><th>FY2020 goal</th><th>FY2016 results</th></tr> </thead> <tbody> <tr> <td rowspan="2">Global</td><td rowspan="2">Number of HVs sold</td><td>Year</td><td>1.5 million units</td><td>1.40 million units</td></tr> <tr> <td>Cumulative</td><td>15 million units</td><td>9.94 million units</td></tr> </tbody> </table> <ul style="list-style-type: none"> <li>PHV: In February 2017, Toyota launched the second-generation Prius PHV. CO<sub>2</sub> emissions during driving were reduced, and product performance including EV driving range was significantly enhanced                              Positioning PHVs as the pillar of next-generation eco-friendly vehicles after hybrid vehicles, Toyota is accelerating PHV development toward widespread adoption                         </li> <li>EV and FCV: Toyota considers these types of vehicles viable options toward achieving emission-free vehicles through the use of renewable energy and CO<sub>2</sub>-free hydrogen. Based on the concept of "the right vehicle for the right place at the right time," we established a development structure for early launch of EVs as well as FCVs</li> </ul>	Region	Item	Base year	FY2020 goal	FY2016 results	Global	Number of HVs sold	Year	1.5 million units	1.40 million units	Cumulative	15 million units	9.94 million units	✓✓																		
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<b>(2) Life Cycle Zero CO<sub>2</sub> Emissions Challenge</b>																																			
3. Promote environmental management for product development (Eco-VAS)	3. Promote environmental management for product development (Eco-VAS)	<ul style="list-style-type: none"> <li>Steadily promote environmental target management using vehicle environmental assessment (Eco-VAS) at the development stage                             <ul style="list-style-type: none"> <li>- Reduce life cycle environmental impact or both new models and fully redesigned models compared with previous models</li> <li>- Disclose assessment results properly to customers on website and in product catalogues</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>In Japan, we used the Eco-VAS to conduct life cycle assessment of eight vehicle models including new and redesigned models                              Life cycle CO<sub>2</sub> emissions of all the assessed models were reduced compared to their reference vehicles. (CO<sub>2</sub> emissions from the second-generation Prius PHV were 5% lower than those from the 2012 model)</li> </ul>	✓✓																															
	4. Study practical use development of catalyst technology-based CO <sub>2</sub> absorption and new material creation (artificial photosynthesis, etc.)	<ul style="list-style-type: none"> <li>Develop artificial photosynthesis technologies from CO<sub>2</sub>, water, and solar power                             <ul style="list-style-type: none"> <li>- Complete basic verification tests for creation of primary CO<sub>2</sub>-absorbing material (material or fuel) using the world's most efficient photosynthetic unit in 2020</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Achieved a world-leading efficiency level in synthesizing formic acid using only CO<sub>2</sub>, water, and solar power</li> </ul>	✓✓																															
	5. Raising transport efficiency and reducing CO <sub>2</sub> emissions in logistics activities	<ul style="list-style-type: none"> <li>Promoting CO<sub>2</sub> reduction activities by further improving transport efficiency (Take comprehensive measures to reduce total distance travelled and promote further modal shift)</li> </ul> <table border="1"> <thead> <tr> <th>Region</th><th>Item</th><th>Base year</th><th>Target (FY2020)</th></tr> </thead> <tbody> <tr> <td rowspan="2">Japan</td><td>Total emissions</td><td>FY1990</td><td>25% reduction</td></tr> <tr> <td>Emissions per transport volume</td><td>FY2006</td><td>14% reduction (1% reduction)</td></tr> <tr> <td>Overseas</td><td colspan="3">Measure performance</td><td></td></tr> </tbody> </table>	Region	Item	Base year	Target (FY2020)	Japan	Total emissions	FY1990	25% reduction	Emissions per transport volume	FY2006	14% reduction (1% reduction)	Overseas	Measure performance				<ul style="list-style-type: none"> <li>Achieved the goal by promoting kaizen activities</li> </ul> <table border="1"> <thead> <tr> <th>Region</th><th>Item</th><th>Base year</th><th>FY2016 results</th></tr> </thead> <tbody> <tr> <td rowspan="2">Japan</td><td>Total emissions</td><td>FY1990</td><td>36% reduction</td></tr> <tr> <td>Emissions per transport volume</td><td>FY2006</td><td>17% reduction</td></tr> <tr> <td>Overseas</td><td colspan="3">Measure performance</td><td></td></tr> </tbody> </table>	Region	Item	Base year	FY2016 results	Japan	Total emissions	FY1990	36% reduction	Emissions per transport volume	FY2006	17% reduction	Overseas	Measure performance			
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6. Contribute to local communities through the expansion of local grid energy management technologies	<ul style="list-style-type: none"> <li>Establish micro-grid (F-grid) and regional optimal energy management technology and promote domestic and overseas rollout                             <ul style="list-style-type: none"> <li>- Verify the tests in Ohira-mura project in Tohoku and Motomachi Plant project in Toyota City</li> <li>- Deploy technologies at other plants in Japan and countries in Asia, etc.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Promoted all projects as planned                             <ul style="list-style-type: none"> <li>- Ohira-mura, Tohoku:                                     <ul style="list-style-type: none"> <li>Down 24% after the introduction of energy-saving equipment;</li> <li>Down 31% after the introduction of environment-friendly equipment</li> </ul> </li> <li>- Motomachi Plant, Toyota City:                                     <ul style="list-style-type: none"> <li>Planning NEDO verification tests (2018 and 2019)</li> <li>- Other plants in Japan, Asia: Collected information such as introduction environment, laws and regulations</li> </ul> </li> </ul> </li> </ul>	✓✓																																
7. Promoting an integrated approach to reduce CO <sub>2</sub> emissions in road traffic sectors	<ul style="list-style-type: none"> <li>Contribute to realization of smart mobility society through IT and ITS technologies                             <ul style="list-style-type: none"> <li>- Based on the verification tests results of next-generation transportation system Ha:mo in Japan and France, which we use ultra-compact EVs, aim to deploy technologies in other regions and establish business models, considering the Olympic Games Tokyo 2020 and Paralympic Games</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Improved profitability, systems, and functional development in verification tests (use cases) in various areas including Toyota City, Grenoble (France), Okinawa, Tokyo, and Okayama City toward building sustainable business operation models                              Particularly in Toyota City and Okinawa, promoted utilization and commercialization of the Ha:mo system, in line with local organizations and local governmental measures</li> </ul>	✓✓																																
	<ul style="list-style-type: none"> <li>Actively participate in integrated traffic flow improvement project for establishment of a low-carbon mobility society                             <ul style="list-style-type: none"> <li>- Establish WBCSD/SMP 2.0 Sathorn Model and formulate roadmap for Bangkok rollout</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>In June 2016, implemented 24 measures to help control the amount of traffic and manage its flow in the Sathorn Road district of Bangkok, validating the congestion-easing effects of traffic management (Traffic flow rate: Improved by 12.6%; length of queue at traffic lights: down by 1 km)                              In February 2017, proposed a roadmap for deploying the measures implemented in the Sathorn Road district throughout Bangkok to Thailand's National Traffic Management Board (chaired by the Deputy Prime Minister Somkid), and received approval</li> </ul>	✓✓																																
	<ul style="list-style-type: none"> <li>Promote adoption of eco-driving globally                             <ul style="list-style-type: none"> <li>- Promote eco-driving globally among customers and employees</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:                             <ul style="list-style-type: none"> <li>- Continued to promote customer education activities, such as eco-driving advice through dealers and eco-driving support through rental &amp; leasing shops</li> <li>- In October 2016, TDEM created and distributed pamphlets to be utilized for raising awareness of customers and employees for eco-driving to the distributors and business entities under its control.</li> </ul> </li> </ul>	✓✓																																

## FY2016 Review of the Sixth Toyota Environmental Action Plan (details)

	Action Items	Specific Actions and Goals	FY2016 Results	Action Items Evaluation																																								
Low carbon (climate change, CO <sub>2</sub> )	(3) Plant Zero CO <sub>2</sub> Emissions Challenge	<p>8. Reduce CO<sub>2</sub> emissions in production activities</p> <ul style="list-style-type: none"> <li>Promote activities to reduce CO<sub>2</sub> emissions through the development and deployment of low-CO<sub>2</sub> production technologies and daily <i>kaizen</i></li> <li>Pursue further productivity and include offices and other sites in rollout of activities</li> <li>Utilize clean energies in accordance with the particular conditions of each country and region <ul style="list-style-type: none"> <li>Promote introduction in stages toward 2020</li> </ul> </li> <li>Manage greenhouse gases (GHG) emissions from sources other than energy sources</li> </ul> <table border="1"> <thead> <tr> <th>Region</th><th>Item</th><th>Base year</th><th>Target (FY2020)</th></tr> </thead> <tbody> <tr> <td>Global<sup>*1</sup></td><td>Emissions per vehicle</td><td>FY2001</td><td>39% reduction</td></tr> <tr> <td>TMC</td><td>Emissions per vehicle</td><td>FY2001</td><td>48% reduction</td></tr> <tr> <td></td><td>Total emissions</td><td>1990</td><td>28% reduction</td></tr> <tr> <td>Overseas</td><td>Promote regional No. 1 reduction activities</td><td></td><td></td></tr> </tbody> </table> <p><sup>*1</sup> TMC + worldwide consolidated subsidiaries (manufacturing)</p>	Region	Item	Base year	Target (FY2020)	Global <sup>*1</sup>	Emissions per vehicle	FY2001	39% reduction	TMC	Emissions per vehicle	FY2001	48% reduction		Total emissions	1990	28% reduction	Overseas	Promote regional No. 1 reduction activities			<ul style="list-style-type: none"> <li>Promote technological development and steadily introduce developed technologies toward achieving the FY2020 goals</li> <li>Accelerate shop-oriented daily <i>kaizen</i> activities</li> </ul> <table border="1"> <thead> <tr> <th>Region</th><th>Item</th><th>Base year</th><th>FY2016 results</th></tr> </thead> <tbody> <tr> <td>Global</td><td>Emissions per vehicle</td><td>FY2001</td><td>34% reduction</td></tr> <tr> <td>TMC</td><td>Emissions per vehicle</td><td>FY2001</td><td>46% reduction</td></tr> <tr> <td></td><td>Total emissions</td><td>1990</td><td>45% reduction</td></tr> <tr> <td>Overseas</td><td>Implement reduction scenarios that match local situations</td><td></td><td></td></tr> </tbody> </table>	Region	Item	Base year	FY2016 results	Global	Emissions per vehicle	FY2001	34% reduction	TMC	Emissions per vehicle	FY2001	46% reduction		Total emissions	1990	45% reduction	Overseas	Implement reduction scenarios that match local situations			✓✓
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Recycling (Resources, Water)	(4) Challenge of Minimizing and Optimizing Water Usage	<p>9. Reduce water consumption in production activities</p> <ul style="list-style-type: none"> <li>Promote continual activities to reduce water consumption in consideration of water environment in each country and region <ul style="list-style-type: none"> <li>Introduce innovative initiatives linked with planning of new plants and production line reforms</li> <li>Reduce water consumption through daily <i>kaizen</i> and other activities</li> </ul> </li> </ul> <table border="1"> <thead> <tr> <th>Region</th><th>Item</th><th>Base year</th><th>Target (FY2020)</th></tr> </thead> <tbody> <tr> <td>TMC (vehicle plants)</td><td>Emissions per vehicle</td><td>FY2001</td><td>12% reduction</td></tr> <tr> <td>Overseas</td><td>Promote regional No. 1 reduction activities</td><td></td><td></td></tr> </tbody> </table>	Region	Item	Base year	Target (FY2020)	TMC (vehicle plants)	Emissions per vehicle	FY2001	12% reduction	Overseas	Promote regional No. 1 reduction activities			<ul style="list-style-type: none"> <li>Promote introduction of water usage reduction technologies as well as daily water conservation activities</li> </ul> <table border="1"> <thead> <tr> <th>Region</th><th>Item</th><th>Base year</th><th>FY2016 results</th></tr> </thead> <tbody> <tr> <td>TMC (vehicle plants)</td><td>Emissions per vehicle</td><td>FY2001</td><td>20% reduction</td></tr> <tr> <td>Overseas</td><td>Implement reduction scenarios that match local situations</td><td></td><td></td></tr> </tbody> </table>	Region	Item	Base year	FY2016 results	TMC (vehicle plants)	Emissions per vehicle	FY2001	20% reduction	Overseas	Implement reduction scenarios that match local situations			✓✓																
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	(5) Challenge of Establishing a Recycling-based Society and Systems																																											
	10. Reduce consumption of dwindling natural resources through use of renewable resources and recycled materials	<ul style="list-style-type: none"> <li>Reduce use of petroleum-derived plastics <ul style="list-style-type: none"> <li>Develop technology for recycled plastics and eco-plastics meeting quality and performance requirements</li> <li>Establish collection systems for used plastics</li> </ul> </li> <li>Promote reuse of rare resources and use of recycled materials <ul style="list-style-type: none"> <li>Develop CFRP recycling technologies</li> <li>Develop technologies for recycling and reducing use of rare earth materials</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Petroleum-derived plastics <ul style="list-style-type: none"> <li>Ran trials to recover plastics from End-of-life vehicles three times a year, working with several dismantling companies in the Chubu region</li> <li>Continued to collect and recycle End-of-life bumpers generated through repair work at Toyota dealers</li> </ul> </li> <li>Rare resources <ul style="list-style-type: none"> <li>Set out to develop technologies for recycling CFRP materials</li> <li>Continued to work on reducing the amount of rare earth metals used in hybrid components</li> </ul> </li> </ul>	✓✓																																								
	11. Achieve industry-leading levels in easy-to-dismantle design for effective resource recycling	<ul style="list-style-type: none"> <li>Maintain and improve industry-leading levels for easy-to-dismantle design <ul style="list-style-type: none"> <li>Integrate reliable easy-to-dismantle designs into all models including next-generation vehicles (EV, FCV) and smart mobility vehicles</li> <li>Develop and integrate easy-to-dismantle designs into new technologies and new materials parts</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Continued to apply easy-to-dismantle designs to newly developed vehicles as well, such as the Prius PHV and Lexus LC (TNGA-based vehicles)</li> </ul>	✓✓																																								
	12. Contribute worldwide through End-of-life vehicle treatment and recycling technology developed in Japan	<ul style="list-style-type: none"> <li>Deploy proper End-of-life vehicles treatment technology overseas Japan in accordance with conditions in each country and region <ul style="list-style-type: none"> <li>Conduct proper End-of-life vehicle treatment in accordance with local End-of-life recycling laws, while enhance initiatives in countries and regions where laws are expected to be introduced, based on the guidance.</li> <li>Establish 100 of proper ELV treatment facilities (seven sites by 2020) Target number of sites was reduced from 10 to 7 in consideration of changes to the external environment</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives: <ul style="list-style-type: none"> <li>Issued the "Guidelines for Automobile Recycling Laws" prior to legislation</li> <li>Created the "Waste oil, fluid, HFC proper Treatment Manual (Basic Edition)" on dismantling End-of-life vehicles, assuming countries and regions without sufficient dismantling facilities and equipment</li> <li>Launch to establish the infrastructure necessary for End-of-life vehicles proper treatment in preparation for enactment of End-of-life vehicle regulations (Vietnam)</li> <li>Launch to establish a system for End-of-life vehicles proper treatment, using existing infrastructure (Thailand)</li> </ul> </li> </ul>	✓✓																																								
	13. Deploy original End-of-life vehicle resources recycling system overseas	<ul style="list-style-type: none"> <li>Promote advanced development of Toyota's original recycling technologies and provide support overseas Japan <ul style="list-style-type: none"> <li>Enhance technologies for remanufacturing and recycling nickel-metal-hydride batteries (lowering cost) and provide support overseas</li> <li>Establish technologies for remanufacturing and recycling lithium-ion batteries and provide support overseas</li> <li>Practical use of recycling wiring harnesses in Japan (expand scale of operations)</li> <li>Practical use of recycling magnets in Japan (expand scale of operations)</li> <li>Develop power generation and storage systems using HV units</li> <li>Study and set goals for bumper collection and recycling technologies in major regions overseas</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives: <ul style="list-style-type: none"> <li>Since FY1997, collected and recycled a total of 73,000 batteries from ELVs</li> <li>In Japan, reinforced the capacity for collecting and recycling batteries towards globalization (expansion of volume) of battery recycling in the future</li> <li>Continuing to promote remanufacturing (testing and re-assembly) and reuse of batteries, including application of stationary batteries</li> <li>Completed development of smelting-less copper recycling technology for 99.96% purity, and began to examine new processing technologies</li> <li>Collected magnets from End-of-life hybrid vehicle, extracting rare earth from magnets and recycling into magnets since FY2012 Collected a total of 28 tons of magnets</li> <li>Continued to examine the application of reuse in stationary storage battery systems</li> <li>Carried out verification tests for recycling End-of-life bumpers into plastic pellets at North American Parts Operations (NAPo)</li> </ul> </li> </ul>	✓✓																																								

## FY2016 Review of the Sixth Toyota Environmental Action Plan (details)

	Action Items	Specific Actions and Goals					FY2016 Results					Action Items Evaluation
Recycling (Resources, Water)	(5) Challenge of Establishing a Recycling-based Society and Systems											
	14. Reduce waste and use resources efficiently in production activities	<ul style="list-style-type: none"> <li>Promote activities to reduce waste through development and deployment of waste reduction-oriented production technologies and daily <i>kaizen</i></li> <li>Promote waste reduction and efficient use of resources through improving yields and other source-oriented measures</li> <li>Promote activities to reduce resources loss by reducing amounts of valuables and waste generated</li> <li>Promote activities to reduce metal scrap generation and implement All-Toyota campaigns to effectively use resources internally</li> </ul>					<ul style="list-style-type: none"> <li>Continue to reduce the dust from casting processes and reduce the volume of sludge by increasing the recycling rate</li> </ul>					✓✓
Harmony with Nature	15. Reduce packaging and wrapping materials and using resources efficiently in logistics activities	<ul style="list-style-type: none"> <li>Promote <i>kaizen</i> mainly for increasing use of returnable containers and reducing amount of packaging materials (Japan)</li> <li>Continue <i>kaizen</i> at conventional level (down 14% from FY2006) (Overseas)</li> <li>Promote awareness of case studies</li> </ul>					<ul style="list-style-type: none"> <li>Promote simplified and returnable packaging materials (Japan)</li> <li>Continue to make the same level of improvement as before (down 28% from FY2006) (Overseas)</li> <li>Assess improvement practices</li> </ul>					✓✓
	(6) Challenge of Establishing a Future Society in Harmony with Nature											✓✓
	16. Promote nature conservation activity "Connecting regional conservation activities with region and community"	<ul style="list-style-type: none"> <li>Toyota Green Wave Project - an initiative to connect with local communities through the various activities undertaken by all Toyota companies and their global affiliates to preserve the natural environment</li> <li>Continue the currently sustainable plant activity and simultaneously expand the various activities of all Toyota Group companies to overseas subsidiaries, affiliates and local communities and expand the reach of activities in partnership with stakeholders</li> </ul>					<ul style="list-style-type: none"> <li>Establish the All-Toyota Harmony with Nature Working Group (WG) at group companies and others (23 companies) and commence activities (Connecting activities)</li> <li>Expand harmony-with-nature activities by carrying out a total of 116 activities per year at all Toyota companies in Japan</li> <li>Hold a joint event twice a year to strengthen group collaboration (May 2016, Tree-planting festival; October 2016, Ecosystem conservation)</li> <li>Enhance awareness</li> <li>Summarize the Green Wave Project activities in a booklet, distribute to employees in the Working Group companies, and post on the company website in June 2016</li> <li>Enhance information dissemination to recognize biodiversity and the activities of the individual companies</li> </ul>					✓✓
	17. Boost nature and biodiversity conservation grants to connect environmental activities to the world	<ul style="list-style-type: none"> <li>Connect environmental and biodiversity conservation activities to the world through grants for those activities</li> <li>Toyota Today for Tomorrow Project -</li> <li>Strengthen grants for projects helping to solve environmental issues as a means to prioritize the environment field among social contribution activities</li> <li>Collaborate with global organizations and stakeholders to provide new value and extend the circle of activities globally</li> </ul>					<ul style="list-style-type: none"> <li>Announced partnerships with an international organization and NGOs</li> <li>Issued a press release on the IUCN Red List Project (May 2016, Switzerland)</li> <li>Issued a press release on the WWF Living Asian Forest Project (July 2016, Tokyo and Nagoya)</li> <li>Announced Toyota's initiatives at the Sixth World Conservation Congress (September 2016, U.S.)</li> <li>At the thirteenth meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP13), Toyota held its first side event jointly with IUCN, BirdLife International, and Conservation International (December 2016, Mexico)</li> <li>Through the above-described activities, Toyota built cooperative relationships with international organizations and NGOs, receiving positive feedback, in particular from government officials, experts, and NGOs.</li> <li>In addition to collaborating with the above organizations, continue the Toyota Environmental Activities Grant Program from FY2000 to assist NGOs and NPOs</li> </ul>					✓✓

## FY2016 Review of the Sixth Toyota Environmental Action Plan (details)

	Action Items	Specific Actions and Goals	FY2016 Results	Action Items Evaluation
(6) Challenge of Establishing a Future Society in Harmony with Nature				
Harmony with Nature	18. Boost contribution to environmental education "Connecting environmental activities to the future"	<ul style="list-style-type: none"> <li>Toyota ESD Project - an initiative to strengthen environmental education using regional business bases and company property, and thereby connect environmental conservation activities to the future           <ul style="list-style-type: none"> <li>- Toyota ESD Project - an initiative to strengthen environmental education using regional business bases and company property, and thereby connect environmental conservation activities to the future</li> <li>- Promote development of educational programs taking advantage of the special characteristics of company-owned land (The Toyota Shirakawa-Go Eco-Institute, Forest of Toyota, Miyagawa Forest in Mie Prefecture, etc.) and promote human resources development to connect to the future</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:           <ul style="list-style-type: none"> <li>(Global)               <ul style="list-style-type: none"> <li>- Opened a learning center at Toyota Motor Thailand for the general public</li> <li>(Employee education)                   <ul style="list-style-type: none"> <li>- Same as No.25 (Forest of Toyota)</li> </ul> </li> <li>- Held hands-on nature programs for local elementary school children (6,050 children in FY2016)</li> <li>- The cumulative number of visitors reached 160,000 as of March 31 2017</li> <li>- Held two sessions of seminars such as "Living in Satoyama" to learn about forest resource utilization and forest management while having fun!</li> </ul> </li> <li>(Toyota Shirakawa-Go Eco- Institute)               <ul style="list-style-type: none"> <li>- The number of visitors who stayed at the Institute in FY2016 reached 16,529</li> <li>The cumulative number of visitors reached 190,000 as of March 31 2017</li> <li>- Strengthened programs for nurturing children for the future, held children's summer and winter camps (six different camp themes, for a total of 15 camps), with 243 children participating from all over Japan (up by 101 children (240%) from the previous fiscal year)</li> <li>(TOYOTA Mie Miyagawa Mountain Forest)                   <ul style="list-style-type: none"> <li>- Held a total of four hands-on forest programs for learning forestry and lumber utilization in cooperation with local NPOs and high schools (New Toyota R&amp;D Center)</li> <li>- Conducted a survey of wasps jointly with a local junior high school as part of its environmental education program</li> <li>Conducted a survey of harvest mice as part of environmental education for employees</li> </ul> </li> </ul> </li> </ul> </li> </ul>	✓✓
	19. Promoting environmental contributions through biotechnology and afforestation business automotive peripheral technologies, and forest conservation activities	<ul style="list-style-type: none"> <li>Respond to environmental issues with bio technology           <ul style="list-style-type: none"> <li>- Promote cellulose ethanol development by further improvement of yeast ferment capacity</li> <li>- Contribute natural capital creation by applying to farming biomass business and agriculture area</li> </ul> </li> <li>Contribute to "Adaptation" in climate change through urban greening business and group owned technology           <ul style="list-style-type: none"> <li>- Respond to heat island (Dissemination of wall greening, High efficient shading paint)</li> </ul> </li> </ul> <p>• Establish a model to use resources effectively in Forestry in Miyagawa, Mie Prefecture</p> <p>• Realize a sustainable technical center in harmony with nature and local communities at the new research and development facility currently in the planning stage</p>	<ul style="list-style-type: none"> <li>Initiatives in biomass and agriculture fields           <ul style="list-style-type: none"> <li>- Began verification tests at overseas cellulosic ethanol pilot plants</li> <li>- Improved market acceptance of the resQ45 series, a manure-composting and deodorizing material for the livestock industry*</li> <li>- Concluded cooperative agreements with local governments, with the goal of expanding the use of <i>Housaku Keikaku</i> (an agricultural IT management tool + site improvement tool) by agricultural corporations</li> <li>- Promoted urban greening initiatives                   <ul style="list-style-type: none"> <li>- Promoted market acceptance of Smart Green Parking (SGP) and Smart Green Wall (SGW), or special urban greening materials*</li> <li>* Sold by Toyota Roof Garden, a consolidated subsidiary</li> </ul> </li> </ul> </li> </ul>	✓✓
			<ul style="list-style-type: none"> <li>TOYOTA Mie Miyagawa Mountain Forest           <ul style="list-style-type: none"> <li>- Carried out initiatives to reduce forest maintenance costs for revitalize sustainable forestry</li> <li>- Utilized harvested lumber in company facilities and related commercial facilities</li> </ul> </li> <li>New Toyota R&amp;D Center           <ul style="list-style-type: none"> <li>- Continued steady environmental conservation activities and surveys at the development site and reported the results to the Environment Monitoring Committee (twice a year)</li> <li>- Worked with experts to continue activities to conserve wild birds, which are declining in number in the Mikawa District               <ul style="list-style-type: none"> <li>Confirmed successful breeding of owls, as well as oriental dollarbirds, very few of which had successfully bred in the region, in the nest boxes that had been installed</li> </ul> </li> <li>- Publicized the knowledge obtained through conservation activities in environmental reports (four times) and academic society meeting (twice)</li> </ul> </li> </ul>	✓✓
Management				
Management	20. Strengthening consolidated environmental management	<ul style="list-style-type: none"> <li>Enhance activities of various environmental committees to improve environmental management activities and ensure superior environmental performance (CO<sub>2</sub>, water, etc.) across all business activities in countries and regions around the world</li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:           <ul style="list-style-type: none"> <li>- Regularly held the (annual) All-Toyota Production Environment Conference and Liaison Committee (Board of Directors meeting)</li> <li>- Held an environmental global award ceremony (to promote <i>kaizen</i> activities at overseas affiliates)</li> <li>- Held the Sixth Toyota Global Environment Conference in November 2016 and discussed Toyota Environmental Challenge 2050, etc. with managers from various regions</li> </ul> </li> </ul>	✓✓
		<ul style="list-style-type: none"> <li>Thoroughly comply with environmental laws and regulations and strengthen proactive prevention measures for environmental risks</li> <li>Improve chemical substance management by carefully monitoring legal trends in each country and region</li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:           <ul style="list-style-type: none"> <li>- Held seminars, etc. targeting those responsible for environmental initiatives at Toyota Group companies in Japan (key point expansion, potential risk identification, and countermeasures)</li> <li>- Six cases of environmental non-compliance (1 at TMC, 5 in Japan, and 0 overseas); one complaint (1 in Japan)               <ul style="list-style-type: none"> <li>All were minor non-compliance issues and complaints, and corrective measures and <i>yokoten</i> (sharing) to other departments were completed.</li> </ul> </li> </ul> </li> </ul>	✓
		<ul style="list-style-type: none"> <li>Improve chemical substance management by carefully monitoring legal trends in each country and region</li> </ul>	<ul style="list-style-type: none"> <li>Deployed chemical substance management globally           <ul style="list-style-type: none"> <li>- Ensured entry of chemical substance data into the IMDS</li> <li>- Monitored processes and evaluated suppliers' chemical substances management.</li> </ul> </li> </ul>	✓✓
	21. Reduce vehicle exhaust emissions to improve urban air quality in each country and region	<ul style="list-style-type: none"> <li>Steadily introduce low-emissions vehicles to improve urban air quality in each country and region</li> <li>Contribute to air quality improvement through air quality research in collaboration with research organizations in each country</li> </ul>	<ul style="list-style-type: none"> <li>In response to tightening of emissions regulations, designed to help improve the urban environment in various countries and regions, we steadily introduced vehicles that satisfied these regulations</li> </ul>	✓✓

