

# MANY SHADES OF GREEN

REGIONAL DISTRIBUTION AND TRENDS IN CALIFORNIA'S GREEN ECONOMY



NORTH COAST  
SIERRA REGION  
SACRAMENTO VALLEY

SACRAMENTO AREA  
BAY AREA  
SAN JOAQUIN VALLEY

CENTRAL COAST  
INLAND EMPIRE

LOS ANGELES AREA  
ORANGE COUNTY  
SAN DIEGO REGION

NEXT 10 IS AN INDEPENDENT NONPARTISAN ORGANIZATION THAT EDUCATES, ENGAGES, AND EMPOWERS CALIFORNIANS TO IMPROVE THE STATE'S FUTURE. WE PROVIDE CRITICAL DATA TO HELP INFORM THE STATE'S EFFORTS TO GROW THE ECONOMY AND REDUCE GLOBAL WARMING EMISSIONS.

THIS REPORT SERVES AS A COMPANION TO NEXT 10'S CALIFORNIA GREEN INNOVATION INDEX, AND THE ANALYSIS PRESENTED HEREIN BUILDS ON THE GREEN BUSINESS ANALYSIS PUBLISHED IN THE INDEX SINCE 2008. THE INDEX TRACKS CALIFORNIA'S PROGRESS IN REDUCING GREENHOUSE GAS EMISSIONS, IMPLEMENTING INNOVATIVE PUBLIC POLICY, GENERATING TECHNOLOGICAL AND BUSINESS INNOVATION, AND GROWING BUSINESSES AND JOBS THAT ENABLE THE TRANSFORMATION TO A MORE RESOURCE-EFFICIENT ECONOMY.

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# CALIFORNIA FACTS 1995-2009

## POPULATION

1995 31,712,000  
2008 38,134,000  
2009 38,488,000

0.9% AAGR\* / 2008-2009  
1.4% AAGR / 1995-2009

1.

## TOTAL EMPLOYMENT

1995 15,940,000  
2008 18,602,000  
2009 18,760,000

1% AAGR / 2008-2009  
1% AAGR / 1995-2009

2.

## CORE GREEN ECONOMY JOBS

1995 111,000  
2008 169,000  
2009 174,000

3% AAGR / 2008-2009  
3% AAGR / 1995-2009

3.

## BIOTECH JOBS

1995 48,000  
2008 54,000  
2009 52,000

-4.0% AAGR / 2008-2009  
0.5% AAGR / 1995-2009

## SOFTWARE JOBS

1995 120,000  
2008 231,000  
2009 236,000

2% AAGR / 2008-2009  
5% AAGR / 1995-2009

## CALIFORNIA'S ECONOMY

1995 \$1.2 TRILLION  
2008 \$2.0 TRILLION  
2009 \$1.9 TRILLION

-5% AAGR / 2008-2009  
3% AAGR / 1995-2009

Inflation adjusted dollars  
(first half 2010)

4.

## PER CAPITA GDP

1995 \$38,000  
2008 \$51,000  
2009 \$48,000

-6% AAGR / 2008-2009  
2% AAGR / 1995-2009

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.

1. Data Source: California Department of Finance
  2. Data Source: National Establishments Time Series data; Green Establishments Database. Employment estimates are current as of January for each year.
  3. See Appendix for explanation of the evolving methodology underlying the Green Establishment Database.
  4. Data Sources: Moody's economy.com; California Department of Finance
- \*Average Annual Growth Rate

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Dear Friends,

As a California businessperson and resident, I care deeply about the state's economic future and the quality of life of all Californians. I started Next 10 in 2003 as I saw California at a crossroads facing a multi-billion dollar budget deficit and an energy crisis. Today, we are experiencing daunting economic and environmental challenges, and many of the driving forces come from well beyond our own state borders. Over the years our research has explored the nexus of the economy and environment and the profound impact both have on our overall quality of life.

