2013 CALIFORNIA GREEN INNOVATION INDEX

5TH EDITION

NEXT 10

NEXT 10'S *CALIFORNIA GREEN INNOVATION INDEX* TRACKS THE STATE'S PROGRESS IN REDUCING GHG EMISSIONS, GENERATING TECHNOLOGICAL AND BUSINESS INNOVATION, AND GROWING BUSINESSES AND JOBS THAT ENABLE THE TRANSITION TO A MORE RESOURCE-EFFICIENT ECONOMY AS CALIFORNIA ADOPTS INNOVATIVE ENERGY AND EMISSIONS POLICIES. THE 2013 INDEX IS THE FIFTH EDITION PUBLISHED BY NEXT 10.

NEXT 10 IS AN INDEPENDENT NONPARTISAN ORGANIZATION THAT EDUCATES, ENGAGES AND EMPOWERS CALIFORNIANS TO IMPROVE THE STATE'S FUTURE.

NEXT 10 WAS FOUNDED IN 2003 BY BUSINESSMAN AND PHILANTHROPIST F. NOEL PERRY. NEXT 10 IS FOCUSED ON INNOVATION AND THE INTERSECTION BETWEEN THE ECONOMY, THE ENVIRONMENT, AND QUALITY OF LIFE ISSUES FOR ALL CALIFORNIANS. WE PROVIDE CRITICAL DATA TO HELP INFORM THE STATE'S EFFORTS TO GROW THE ECONOMY AND REDUCE CARBON EMISSIONS.

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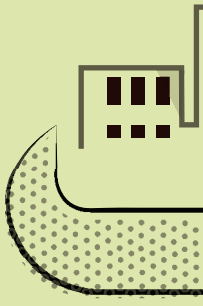

NEXT 10 CALIFORNIA GREEN INNOVATION INDEX.
Population Data Source: California Department of Finance
Gross Domestic Product Data Source: Bureau of Economic Analysis. California Department of Finance.
Green House Gas Emissions Data Source: California Air Resources Board, "California Greenhouse Gas Inventory – by Sector and Activity." California Department of Finance.
Carbon Economy Data Source: California Air Resources Board, "California Greenhouse Gas Inventory – by Sector and Activity." Bureau of Economic Analysis.

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CALIFORNIA'S CARBON ECONOMY

GROSS DOMESTIC PRODUCT

(INFLATION ADJUSTED TO 2012 DOLLARS)

2011 **$2.0** TRILLION

1.9% AVERAGE ANNUAL GROWTH 1990 – 2011

2011 **$53,066** PER CAPITA GDP

Gross Domestic Product (GDP) is a way of measuring the size of an economy, and is calculated by summing the value added from all industries in the economy. This measure can be used for a country as well as a state.

RATIO OF GHG EMISSIONS (METRIC TONS) TO GDP ($10,000)

1990 **3.19** 2010 **2.28**

California's Greenhouse Gas Emissions: Gross greenhouse gas emissions includes fossil fuel carbon dioxide (CO_2), with electric imports and international fuels (CO_2 only) and noncarbon GHG emissions (in CO_2 equivalents).

RN A

POPULATION

2012 **37.68** MILLION

1990 – 2012 **1.1%**

AVERAGE ANNUAL GROWTH RATE

PER CAPITA GHG EMISSIONS

2010 **12.1**

(MILLION METRIC TONS OF CO_2 EQUIVALENT)

AB 32 TARGETS

TOTAL GHG EMISSIONS

2020 **427**

(MILLION METRIC TONS OF CO_2 EQUIVALENT)

Assembly Bill 32: the "California Global Warming Solutions Act of 2006." AB 32 has put California at the forefront of climate change policy by requiring the state to reduce its greenhouse gas (GHG) emissions to 1990 levels by 2020.

TOTAL GHG EMISSIONS

1990 **427** 2010 **451.6**

0.24% AVERAGE ANNUAL GROWTH 1990–2010

(MILLION METRIC TONS OF CO_2 EQUIVALENT)

Dear Californians,

It is my pleasure to release Next 10's fifth edition of the *California Green Innovation Index*. Since 2008, the Index has tracked economic impacts of innovative state policies that reduce carbon emissions.

Trends identified in this year's Index indicate that California's clean economy is diversifying and advancing. A leader in clean technology patents, energy productivity and efficiency, California's performance in these areas continues to grow. Overall investments in clean industries have fallen, as their financing models are shifting.

California has a long history in implementing innovative environmental and energy policies that have driven positive activity in our overall economy.. It all began in 1947 with the creation of the first Air Pollution Control Board in Los Angeles. Today California remains at the forefront, developing programs that are replicated in other states, the nation, and the world. Recent milestones include:

» The California Air Resources Board conducted its first two AB 32 cap-and-trade allowance auctions, lawmakers determined a framework for spending auction revenues, and the CPUC established how utilities will distribute auction proceeds to ratepayers.

» The California Public Utilities Commission (CPUC) voted to change the five percent net metering cap calculation, potentially doubling the number of homeowners and businesses that may receive financial credit for solar power that they provide to the grid.

» Voters passed Proposition 39, which will provide $550 million in annual funding for energy efficiency and clean energy programs.

Historically, policies like these have helped California become among the most efficient and least carbon intensive economies in the world. Long term, we have seen GDP rise and emissions per capita fall. California's renewable energy generation continues to surpass previous year records.

The 2013 California Green Innovation Index documents the progress being made toward meeting the state's 2020 emission reduction target. However, the path to achieving the state's longer-term 2050 goal will require significant technological advances. As this important work is being done, we will continue to track it.

Best regards,

F. Noel Perry

F. Noel Perry
Founder, Next 10

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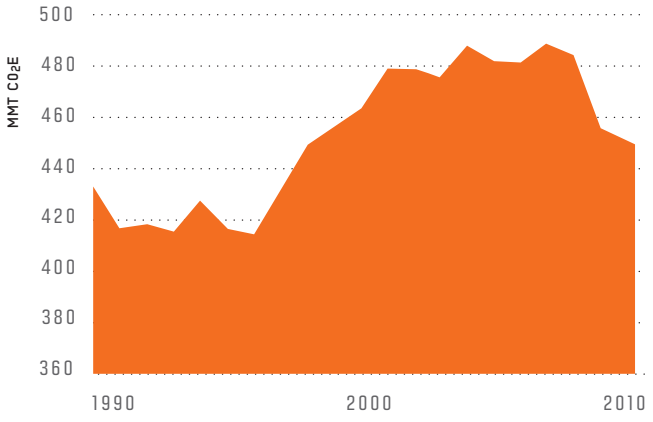
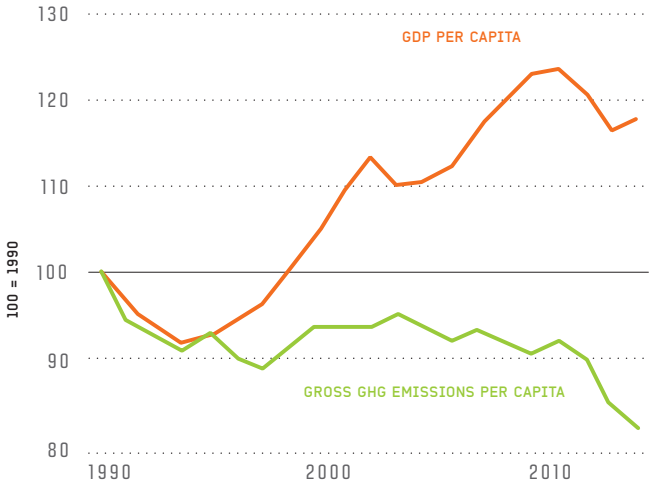
GHG EMISSIONS _PAGE 19



Greenhouse gas emissions in California continued to fall from their 2008 peak to 451.6 million metric tons of carbon dioxide equivalent in 2010, a 1.4 percent drop from 2009 and seven percent decrease in the last five years.

5 year
-7%

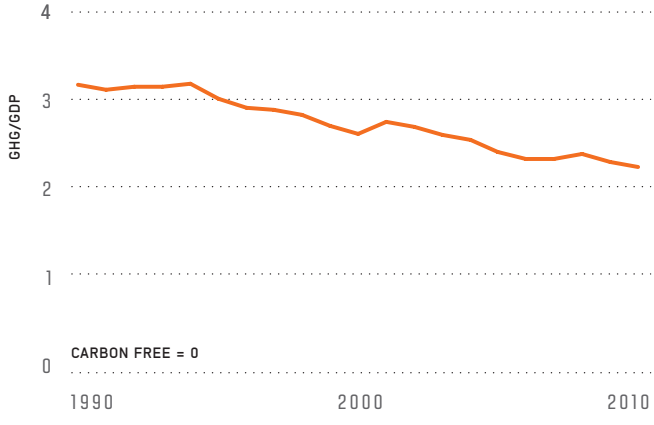
GDP & EMISSIONS _PAGE 16



Emissions per capita maintained their downward trend in 2010, dropping two percent from 2009 while GDP increased 0.3 percent over the same period, highlighting California's progress in becoming more carbon efficient while increasing economic output.

5 year
-6%
-10%

CARBON ECONOMY _PAGE 16



California continues to move towards a carbon free economy with a 2.3 percent decrease in emissions per dollar of GDP from 2009 to 2010.

5 year
-3.4%

VMT & EMISSIONS _PAGE 40

PERCENT CHANGE 2006-2010	
VMT PER CAPITA	-3.6%
SURFACE TRANSPORTATION GHG EMISSIONS PER CAPITA	-9.8%

Greenhouse gas emissions from transportation and vehicle miles traveled (VMT) per person both declined over the last five years, though from 2009 to 2010 VMT per capita increased by 0.3 percent while emissions decreased by about one percent.

ENERGY EFFICIENCY: CALIFORNIA PIONEERED ENERGY POLICIES THAT HAVE SPURRED LARGE IMPROVEMENTS IN ENERGY EFFICIENCY. THE STATE HAS ACHIEVED THIS IMPROVEMENT WHILE GROWING THE ECONOMY AND LOWERING ENERGY BILLS FOR CONSUMERS.

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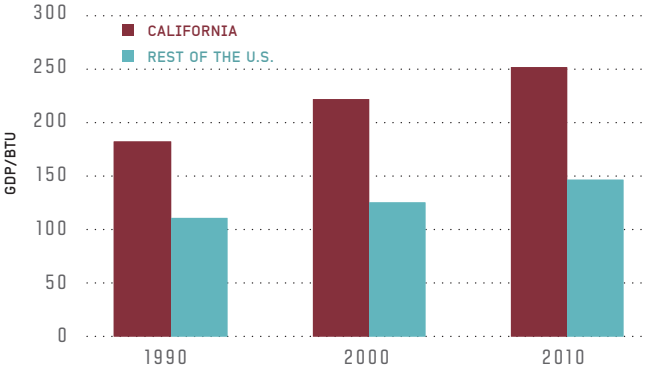
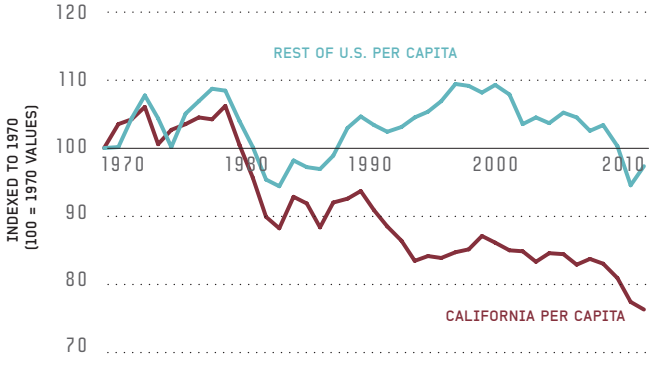


Energy productivity measures the GDP produced (output) for each unit of energy consumed (input). California created 1.7 times as much economic activity as the rest of the U.S. with the same amount of energy in 2010, a three percent improvement in the past five years.

ENERGY CONSUMPTION _PAGE 22

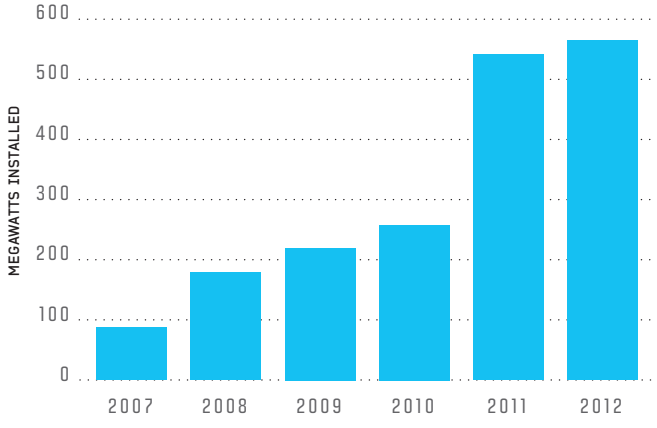
TOTAL ENERGY CONSUMPTION RELATIVE TO 1970



California's energy consumption per person has decreased substantially over the long term, falling nine percent in the last five years alone. California achieved a 24 percent reduction since 1970, compared to a three percent reduction in the rest of the U.S.

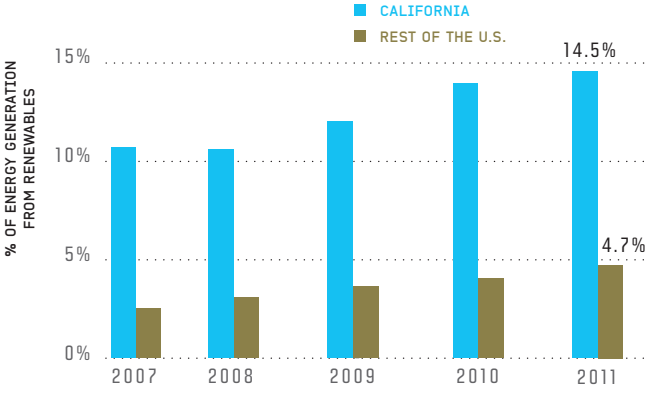
RENEWABLE ENERGY: CALIFORNIA CONTINUES TO SURPASS PREVIOUS YEAR RECORDS AND INSTALL MORE RENEWABLE ENERGY SYSTEMS.

NEW SOLAR INSTALLATIONS _PAGE 28



California installed a record level of solar power in 2012, with over three times more new solar installations compared to 2008.

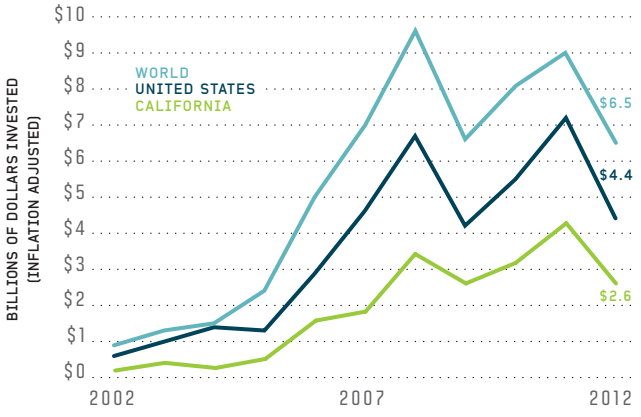
RENEWABLES _PAGE 25



Renewable electricity generation reached new levels with 14.5 percent of total electricity generation in 2011, three times the percentage of the U.S. as a whole. California renewable electricity has increased 3.8 percentage points in the last five years.

CLEAN TECHNOLOGY INNOVATION: CALIFORNIA CONTINUES TO LEAD CLEAN TECHNOLOGY INNOVATION, WITH ITS COMPANIES RECEIVING THE MOST INVESTMENT AND PATENTS IN THE NATION AND WORLD. DESPITE THE RECENT DECREASE IN VENTURE CAPITAL, THE CLEAN TECHNOLOGY SECTOR HAS BEEN RESILIENT AND NEW INVESTORS AND FINANCING TYPES HAVE EMERGED.

CLEANTECH VC _PAGE 31

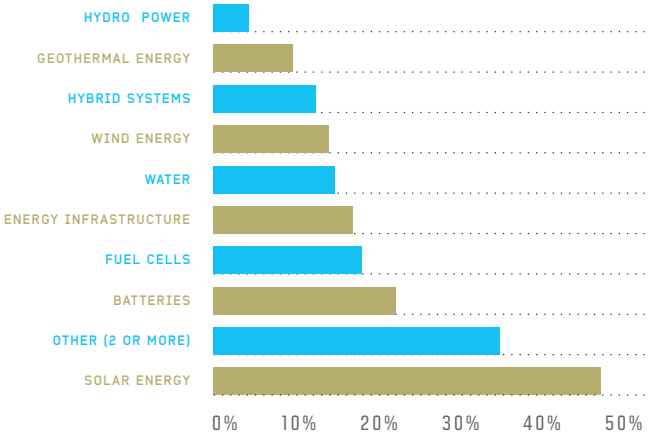


Clean technology venture capital declined in 2012, though investment in California declined less than the U.S. or World since 2008 and remains above pre-2008 levels.

-32%
-35%
-24%
5 year

CLEAN TECHNOLOGY PATENTS _PAGE 34

CA % OF U.S. PATENTS, 2010-2011



CLEAN TECHNOLOGY INNOVATION _PAGE 33

CALIFORNIA CLEAN TECHNOLOGY PATENTS (2010 - 2011)

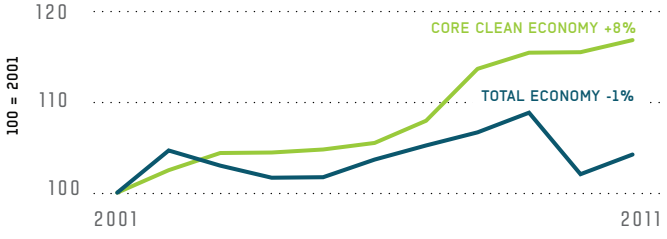
PATENT TECHNOLOGY	NUMBER OF PATENTS	CALIFORNIA NATIONAL RANKING
TOTAL CLEAN TECHNOLOGY PATENTS	913	1
BATTERIES	230	1
WATER	166	1
SOLAR ENERGY	273	1
FUEL CELLS	133	2
HYBRID SYSTEMS	61	2
ENERGY INFRASTRUCTURE	28	1

California leads the nation in clean technology patent registrations, achieving the highest or second highest amount compared to other states in all segments. California registered twice as many clean technology patents compared to five years ago.

5 year
+108%

EMPLOYMENT IN THE CORE CLEAN ECONOMY: CALIFORNIA'S POLICIES, INVESTMENTS, AND CONSUMER HABITS ARE DRIVING GROWTH IN THE CLEAN ECONOMY, CREATING JOBS IN BUSINESSES THAT KEEP THE STATE ON THE LEADING EDGE OF A MORE EFFICIENT AND COMPETITIVE ECONOMY.

EMPLOYMENT GROWTH _PAGE 42



Jobs in California's Core Clean Economy had a stronger recovery than the California economy as a whole from the recent economic crisis, with a 2.8 percent increase in employment compared to 2.3 percent decrease in the total employment between January 2008 and January 2011. The total economy rebounded recently, up two percent since January 2010, while the Core Clean Economy increased about one percent.

+8%
-1%
5 year

CALIFORNIA'S PAST AND FUTURE

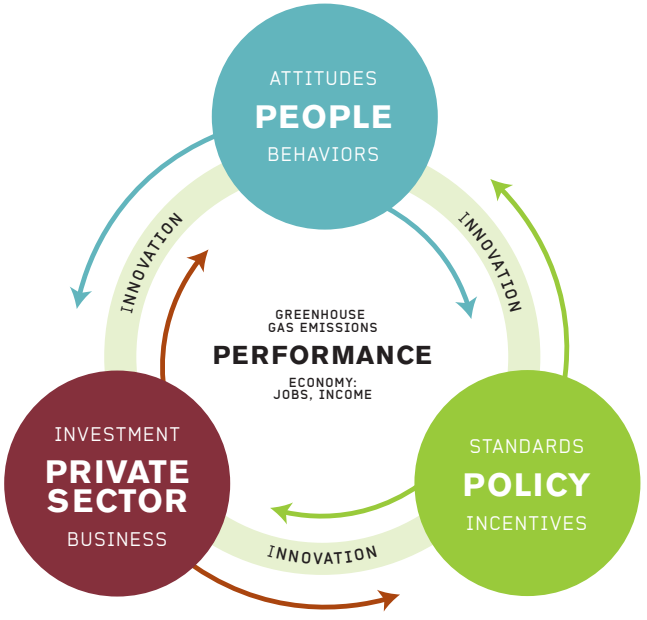
INNOVATION DRIVING CALIFORNIA'S CLEAN ECONOMY

California is known for being at the forefront of innovation, spurring change in industries of all shapes and sizes. The clean technology sector is no exception, with California leading the way in technology and policy breakthroughs in energy efficiency, clean transportation, and renewable energy. By growing its clean technology economy, California demonstrates that economic prosperity and environmental protection are not mutually exclusive concepts. The *California Green Innovation Index* provides data that show economic growth can be achieved while protecting our limited natural resources and that California's clean economy is diversifying and advancing.

California's clean technology sector has shown resilience even during the recent recession, with continued innovation and deployment of products and services while becoming more diverse and mature. Innovation in clean technology, a key component to growing the sector, is a shared responsibility and results from the interactions among government, the private sector, and individuals. As one breakthrough triggers another, momentum grows, and the innovation process advances.

Government adopts new policies, which create an environment that encourages both private sector and individual innovation. At the same time, government policy is influenced by the emergence of new technologies, products, and business practices in the marketplace. Elected officials also advance policy innovations in response to growing concerns from the public.

Private sector businesses respond to government standards and incentives as well as global market forces (like the price of oil). Businesses pursue innovations to meet emerging industry and consumer demand for more sustainable products and practices. These innovations not only help advance the bottom line, but also create jobs, help inform policy, and change individual behavior by offering tangible clean technology products. The private sector also includes a diverse mix of nonprofit groups that promote changes in government policy, business practices, and individual behaviors.

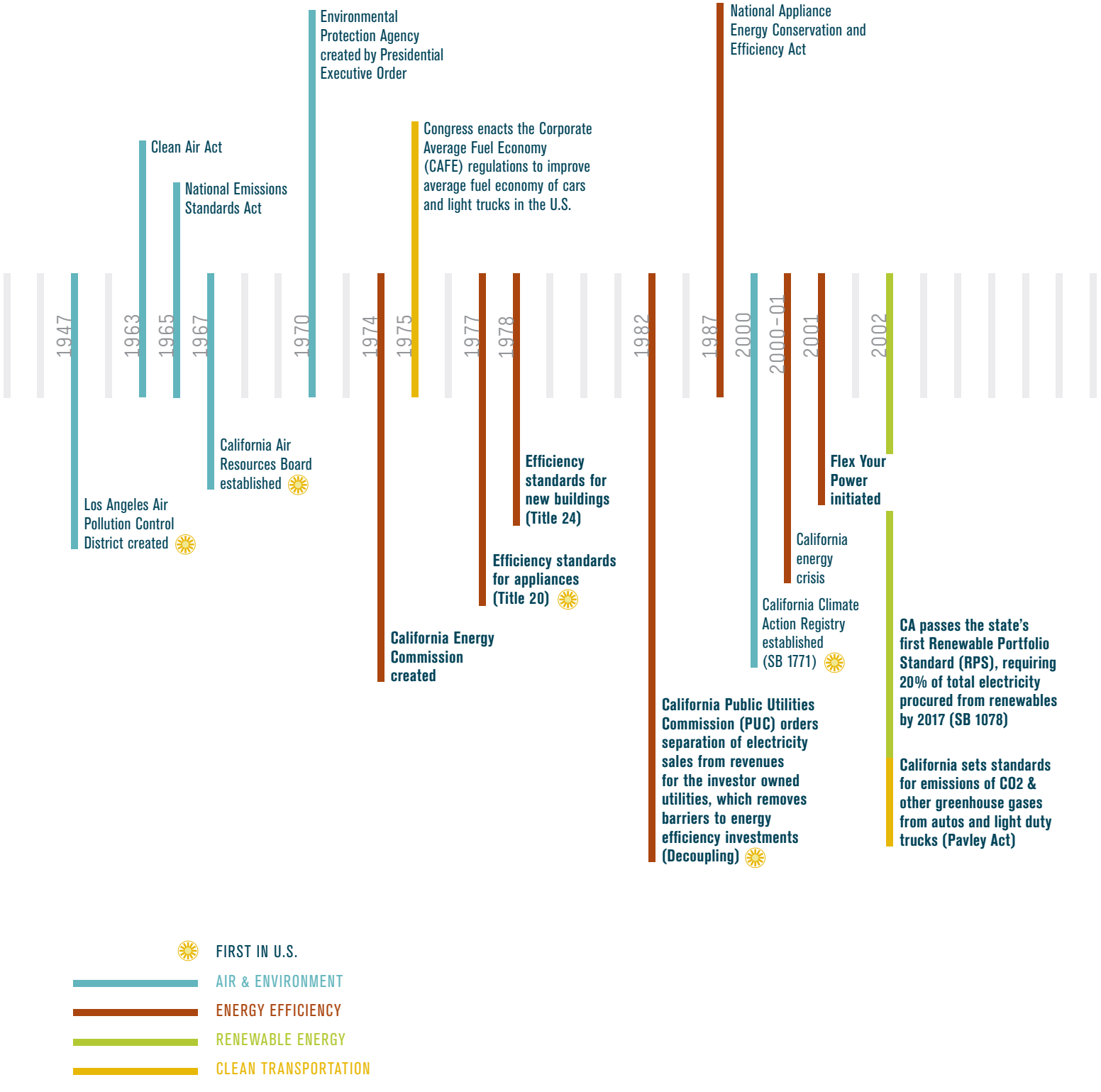


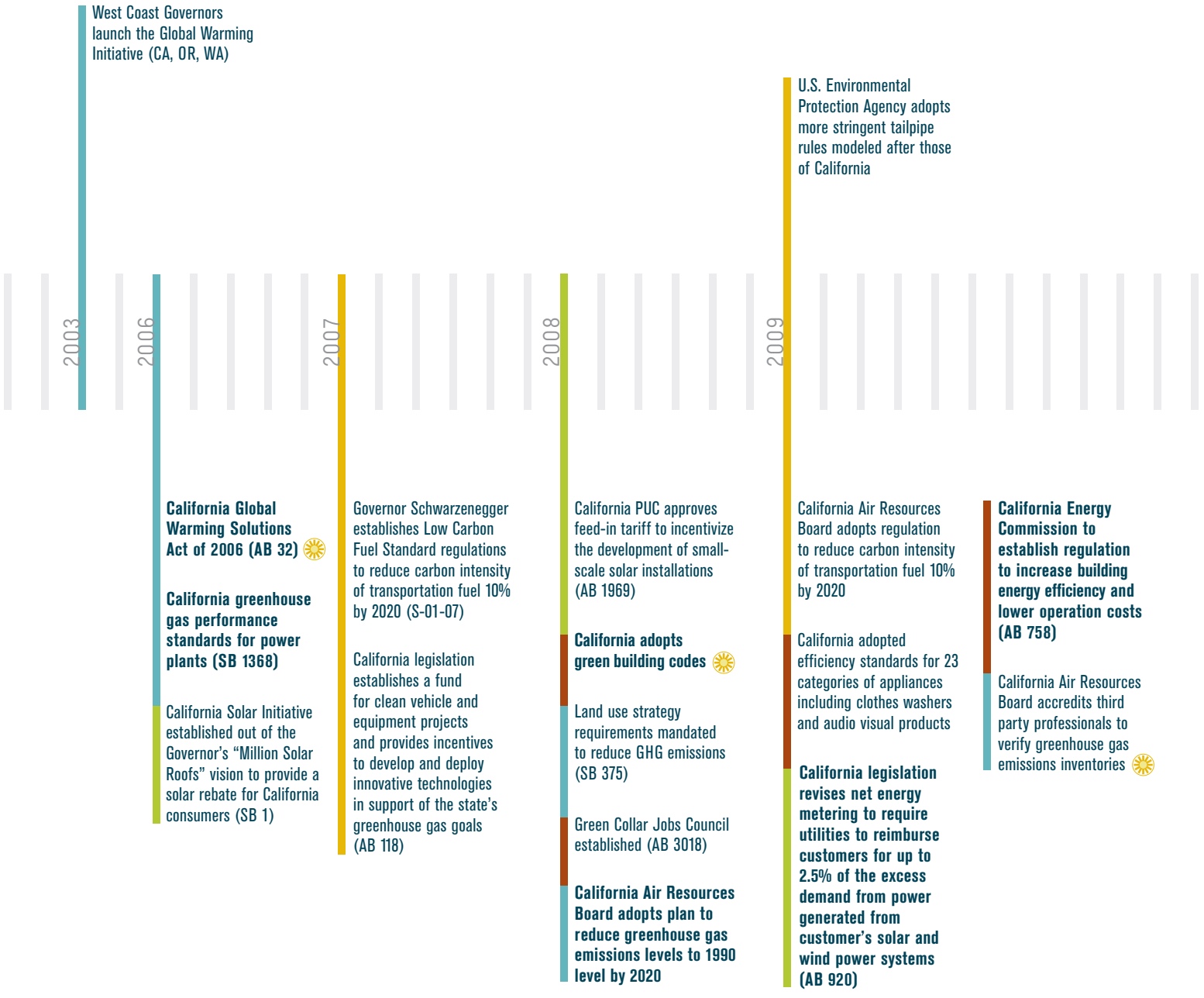
Individuals not only respond to government incentives and the availability of new products, but also influence the direction of policy through the political process. They also generate demand for more sustainable products in the marketplace.