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	Action Items	Specific Actions and Goals	FY2016 Results	Action Items Evaluation																																														
Management	Management																																																	
	22. Reducing VOC emissions in production activities	<ul style="list-style-type: none"> <li>Develop and deploy VOC emissions reduction technologies through reduced usage of paint and thinners in painting processes           <ul style="list-style-type: none"> <li>Promote continual reduction in VOC emissions through initiatives linked to painting equipment upgrade plans as well as daily kaizen</li> </ul> </li> </ul> <table border="1"> <thead> <tr> <th>Scope</th><th>Region</th><th>Item</th><th>Target (FY2020)</th></tr> </thead> <tbody> <tr> <td rowspan="2">Vehicle body painting</td><td>Japan*1</td><td>Emissions volume per area painted</td><td>26g/m<sup>2</sup> or less (average for all lines)</td></tr> <tr> <td>TMC</td><td>Emissions volume per area painted</td><td>19g/m<sup>2</sup> or less (average for all lines)</td></tr> <tr> <td>Overseas</td><td></td><td>Promote regional No. 1 reduction activities</td><td></td></tr> <tr> <td>Bumper painting</td><td>TMC</td><td>Emissions volume per area painted</td><td>310g/m<sup>2</sup> or less (average for all lines)</td></tr> <tr> <td>Other painting</td><td>Japan/ Overseas</td><td>Promote VOC emissions reduction activities</td><td></td></tr> </tbody> </table> <p>*1 TMC + consolidated subsidiaries in Japan (manufacturing)</p>	Scope	Region	Item	Target (FY2020)	Vehicle body painting	Japan*1	Emissions volume per area painted	26g/m <sup>2</sup> or less (average for all lines)	TMC	Emissions volume per area painted	19g/m <sup>2</sup> or less (average for all lines)	Overseas		Promote regional No. 1 reduction activities		Bumper painting	TMC	Emissions volume per area painted	310g/m <sup>2</sup> or less (average for all lines)	Other painting	Japan/ Overseas	Promote VOC emissions reduction activities		<ul style="list-style-type: none"> <li>Continue efforts to limit the use of cleaning solvents and to recover a larger percentage of solvents           <ul style="list-style-type: none"> <li>Promoted switching bumper-painting processes to water-borne paints in conjunction with facility remodeling</li> </ul> </li> </ul> <table border="1"> <thead> <tr> <th>Scope</th><th>Region</th><th>Item</th><th>FY2016 results</th></tr> </thead> <tbody> <tr> <td rowspan="2">Vehicle body painting</td><td>Japan</td><td>Emissions volume per area painted</td><td>21.5g/m<sup>2</sup></td></tr> <tr> <td>TMC</td><td>Emissions volume per area painted</td><td>14.6g/m<sup>2</sup></td></tr> <tr> <td>Overseas</td><td></td><td>Promoted coating efficiency improvement and other activities</td><td></td></tr> <tr> <td>Bumper painting</td><td>TMC</td><td>Emissions volume per area painted</td><td>193g/m<sup>2</sup></td></tr> <tr> <td>Other painting</td><td>Japan/ Overseas</td><td>Promoted painting condition optimization, etc.</td><td></td></tr> </tbody> </table>	Scope	Region	Item	FY2016 results	Vehicle body painting	Japan	Emissions volume per area painted	21.5g/m <sup>2</sup>	TMC	Emissions volume per area painted	14.6g/m <sup>2</sup>	Overseas		Promoted coating efficiency improvement and other activities		Bumper painting	TMC	Emissions volume per area painted	193g/m <sup>2</sup>	Other painting	Japan/ Overseas	Promoted painting condition optimization, etc.		✓✓
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	23. Promoting environmental activities in cooperation with business partners (suppliers)	<ul style="list-style-type: none"> <li>Reinforce cooperation with suppliers to further promote environmental activities globally           <ul style="list-style-type: none"> <li>Ensure compliance with each country's laws and regulations while steadily promoting chemical substance management</li> <li>Pursue cooperative environmental initiatives in a broad range of areas, including CO<sub>2</sub> emissions reduction, resource recycling, water impact reductions, and the establishment of societies in harmony with nature</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:           <ul style="list-style-type: none"> <li>Completed revising purchasing guidelines at the global level (at 36 affiliates in 15 countries) based on the TOYOTA Green Purchasing Guidelines, which were revised in Japan (in January 2016)</li> <li>Requested suppliers in Japan to conduct self-assessments in order to ensure thorough chemical substances management, and carried out activities to enhance future initiatives.</li> <li>Continued to implement the CDP Supply Chain Program (to address climate change and the water environment)</li> <li>Enhanced mutual studies through holding an annual CSR Study Meeting, etc.</li> </ul> </li> </ul>	✓✓																																														
	24. Promoting environmental activities in cooperation with business partners (dealers and distributors)	<ul style="list-style-type: none"> <li>Promote environmental management in cooperation with dealers and distributors (Japan)           <ul style="list-style-type: none"> <li>Promote environmental initiatives by adhering closely to the Toyota Dealer CSR Checklist and promote CO<sub>2</sub> emissions reduction, etc., by improving environmental management (Overseas)</li> <li>Promote and strengthen environmental initiatives led by each regional headquarters and distributor in each country (CO<sub>2</sub> reduction, etc.)</li> <li>Promote and strengthen Dealer Environmental Risk Audit Program (DERAP)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:           <ul style="list-style-type: none"> <li>(Japan)               <ul style="list-style-type: none"> <li>Promote environmental initiatives by updating the content of the Toyota Dealer CSR Checklist, and promote CO<sub>2</sub> emissions reduction, etc., by using external environmental certification systems and improving environmental management (Overseas)</li> <li>Currently creating environmental guidelines for the sales and services fields in each region</li> <li>Promote and strengthen environmental initiatives (CO<sub>2</sub> emissions reduction, etc.)</li> <li>Eighty-three distributors and 4,233 dealers from 80 countries worldwide participated in the Dealer Environmental Risk Audit Program (DERAP), and 91% of participating dealers satisfied the five requirements (up 2% from the previous fiscal year)</li> </ul> </li> </ul> </li> </ul>	✓✓																																														
	25. Bolster global employee education and awareness activities	<ul style="list-style-type: none"> <li>Raise awareness of environmental conservation through global environmental education among employees           <ul style="list-style-type: none"> <li>Systemize environmental education programs conducted in cooperation with consolidated affiliates</li> <li>Conduct environmental education in accordance with situations in each country and region</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:           <ul style="list-style-type: none"> <li>In collaboration with the Toyota Institute, continued to provide environmental education to managers and new employees in conjunction with the Toyota Global Environment Month (observed at Toyota companies globally), which marked its 45th year in 2016. Additionally, planned and implemented various measures starting in January 2016 and continuing throughout the year to ensure that the Toyota Environmental Challenge 2050 is fully understood inside the company and to further improve the environmental awareness of our employees</li> <li>Developed an internal environmental education plan in line with the Sixth Toyota Environmental Action Plan in each country and region</li> </ul> </li> </ul>	✓✓																																														
	26. Enhance active disclosure of environmental information and communication	<ul style="list-style-type: none"> <li>Enhance environmental information disclosures           <ul style="list-style-type: none"> <li>Expand business organizations subject to collection of environmental information, and creation of the system</li> <li>Further enhance "Environmental Report" contents</li> </ul> </li> <li>Further enhance environmental communications activities in each country and region globally</li> </ul>	<ul style="list-style-type: none"> <li>Took the following initiatives:           <ul style="list-style-type: none"> <li>After obtaining an approval for its three-year plan for enhancing environmental information disclosure, the Production Environment Committee set out to create a system for acquiring newly disclosed information and third-party verification</li> <li>Effectively described the progress status in line with the Toyota Environmental Challenge 2050 and the Sixth Toyota Environmental Action Plan, in the Environmental Report 2016. Received the Excellence Prize in the Global Warming Countermeasure Reporting Category of the 20th Environmental Communication Awards</li> <li>Produced and made public videos effectively spotlighting Toyota employees who are striving to meet the Toyota Environmental Challenge 2050. Produce a series of the video through 2020</li> <li>Made it a standard practice to feature the environmental topics of overseas affiliates on the TMC website. Planning to build a system for sharing information with overseas affiliates in order to achieve further standardization</li> </ul> </li> </ul>	✓✓																																														

# Eco-friendly Vehicles Contribute to the Environment Only When Widespread

Global cumulative sales of hybrids exceed 10 million units

Mitigating the environmental effects of automobiles has long been a priority for Toyota. Based on the stance that eco-friendly vehicles contribute to the environment only when they are widely used, we have striven to make hybrid vehicles widespread. In August 1997 Toyota launched the Coaster Hybrid EV in Japan, followed in December of that year by the launch of the Prius, the world's first mass-produced hybrid passenger vehicle. Toyota hybrid vehicles' global cumulative sales exceeded 10 million units as of January 31, 2017 with tremendous support from customers around the world.



The environment surrounding eco-friendly vehicles has changed dramatically since Toyota launched the first hybrid vehicle 20 years ago. The spread of Prius created a new customer standard of choosing cars based on their environmental performance. As the number of automakers developing and launching new hybrid vehicles increased, so a new market segment of "hybrid vehicles" was established.

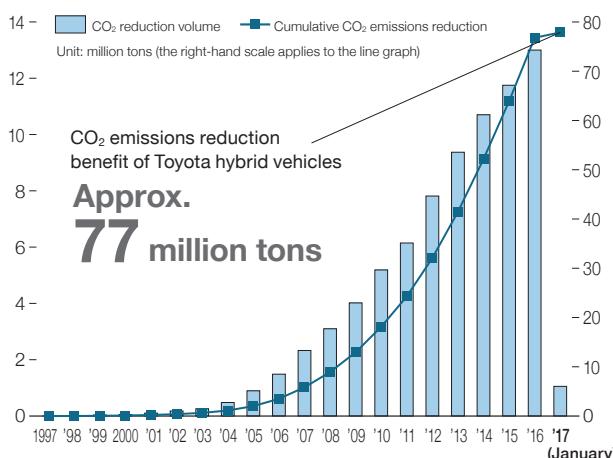
Now that customers around the world opt for hybrid vehicles and other highly fuel-efficient vehicles, it made possible for the automotive industry as a whole to contribute to addressing global environmental issues. Having reached the milestone of selling 10 million hybrid vehicles, Toyota is encouraged to keep striving to make ever-better cars for its customers.

## Hybrid Vehicles Continue to Restrain CO<sub>2</sub> Emissions

Toyota calculated that by the end of January 2017, the use of 10 million Toyota's hybrid vehicles in lieu of conventional gasoline vehicles of similar class and engine performance has reduced

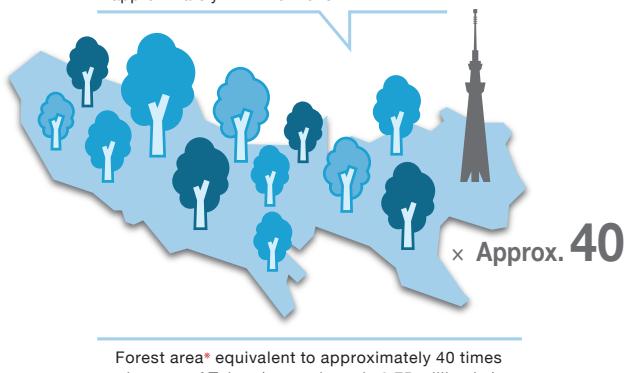
CO<sub>2</sub> emissions by approximately 77 million tons, and has saved approximately 29 million kL of gasoline.

**CO<sub>2</sub> Emissions Reduction Benefit of Toyota Hybrid Vehicles  
(Toyota Calculations)**



### Trees' CO<sub>2</sub> Absorption Equivalent

Global CO<sub>2</sub> emissions reduction benefit of approximately 77 million tons



\* A one hectare man-made forest of Japanese cedar (1,000 trees) aged about 40 years is estimated to absorb approximately 8.8 tons of CO<sub>2</sub> annually (reference: Ministry of Agriculture of Japan, Forestry and Fisheries website)

## Do What Should Be Done: The World's First Prius

The development of the first-generation Prius was Toyota's answer to how it could help the world cope with resource and environmental issues in the 21st century amid the increasingly urgent need to lower greenhouse gas emissions. The development team, being motivated

by desires to make hybrid vehicle a useful part of the future and do what should be done instead of doing what is possible, was ready to take a leap. The result was the world's first mass-produced hybrid passenger car.

### Making the Hybrid Widespread as an Ordinary Car—Takeshi Uchiyamada, Chairman of the Board of Directors and Development Leader for First-generation Prius

When we launched the first-generation Prius, no one even knew what a hybrid was and those who drove it were called geeks. Today, thanks to many customers with expectations for this unknown car, we've reached a milestone with sales units of 10 million hybrid vehicles, which helped hybrid become just an ordinary type of vehicle. We are so grateful for all the customers who have supported us to develop hybrid vehicles and make them widely accepted. We are committed to continue working hand-in-hand with our customers, to contribute to address environmental issues.

お客様に支えられて



New Prius PHV press conference (February 2017)

## Prius PHV is a Pillar for the Next-generation Eco-friendly Vehicles, Offering the Largest Contribution to the Environment Today

In order to further reduce CO<sub>2</sub> emissions, Toyota is pursuing higher energy efficiency to save limited fossil fuels, while accelerating the fuel diversification beyond fossil fuels using hydrogen and electricity. In this strategy, our hybrid vehicles (HV) are positioned to raise energy efficiency while the fuel cell vehicles (FCV) and electric vehicles (EV) support fuel diversification. Besides these environmental technologies, the plug-in hybrid vehicles (PHV) combine the best of HVs and EVs to currently provide the greatest environmental benefits.

In February 2017, the second-generation Prius PHV was launched in Japan as a major innovation and as the next-generation eco-friendly vehicle to follow in the footsteps of HVs as the next-generation eco-friendly vehicle. With a larger-sized battery, the new Prius PHV boasts an EV-mode cruising range increased to 68.2 km, while achieving the high fuel efficiency of 37.2 km/liter\* in gasoline driving mode in the JC08 test cycle\*, the same as the fourth-generation Prius. This makes

it possible for customers to use EV mode during most short-distance drives such as daily commuting and shopping trips.

The Prius PHV also features the world's first solar charging system among mass-produced vehicles. This system supplies an amount of electricity sufficient for driving a vehicle up to around 6.1 km per day. "A key reason why the Prius has enjoyed so much popularity is that we developed it from the customer's viewpoint," says Prius PHV Development Leader Shoichi Kaneko. "The second-generation Prius PHV was also developed through a process of listening carefully to the customers and reflecting their views into the development. Just like the hybrid vehicles, we're looking forward to the day when the Prius PHV becomes accepted by society as just another ordinary car and a mainstream of the eco-friendly vehicle movement."

\* JC08 test cycle: Test mode defined by Ministry of Land, Infrastructure, Transport and Tourism of Japan to measure vehicle fuel efficiency (km/L) using several driving patterns.

\* Excluding A grade model



Second-generation Prius PHV



Solar charging system



Shoichi Kaneko, Prius PHV Development Leader

## Challenge 1

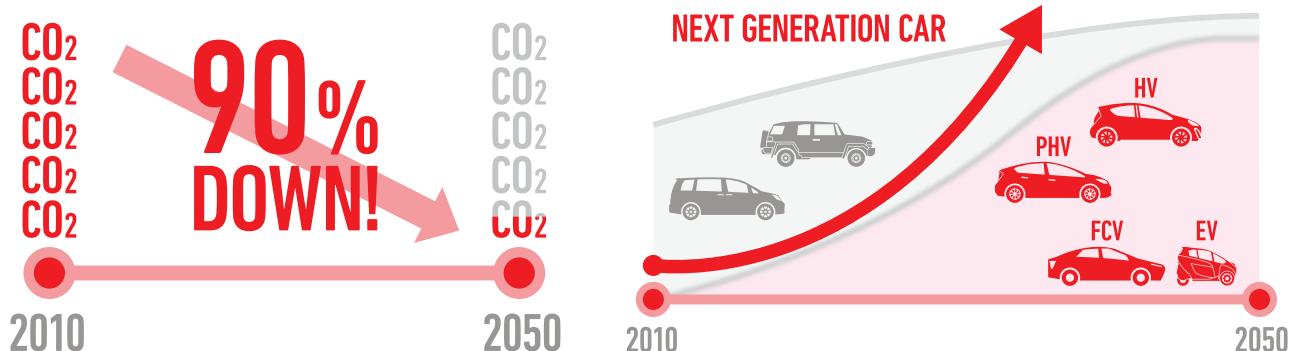
# New Vehicle Zero CO<sub>2</sub> Emissions Challenge

### Fundamental Approach

Extreme weather phenomena around the world are wreaking havoc on society, attesting to the reality of global warming. If further measures are not taken to reduce emissions of greenhouse gases, it is estimated\* that average global temperatures could rise between 3.7 and 4.8°C by 2100 compared with pre-industrial levels. In order to keep the temperature increase less than 2°C, reducing CO<sub>2</sub> emissions to zero will not be enough—we must further reduce it below zero.

Amid global efforts to hold the temperature rise less than 2°C, Toyota has taken on the “New Vehicle Zero CO<sub>2</sub> Challenge,” in which Toyota will strive to reduce vehicle CO<sub>2</sub> emissions by 90 percent in comparison with 2010 levels, by 2050. This Challenge involves not only raising the mileage of engine vehicles, but also accelerating the development of next-generation eco-friendly vehicles with low or zero CO<sub>2</sub> emissions, including hybrid vehicles (HVs), plug-in hybrid vehicles (PHVs), electric vehicles (EVs), and fuel cell vehicles (FCVs), and spreading these vehicles on roads everywhere. Eco-friendly vehicles contribute to the society only when they come into widespread use. Toyota is committed to continue working hand in hand with stakeholders to build an infrastructure that supports the widespread adoption of these vehicles.

\* 5th Assessment Report of IPCC Working Group III (2014)

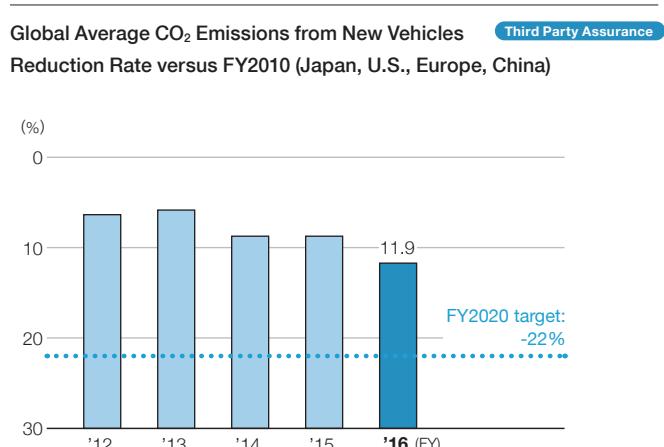


### Developing Technologies to Achieve the Leading Fuel Efficiency Performance

Toyota is committed to reducing the global average CO<sub>2</sub> emissions from new vehicles more than 22 percent by FY2020 from the FY2010 level to steadily proceed with our challenge. As specific initiatives, we will further improve the performance of HVs and expand their use in line with developing and deploying powertrains with high environmental performance, based on our next-generation platform strategy known as TNGA\*.

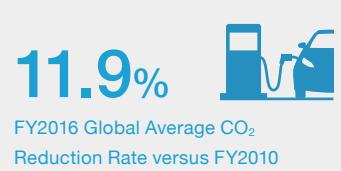
In FY2016, while expanding the availability of vehicles with hybrid systems by launching the new hybrid model C-HR in Japan as well as a hybrid model of the Vitz, we improved the efficiency of conventional engine vehicles. These initiatives ensured steady progress for our 2020 goals.

\* Toyota New Global Architecture (TNGA): Toyota's company-wide global program to structurally transform automobile design. The goal of TNGA is to dramatically improve the basic performance and marketability of Toyota vehicles by reforming and integrally redesigning powertrain components and vehicle platforms.



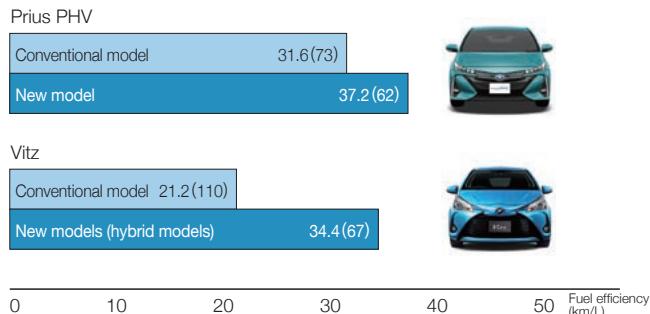
\* The average CO<sub>2</sub> emissions (g/km) of new vehicles in each year, based on the fuel efficiency value (CO<sub>2</sub> emissions) certified by each national authority

[Environmental Data P54-R](#)



## Challenge 1 New Vehicle Zero CO<sub>2</sub> Emissions Challenge

### Fuel Efficiency Comparison between Selected New Models Introduced in FY2016 (in Japan) and Old Models



### Fuel Efficiency of FY2016 New Hybrid Models (in Japan)



- Fuel efficiency values are based on JC08 test cycle verified by (Ministry of Land, Infrastructure, Transport and Tourism of Japan)
- CO<sub>2</sub> emissions (g/km) in brackets

### Environmental Performance Was Greatly Improved with Adoption of Redesigned Engines, Transmissions and Other Components Based on TNGA

The fundamental vehicle performance of Toyota's newly developed powertrain components were thoroughly reviewed in line with highly-efficient, compact, and lightweight design.

The newly developed 2.5-liter engines for gasoline vehicles and those for HVs attained world's top maximum thermal efficiency levels of 40% and 41% respectively.

The new 8-speed and 10-speed automatic transmissions achieved world's top level of transmission efficiency by drastically reducing loss. Furthermore, the multi-gearred, compact, and lightweight design contributes to CO<sub>2</sub> emissions reduction.

The hybrid system benefits from the compact, lightweight, loss-reducing technologies deployed in the fourth-generation Prius. These were combined for a completely redesigned hybrid system for 2.5-liter engines, as well as a high-performance Multistage THS II newly developed for FR cars.

These newly developed powertrains will be deployed in Toyota vehicles between 2017 and 2021. We plan to launch nine new engines with 17 variations, four new transmissions with 10 variations, and six new hybrid systems with 10 variations in the five-year period. These will be installed in 60% of Toyota vehicles sold (in Japan, U.S., Europe, and China), reducing CO<sub>2</sub> emissions by 15% or more.



Inline 4 cylinder 2.5-liter direct injection gasoline engine



10-speed automatic transmission for FR vehicles

## Promoting Development of Next-generation Vehicles Using Electric Power, and Widespread Use According to Their Features

Eco-friendly vehicles contribute to the environment only when widespread. Based on this concept, we will expand our lineups of hybrid vehicles, PHVs, EVs, and FCVs, promoting their further adoption. HV sales target for 2020 is 1.5 million units annually and 15 million units in cumulative total.

In 2016, cumulative sales of the Aqua hybrid model reached 1 million units in Japan, while those of Lexus hybrid model reached 1 million units globally. With these milestones, the global cumulative sales of HVs topped 10 million units in January 2017, of which 15% Toyota sells today are HVs (43% in Japan). It took us around 20 years to achieve these results since we launched the first-generation Prius in 1997.