This second edition of *Many Shades of Green: Regional Distribution and Trends in California's Green Economy*, tracks employment and business growth related to products and services that improve efficiencies in the consumption of all natural resources and reduce negative environmental impacts. The results presented here offer new evidence that Californians are forward-thinking people, creators of cutting-edge technology and nimble prospectors adept at finding new opportunity in a changing context. Based on this research, we can conclude that California's green economy has continued to grow in the current downturn, and opportunities are growing across the state's eleven economic regions.

Top findings include:

- Employment in the Core Green Economy has expanded 56 percent since 1995, while total state employment grew by just 18 percent. In the most recent observable 12-month period (January 2008 to 2009), green employment increased by three percent while growth in total employment was less than one percent.
- Recent employment growth has been exceptionally strong in Energy Generation, Energy Storage and Clean Transportation.
- California's green economy is diverse with strong employment shares in manufacturing. Manufacturing employment represents 26 percent of all green employment but only 11 percent of California's total employment.

At home, Californians can have little impact on global natural resource markets; however, faced with rising prices and increasing volatility, we can make ourselves more resilient to these external shocks. The state has already achieved the important initial steps with our pioneering energy efficiency standards following the energy crisis of the 1970s. As a result of innovation in technology, business and public policy, the state's energy productivity is now 68 percent higher than the rest of the nation, which means we can produce more using less and spending less on energy.

Improving efficiencies in our consumption of all natural resources will make our communities and businesses more resilient to external forces, more competitive and more environmentally sustainable. The results of this analysis illustrate that there is growing business and employment opportunity in getting us there.

Sincerely,

F. Noel Perry  
Founder, Next 10

## HIGHLIGHTS

FACED WITH CHANGE, CALIFORNIANS ARE FINDING NEW OPPORTUNITIES. GROWING NUMBERS OF BUSINESSES AND EMPLOYEES ARE PRODUCING PRODUCTS AND SERVICES THAT IMPROVE EFFICIENCIES IN THE CONSUMPTION OF ALL NATURAL RESOURCES. THE ADOPTION OF GREEN PRODUCTS AND PRACTICES ACROSS THE ECONOMY ARE CHANGING JOBS IN ALL INDUSTRIES AND CREATING ENTIRELY NEW OCCUPATIONS. THERE ARE MULTIPLE DRIVERS BEHIND THE CHANGES CURRENTLY UNDERWAY, BUT THE RESULT IS THAT CALIFORNIA'S COMMUNITIES AND BUSINESSES ARE MORE RESOURCE EFFICIENT AND BECOMING MORE COMPETITIVE AND MORE RESILIENT TO EXTERNAL FORCES.

GREEN IS OUTPACING TOTAL ECONOMIC GROWTH STATEWIDE AND IN ALL BUT TWO REGIONS. SINCE 1995, JOBS IN THE CORE GREEN ECONOMY HAVE EXPANDED BY 56 PERCENT WHILE THE TOTAL ECONOMY GREW BY 18 PERCENT. MOST RECENTLY, BETWEEN JANUARY 2008 AND 2009, GREEN EMPLOYMENT INCREASED BY THREE PERCENT WHILE THE TOTAL ECONOMY INCHED FORWARD BY LESS THAN ONE PERCENT. (PAGE 8)

\_Over the long term, the Bay Area and the Sacramento Area have posted the strongest employment gains of 109 percent and 103 percent respectively, followed by Orange County (67%) and the San Joaquin Valley (55%). (Pages 13, 14, 18, 22, 26)

\_While statewide green employment increased three percent between January 2008 and 2009, both the Bay Area and the San Diego Region exceeded this rate with employment gains of eight percent and seven percent respectively over the twelve months. (Page 9)

\_Overall growth in green employment has been slower in rural regions; however, employment in Energy Generation has been strong in the North Coast, the Sacramento Valley, the Sierra Region and the Central Coast (pages 28-35). Energy Generation has also been a key driver in the Inland Empire. (Page 24)

EMPLOYMENT AND BUSINESS GROWTH VARIES ACROSS THE 15 GREEN INDUSTRY SEGMENTS, AND EMPLOYMENT GROWTH CONTINUES TO SURGE IN ENERGY GENERATION, ENERGY STORAGE AND CLEAN TRANSPORTATION. (PAGE 9)