The progress made in California's clean technology sector shows that a clean economy is not just about a single technology, company, or policy. As the following sections will show, new investors are emerging, private sector businesses are maturing, technologies are advancing, and policies are driving the state forward.

POLICY TIMELINE

For decades, California has been a national and global leader in innovative environmental and energy policy. Since 1947, California has implemented policies and programs that have been replicated in other states and used as a model for federal legislation. Responding to the energy crisis in the 1970s, California adopted groundbreaking building and appliance standards. California continues to build upon these landmark policies today. The policy innovations documented in the timeline are the product of combined efforts by public leaders, business leaders, grassroots organizations, and voters (see next pages).


1947
Los Angeles Air Pollution Control District created
1963
Clean Air Act
1965
National Emissions Standards Act
1967
California Air Resources Board established
1970
Environmental Protection Agency created by Presidential Executive Order
1974
California Energy Commission created
1975
Congress enacts the Corporate Average Fuel Economy (CAFE) regulations to improve average fuel economy of cars and light trucks in the U.S.
1977
Efficiency standards for appliances (Title 20)
1978
Efficiency standards for new buildings (Title 24)
1982
California Public Utilities Commission (PUC) orders separation of electricity sales from revenues for the investor owned utilities, which removes barriers to energy efficiency investments (Decoupling)
1987
National Appliance Energy Conservation and Efficiency Act
2000
California Climate Action Registry established (SB 1771)
2000-01
California energy crisis
2001
Flex Your Power initiated
2002
CA passes the state's first Renewable Portfolio Standard (RPS), requiring 20% of total electricity procured from renewables by 2017 (SB 1078)
California sets standards for emissions of CO2 & other greenhouse gases from autos and light duty trucks (Pavley Act)
FIRST IN U.S.
AIR & ENVIRONMENT
ENERGY EFFICIENCY
RENEWABLE ENERGY
CLEAN TRANSPORTATION


2003
West Coast Governors launch the Global Warming Initiative (CA, OR, WA)
2006
California Global Warming Solutions Act of 2006 (AB 32)
California greenhouse gas performance standards for power plants (SB 1368)
California Solar Initiative established out of the Governor's "Million Solar Roofs" vision to provide a solar rebate for California consumers (SB 1)
2007
Governor Schwarzenegger establishes Low Carbon Fuel Standard regulations to reduce carbon intensity of transportation fuel 10% by 2020 (S-01-07)
California legislation establishes a fund for clean vehicle and equipment projects and provides incentives to develop and deploy innovative technologies in support of the state's greenhouse gas goals (AB 118)
2008
California PUC approves feed-in tariff to incentivize the development of small-scale solar installations (AB 1969)
California adopts green building codes
Land use strategy requirements mandated to reduce GHG emissions (SB 375)
Green Collar Jobs Council established (AB 3018)
California Air Resources Board adopts plan to reduce greenhouse gas emissions levels to 1990 level by 2020
2009
U.S. Environmental Protection Agency adopts more stringent tailpipe rules modeled after those of California
California Air Resources Board adopts regulation to reduce carbon intensity of transportation fuel 10% by 2020
California adopted efficiency standards for 23 categories of appliances including clothes washers and audio visual products
California legislation revises net energy metering to require utilities to reimburse customers for up to 2.5% of the excess demand from power generated from customer's solar and wind power systems (AB 920)
California Energy Commission to establish regulation to increase building energy efficiency and lower operation costs (AB 758)
California Air Resources Board accredits third party professionals to verify greenhouse gas emissions inventories

2010

California Air Resources Board finalizes regulation of Palvey Act from greenhouse gas emissions from passenger vehicle

California raises cap on net metering from 2.5% to 5% (AB 510)

Clean technology manufacturing equipment is exempt from sales tax (SB 71)

2011

U.S. Department of Transportation, U.S. Environmental Protection Agency and California Air Resources Board announce a unified timeframe for CAFE and greenhouse gas standards for cars and trucks model year 2017-2025 so that automakers can work towards a single national program

The President Obama administration and 13 major automakers agree to raise CAFE standards up from 27 to an average of 54.5 miles per gallon by 2025

California legislation increases the state's RPS to require all retail sellers of electricity and all publicly owned utilities to procure at least 33% of electricity delivered to their retail customers from renewable resources by 2020, the most ambitious standard in the country (SB X1-2)

California legislation passes the Renewable Energy Equity Act (SB 489), which expands the Net Energy Metering Program to all eligible forms of renewable energy allowing small-scale renewable energy producers to participate

Governor Brown announces Clean Energy Jobs Plan which calls for 12,000 megawatts to come from localized energy sources and 8,000 megawatts of large scale renewable & necessary transmission lines goals by 2020

The Western Climate Initiative Inc, a nonprofit corporation with officials from the provinces of Quebec and British Columbia and the State of California, is formed to provide administrative and technical services to support the implementation of greenhouse gas emissions trading programs

California legislation extends the Self-Generation Incentive Program (AB 1150), which helps customers switch to clean energy and provides a bridge for clean energy technologies to scale up and drive down costs

California legislation aims to reduce pollution and waste by more than 15 million tons annually; establishing a new statewide goal of 75% source reduction, recycling and composting by 2020 (AB 341), the highest in the nation

California leads the nation in solar energy installations, with a total of over 1,000 megawatts installed at homes and businesses in the state, nearly a third of total installations in 2011

2012

U.S. Environmental Protection Agency and the National Highway Traffic Safety Administration issued a final rule that raises average CAFE standards for cars and light-duty trucks to 54.5 miles per gallon by 2025

California Air Resources Board passes the Advanced Clean Car Rules to be attained by 2025, including a mandate for manufacturers to produce 1.4 million zero-emissions vehicles, in addition to a 75% reduction in smog-forming pollutants and a 34% reduction in greenhouse gas emissions

Governor Brown reinforces the Air Resources Board's clean car rules by issuing an executive order for 1.5 million zero-emission vehicles and supporting infrastructure to be operating in California by 2025 (B-16-12)

California PUC effectively doubles the amount of solar power utilities will purchase from homeowners and businesses by adjusting how electricity generation is calculated under the net metering program

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ENERGY EFFICIENCY
RENEWABLE ENERGY
CLEAN TRANSPORTATION

2013

California Air Resources Board issues final regulations on the Low Carbon Fuel Standard

California established the Greenhouse Gas Reduction Fund as a special fund in the State Treasury and requires state agencies to prepare a record in support of auction revenue expenditures to ensure consistency in reporting and accounting (SB 1018)

California passes two laws to establish a process for spending revenue generated from the state's cap-and-trade program. The laws require the revenue to be spent for environmental purposes, with an emphasis on improving air quality, and that at least 25% of the revenue be spent on programs that benefit disadvantaged communities. (AB 1532 and SB 535)

California standardizes and limits the fees city and county governments can charge on building permits for rooftop solar (SB 1222)

Voters pass Prop 39, the Clean Energy Jobs Act to provide an estimated $500 million annually for five years for energy efficiency and clean energy programs, such as retrofits of schools and government buildings

California Air Resources Board conducts its first auction for emissions allowances under its cap-and-trade program as authorized by AB 32

California PUC approves nearly $2 billion in energy efficiency program financing over the next two years to enable utilities, local governments, nonprofits, and other implementers to carry out programs to help electric and natural gas utility customers save energy

California PUC approves a plan to distribute 85% of revenue from the sale of greenhouse gas allowances under cap-and-trade from the state's three investor owned utilities to households in a semi-annual credit on their energy bill, a type of "climate dividend," with the remainder allocated to emissions-intensive and trade-exposed industries and small businesses

California Air Resources Board conducts its second auction for emissions allowances under its cap-and-trade program as authorized by AB 32

Governor Brown releases the Zero Emissions Vehicle Action Plan that identifies specific strategies and actions that state agencies will take to meet milestones of the executive order for 1.5 million zero-emission vehicles in California by 2025

UPDATE ON CALIFORNIA'S CAP-AND-TRADE PROGRAM

OVERVIEW

The California Global Warming Solutions Act of 2006 (AB 32) sets an enforceable goal to reduce greenhouse gas emissions to 1990 levels by the year 2020. In order to achieve this goal, the California Air Resources Board (ARB) developed a Scoping Plan, a blueprint that identifies strategies for cutting emissions through technologically feasible actions. One of these strategies is a cap-and-trade program that establishes a declining limit (cap) on the state's largest sources of greenhouse gas emissions. The program is expected to reduce emissions by more than 16 percent between 2013 and 2020 and can help spur innovation in carbon reduction technologies.

California's cap-and-trade system is the first such multi-sector program in the U.S. Under the "cap" portion of this system, regulated entities must turn in one emission allowance for each metric ton of carbon dioxide they emit. The "trade" part of the system refers to a market for buying and selling emissions allowances. For the first few years of the program, a portion of the total emissions allowances needed are given away at no cost to the entities. If the entity emits more greenhouse gases than are covered by the free allowances, it must purchase the difference in the primary market during quarterly allowance auctions held by the state or in the secondary market from a clean-running company that has extra allowances. Between 2013 and 2020, the total number of emissions allowances available in California will decline by two to three percent annually, ensuring that total emissions from the largest emitters will continue to fall.

The cap-and-trade program's open market system incentivizes entities to reduce emissions by allowing them to sell surplus allowances or to avoid purchasing additional credits. At the same time, it allows entities freedom to reduce emissions in the most economically efficient manner they see fit.

ENTITIES COVERED UNDER THE CAP-AND-TRADE PROGRAM

California's cap-and-trade program regulates facilities and companies that operate in the state and emit 25,000 or more metric tons of carbon dioxide equivalent ($MTCO_2e$) per year. In the first two years, only electric power providers and industrial plants are covered. In 2015, fuel distributors that meet the threshold will be brought into the program. As of January 2013, 359 entities were covered under the cap-and-trade program. While this number represents a small fraction of total facilities and companies in California, these firms account for a large portion of the state's facility-level greenhouse gas emissions.

The covered entities are spread throughout California, with an additional 28 located outside of the state that provide imported electricity. The highest concentration of entities within the cap-and-trade program is in the San Joaquin Valley where there are several large manufacturers and power generators. Other areas, such as the North Coast, have fewer than ten firms in the region covered under the cap-and-trade program.

The covered entities operate in a limited range of industries. Table 1 shows that most entities are involved in electricity generation or other direct energy generation activities, such as refining petroleum. About one-third, or 125 entities, are primarily manufacturing plants or mining operations, which are categorized as "Other" or "General Stationary Combustion" in Table 1.[1]

TABLE 1. COVERED ENTITIES BY INDUSTRY SECTOR

INDUSTRY SECTOR	NUMBER OF ENTITIES
ELECTRICITY GENERATION	167
GENERAL STATIONARY COMBUSTION	98
GSC (OIL AND GAS PRODUCTION)	27
OTHER	27
PETROLEUM REFINERY	20
CEMENT PLANT	9
HYDROGEN PLANT	7
COGENERATION FACILITY	4
TOTAL NUMBER OF ENTITIES	359

CAP-AND-TRADE AUCTION

The California ARB successfully held its first cap-and-trade emissions auction for covered entities on November 14, 2012. The minimum price per allowance was set at $10 per ton of carbon and companies paid just over this floor at $10.09 per ton, generating a total of nearly $290 million from the sales. All of the 23.1 million allowances available for 2013 were sold,[2] generating $233.3 million, and

14 percent of the 40 million credits available for 2015 were sold, generating an additional $55.8 million.[3] ARB beat market expectations in its second auction held on February 19, 2013 and sold all of the 13 million allowances available for use in 2013 at $13.62 per ton, generating about $176 million, and sold about half of the future 2016 allowances at $10.71 per ton, raising roughly $83 million.[4]

ALLOCATING THE AUCTION REVENUE

In 2012, California lawmakers passed two laws (AB 1532 and SB 535) that established a framework for spending revenue generated from the cap-and-trade auctions. These laws require auction revenue to be deposited in the Greenhouse Gas Reduction Fund and spent to cut emissions while benefiting the environment and public health.[5] In December 2012, the California Public Utilities Commission (CPUC) approved the nation's first "climate dividend" to distribute 85 percent of revenue from the sale of allowances allocated to investor-owned utilities back to customers as a semi-annual credit to households starting in 2013.[6]

COVERED ENTITIES BY REGION

THE FUTURE OF CALIFORNIA'S CAP-AND-TRADE PROGRAM

California's cap-and-trade system is designed to ensure that the state meets the 2020 emissions goal and moves the state towards meeting its long-term goal to reduce emissions 80 percent below 1990 levels by 2050 (Executive Order S-3-05). The ARB is also working with British Columbia, Ontario, Quebec and Manitoba through the Western Climate Initiative, and Australia to link cap-and-trade programs in an effort to make the program and measures to reduce emissions more cost-effective.

DASHBOARD INDICATORS

Tracking progress in multiple aspects of California's clean technology innovation demonstrates how the state is maintaining its pacesetter position and reveals emerging areas of clean technology innovation. The dashboard indicators track the state's progress in the carbon economy, energy efficiency, renewable energy, clean technology innovation, and transportation. Following the dashboard indicators is a feature that delves into deeper detail on job growth in California's core clean economy.

California ranks among the most efficient and least carbon intensive economies in the world, moving in the direction of carbon free economy while still increasing output. The state has achieved improvements in energy efficiency while growing the economy and lowering energy bills for consumers. Renewable energy installations and generation in the state continue to surpass previous year records. California continues to lead clean technology innovation, with its companies receiving the most investment and patents in the nation and world. This innovation, along with progressive policies, drives the state's progress in implementing clean technology products and services.

THE CARBON ECONOMY

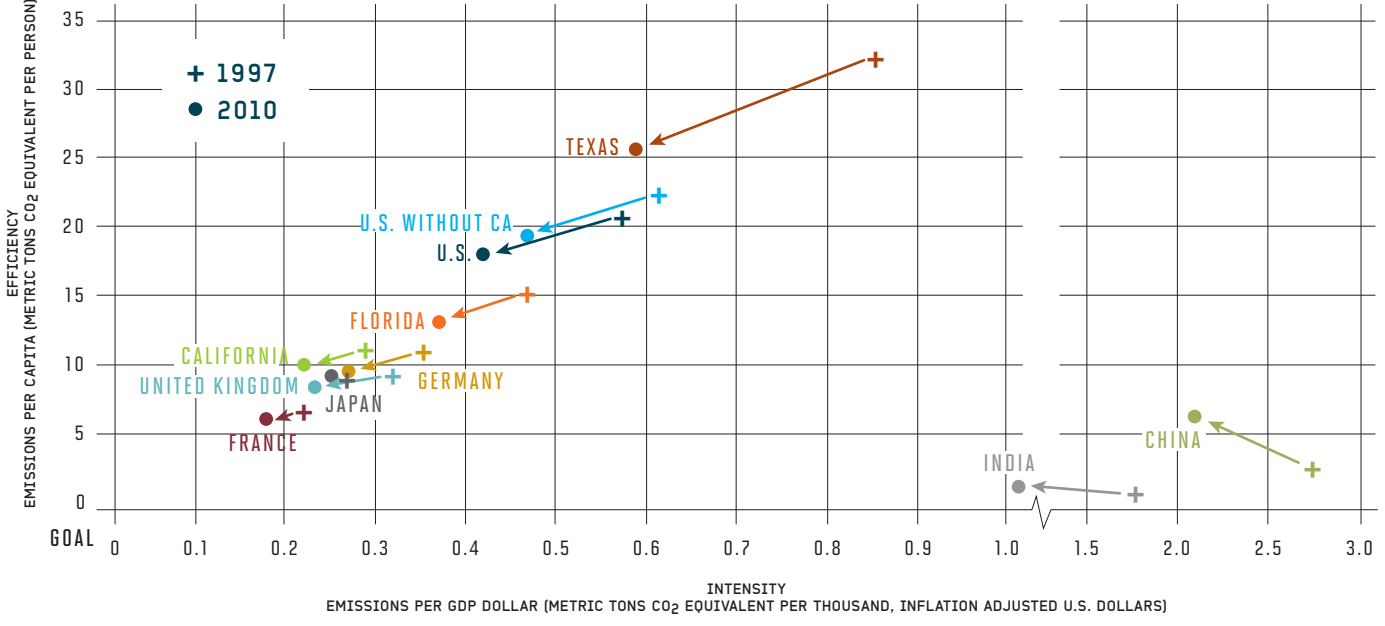
California is a leader among states and other countries in reducing carbon emissions while boosting the economy. California ranks among the most efficient and least carbon intensive economies in the world (Figure 1). California's emissions per dollar of gross domestic product (GDP) dropped by 27 percent since 1997, representing one of the largest improvements in carbon intensity in the nation. California's efficiency also improved with per capita emissions dropping nine percent over the same time period. By comparison, Texas continues to have the highest level of emissions in the nation, but has improved since 1997 with a 31 percent decrease in carbon intensity and 22 percent drop in per capita emissions. In 2010, advanced economies including the United States, Germany, and Japan continued to trend towards a carbon free economy. At the same time, per-capita emissions are rising in carbon-intensive developing economies such as China and India.

WHY IS IT IMPORTANT?

While California has implemented innovative policies to reduce its carbon emissions, the state's economy, as well as the national and international economies, are still dependent on carbon-based energy. In order to meet the state's goals for reducing emissions, it is necessary to find cleaner ways to create and transport our products. Indicators relating to the carbon economy help track this shift and illustrate the changing relationship between economic vitality and environmental quality.

FIGURE 1. GLOBAL FOSSIL FUEL COMBUSTION IN CALIFORNIA AND OTHER REGIONS

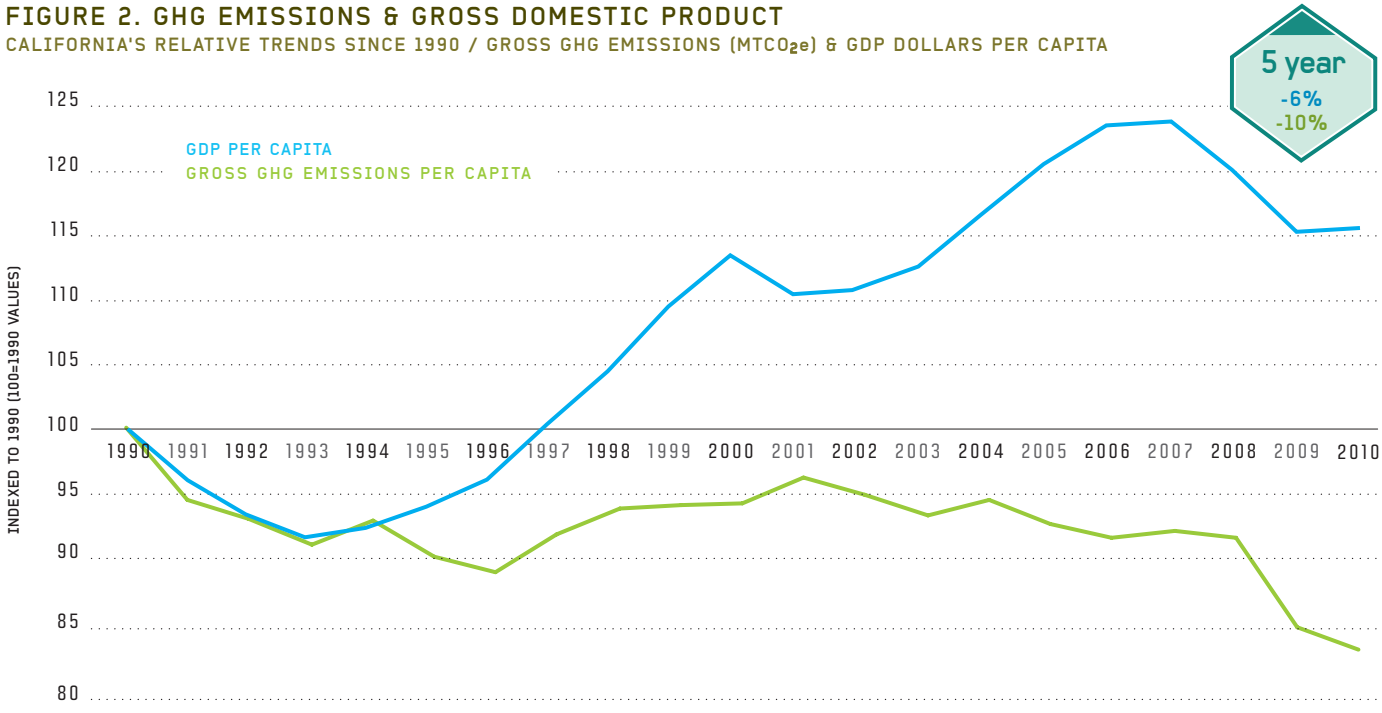
CARBON INTENSITY AND EFFICIENCY 1997 TO 2010



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: U.S. Department of Energy, Energy Information Administration, International Energy Statistics and State CO2 Emissions; Bureau of Economic Analysis, U.S. Department of Commerce; U.S. Census Bureau, Population Estimates Branch; The California Department of Finance. Analysis: Collaborative Economics

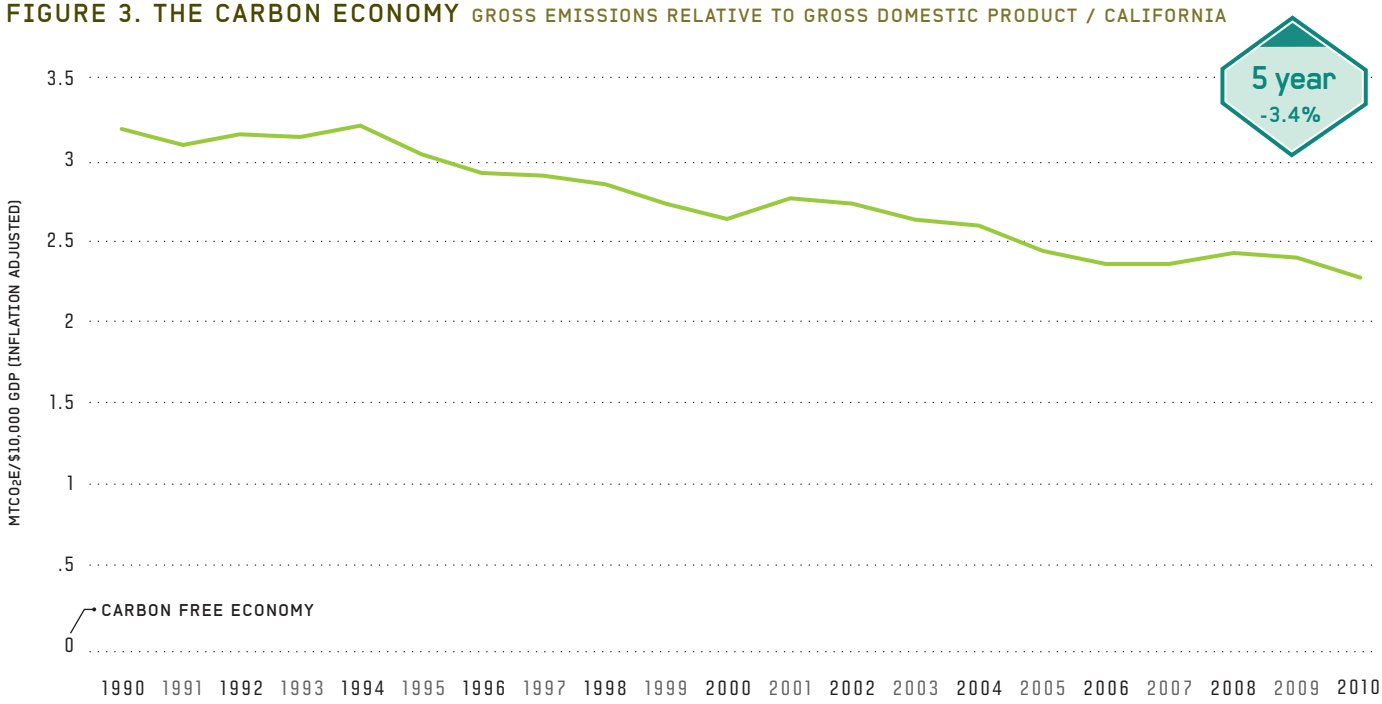
FIGURE 2. GHG EMISSIONS & GROSS DOMESTIC PRODUCT

CALIFORNIA'S RELATIVE TRENDS SINCE 1990 / GROSS GHG EMISSIONS ($MTCO_2e$) & GDP DOLLARS PER CAPITA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: California Air Resources Board, California Greenhouse Gas Inventory – by Sector and Activity; Bureau of Economic Analysis, U.S. Department of Commerce; California Department of Finance. Analysis: Collaborative Economics

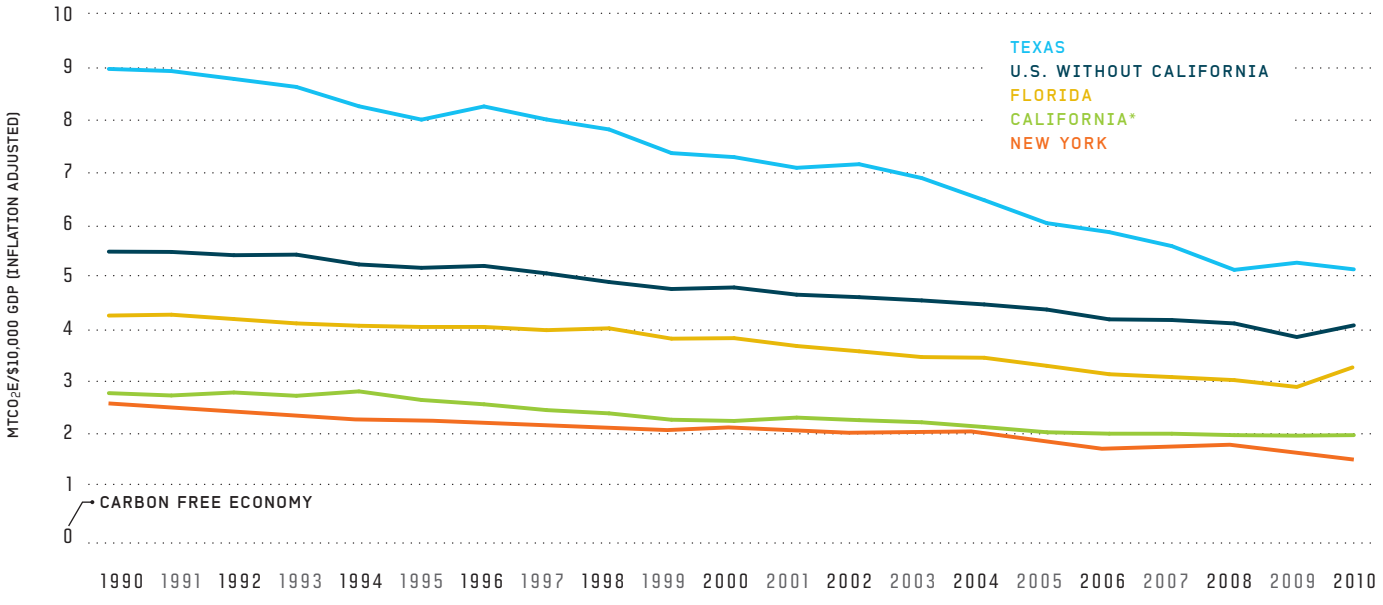
FIGURE 3. THE CARBON ECONOMY GROSS EMISSIONS RELATIVE TO GROSS DOMESTIC PRODUCT / CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: California Air Resources Board, California Greenhouse Gas Inventory – by Sector and Activity; Bureau of Economic Analysis, U.S. Department of Commerce; California Department of Finance. Analysis: Collaborative Economics

FIGURE 4. THE CARBON ECONOMY IN CALIFORNIA & OTHER STATES

GREENHOUSE GAS EMISSIONS ($MTCO_2E$) PER 10,000 DOLLARS GDP (INFLATION ADJUSTED)



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. *GHG emissions data that allows for state-level comparison is from the Energy Information Administration and is limited to carbon emissions (fossil fuel combustion). Therefore, data represented here differs from analyses represented in other charts of total GHG emissions for California. Data Source: Energy Information Administration, U.S. Department of Energy; Bureau of Economic Analysis, U.S. Department of Commerce. Analysis: Collaborative Economics

Emissions per capita in California continued their downward trend in 2010, reaching about 12 $MTCO_2e$ per person, a 17 percent drop since 1990 and a two percent decline since 2009 (Figure 2). Over the same time period, GDP per person increased 16 percent since 1990 and rose 0.3 percent in 2010 after a two-year decline, illustrating how the state has been able to reduce greenhouse gas emissions while growing the economy.