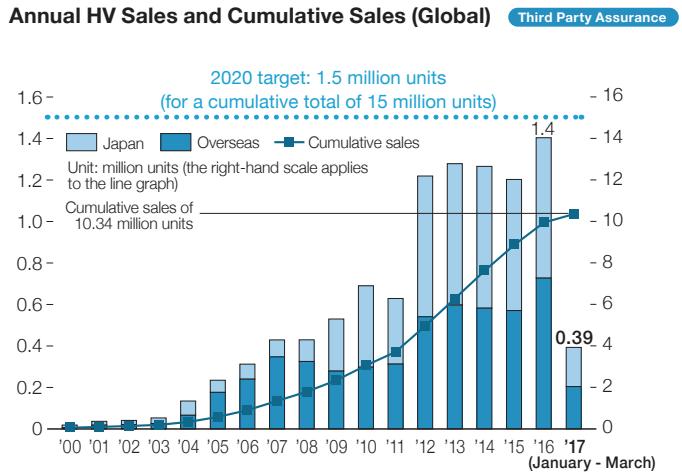
As for PHVs, we will further accelerate the expansion of their use as a mainstay of our next-generation eco-friendly vehicle lineup, taking measures for low-CO<sub>2</sub> emissions while driving and fuel diversification, which will lower CO<sub>2</sub> emissions even further.

In February 2017, we launched the second-generation Prius PHV, resulting in a big evolution in eco-friendly vehicle technology.

Toyota considers FCVs and EVs, which emit no CO<sub>2</sub> while driving and have the potential of attaining massive CO<sub>2</sub> reductions through the use of renewable energies and CO<sub>2</sub>-free hydrogen, to be the future eco-friendly vehicles. We strive to work on promoting widespread use of these vehicles according to their individual features, by considering energy issues and infrastructure status, as well as vehicle use in countries and regions.

In FY2016, Toyota established a structure that will enable early commercial introduction of EVs.

 Environmental Data P51-A



### Toyota Fuel Cell Bus Purchased by Tokyo Metropolitan Government (Japan)

In March 2017, two fuel cell buses (FC bus) purchased by the Bureau of Transportation of the Tokyo Metropolitan Government became the first FC buses to operate as city-run route buses in Japan.

The FC buses use the Toyota Fuel Cell System developed for the Mirai fuel cell vehicle. This system offers exceptional environmental performance, with high energy efficiency compared with gasoline, diesel, and other internal combustion engines, and without emitting any CO<sub>2</sub> or substances of concern (SOCs) when driving.

We plan to deliver more than 100 FC buses, mainly in Tokyo, in preparation for the Olympic Games Tokyo 2020 and Paralympic Games.



FC bus

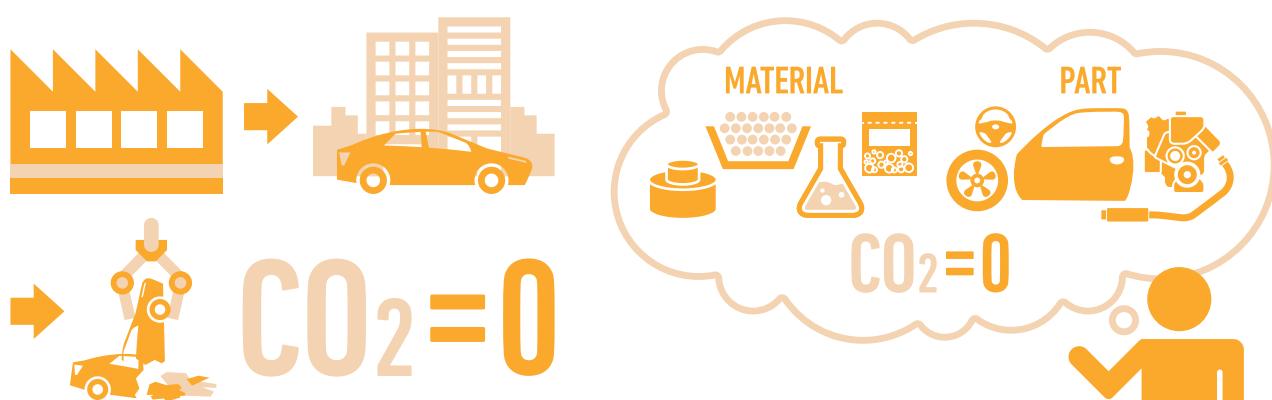
## Challenge 2

# Life Cycle Zero CO<sub>2</sub> Emissions Challenge

### Fundamental Approach

The “Life Cycle Zero CO<sub>2</sub> Emissions Challenge” takes an approach to zero CO<sub>2</sub> emissions not only while driving, but also in the entire vehicle life cycle including materials and parts manufacturing, vehicle assembly, disposal and vehicle recycling.

Because some next-generation eco-friendly vehicles may increase CO<sub>2</sub> emissions in the processes of materials and parts manufacturing, we strive to develop low CO<sub>2</sub> emitting materials during manufacturing and their widespread use, as well as reducing material usage and the number of parts used. In order to reduce CO<sub>2</sub> emissions at the disposal and recycling stages, we further push forward expanding the use of recycled materials and applying eco-friendly designs that make it easier to dismantle vehicles, pursuing “ever-better cars.”



## Promoting Environmental Management in Product Development (Eco-VAS)

### Steady Promotion of Environmental Target Management

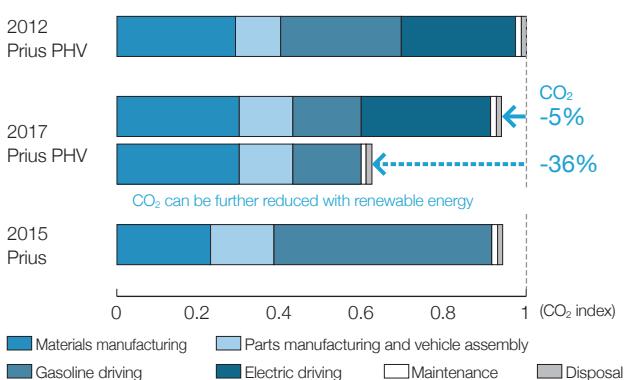
To reduce the environmental impact of its vehicles, Toyota has introduced the Eco-Vehicle Assessment System (Eco-VAS) to set and achieve environmental targets such as life cycle CO<sub>2</sub> and recyclability, under the guidance of the chief engineer, including at the development stage. In this system, we conduct LCA<sup>\*1</sup> which assesses the impact of the vehicle life cycle on the environment at all stages including materials and parts manufacturing, vehicle assembly, driving, maintenance, and disposal.

In FY2016, we conducted LCA for one new model and seven redesigned models<sup>\*2</sup>. For the second-generation Prius PHV launched in February 2017, the life cycle CO<sub>2</sub> emissions were reduced by 5 percent compared with the 2012 model year. This was achieved by reducing CO<sub>2</sub> emissions while manufacturing, even though the total battery capacity was nearly doubled in order to increase the EV driving range (to 68.2 km). Prius PHV has potential to reduce CO<sub>2</sub> emissions even further when charged with electricity from sources of renewable energy.

\*1 LCA (Life Cycle Assessment): A comprehensive technique to assess vehicle's impact on the environment over the entire life cycle from resource mining through to disposal and recycling, by quantifying the impact of each stage

\*2 Passo, Auris Hybrid, Roomy/Tank, C-HR, Pixis Joy, Vitz Hybrid, Prius PHV, Lexus LC

Prius PHV LCA Results



- Evaluations are based on driving a vehicle in JC08 test cycle (Ministry of Land, Infrastructure, Transport and Tourism of Japan) for a lifetime mileage of 100,000 km (Toyota data).

LCA assessment results are shown as an index.



The LCA that Toyota conducts on its passenger vehicles has been tested and certified by German third-party organization TÜV Rheinland based on ISO 14040/14044 standards.

### Response to Scope 3

Scope 3 is a standard established to measure CO<sub>2</sub> emissions at all stages of a company's business activities and identify areas for future reductions. Scope 3 accounts for not only CO<sub>2</sub> emissions from their activities and those of their consolidated subsidiaries (Scope 1 and Scope 2), but emissions from other stages of the life cycle, such as procured materials and parts, transportation, employee commuting and business travel, along with the driving, maintenance, and disposal of customer vehicles.

For FY2016, Toyota calculated its Scope 3 total CO<sub>2</sub> emissions to be 401.75 million t-CO<sub>2</sub>. Breaking down the total, most of the emissions

were from category 1 and category 11 emissions, combining for approximately 97.1% of the total Scope 3 emissions.

Category 1 covers emissions from materials and parts at the manufacturing stage, while category 11 covers emissions from vehicles driven by customers. Therefore, use of lightweight parts, materials selection, development of fuel efficiency improvement technologies, and next-generation eco-friendly vehicles are important measures that will lead to CO<sub>2</sub> emissions reduction.

Moving forward, we will continue to monitor Scope 3 emissions and utilize the findings to take measures for developing technologies.

#### CO<sub>2</sub> Emissions Ratio of 15 Categories in Scope 3 (FY Global Basis)

Category	Emissions volume (million tons-CO <sub>2</sub> )	Emissions ratio (%)
1. Purchased goods and services	<b>61.20</b>	15.2
2. Capital goods	<b>3.89</b>	1.0
3. Fuel- and energy-related activities (not included in Scope 1 or 2)	<b>0.96</b>	0.2
4. Upstream transportation and distribution	<b>0.85</b>	0.2
5. Waste generated in operations	<b>0.12</b>	0.0
6. Business travel	<b>0.14</b>	0.0
7. Employee commuting	<b>0.71</b>	0.2
8. Upstream leased assets	—	—

Third Party Assurance

Category	Emissions volume (million tons-CO <sub>2</sub> )	Emissions ratio (%)
9. Downstream transportation and distribution	<b>0.01</b>	0.0
10. Processing of sold products	<b>1.07</b>	0.3
11. Use of sold products	<b>328.94</b>	81.9
12. End-of-life treatment of sold products	<b>3.71</b>	0.9
13. Downstream leased assets	—	—
14. Franchises	—	—
15. Investments	<b>0.15</b>	0.0
Total for categories 1 through 15	<b>401.75</b>	100.0

- The calculation range mainly covers financial consolidated automotive businesses
- CO<sub>2</sub> emissions from the use of sold products are calculated from the average fuel efficiency and estimated lifetime mileage of vehicles in Japan, U.S., Europe, China; the consolidated number of vehicles sold in FY2016; and the CO<sub>2</sub> emission factor.
- Upstream and Downstream leased assets are included in the other category, and Franchises are not included.

↗ Environmental Data P55-S

### Pursuing Transport Efficiency and Reducing CO<sub>2</sub> Emissions in Logistics Activities

To reduce CO<sub>2</sub> emissions in its logistics activities, Toyota Motor Corporation (TMC) is taking measures to improve the transport efficiency of parts for production and replacement, as well as completed vehicles.

In FY2016, we continued fuel efficiency initiatives, including loading efficiency improvement activities, reducing CO<sub>2</sub> emissions per unit of workload (transported volume) to 105.2 g-CO<sub>2</sub>/tkm (down 3.0% year on year).

CO<sub>2</sub> emissions from logistics operations totaled 0.282 million tons (up 2.5 percent year on year), due largely to an increase in completed vehicles shipments in Japan.

At the global level, Toyota began assessing CO<sub>2</sub> emissions in each country and region in FY2007, and indicated global target guidelines starting in FY2013. Based on these guidelines, each country and region set up a goal toward which they have been carrying out reduction activities. As a result, Toyota's global CO<sub>2</sub> emissions in FY2016 totaled 2.10 million tons.

We will strive to further improve transport efficiency and reduce CO<sub>2</sub> emissions per transport volume.

#### Trends in CO<sub>2</sub> Emissions per Ton-kilometer (Transport Volume) from TMC Logistics Operations (Japan)

FY	2012	2013	2014	2015	2016
(million tons)					
CO <sub>2</sub> emissions from logistics operations	0.298	0.290	0.278	0.275	<b>0.282</b>
(g-CO <sub>2</sub> /tkm)					
CO <sub>2</sub> emissions per ton-kilometer	1.067	1.066	1.096	1.084	<b>1.052</b>

- CO<sub>2</sub> conversion factors: The CO<sub>2</sub> conversion factors were calculated based on guidelines such as the "Guidelines on Disclosure of CO<sub>2</sub> Emissions from Transportation & Distribution (version 3.0)" issued by Ministry of Economy, Trade and Industry and Ministry of Land, Infrastructure, Transport and Tourism of Japan.

↗ Environmental Data P55-T

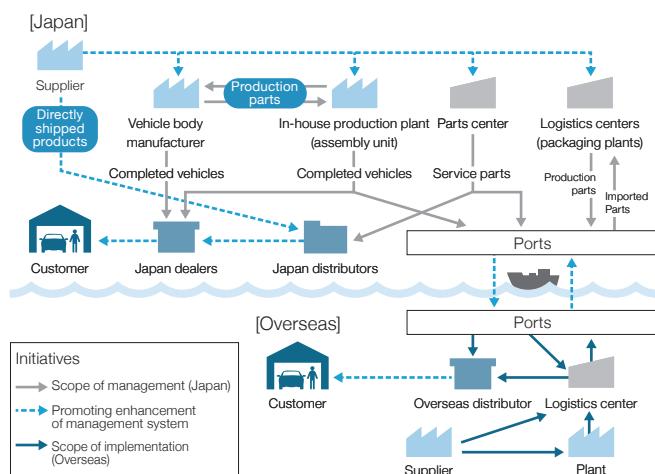
#### Global Logistics CO<sub>2</sub> Emissions

FY	2016
(million tons)	
CO <sub>2</sub> emissions from logistics	<b>2.10</b>

- Total CO<sub>2</sub> emissions from business that handle logistics in each region (seven regions: North America, Europe, China, Southeast Asia, South Africa, South America, Japan) from delivery of production parts, service parts, and completed vehicles
- Transport between regions (e.g., Japan to North America) has been excluded from the scope of calculations
- Some production and sales businesses (different to businesses that handle logistics) that directly handle deliveries in North America, China, and Southeast Asia have been excluded from the scope of calculations
- CO<sub>2</sub> emissions have been calculated according to the calculation methods of each business

## Challenge 2 Life Cycle Zero CO<sub>2</sub> Emissions Challenge

### Scope of CO<sub>2</sub> Emissions from Logistics



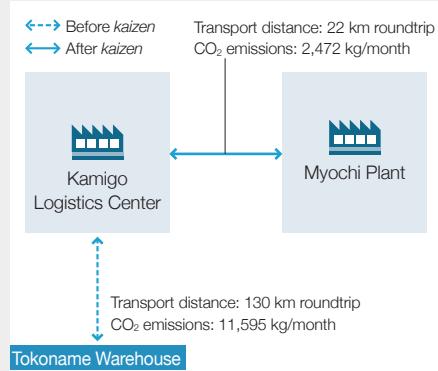
### Results of TMC Kaizen Initiatives to Reduce CO<sub>2</sub> Emissions (Japan)

Third Party Assurance

Kaizen item	Products	Main kaizen activity	Reduction volume (thousand tons)
Reduction in total transport distance	Completed vehicles	Sea route review, Increased number of loaded vehicles, etc.	1.2
	Production parts	Expansion of railway usage, improved loading efficiency, etc.	4.6
	Service parts	Allocation of vehicles and delivery routes review, etc.	0.7
Total			6.5

### Shortening Transport Distance by Terminating Use of Tokoname Warehouse (Japan)

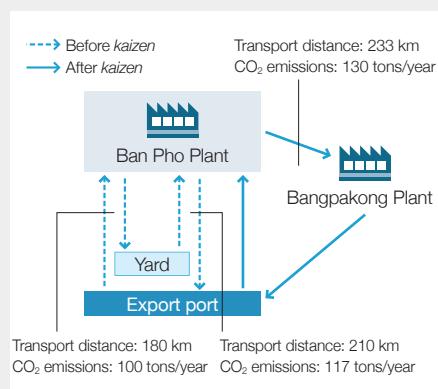
The Kamigo Logistics Center located in Aichi Prefecture had previously stored service parts in the Tokoname Warehouse 65 km away and had them delivered as needed. However, because it was our focus to reduce the CO<sub>2</sub> emissions associated with the transport distance, we reviewed the transport efficiency. We transferred all the production parts stored at the Myochi Plant, located 11 km away from the Kamigo Logistics Center, to other plants starting August 2016, using the vacant space for the service parts previously stored at the Tokoname Warehouse. This resulted in reducing monthly CO<sub>2</sub> emissions by 4,562 kg. Furthermore, at the end of 2016, we shifted all the remaining service parts at the Tokoname Warehouse to the Myochi Plant and terminated the use of the Tokoname Warehouse, reducing monthly CO<sub>2</sub> emissions by 4,561 kg. This shortening of transport distance succeeded in reducing monthly CO<sub>2</sub> emissions by 9,123 kg in total.



### Reducing CO<sub>2</sub> Emissions by Raising the Reuse Rate of Transport Containers (Thailand)

At the Ban Pho Plant in Thailand, containers used for transporting imported parts from ports to the plant were being reused for exporting parts. The percentage of containers available for reuse, however, had been only about 20% of the total. The remaining empty containers were transported to a yard (storage) near the port.

To eliminate the waste in transport efficiency, the remaining containers were sent to the Bangpakong Plant, located near the Ban Pho Plant, where they were reused to ship parts for export, raising the container reuse rate to more than 90%. As a result, the truck driving distance needed for parts import and export was shortened from 390 km to 233 km, reducing the CO<sub>2</sub> emissions per container by 0.16 tons, for an annual reduction of about 88 tons.



## Promoting an Integrated Approach to Reduce CO<sub>2</sub> Emissions in Road Transport Sectors

### Project to Mitigate Traffic Congestion in Bangkok Using Sathorn Model

The global urbanization trend has created the need for urban transport measures that harmonize vehicles with social systems in order to reduce carbon emissions and smooth people movement. Therefore, Toyota is actively participating in integrated traffic management projects to realize low-carbon mobility societies. The WBCSD\*1 makes policy proposals to achieve sustainable development based on the three pillars of economic growth, environmental conservation, and social development. Toyota is participating in the WBCSD's Sustainability Mobility Project 2.0. The project's goal is to combine the latest technologies and traffic management methods of participating companies into sustainable mobility for the world's cities, thereby creating new social systems. Verification projects are conducted in six cities around the world. Toyota is the leader of the verification project in Bangkok, which received a grant from the Toyota Mobility Foundation to verify new traffic management methods for alleviating congestion. The project uses Sathorn Road, the most congested road in Bangkok, as a model case. In June 2016, we carried out the third social verification test. This test combined Park & Ride<sup>\*2</sup>, shuttle buses, flextime, and other traffic demand controls with traffic bottlenecking mitigation, effective traffic signal operation, and other traffic flow management to reduce rush-hour travel times by 27 percent. The test proved a success in effectively managing traffic through public-private partnership. In February 2017, we proposed a roadmap for deploying the Sathorn

model throughout Bangkok to Thai National Traffic Management Board (Chairman: Vice Prime Minister Somkid Jatusripitak) and it was approved. Ministry of Transport leads the roadmap by the collaboration between government agencies and public-private partnerships. In April 2017, the Sathorn Model Project held a closing ceremony, "Road to Deploy Sathorn Model to Bangkok," to celebrate its success.

The project has moved from the verification stage supported by Toyota and other private-sector companies, to the implementation phase throughout Bangkok, led by the Thai government. While challenges remain with securing promotion structures and expertise, Toyota is committed to continuing its contributions.

\*1 WBCSD: World Business Council for Sustainable Development comprises CEOs from approximately 200 companies for the realization of sustainable development.

\*2 Park & Ride: A method of mitigating traffic congestion in urban areas and sightseeing spots. People drive cars to a designated place, moving to their destination by transferring to trains or buses.



Thai Transport Minister Arkhom Termpittayapapaisith (third from left) takes part in the Sathorn Model Project closing ceremony

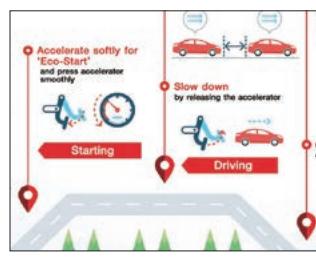
### Promoting Eco-driving Globally

Toyota is promoting integrated measures in road traffic sectors to reduce CO<sub>2</sub> emissions while driving. As one of the initiatives, we will pursue the promoting activities for eco-driving globally among our customers and employees.

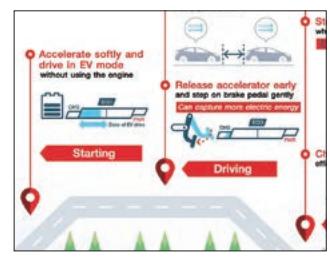
Eco-driving leads to improved fuel efficiency and reduced CO<sub>2</sub> emissions through soft acceleration, keeping proper inter-vehicle distance and accelerating and decelerating less. Practicing eco-driving is also a good way to ensure safe driving.

In October 2016, Toyota Daihatsu Engineering & Manufacturing (TDEM) launched a program to raise eco-driving awareness by distributing APEco-Driving Guidelines to all of its affiliates and dealers in Asia Pacific. The guidelines explain the key points for optimal eco-driving for both gasoline vehicles and hybrid vehicles. The company also calls for the creation of leaflets and holds eco-driving fuel efficiency competitions etc. as necessary.

Going forward, TDEM and its affiliates will continue to leverage these guidelines to train employees and raise awareness among customers across Asia.



Eco-driving key points for gasoline vehicles



Eco-driving key points for hybrid vehicles

### Challenge 3

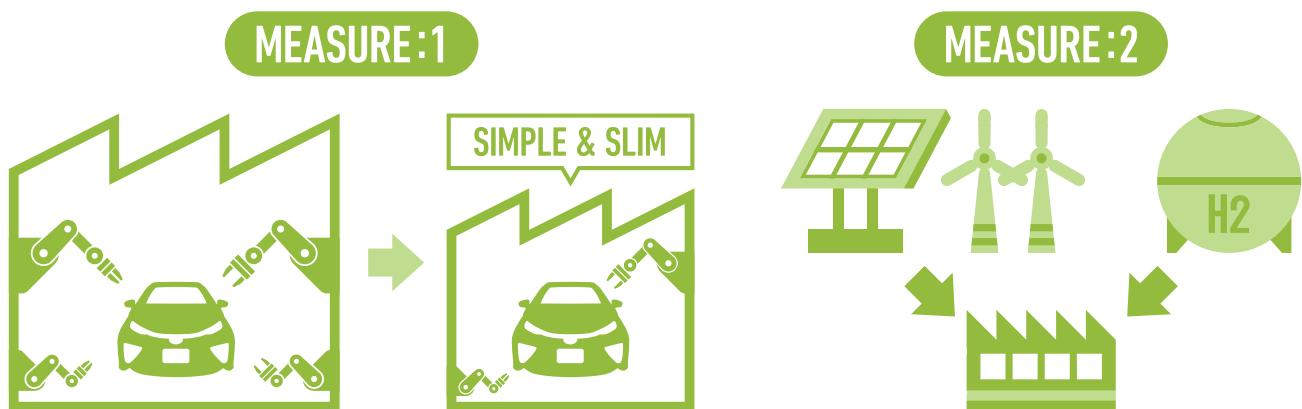
## Plant Zero CO<sub>2</sub> Emissions Challenge

### Fundamental Approach

Since CO<sub>2</sub> is emitted not only when vehicles are being driven, but when they are in the manufacturing process, the restraint of CO<sub>2</sub> emissions to suppress climate change is also the challenge for manufacturing plants. The two main pillars of this challenge are manufacturing technology improvement and switching forms of energy.

In the area of manufacturing technologies, simplifying and streamlining our processes to reduce their complexity and the time they require enable us to reduce CO<sub>2</sub> emissions. We can also obtain reduction effects by raising energy efficiency in manufacturing processes. Furthermore, we use every possible means to reduce CO<sub>2</sub> emissions including introducing an innovative process called "Karakuri" that does not consume any energy at all.

Regarding initiatives on the energy used, we will effectively utilize renewable energies such as solar power and wind power along with hydrogen energy.



### Reduce CO<sub>2</sub> Emissions in Production Activities

#### Activities to Reduce CO<sub>2</sub> Emissions in Production Activities

In our production activities, we have been developing and deploying low-CO<sub>2</sub> production technologies along with taking daily measures to achieve our reduction targets.

In FY2016, Toyota Motor Corporation (TMC) has steadily promoted energy-saving activities, with a focus on painting processes and casting processes, which create significant CO<sub>2</sub> emissions.

In the painting process, we introduced gas burners to the water-based paint preheating furnace and booth air-conditioning system.

In the casting process, we worked toward pulsed-blow and other air-saving systems to reduce the amount of compressed air used in the process with high air supply loss.

In both processes, we implemented energy-saving initiatives to reduce power and air consumption by shutting down all power during machine downtime, and to increase the use of LED lighting. As a result, we managed to reduce CO<sub>2</sub> emissions per unit produced to 0.398 tons (down 2.5 percent year on year), against total CO<sub>2</sub> emissions of 1.16 million tons (up 0.7 percent year on year).

On a global scale, we introduced innovative technologies when launching new production lines while actively switching to renewable energy sources.

We also accelerated *genchi genbutsu* (onsite hands-on experience) activities and reduced energy consumption globally, including *yokoten* (sharing)\* of 29 general-use examples such as steamless and airless processes, and conversion to LED lighting, being promoted by our ESCO activities that support energy-saving activities in our plants. Nevertheless, because of increased production volumes, we did increase CO<sub>2</sub> emissions to 7.87 million tons (up 4.1 percent year on year). Our CO<sub>2</sub> emissions per unit produced was 0.747 tons (up 0.5 percent year on year) due to lower productivity of some companies for model discontinuations and production line changes.