\_From January 1995 to 2009, Energy Generation has accounted for the largest job increases adding nearly 20,000 jobs across the state. Energy Efficiency, Green Building, Energy Storage, and Clean Transportation have also vastly exceeded the average growth of 56 percent over the same period. (Page 9)

\_Most recently, Energy Generation, Energy Storage and Clean Transportation displayed above-average employment growth from January 2008 to 2009. Expanding by eight percent over a single year, Energy Generation added nearly 3,000 jobs. Similarly, employment in Energy Storage increased eleven percent. Also over the one-year span, employment in Clean Transportation surged six percent driven primarily by increased activity related to motor vehicles. (Page 9)

ACROSS THE VALUE CHAIN, CALIFORNIA'S CORE GREEN ECONOMY CONSISTS LARGELY OF HIGH-VALUE SERVICES AND MANUFACTURING. THE STATE ALSO ENJOYS A STRONG BASE OF RESEARCH AND DEVELOPMENT IN MULTIPLE FIELDS. (PAGE 10)

\_Employment in businesses that primarily offer services account for 40 percent of all jobs in California's Core Green Economy. (Page 10)

\_Manufacturing employment represents 26 percent of all green employment and only 11 percent of total statewide employment. Manufacturing kept pace increasing 52 percent over the long term and ten percent over the most recent observable period, January 2008 to 2009. (Page 10)

\_Across all green segments, employment in Installation, Sales, Research & Development, and Finance & Investment more than doubled over the 15-year period. Over the most recent year, Sales and Research & Development expanded by nine percent. (Page 11)

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# CALIFORNIA'S *green* ECONOMY

## EXPLORING THE MULTIPLE FACETS OF CALIFORNIA'S TRANSFORMING ECONOMY

California's economy is undergoing fundamental change driven by formidable external forces. As the demand for energy and all natural resources rises, volatility of supplies and rising prices are concerns for the present and the future. Recognizing these forces of change and the opportunities they portend is essential for bolstering and even maintaining the state's global competitiveness and the quality of life of its residents.

Global market forces are significant. Never before in human history has the world experienced such strong demand for energy and natural resources. The economic growth currently taking place in the emerging economies of Asia and Brazil is unprecedented. Large cities are expanding rapidly as millions of people move from poverty into higher standards of living. Given this development and the continued growth in global population, the demand for all resources would continue to rise.

And then there is climate change. Changing weather patterns will increasingly disrupt global agriculture, fresh water supplies, and population centers along our coastlines. Preparing for these changes is not without cost, but waiting to react to the real impacts of climate change would be much more costly.<sup>1</sup>

Faced with volatile fuel prices and increasing costs for limited resources, we seek out alternatives and new ways of doing things. We innovate. Businesses, households, schools and other public bodies are doing this as they look for ways to cut costs and reduce waste. In so doing, market demand for cleaner and more sustainable products rises.

When market demands shift, entrepreneurs see opportunity. California is home to some of the world's most innovative entrepreneurs, research centers and policymakers. These combined forces place the state at the forefront of the growing global green economy. Changing consumer habits stimulate new markets and new business activity. Technological breakthroughs can have an even greater positive environmental and economic impact. By raising efficiency standards, streamlining permitting, offering incentives, and providing creative forms of financing, smartly crafted public policy can reinforce and even speed these vital dynamics.

The growing green economy is about both the emergence of new products and activities and the transformation of old products and activities. There are multiple aspects to the green economy, and they are interrelated.