Although the state is powered mostly by fossil fuels, California is improving its' carbon intensity with a steady decrease in emissions per GDP (Figure 3). California emitted 2.3 $MTCO_2e$ per $10,000 of GDP generated in 2010, a 28.4 percent drop from 1990 and a 2.3 percent drop since 2009.

California's economy is one of the least carbon-intensive in the country. In 2010, California had the fifth least carbon dependent economy (emissions per GDP) in the U.S., following New York, Connecticut, Delaware, and Massachusetts (Table 2). California's economy is less carbon dependent than the national average and other large states, as illustrated in Figure 4. California generates less than half the amount of emissions per GDP than Texas, and dropped three percent from 2009 to 2010, while Florida increased emissions per GDP by nine percent. Since 1990, California's carbon intensity declined 30 percent, more than the U.S. average, though less than New York and Texas with 39 percent and 44 percent declines respectively.

TABLE 2. NATIONAL CARBON ECONOMY RANKING

2010 LOWEST CARBON INTENSITY (EMISSIONS/GDP)	
NEW YORK	1
CONNECTICUT	2
DELAWARE	3
MASSACHUSETTS	4
CALIFORNIA	5
FLORIDA	17
TEXAS	33
WYOMING	50

NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. DATA SOURCE: ENERGY INFORMATION ADMINISTRATION, U.S. DEPARTMENT OF ENERGY; BUREAU OF ECONOMIC ANALYSIS, U.S. DEPARTMENT OF COMMERCE; ANALYSIS: COLLABORATIVE ECONOMICS

Total greenhouse gas emissions in California continue to fall from their peak in 2008, decreasing 1.4 percent since 2009 to 451.6 million $MTCO_2e$ (Figure 5). Emissions need to drop another four percent to reach 1990 levels. While California improves, total U.S. emissions rose 3.2 percent from 2009 to 2010 and have increased 10.5 percent since 1990.[7] More recently, the nation has reduced energy-related carbon emissions by 2.4 percent from 2010 to 2011 by curbing coal use and increasing renewable electricity as well as natural gas.[8] Global emissions, in contrast, peaked in 2011, rising 3.2 percent from 2010 levels, as high-growth economies continue to emit greater volumes of greenhouse gases.[9]

In 2010, the transportation sector accounted for the largest portion (38%) of California's greenhouse gas emissions, followed by the electric power and industrial sectors with 21 percent each (Figure 6). These three sectors combined represent 80 percent of the state's emissions. The California ARB collects greenhouse gas emissions data by direct source of emissions rather than by end-user. Figure 7 shows these emissions by detailed direct source.

Transportation 38%: Emissions from all transportation sources account for 38 percent of California's total emissions. Seventy-three percent of transportation emissions come from passenger vehicles and 19 percent from heavy-duty trucks. Other sources, including ships and boats, locomotives, non-road transportation, and domestic (intrastate) aviation, account for the remaining eight percent of total transportation emissions.

Electric Power 21%: Electric power emissions encompass total greenhouse gases related to electricity generation, and their relative proportion of total emissions decreased from 23 percent of the total in 2009 to 21 percent in 2010, as more electricity has come from renewable sources. Emissions from electric power generation (including natural gas and other fuels) consist of 53 percent from in-state generation and 47 percent from electric power imports.

Industrial 21%: Industrial activities account for roughly 21 percent of California's emissions, up from 20 percent of the total in 2009. About one-third of these emissions come from petroleum refining, with industrial manufacturing (22%) and oil & gas extraction (17%) representing the next largest sources. Other emissions from industrial sources include cogeneration, landfills, cement plants, and other sources such as mining.

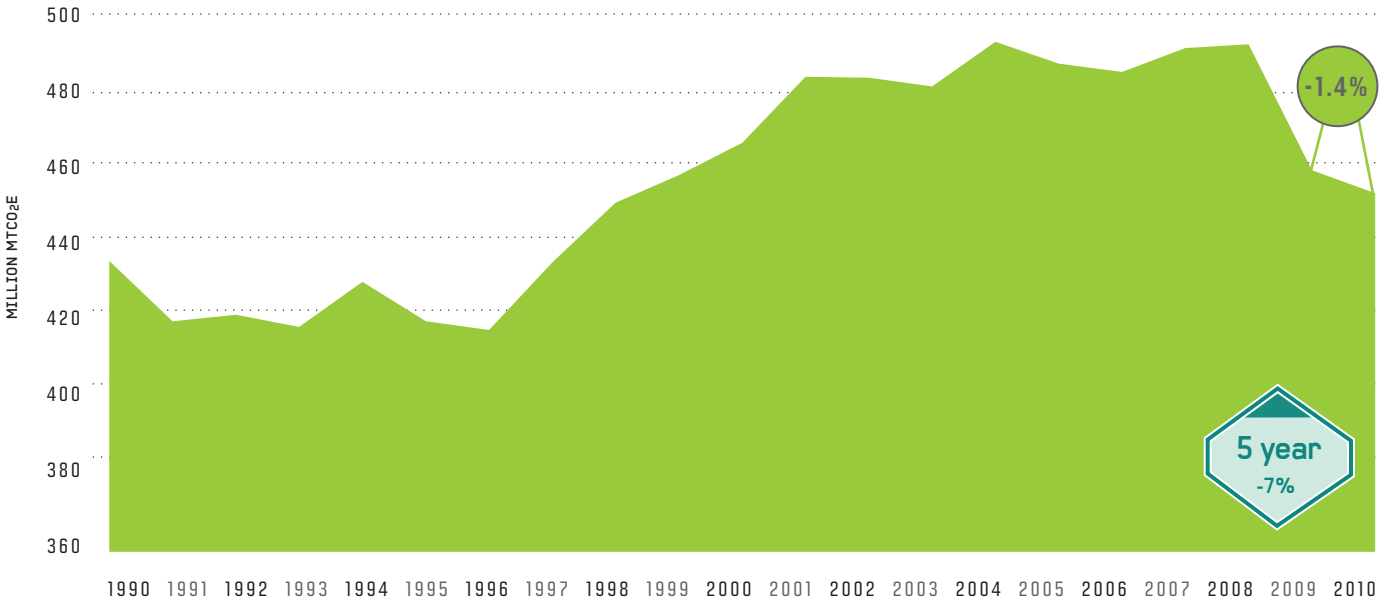
Agriculture and Forestry 7%: Emissions from agriculture & forestry represented seven percent of California's total emissions. Livestock emits over half (60%) of total agriculture and forestry emissions. Crop growth and harvesting accounts for about one-third of emissions, while forest and range management and other sources, such as soil preparation and agricultural residue burning, account for the remainder.

Residential 7%: The residential sector comprises seven percent of total emissions in the state, up from six percent in 2009. Residential sector emissions are from fuel combustion from natural gas and other fuel use to heat houses and buildings, prepare food, and for hot water.

Commercial 3%: Emissions from commercial fuel combustion and cogeneration heat output account for three percent of emissions statewide. The vast majority of these emissions are from fuel combustion from natural gas and other fuel use. Similar to the residential sector, fuel is burned in order to heat buildings, prepare food, and for hot water.

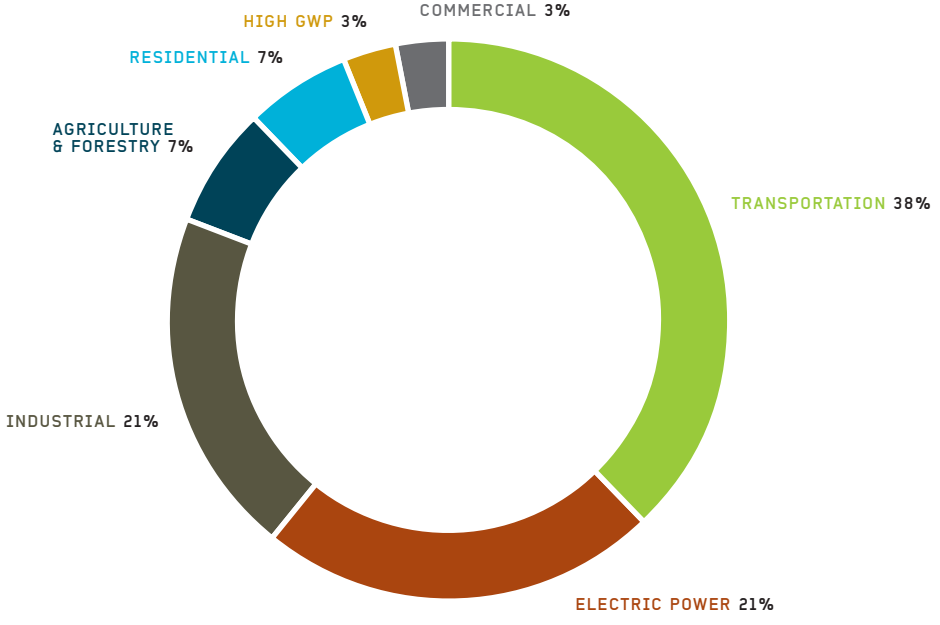
High Global Warming Potentials (GWP) 3%: High GWP and other greenhouse gas emissions make up three percent of California's total. The largest source of high GWP emissions is in the use of substitutes for ozone depleting substances.

FIGURE 5. TOTAL CALIFORNIA GREENHOUSE GAS EMISSIONS GROSS ANNUAL EMISSIONS



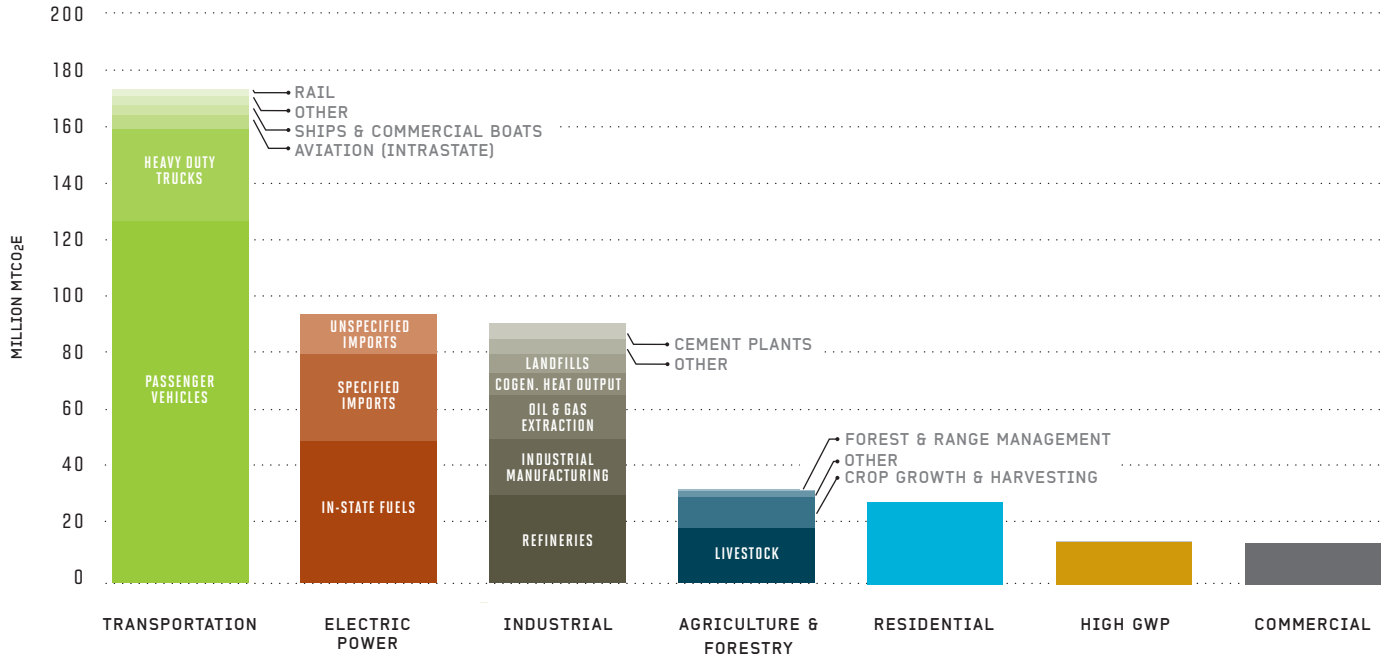
NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Note: Gross greenhouse gas emissions (GHG) includes fossil fuel CO2, with electric imports and international fuels (carbon dioxide equivalents) and noncarbon GHG emissions (in CO2 equivalents). Noncarbon GHG emissions are made up of Agriculture (CH4 and N2O), Soils, ODS substitutes, Semi-conductor manufacture (PFCs), Electric Utilities (SF6). Cement, Other Industrial Processes, Solid Waste Management, Landfill Gas, and Wastewater, Methane from oil and gas systems, Methane and N2O from Fossil Fuel Combustion. Data Source: California Air Resources Board, California Greenhouse Gas Inventory - by Sector and Activity Analysis: Collaborative Economics

FIGURE 6. GREENHOUSE GAS EMISSIONS BY SOURCE CALIFORNIA 2010



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: California Air Resources Board, California Greenhouse Gas Inventory – by Sector and Activity. Analysis: Collaborative Economics

FIGURE 7. GREENHOUSE GAS EMISSIONS BY DETAILED SOURCE CALIFORNIA 2010



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: California Air Resources Board, California Greenhouse Gas Inventory – by Sector and Activity. Analysis: Collaborative Economics

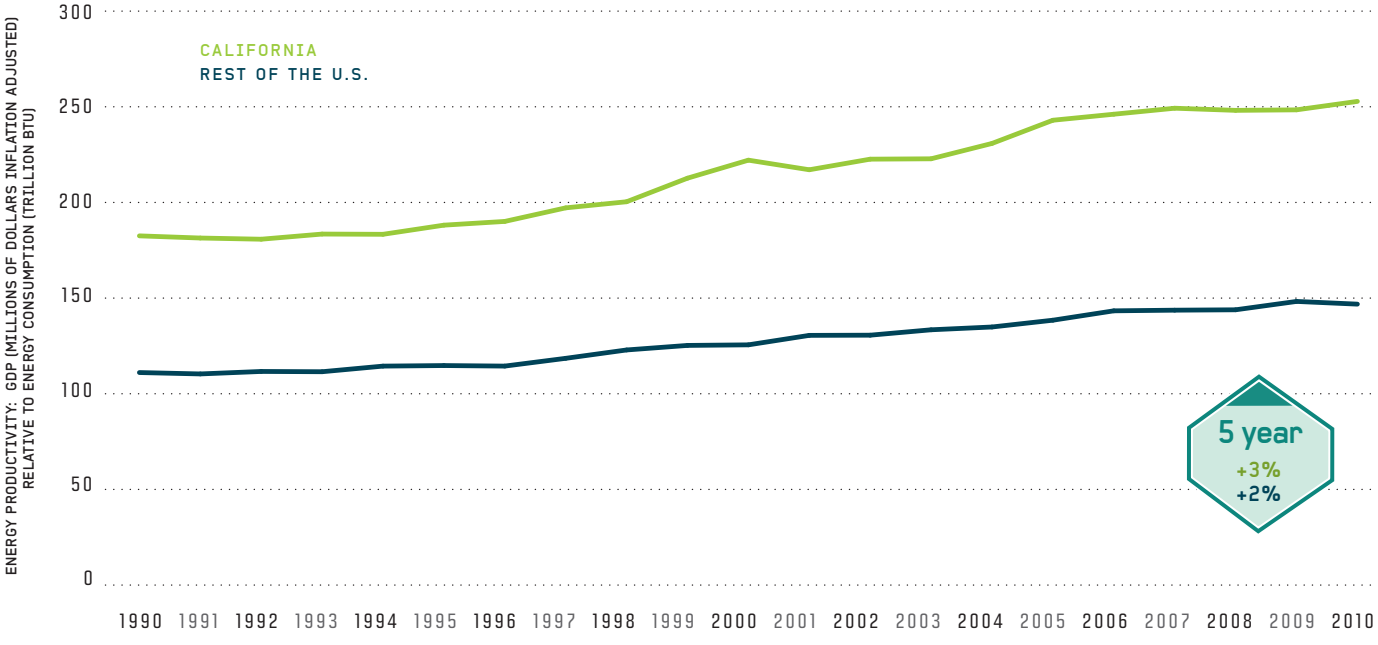
ENERGY EFFICIENCY

California has been at the forefront of energy efficiency policy and business activity since the 1970s. The American Council for an Energy-Efficient Economy ranked California one of the top states in the nation in 2012 for its energy efficiency progress, surpassed only by Massachusetts.[10] California has pioneered policies that promote energy efficiency, such as utility revenue decoupling,[11] along with an array of energy efficiency standards, programs and smart grid innovations that encourage utilities and consumers alike to reduce their energy usage. California's public utilities have also prioritized energy efficiency and reduced electricity demand by nearly 400 MW (about the size of a mid-sized power plant) from 2006 to 2010.[12]

WHY IS IT IMPORTANT?

Energy efficiency allows consumers to obtain more or better services, or use less energy for the same level of service. Energy efficiency can help businesses, governments, and consumers save money and create investment opportunities across the economy, creating jobs and reducing the environmental impact of energy use. Indicators that measure California's change in energy and electricity consumption, while factoring in changes in population and the economy, can show how the state is performing in making energy more affordable and efficient.

FIGURE 8. ENERGY PRODUCTIVITY GDP RELATIVE TO TOTAL ENERGY CONSUMPTION / CALIFORNIA & REST OF THE U.S.



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: U.S. Energy Information Administration, State Energy Data System; U.S. Department of Commerce, Bureau of Economic Analysis
Analysis: Collaborative Economics

These policies, along with an innovative culture, have made California a productive state in terms of its energy usage. Energy productivity measures the GDP produced (economic output) for each unit of energy consumed (resource input). In 2010, California generated $2.53 of GDP for every 10,000 British Thermal Units (BTU) of energy consumed, while the rest of the U.S. generated $1.47 (Figure 8). In other words, California created 1.7 times as much economic activity as the rest of the U.S. with the same amount of energy. The gap widened in 2010 compared to 2009, as California's energy productivity increased by nearly two percent, while the rest of the U.S.'s declined by about one percent.

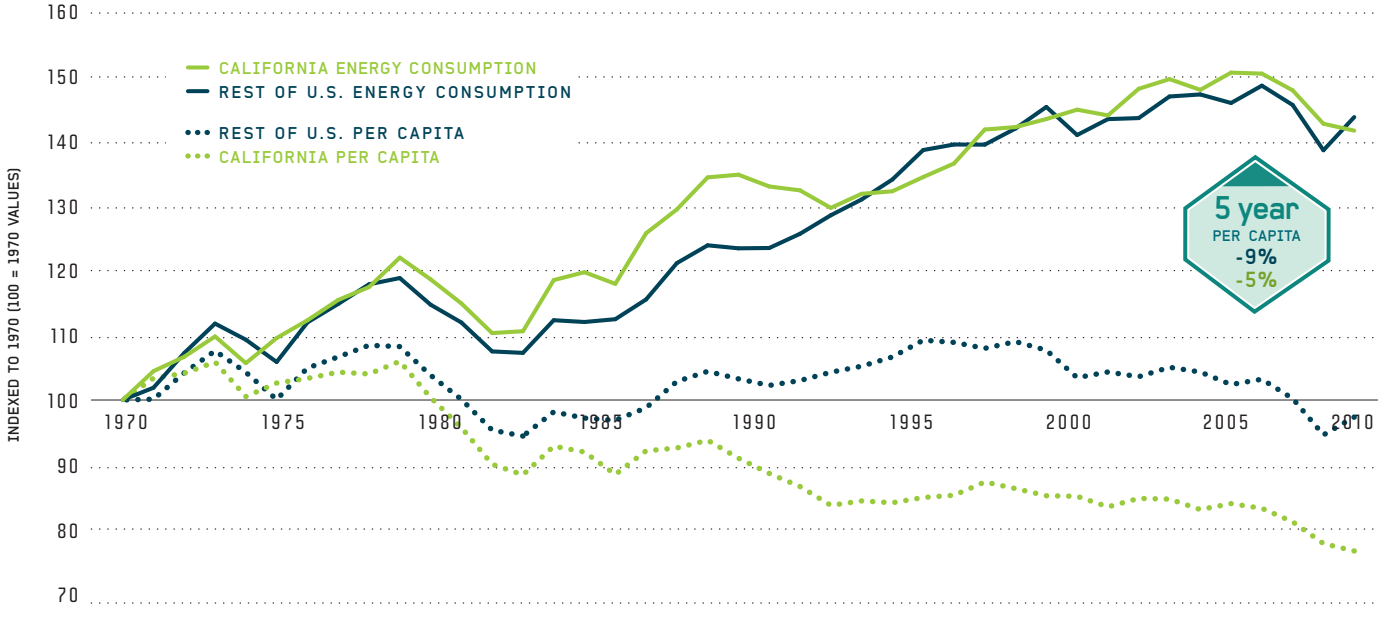
California's per capita energy consumption has decreased since the late 1970s when major energy efficiency policies were introduced. Energy usage per person dropped 24 percent in California in 2010 compared to 1970, as displayed in Figure 9. In contrast, energy consumption per capita in the rest of the U.S. declined by only three percent over the same period. Total energy consumption in California and the U.S. is higher in 2010 than 1970.

A similar pattern occurred in electricity consumption. In 2011, California used 1.3 percent less electricity per capita than it did in 1990, while total electricity consumption increased 24 percent (Figure 10). Over the same period, the rest of the U.S. increased usage per capita by 13 percent, and 41 percent in total consumption. However, California's total and per capita electricity consumption in 2011 increased by 1.3 and 0.8 percent respectively compared to 2010, while the rest of the U.S. decreased both measures.

The mix of California electricity consumption by sector has remained fairly stable over the past ten years, though the industrial and residential sectors have shifted as seen in. California's industrial sector decreased its share of electricity usage by five percentage points between 2000 and 2011 to consume 14 percent of total electricity usage in the state. The residential sector increased its share by three percentage points to 33 percent of total consumption.

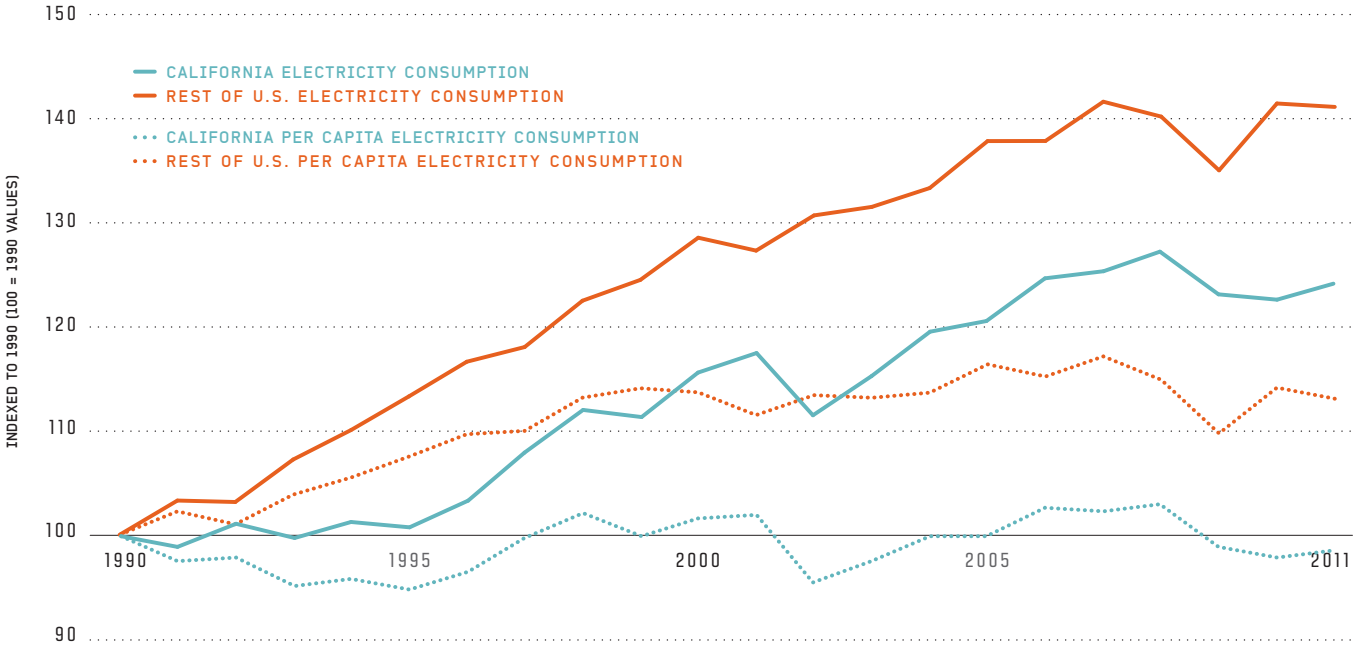
FIGURE 9. TOTAL ENERGY CONSUMPTION RELATIVE TO 1970

TOTAL CONSUMPTION & PER CAPITA / CALIFORNIA & REST OF THE U.S.



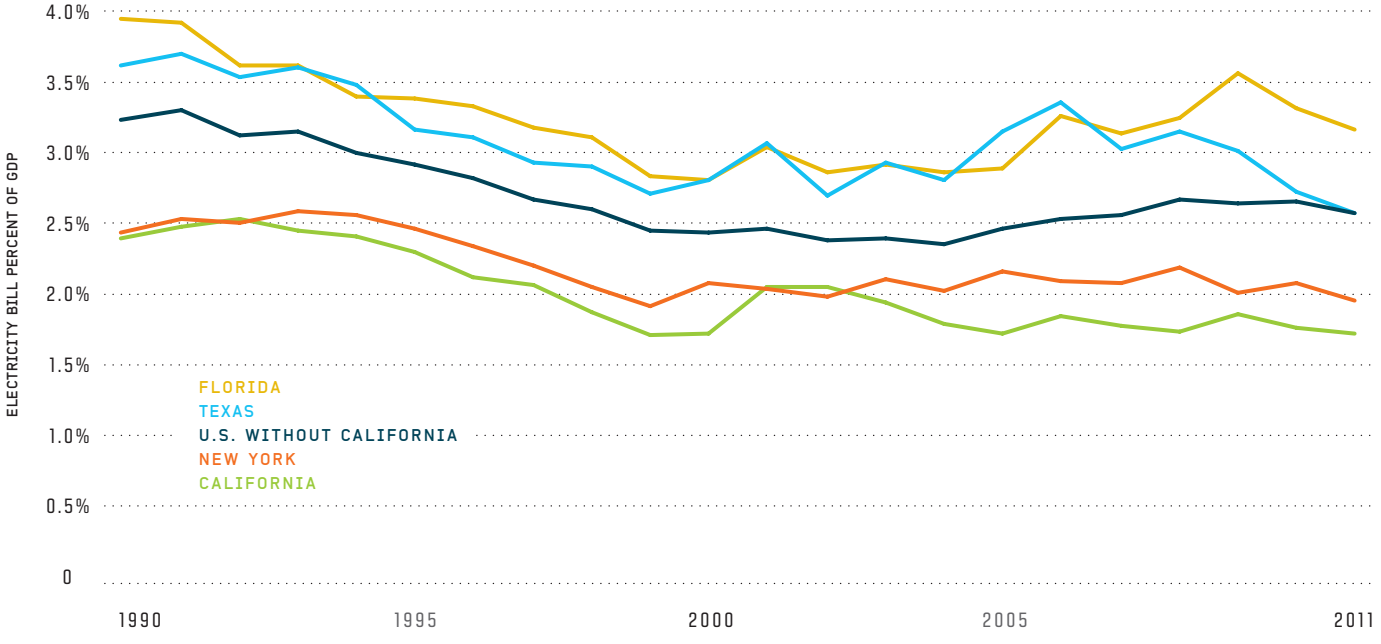
NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: U.S. Energy Information Administration, State Energy Data System; U.S. Census Bureau, Population Estimates Branch. Analysis: Collaborative Economics

FIGURE 10. ELECTRICITY CONSUMPTION RELATIVE TO 1990 TOTAL CONSUMPTION & PER CAPITA / CALIFORNIA & REST OF THE U.S.