In order to reduce CO<sub>2</sub> emissions from production activities, we will strive to accelerate our energy saving activities by promoting steamless processes and carrying out daily reduction activities, as well as introducing further innovative technologies.

\* Yokoten (sharing) refers to sharing of improvement practices, know-how, violation and other information within the Group

## Challenge 3 Plant Zero CO<sub>2</sub> Emissions Challenge

### Trends in Total CO<sub>2</sub> Emissions (from Energy Consumption at Stationary Emission Sources) and CO<sub>2</sub> Emissions per Unit Produced at TMC

FY	2012	2013	2014	2015	<b>2016</b>
(million tons)					
CO <sub>2</sub> emissions	1.16	1.20	1.18	1.15	<b>1.16</b>
(tons/unit)					
CO <sub>2</sub> emissions per unit produced	0.415	0.414	0.413	0.408	<b>0.398</b>

- Scope: Production and non-production divisions (excluding employee benefit facilities)
- Conversion factors: CO<sub>2</sub> emissions were calculated using the Nippon Keidanren's 1990 conversion factors.

[Environmental Data P55-U](#)

Third Party Assurance

### Trends in Global CO<sub>2</sub> Emissions (from Energy Consumption at Stationary Emission Sources) and CO<sub>2</sub> Emissions per Unit Produced

FY	2012	2013	2014	2015	<b>2016</b>
Total CO <sub>2</sub> emissions (million tons)					
TMC	1.22	1.26	1.25	1.21	<b>1.22</b>
Japan (excluding TMC)	3.67	3.73	3.66	3.55	<b>3.61</b>
North America	1.08	1.13	1.17	1.13	<b>1.21</b>
China	0.55	0.66	0.65	0.69	<b>0.70</b>
Europe	0.27	0.29	0.29	0.27	<b>0.30</b>
Asia (excluding Japan), Australia, Middle East, South Africa, Latin America	0.80	0.77	0.77	0.72	<b>0.83</b>
Total	7.59	7.84	7.79	7.57	<b>7.87</b>
(million tons)					
Scope 1	2.66	2.80	2.72	2.49	<b>2.60</b>
Scope 2	4.93	5.04	5.07	5.08	<b>5.27</b>
(tons/unit)					
CO <sub>2</sub> emissions per unit produced	0.770	0.757	0.753	0.744	<b>0.747</b>

- Scope: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 121 companies
- Conversion factors: Using the Greenhouse Gas (GHG) Protocol

[Environmental Data P55-Q](#)

[Environmental Data P55-V](#)

### Won the 63rd Okochi Memorial Production Prize for Developing a New Car Painting Line that Reduces Environmental Footprint (Japan)

In March 2017, Toyota Motor Corporation was awarded the 63rd Okochi Memorial Production Prize.

Presented by the Okochi Memorial Foundation, the Okochi Memorial Prize is one of the oldest and most prestigious annual industrial awards in Japan, recognizing remarkable achievements related to research and development, and the application of production engineering, technology, and systems. This is Toyota's 11th Okochi Memorial Prize, received for the first time in 16 years.

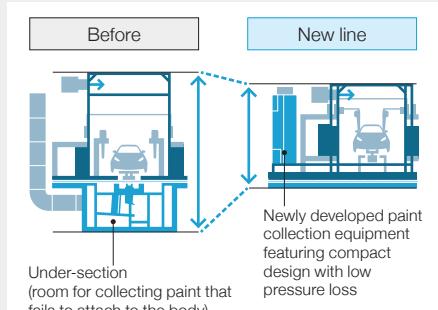
The award is for the various car painting processes used to finish a vehicle account for the greatest proportion of CO<sub>2</sub> emissions in car manufacturing. This award recognizes a new Toyota car painting line that achieves dramatic reductions in volume of floor area and CO<sub>2</sub> emissions (Tsutsumi Plant, Prius production line). In this initiative, we developed and deployed new painting technologies while thoroughly improving all the various individual painting processes. While maintaining the previous high levels of quality, the new painting line reduced the volume of floor area used by line equipment by 40 percent, and CO<sub>2</sub> emissions from the line by 32 percent.

Specifically, this technology development enabled us to shorten the length of processes, reduce the height of equipment, and make the incidental equipment more compact. Lowering the floor of the under-section of the booth was the most contribution to the line. In this area, we developed a new method using centrifugal force to collect paint that does not attach to the car body. The method makes the equipment more compact and reduces pressure loss, thereby reducing CO<sub>2</sub> emissions.

The new technologies have already been adopted on the painting line for Prius production and we plan to expand them to other plants in Japan and overseas as well.



Ceremony for 63rd Okochi Memorial Prize



Painting booth (cross sectional view)

## Promoting the Use of Renewable Energy

The development and deployment of low-CO<sub>2</sub> production technologies and daily *kaizen* activities have been reducing CO<sub>2</sub> emissions at production sites. We also have introduced the No. 1 regional CO<sub>2</sub> reduction activities by using renewable energies matching the needs of each country and region. TMC led the way in 2008 at the Tsutsumi Plant, producer of the Prius, with the deployment of a solar power generation system generating rated power of 2,000 kW, which is equivalent to the electricity for

500 households. In FY2016, the system generated 1,981 MWh of electricity.

Solar panels were also installed, and renewable energy was introduced, at the TMC Honsha Plant and overseas plants of TMMK (U.S.) and TSAM (South Africa) during 2016.

We will actively introduce further renewable energy systems after considering the balance of environmental, regional, and economic factors.

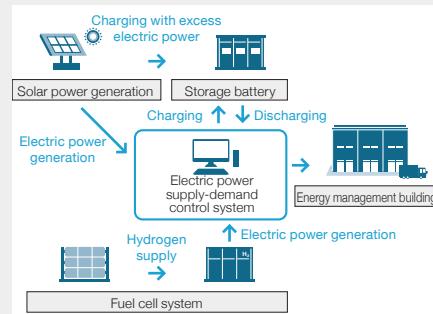
#### **Constructed a Zero-emissions Building Using Stationary Pure Hydrogen Fuel Cell Technology (Japan)**

At its Honsha Plant, TMC completed an energy management building in August 2016 which uses stationary pure hydrogen fuel cells. Here, we aim to completely eliminate CO<sub>2</sub> emissions through energy-saving measures and the use of renewable and hydrogen-based energy.

Inside the energy management building, we save energy by allowing each employee to switch the air-conditioning and lighting on and off, as well as maximizing the use of natural lighting and ventilation as energy-saving measures, keeping energy consumption to a minimum.

The stationary pure hydrogen fuel cells have a rated power output of 3.5 kW. The fuel cells are part of an energy management system which also combines solar power generation with storage batteries made from End-of-life Prius batteries. The system predicts energy demand to provide efficient power streams relying mainly on highly efficient fuel cells, supplemented by solar power

with storage batteries. The pure hydrogen fuel cell system was newly developed for use in small-offices. This project represents the first operational start within a commercial environment. Based on monitoring results after the installation and testing of the pure hydrogen fuel cells, Toyota will progress with the development and installation of efficient hydrogen utilization technology at the plant's other buildings.



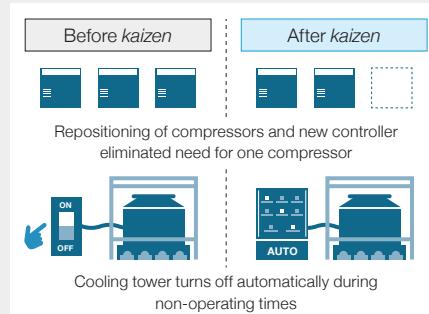
Overview of energy management system used in energy management building

## CO<sub>2</sub> Reduction Initiatives at TDB Plant (Brazil)

Toyota do Brasil Ltda. (TDB), a vehicle production and sales company, has reduced CO<sub>2</sub> emissions by controlling its facilities in accordance with line operational status. The activity consists of three main pillars. First, in the painting processes, the company used trial and error to optimize the operating time of the Regenerative Thermal Oxidizer (RTO), which thermally breaks down odor from the drying oven, reducing CO<sub>2</sub> emissions per unit produced by 1.65 kg.

In the plant's motive force center, the compressors' positions were realigned and a new control system was developed to ensure the compressor was operated only when necessary. These measures eliminated the need for one 200-kW compressor, reducing CO<sub>2</sub> emissions per unit produced by 0.11 kg.

In the welding processes, while the cooling tower was previously turned on and off manually, a new automated system was introduced to turn off the tower during machine downtime, reducing CO<sub>2</sub> emissions per unit produced by 0.04 kg.



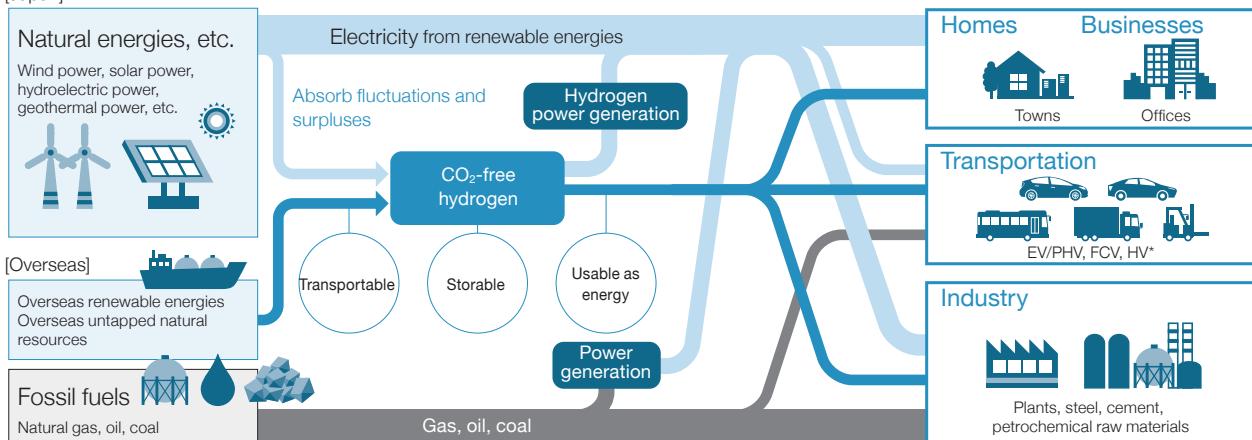
# For an Ever-better Society Toyota's Next Challenge

## Vision for a Low-carbon Society in 2050

Under the Paris Agreement, “net-zero carbon” has been promoted for eliminating net CO<sub>2</sub> emissions worldwide by the end of this century. Renewable energy derived from natural sources is becoming the main force, and there is great expectation for hydrogen as a means of absorbing fluctuations and surpluses, while serving as an alternative to fossil fuels for energy storage and transportation. Amid the diversification of energies, Toyota is moving beyond the reduction of CO<sub>2</sub> emissions from cars and plants together with people in various local communities to contribute to the realization of a low-carbon society.

### Energy Flow Vision to Achieve an 80 Percent Reduction in CO<sub>2</sub> Emissions (Year 2050)

[Japan]



\*EV: electric vehicle; PHV: plug-in hybrid; FCV: fuel cell vehicle; HV: hybrid vehicle

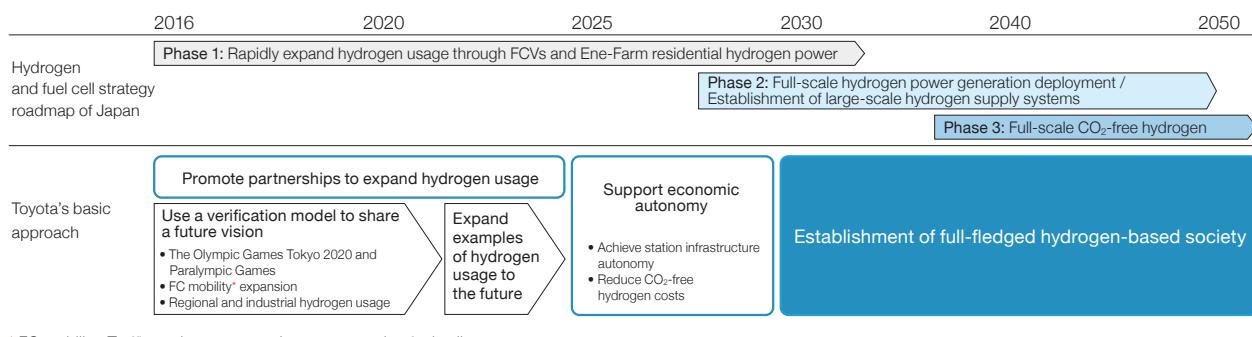
## Strategies and Steps

Building infrastructure and promoting new energies are major challenges to realizing a hydrogen-based society. In addition to promoting widespread use of FCVs, Toyota is actively building partnerships with local communities and industry to promote future hydrogen usage in line with the national energy roadmap of Japan. We will strive to expand the use of hydrogen energy and make it economically viable.

### Toyota's Current Mission

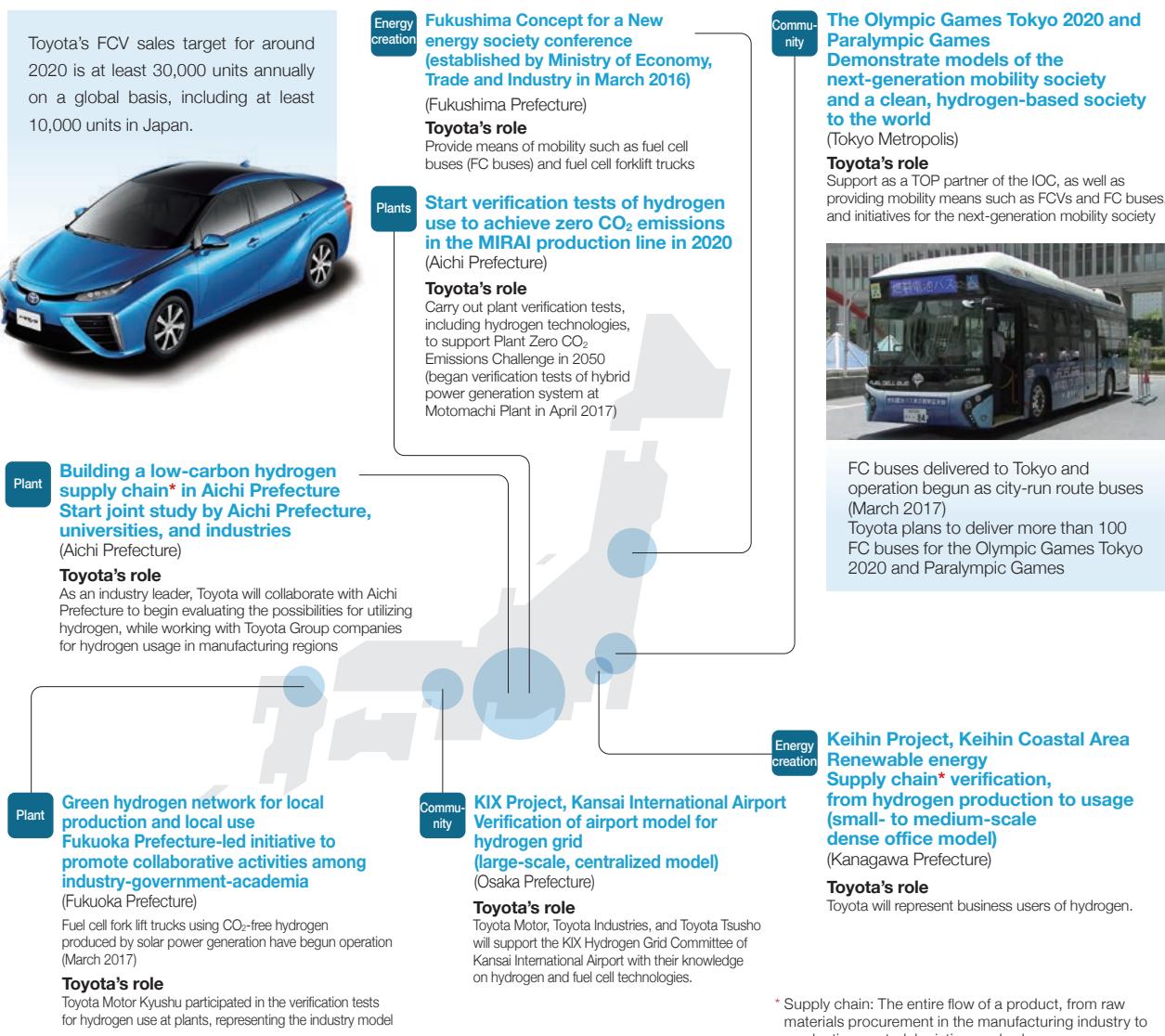
- 1** Achieve a hydrogen-based society through the widespread use of FCVs
- 2** Collaboration with government, local communities, and the energy industry to build structures and perform verification tests

### Aligning Toyota's Strategies and Steps with National Policies of Japan



\* FC mobility: Traffic environments and movement using fuel cells

## Toyota's Involvement in Regional Projects in Japan to Realize Hydrogen-based Society



## Major Overseas Projects (Partnerships for the Widespread Use of FCVs and Hydrogen Usage)

Country	Project name
Australia	MIRAI test launch (July 2016)
UAE	Participated in joint research for realizing a hydrogen-based society (January 2017)
China	Started driving experiment by launching MIRAI on a test basis (January 2017)
Canada	Started driving experiment by launching MIRAI on a test basis (February 2017)
United States	Shell and Toyota collaborate on building a hydrogen station network in California (February 2017)
United States	Started verification tests for large-scale FC trucks at the Port of Los Angeles (April 2017)

### Establishment of Hydrogen Council

In January 2017, the Hydrogen Council was established in Davos, Switzerland as the first global hydrogen initiative. The council is represented by 13 leaders, including Toyota, from global companies striving to promote hydrogen usage as a means to achieve climate change goals. We will collaborate with many leading stakeholders to meet the goals, promoting recommended measures of hydrogen usage.



## Challenge 4

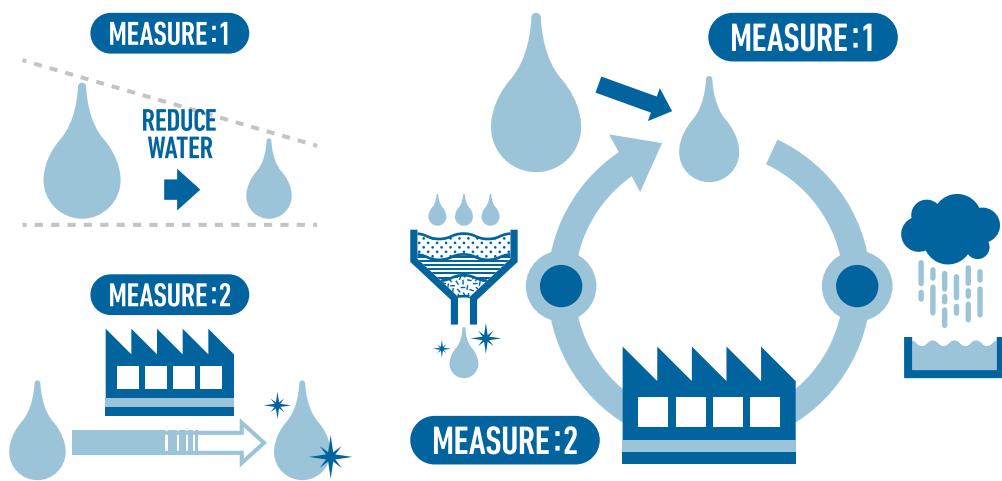
# Challenge of Minimizing and Optimizing Water Usage

### Fundamental Approach

According to forecasts, the world's population will grow to 9.1 billion by 2050, water demand will increase 55 percent from current levels, and 40 percent of the world's population is therefore expected to suffer water shortages\*. Water is used in painting and other car manufacturing processes, making it imperative to reduce impacts on the water environment as much as possible. We have two main strategies to adopt our challenge; thoroughly reducing the amount of water used, and comprehensive water purification and returning it to the Earth.

Toyota has pursued various effective initiatives, such as collecting rainwater to reduce the amount of industrial water usage, raising the water recycling rate through filtering, recycling wastewater for reuse, and returning clean water to the local environment. As the local water environment differs depending on the region, moving forward, we intend to expand our water environment initiatives around the world, taking the local needs into account.

\* According to Toyota data



### Reduce Water Consumption in Production Activities

To reduce water usage in our production activities, we have been working to introduce innovative technologies alongside planned upgrades to our production lines, and to conduct regular activities to reduce water consumption.

In FY2016, Toyota Motor Corporation (TMC) managed to reduce steam usage in production processes as one of the measures to reduce water consumption. As a result, total water consumption was 10.7 million m<sup>3</sup> (down 1.9 percent year on year). Water consumption per unit produced was 4.3 m<sup>3</sup> (down 8.0 percent year on year).

Globally, Toyota is steadily implementing measures to reduce water consumption according to the actual water environment in each country and region. In regions with scarce water resources, we are

encouraging water recycling. In the painting pretreatment process in particular, with its high water consumption, we are improving transport position for the vehicle bodies to reduce the amount of water left on them and removed from the system. Nevertheless, because of increased production volumes, we increased water consumption to 31.3 million m<sup>3</sup> (up 7.0 percent year on year). Also, our water consumption per unit produced was 3.0 m<sup>3</sup> (up 1.4 percent year on year) due to lower productivity of some companies through production line changes.

Moving ahead, we will continue striving to minimize impacts on the water environment through the promotion of water-saving and recycling measures.

## Challenge 4 Challenge of Minimizing and Optimizing Water Usage

Trends in Total Water Consumption and Consumption per Unit Produced at TMC						Third Party Assurance
FY	2012	2013	2014	2015	2016	
(million m <sup>3</sup> )						
Total water consumption (company-wide)	11.5	11.6	11.5	10.9	<b>10.7</b>	
(m <sup>3</sup> /unit)						
Water consumption per unit produced	4.8	4.9	4.9	4.7	<b>4.3</b>	

- Scope: Production and non-production divisions (excluding employee benefit facilities)
- Water consumption per unit produced indicates the amount of water consumed per unit produced at vehicle assembly plants.

Trends in Global Water Consumption and Consumption per Unit Produced						Third Party Assurance
FY	2012	2013	2014	2015	2016	
(million m <sup>3</sup> )						
TMC	5.1	5.3	5.2	4.9	<b>4.7</b>	
Japan (excluding TMC)	10.5	12.1	11.9	11.3	<b>12.1</b>	
North America	5.0	5.0	5.3	5.0	<b>5.9</b>	
China	2.5	2.6	2.5	2.5	<b>2.2</b>	
Europe	1.0	1.4	1.2	1.1	<b>1.4</b>	
Asia (excluding Japan), Australia, Middle East, South Africa, Latin America	5.1	4.8	4.9	4.5	<b>5.0</b>	
Total	29.2	31.2	31.0	29.3	<b>31.3</b>	
(m <sup>3</sup> /unit)						
Water consumption per unit produced	3.2	3.1	3.0	2.9	<b>3.0</b>	

- Scope: TMC and consolidated vehicle assembly subsidiaries and other companies, a total of 38 companies in Japan and overseas
- Companies added to scope of coverage from FY2013
- Revised due to an error in past data

### Initiatives in Each Country and Region to Reduce Water Consumption (South Africa, United States, Argentina)

Toyota plants around the world are taking steady daily measures to reduce water consumption in production activities, in accordance with the water environments in each country and region. We feature the following leading initiatives in three regions.

#### Improving the quality of cooling water

In South Africa, hard water containing relatively high amounts of magnesium and calcium is common. At manufacturing company Toyota South Africa Motors (TSAM), the hard water has caused clogging of molding equipment and cooling systems, forcing the company to frequently replace water used in production. TSAM resolved the clogging by preprocessing the water to raise alkalinity and by using the conditioned water for cooling, which successfully resulted in reducing water consumption by 48 m<sup>3</sup> annually.



Wastewater discharge pipe coated with calcium from the naturally hard water (left) and conditioned alkaline cooling water (right) (TSAM)

#### Adjusting spray nozzles and spray timing

At manufacturing company Toyota Motor Manufacturing, Mississippi (TMMMS), the painting booth experienced issues in the preprocessing and electro-coating stages after a change in production volume, including occurrence of bubbles after spraying, along with cleanliness issues and malfunctions due to defects with the drain. To solve these problems, the company changed the type of spray nozzle and the spray timing to ensure optimal spray volume. These measures led to an annual water consumption reduction of 11 m<sup>3</sup>.



Before (left) and after (right) spray nozzle improvement (TMMMS)

#### Visualizing water usage and optimally controlling peripheral equipment

At manufacturing company Toyota Argentina (TASA), the production capacity has grown more than fourfold since 2004 through successive expansions of the production facilities. The expansions have resulted in production lines that do not conform to the original energy usage approach, forcing TASA to reconsider its production methods. In the painting processes, for example, the company introduced new systems to visualize the water consumption on conveyor rails used to prevent static electricity in the coating booth, while the peripheral equipment was reformed to ensure optimal control. These measures reduced annual water consumption by 14,000 m<sup>3</sup>.

# Toyota's Water Environment Challenge: Connecting with Society to Make Our Plants No. 1 Regionally

Water is one of the recyclable resources on the Earth. In the recycling processes, we consume water and drain it back into the environment. Since water is a local resource for each community, overuse of water by one user in a local community can limit the water consumption for others.