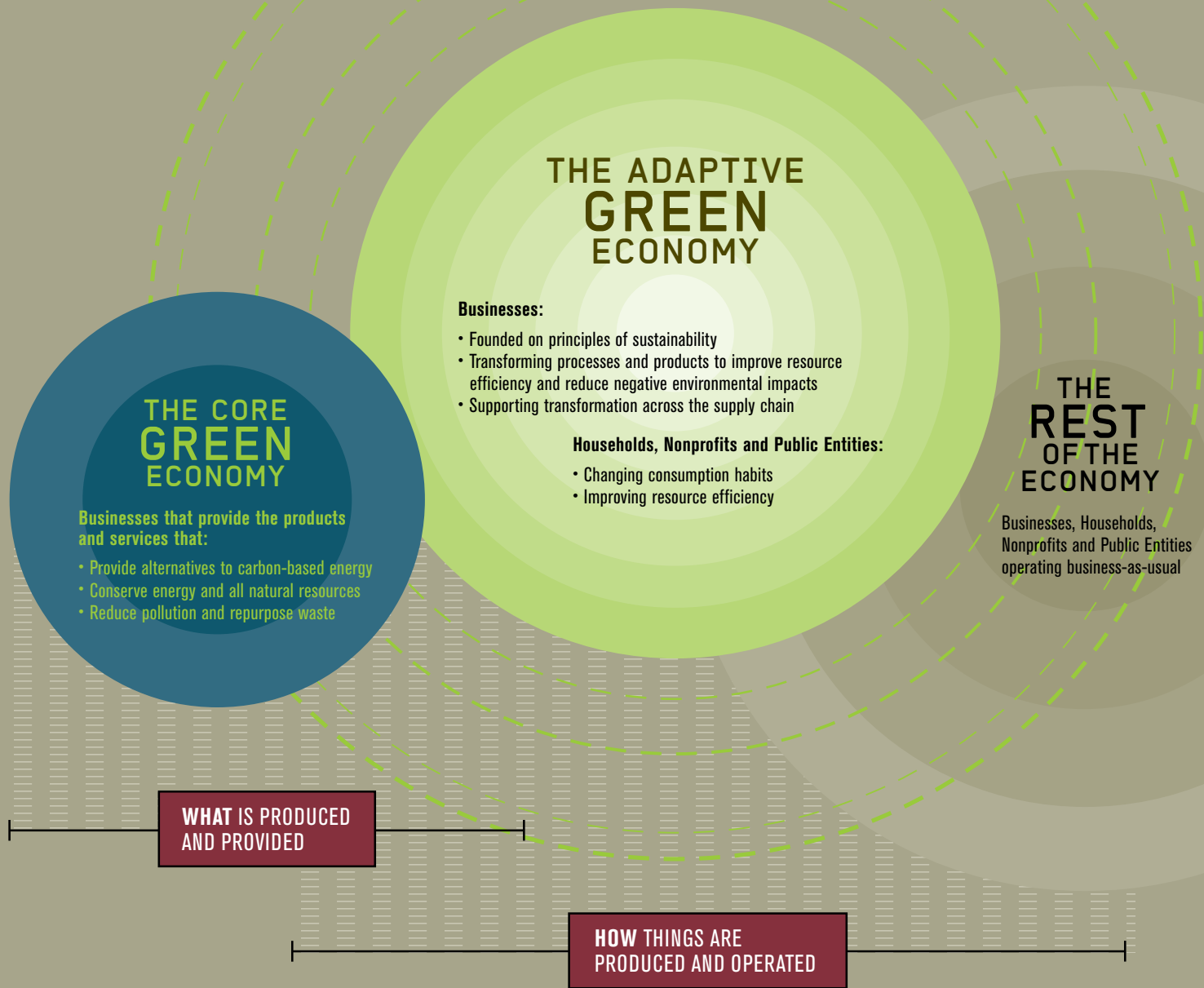
The **Core Green Economy** provides the products and services that enable the transformation toward a cleaner, more efficient and more competitive economy. **The Core Green Economy consists of businesses that provide the products and services that:**

- **Provide alternatives to carbon-based energy sources**
- **Conserve energy and all natural resources**
- **Reduce pollution and repurpose waste**

The Core Green Economy represents a diverse mix of industries including novel technologies as well as tried and tested products. These businesses span energy generation and efficiency as well as transportation and water. The 15 green segments of the Core Green Economy are described on page 12.