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: U.S. Department of Energy, Energy Information Administration; U.S. Census Bureau Analysis: Collaborative Economics

FIGURE 11. STATEWIDE ELECTRICITY BILL AS A PERCENT OF GDP CALIFORNIA, TEXAS, FLORIDA, NEW YORK & U.S. WITHOUT CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: U.S. Department of Energy, Energy Information Administration; U.S. Census Bureau Analysis: Collaborative Economics

California's energy policies have improved efficiency across the state without increasing electricity bills. A state's energy productivity can be illustrated in the total amount spent on electricity compared to the state's total economic output. Money not spent on energy costs, whether by a household, business or public entity, can be invested in capital upgrades that boost productivity or can be invested in the creation of new jobs. California's state-wide electricity bill as a share of its GDP is significantly lower than states with comparable economies, population and geographic area (Figure 11). California's state-wide electricity bill equated to 1.4 percent of the state's GDP in 2011, an improvement from 2010. In comparison with other large states, the state-wide electricity bill in Texas was 2.6 percent of GDP, while Florida's bill equated 3.2 percent of GDP and New York's bill was two percent of GDP in 2011.

While California's average electricity rates per kilowatt-hour are higher than the U.S., average monthly bills (inflation adjusted) in California were lower and declined more significantly from 1991 to 2011 as energy efficiency improved (Table 3). The average industrial electrical bill declined by 67 percent in California from 1991 to 2011, compared to a 36 percent decline in the U.S., a 53 percent decline in New York, a 29 percent increase in Florida, and a 32 percent decline in Texas. The residential bill decreased eight percent in California compared to a two percent increase in the U.S., a nine percent increase in New York, a two percent decrease in Florida, and a five percent increase in Texas. The average commercial electricity bill declined by five percent in California, compared to a one percent decline in the U.S., a 13 percent increase in New York, a three percent decline in Florida, and a six percent increase in Texas.

TABLE 3. ELECTRICITY PRICES AND BILLS (INFLATION ADJUSTED) BY SECTOR
CALIFORNIA, NEW YORK, FLORIDA, TEXAS, AND THE U.S.

		PRICE (CENTS PER KWH)	AVERAGE MONTHLY BILL		
		2011	1991	2011	% CHANGE 1991-2011
RESIDENTIAL	CALIFORNIA	$0.15	$93.24	$85.44	-8%
	UNITED STATES	$0.12	$109.8	$112.41	2%
	NEW YORK	$0.19	$104.42	$113.9	9%
	FLORIDA	$0.12	$135.4	$132.8	-1%
	TEXAS	$0.11	$135.78	$142.7	5%
INDUSTRIAL	CALIFORNIA	$0.10	$17,501	$5,856	-67%
	UNITED STATES	$0.07	$12,397	$7,900	-36%
	NEW YORK	$0.08	$23,354	$10,877	-53%
	FLORIDA	$0.09	$5,486	$7,085	29%
	TEXAS	$0.06	$8,075	$5,469	-32%
COMMERCIAL	CALIFORNIA	$0.13	$791.62	$749.41	-5%
	UNITED STATES	$0.10	$665.03	$655.49	-1%
	NEW YORK	$0.16	$873.98	$991.75	13%
	FLORIDA	$0.10	$695.5	$674.68	-2%
	TEXAS	$0.09	$663.92	$705.81	6%

NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Note: Price statistics for the U.S. without California are the national average price. Data Source: Energy Information Administration, U.S. Department of Energy. Analysis: Collaborative Economics

RENEWABLE ENERGY

California continues to increase renewable energy generation, which reached 14.5 percent of total electricity in 2011 (Figure 12). While the U.S. achieved the same percentage point increase, the nation still trails California with only 4.7 percent of total electricity generation from renewable sources.

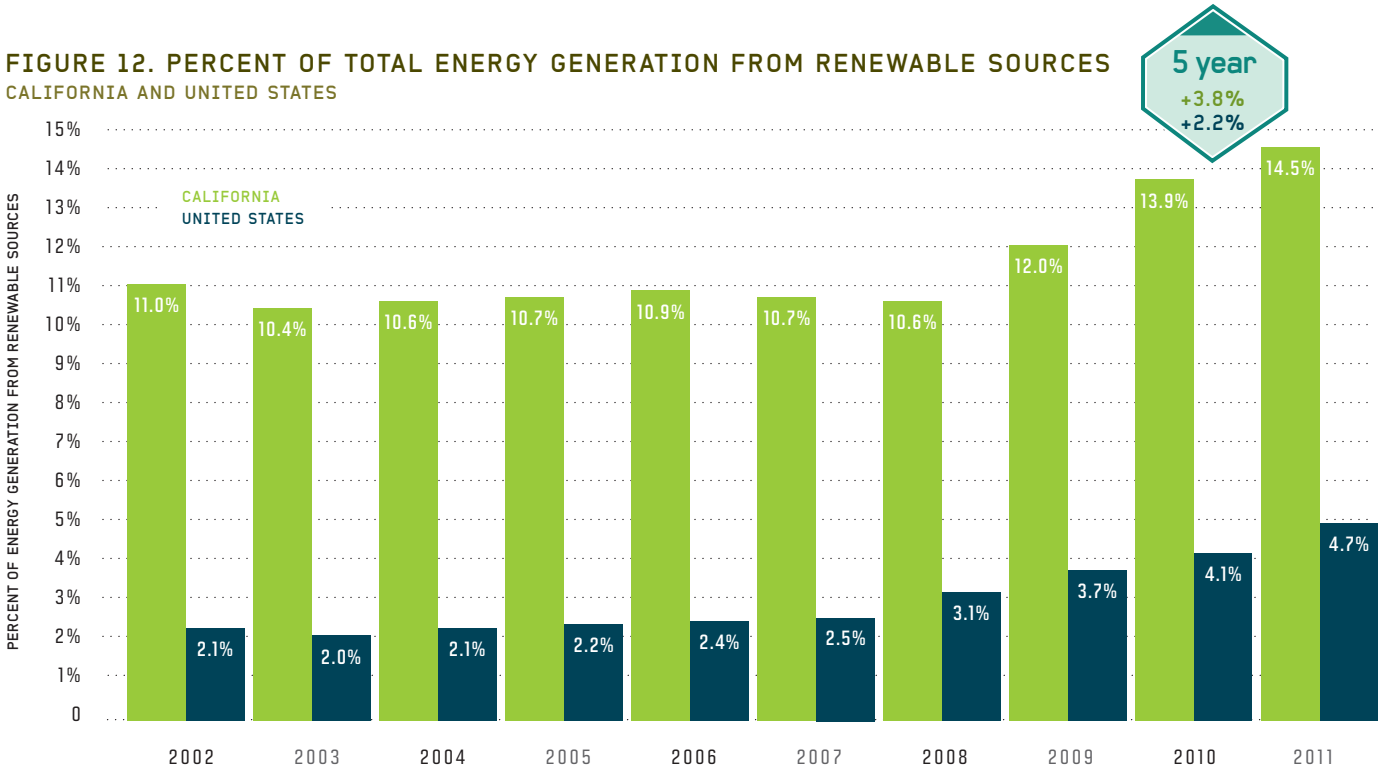
California's renewable electricity generation grew 39 percent between 2002 and 2011, reaching over 41,000 gigawatt hours (GWh) (Figure 13). The majority of the jump is due to a four-fold increase in wind generation since 2002, while solar and small hydropower also had large boosts of 41 and 40 percent respectively. Between 2010 and 2011, solar power had the largest percent increase (27%), though solar only accounted for about three percent of total renewable

WHY IS IT IMPORTANT?

Renewable energy is a natural, unlimited source of energy that produces no emissions or fewer emissions when compared to fossil fuel energy. Therefore, renewable energy offers a way to increase or maintain an energy supply while reducing greenhouse gas emissions and environmental impacts from energy use. Indicators that track trends in renewable energy illustrate California's shift to a cleaner energy supply.

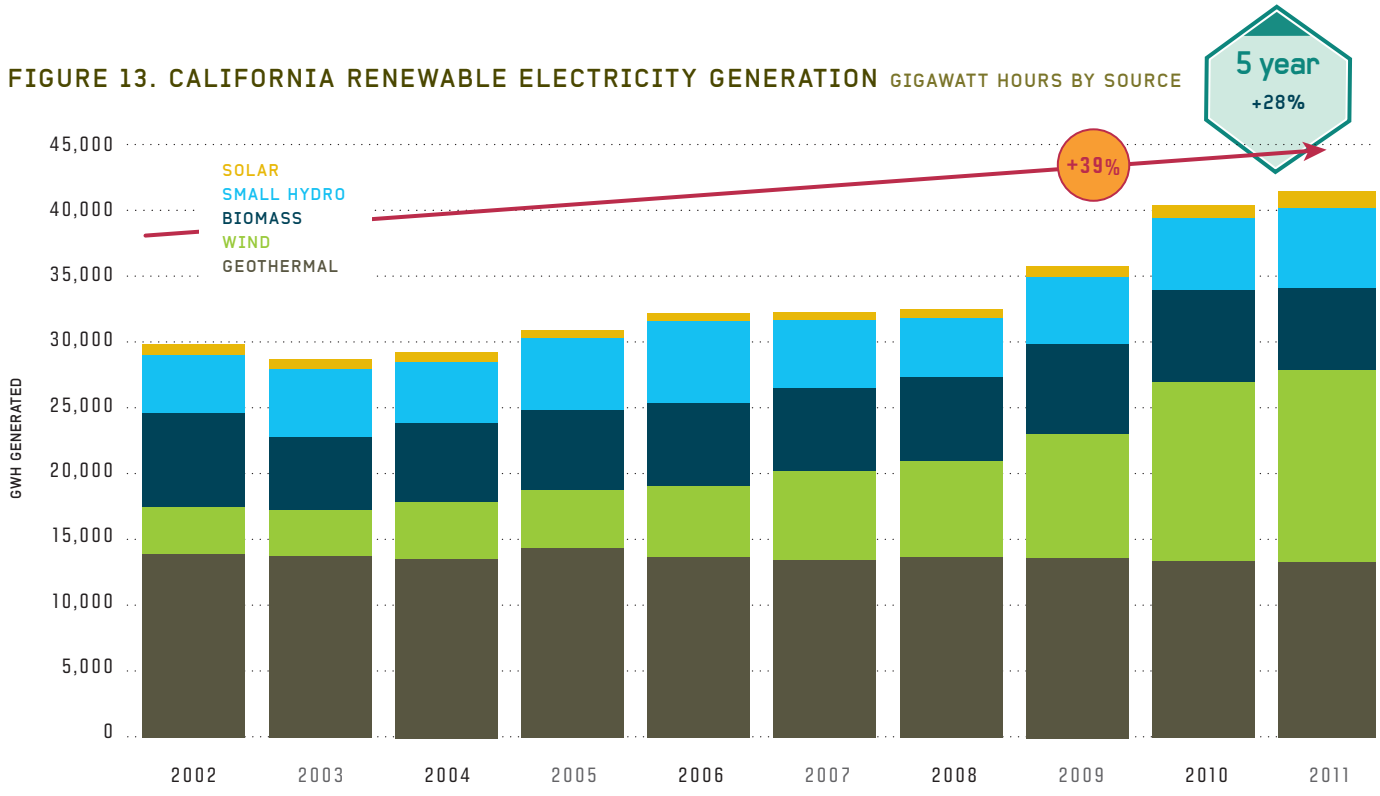
FIGURE 12. PERCENT OF TOTAL ENERGY GENERATION FROM RENEWABLE SOURCES

CALIFORNIA AND UNITED STATES



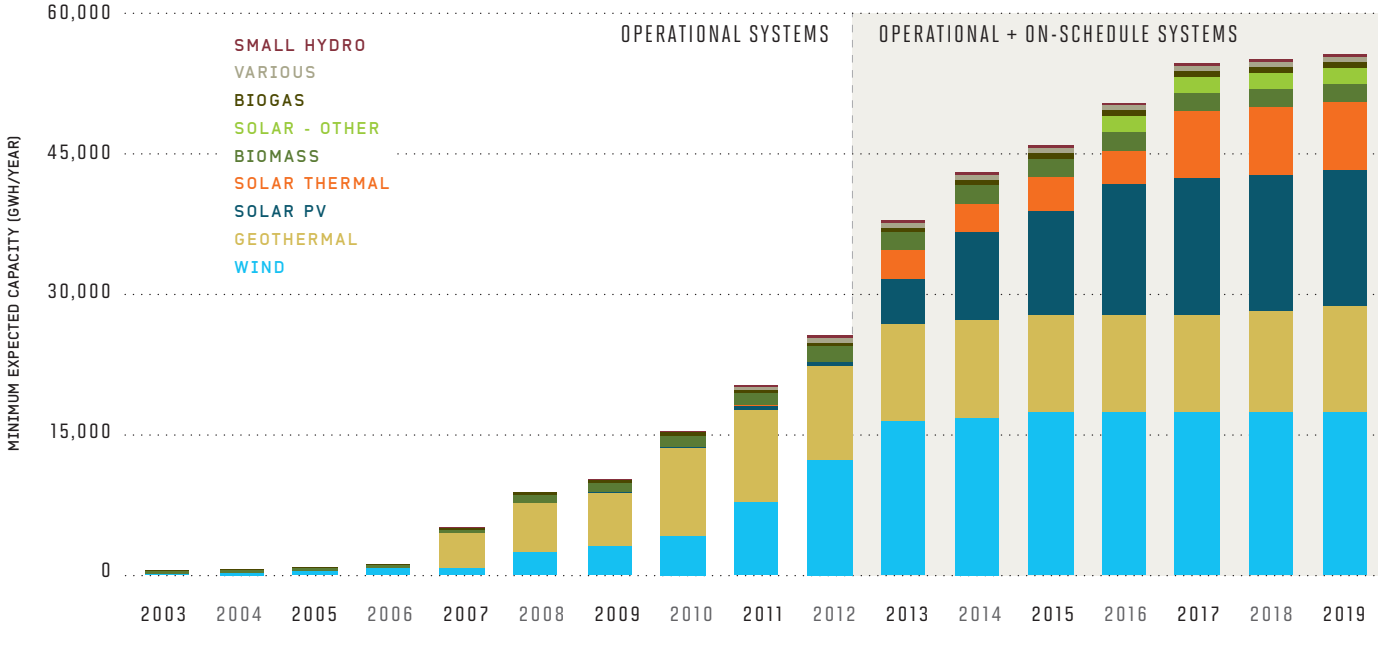
NEXT 10 CALIFORNIA GREEN INNOVATION INDEX.Note: Renewables do not include large hydro. Data Source: California Energy Commission; Energy Information Administration, U.S. Department of Energy Analysis: Collaborative Economics

FIGURE 13. CALIFORNIA RENEWABLE ELECTRICITY GENERATION GIGAWATT HOURS BY SOURCE



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: California Energy Commission. Analysis: Collaborative Economics

FIGURE 14. CUMULATIVE OPERATIONAL CAPACITY OF RENEWABLES PORTFOLIO STANDARD PROJECTS BY INVESTOR-OWNED UTILITIES CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: California Public Utility Commission Analysis: Collaborative Economics

electricity generation. In 2011, wind accounted for over a third (35%) of total renewable electricity generation, followed by geothermal (32%) and biomass (15%); despite their large share of the portfolio, geothermal and biomass production decreased from 2010 to 2011.

To achieve its Renewable Portfolio Standard goal of 33 percent of electricity generation by 2020, California investor-owned utilities are poised to more than double the amount of renewable electricity generation between 2012 and 2020, as illustrated in the operational and on-schedule system capacity in Figure 14. The largest increase is expected in solar thermal and solar photovoltaic with about 7,200 and 14,000 GWh respectively in projects that are on schedule or approved. Wind grew the most between 2011 and 2012, with a 58 percent increase in generation, while biomass also saw growth of 24 percent.

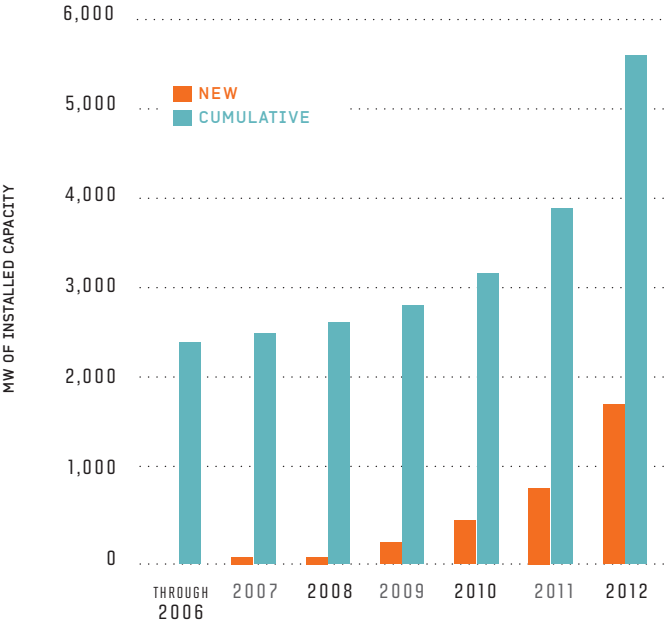
California's wind capacity surged in 2012 to over 5,500 MW of total capacity, replacing Iowa as second in the nation for overall installed wind capacity, while Texas remains the leader in wind capacity in the U.S. Figure 15 shows that California installed roughly 1,600 MW in 2012, more than twice the amount installed in 2011, leading to a 41 percent increase in cumulative capacity. This increase was likely due to the federal wind Production Tax Credit, which expired at the end of 2012 but was then extended by Congress a few days later to the end of 2013.

California also installed a total of 564 MW of solar power in 2012, up four percent from the previous year (Figure 16). These installations include large utility-scale solar plants, municipal utility installations, and smaller projects installed through the investor-owned utility solar rebate program the California Solar Initiative. Solar projects that received a California Solar Initiative incentive drove new installations in 2012, with 26 percent more installed than in 2011, whereas non-California Solar Initiative installations decreased 17 percent. Overall, California installed more than six times more solar projects in 2012 than in 2007.

California is more than halfway towards its goal of installing 1,940 MW of solar capacity by the end of 2016 through the California Solar Initiative, with a cumulative total of 1,047 MW installed at the end of 2012. About 338 MW of solar

FIGURE 15. WIND ENERGY INSTALLATIONS

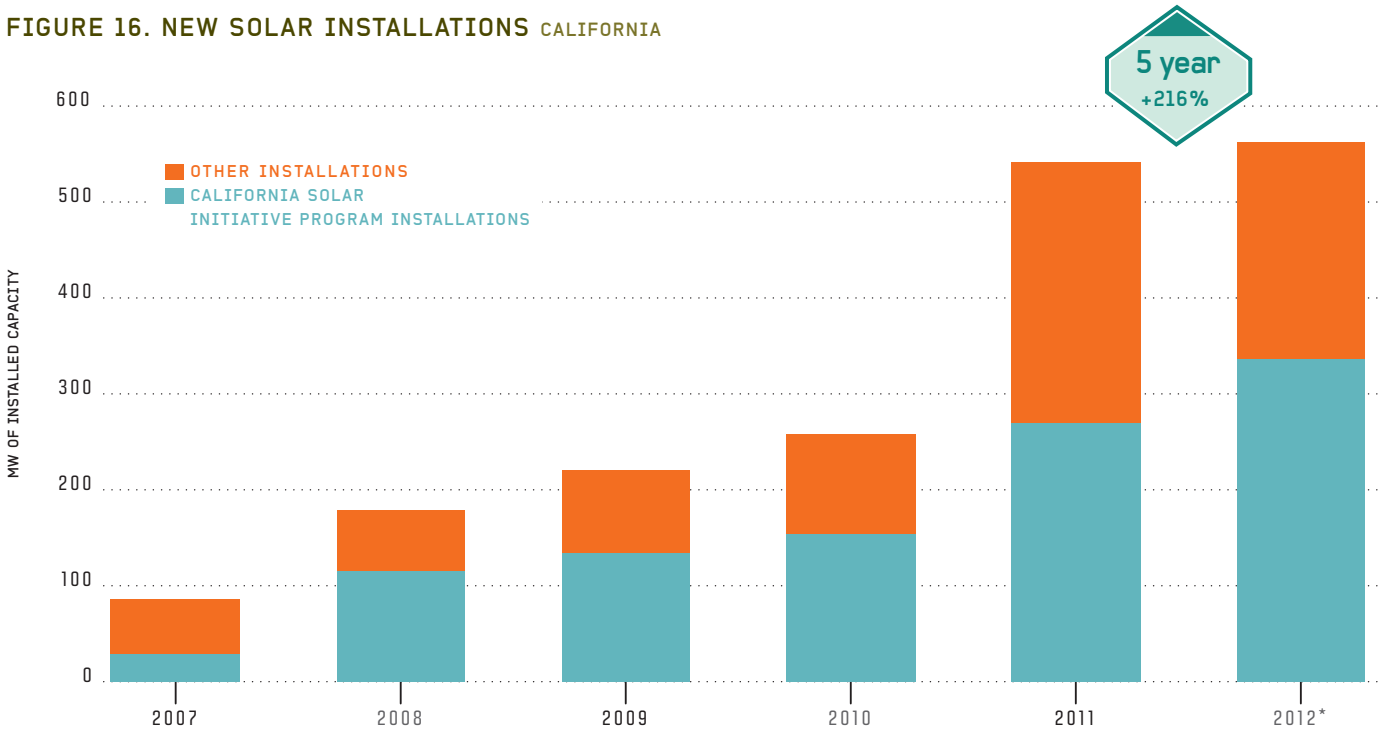
CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: American Wind Energy Association. Analysis: Collaborative Economics

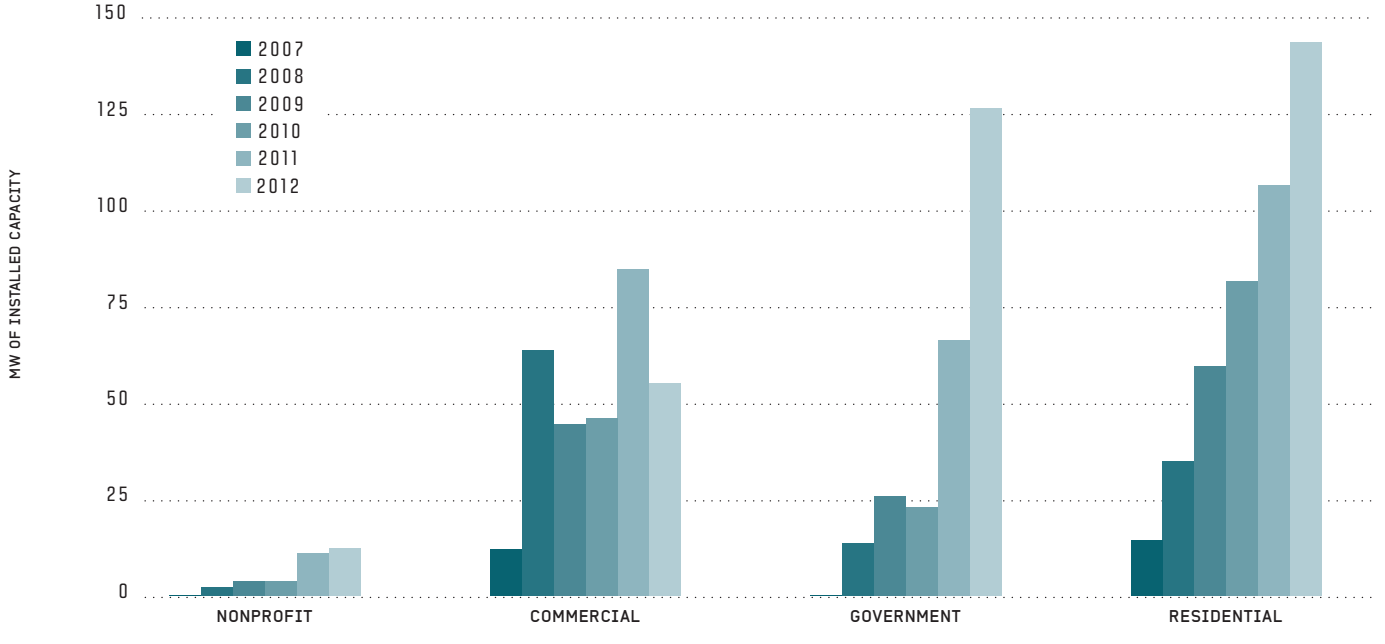
power was installed through the program in 2012, a 26 percent increase over the prior year, and 30 times more new installations than in 2007 when the program began. Figure 17 shows that the Residential sector continued to have the most solar installations, with nearly 144 MW installed in 2012, a 35 percent increase compared to 2011. The Government sector had the largest jump with roughly 127 MW in 2012, almost doubling the amount compared to 2011. The Commercial sector is the only sector that declined over the past year, with a 35 percent decrease to about 55 MW installed in 2012. The Nonprofit sector comprises the remainder of the installations through the California Solar Initiative program, with a ten percent increase in 2012 to about 12.5 MW.

FIGURE 16. NEW SOLAR INSTALLATIONS CALIFORNIA



*2012 data from Solar Industries Association and GTM Research through third quarter.
NEXT 10 CALIFORNIA GREEN INNOVATION INDEX.Data Source: California Public Utilities Commission, California Solar Initiative and Solar Energy Industries Association and GTM Research. Analysis: Collaborative Economics

FIGURE 17. NEW SOLAR INSTALLATIONS BY SECTOR INSTALLATIONS THROUGH THE CALIFORNIA SOLAR INITIATIVE / CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: California Public Utilities Comission, California Solar Initiatve Analysis: Collaborative Economics

CLEAN TECHNOLOGY INNOVATION

INVESTMENT IN CLEAN TECHNOLOGY

Investment in clean technology companies fuel the creation of new, innovative products and services. The public and private sector both play important roles in the investment landscape. The public sector, including state and federal government agencies, can provide seed money in the form of grants to test new ideas or loan guarantees to help companies scale up. The private sector, including venture capital firms, corporations, and banks, often provides a wider range of funding to early stage and established companies such as venture capital, project financing, and loans.

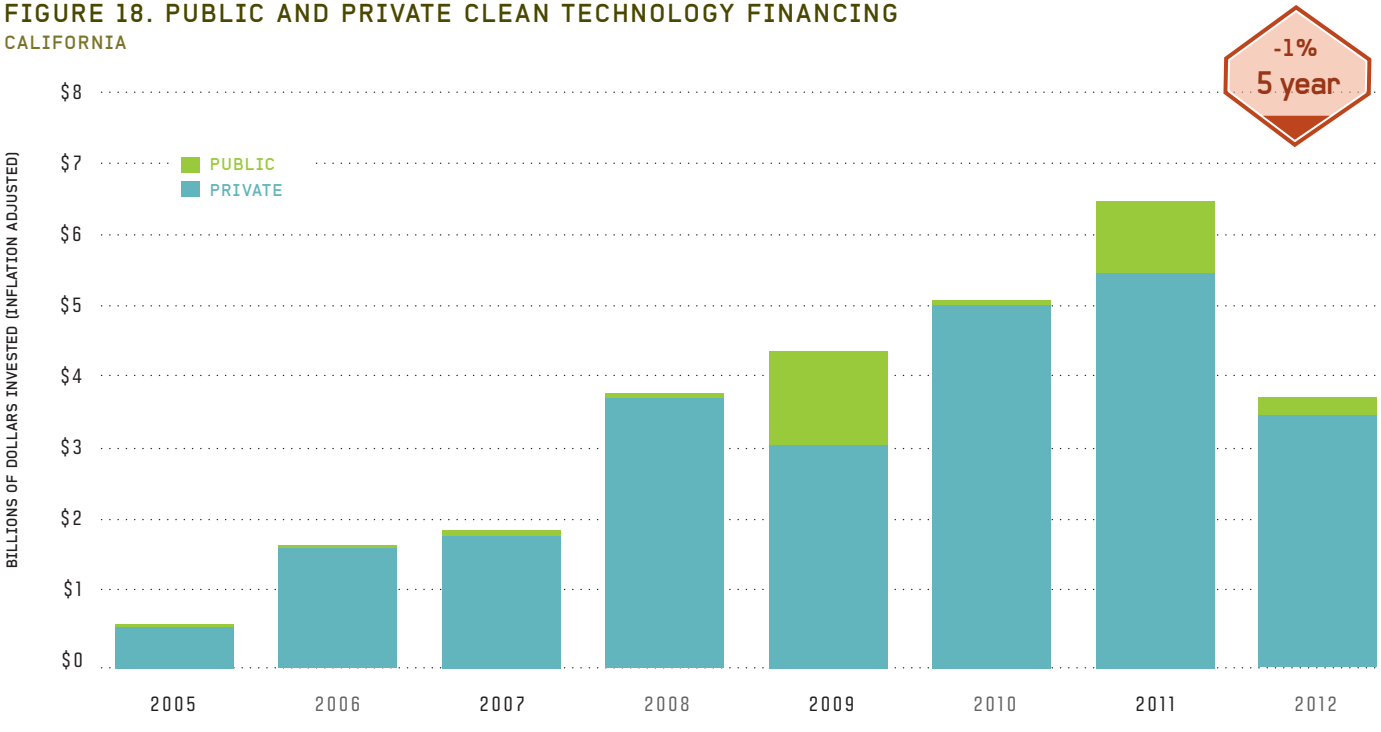
Public and private investment in clean technology dropped to $3.75 billion in 2012, returning to 2008 levels (Figure 18), due to a variety of factors such as market uncertainty, changes in national public policy, and a maturation and consolidation of

WHY IS IT IMPORTANT?