Moreover, if the water remains dirty after use, it can be equal to lose water. In recent years, due to the climate change the problem of uneven distribution of water resources has been getting serious. This has highlighted the importance of taking

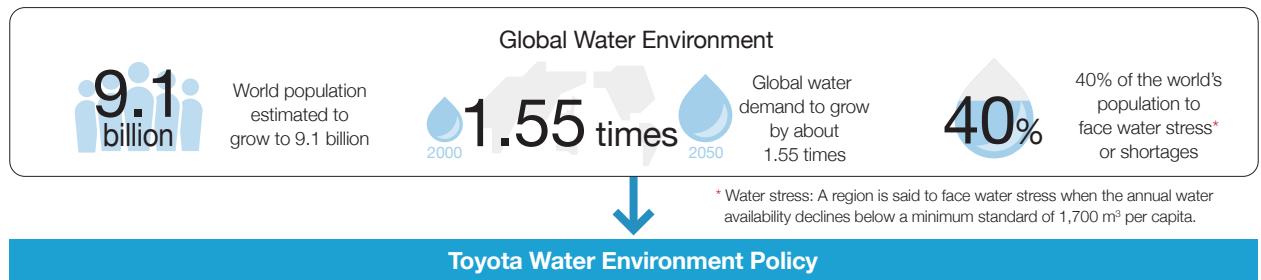
measures reflecting respective local water conditions. Car-manufacturing consumes significant amounts of water. At Toyota, we are minimizing our impact on water environments by taking thorough measures to reduce water on the input end, and thorough measures to purify water on the output end of the cycle. Our goal is to become the No. 1 regional plant by taking measures to control water consumption volume and water quality in consideration of local water conditions, and connecting these activities to support prosperous societies.

## Formulating the Toyota Water Environment Policy

Although water-related issues and measures differ depending on the region, it is necessary for Toyota as a whole to unite behind a common approach in order to achieve the goals of our water environment Challenge on a global level. To achieve that end, we formulated the Toyota Water Environment Policy.

The Toyota Water Environment Policy is comprised of a "Basic

Stance," "Challenge of Minimizing and Optimizing Water Usage," and "Three Directions for Initiatives (Pursuit of Environmental Technologies, Community-rooted Operations. Cooperation with Society)." Based on this policy, we will strive for societies with plentiful water environments.



Striving to consider the importance of water sustainability, Toyota will aim for realizing prosperous societies that will share a sound water environment to the future.

## Challenge of Minimizing and Optimizing Water Usage



## Three Directions for Initiatives

### Pursuit of Environmental Technologies

Explore the potential for new technologies to promote the thoroughly efficient use of water resources

### Community-rooted Operations

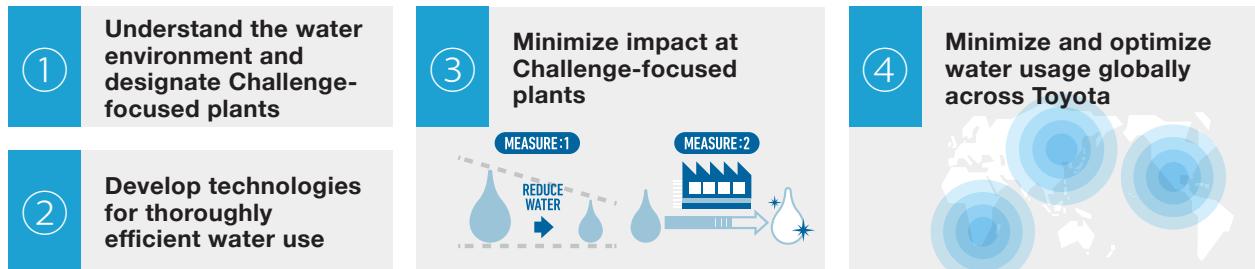
Recognize water as a community asset and take continual measures to improve the water environment

### Cooperation with Society

Promote cooperation and collaboration with stakeholders by engaging in active communication and information disclosure

## Four Processes for Minimizing and Optimizing Water Usage

Toyota implements its challenge based on the following four processes

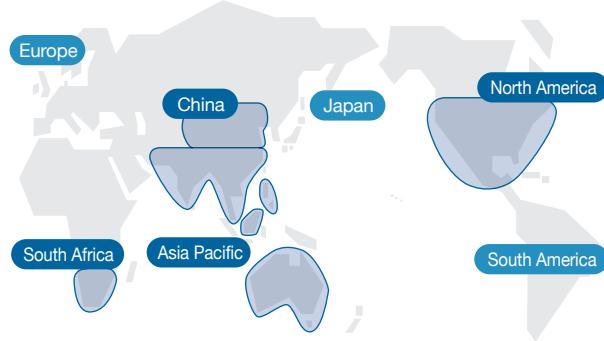


### Designate Challenge-focused Plants

Toyota has collected various types of data through databases and evaluation tools to understand the current status of the water environment in each country and at each plant. We also have evaluated plant operational data, water usage volumes, water quality, and other information from various points of view to determine impacts on the water environment. Plants that will lead our way in accomplishing the Challenge have been designated as Challenge-focused plants. We are prioritizing four plants around the world, for example, for deployment of initiatives to reduce water usage. The technologies and measures developed at these plants will then be promoted worldwide.

The surveys and evaluations of water environments will be updated to enable us to respond to environmental changes in each country and region.

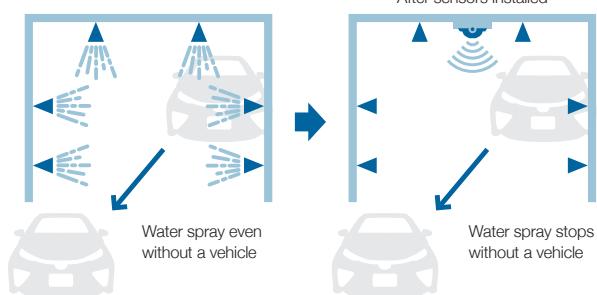
### Challenge-focused Plants (as of 2016)



### Every Drop Counts – Our Commitment to Efficient Water Use

Toyota has traditionally targeted efficient use of our water resources, with activities including ongoing improvements to our processes, wastewater recycling and rainwater use. To reduce water use in the painting process, which uses a lot of water, we have reviewed a range of conditions previously accepted as the norm. For example, we fully investigated the relationship between product quality and the quality of the water used to wash the vehicle bodies. By adding water quality to our managed conditions, we succeeded in roughly halving the amount of water previously thought necessary to clean the body sufficiently. We have also installed sensors so that the sprayers only operate when a vehicle is passing by, which has helped with water drainage and has reduced the amount of water used. Toyota continues to implement thorough improvement activities and to develop innovative technologies while making greater use of its technologies and know-how.

### Installation of Sensors



### Communication with Local Communities and Information Disclosure

Toyota has actively cooperated with and disclosed information to its stakeholders. We engage with local communities through collaborative councils and invite local stakeholders to tour our plants, ensuring mutual communication. We communicate with a broad range of stakeholders through our Environmental Report and website. In terms of information disclosure, we

received the highest "A Rank" for two consecutive years in CDP's "CDP Water," a ranking of companies with exemplary water management, which attests to the soundness of our management and environmental information disclosure. Going forward, we will continue our efforts at communication and disclosure as we strive to be the No.1 plants in our regions.

## Challenge 5

# Challenge of Establishing a Recycling-based Society and Systems

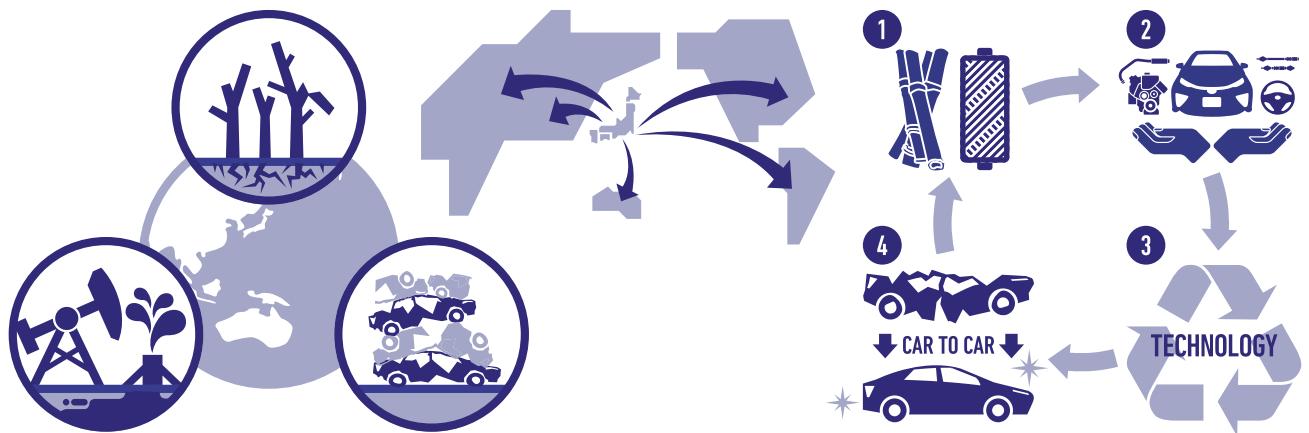
### Fundamental Approach

Due to global population increase along with the pressure for economic growth and convenient lifestyles, the pace of resource consumption is accelerating. If the present trends continue, large-scale exploitation will bring the depletion of natural resources, and appropriate disposal will be unable to keep pace with the increasing amounts of waste generated by mass consumption, resulting in environmental pollution.

To prevent the environmental impact caused by End-of-life vehicles, Toyota launched the Toyota Global 100 Dismantlers Project, to establish social systems for End-of-life vehicle proper treatment.

In order to improve resource efficiency toward an ideal resource-recycling based society, initiatives are needed in four key areas: (1) use eco-friendly materials, (2) use auto parts longer, (3) develop recycling technologies, and (4) manufacture vehicles from End-of-life vehicles.

Toyota aims to realize the ultimate recycling-based society, and promotes the Toyota Global Car-to-Car Recycle Project (TCCR) so that we can use resources from End-of-life vehicles for manufacturing new vehicles.



### Reduce Consumption of Dwindling Natural Resources through Use of Renewable Resources and Recycled Materials

#### Reduce the Use of Petroleum-derived Plastics

Since the early 1990s, Toyota has been collecting and recycling bumpers replaced at dealers as a way to support global-wide sustainable economic growth by reducing the usage of petroleum-derived plastics.

Some plastic parts collected from ELVs were reused for energy as a heat source except using for used parts. Others were recycled into plastics for non-automobile use after going through a machine-automated sorting process.

In FY2016, we teamed up with dismantling companies and plastic recycling manufacturers in the Chubu region of Japan to conduct three trial tests as part of prior studies to build a framework for collecting and recycling ELV-derived plastics. Amid the growing need to further promote plastic recycling, we will continue to study new technologies for collecting and recycling plastics from End-of-life vehicles.

#### Promote the Reuse of Rare Resources and Recycled Materials

Hybrid vehicles, plug-in hybrids, fuel cell vehicles, and other next-generation eco-friendly vehicles use significant amounts of rare resources compared with conventional gasoline vehicles. Some of these resources often carry risks such as resource depletion or uneven supply among regions. In order to promote the reuse of resources and the adoption of recycled materials, we are collaborating with partner companies to establish a framework for collecting and recycling hybrid batteries and motor parts, along with cemented carbide tools used in production.

HV batteries, for example, contain rare metals such as nickel and cobalt. Since launching the first-generation Prius in 1997, we have built our own recovery network to collect End-of-life HV batteries to be recycled. As of March 2017, we have collected 73,300 End-of-life HV batteries in total.

## Challenge 5 Challenge of Establishing a Recycling-based Society and Systems

The collected batteries undergo inspection to determine which parts can be remanufactured into stationary storage batteries or vehicle replacement batteries while other parts are recycled as raw metal materials.

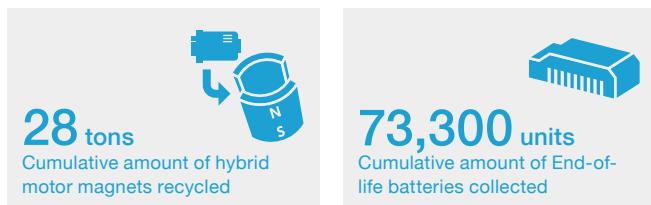
Toyota began recycling HV motor magnets in 2012. As of March 2017, we recycled a cumulative 28 tons of magnets, extracting rare earth.

For cemented carbide tools, we launched a system to extract and recycle tungsten<sup>\*1</sup> in 2010. As of March 2017, we recycled a cumulative total of approximately 154 tons of cemented carbide tools.

The use of Carbon Fiber Reinforced Plastics (CFRP) is expected to increase in the future to support the design of light-weight vehicles.

We have made progress towards effective thermal recovery<sup>\*2</sup> for this material, while also starting in FY2016 the development of carbon fiber separation and collection technologies for material recycling systems.

As next-generation eco-friendly vehicles become further widespread, the amount of End-of-life parts, such as batteries and motors that contain rare resources, is expected to rise. We will continue material recycling activities for End-of-life parts and CFRP.



\*1 Tungsten: Japan imports all of its demand for tungsten, which is used in the cutting edges of 80% of cemented carbide tools.

\*2 Thermal recovery: During the incineration of waste, thermal energy generated is recovered and reused.

## Achieve Industry-leading Levels in Easy-to-dismantle Design for Effective Resource Recycling

To promote material recycling of End-of-life vehicles, Toyota directly visits dismantling companies in Japan and overseas to investigate actual conditions and gain insight into the development of vehicle structure that make it easy to dismantle and separate parts. We have actively adopted these designs for new models since 2003 with the launch of the Raum passenger car.

The new Prius PHV and Lexus LC unveiled in FY2016 adopt the Toyota New Global Architecture (TNGA)<sup>\*1</sup>, a new concept for car-manufacturing which ensures superior stability and control along with a comfortable ride with minimal vibration and sway. Although

the design with a lower center of gravity and the lowered hood have made the engine room smaller, the design still ensures safe and speedy dismantling of the wiring harnesses above the engine space and other parts.

In other areas where we adopt new structures, parts, and other technologies, we will continue to ensure easy-to-dismantle designs in order to maintain and enhance the capability to dismantle vehicles.

\*1 TNGA: Toyota's company-wide global initiative to structurally transform automobile design. TNGA aims to dramatically improve the basic performance and marketability of Toyota vehicles by reforming and integrally redeveloping powertrain components and platforms.

### Vehicle Structure for Easy Dismantling

**Removal of heavy battery components from hybrid vehicle**  
Component removal times for the Prius are further reduced. The new easy to dismantle mark has been added to assist in hoisting heavy components with good balance.



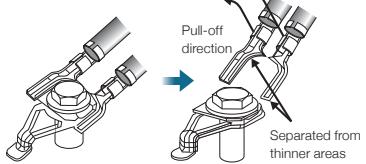
**Use of "Easy to dismantle mark"**  
"Easy to dismantle marks" are added to show key points for disassembly tasks.



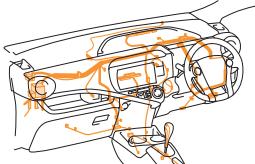
**Removal of door trim<sup>\*2</sup>**  
The easy to dismantle mark indicates places where the load required for removing the door trim is 30 percent less than usual.



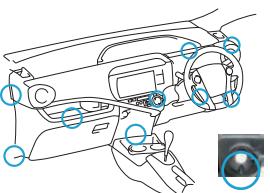
**Wiring harness<sup>\*3</sup>**  
Use of pull-tab type ground terminal for wiring harness  
Assembled condition      During dismantled



**Wiring harness layout innovation**  
The wiring harness can be stripped out without interfering with other components.



**Removal of instrument panel**  
The positioning of the V-grooves makes it easy to remove the instrument panel by pulling it strongly.



## Contribute Worldwide through Appropriate End-of-life Vehicle Treatment and Recycling Technology Developed in Japan

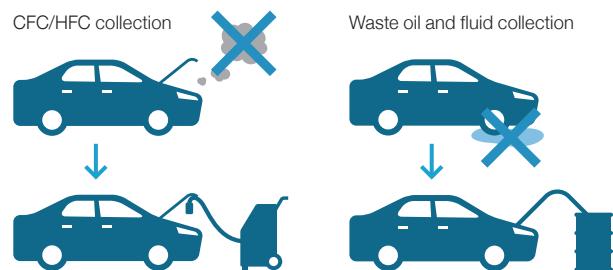
When End-of-life vehicles are not properly disposed or dismantled, that may not only affect regional environments, but cause risks to the health and safety of local residents. To prevent these problems, we promote the Toyota Global 100 Dismantlers Project. Through this project, we aim to establish social systems for properly treating of End-of-life vehicles without imposing regional environmental impact. Our long-established End-of-life vehicle technologies and know-how contribute to the establishment of social systems.

In FY2016, we prepared basic operating procedures for the purpose of properly dismantling End-of-life vehicles with tools commonly available. This manual was created for countries and regions where there are no suitable dismantling facilities and tools. We have been constantly researching the flow of End-of-life vehicles and setting an each target level according to the conditions of regional infrastructure in cooperation with local affiliates for proper treatment of End-of-life vehicles.

There are regions in the world facing the risk of dramatic increases in the number of End-of-life vehicles. We will strive to establish recycling-based societies with proper End-of-life vehicle treatment and efficient resource collection by expanding the Toyota Global 100 Dismantlers Project gradually.

 Environment Data P53-1

**Image of Appropriate End-of-life Treatment and Recycling System**



## Expand Original Recycling Systems for End-of-life Vehicles Worldwide

In order to realize an ultimate recycling-based society, we promote the Toyota Car-to-Car Recycle Project (TCCR) that is based on the concepts of reduce, reuse, and recycle, aiming specifically at elimination of resource-related risks and global warming.

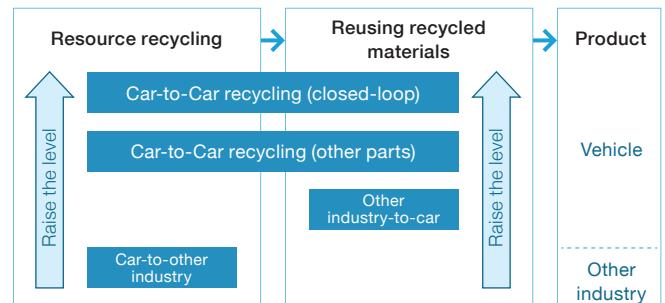
In FY2016, we began with a model case in Japan as a blueprint toward the establishment of a global recycling-based society. Specifically, we set year 2030 as a milestone and conceptualized ideal social systems along with expected issues and their countermeasures.

Moving ahead, we expect a large increase in the amount of hybrid batteries used overseas.

In FY2016, we began studying to boost recycling capacity and raise the level of collection and recycling structure toward globalization of battery recycling systems.

The ultimate goal of this project is closed-loop recycling, the concept that the vehicles parts and materials are recycled into identical parts. We will continue promoting “Car-to-Car Recycling” through gradual progress in both phases of this system, namely the first phase of resource recycling in which vehicle parts and materials are turned into raw materials for new parts, and the second phase of fully reusing recycled materials in new vehicles.

**Image of “Car-to-Car Recycling”**



## Reduce Waste and Use Resources Efficiently in Production Activities

Toyota strives to reduce the volume of waste from production activities by developing and deploying new production technologies while taking continual day-to-day improvement measures in terms of the sources of waste, the amount of waste generated, resources loss, and cost reduction and so forth.

In FY2016, Toyota Motor Corporation (TMC) continued to take waste reduction measures such as sludge volume reduction. The total waste volume, as a result, was 33.8 thousand tons (down 4.1 percent

year on year), and the waste volume per unit produced was 11.6 kg (down 7.2 percent year on year).

On a global level, as a result of Toyota's continual waste reduction activities in conjunction with cost reduction, the waste volume per unit produced was 45.0 kg (down 0.7 percent year on year). However, the total waste volume was 474 thousand tons (up 2.9 percent year on year) due to increase of waste to be managed for aggregation in some companies.

**Trends in Total Waste Volume and Waste Volume per Unit Produced at TMC (Japan)** Third Party Assurance

FY	2012	2013	2014	2015	2016
(thousand tons)					
Total waste volume	33.9	36.0	35.9	35.2	<b>33.8</b>
(kg/unit)					
Waste volume per unit produced	12.1	12.4	12.5	12.5	<b>11.6</b>

- Scope: Production and non-production divisions (excluding employee benefit facilities)
- The total waste volume in production divisions consists of waste generated through production activities
- Waste volume: Waste at cost + incineration\* + landfill
- Waste at cost: Waste that is recycled for a fee
- Revised due to an error in past data

**Trends in Global Waste Volumes and Waste Volume per Unit Produced** Third Party Assurance

FY	2012	2013	2014	2015	2016
Total waste volume (thousand tons)					
TMC	34	36	36	35	<b>34</b>
Japan (excluding TMC)	367	365	353	348	<b>359</b>
North America	31	32	29	29	<b>30</b>
China	19	20	17	17	<b>17</b>
Europe	10	14	14	11	<b>12</b>
Asia (excluding Japan), Australia, Middle East, South Africa, Latin America	26	27	26	21	<b>22</b>
Total	487	494	475	461	<b>474</b>
(kg/unit)					
Waste volume per unit	49.4	47.7	46.0	45.3	<b>45.0</b>

- Scope of coverage: TMC and consolidated company in Japan and overseas, a total of 121 companies

↗ **Environmental Data P54-Q**

- Waste volume: Waste at cost + incineration + landfill

### Achieve Zero Landfill Waste by Composting Bio-sludge with Worms (India)

Indian manufacturing affiliate TKM uses biological treatment to purify waste and water through manufacturing processes. TKM uses the purified treatment for sprinkling or returns it to the local water environment. The biological treatment conducted at wastewater processing facilities, meanwhile, decomposes the organic matter included in water into bacteria. It is necessary to treat waste of the carcasses of propagated bacteria as bio-sludge, which was landfilled between 2009 and 2015. The decomposition process for landfill waste, however, takes several months in addition to the fact that 500 trucks worth of waste from the Bangalore area was brought in to the landfill waste area daily. TKM therefore turned to composting using worms, which requires only 35 days to process. As a result, TKM achieved zero landfill waste from bio-sludge. The compost is a superior biomass resource used for fertilizer and soil conditioning, effectively recycled for tree-planting at the site and as a fertilizer for local farms. Because finely processed gardening waste (tree clippings, etc.) to be added to the worm-fed bio-sludge improves the composting, TKM has been testing to determine optimal input.



Curing condition before processing (left) and after processing (right)

## Reduce Packaging and Wrapping Materials and Use Resources Efficiently in Logistics Activities

Toyota Motor Corporation (TMC) is taking a broad range of initiatives to reduce the amount of packaging and wrapping materials used in logistics. These include increasing packaging efficiency in containers, using returnable containers\* to reduce the amount of unrecyclable materials used, and making packaging and wrapping materials simplified and lighter.

In FY2016, TMC succeeded in reducing the amount of packaging and wrapping material per shipment unit to 6.87 kg/m<sup>3</sup> (down 6.7 percent year on year) by making packaging and wrapping materials smaller and adopting returnable shipping containers. The total volume of packaging and wrapping materials used amounted to 51.4 thousand tons (up 1.0 percent year on year), due to the effects of fluctuations in shipment volume and other factors.

On a global basis, Toyota continued efforts to quantify its use of packaging and wrapping materials, while gathering information on best practices.

In FY2008, TMC began implementing measures to determine the usage volume of packaging and wrapping material at affiliates worldwide. Assessments for all regions, excluding North America, have almost been completed. It has been difficult to grasp the usage at suppliers in North America, and TMC is currently adjusting the assessment method. Moving forward, we will promote the efficient use of resources when shipping goods, while striving to reduce the volume of packaging and wrapping materials.

\* Returnable: To enable used packaging materials to be returned to original shipping points for reuse.

**Trends in Usage of Packaging/Wrapping Materials** Third Party Assurance  
at TMC (Japan) and Packaging/Wrapping Materials per Shipment Unit at TMC (Japan)

FY	2012	2013	2014	2015	2016
(thousand tons)					
Usage of packaging and wrapping materials	56.0	56.3	51.7	50.9	<b>51.4</b>
(kg/m <sup>3</sup> )					
Usage of packaging and wrapping materials per shipment unit	7.23	6.97	6.98	7.36	<b>6.87</b>

**Results of Activities to Reduce Usage of Packaging/Wrapping Materials at TMC (FY2016, Japan)** Third Party Assurance

Improvement	Products	Main improvement activities	Reduction volume (thousand tons)
Simplification of packaging styles	Production parts	Production process improvement, reuse, etc.	0.37
	Service parts	Simplification of wrapping specifications	0.20
	Service parts	Increase in parts quantity per box, simplification of packaging specifications, etc.	0.03
Use of returnable containers	Service parts	Expanding use of returnable containers (increasing number of applicable items)	0.14
Total			0.74

## Challenge 6

# Challenge of Establishing a Future Society in Harmony with Nature

### Fundamental Approach

It is critical for humans to conserve forests and other natural environments in all regions for coexistence in harmony with nature. However, deforestation is progressing across the world, resulting in the fragmentation of habitats of diverse species, as well as the continuing loss of biodiversity.

Toyota Group companies have engaged in planting trees at plants, environmental conservation activities in their surrounding areas, and environmental education in order to "enrich the lives of communities" in each region. Moving forward, we will promote our three "connecting" projects. We will expand these activities at group, regional, and organizational levels using the insights we have gathered so far, aiming for a future where people and nature live in harmony.

#### ● Toyota Green Wave Project

Connecting Communities



#### ● Toyota Today for Tomorrow Project

Connecting with the World



#### ● Toyota ESD Project

Connecting to the Future

### Promote Expansion of Nature Conservation Activities Connecting Communities — Toyota Green Wave Project

Toyota Group companies have planted trees at plants and undertaken environmental conservation activities in their surrounding areas. The Toyota Green Wave Project is an initiative to connect these diverse activities promoting harmony with nature.