<sup>1</sup>David Roland-Holst and Fredrich Kahr. 2008. *California Climate Risk and Response*. Next 10.

# THE GREEN ECONOMY AND ITS MULTIPLE FACETS



Representing a much larger population than the Core Green Economy, the **Adaptive Green Economy** is made up of businesses that were either founded on principles of sustainability or are now becoming more sustainable in an effort to cut costs, raise efficiencies and prepare for the changes they already recognize. These businesses are reexamining their production processes, inputs and the full lifecycle of their products. Many are strongly supporting their suppliers to follow suit. In addition to businesses, the Adaptive Green Economy also includes households, churches, schools, and all levels of government as they change their consumption habits and improve their resource efficiency. The largest public entity driving this transformation is the U.S. military.

The **Rest of the Economy** consists of businesses, households, private organizations and public bodies that are holding on to familiar old ways despite the evidence that business-as-usual is no longer an option. Eventually, this group will adapt, because costs will become too prohibitive not to.

# THE ADAPTIVE *green* ECONOMY

ACCORDING TO RESULTS FROM THE STATE OF CALIFORNIA'S SURVEY OF EMPLOYERS, GREEN OCCUPATIONS ARE EMERGING ACROSS THE ENTIRE ECONOMY.

Looking across all industries of the economy, green occupations have made a significant mark. In 2009, California's Employment Development Department (EDD) completed a survey of nearly 15,200 employers in order to estimate the number of green jobs in the state, the variety of green occupations, and their distribution across the state's economy. This survey concluded that more than 263,000 people spend at least half their time on the job focused on the production of green products or services. Another 170,000 jobs are held by employees who spend at least part of their time on green activities. Together, the two groups represent nearly half-a-million jobs in California with green activities across all industries.

The survey revealed that 7.9 percent of employers have employees with some type of green activity, and that three quarters of current green workers were trained on the job. EDD's Labor Market Information Division surveyed businesses of all sizes and types throughout the state to develop baseline measures for the number of workers in jobs with green activities, the number of businesses that have adopted green practices, and emerging occupations that require further study.

The manufacturing sector was the leading employer in the California survey, with over 88,810 workers with at least some responsibilities related to green activities. It was followed by nearly 61,300 jobs in construction, 41,820 jobs in scientific and technical services (including administrative and support

services), nearly 26,540 jobs in waste management and remediation services, and over 32,960 jobs in wholesale trade.