While technologies and businesses of today are helping California make the shift from a carbon-based to a cleaner and more efficient economy, new innovations are critical for California to achieve its greenhouse gas reduction goals. Financial investments in clean technology companies help to commercialize and scale new products and services, which positions California on the leading edge of the market. Similarly, patent registrations reflect private and public research and development investments and clean technology sector growth potential. Looking at changes in clean technology investments and patents together can illustrate California's role in leading the clean economy shift.

FIGURE 18. PUBLIC AND PRIVATE CLEAN TECHNOLOGY FINANCING

CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: CB Insights. Analysis: Collaborative Economics

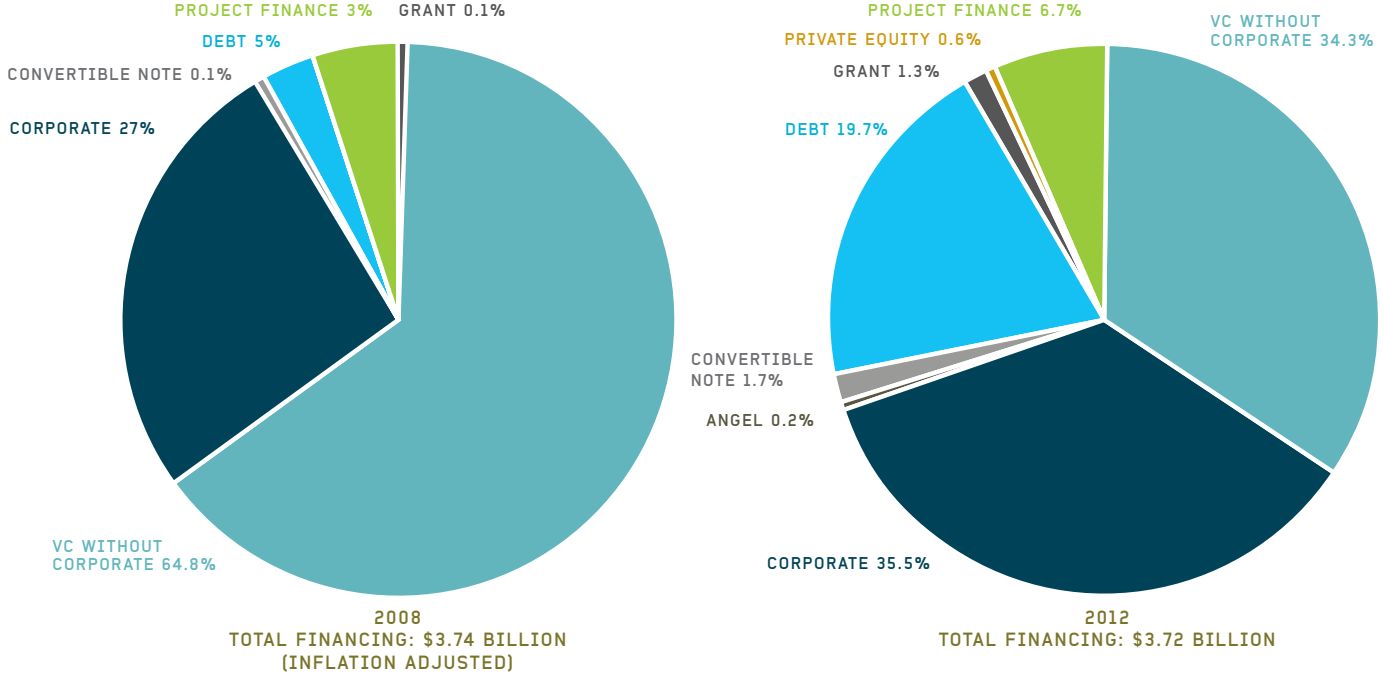
companies in the sector. Despite this receding capital flow, the clean technology sector is continuing to diversify and advance, displaying resilience through the recession with increasing deployment of technologies to end markets (as described above) and the emergence of new investors for startup companies.

Total financing increased steadily in the late 2000s, even during the recession that hit the U.S. in 2008, and peaked in 2011. Public sector financing played a significant role in 2009 and 2011, accounting for 30 and 15 percent respectively of total investment, largely as a result of grants and loan guarantees from the American Recovery and Reinvestment Act. On average, public financing comprised only seven percent of all clean technology financing between 2005 and 2012, leaving the private sector as the dominant player in clean technology investment.

While total public and private investment in 2012 mirrored 2008 levels, the types of funding and investors were much more diverse. Figure 19 shows that traditional venture capital, without strategic corporate investor involvement, accounted for the vast majority, roughly 65 percent, of 2008 investment. In contrast, in 2012 venture capital alone was only about 34 percent of total investment. While the role of traditional venture capital has declined, other players have stepped in to fund companies, showing that the sector is maturing and attracting new investors that generally have a less risky portfolio. Corporations have emerged as a strategic investor in clean technology companies, with involvement in over 35 percent of investments in 2012 compared to 27 percent five years prior. These strategic corporate investors are strong partners for startups not only because they provide financing, but because the corporation can directly utilize the new technology and provide a pathway to commercialization. Clean technology companies are also receiving more debt and project financing to scale operations, increasing 15 and four percentage points respectively, and other sources of funding such as convertible notes are emerging.

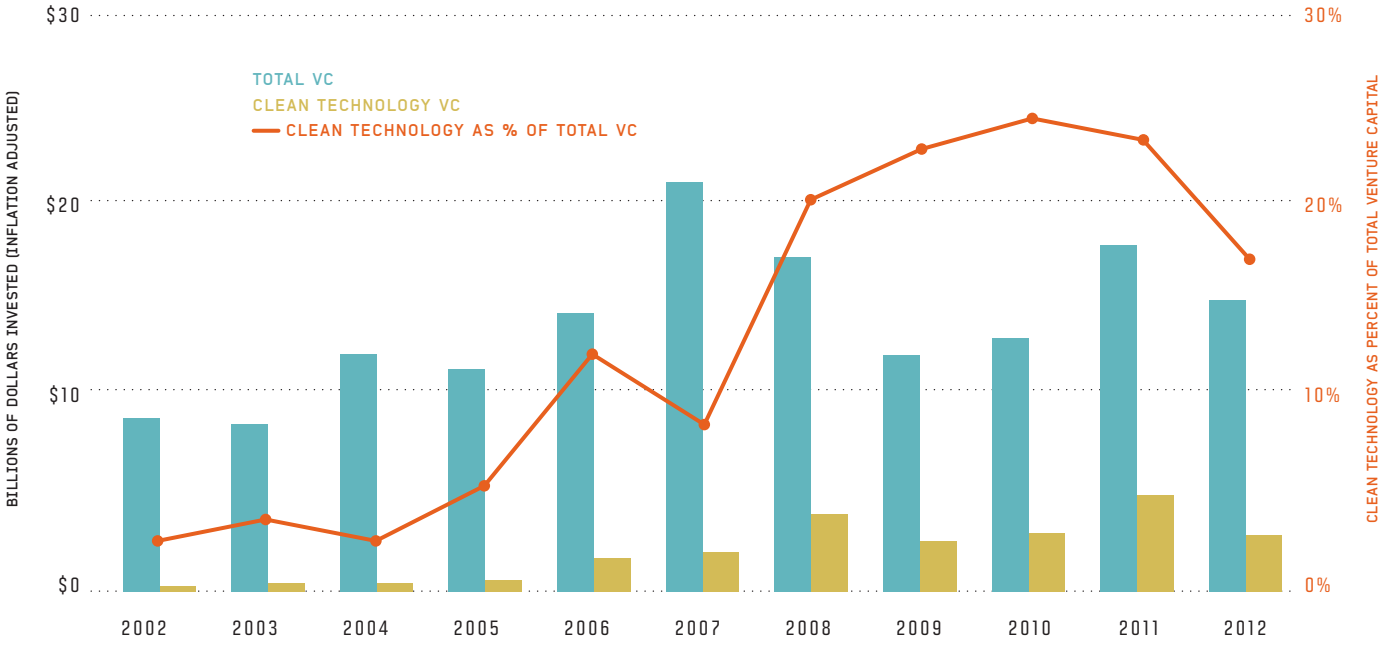
In addition to direct investment in companies, corporations are also ramping up investments in clean technology projects. For example, Warren Buffett's MidAmerican Energy Holdings Company announced in January 2013 a $2.5 billion investment for SunPower Corp. to develop and operate 579 megawatts (MW) of solar power in Southern California[13]. Google has also demonstrated a growing interest in renewable energy projects, investing $157 million for 270 MW of wind power and $94

FIGURE 19. DIVERSE SOURCES OF CLEAN TECHNOLOGY FINANCING CALIFORNIA



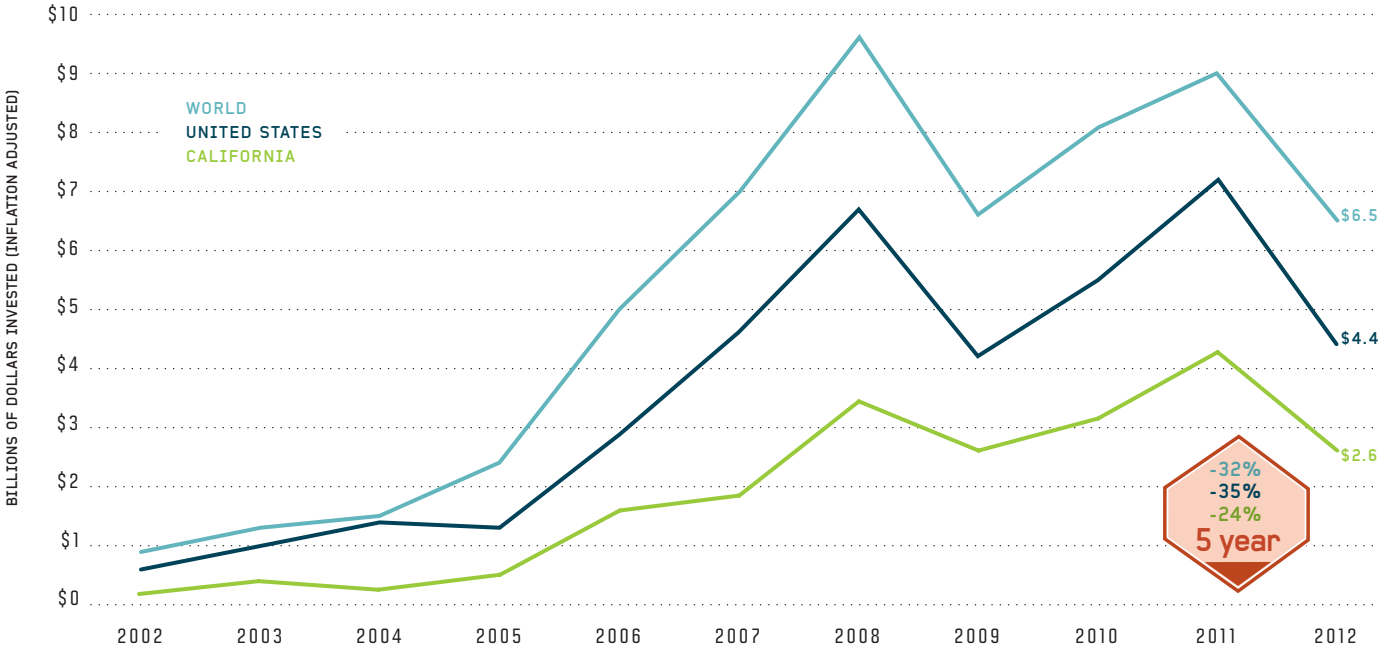
NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: CB Insights Analysis: Collaborative Economics

FIGURE 20. VENTURE CAPITAL CLEAN TECHNOLOGY VC & TOTAL VC INVESTMENT / CALIFORNIA



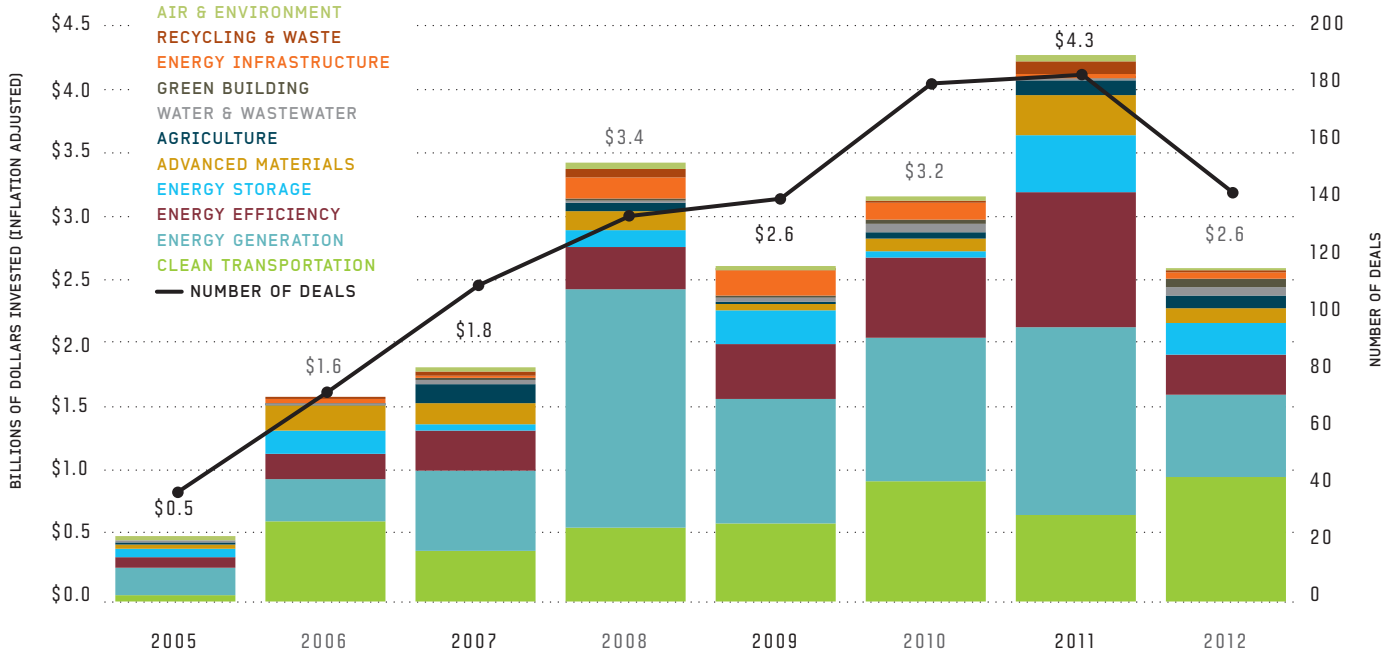
NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: CB Insights Analysis: Collaborative Economics

FIGURE 21. VENTURE CAPITAL INVESTMENT IN CLEAN TECHNOLOGY CALIFORNIA, THE UNITED STATES & GLOBAL



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source. CB Insights and Cleantech Group, LLC. Analysis: Collaborative Economics

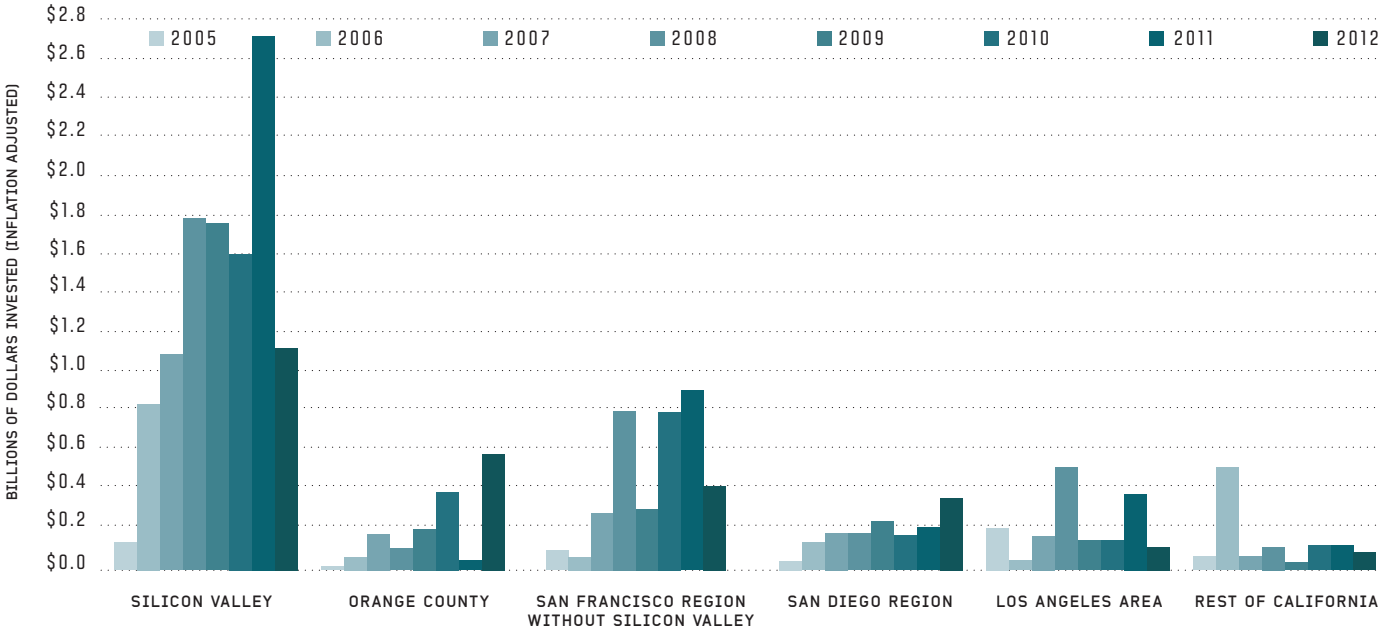
FIGURE 22. VENTURE CAPITAL INVESTMENT IN CLEAN TECHNOLOGY BY SEGMENT CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: CB Insights Analysis: Collaborative Economics

FIGURE 23. VENTURE CAPITAL INVESTMENT IN CLEAN TECHNOLOGY BY REGION

SILICON VALLEY, SAN FRANCISCO WITHOUT SILICON VALLEY, LOS ANGELES AREA, ORANGE COUNTY, SAN DIEGO REGION & REST OF CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: CB Insights Analysis: Collaborative Economics

million for 88 MW of solar power in California in 2011, with more recent investments in other states as well.[14]

Venture capital is one type of private financing as described above, but it is still an important source of funding for higher risk, innovative companies. In 2012, total venture capital across all sectors in California decreased 17 percent from 2011 to $15.5 billion, while clean technology venture capital declined at a faster rate, down 39 percent to $2.6 billion (Figure 20). Despite this recent change, clean technology remains a significant part of the California venture capital field, accounting for 17 percent of total venture capital in 2012.

The decrease in clean technology venture capital was seen around the world, with global investments down 28 percent to roughly $6.5 billion as demonstrated in Figure 21. California and U.S. investments fell at the same rate, though California still captured over half of national clean technology venture capital investments.

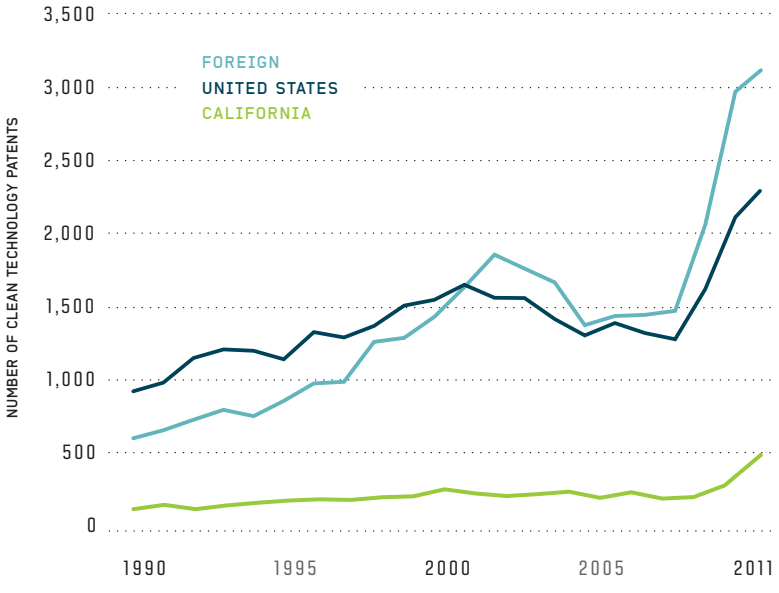
California clean technology venture capital remains above pre-2008 levels despite falling in 2012 (Figure 22). The level of venture capital deal activity was more resilient in 2012 compared to overall funding levels, which also illustrates that the average deal size was slightly smaller than in 2011. Clean technology venture capital deals fell at a slower rate of 22 percent from 2011 to 2012 compared to funding levels that decreased 39 percent.

Venture capital investment in a number of clean technology segments grew in 2012, even though overall levels are down. Clean transportation grew 44 percent from 2011 to 2012 to nearly $1 billion, emerging as the largest clean technology segment with 38 percent of total venture capital investment. Water & wastewater reported the largest jump in 2012, nearly eight times greater at $81 million compared to 2011, and green building was nearly five times bigger at $55 million. Energy generation and energy efficiency remained the next largest clean technology segments at 25 and 12 percent of the total venture capital respectively, though both segments experienced a decrease in investment from 2011 to 2012.

Silicon Valley continues to attract the most clean technology venture capital in California as highlighted in Figure 23, with 43 percent ($1.1 billion) in 2012. Orange County surpassed the San Francisco Region in 2012, with 22 percent ($570 million) of investments. The San Diego Region was the only other region to increase investments, receiving $340 million in 2012, an 80 percent increase from 2011.

FIGURE 24. CLEAN TECHNOLOGY PATENT REGISTRATIONS

BY LOCATION OF PRIMARY INVENTOR / CALIFORNIA, U.S. & FOREIGN



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File. Analysis: Collaborative Economics

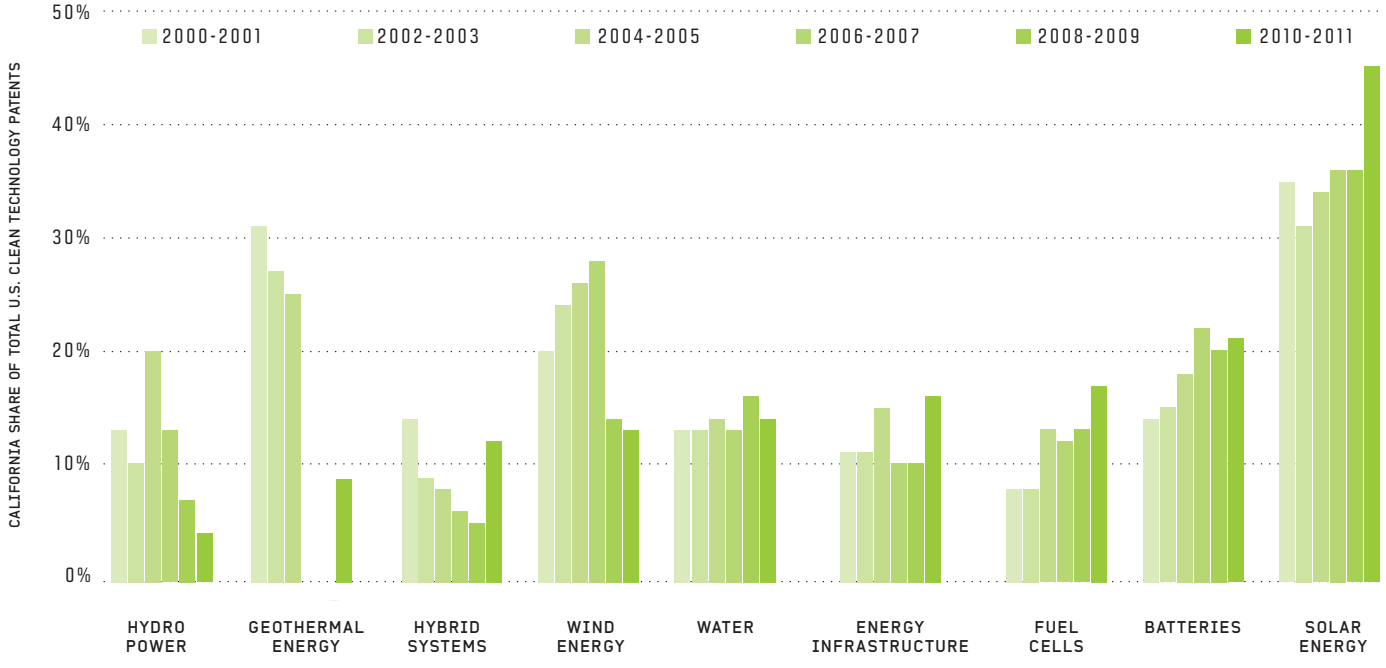
TABLE 4. TOTAL CLEAN TECHNOLOGY PATENTS

TOP RANKING STATES IN PATENTS REGISTERED

	NUMBER OF PATENTS	RANKING	
	2010-2011	2000-2001	2010-2011
CALIFORNIA	913	1	1
NEW YORK	427	3	2
MICHIGAN	389	6	3
TEXAS	255	2	4
MASSACHUSETTS	189	8	5
FLORIDA	179	5	6
OHIO	176	7	7
MINNESOTA	156	11	8
PENNSYLVANIA	145	9	9
ILLINOIS	141	4	10

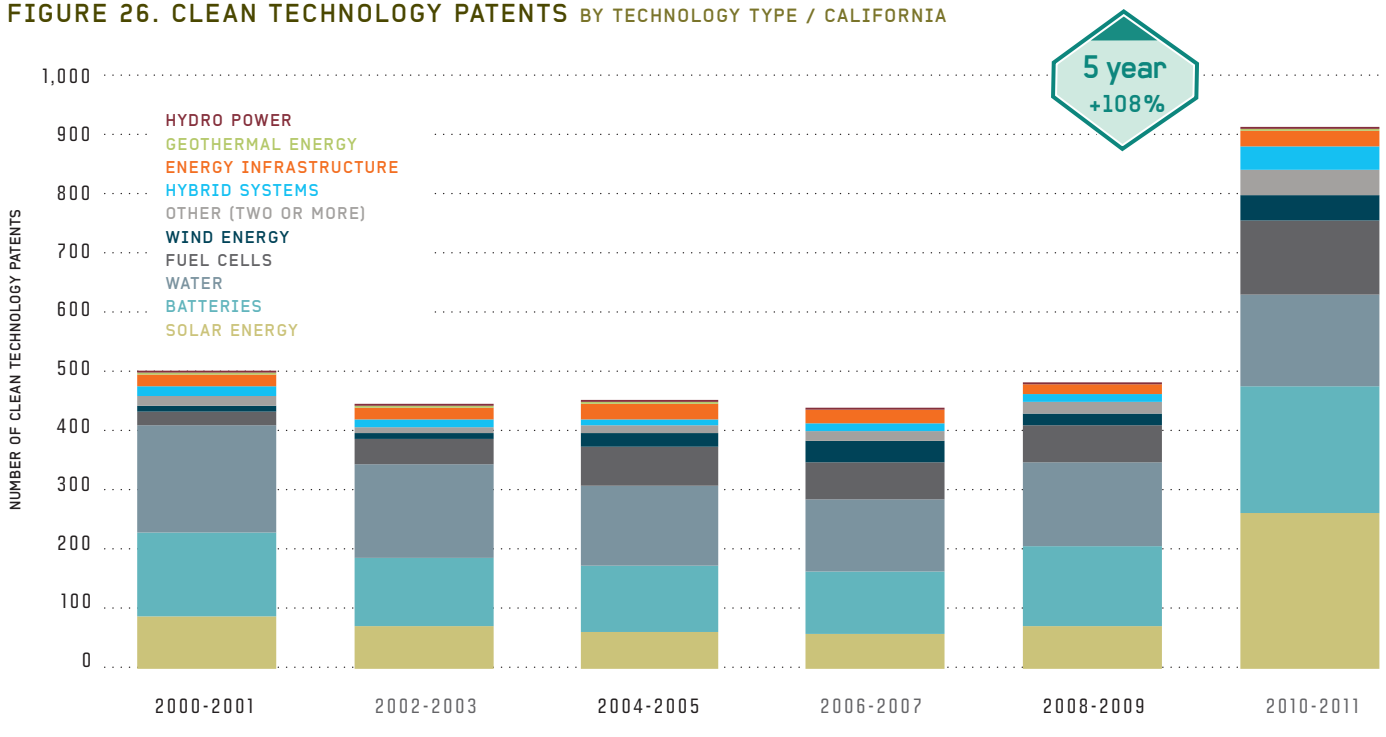
NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File. Analysis: Collaborative Economics

FIGURE 25. CLEAN TECHNOLOGY PATENTS CALIFORNIA SHARE OF TOTAL U.S. CLEAN TECHNOLOGY PATENTS



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File. Analysis: Collaborative Economics

FIGURE 26. CLEAN TECHNOLOGY PATENTS BY TECHNOLOGY TYPE / CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File. Analysis: Collaborative Economics

CLEAN TECHNOLOGY PATENTS

California continues to lead the U.S. in clean technology patent innovations and increased patent registrations by 26 percent between 2010 and 2011 (Figure 24). This outpaces growth in clean technology patents originated throughout the U.S. overall (10%) and abroad (5%), though clean technology patent registrations have jumped significantly in all locations since 2009. California's surge in clean technology patents far outpaces overall patents in the state including other sectors, which increased by only three percent in the same period.[15]

The strong growth in patents pushed California to account for an even larger share of total U.S. patent registrations in several segments than prior years (Figure 25). In the 2010-2011 period, its share of total U.S. solar patents increased to 45 percent. Similarly, patents that cut across multiple segments, (e.g. patents applicable to both fuel cells and hybrid systems) surged to 33 percent of total cross-segment U.S. registrations. Wind energy and water lost share, falling to 13 percent and 14 percent, respectively.