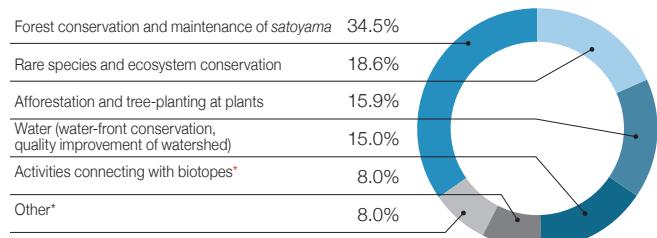
By extending the Toyota Group activities to promote harmony with nature in regions in Japan and overseas, we aim to expand natural habitats and help create a sustainable society, benefitting biodiversity.

#### All-Toyota Harmony with Nature Working Group Activities

The Toyota Green Wave Project kicked off in May 2015 with the launch of the All-Toyota Harmony with Nature Working Group represented by 23 Group companies. This working group is striving to expand activities in harmony with nature, enhance the dissemination of information, and strengthen Group-wide cooperation.

In FY2016, we steadily promoted and implemented activities in Japan, carrying out 116 All-Toyota individual activities, an increase of 17% from the planning stage. Furthermore, the strengthened relations among participating companies began to bear fruit, as the activities began to spread throughout Japan, especially in the Chubu region. Additionally, in October 2016, a total of 21 employees from 15 Group companies jointly participated in the cleanup campaign at Fujimae Tidal Flat (Nagoya City), which has been registered under the Ramsar Convention. This was the second All-Toyota activity led by the working group, following the first in the previous spring.

#### All-Toyota Harmony with Nature Working Group Activities by Individual Companies (116 Activities in Japan)



\* Biotope: A small-scale habitat that makes you feel familiar with natural ecosystem, either artificially developed or restored to its natural condition, in which plants and animals can live constantly.

\* Ecosystem monitoring, countermeasures to exterminate foreign species, coastal ecosystem conservation



Second All-Toyota unified activity

### "All-Toyota Green Wave Project" Vol. 2 Published

In June 2016, we published and distributed to employees a booklet (vol. 1) on the Green Wave Project in order to explain the project's significance, the importance of biodiversity, and examples of activities by Toyota Group companies. In June 2017, we published the second issue, presenting All-Toyota activities in FY2016 which began to spread across Japan, raising employees' awareness of participation in such activities and promote the importance of cross-functional cooperation.



Booklet centerfold (FY2016 Challenge Map)

Toyota Environment Green Wave

[http://www.toyota-global.com/sustainability/environment/challenge6/green\\_wave/index.html](http://www.toyota-global.com/sustainability/environment/challenge6/green_wave/index.html)

### Sustainable Plant Activities

Since 2007, Toyota has been pursuing sustainable plant activities positioning the Prius-producing Tsutsumi Plant as its model plant. With the concept of "plant development that fully utilizes natural resources while operating in harmony with nature," the Tsutsumi Plant is taking measures to reduce energy consumption, switch energy sources, enhance communication with local communities, and preserve biodiversity.

As part of these sustainable activities at plants, the number of trees planted at sites by employees, family members, and local residents in regions in Japan and overseas reached a cumulative 1.18 million trees in 2016. Various wildlife is propagating in these forests at our plants, creating habitats rich in nature and wildlife.

At the Motomachi Plant, the Environmental Center\* has been leading afforestation activities at the site to create and maintain natural habitats for wildlife, raising employees' environmental awareness. In 2016, the center created water spaces as a biotope by the forested area. Trees planted in the area have grown, and the creation

of water spaces has facilitated further diversification of the habitat. Employees have taken the initiative to survey the area's wildlife, discovering kingfishers, *Potanthus flavum* butterflies, and *Anax parthenope* dragonflies. Using dragonflies as an index of biodiversity, the employees found the number of species had risen from six before the biotope addition to 14 after, reflecting the successful creation of new habitats.

We will continue to create new habitats to ensure that people and nature live in harmony at all of our plants.

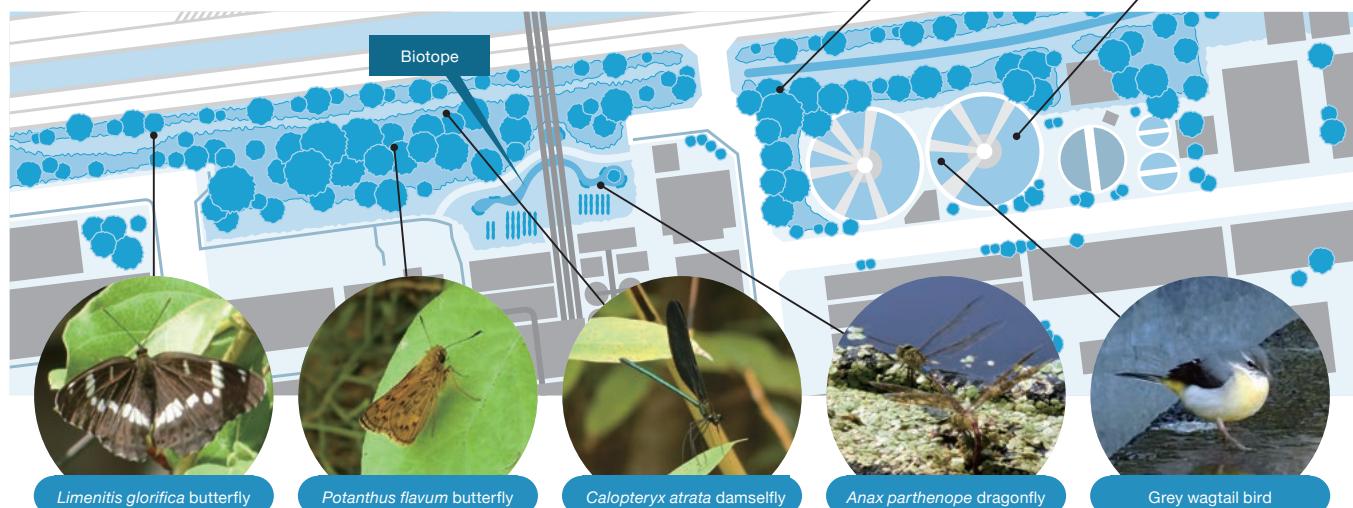
\* Environmental Center: A facility that powers the Motomachi Plant utilizing energy obtained from combustible waste generated at Toyota plants. Various experimental measures related to a low-carbon society, resource recycling, and harmony with nature are being verified in the center.



Japanese pygmy woodpecker

Kingfisher

### Wildlife Confirmed through Employee Survey



## Initiatives at the New Toyota R&D Center Promoting Harmony with the Natural Environment and Local Communities

Toyota is proceeding with plans to construct a new research and development facility in the overlapping area of Toyota City and Okazaki City. This new R&D Center will be a hub for the development of sustainable next-generation mobility. The main design concept is to build a technical center that operates in harmony with both the natural environment and local communities. About 60 percent of the total project site will be preserved as areas for the regeneration of forest and restoration of yatsuda rice paddies in collaboration with the local community. Toyota is also actively sharing information that includes the status of these activities and knowledge gained through them.

Toyota has taken initiatives to protect the Japanese eight-barbel loach, which lives in waterways and ponds surrounding yatsuda rice paddies, by promoting a reduction in the use of agrochemicals and

chemical-based fertilizers, as well as the restoration of abandoned yatsuda rice paddies. In FY2016, we completed an additional initiative to transform U-shaped gutters into stone-lined waterways and network the waterways to ensure the loaches can move freely. In order to confirm the benefits, we are attaching tracking markers to loach each year to confirm their movement.



U-shaped gutters before construction (left) and stone-lined waterways after construction (right)

Japanese eight-barbel loach

## Preserving Loggerhead Turtle Spawning Beach (Japan)

The Omotehama coastline on the Atsumi Peninsula in Aichi Prefecture is a well-known spawning site for loggerhead turtles. Toyota supports shoreline conservation NPOs "Omotehama Network" and "Akabane Juku," preserving this coastline. Since 2011, Toyota employees and their families have been participating in conservation activities. These include coastal cleanups and building sand-arresting barriers to facilitate sand accumulation. Since FY2016, we also have been supporting the building of sand fences\* using reeds.

In March 2017, 190 employees and their families from the coastal Tahara Plant and the Head Office region participated in the fence-building project, to prepare for return of the turtles for spawning in May.

\* Sand fences: Dead reeds and branches are driven into the beach in a grid pattern to slow winds crossing the beach and prevent beach erosion.



Preserving loggerhead turtle spawning areas on Omotehama coastline

## Support Reforestation in a National Park to Reduce CO<sub>2</sub> Emissions (India)

In July 2016, TKM, our Indian manufacturing company, organized a reforestation drive at the Bannerghatta National Park, and 500 saplings were planted. The event witnessed participation from 600 TKM employees with their families, along with 150 students from Delhi public School, Bangalore South, and 100 members from the Karnataka Forest Department.

Reforestation through tree-planting is said to be one of the most effective ways of reducing CO<sub>2</sub> emissions. A fully grown tree can absorb 20 kg of CO<sub>2</sub> and generates about 118 kg of oxygen per year.

TKM initiated a large scale afforestation drive in 2009, and since then it has planted 265,000 saplings. "Environmental conservation is inherent in the Toyota's culture," says TKM Vice President Raju Ketkale. "It is not just imperative to create necessary awareness, at the same time, one needs to action out measures along with the involvement of the local community. Therefore, we involve our employees physically in afforestation drives and environment month activities."



Children take part in tree-planting activities

## Boost Grant for Environmental Activities Connecting to the World - Toyota Today for Tomorrow Project

Toyota has conducted cooperative activities in Japan and overseas environmental NGOs including the Toyota Environmental Activities Grant Program and afforestation programs in China and the Philippines. We have established Toyota Today for Tomorrow Project to bolster our long-standing grant program on a global basis.

With the aim of contributing to society, we will work together with organizations engaged in nature conservation around the world by establishing projects to solve issues in the areas of living in harmony with nature and biodiversity.

### Launch a Five-Year Partnership with WWF on Living Asian Forest Project

In July 2016, Toyota entered into a five-year partnership with WWF (World Wide Fund for Nature) aiming at accelerating the globe's transition to sustainability. Toyota is the first car company and the first Japanese company to sign a Global Corporate Partnership agreement with WWF.

To promote biodiversity conservation under the partnership, Toyota made a 1 million US dollar grant to WWF in 2016 to support the Living Asian Forest Project.

The Living Asian Forest Project aims to strengthen existing WWF activities to conserve tropical forests and wildlife in Southeast Asia and launch new conservation initiatives. The project will take place in WWF priority places Borneo (Kalimantan) and Sumatra in Indonesia. In the future, the project will expand to the Greater Mekong region. The partnership recognizes that the sustainable production and use of natural rubber is required for forest ecosystem conservation. Demand for natural rubber, the main resource for car tires, is expected to continue rising. Toyota will collaborate with industries and stakeholders to actively contribute to natural rubber sustainability activities promoted by WWF.



### Toyota Environmental Activities Grant Program

In 1999, Toyota was honored with the Global 500 Award from the United Nations Environment Programme (UNEP). To commemorate receipt of this award, in FY2000, we launched the Toyota Environmental Activities Grant Program to support the environmental activities of NPOs and other groups. The two main themes behind the program are biodiversity and climate change. The grants are offered in the categories of project support overseas (up to 7 million yen per project) and project support in Japan (up to 3 million yen or 1 million yen per project).

Over the 17 years since the program was established, we have supported 332 projects in 53 countries and regions worldwide.



[Environmental Data P53-N](#)

One of the domestic projects, the Ube City Network for Global Warming Prevention in Yamaguchi Prefecture worked on "Summer Holiday Hybrid Mini Solar Car Workshop Class."

In the class, local elementary school children were taught the fundamentals of energy and climate change, followed by the demonstrations of how solar panels can generate electricity and charge batteries. The children gained a valuable understanding of the vast potential of solar power and other renewable energies, while building their awareness of climate change. At the same time, the project taught children the joys of making things and encouraged their interest in science.

The project activities are now being introduced to other areas of the prefecture.



Children enjoy building hybrid mini solar cars

## Challenge 6 Challenge of Establishing a Future Society in Harmony with Nature

One of the overseas projects, the Japan Environmental Education Forum promoted and verified the effectiveness of biodiversity educational materials among Bangladeshi elementary school students and their parents. In the Sundarbans region of Bangladesh, a registered world heritage, there is a rising concern over the deterioration of natural habitats. To help alleviate the problem, the forum distributed educational materials and promoted learning programs in 82 public elementary schools nationwide. The enjoyable educational materials included a dice and board game using Sundarbans National Park as its theme, a card game exploring the relationship between Sundarbans nature and human activities, and a

DVD on Sundarbans nature for parents.

The forum is now working to have the developed materials approved by the Bangladeshi government as supplementary teaching aids.



School testing nature education materials



Final version of Bangladesh nature education materials

### Held Environmental Events Hosted by IUCN and Toyota, Collaborating with NGOs around the World (United States, Mexico, South Africa)

In May 2016, Toyota began a five-year partnership with International Union for Conservation of Nature (IUCN)<sup>\*1</sup> to raise awareness of the biodiversity crisis. Under the partnership, we are providing a grant of 1.2 million dollars to support the IUCN Red List of Threatened Species<sup>\*2</sup>. The support made it possible for IUCN to conduct assessments of more than 28,000 species, accounting for 35 percent out of 80,000 species requiring assessment. This represents a major step forward in the IUCN's goal of gaining a comprehensive view of the conservation status of biodiversity on the Earth. In September 2016, the 6th IUCN World Conservation Congress was held in Hawaii. Held once every four years, the congress gathered some 10,000 participants to discuss strategies and issues involved with biodiversity and nature conservation over the next four years. Toyota and IUCN co-hosted a panel discussion on private sector engagement in biodiversity field, followed by a reception to celebrate their partnership for the Red List.

In December 2016, the United Nations held its Convention on Biological Diversity, 13th Meeting of the Conference of the Parties (CBD<sup>\*3</sup> COP<sup>\*4</sup> 13) in Cancun, Mexico. In the conference, Toyota collaborated with IUCN and environmental NGOs BirdLife International and Conservation International to host a side event—the first time Toyota has held an event at a COP meeting.

BirdLife International and Conservation International conduct local surveys to support the Red List and protect regions where rare species live. Toyota is proud to support activities for the Red List, and has provided vehicles to the two organizations. We held a vehicle ceremony with the organizations at the COP side event. The vehicles will be used for activities in Mexico and South Africa. The ceremony was attended by Mr. Braulio Ferreira de Souza Dias, Executive Secretary of the Secretariat of the Convention on Biological Diversity, reflecting the importance of collaboration between NGOs and private sectors in conserving nature.



The 6th IUCN World Conservation Congress



Vehicle donation ceremony at COP13

\*1 IUCN: Founded in 1948 through an international initiative, International Union for Conservation of Nature is a global nature conservation network comprising nations, government agencies, and non-governmental organizations.

\*2 Red List: The IUCN Red List of Threatened Species is a list of threatened species managed by the international organization IUCN.

\*3 CBD: Convention on Biological Diversity

\*4 COP: Conference of the Parties is a conference among convention signatory nations to discuss the contents of the conventions.

## Boost Contributions to Environmental Education Connecting to the Future – Toyota ESD Project

Human resources development is crucial for expanding environmental conservation activities to the future. Consequently, the Toyota Education for Sustainable Development (ESD) Project promotes sustainable human resource development that matches the community.

Our corporate training approach is to nurture environmentally

conscious employees and leverage their awareness to make it better for business. Additionally, we are connecting our training activities to the future by making the best use of the features of business sites and company-owned fields to provide environmental education to children, who will be responsible for sustainable societies in the future.

### Toyota Shirakawa-Go Eco-Institute

Toyota Shirakawa-Go Eco-Institute, located in the world heritage site Shirakawa-Go, was opened in 2005 with the goal of widely promoting locally rooted environmental education valuing nature's inherent wisdom.

Located in rich nature at the foot of Hakusan (Mt. Haku), the Institute provides many adults and children visiting Shirakawa-Go with hands-on nature programs as well as working on ecosystem surveys of wildlife, along with forest conservation activities.

In 2015, to commemorate the institute's 10th anniversary, we enhanced the hand-on nature programs under the slogan, "Trail walking for adults. Forest play helps kids grow stronger." The Institute aims to provide opportunities and education to enable individuals to understand and take action on their own initiative through shared education that enhances growing and learning together toward living in harmony with nature. There is a special emphasis on "Children's camp" that nurtures children's environmental awareness, self-reliance, and ability to take action.

In FY2016, Shirakawa-Go hosted a total of 15 children's camps with six different camp themes. The number of participants reached 243 children, compared with 101 in the previous year, attesting to the participants' strong interest.

The total number of people staying overnight at Shirakawa-Go in FY2016 was 16,529, and the number of people who participated in institute programs during the year was 12,336. Since opening in 2005, the institute has welcomed more than 190,000 visitors.

Toyota Shirakawa-Go Eco-Institute will continue to develop new hands-on nature programs to nurture an awareness of living in harmony with nature among a growing number of adults and children.



Children participating in a children's camp



### Forest of Toyota

Forest of Toyota in Toyota City is a company-owned forest near the urban areas. It has been maintained based on the environment of *satoyama*, which was once part of our lives, creating a forest where wildlife can naturally inhabit. Since 1997, the forest has been open to the public. Anyone can walk freely through the forest and take part in various events to experience the *satoyama* environment and learn about nature through their five senses.

Since 2001, we have provided hands-on learning events for regional elementary schoolchildren. In 2016, the forest accepted 6,050 children.

In FY2016, as a new event, we held two sessions of a special program for adults on the theme of life using fire.

The program explored the history of mankind that encountered fire and created various tools, and the way people have continually managed *satoyama* environments to provide them with firewood, charcoal, and other resources. Participants had an opportunity to make a fire, use it for cooking, and carry out forest maintenance to make firewood.

The program was well-received by the participants together with feedback that they had rediscovered the wonder of fire, and that they wanted to pass along the wisdom of forestry to the next generation. At the Forest of Toyota, we will continue to hold programs which introduce the beauties of *satoyama* environments and living in harmony with nature.



Making fire by hand with the string method



Splitting firewood

## TOYOTA Mie Miyagawa Mountain Forest

In Odai Town, Taki District of Mie Prefecture, Toyota has introduced automobile manufacturing expertise to the forest site for management, such as cultivating water sources and providing other functions which benefit the public.

We are fully leveraging the region's long-standing timber industry to connect the public with forests, as well as providing opportunities to learn about the timber industry. Since 2015, we have been holding hands-on seminars for local high-school carpentry students to learn how to use tools from professionals.

Wood from the forest is also used in Toyota's office facilities. In this way, we promote forest conservation and resource recycling through a virtuous cycle of cultivation, cutting and use.



Local high-school students take part in a hands-on forestry experience



Toyota Automobile Museum uses wood from the Mie Miyagawa Forest (flooring for the book cafe)

## Launch a Biodiversity and Sustainability Learning Center at the Ban Pho Plant (Thailand)

Opened in 2007, the Ban Pho Plant in Thailand operated by manufacturing company Toyota Motor Thailand (TMT) strives to be the world's No. 1 plant in terms of environmental conservation and knowledge dissemination. The plant launched the Eco-Forest, an afforestation project in 2008, and embarked on the Toyota biotope project the following year.

In June 2016, Her Royal Highness Princess Maha Chakri Sirinkhon graciously presided over the launch of the Learning Center "Cheewa Panavet." Cheewa Panavet is a combination of three Thai words, "cheewa" (life), "pana" (forest), and "vet" (habitat). The Learning Center consists of three main sections, namely the Eco Forest, the Toyota Biotope, and the Royal Commemoration Exhibition Building. Currently, there are 43 species of plant, while the Toyota Biotope is a habitat of more than 218 species of living organisms spanning over 96,000 m<sup>2</sup>. The Royal Commemoration Exhibition Building exhibits projects on the environment and there is an exhibition room on ecosystems on ground level and below the ground.

Toyota has contributed to the sustainable development and human resources of Thailand. The opening of the new Learning Center has brought a new level for environmental conservation and enlightenment activities.



Cheewa Panavet, Toyota's Biodiversity and Sustainability Learning Center in Thailand



Biotope

# Environmental Management

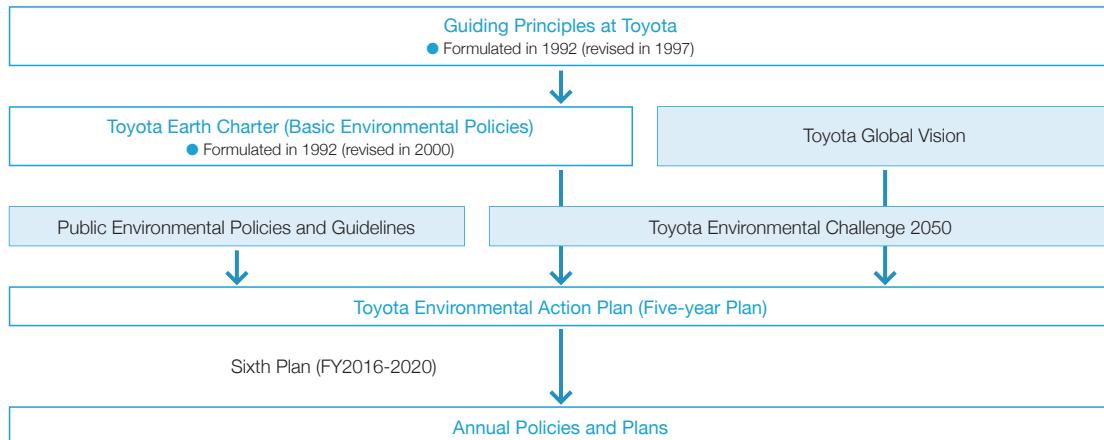
## Fundamental Approach

Toyota's environmental philosophy and policies are based on the Guiding Principles at Toyota established in 1992 (revised in 1997). Policies for environmental initiatives were formulated in 1992 as the Toyota Earth Charter (revised in 2000). This Charter is shared among 661 Toyota affiliates\* subject to the Consolidated Environmental Management System (consolidated EMS) around the world.

The Toyota Global Vision announced in 2011 emphasizes the importance of "Respect for the Planet." Based on its philosophy and policies, Toyota formulated the Toyota Environmental Challenge 2050 in FY2015 as its first long-term vision for environmental initiatives. In FY2016, Toyota started the Sixth Toyota Environmental Action Plan (FY2016-2020), initiating new programs for sustainable development in harmony with society toward the year 2050.

\* Since FY2016, in addition to the subsidiaries based on the formal standards, those based on the effective control standards have also been added due to the amendment of the Japanese Companies Act.

## Structure of Toyota's Environmental Management System



## Toyota Earth Charter

### I. Basic Policy

#### 1. Contribution toward a prosperous 21st century society

Contribute toward a prosperous 21st century society. Aim for growth that is in harmony with the environment and set as a challenge the achievement of zero emissions throughout all areas of business activities.

#### 2. Pursuit of environmental technologies

Pursue all possible environmental technologies, developing and establishing new technologies to enable the environment and economy to coexist harmoniously.

#### 3. Voluntary actions

Develop a voluntary improvement plan, based on thorough preventive measures and compliance with laws, which addresses environmental issues on the global, national, and regional scales, and promotes continuous implementation.

#### 4. Working in cooperation with society

Build close and cooperative relationships with a wide spectrum of individuals and organizations involved in environmental preservation, including governments, local municipalities, related companies and industries.

### II. Action Guidelines

#### 1. Always be concerned about the environment

Take on the challenge of achieving zero emissions at all stages, i.e., production, utilization, and disposal.

- (1) Develop and provide products with top-level environmental performance
- (2) Pursue production activities that do not generate waste
- (3) Implement thorough preventive measures
- (4) Promote businesses that contribute toward environmental improvement

#### 2. Business partners are partners in creating a better environment

Cooperate with associated companies.

#### 3. As a member of society

Actively participate in social actions.

- (1) Participate in the creation of a recycling-based society
- (2) Support government environmental policies
- (3) Contribute to non-profit activities

#### 4. Toward better understanding

Actively disclose information and promote environmental awareness.

### III. Organization in Charge

Promotion by the Corporate Planning Meeting which consists of top management

## Promotion Structure and Framework

Since April 2015, the Corporate Planning Meeting has deliberated on growth and business strategies with a wide range of challenges taken into consideration. Environmental initiatives along with business strategies are discussed in this meeting.

TMC has three core environment-related committees: the Environmental Product Design Assessment Committee, the Production Environment Committee, and the Resource Recycling Committee. These committees consider their issues and responses and all relevant divisions work together to promote company-wide initiatives.

As the foundation of our consolidated environmental management system (EMS), Environment Committees have been established in six regions around the world where Toyota operates business (Europe, China, South Africa, Asia Pacific, North America, South America).

These committees steadily promote environmental initiatives and enhance our global responses.

In Japan, we promote consolidated environmental initiatives through established meeting bodies including the All-Toyota Production Environment Conference, the All-Toyota Production Environment Meeting, and the All-Toyota Logistics Environment Conference.