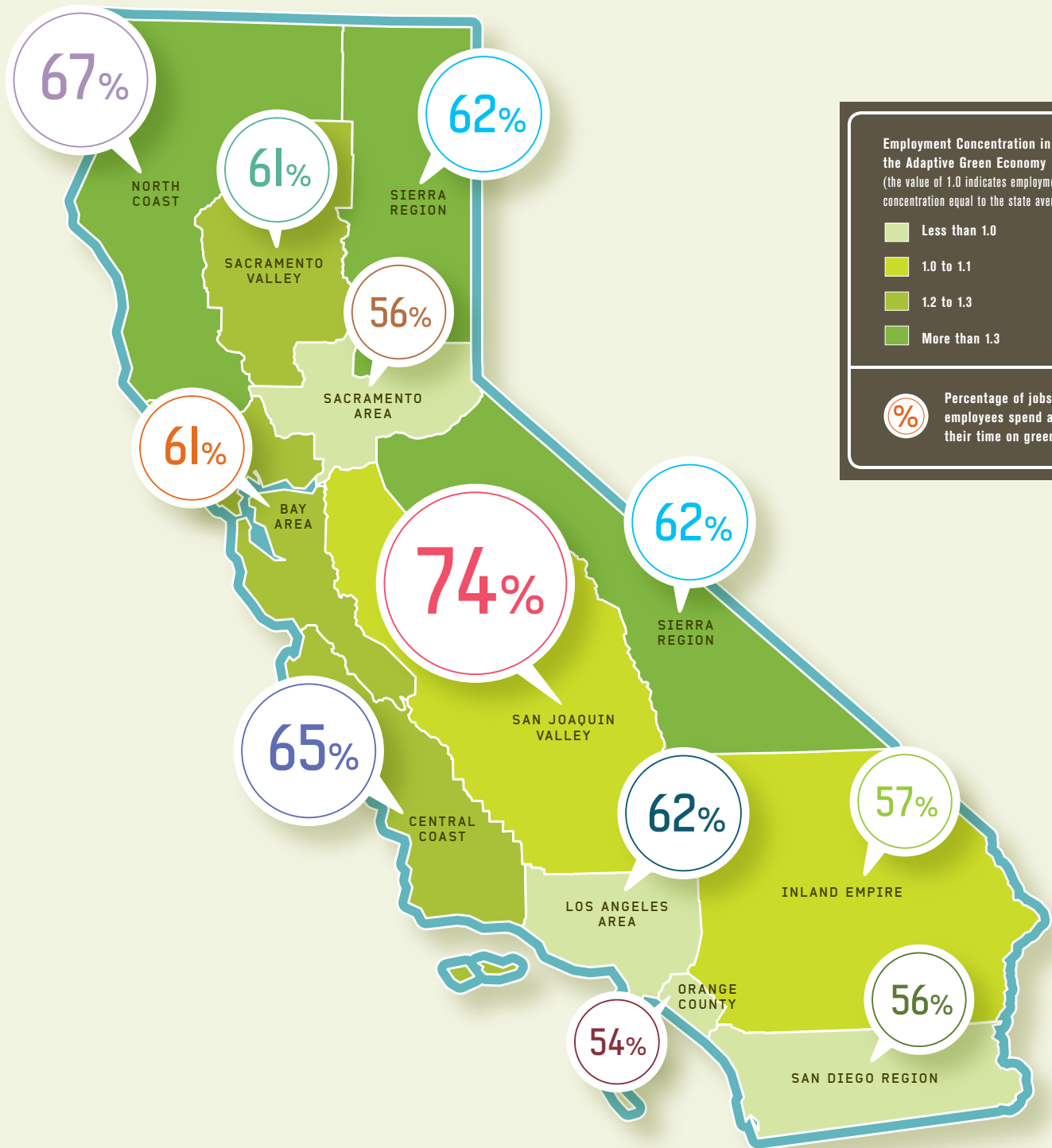
These "green" jobs identified across the economy include existing occupations with new tasks such as a laborer who carefully dismantles materials for recycling purposes and architects who design energy efficient buildings. These jobs also include new occupations such as solar installers, biomass collectors, and wind turbine technicians.

Some of the top occupations identified in the survey include carpenters working in green activities, hazardous waste specialists, farm workers in sustainable agriculture, assemblers of green products, recycling center operators, electricians and plumbers in green activities, architects, industrial production managers, biomass collectors, alternative fuel vehicle technicians and engineers, health and safety managers, and transportation program specialists.

When asked what skills and knowledge future employees at their company would need, 68 percent of employers cited waste minimization and 43 percent noted principles of energy conservation.

The State survey represents employers across the entire economy, from the private and public sectors, and how they describe their green workforce. This survey represents a large part of the Adaptive Green Economy. The research results presented in the rest of *Many Shades of Green* represent the employment growth in businesses in the Core Green Economy.