California achieved the strongest clean technology patent activity in solar energy, batteries, water and fuel cells, as demonstrated in Figure 26. These segments comprised over 80 percent of California's clean technology patents in the 2010-2011 period, though nearly all segments demonstrated growth. Hybrid systems, fuel cells, wind energy and solar energy had the highest growth levels, with patents doubling or more compared to the 2008-2009 period.

California's battery patent registrations grew by a robust 72 percent between the 2008-2009 and 2010-2011 periods (Figure 27). Other advanced storage technology accounted for the most growth in this segment, which includes storage innovations outside of the most prevalent chemical battery categories. California continues to be a leader among states in batteries; in the 2010-2011 period, battery patents were higher than the next three highest states combined.

Water technology patents were the third-highest segment of clean technology patent activity in California in the 2010-2011 period, and Figure 28 illustrates a shift in the types of water technology patents registered. Desalination patents more than tripled, rising to 11 percent of total water patent activity in California during the 2010-2011 period. At the same time, mechanical filtration and treatment patents fell by a third. The largest sub-segment, water filtration and treatment patents related to wave energy, rose 75 percent. Despite recent increases in water patent registrations, current levels remain below the recorded high in 2000-2001.

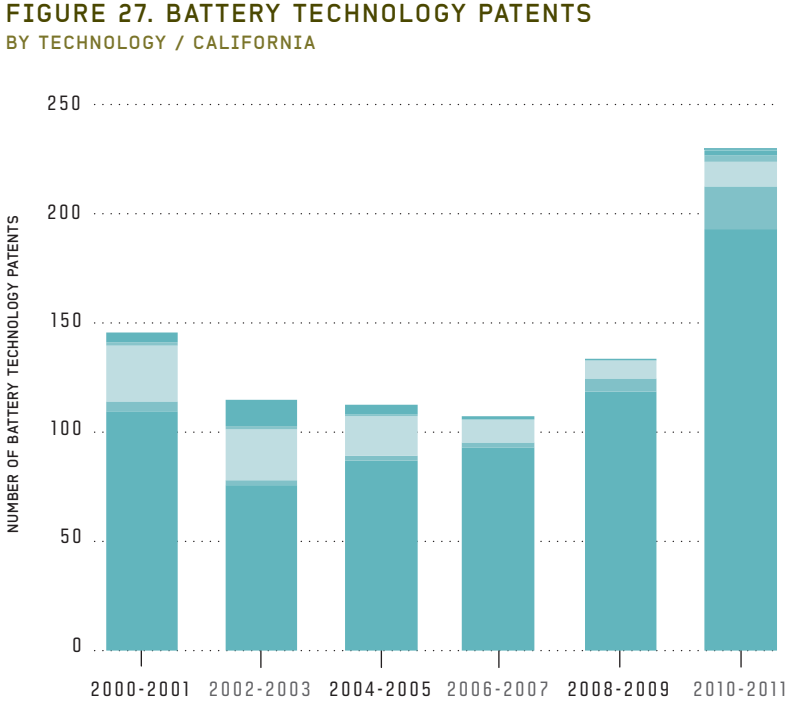
California's solar patents leaped in 2010-2011, more than tripling its levels from the 2008-2009 period (Figure 29). The state remains the undisputed leader in solar patents within the U.S.; it would take the next eight highest states' solar patents combined to reach the level of California's photovoltaic patents alone in the 2010-2011 period. Applied Materials (20 patents), Stion Corp (16 patents) and SunPower (16 patents) were the top three inventors of the 2010-2011 period in California, but more than 85 entities secured solar patents.

Fuel cells had the most patenting activity of any clean technology segment in the U.S. overall in 2010-2011,[16] and Figure 30 shows that California remains a strong contributor to patent gains. While falling behind New York as the domestic leader in fuel cells in 2010-2011, California more than doubled fuel cell patent registrations from 2008-2009 to 2010-2011.

California achieved a threefold growth in hybrid systems patents in 2010-2011 (Figure 31); however the state is now ranked second, with roughly one third of Michigan's registrations in this segment. Tesla Motors (9 patents), ISE Corporation (7 patents) and Coulomb Technologies, now ChargePoint (6 patents), generated the most patents in the state over the 2010-2011 period, though global segment leaders Toyota, General Motors' divisions and Ford secured significantly higher levels of patents than the California-based companies (161, 106 and 77, respectively).

California was the domestic leader in energy infrastructure patents in 2010-2011, though this segment has a low concentration of patenting activity among leading states compared to other segments. At 28 patents in 2010-2011, California accounts for 15 percent of U.S. patent activity in the segment (Figure 32).

FIGURE 27. BATTERY TECHNOLOGY PATENTS
BY TECHNOLOGY / CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File Analysis: Collaborative Economics

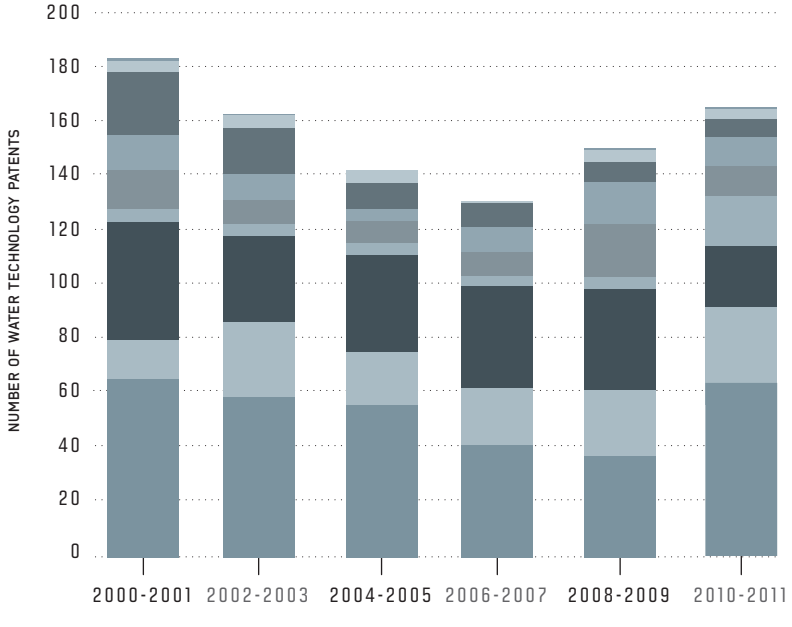
TABLE 5. BATTERY TECHNOLOGY

TOP RANKING STATES IN PATENTS REGISTERED

	NUMBER OF PATENTS	RANKING	
	2010-2011	2000-2001	2010-2011
CALIFORNIA	230	1	1
OHIO	67	4	2
MICHIGAN	66	7	3
MASSACHUSETTS	65	2	4
MINNESOTA	63	9	5
TEXAS	59	5	6
NEW YORK	59	3	6
WISCONSIN	44	8	8
ILLINOIS	38	10	9
COLORADO	33	21	10

NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File. Analysis: Collaborative Economics

FIGURE 28. WATER TECHNOLOGY PATENTS
BY TECHNOLOGY / CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File Analysis: Collaborative Economics

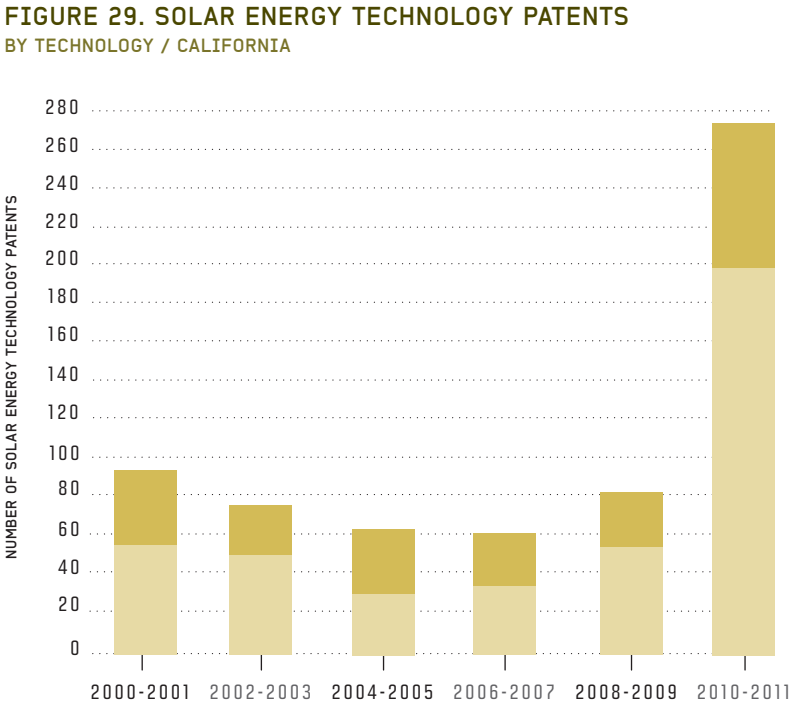
TABLE 6. WATER TECHNOLOGY

TOP RANKING STATES IN PATENTS REGISTERED

	NUMBER OF PATENTS	RANKING	
	2010-2011	2000-2001	2010-2011
CALIFORNIA	166	1	1
TEXAS	112	2	2
FLORIDA	87	4	3
OHIO	50	7	4
MICHIGAN	49	14	5
ILLINOIS	49	3	5
MINNESOTA	48	9	7
PENNSYLVANIA	46	5	8
NEW YORK	44	5	9
COLORADO	37	17	10

NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File. Analysis: Collaborative Economics

FIGURE 29. SOLAR ENERGY TECHNOLOGY PATENTS
BY TECHNOLOGY / CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File Analysis: Collaborative Economics

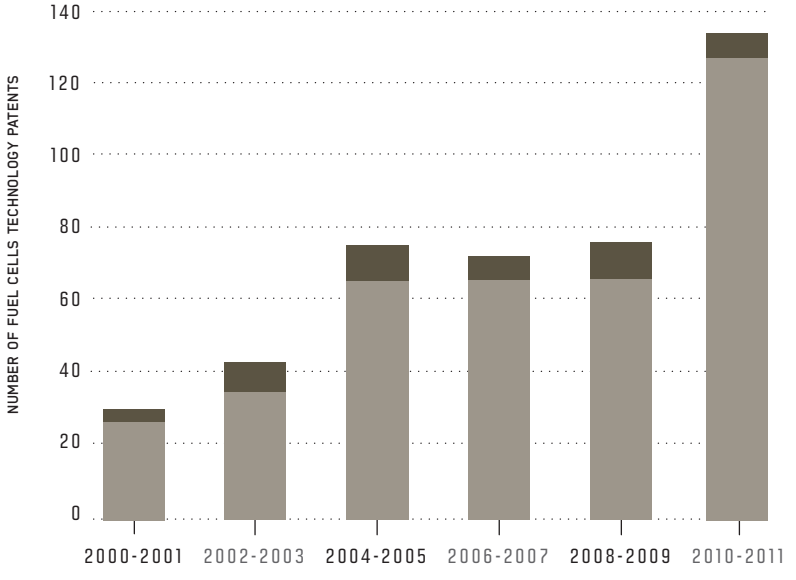
TABLE 7. SOLAR ENERGY TECHNOLOGY

TOP RANKING STATES IN PATENTS REGISTERED

	NUMBER OF PATENTS	RANKING	
	2010-2011	2000-2001	2010-2011
CALIFORNIA	273	1	1
NEW YORK	44	2	2
MICHIGAN	29	15	3
MASSACHUSETTS	29	4	3
FLORIDA	21	12	5
TEXAS	20	3	6
COLORADO	20	5	6
PENNSYLVANIA	18	7	8
NEW MEXICO	18	13	8
NEW JERSEY	15	6	10

NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File. Analysis: Collaborative Economics

FIGURE 30. FUEL CELLS TECHNOLOGY PATENTS
BY TECHNOLOGY / CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File Analysis: Collaborative Economics

TABLE 8

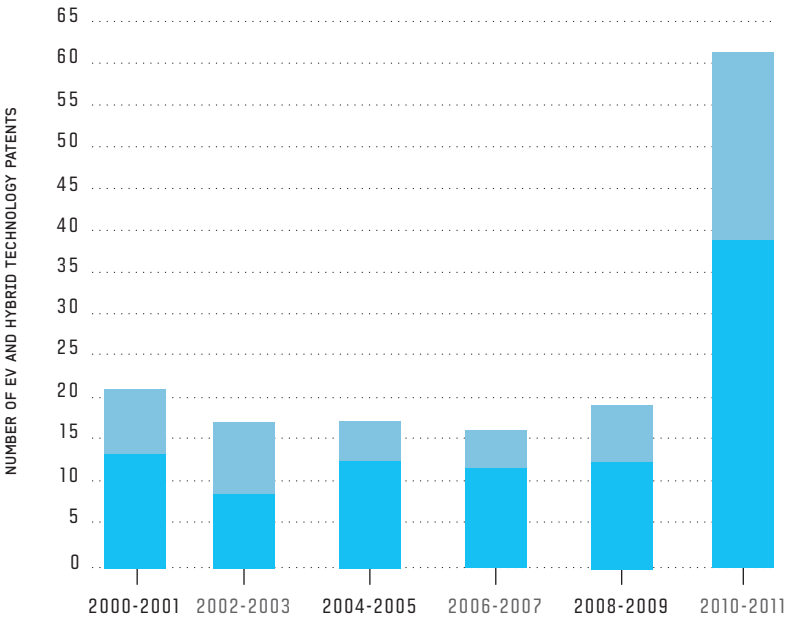
TABLE 8. FUEL CELLS TECHNOLOGY

TOP RANKING STATES IN PATENTS REGISTERED

	NUMBER OF PATENTS	RANKING	
	2010-2011	2000-2001	2010-2011
NEW YORK	210	1	1
CALIFORNIA	133	3	2
CONNECTICUT	67	2	3
MICHIGAN	55	7	4
MASSACHUSETTS	34	5	5
PENNSYLVANIA	28	12	6
MINNESOTA	28	16	6
OREGON	24	27	8
OHIO	24	8	8
ILLINOIS	23	9	10

NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File. Analysis: Collaborative Economics

FIGURE 31. HYBRID & ELECTRIC SYSTEMS TECHNOLOGY PATENTS BY TECHNOLOGY / CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File Analysis: Collaborative Economics

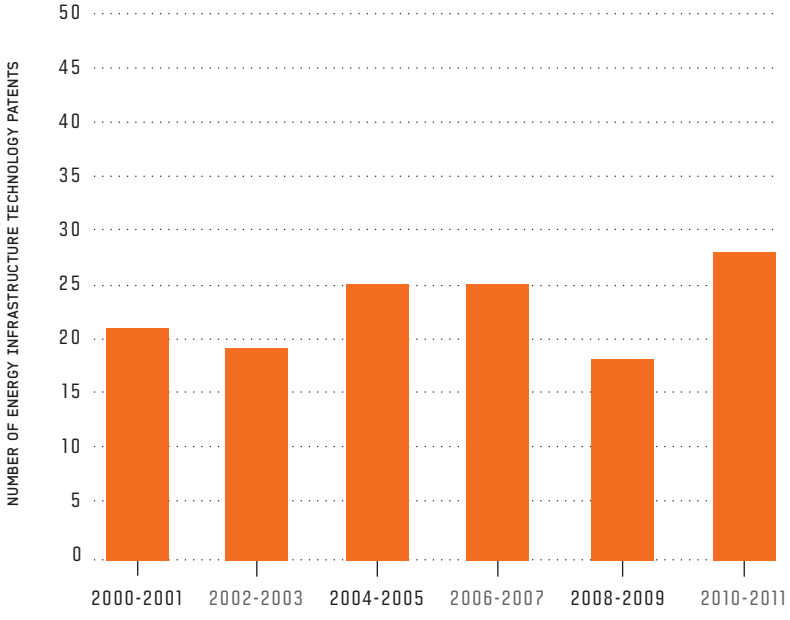
TABLE 9. HYBRID SYSTEMS TECHNOLOGY

TOP RANKING STATES IN PATENTS REGISTERED

	NUMBER OF PATENTS	RANKING	
	2010-2011	2000-2001	2010-2011
MICHIGAN	187	1	1
CALIFORNIA	61	2	2
NEW YORK	16	3	3
INDIANA	16	5	3
ILLINOIS	15	8	5
OHIO	12	4	6
MASSACHUSETTS	9	15	7
FLORIDA	8	9	8
WISCONSIN	7	11	9
OREGON	7	35	9

NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology;
USPTO Patent File. Analysis: Collaborative Economics

FIGURE 32. ENERGY INFRASTRUCTURE TECHNOLOGY PATENTS BY TECHNOLOGY / CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File Analysis: Collaborative Economics

TABLE 10. ENERGY INFRASTRUCTURE TECHNOLOGY

TOP RANKING STATES IN PATENTS REGISTERED

	NUMBER OF PATENTS	RANKING	
	2010-2011	2000-2001	2010-2011
CALIFORNIA	28	1	1
MARYLAND	18	29	2
NEW YORK	14	2	3
GEORGIA	13	10	4
TEXAS	10	5	5
FLORIDA	9	17	6
WISCONSIN	8	8	8
WASHINGTON	8	12	8
PENNSYLVANIA	7	4	9
TENNESSEE	5	20	10

NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: 1790 Analytics, Patents by Technology; USPTO Patent File. Analysis: Collaborative Economics

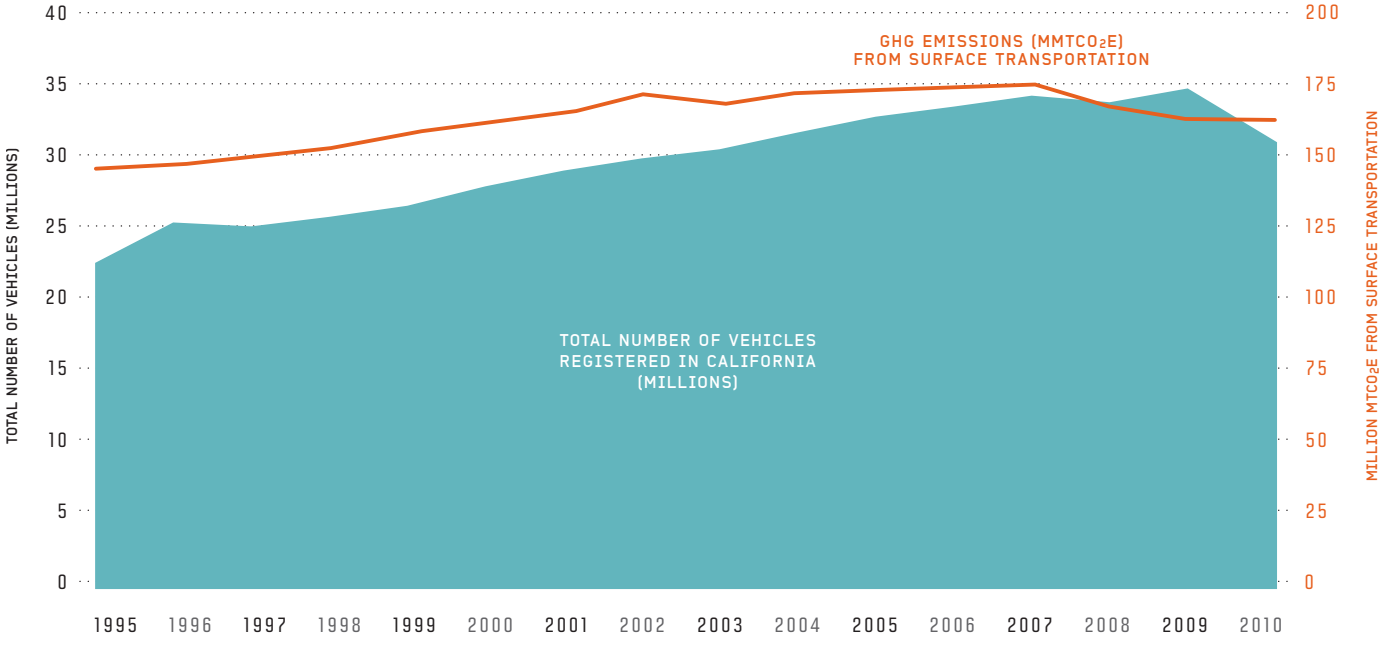
TRANSPORTATION

California has historically led the country, in the transportation sector, being the first state to adopt clean cars policies that reduce carbon emissions from vehicles. California first passed a Clean Cars Program in 2004, which impacts vehicle emissions through model year 2016. In 2012, the ARB voted to adopt an updated Advanced Clean Cars Program, which extends through model year 2025. In March 2012, Governor Brown further pushed the state forward through an executive order for 1.5 million zero-emission vehicles and supporting infrastructure to be operating in California by 2025 (B-16-12), and in February 2013 released an action plan to implement this goal.[17] In addition, the state's Low Carbon Fuel Standard established in 2007 will reduce the carbon pollution from gasoline and diesel by 10 percent by 2020.

WHY IS IT IMPORTANT?

California's transportation network of highways, railways, and shipping and aviation routes facilitates economic activity and improves travel convenience for residents and companies, but it also takes a vast amount of energy to fuel vehicles. In California alone, the transportation sector accounts for more than a third of the state's greenhouse gas emissions. Therefore, it is important to measure progress in making trips more efficient and providing alternatives modes of transportation in order to reduce emissions.

FIGURE 33. TOTAL VEHICLES AND GREENHOUSE GAS EMISSIONS CALIFORNIA



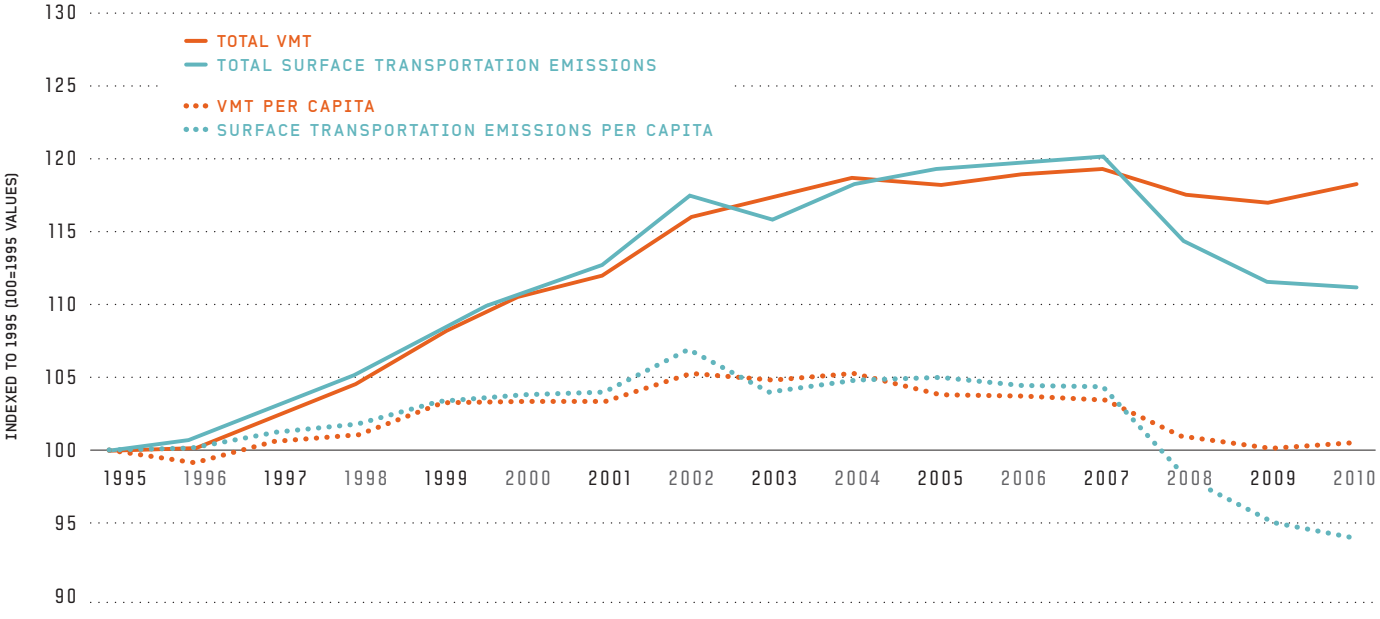
NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Note: Total number of vehicles are for all vehicles registered in California including cars, trucks, buses, and motorcycles. GHG Emissions measured in Million Metric Ton of Carbon Dioxide-Equivalent. Data Source: California Air Resources Board, California Greenhouse Gas Inventory - by Sector and Activity; Federal Highway Administration, U.S. Department of Transportation Analysis: Collaborative Economics

California consumers are taking advantage of state rebates and incentives, and purchasing more clean cars than any other state. In 2012, the state ranked highest in electric vehicle and hybrid vehicle registrations in the U.S., with about 24 percent of hybrid and 32 percent of electric vehicles registered in California.[18] Regions are also taking steps that reduce overall vehicle use while increasing clean cars. San Diego, for example, launched an electric-vehicle car sharing service through Car2Go in 2012 and already has over 12,500 members and spaces across the region.[19]

Since 2007, California has achieved a marked decrease in greenhouse gas emissions from transportation sources. Overall emissions have declined 7.5 percent from the 2007 peak, with a decrease of less than one percent between 2009 and 2010 (Figure 33). This overall decrease occurred while vehicle registrations in the state continued to increase, though there was a ten percent drop in the number of vehicles registered in California between 2009 and 2010.

Total vehicle miles traveled (VMT) and VMT per capita declined slightly from 2007 to 2010 (-1% and -3.2%, respectively), though both increased compared to 2009 (Figure 34). Greenhouse gas emissions from transportation dropped by a much wider margin, with a ten percent drop in per capita emissions between 2007 and 2010, and a continued improvement since 2009 in both overall transportation emissions (-0.3%) and per capita transportation emissions (-1.1%).

FIGURE 34. VEHICLE MILES TRAVELED AND GREENHOUSE GAS EMISSIONS FROM SURFACE TRANSPORTATION TOTAL VMT AND EMISSIONS AND PER CAPITA / CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: California Air Resources Board, California Greenhouse Gas Inventory - by Sector and Activity; California Department of Transportation; California Department of Finance Analysis: Collaborative Economics

EMPLOYMENT IN THE CORE CLEAN ECONOMY: A DECADE IN REVIEW

California's clean economy is growing and creating new jobs and business opportunities across a diverse set of sectors. The growing clean economy encompasses both the emergence of new industries and the transformation of existing industries. There are multiple facets to the changes underway, and they are interrelated. At the center of these developments is the "Core Clean Economy," which encompasses businesses that provide the products and services that allow the entire economy to transition away from fossil fuels and improve efficiencies in the use of all natural resources.