## Organizational Structure (as of the End of June 2017)



\* PDCA: The circular process of Plan-Do-Check-Act to continually improve business

## Main Companies Subject to Consolidated EMS in Japan (Alphabetical Order)

### Production Companies

Group 1	Group 2	Group 3	Group 4	Group 5
<ul style="list-style-type: none"> <li>Consolidated subsidiaries</li> <li>Automotive production companies and others</li> <li>TMC secondary companies</li> </ul>	<ul style="list-style-type: none"> <li>Companies not subject to consolidated accounting</li> <li>Main parts manufacturers</li> <li>Body manufacturers, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Consolidated subsidiaries</li> <li>Parts manufacturers</li> </ul>	<ul style="list-style-type: none"> <li>Consolidated subsidiaries</li> <li>Various other products production companies</li> </ul>	<ul style="list-style-type: none"> <li>Companies not subject to consolidated accounting</li> <li>Parts manufacturers</li> </ul>
Daihatsu Motor Co., Ltd. Gifu Auto Body Co., Ltd. Hino Motors, Ltd. Toyota Auto Body Co., Ltd. Toyota Motor East Japan, Inc. Toyota Motor Hokkaido, Inc. Toyota Motor Kyushu, Inc.	Aisan Industry Co., Ltd. Aisin AI Co., Ltd. Aisin AW Co., Ltd. Aisin Seiki Co., Ltd. Aisin Takaoka Co., Ltd. JTEKT Corporation Tokai Rika Co., Ltd. Toyota Gosei Co., Ltd. Toyota Boshoku Corporation Toyota Industries Corporation Toyota Tsusho Corporation	Cataler Corporation Central Motor Wheel Co., Ltd. Kyoho Machine Works, Ltd. Primearth EV Energy Co., Ltd. Toyota Home Co., Ltd. Yutaka Seimitsu Kogyo, Ltd.	Admatechs Co., Ltd. Japan Chemical Industries Co., Ltd. Shintec Hozumi Co., Ltd. Toyota Turbine and Systems Inc.	Chuo Pack Industry Co., Ltd. Chuo Spring Co., Ltd. Fine Sinter Co., Ltd. FTS Co., Ltd. Futaba Industrial Co., Ltd. Koito Manufacturing Co., Ltd. Kyowa Leather Cloth Co., Ltd. Taitoh Kogyo Co., Ltd. Toyota Iron Works Co., Ltd. Trinity Industrial Corporation Tsuda Industries Co., Ltd.
All-Toyota Production Environment Conference Members				
All-Toyota Production Environment Meeting Members				

## Scope of Companies Subject to Consolidated EMS

The consolidated EMS scope covers all consolidated subsidiaries\* on the financial accounting basis and non-consolidated subsidiaries considered material from the viewpoint of environmental management. The 661 consolidated EMS companies consist of 242 production and sales companies under the direct control of TMC (13 production and sales companies, 80 production companies, and 149 non-production companies), as well as 419 companies managed by way of consolidated subsidiaries.

\* Since FY2016, in addition to the subsidiaries based on the formal standards, those based on the effective control standards have also been added.

## Details of Actions

- Jointly adopt the Toyota Earth Charter and draft individual environmental policies
- In production, set quantitative goals and follow up on those goals
- In sales, develop environmental management systems, and carry out environmental communication and other initiatives
- Implement top-level environmental responses based on actual conditions in each country and region

\* TMC's requirements for non-consolidated companies on the financial accounting basis may vary according to region and the nature of business.

## Scope of Overseas Consolidated EMS (as of the End of March 2017)



(as of March 31, 2017)

Sales Companies
Fukuka Toyopet Corporation Shizuoka Toyota Motor Co., Ltd. Toyota Corolla Aichi Co., Ltd. Total: 31 companies
Other Business
TACTI Corporation Toyota Central R&D Labs., Inc. Toyota Enterprises Inc. Toyota Modelista International Corporation Toyota Technocraft Co., Ltd. and others Total: 45 companies
All-Toyota Logistics Environment Conference Members

## Promote Strengthening of Consolidated Environmental Management

### Environmental Performance in Each Country and Region

Toyota formulates annual policies and conducts initiatives based on the policies to ensure that all business activities achieve top levels of environmental performance.

In FY2016, each of our production and sales companies formulated fiscal year plans and promoted measures to ensure achievement of the plan goals.

### Action Policies and Results of Major Affiliates Implementing Consolidated Environmental Management in FY2016

	Action Policy	Goals	Activity Results
Overall	<ul style="list-style-type: none"> <li>Promote environmental management through strengthened cooperation with each region</li> </ul>	<ul style="list-style-type: none"> <li>Achieve goals in all areas</li> </ul>	<ul style="list-style-type: none"> <li>Strengthened consolidated environmental management</li> <li>Carried out environmental meetings in Japan and overseas</li> <li>Conducted global ECO Awards</li> <li>Promoted activities under the Sixth Toyota Environmental Action Plan</li> </ul>
Production (83 companies) Japan (40 companies) Overseas (43 companies*)	<ul style="list-style-type: none"> <li>All companies to implement initiatives toward achieving FY2016 goals</li> <li>All companies to strengthen activities to prevent recurrence of non-compliance and complaints</li> <li>Maintain and improve environmental management systems</li> </ul>	<ul style="list-style-type: none"> <li>Achieve goals in Japan and other regions</li> <li>Zero non-compliance and complaints</li> <li>Renew ISO 14001 certification</li> </ul>	<ul style="list-style-type: none"> <li>All companies implemented systematic measures and nearly all the goals were achieved</li> <li>While there were no major issues, there were six minor incidents of non-compliance (non-compliance: 5 incidents in Japan excluding those at TMC; complaints: 1 incidents)</li> <li>ISO 14001 acquisition: 100% in Japan and overseas</li> </ul>
Sales (107 companies) Japan (55 companies) Overseas (52 companies*)	<ul style="list-style-type: none"> <li>Promote environmental initiatives by ensuring thorough implementation of CSR checklist among dealers, reducing CO<sub>2</sub> emissions by improving environmental management, and supporting third-party certification</li> <li>Promote and strengthen environmental initiatives led by regional headquarters and distributors in each country</li> <li>Promote and strengthen Dealer Environmental Risk Audit Program (DERAP)<sup>②</sup></li> </ul>	<ul style="list-style-type: none"> <li>Increase number of dealers acquiring EMS certification</li> <li>Build environmental initiative promotion frameworks in each region</li> <li>Percentage of dealers that achieved goals: 80% or more</li> </ul>	<ul style="list-style-type: none"> <li>Dealers acquiring Eco-Action 21<sup>①</sup> certification: 7</li> <li>Environmental activities framework under way according to plans in each region</li> <li>Percentage of dealers achieving goal: 91%</li> </ul>

\*1 Eco-Action 21: An easy-to-adopt guideline by Ministry of the Environment of Japan under which companies raise their environmental awareness, set goals, and take action.

The guideline integrates environmental management systems, environmental performance assessment, and environmental reporting into a single system.

\*2 DERAP: Toyota uses DERAP to reduce environmental risks at overseas dealer service shops.

\* Includes the 12 production and sales companies

\* The 65 other Toyota Group companies in Japan and overseas are implementing individual activities on their own initiative.

### Eco-factory Activities

Toyota is promoting eco-factory activities with the aim of surely incorporating environmental measures into plant activities, and becoming No. 1 regional plant. Our eco-factory activities are to build and develop a mechanism which surely incorporates environmental measures into each stage from planning to design and operations. These measures will be utilized for projects such as construction of new plants, major renovations of existing plants, and capacity

expansions. We confirm environmental consciousness through *genchi genbutsu* (on site, hands on) and rectify issues to ensure our environmental measures are performed.

In 2016, we carried out eco-factory measures at eight plants around the world, in Mexico, China, Brazil, Indonesia, and Malaysia.

We will continue to promote eco-factory activities as a means to contribute to regional environmental conservation around the world.

### Eco-factory Activities

Region	Mexico	China				Brazil	Indonesia	Malaysia
Office, plant	TMMGT	TMCAP	GTE*	GTMC Plant No.3	TFTM new plant	TDB new engine plant	TMMIN new engine plant	ASSB Plant No. 2
Planning stage	2016							2016
Audits of facility specifications	2017			2016	2016			2017
On-site audit (building)	2018			2017	2017			2018
On-site audit (equipment)	2018			2017	2018			2018
Compliance and risk assessment	2019		2016	2018	2019	2016	2016	2019
Performance assessment	2020	2016		2019	2020	2016	2017	2020

\* Plants expanding production capacity (since FY2013)

\* The years indicate activities implemented in FY2016 or planned for fiscal years thereafter

: Completed

## Global ECO Awards

Toyota conducts its own Global ECO Awards to encourage *kaizen* activities at overseas affiliates and promote *yokoten*\* (sharing) of the best improvement practices throughout the Toyota Group.

In FY2016, six finalists out of 19 teams selected from six regions around the world were invited to give their presentations in Japan.

Toyota do Brasil (TDB) won the Platinum Award for its continuous CO<sub>2</sub> reduction initiatives. The remaining five teams, all winners of the Gold Awards, also made impressive presentations on their important issues, sharing the examples of their excellent achievements.

\* *Yokoten* (sharing): Promoting the sharing of information on non-compliance incidents, improvement practices, and know-how throughout the Toyota Group.

### Award Results

Award Categories		Award for On-site Kaizen Activity		Award for Affiliates with the Best Performance	
Area	Production	Production Affiliate (Plant)		Production Affiliate (Plant)	
	Logistics	Administration, Production and Logistics affiliate			
Platinum Award		TDB (Brazil) .....  Challenge 3 P24		TMMK (U.S.) TMMI (U.S.) TMMMS (U.S.) FTCE (China)	
Gold Awards		TMMC (Canada) TSAM (South Africa) .....  Challenge 4 P28 GTMC (China) TMCP (China) TMT (Thailand) .....  Challenge 2 P20			
Silver Awards		TMMWV (U.S.) TMMMS (U.S.) .....  Challenge 4 P28 Toyota Logistics Services, Inc. (U.S.) TMMP (Poland) TMMF (France) Toyota Logistics Services Deutschland GmbH (Germany) TSAM (South Africa) TFTM (China) GTE (China) TKM (India) .....  Challenge 5 P34 TMT Ban Pho Plant (Thailand) TMT Gateway Plant (Thailand) TASA (Argentina) .....  Challenge 4 P28			



Platinum Award winners from TDB members with then TMC Senior Managing Officer Hirofumi Muta

### Legal Compliance Activities

Toyota aims to ensure that its production activities pose zero environmental risk to local communities. The foundation of our efforts is preventive measures to avoid non-compliance issues and complaints. Neglecting preventive measures can lead to situations where non-compliance may occur. We consider these situations to be non-compliance near-misses, and we take stringent measures to root out the causes of these near-misses and prevent reoccurrence. For incidents posing significant risk, we implement *yokoten* (sharing) of reoccurrence prevention measures through environmental affairs meetings at all Group companies. Additionally, we are taking measures to completely eliminate the use of ozone-depleting substances (ODS). In FY2016, Toyota was not involved in any major environmental incidents causing air or water pollution, nor was the Group subject to fines or penalties. However, in one incident at the Toyota Honsha Plant in Japan, a hose for facility cooling water became detached and leaked cooling water around the equipment, causing oil waste to be discharged into a local river through rainwater ditches. The plant immediately notified local government authorities and took measures to collect the oil film.

To prevent reoccurrence, the plant improved the hose connection and attached an oil monitor on the rainwater tank to alert the plant of abnormalities prior to discharge, sharing these measures.

Regarding reporting and storage of Poly Chlorinated Biphenyl (PCB) waste, in accordance with the Law Concerning Special Measures against PCB Waste of Japan, since FY2005 we have used outside subcontractors to handle high concentration PCB waste. So far we have completed the disposal of 5,243 containers of waste, and we will continue to work with subcontractors to dispose of the remaining four units of transformers and condensers. For equipment containing low concentration PCB waste, we have been updating our plans on a regular basis and are progressing with proper disposal.

At six of our production plants, we completed groundwater pollution prevention measures in 1997. We continue to conduct pumping aeration and purification to complete purification and ensure that groundwater is purified to levels below standards.

The levels of trichloroethylene at production plants are reported to the government and to local councils in the surrounding communities.

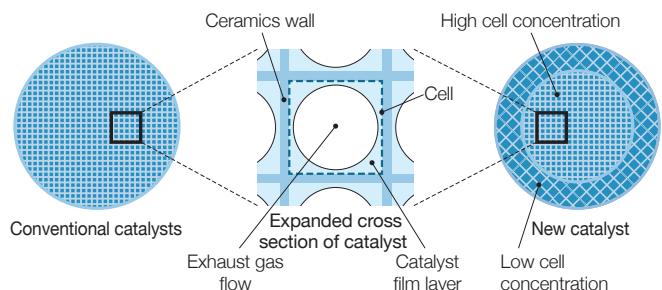


## Reduce Vehicle Exhaust Emissions to Improve Urban Air Quality in Each Country and Region

To improve air quality Toyota has been working on research and development for new catalyst technologies which enhance air purification performance to ensure vehicle exhaust gas emissions as clean as possible.

In FY2016, we commercialized the catalyst using the world's first FLAD® substrate. This substrate is integrally molded with different cell cross-sectional area at the inner portion compared to the outer portion. Developed jointly with Denso Corporation, FLAD® exhibits optimal cell density at both the inner and outer portions, which enables a uniform flow of exhaust gas through the catalyst. As a result, it uses 20 percent less precious metal in approximately 20 percent less volume, while maintaining the same exhaust gas purification performance as the conventional type. The new catalyst debuted in the Lexus LC series in March 2017 and will be gradually rolled out in other new models.

Toyota will continue collaborating with Group companies and partners to actively develop new catalyst technologies which use fewer precious metals and achieve cleaner exhaust gas emissions.



## Reduce VOC Emissions in Production Activities

Volatile Organic Compounds (VOCs\*) are one of the causes of photochemical oxidation, the cause of photochemical smog. Toyota has been striving to reduce VOCs emitted in vehicle painting processes. Specifically, we have reduced the use of paints and thinners, continuously promoting initiatives linked to painting facility refurbishment plans and day-to-day activities to reduce VOC emissions.

For FY2016, as a result of continuous day-to-day activities to reduce VOC emissions, the volume of VOC emissions per area painted in TMC body painting processes (average for all lines) was 14.6 g/m<sup>2</sup> (down 8% year on year). For TMC and its consolidated subsidiaries in Japan, VOC emissions volume was 21.5 g/m<sup>2</sup> (down 1.5 % year on year). The volume of VOC emissions per area painted in TMC bumper painting processes (average for all lines) was 193 g/m<sup>2</sup> (down 24% year on year).

\* VOC (Volatile Organic Compounds):

Used in painting, adhesives, and other products, VOCs are volatile at room temperature under normal pressure. VOCs cause air pollution and soil contamination, raising concerns about the influence on the human body.

### Trends in VOC Emissions Volume in Vehicle Body Painting Processes at TMC in Japan (Average for All Lines)

Third Party Assurance

FY	2012	2013	2014	2015	<b>2016</b>
(Unit: g/m <sup>2</sup> )					
VOC emissions per area painted	20.0	18.8	17.2	15.8	<b>14.6</b>

### Trends in VOC Emissions Volume in Vehicle Body Painting Processes by Consolidated Subsidiaries in Japan

FY	2012	2013	2014	2015	<b>2016</b>
(Unit: g/m <sup>2</sup> )					
VOC emissions per area painted	24.6	24.1	22.6	21.8	<b>21.5</b>

• Vehicle assembly plants of TMC and consolidated subsidiaries and other companies in Japan, a total of eight companies

### Trends in VOC Emissions Volume in Bumper Painting Processes at TMC in Japan (Average for All Lines)

FY	2012	2013	2014	2015	<b>2016</b>
(Unit: g/m <sup>2</sup> )					
VOC emissions per area painted	319	310	282	253	<b>193</b>

## Promote Environmental Activities in Cooperation with Business Partners (Suppliers)

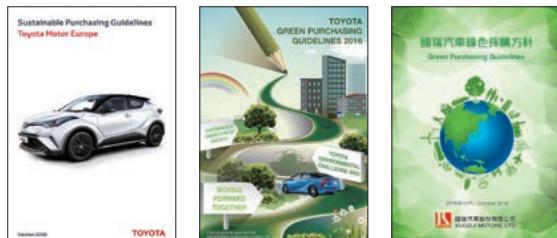
Toyota purchases a wide range of materials, parts, and equipment from many different suppliers. We have collaborated with suppliers on implementing environmental initiatives through Green Purchasing Guidelines<sup>\*1</sup>, seminars, and other means. Ensuring compliance with each country's laws and regulations and improving the management of substances of concern are fundamental requirements for suppliers. Additionally, after releasing the Toyota Environmental

Challenge 2050, we revised the "Toyota Green Purchasing Guidelines" in January 2016, asking suppliers to promote a broad range of environmental initiatives to reduce greenhouse gases (GHG) and protect ecosystems in support of the Challenge. We have been working even closer with suppliers to that end.

<sup>\*1</sup> Green Purchasing Guidelines: Prioritizing the purchase of parts, materials, equipment, and services with a low environmental footprint when manufacturing products.

### Completed Revision of the Green Purchasing Guidelines Globally

Toyota conducts purchasing not only in Japan, but in regions around the world. Each affiliate has its own Green Purchasing Guidelines. After the revision of the Toyota Green Purchasing Guidelines in Japan (completed in January 2016), 36 overseas affiliates in 15 countries also revised their guidelines in FY2016. Affiliates also held seminars and other events in their respective countries to raise awareness and compliance.



From left, Green Purchasing Guidelines of TME (Europe), TDEM (Thailand), and Kuozui Motors (Taiwan)

### Mutual Study about the Environment

Toyota holds an annual CSR Study Meeting in Japan attended by many suppliers. In FY2016, the lecture featured the Toyota Environmental Challenge 2050 as its main theme. At the Head Office in Japan, we promote environmental activities through a special exhibition corner featuring the Six Challenges along with videos and pamphlets designed to provide information and raise awareness.

### Assessing Risks and Opportunities Related to Climate Change and the Water Environment in Supply Chains

We introduced the CDP Supply Chain<sup>\*2</sup> Program in FY2015 to support the continual implementation and improvement of environmental initiatives conducted with suppliers. The program enables us to assess environmental risks and opportunities across the supply chain. We have been enhancing the program's activities through briefings and other types of communication with suppliers.

<sup>\*2</sup> Supply chain: The entire flow of business activities related to a product, from procurement of materials for manufacturing, to production control, logistics, and sales.

### Ensuring Compliance with REACH and Other Global Regulations on Chemical Substances

In order to minimize severe negative impacts on human health and the environment due to the production and usage of chemical substances, nations are strengthening laws related to chemical substances, which include the Chemical Substances Control Law in Japan, and the ELV Directive<sup>\*3</sup> and REACH regulation<sup>\*4</sup> in Europe. To properly respond to these regulations, Toyota has built and is operating chemical substance management frameworks in cooperation with its suppliers.

In FY2016, we requested suppliers in Japan to conduct self-assessments of their operations. Based on the results, we have been working with suppliers to take further measures.

<sup>\*3</sup> End of Life Vehicles (ELV) Directive: A European Union directive on vehicle disposal designed to reduce the impact of End-of-life vehicles on the environment

<sup>\*4</sup> Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) regulation: A European Union regulation for managing chemical substances to protect human health and the environment.

## Promote Environmental Activities in Cooperation with Business Partners (Dealers and Distributors)

Toyota has strong bonds of trust with its dealers and distributors built on shared values for products and services, supporting a long history of collaborative initiatives in environmental activities. Given their direct contact with customers, dealers are a critical partner in carrying out environmental initiatives. Therefore, we are fully implementing a CSR checklist among Toyota dealers in Japan

and taking measures to enhance environmental controls to reduce CO<sub>2</sub> emissions.

In overseas regions, we strongly promote environmental management through environmental activities led by regional headquarters and distributors along with continual DERAP implementation.

### Promoting Environmental Initiatives at Domestic Dealers

The Toyota National Dealers' Advisory Council (TNDAC) promotes unified efforts among all dealers in Japan to implement voluntary activities based on the Toyota Dealer CSR Guidelines set forth in 2005. To further promote environmental initiatives, TNDAC encourages dealers to attain third-party certification of their environmental management systems and accelerate the development of environmentally conscious dealerships and human resources, in which we aim to bolster customer trust in Toyota dealers. In FY2016, we used the Toyota dealer CSR checklist to promote thorough environmental assessments at dealers while also encouraging the acquisition of Eco-Action 21 accreditation. As a result, seven additional dealers attained Eco-Action 21 accreditation. Moving forward, we will strive to improve environmental initiatives by working together with dealers to enhance environmental performance and planning Toyota's new initiatives.

### Raise Ratio of Dealers Achieving DERAP

Toyota continues the Dealer Environmental Risk Audit Program (DERAP) to reduce environmental risks at overseas dealer service shops. These audits aim to establish a framework to deal with five fundamental environmental requirements, including the proper management of waste and treatment of wastewater.

In FY2016, 83 distributors and 4,233 dealers from 80 countries worldwide participated in the program, representing an increase of 12 distributors and 253 dealers from FY2015. 91 percent of these participating dealers satisfied the five requirements (up 2% year on year).

Globally, there are still many Toyota distributors and dealers which do not participate in the program. We will continue to support expansion of DERAP participation and promote the activities of the participating companies. We will also be responsible for creating environmental guidelines of each overseas region based on global environmental guidelines for dealers and distributors, tracking the progress of their operation.

### TDB and ABRADIT Jointly Recognize Eco Dealers (Brazil)

ABRADIT, the association of Toyota dealers in Brazil, was founded in 1975 to unify local dealer initiatives. Since then, ABRADIT has collaborated with production and sales company Toyota do Brasil (TDB) on various initiatives contributing to the success of local dealers.

In 2015, TDB and ABRADIT jointly launched the Eco Dealer Award as a way to raise environmental awareness following a nationwide drought in Brazil in 2014. In FY2016, the second year of the program, dealers submitted 13 projects for consideration under the theme of energy efficiency. The Kurumá Veículos team won the grand prize for its adoption of LED lighting and energy-efficient air conditioning systems.



TDB executives join award candidates

## Further Strengthen Global Employee Education and Awareness Activities

In accordance with the national policies of Japan, Toyota designated June as its “Toyota Environment Month” in 1973 and has been taking measures since then to raise employees’ awareness and actions for the environment. In 1991, we changed the name to “Toyota Global Environment Month,” expanding our activities globally.

We ensure that all global employees are aware of Toyota Global Environment Month by displaying a common poster worldwide, distributing the President’s message on the environment through global affiliates in their local languages, and making event-related notifications on monitors at various locations throughout company sites and on the intranet.

To further raise awareness during Toyota Global Environment Month, our in-house environment character “Ecoba” made appearances at the main gate of our plants during commute times and in cafeterias at lunch time.

At our environmental lectures, astronaut Ms. Naoko Yamazaki discussed global warming and the recent issue of space debris,

while also praising Toyota for announcing the Toyota Environmental Challenge 2050 as our plan to voluntarily tackle various environmental issues. The lecture was simulcast live, allowing more than 1,100 people to enjoy Ms. Yamazaki’s valuable insights. Since 2017, we have been accelerating initiatives throughout the year, such as conducting internal environmental seminars by the general manager from the Environmental Affairs Division and reimbursing test fees for employees who have passed the certification test for environmental specialists (Eco Test) sponsored by the Tokyo Chamber of Commerce and Industry.



“Ecoba” makes appearance at a site



Astronaut Ms. Naoko Yamazaki delivers a lecture

## Enhance Active Disclosure of Environmental Information and Communication

Toyota Motor Corporation (TMC) strives to proactively disclose environmental information and enhance its communication through an annual Environmental Report, its website, and events.

In February 2017, our Environmental Report 2016 won the Excellence Prize in the Global Warming Countermeasure Reporting Category of the 20th Environmental Communication Awards sponsored by Ministry of the Environment of Japan and other organizations. In March 2017, TMC unveiled a new video contents website, “econohito,” which features employees striving to carry out environmental initiatives in support of the Toyota Environmental Challenge 2050.

Toyota’s overseas consolidated subsidiaries actively engage in

environmental communication with a broad range of stakeholders in accordance with the needs of each country and region.