ADAPTIVE GREEN ECONOMY  
 EDD SURVEY OF EMPLOYERS ON GREEN OCCUPATIONS  
 MAY 2009 – JANUARY 2010



# THE CORE *green* ECONOMY

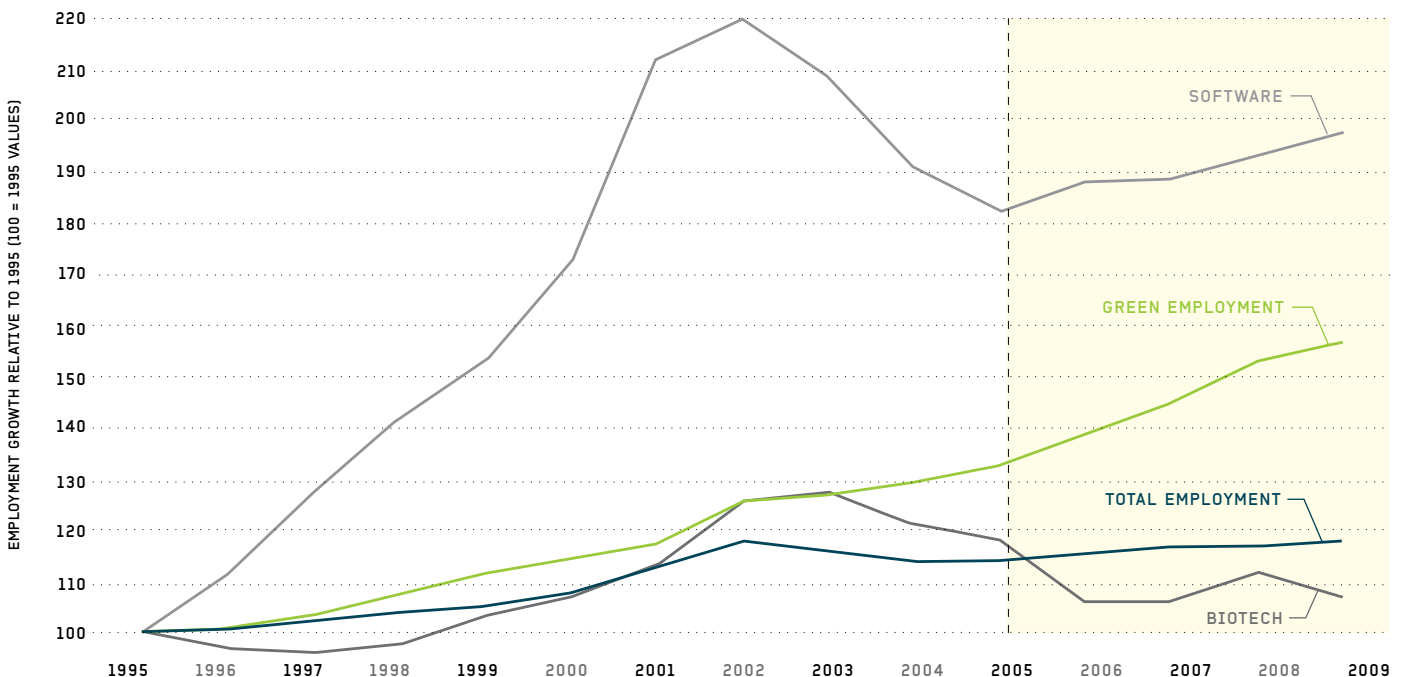
California is a global leader in the Core Green Economy, and its businesses and jobs continue to grow and diversify. The Core Green Economy provides the products and services that enable the transformation toward a cleaner, more efficient and more competitive economy. Some green sectors and regions have been hit harder by the current economic slowdown than have others. In some parts of the state, high concentrations of specialized business activity have resulted in continued growth throughout 2008 and into 2009.

Even during the current economic downturn, employment growth in the Core Green Economy continues to outpace California's overall employment growth. Since 1995, jobs in the Core Green Economy have expanded by 56 percent, while the total economy grew by 18 percent. Compared to other industries, employment has increased seven percent in Biotech and 97 percent in Software since 1995. Since

2005, the Core Green Economy and Software have grown at similar rates. Most recently, between January 2008 and 2009, green employment increased by three percent while the total economy inched forward by less than one percent.

Employment and business growth varies by region. In all but two regions, the Sierra Region and the Central Coast, employment in the Core Green Economy has outpaced total economic growth. Over the long term, the Bay Area and the Sacramento Area have posted the strongest employment gains followed by Orange County and the San Joaquin Valley. Over the most recent observable year (January 2008 to January 2009), statewide green employment expanded three percent. Both the Bay Area and the San Diego Region exceed this, with employment gains of eight percent and seven percent respectively.