Across the economy, economic actors including businesses, households, government and others are reexamining their processes to find ways to conserve resources in an effort to reduce costs or in anticipation of pending regulatory changes. This diverse set of actors makes up the "Adaptive Clean Economy," and it represents the growing demand for and application of the products and services from the Core Clean Economy. Examples of businesses benefiting from their transition to cleaner, more resource efficient operations include large corporations such as Staples, Walmart, and FedEx. In addition, new businesses are increasingly being founded on principles of sustainability and their products are developed with consideration for the entire product life-cycle. The Adaptive Clean Economy reflects the broader economic transformation but is not included in this analysis. This would require detailed surveys of households, businesses, schools, churches, public and all other entities on how they are changing their purchasing habits and operations.

LONG TERM GROWTH ACROSS DIVERSE SECTORS

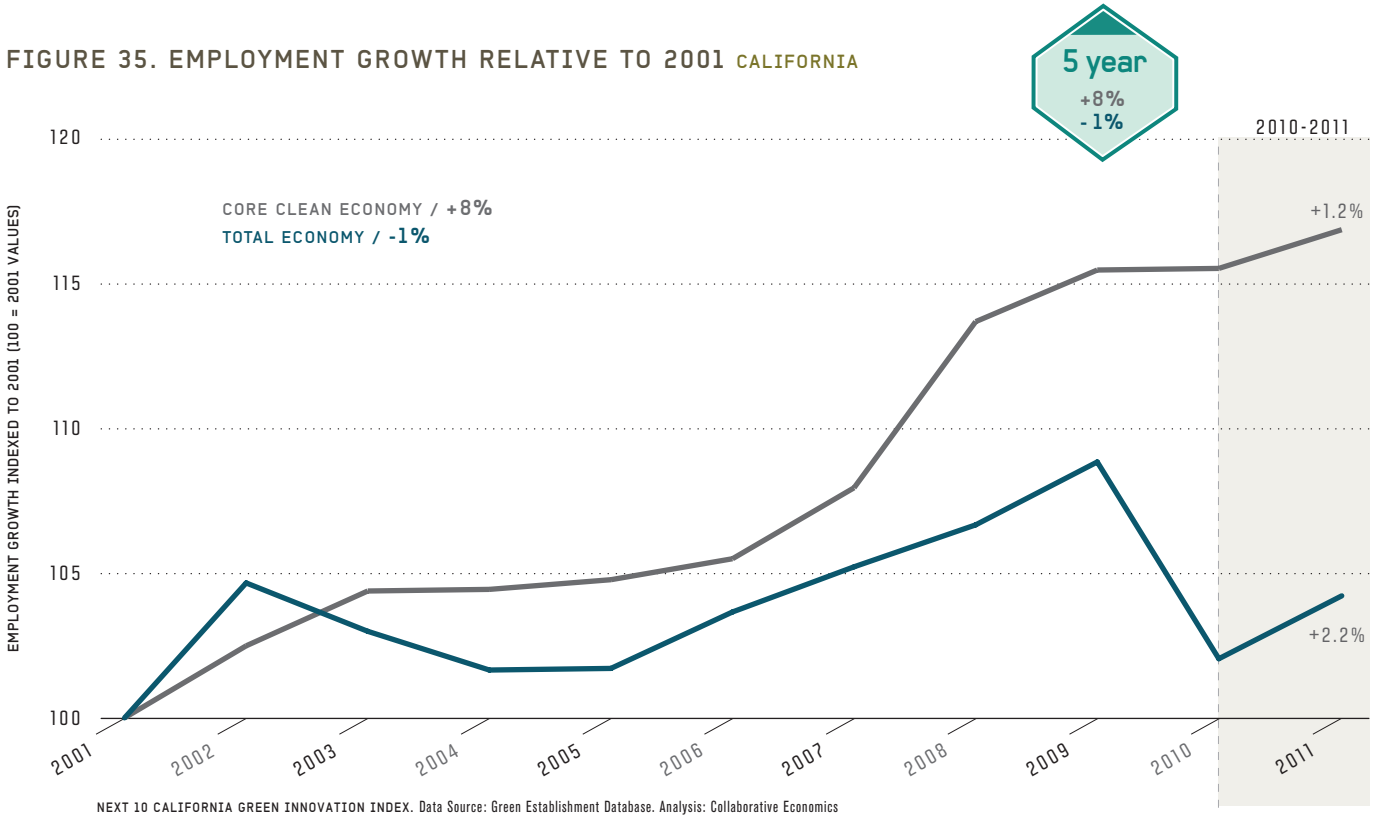
Employment in California's Core Clean Economy has grown four times faster than the total state economy over the past ten years, reaching more than 176,000 jobs in January 2011 (Figure 35). The Core Clean Economy keeps California on the leading edge of a more efficient and more competitive economy, and represents a diverse mix of industries and activities, ranging from cutting-edge clean energy generation technologies, to recycling and energy efficiency consulting. Table 11 describes the fifteen segments of the Core Clean Economy.

While the Clean Economy continues its steady growth, California's economy as a whole is picking up its pace.

Between January 2010 to January 2011 (the most recent observable period), employment growth in the Core Clean Economy increased at a rate of 1.2 percent while total statewide employment expanded by 2.2 percent.

Over the last decade and during the recent economic downturn, California's Clean Economy has grown at a faster rate than the economy as a whole. Compared to pre-recession levels in January 2008, employment in the Core Clean Economy expanded nearly three percent while the total economy dropped two percent. Over ten years, employment in California's Core Clean Economy increased 17 percent, while the total economy expanded by only four percent from January 2001 to 2011 (Figure 35).

FIGURE 35. EMPLOYMENT GROWTH RELATIVE TO 2001 CALIFORNIA

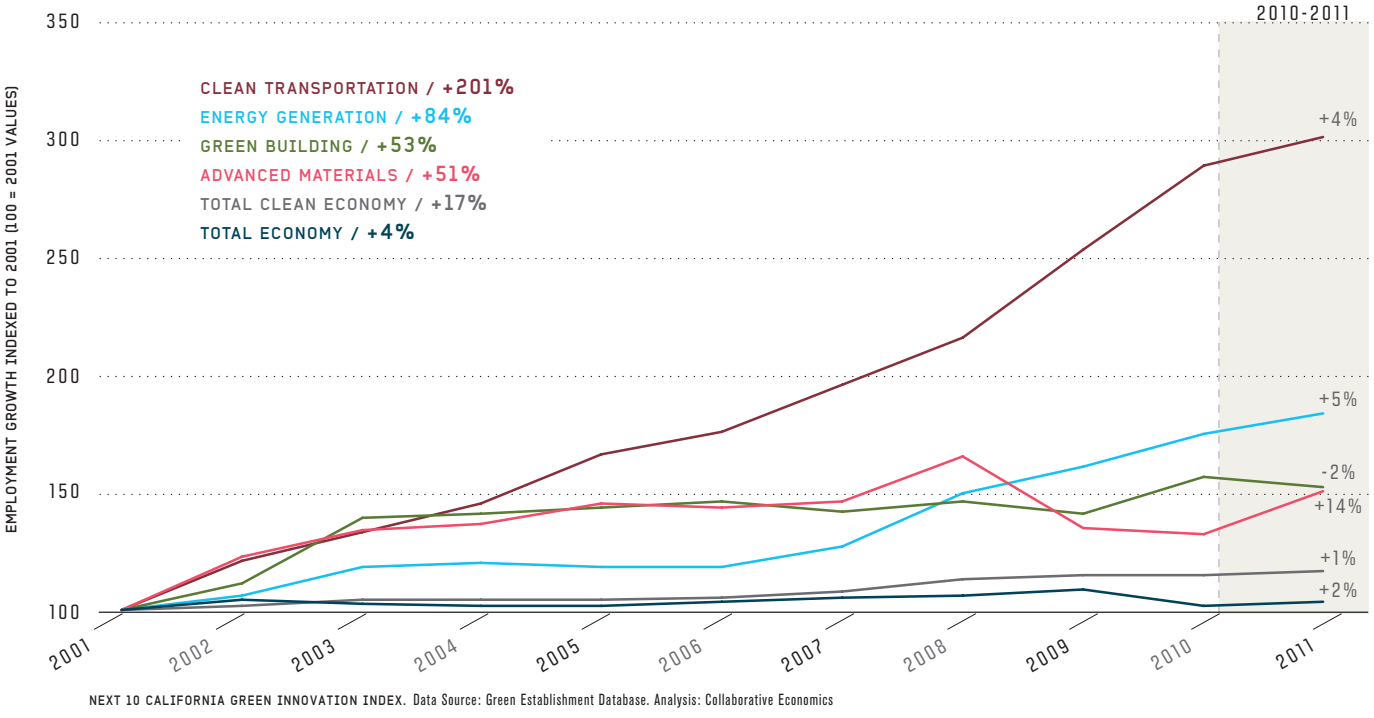


NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: Green Establishment Database. Analysis: Collaborative Economics

TABLE 11. THE FIFTEEN SEGMENTS OF THE CORE CLEAN ECONOMY

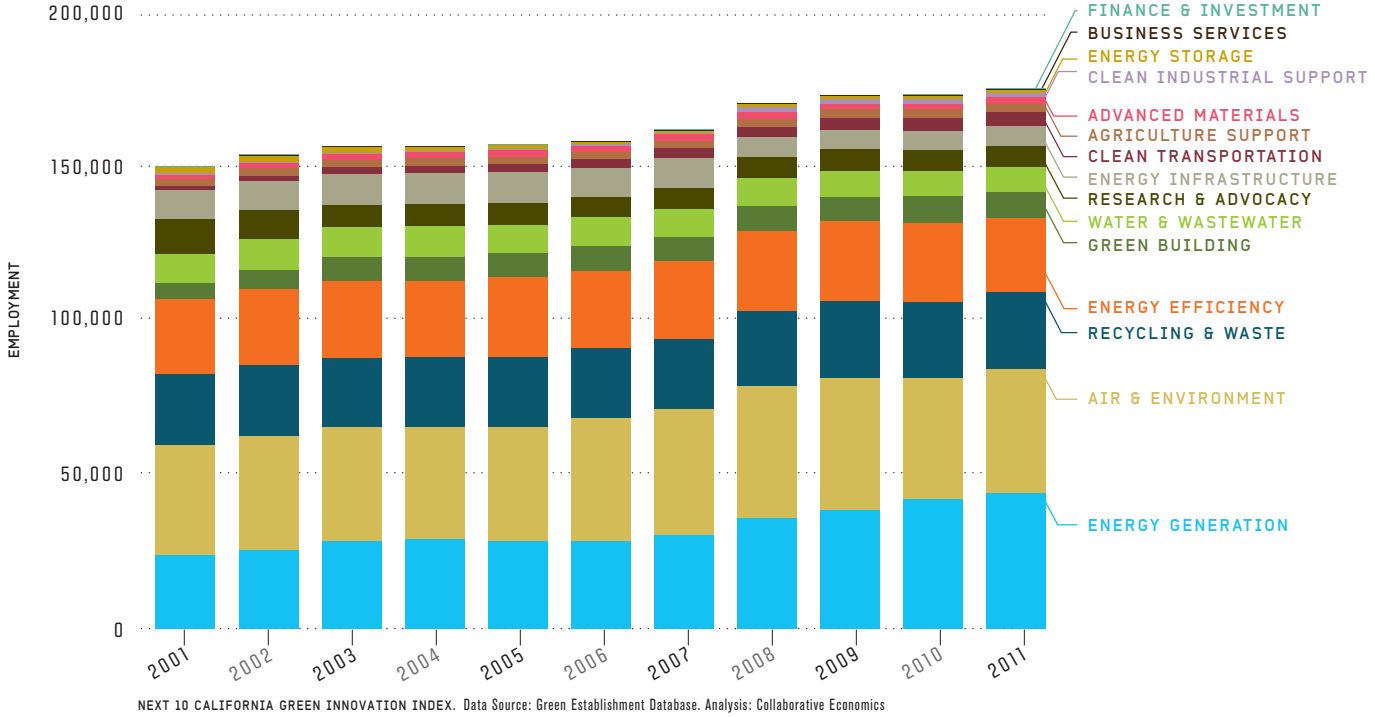
CLEAN ECONOMY SEGMENT	DESCRIPTION	
Energy Generation	• Renewable energy generation (all forms of solar, wind, geothermal, biomass, hydro, marine and tidal, hydrogen, co-generation)	• Renewable energy consulting services • Associated equipment, controls, and other management software and services
Energy Efficiency	• Energy conservation consulting and engineering • Building efficiency products and services	• Alternative energy appliances (solar heating, lighting, etc.) • Energy efficiency meters and measuring devices
Clean Transportation	• Alternative fuels (biodiesel, hydrogen, feedstock-neutral ethanol infrastructure) • Motor vehicles & equipment (electric, hybrid, and natural gas vehicles, diesel technology)	
Energy Storage	• Advanced batteries (Li-Ion, NiMH) • Battery components and accessories	• Fuel cells
Air & Environment	• Environmental consulting (environmental engineering, sustainable business consulting)	• Emissions monitoring and control • Environmental remediation
Recycling & Waste	• Consulting services • Recycling (paper, metal, plastics, rubber, bottles, automotive, electronic waste and scrap)	• Recycling machinery manufacturing • Waste treatment
Water & Wastewater	• Water conservation (control systems, meters and measuring devices) • Development and manufacturing of pump technology	• Research and testing • Consulting services • Water treatment and purification products/services
Agriculture Support	• Sustainable land management and business consulting services	• Sustainable pest control & fertilizer • Sustainable aquaculture
Research & Advocacy	• Organizations and research institutes focused on advancing science and public education in the areas of: renewable energy and alternative fuels and transportation.	
Business Services	• Environmental law legal services • Green business portals	• Green staffing services • Green marketing and public relations
Finance & Investment	• Emission trading and offsets • Venture capital and private equity investment	• Project financing (e.g. solar installations, biomass facilities, etc.)
Advanced Materials	• Bioplastics	• New materials for improving energy efficiency
Green Building	• Design and construction • Building materials	• Site management • Green real estate and development
Clean Industrial Support	• Advanced packaging • Process management and consulting	Industrial surface cleaning Support for developing and sourcing components
Energy Infrastructure	• Consulting and management services • Transmission (Sensors, Controls, Smart Grid)	• Cable and equipment

FIGURE 36. LEADING CORE CLEAN ECONOMY SEGMENT GROWTH RELATIVE TO 2001 CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: Green Establishment Database. Analysis: Collaborative Economics

FIGURE 37. EMPLOYMENT BY CLEAN ECONOMY SEGMENT CALIFORNIA



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Since 2001, employment has increased in ten of the fifteen Core Clean Economy segments described in Table 11. Clean Transportation recorded one of the largest jumps with employment tripling between January 2001 and 2011 (Figure 36). Job growth has also been strong over the decade in Energy Generation (+84%), Green Building (+53%), and Advanced Materials (+51%).

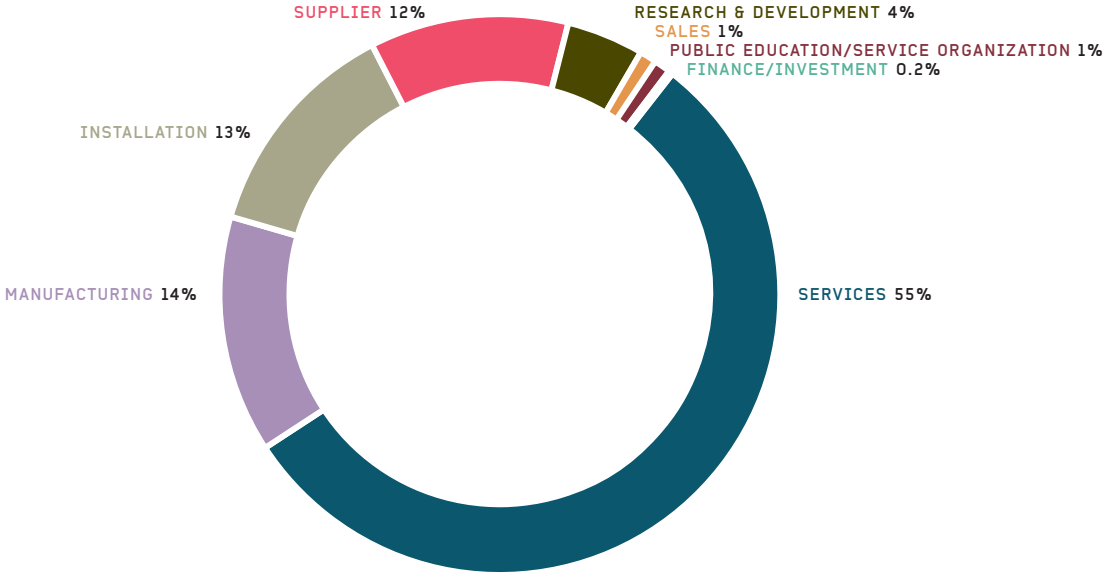
More recently, growth in the Core Clean Economy by segment was more diverse (Figure 37). Advanced Materials employment increased by the largest percentage, growing by 14 percent from January 2010 to 2011, followed by Energy Infrastructure (+8%), Energy Generation (+5%), and Clean Transportation (+4%). Over the same time period, other segments decreased, such as Energy Efficiency (-6%) and Green Building (-3%). Energy Generation and Air & Environment remain the largest Core Clean Economy segments, representing 25 and 23 percent respectively.

DIVERSE BUSINESS ACTIVITIES, EXPANDING FROM R&D TO MANUFACTURING

In addition to viewing the Core Clean Economy by segment, that is, by the field of application of products and services, businesses can also be viewed by their primary function or daily activity along the production value chain. From the point of conception until delivery to the customer and maintenance over the lifetime of the product, there are many distinct activities that take place in the economy. These functions include Research & Development, Manufacturing, Supplying components or raw materials, Installation, Sales, Services, and Public Education Services.

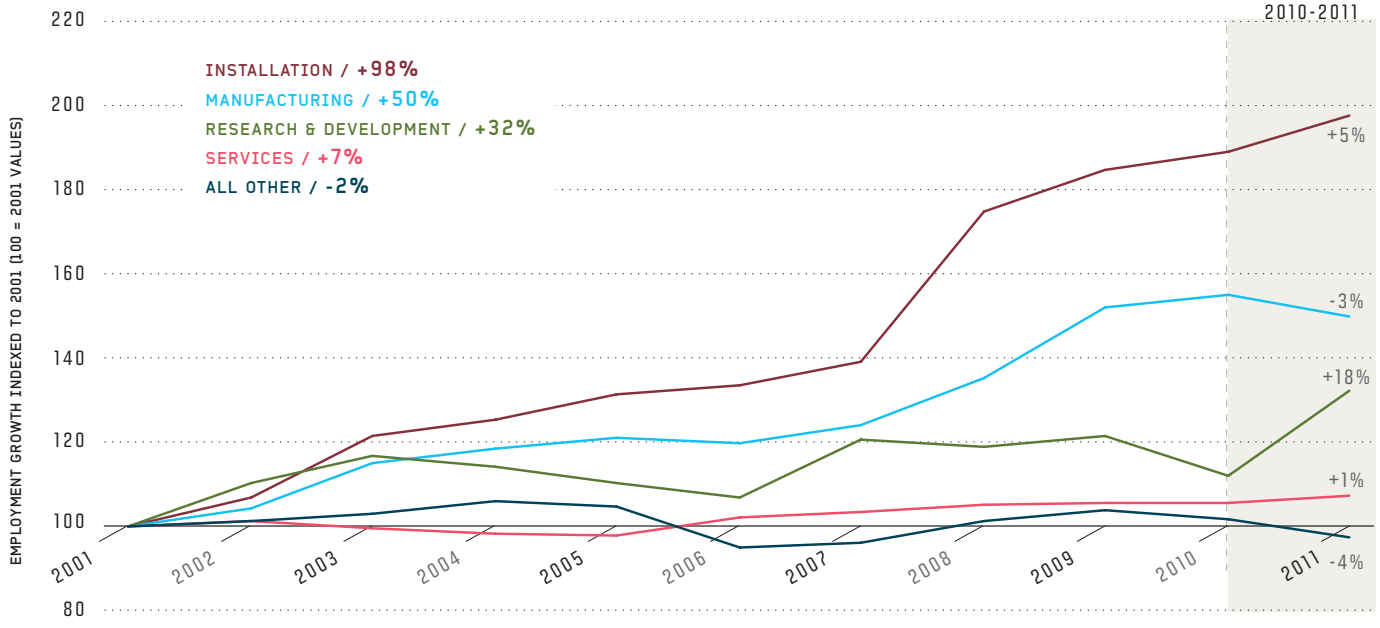
Services comprise the majority (55%) of jobs across California's Core Clean Economy as of January 2011 (Figure 38). Services include companies such as those that provide design, technical and logistical support, consult on environmental impacts or energy efficiency projects, or manage recycling facilities, and therefore encompass a larger range of companies than other value chain functions. Manufacturing is the next largest activity in the Core Clean Economy with 14 percent of employment.

FIGURE 38. CORE CLEAN ECONOMY BY VALUE CHAIN FUNCTION CALIFORNIA, 2011



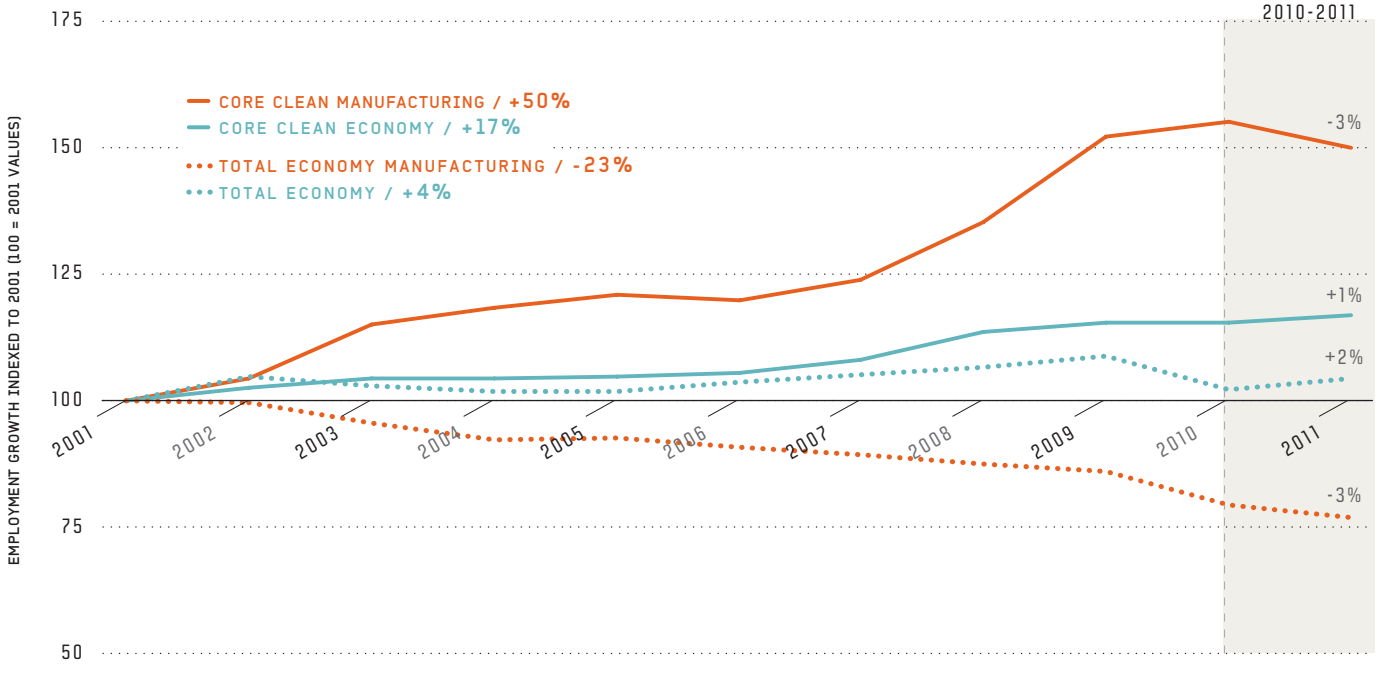
NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: Green Establishments Database Analysis: Collaborative Economics

FIGURE 39. VALUE CHAIN FUNCTION EMPLOYMENT GROWTH RELATIVE TO 2001 CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. "All Other" includes Supplier, Sales, Finance/Investment, and Public Education/Service Organization value chain functions Data Source: Green Establishments Database Analysis: Collaborative Economics

FIGURE 40. MANUFACTURING EMPLOYMENT GROWTH RELATIVE TO 2001 CALIFORNIA



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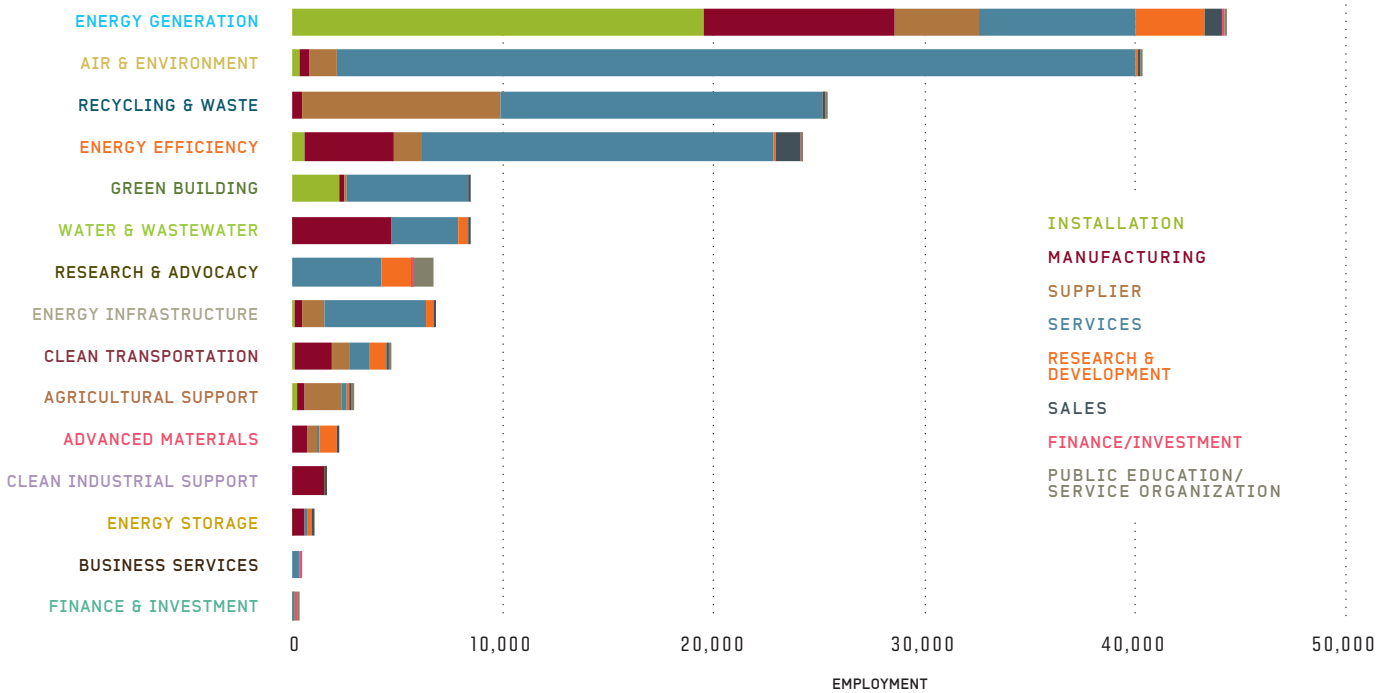
Installation is third largest with 13 percent of jobs, then Supplier with 12 percent, such as providers of recycled materials.

Value chain functions have grown at a varying pace over the past ten years (Figure 39). Installation increased the most, with employment in this activity up 98 percent since January 2001, driven largely by market improvement in the Energy Generation sector with solar companies such as Solar City installing more systems. Manufacturing reported the next largest jump with 50 percent more employees over the same time period. Research & Development increased 32 percent, though employment remains relatively low compared to other value chain functions. From January 2010 to 2011, Research & Development grew 18 percent, followed by Installation and Public Education/ Service Organization with a five percent increase. At the same time, other sectors such as Sales (-7%) and Supplier (-3%) decreased.

Most recently, between January 2010 and 2011, employment at manufacturing firms in the Core Clean Economy declined by about three percent due to factors such as increased foreign competition and political and market uncertainty, though remains 50 percent above 2001 employment levels (Figure 40). Across the state's entire economy, manufacturing employment experienced a similar three percent decrease from January 2010, but remains 23 percent below 2001 levels.

Each Core Clean Economy segment reflects a different mix of value chain activities, as seen in Figure 41. For example, most Installation jobs (85%) were concentrated in Energy Generation, followed by Green Building (10%). A majority of Services employment was in Air & Environment (39%) and Energy Efficiency (17%) including jobs that provide analysis, auditing, and services such as consulting or remediation. Manufacturing jobs were distributed across multiple segments, with most in Energy Generation (38%), Water & Wastewater (19%), and Energy Efficiency (17%). Energy Generation is the largest segment of the Core Clean Economy and also accounts for the highest concentration of jobs in Research & Development and Finance & Investment. Supplier jobs were concentrated in Recycling & Waste (47%), and Energy Efficiency accounted for the largest number of Sales jobs (43%).