Awards ceremony for Environmental Communication Awards



Video content “econohito”

# Environmental Data

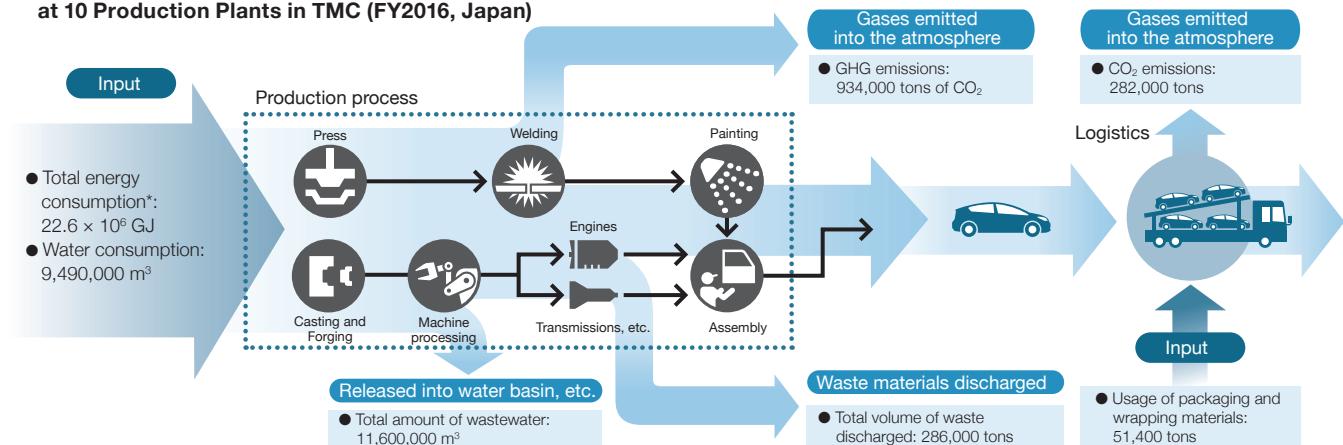
## Challenge 1 New Vehicle Zero CO<sub>2</sub> Emissions Challenge

**A Sales of Clean Energy Vehicles (Global)** Third Party Assurance

Year	2015	2016
(1,000 units)		
Hybrid and plug-in hybrid vehicles	1,203.9	<b>1,400.6</b>
Fuel cell vehicles	0.5	<b>2.0</b>
Total	1,204.4	<b>1,402.6</b>

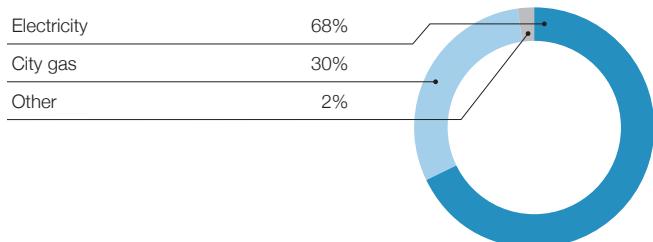
## Challenge 2 Life Cycle Zero CO<sub>2</sub> Emissions Challenge

### B Resources Input and Substances Discharged from Logistics Activities at 10 Production Plants in TMC (FY2016, Japan)



## Challenge 3 Plant Zero CO<sub>2</sub> Emissions Challenge

### C Calorific Energy Use Ratio at TMC (FY2016, Japan)



### D Global CO<sub>2</sub> Emissions (from Energy Consumption at Stationary Emission Sources)

FY	2015	2016
Total CO <sub>2</sub> emissions (million tons)		
TMC	1.55	<b>1.56</b>
Japan (excluding TMC)	4.28	<b>4.35</b>
North America	0.96	<b>1.03</b>
China	0.64	<b>0.66</b>
Europe	0.27	<b>0.30</b>
Asia (excluding Japan), Australia, Middle East, South Africa, Latin America	0.73	<b>0.83</b>
Total emissions	8.43	<b>8.73</b>
Tons/unit		
CO <sub>2</sub> emissions per unit produced	0.828	<b>0.829</b>

- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 121 companies
- Conversion factors: Using the Greenhouse Gas (GHG) Protocol

[Environmental Data P54-Q](#)

[Environmental Data P55-W](#)

## Environmental Data

### E Global Energy Consumption (from Stationary Emission Sources)

Third Party Assurance

FY	2015	2016
By region		
(PJ <sup>*1</sup> )		
TMC	16.0	<b>16.4</b>
Japan (excluding TMC)	45.8	<b>46.9</b>
North America	12.8	<b>13.9</b>
China	5.5	<b>5.5</b>
Europe	3.3	<b>3.7</b>
Asia (excluding Japan), Australia, Middle East, South Africa, Latin America	7.4	<b>8.1</b>
Total consumption	90.8	<b>94.5</b>
(GJ/unit <sup>*2</sup> )		
Energy consumption per unit produced	8.93	<b>8.97</b>

\*1 PJ (Peta joule): Peta represents  $10^{15}$  and a joule is a unit of energy

\*2 GJ (Giga joule): Giga represents  $10^9$  and a joule is a unit of energy

- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 121 companies

[Environmental Data P54-Q](#)

Conversion factors: Using the Greenhouse Gas (GHG) Protocol

[Environmental Data P55-X](#)

FY	2015	2016
By energy type		
(PJ)		
Electricity	37.7	<b>38.5</b>
City gas	28.0	<b>29.5</b>
Natural gas	15.6	<b>17.1</b>
LPG	2.2	<b>2.3</b>
LNG	1.2	<b>1.2</b>
Coke	1.0	<b>0.9</b>
Coal	0.5	<b>0.5</b>
Heavy oil A	1.2	<b>1.0</b>
Diesel oil	0.5	<b>0.4</b>
Kerosene	0.3	<b>0.2</b>
Steam	1.1	<b>1.1</b>
Hot water	0.6	<b>0.6</b>
Others	0.6	<b>0.8</b>
Renewable energy	0.3	<b>0.4</b>
Total consumption	90.8	<b>94.5</b>

## Challenge 4 Challenge of Minimizing and Optimizing Water Usage

### F Global Water Withdrawal Volume by Source

FY	2016
(million m <sup>3</sup> )	
Municipal water	<b>46.0</b>
Groundwater	<b>9.0</b>
Rainwater	<b>0.2</b>
Wastewater from other organizations	<b>2.1</b>

- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 104 companies

### G Global Water Discharge by Destination

FY	2016
(million m <sup>3</sup> )	
River/lake	<b>23.2</b>
Brackish surface water/seawater	<b>2.6</b>
Sewage	<b>8.9</b>
Other organizations	<b>0.6</b>

- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 69 companies

### H Global Recycled Wastewater

FY	2016
(million m <sup>3</sup> )	
Volume of recycled wastewater	<b>1.4</b>

- Scope of coverage: TMC and consolidated subsidiaries and other companies in Japan and overseas, a total of 15 companies

## Challenge 5 Challenge of Establishing a Recycling-based Society and Systems

FY (%)	Third Party Assurance				
	2012	2013	2014	2015	2016
Vehicle recovery rate* <sup>2</sup> (converted into a per-vehicle value)	99	99	99	99	<b>99</b>
ASR recovery rate* <sup>3</sup>	94	96	97	97	<b>98</b>

\*1 Automobile Shredder Residue: Residue after vehicles are shredded

\*2 Vehicle recovery rate: Calculated by combining the percentage recycled and recovered through the dismantling and shredding processes, approximately 83% (quoted from the April 2003 joint council report), with the remaining ASR rate of 17% × ASR recovery rate of 98%

\*3 ASR recovery rate: Recovery volume/amount collected

### I Trends in Damaged and Removed Bumpers Collected and Recovered at TMC (Japan)

FY (thousand pieces)	2012	2013	2014	2015	2016
Amount collected	951	912	855	809	<b>770</b>
(%)					
Collection rate	723	725	729	694	<b>674</b>

### K Volume of Raw Materials Used and Ratio of Recycled Materials Used (Global)

FY (million tons)	2016
Volume of raw materials used	<b>13.9</b>
(%)	
Ratio of recycled materials used	<b>24</b>

## Challenge 6 Challenge of Establishing a Future Society in Harmony with Nature

### N Results of Toyota Environmental Activities Grant Program (Global)

FY	2012	2013	2014	2015	2016	Cumulative total*
Country/region covered and number of grants						
Asia-Pacific	8	8	7	5	<b>7</b>	<b>105</b>
North America, Latin America	1	0	0	1	<b>0</b>	<b>20</b>
Africa	0	2	1	3	<b>1</b>	<b>29</b>
Europe	0	0	2	1	<b>2</b>	<b>12</b>
Japan	10	14	11	16	<b>18</b>	<b>166</b>
Total	19	24	21	26	<b>28</b>	<b>332</b>

\* FY2000–2016 (grant topics: biodiversity, global warming)

### L Damaged and Removed Parts Collected and Recovered at TMC (FY2016, Japan)

Bumpers	770,000 units (collection rate of 67.4%)
Lead wheel balance weights* <sup>4</sup>	27.1 tons
Amount of oil delivered using tanker trucks (bulk supply system* <sup>5</sup> )	64.4% of the volume sold by parts distributors

\*4 Lead wheel balance weights: Weights used to ensure rotation balance when joining a wheel and tire

\*5 Bulk supply system: Filling oil directly to large-capacity tanks located on site

### M Supply of Used and Remanufactured Parts at TMC (FY2016, Japan)

Parts name	Number of parts supplied	
	Used and remanufactured parts	New parts (reference)
Remanufactured parts	Automatic transmissions	1,671
	Power steering gear	3,723
	Torque converters	1,293
Used parts	35,379	—

## Environmental Management

### Environment-related Non-compliance Incidents and Complaints at TMC (Japan)

FY	2012	2013	2014	2015	2016
(Cases)					
Non-compliance incident	1 <sup>*1</sup>	1 <sup>*2</sup>	0	0	1
Complaint	0	0	0	0	0

\*1 See P24 of "Respect for the Planet—Toyota's Environmental Initiatives —2013"

\*2 See P15 of "Respect for the Planet—Toyota's Environmental Initiatives —2014"

- Number of non-compliance incidents and complaints are determined based on internal standards

### Trichloroethylene Levels at TMC (FY2016, Japan)

Third Party Assurance

Plant	Levels of Groundwater before Remediation
	mg/L (Environmental standard value: 0.01)
Honsha Plant	Less than 0.002-0.93
Motomachi	Less than 0.002-0.12
Kamigo	Less than 0.002-0.10
Takaoka	Less than 0.002-0.18
Miyoshi	Less than 0.002-0.10
Tsutsumi	Less than 0.002-0.27

- In 1997, Toyota completed implementation of measures to prevent outflow of groundwater at the six production plants listed above.

Toyota is continuing groundwater remediation using pump and aeration treatment without exceeding the standard values.

Trichloroethylene levels are reported to the authorities concerned

Levels are also explained to citizens at local council meetings

- Measurements are taken at all Toyota Motor Corporation (TMC) plants, and nothing is detected at plants other than those listed

- The levels are expressed as a range since each plant includes multiple measurement points

### Scope of Data Coverage (TMC and Consolidated Subsidiaries and Other Companies in Japan and Overseas, a Total of 121 Companies)

Third Party Assurance

TMC: One company

Japan: 39 of the main companies subject to consolidated EMS (P44) and their subsidiaries, a total of 77 companies

Group 1	Group 2	Group 3	Group 4	Group 5
Gifu Auto Body Co., Ltd.	Aisan Industry Co., Ltd.	Cataler Corporation	Admatechs Co., Ltd.	FTS Co., Ltd.
Daihatsu Motor Co., Ltd.	Aisin AW Co., Ltd.	Kyoho Machine Works, Ltd.	Shintec Hozumi Co., Ltd.	Kyowa Leather Cloth Co., Ltd.
Toyota Motor Kyushu, Inc.	Aisin AI Co., Ltd.	Central Motor Wheel Co., Ltd.	Toyota Turbine and Systems Inc.	Koito Manufacturing Co., Ltd.
Toyota Motor East Japan, Inc.	Aisin Seiki Co., Ltd.	Toyota Home Co., Ltd.	Japan Chemical Industries Co., Ltd.	Taiho Kogyo Co., Ltd.
Toyota Motor Hokkaido, Inc.	Aisin Takaoka Co., Ltd.	Primearth EV Energy Co., Ltd.		Chuo Pack Industry Co., Ltd.
Toyota Auto Body Co., Ltd.	Aichi Steel Corporation	Yutaka Seimitsu Kogyo, Ltd.		Chuo Spring Co., Ltd.
Hino Motors, Ltd.	JTEKT Corporation			Tsuda Industries Co., Ltd.
	Denso Corporation			Toyoda Iron Works Co., Ltd.
	Tokai Rika Co., Ltd.			Trinity Industrial Corporation
	Toyota Gosei Co., Ltd.			Fine Sinter Co., Ltd.
	Toyota Industries Corporation			
	Toyota Boshoku Corporation			

Overseas: 43 production companies and production/sales companies

North America	China	Europe	Asia (excluding Japan), Australia, Middle East, South Africa, Latin America
TMMK (U.S.)	TFTM	TMR (Russia)	TSAM (South Africa)
TMMI (U.S.)	TFTD	TMMP (Poland)	Kuozui (Taiwan)
TMMWU (U.S.)	TTFC	TMMF (France)	TMCA (Australia)
TMMAL (U.S.)	TFAP	TMUK (U.K.)	TASA (Argentina)
TMMTX (U.S.)	TTFE	TMMT (Turkey)	TDB (Brazil)
TMMMS (U.S.)	FTCE	TPCA (Czech Republic)	TDV (Venezuela)
BODINE (U.S.)	SFTM		
TABC (U.S.)	GTMC		
TMMC (Canada)	GTE		
CAPTIN (Canada)	TMCAP		
TMMBC (Mexico)			

### Global Average CO<sub>2</sub> Emissions from New Vehicles

(Japan, U.S., Europe, China)

Conversion Factors Used to Calculate Reduction Rate versus FY2010

Gasoline	2.32 kg-CO <sub>2</sub> /L
Diesel oil	2.58 kg-CO <sub>2</sub> /L

- "Greenhouse Gas Emissions Accounting and Reporting Manual" (version 4.3), Japanese Act on Promotion of Global Warming Countermeasures

## Environmental Data

### **S Conversion Factors Used to Calculate Respective Emission Volume of 15 Categories in Scope 3 and Ratio of Total Emissions**

Category	Conversion factors								
Category 1: Purchased goods and services	<ul style="list-style-type: none"> <li>Ministry of the Environment of Japan, "Emissions of Japan Units Database for Accounting for Organizations' Greenhouse Gas Emissions, etc. Throughout the Supply Chain" (version 2.4)</li> </ul>								
Category 2: Capital goods	<ul style="list-style-type: none"> <li>Japan Environmental Management Association for Industry, "Carbon Footprint Communication Program, Basic Database" (version 1.01)</li> </ul>								
Category 3: Fuel- and energy-related activities (not included in Scope 1 and Scope 2)	<ul style="list-style-type: none"> <li>"Greenhouse Gas Emissions Accounting and Reporting Manual" (version 4.3), Japanese Act on Promotion of Global Warming Countermeasures</li> </ul>								
Category 5: Waste generated in business operations	<ul style="list-style-type: none"> <li>Ministry of the Environment of Japan, "Emissions Units Database for Accounting for Organizations' Greenhouse Gas Emissions, etc. Throughout the Supply Chain" (version 2.4)</li> </ul>								
Category 6: Business travel	<ul style="list-style-type: none"> <li>Ministry of the Environment of Japan, "Emissions Units Database for Accounting for Organizations' Greenhouse Gas Emissions, etc. Throughout the Supply Chain" (version 2.4)</li> </ul>								
Category 7: Employee commuting	<ul style="list-style-type: none"> <li>Ministry of the Environment of Japan, "Emissions Units Database for Accounting for Organizations' Greenhouse Gas Emissions, etc. Throughout the Supply Chain" (version 2.4)</li> <li>Japan Environmental Management Association for Industry, "Carbon Footprint Communication Program, Basic Database" (version 1.01)</li> </ul> <table border="1"> <tr> <td>Gasoline</td> <td>2.66 kg-CO<sub>2</sub>/L</td> </tr> <tr> <td>Diesel oil</td> <td>2.74 kg-CO<sub>2</sub>/L</td> </tr> </table>	Gasoline	2.66 kg-CO <sub>2</sub> /L	Diesel oil	2.74 kg-CO <sub>2</sub> /L				
Gasoline	2.66 kg-CO <sub>2</sub> /L								
Diesel oil	2.74 kg-CO <sub>2</sub> /L								
Category 9: Transportation and distribution (downstream)	<ul style="list-style-type: none"> <li>"Greenhouse Gas Emissions Accounting and Reporting Manual" (version 4.3), Japanese Act on Promotion of Global Warming Countermeasures</li> </ul>								
Category 11: Use of sold products	<ul style="list-style-type: none"> <li>Japan Environmental Management Association for Industry, "Carbon Footprint Communication Program, Basic Database" (version 1.01)</li> </ul> <table border="1"> <tr> <td>Gasoline</td> <td>2.66 kg-CO<sub>2</sub>/L</td> </tr> <tr> <td>Diesel oil</td> <td>2.74 kg-CO<sub>2</sub>/L</td> </tr> </table> <ul style="list-style-type: none"> <li>"Greenhouse Gas Emissions Accounting and Reporting Manual" (version 4.3), Japanese Act on Promotion of Global Warming Countermeasures</li> </ul> <table border="1"> <tr> <td>Gasoline</td> <td>2.32 kg-CO<sub>2</sub>/L</td> </tr> <tr> <td>Diesel oil</td> <td>2.58 kg-CO<sub>2</sub>/L</td> </tr> </table>	Gasoline	2.66 kg-CO <sub>2</sub> /L	Diesel oil	2.74 kg-CO <sub>2</sub> /L	Gasoline	2.32 kg-CO <sub>2</sub> /L	Diesel oil	2.58 kg-CO <sub>2</sub> /L
Gasoline	2.66 kg-CO <sub>2</sub> /L								
Diesel oil	2.74 kg-CO <sub>2</sub> /L								
Gasoline	2.32 kg-CO <sub>2</sub> /L								
Diesel oil	2.58 kg-CO <sub>2</sub> /L								

### **T Trends in Conversion Factors Used to Calculate CO<sub>2</sub> Emissions from Logistics at TMC (Japan)**

Railway	22.0 g-CO <sub>2</sub> /tkm
Vessel	39.0 g-CO <sub>2</sub> /tkm
Gasoline	2.32 kg-CO <sub>2</sub> /L
Diesel	2.62 kg-CO <sub>2</sub> /L
Heavy oil C	2.98 kg-CO <sub>2</sub> /L

- Used "Guidelines on Disclosure of CO<sub>2</sub> Emissions from Transportation & Distribution" (version 3.0) issued by Ministry of Economy of Japan, Trade and Industry and Ministry of Land, Infrastructure, Transport and Tourism of Japan, and other guidelines

### **U Trends in Conversion Factors Used to Calculate Total CO<sub>2</sub> Emissions (from Energy Consumption at Stationary Emission Sources) and CO<sub>2</sub> Emissions per Unit Produced at TMC**

Electricity	0.3707 kg-CO <sub>2</sub> /kWh
Heavy oil A	2.6958 kg-CO <sub>2</sub> /L
Heavy oil C	2.9375 kg-CO <sub>2</sub> /L
Kerosene	2.5316 kg-CO <sub>2</sub> /L
LPG	3.0040 kg-CO <sub>2</sub> /kg
City gas	2.1570 kg-CO <sub>2</sub> /Nm <sup>3</sup>
Coke	3.2426 kg-CO <sub>2</sub> /kg
Coal	2.3557 kg-CO <sub>2</sub> /kg
Hot water	0.0570 kg-CO <sub>2</sub> /MJ*
Cold water	0.0570 kg-CO <sub>2</sub> /MJ
Steam	0.0570 kg-CO <sub>2</sub> /MJ

\* MJ (Mega joule): Mega represents 10<sup>6</sup> and a joule is a unit of energy  
• Calculated based on the Nippon Keidanren's 1990 conversion factors

### **V Trends in Conversion Factors Used to Calculate Global CO<sub>2</sub> Emissions (from Energy Consumption at Stationary Emission Sources) and CO<sub>2</sub> Emissions per Unit Produced**

- GHG Protocol was used to calculate emissions
- Emissions from electric power were calculated using the 2001 conversion factor from the "CO<sub>2</sub> Emissions from Fuel Combustion" from IEA, Paris, France (2007 edition)
- For items other than electric power: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). Published: IGES, Japan
- For city gas, steam, hot water, cold water, and coke-oven gas, the conversion factors used were those quoted in the Japanese Act on Promotion of Global Warming Countermeasures (April 2016)

### **W Conversion Factors Used to Calculate Global CO<sub>2</sub> Emissions (from Energy Consumption at Stationary Emission Sources)**

- GHG Protocol was used to calculate emissions
- Emissions from electric power were calculated using the 2014 conversion factor from the "CO<sub>2</sub> Emissions from Fuel Combustion" from IEA, Paris, France (2016 edition)
- For items other than electric power: "2006 IPCC Guidelines for National Greenhouse Gas Inventories," prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). Published: IGES, Japan
- For city gas, steam, hot water, cold water, and coke-oven gas, the conversion factors used were those quoted in the Japanese Act on Promotion of Global Warming Countermeasures (April 2016)

### **X Conversion Factors Used to Calculate Global Energy Consumption (from Stationary Emission Sources)**

- Electricity conversion factor is 3.6 (GJ/MWh)
- Other energy conversion factors were based on the Japanese Act on Promotion of Global Warming Countermeasures (April 2016)

## Environmental Accounting

### Environmental Costs

Scope of coverage: Toyota Motor Corporation

#### FY2015 and 2016 Results Based on Format of Ministry of the Environment of Japan

Third Party Assurance

(billion yen)	Category	Toyota				Five vehicle body manufacturers *1			
		2015		2016		2015		2016	
		Investments	Costs	Investments	Costs	Investments	Costs	Investments	Costs
(1) Pollution prevention costs		1.1	1.5	0.3	1.4	0.5	2.1	0.3	2.3
(2) Global environmental conservation costs		14.9	0.8	18.3	0.8	1.5	0.5	1.5	0.5
(3) Resource recycling costs		0	2.0	0.1	2.0	0.3	1.6	0.4	1.7
Upstream/downstream costs	Recycling-related costs, industry organization shared costs	0	0.5	0	0.5	0	0.1	0	0.1
Management activities costs	Costs for environmental advertisements, environmental reports publishing, full-time environment-related employees, etc.	0	27.0	0	22.5	0	2.2	0	2.2
R&D costs	R&D costs to lower environmental concern	0	379.2	0	395.2	0.4	42.7	0.5	41.8
Social activities costs	Grants, etc. to environmental conservation organizations	0	0.2	0	0.6	0	0	0	0
Environmental damage response costs	Soil and groundwater remediation costs, etc.	0.2	14.2	0.2	9.1	0	0	0	0
Total		16.2	425.4	18.9	432.1	2.7	49.2	2.7	48.6
		441.6		451.0		51.9		51.3	

\*1 Five vehicle body manufacturers: Toyota Motor East Japan, Inc., Daihatsu Motor Co., Ltd., Toyota Auto Body Co., Ltd., Hino Motors, Ltd., Toyota Motor Kyushu, Inc. (total based on each company's respective calculation standards)

### Economic Effect

Substantial Effect			Third Party Assurance	
FY (billion yen)	2015		Five vehicle body manufacturers*1 2015 2016	
Reduction in energy costs through energy conservation	0.5	0.6	0.7	2.0
Reduction in waste processing and treatment costs	-0.2	0.1	0	0
Sales of recycled products	2.1	2.4	3.9	4.9
Other (revenues from environmental technologies, etc.)	10.0	10.3	0	0
Total	12.4	13.4	4.6	6.9

Customer Benefits: Amount of Reduction in Oil Consumption by Switching to Hybrid Vehicles			Third Party Assurance	
FY (billion yen)	2015		Cumulative from December 1997 (first-generation Prius launch)	
Japan	215.8	226.8	1,409.8	
Worldwide	595.6		4,237.6	

### Customer Benefit Calculation Method (Japan Only)

- Calculation method: (Difference in average annual fuel efficiency\*2 × number of vehicles owned\*3 × average annual mileage\*4 × average gasoline price in each year)\*5

\*2 Difference in fuel efficiency between hybrid vehicles on the road in the fiscal year and corresponding gasoline vehicle models

\*3 Number of vehicles owned by customers as estimated by Toyota from the number of hybrid vehicles sold each year adjusted for average vehicle age

\*4 Calculated by Toyota estimate

\*5 Nationwide average gasoline price in each year in Japan calculated by the Oil Information Center, the Institute of Energy Economics Japan

### Environmental Efficiency (Sales/Environmental Footprint)

#### CO<sub>2</sub> Index for Vehicle Production (for 10 Plants Only)

Third Party Assurance

FY	2012	2013	2014	2015	2016
Index	284	311	319	342	337
(billion yen)					
Sales	9,760	11,040	11,210	11,590	11,480

• Sales/CO<sub>2</sub> emissions is used as an index, with FY1990 as 100

#### Waste Index for Vehicle Production

Third Party Assurance

FY	2012	2013	2014	2015	2016
Index	585	628	654	612	600
(billion yen)					
Sales	9,760	11,040	11,210	11,590	11,480

• Sales/waste emissions is used as an index, with FY1990 as 100

# Independent Practitioner's Assurance Report

**Deloitte.**

デロイト トーマツ

(TRANSLATION)

## Independent Practitioner's Assurance Report

August 8, 2017

Mr. Akio Toyoda,  
President,  
Toyota Motor Corporation

Masahiko Sugiyama  
Representative Director  
Deloitte Tohmatsu Sustainability Co., Ltd.  
3-3-1, Marunouchi, Chiyoda-ku, Tokyo

We have undertaken a limited assurance engagement of the quantitative environmental information (the "quantitative environmental information") indicated with **Third Party Assurance** for the year ended March 31, 2017 included in the "Environmental Report 2017" (the "Report") of Toyota Motor Corporation (the "Company").

### The Company's Responsibility

The Company is responsible for the preparation of the quantitative environmental information in accordance with the calculation and reporting standard adopted by the Company (as described in the footnotes of graphs and tables, etc., included in the quantitative environmental information). CO<sub>2</sub> emissions quantification is subject to inherent uncertainty for reasons such as incomplete scientific knowledge used to determine emissions factors and numerical data.

### Our Independence and Quality Control

We have complied with the independence and other ethical requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior. We apply International Standard on Quality Control 1, *Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance and Related Services Engagements*, and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

### Our Responsibility

Our responsibility is to express a limited assurance conclusion on the quantitative environmental information based on the procedures we have performed and the evidence we have obtained. We conducted our limited assurance engagement in accordance with the International Standard on Assurance Engagements ("ISAE") 3000, *Assurance Engagements Other than Audits or Reviews of Historical Financial Information*, issued by the International Auditing and Assurance Standards Board ("IAASB"), ISAE 3410, *Assurance Engagements on Greenhouse Gas Statements*, issued by the IAASB and the *Practical Guideline for the Assurance of Sustainability Information*, issued by the Japanese Association of Assurance Organizations for Sustainability Information.

The procedures we performed were based on our professional judgment and included inquiries, observation of processes performed, inspection of documents, analytical procedures, evaluating the appropriateness of quantification methods and reporting policies, and agreeing or reconciling with underlying records. These procedures also included the following:

- Evaluating whether the Company's methods for estimates are appropriate and had been consistently applied. However, our procedures did not include testing the data on which the estimates are based or reperforming the estimates.
- Undertaking site visits to assess the completeness of the data, data collection methods, source data and relevant assumptions applicable to the sites.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had we performed a reasonable assurance engagement.

### Limited Assurance Conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the Company's quantitative environmental information is not prepared, in all material respects, in accordance with the calculation and reporting standard adopted by the Company.

The above represents a translation, for convenience only, of the original Independent Practitioner's Assurance report issued in the Japanese language.

Member of  
Deloitte Touche Tohmatsu Limited



## TOYOTA MOTOR CORPORATION

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