FIGURE 41. VALUE CHAIN EMPLOYMENT BY SEGMENT CALIFORNIA, 2011



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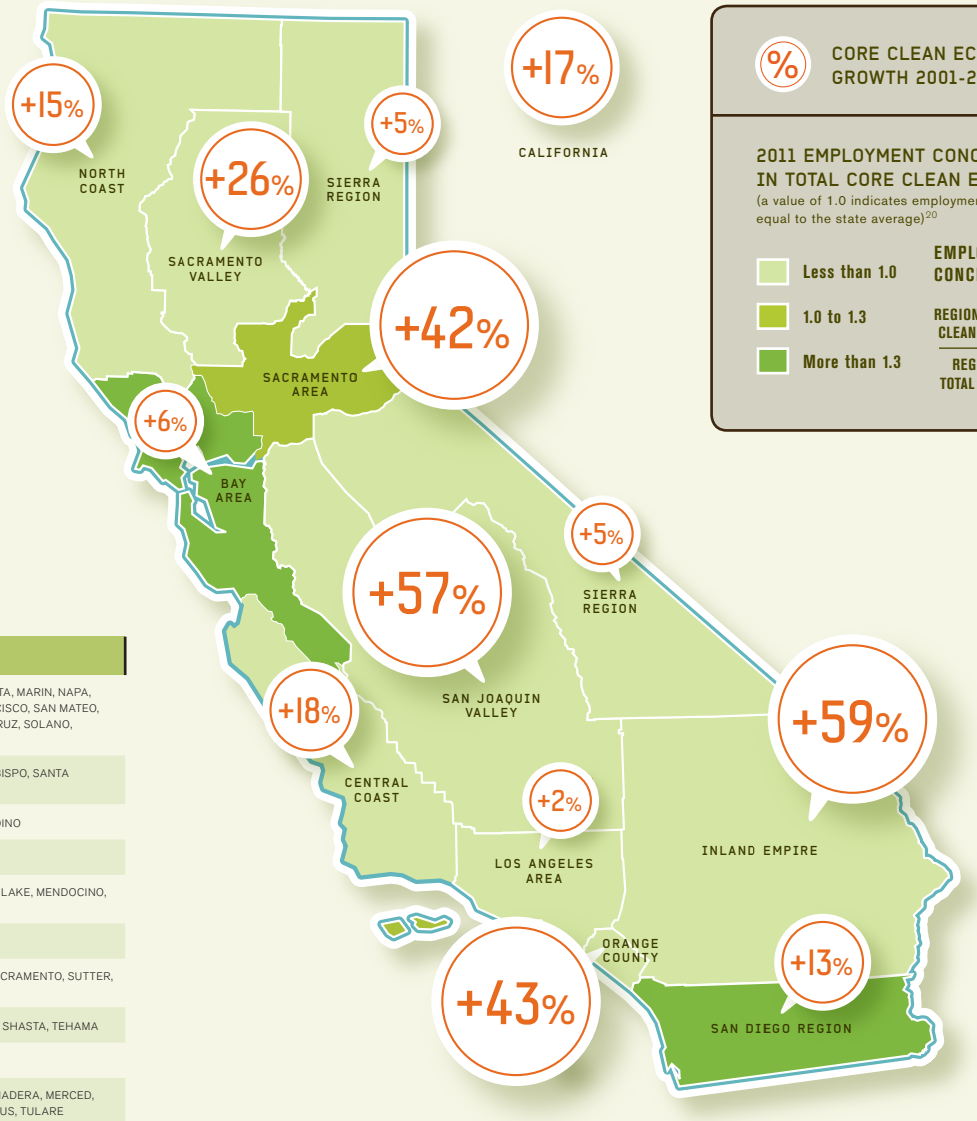
REGIONAL DISTRIBUTION and TRENDS

The Core Clean Economy is present in every region in California, and each region has its own areas of specialization.

TOTAL CORE CLEAN ECONOMY / PERCENT CHANGE IN EMPLOYMENT FROM 2001 TO 2011
EMPLOYMENT CONCENTRATION BY REGION RELATIVE TO CALIFORNIA



REGION DESCRIPTIONS

BAY AREA	ALAMEDA, CONTRA COSTA, MARIN, NAPA, SAN BENITO, SAN FRANCISCO, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, SONOMA
CENTRAL COAST	MONTEREY, SAN LUIS OBISPO, SANTA BARBARA
INLAND EMPIRE	RIVERSIDE, SAN BERNADINO
LOS ANGELES AREA	LOS ANGELES, VENTURA
NORTH COAST	DEL NORTE, HUMBOLDT, LAKE, MENDOCINO, SISKIYOU, TRINITY
ORANGE COUNTY	ORANGE
SACRAMENTO AREA	EL DORADO, PLACER, SACRAMENTO, SUTTER, YOLO, YUBA
SACRAMENTO VALLEY	BUTTE, COLUSA, GLENN, SHASTA, TEHAMA
SAN DIEGO REGION	IMPERIAL, SAN DIEGO
SAN JOAQUIN VALLEY	FRESNO, KERN, KINGS, MADERA, MERCED, SAN JOAQUIN, STANISLAUS, TULARE
SIERRA REGION	ALPINE, AMADOR, CALAVERAS, INYO, LASSEN, MARIPOSA, MODOC, MONO, NEVADA, PLUMAS, SIERRA, TUOLUMNE

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Data Source: Green Establishment Database
Analysis: Collaborative Economics

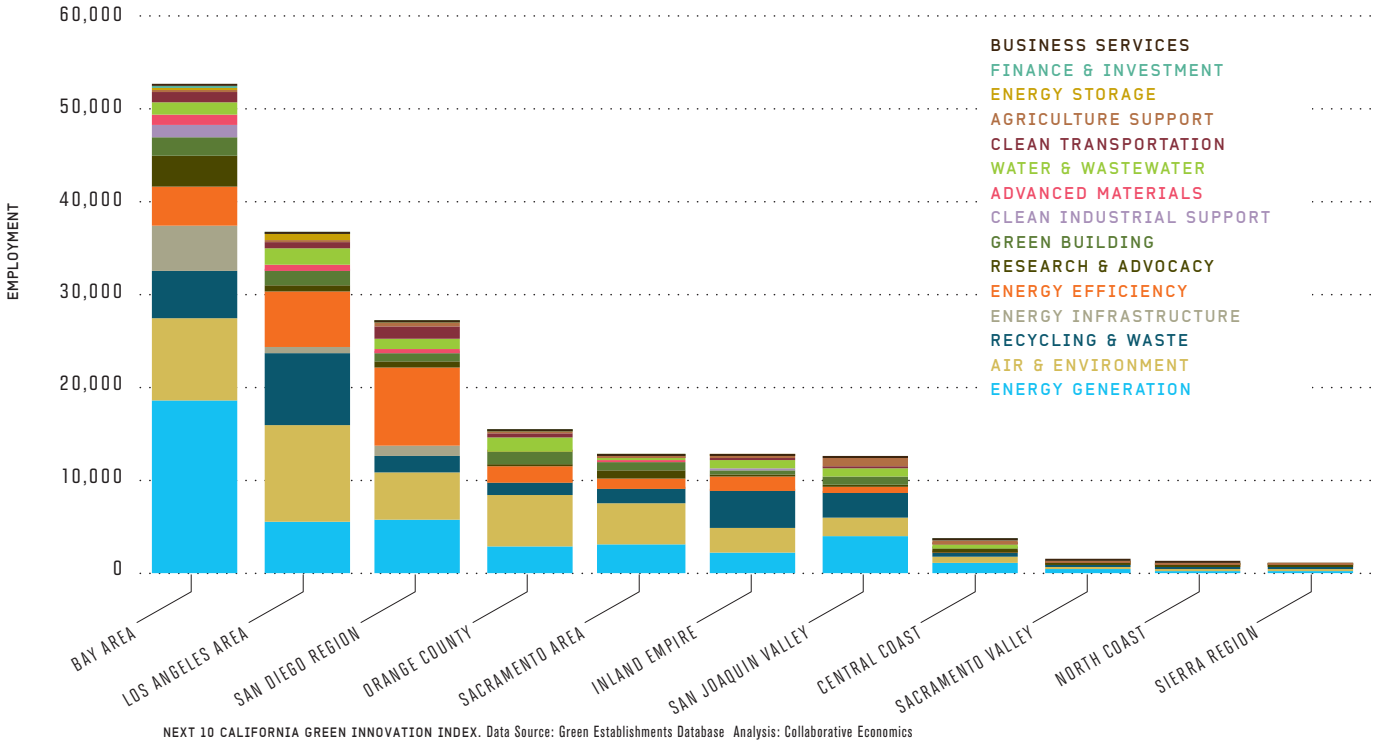
California's diverse regions reflect different strengths within the Core Clean Economy, based on unique regional assets, private sector engagement and constructive public policy (Figure 42). The Bay Area (including Silicon Valley) accounted for the largest share of clean economy jobs (30%) as of January 2011, along with the highest concentration of jobs in Energy Generation, Energy Infrastructure, Green Building, and Advanced Materials segments.

Other regions took the lead in different segments, highlighting California's varied regional expertise. The San Diego Region, for example, reflected the highest employment levels in Energy Efficiency, accounting for 36 percent of California jobs in the segment. San Diego also leads in Clean Transportation with 32 percent of state employment. The second largest region in terms of total employment in the Core Clean Economy, the Los Angeles Area represents 21 percent of jobs in California and led the state in Air & Environment, Energy Storage, Recycling & Waste, and Water & Wastewater. The San Joaquin Valley was the leader in Agriculture Support employment, with 31 percent of jobs statewide in that segment.

California's job growth in the Core Clean Economy over the past decade is reflected across all regions, as seen in Figure 43. Employment growth was strongest in the Inland Empire at 59 percent followed by the San Joaquin Valley at 57 percent between January 2001 and January 2011. Orange County (+43%), the Sacramento Area (+42%) and the Sacramento Valley (+26%) also witnessed strong growth over the same period.

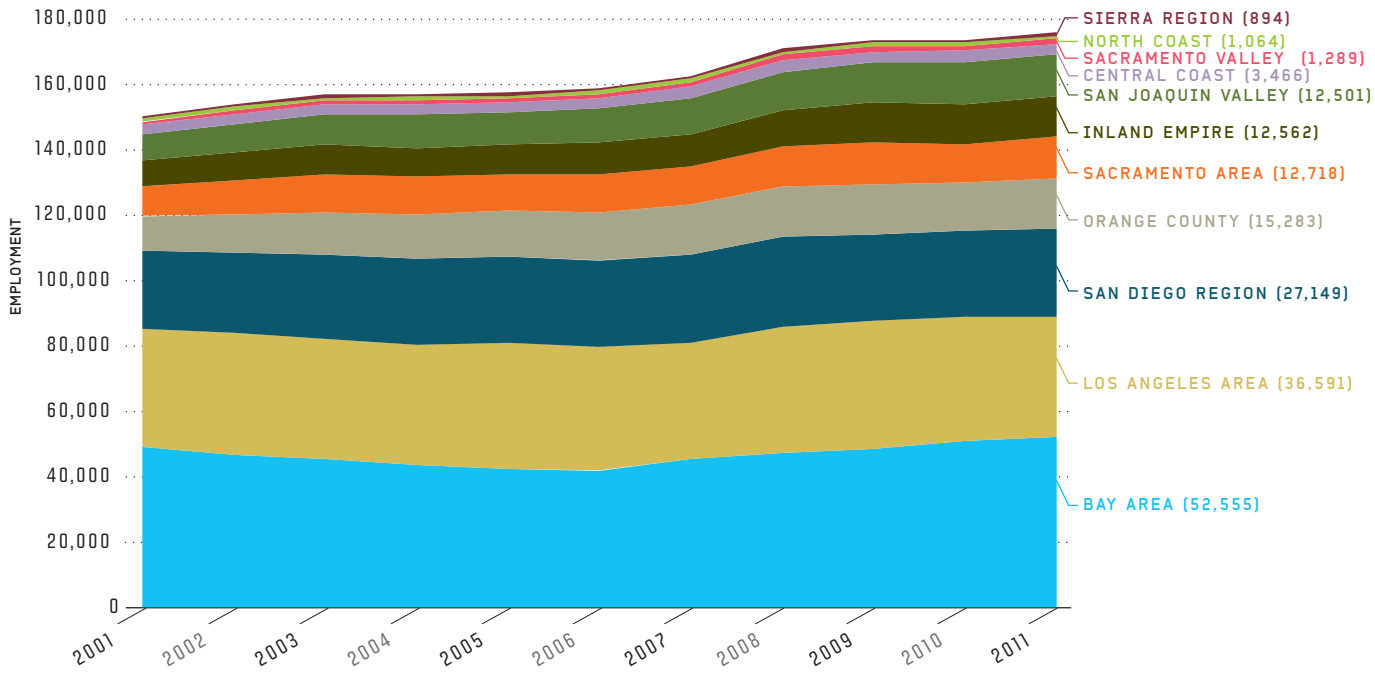
In the most recent year (January 2010 to January 2011), some regions demonstrated stronger growth than the state as a whole. The Sacramento Area reported the strongest growth overall, up ten percent from January 2010 to January 2011, with jumps in Advanced Materials and Air & Environment segments. The Sierra Region's clean economy employment grew by 4.6 percent over the same time period, the second fastest rate in California, largely due to a 12 percent increase in Energy Generation employment (Table 12). The Central Coast reported the third highest growth rate in the state at 4.2 percent, boosted by strong growth in Energy Generation (+22%) and Energy Efficiency (+53%) employment. In contrast, other regions witnessed employment losses in the

FIGURE 42. EMPLOYMENT BY CLEAN ECONOMY SEGMENT / CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX. Data Source: Green Establishments Database Analysis: Collaborative Economics

FIGURE 43. EMPLOYMENT BY REGION OVER TIME CALIFORNIA



NEXT 10 CALIFORNIA GREEN INNOVATION INDEX Data Source: Green Establishments Database Analysis: Collaborative Economics

recent period: the Sacramento Valley (-12%), Los Angeles Area (-3.9%) and the San Joaquin Valley (-3.6%).

From January 2010 to January 2011, employment in the majority of clean economy segments increased in California, though the statewide trends masked more pronounced growth in individual regions, as seen in Table 12. The most robust growth was in Advanced Materials with strong employment gains in Orange County (+63%), the San Diego Region (+46%) and the Sacramento Area (+40%). Energy Efficiency employment fell by 6.3 percent statewide, but still grew strongly in the Central Coast (+53%), the Sacramento Area (+14%) and the Sacramento Valley (+11%). The recent growth by segment reveals expanding regional expertise, such as Energy Generation in the Inland Empire, Clean Transportation in the San Diego Region and the North Coast, and Energy Infrastructure in the Bay Area and Orange County.

MORE RESEARCH ON CLEAN ECONOMY JOBS

For more information on how the clean economy can impact employment, please see:

- Wei, Patadina, and Kammen. "Putting renewables and energy efficiency to work: How many jobs can the clean energy industry generate in the U. S.?" 2010. http://rael.berkeley.edu/node/585
- Congressional Budget Office. "How Policies to Reduce Greenhouse Gas Emissions Could Affect Employment." 2010. http://www.cbo.gov/publication/41257

TABLE 12. REGIONAL EMPLOYMENT CHANGE BY CLEAN ECONOMY SEGMENT

PERCENT CHANGE IN EMPLOYMENT FROM JANUARY 2010 TO JANUARY 2011

	CALIFORNIA	SACRAMENTO AREA	SIERRA REGION	CENTRAL COAST	BAY AREA	SAN DIEGO REGION	ORANGE COUNTY	INLAND EMPIRE	NORTH COAST	SAN JOAQUIN VALLEY	LOS ANGELES AREA	SACRAMENTO VALLEY
Advanced Materials	14%	40%	X	X	12%	46%	63%	X	X	X	-2%	X
Energy Infrastructure	8%	0%	0%	X	11%	0.2%	27%	X	X	0%	1%	X
Energy Generation	5%	5%	12%	22%	3%	16%	4%	17%	3%	-3%	3%	-1%
Business Services	4%	0%	X	50%	1%	0%	-25%	0%	0%	-14%	22%	0%
Clean Transportation	4%	1%	0%	-6%	8%	11%	-4%	-7%	20%	11%	-6%	0%
Finance & Investment	4%	0%	X	0%	3%	0%	0%	X	X	X	18%	X
Recycling & Waste	2%	6%	8%	1%	9%	6%	5%	-1%	6%	-5%	1%	-23%
Air & Environment	1%	19%	0.4%	-10%	1%	0.1%	-0.4%	1%	-9%	-6%	-0.4%	-20%
Research & Advocacy	0.1%	3%	5%	-1%	3%	-8%	-5%	-6%	-9%	-1%	-1%	-6%
Agricultural Support	-1%	-2%	0%	2%	5%	1%	1%	-14%	3%	0.1%	7%	-7%
Energy Storage	-1%	0%	X	X	25%	0%	-8%	29%	X	X	-8%	X
Water & Wastewater	-2%	0%	-3%	-7%	-5%	-13%	17%	-4%	0%	-7%	1%	-17%
Clean Industrial Support	-2%	X	0%	X	-2%	11%	0%	0%	X	X	0%	X
Green Building	-3%	1%	0%	-4%	0%	1%	-6%	-10%	10%	-0.1%	-6%	10%
Energy Efficiency	-6%	14%	-18%	53%	-1%	-2%	1%	-3%	-11%	-7%	-20%	11%
Total Core Clean Economy	1%	10%	5%	4%	3%	3%	2%	1%	-2%	-4%	-4%	-12%
Employment Concentration Relative to California, 2011	1.0	1.2	0.6	0.6	1.3	1.6	0.9	0.9	0.7	0.9	0.7	0.6

GREEN EMPLOYMENT DECREASED < -10%
GREEN EMPLOYMENT DECREASED BY 0-10%
GREEN EMPLOYMENT STAYED THE SAME
PERCENT CHANGE COULD NOT BE CALCULATED BECAUSE GREEN EMPLOYMENT IN 2010 WAS 0
GREEN EMPLOYMENT INCREASED BY 0-10%
GREEN EMPLOYMENT DECREASED > 10%

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ENDNOTES

1 California ARB. "Cap-and-Trade Program." January 25, 2013. http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm

2 Bloomberg. In December of 2013, Bloomberg News reported that Edison International inadvertently submitted bids for 21 times more allowances than it had intended. The utility was not permitted to resubmit a corrected bid. http://www.bloomberg.com/news/2012-12-20/edison-snafu-skews-demand-in-first-california-carbon-permit-sale.html

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11 In 1978 (gas) and 1982 (electricity) the California Public Utility Commission ruled that utlities' revenues should be divided from their energy sales (decoupling), which created incentive for utilities to reduce electricity sales. After a brief reversal in this policy from 1996 to 2001 in the electricity market, the policy was reinstated by the legislature. Source: ACEE. http://aceee.org/energy-efficiency-sector/state-policy/california/1575/all/191

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13 Davis,Tina and Ehren Goossens. "Buffett Utility Buys $2.5 Billion SunPower Solar Projects." January 2, 2013. Bloomberg. http://www.bloomberg.com/news/print/2013-01-02/buffett-utility-buys-sunpower-projects-for-2-billion.html

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16 Cleantech Group at Heslin Rothenberg Farley & Mesiti P.C. "Clean Energy Patent Growth Index 3rd Quarter 2012." December 27, 2012. http://cepgi.typepad.com/files/cepgi-3d-quarter-2012-1.pdf

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19 San Diego Regional Economic Development Corporation. "San Diego's Top 10 Cleantech Milestones." December 18, 2012. http://www.sandiegobusiness.org/category/tags/smart-city-san-diego

20 Employment concentration = (region core clean jobs/region total jobs) divided by (state core clean jobs/state total jobs)

Employment concentration in a region equals a region's percent of core clean economy jobs divided by the statewide percent of core clean economy jobs. A value of 1.0 indicates the percentage of jobs in a region that are in the core clean economy is equal to the state's percentage of core clean economy jobs. A value of greater than 1.0 indicates a regional specialization with more clean economy jobs compared to the state average.

APPENDIX

GENERAL REFERENCES

Inflation Adjustment

Inflation-adjusted figures are converted into 2012 dollars using the U.S. city average Consumer Price Index (CPI) of all urban consumers, published by the Bureau of Labor Statistics.

Gross Domestic Product

Nominal gross domestic product (GDP) data for California, states and the nation are sourced from the Bureau of Economic Analysis, U.S. Department of Commerce. Real GDP figures are nominal GDP data converted into 2012 dollars, as specified in Inflation Adjustment.

Population

California population data used to calculate per capita figures are from the California Department of Finance's "E-4 Population Estimates for Cities, Counties and the State 2001-2010, with 2000 and 2010 Census Counts." National, state and "U.S. without California" population data are from the U.S. Census Bureau, Population Estimates Branch.

CALIFORNIA CAP-AND-TRADE PROGRAM

Entities covered under the cap-and-trade program are from the "List of Covered Entities" provided by the California Air Resources Board (CARB) as of November 2012. The industry sector for each entity is classified using CARB's Primary Reporting Sector listed in the 2010 Mandatory Reporting Facility Summary and by North American Industry Classification System (NAICS) six-digit code when CARB's reporting sector was unavailable.

THE CARBON ECONOMY

Global Fossil Fuel Combustion and Carbon Economy in California and Other Regions

For the U.S. overall and other countries, data for carbon dioxide emissions from the consumption of energy from U.S. Department of Energy, Energy Information Administration (EIA), International Energy Statistics. State level emissions data come from EIA's State CO2 Emissions. Calculations used GDP and Population data where applicable, as described above.

GHG Emissions and Gross Domestic Product, Total California Greenhouse Emissions, Emissions by Source, Emissions by Detailed Source

Greenhouse gas (GHG) emissions data for these figures are from CARB's "California Greenhouse Gas Inventory – by Sector and Activity" (September 2012). Calculations used GDP and Population data where applicable, as described above.

ENERGY EFFICIENCY

Energy Productivity, Energy Consumption Relative to 1970

Energy data used in both analyses are from the U.S. Department of Energy, EIA, State Energy Data System, Consumption Estimates, 1960-2010. Data is for total energy consumption, in British Thermal Units (BTU). Energy productivity divides GDP by total energy consumption. Energy consumption creates a gross and per capita index, where 1970=100. Calculations used GDP and Population data where applicable, as described above.

Electricity Consumption Relative to 1990, Statewide Electricity Bill as a Percent of GDP

Electricity consumption and pricing data are from the U.S. Department of Energy, EIA, Current and Historical Monthly Retail Sales, Revenues and Average Retail Price per Kilowatt-hour by State and by Sector (Form EIA-826), and includes the amount of electricity sold to end users (excludes self-generation). Electricity consumption calculates the gross and per capita index, where 1990=100. Electricity Bill Percent of GDP multiplies monthly retail sales and prices (by sector), aggregates by year and then divides by GDP.

Electricity Consumption by Sector

Electricity consumption data are from the California Energy Commission's California Energy Consumption Data Management System: Electricity Consumption by Entity. Data includes all utility types.

Electricity Bill by Sector

Data to calculate electricity bills by sector are from 1990 – 2011 use Retail Sales of Electricity by State by Sector Provider (EIA-861) and 1990 - 2011 Average Price by State by Provider (EIA-861), published by the U.S. Department of Energy, EIA. All figures are inflation-adjusted.

RENEWABLE ENERGY

Renewable Energy Generation

California renewable energy data is from the California Energy Commission, "Net System Power Reports" 2002-2011, Total System Power in Gigawatt Hours (GWh). U.S. total electricity generation data is from the U.S. Department of Energy, EIA, Electric Power Monthly reports. Annual totals from "Table 1.1 Net Generation by Energy Source: Total (All Sectors)," and "Table 1.1.A. Net Generation by Other Renewables: Total (All Sectors)." Because of different renewable energy definitions between California and the U.S., data represented for the U.S. do not include any hydro.

Renewable Portfolio Standard Cumulative Operational Capacity

Data are from the California Public Utilities Commission "RPS Project Status Table 2013 Jan" released on January 9, 2013. Projects include those Approved and Online, Approved in Development, and those in the Renewable Auction Mechanism and Investor-Owned Utility Solar Photovoltaic programs. Years are based on the online date/contracted delivery date.

New Solar Installations, New Solar Installations by Sector

Solar capacity installed data are provided by Solar Energy Industries Association® (SEIA) and GTM Research and the California Solar Initiative SEIA data were taken from the U.S. Solar Market Insight Reports, 2007 through Quarter 3 2012, and includes California Solar Initiative (CSI), municipal utility, and other utility-scale installations. CSI data for this indicator include all completed projects (across all sectors) from January 2007 through December 31, 2012, and the year is based on First Incentive Claim Request Review Date.

Wind Installations

Wind capacity installed and cumulative data are provided by the American Wind Energy Association. Data is taken from quarterly and annual U.S. Wind Industry Market Reports, 2006-2012.

CLEAN TECHNOLOGY INNOVATION

Investment in Clean Technology, all figures

Clean technology investment data are provided by CB Insights™ (www.cbinsights.com) and includes disclosed investment deals in private companies. Data is through December 2012. Data for global clean technology venture capital investment is provided by Cleantech Group™ (www.cleantech.com). All figures were adjusted for inflation, described above.

Venture capital data includes Angel, Seed, Series A-E+, Growth Equity, Bridge, and Incubator series types. Public financing includes only grants and debt series with government entities listed as investors. Private financing includes venture capital, debt (excluding those with government investors), corporate investment, and unattributed series. Totals may not be the same across charts because of different investment types included. Unattributed series is not included in the Diverse Types of Investment pie charts.

Regions are divided as follows - San Diego: San Diego and Imperial Counties; Los Angeles: Los Angeles and Ventura Counties; Orange County: only Orange County; San Francisco: Alameda, Contra Costa, Marin, Napa, San Francisco, and Solano Counties; Silicon Valley: Santa Clara and San Mateo Counties, and Scotts Valley, Fremont, Newark, and Union City.

Clean Technology Patents, all figures

1790 Analytics developed and performed the search of U.S. Patent data from the U.S. Patent & Trade Office based on search criteria defined by Collaborative Economics. The "Two or more" category refers to patents that fall into multiple clean technology areas, and are therefore distinguished separately in aggregate patent analysis to avoid double counting.

TRANSPORTATION

Total Vehicles and GHG Emissions, and Vehicle Miles of Travel and GHG Emissions from Surface Transportation

GHG emissions data are from the CARB's "California Greenhouse Gas Inventory – by Sector and Activity." Surface Transportation emissions sources include passenger vehicles, motorcycles and light and heavy duty trucks. Vehicle registration data are from the Federal Highway Administration, U.S Department of Transportation, "Highway Statistics" reports 1995-2010, Table MV-1. Total number of vehicles are for all vehicles registered in California including cars, trucks, buses and motorcycles. Vehicle Miles Traveled (VMT) is defined as total distance traveled by all vehicles during a selected time period in geographic segment. VMT estimates for 1995-2007 are from the California Department of Transportation's "2008 California Motor Vehicle Stock, Travel and Fuel Forecast." VMT data for 2008, 2009, and 2010 are from the California Department of Transportation's Highway Performance Monitoring System's "California Public Road Data." Calculations use Population and GDP data sources where applicable.

GREEN ESTABLISHMENTS DATABASE

Collaborative Economics has developed an approach for identifying and tracking the growth of businesses with primary activities in the Core Clean Economy. This methodology was developed for work carried out on behalf of Next 10, a California-based nonprofit, and published in the California Green Innovation Index and Many Shades of Green (2008, 2009, 2010, 2012).

The accounting of green business establishments and jobs is based multiple sources (including New Energy Finance, CB Insights and the Cleantech Group,tm LLC) for the indentification and classification of green businesses and also leveraged a sophisticated internet search process. Collaborative Economics designed the parameters of the internet search platform which was engineered by PlanetMagpie. The operational definition of green is based primarily on the definition of cleantech defined by the Cleantech Group,tm LLC but has been expanded to include all products and services that will experience greater demand as the impacts of climate change increase. The National Establishments Time-Series (NETS) database, based on Dun & Bradstreet business-unit data, was sourced to extract business information such as jobs. The jobs numbers reported in the database reflect all jobs at each business location. In the case of multi-establishment companies, only the green establishments are included.

The multilayered process involves both automated and manual verification steps of business establishments and their activities. In cases where the results were uncertain and the activities of a business establishment could not be verified (e.g. on a company's website), the establishment was dropped from the database. Therefore, the analysis offers a conservative tracking of jobs in the Core Clean Economy.

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