**GROWTH RELATIVE TO 1995**  
CALIFORNIA



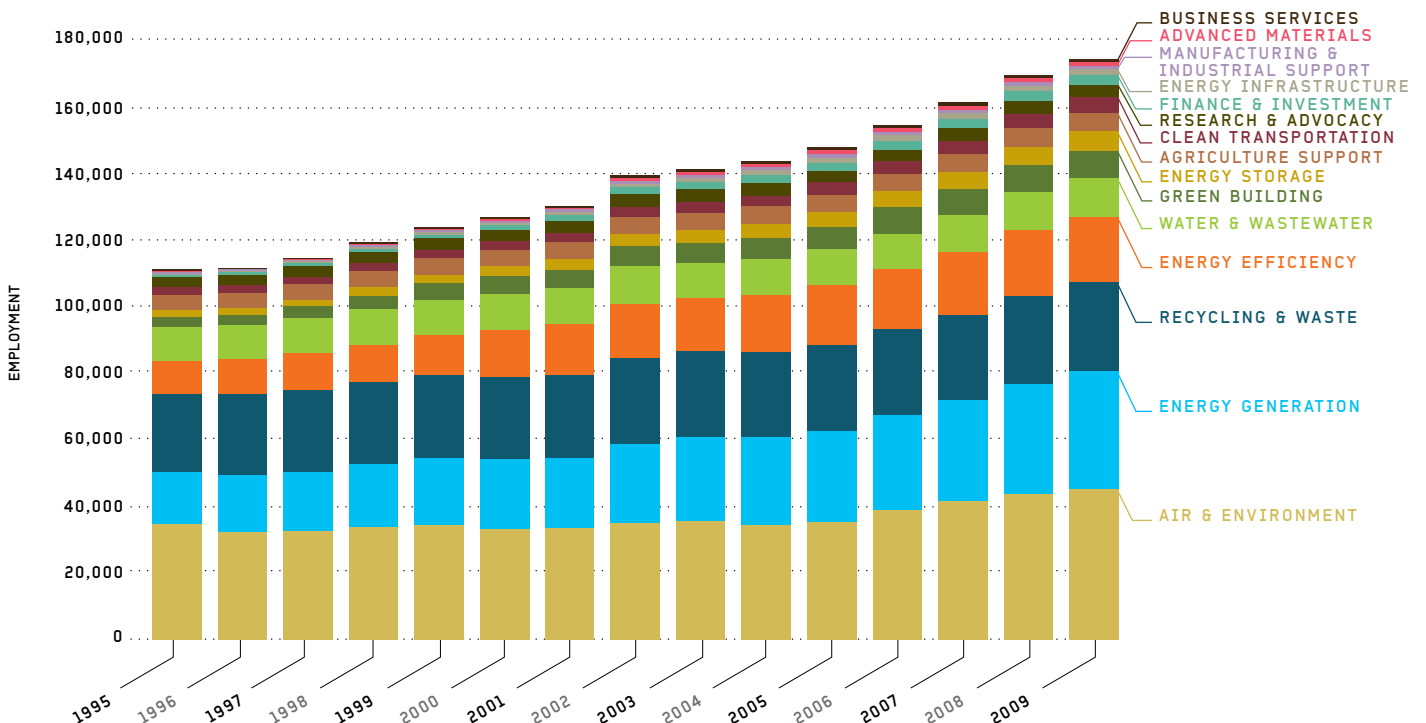
NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database. Analysis: Collaborative Economics

Growth rates vary by the 15 segments of the Core Green Economy over the 15-year period as well as over the most recent observable year. Over the long term, Energy Generation has accounted for the largest job increases and added nearly 20,000 jobs across the state. Energy Efficiency, Green Building, Energy Storage, and Clean Transportation have also vastly exceeded the average growth of 56 percent over the period. Most recently, Energy Generation, Energy Storage, and Clean Transportation persisted with above-average employment gains between January 2008 and 2009. Expanding by eight percent over a single year, Energy Generation added nearly 3,000 jobs. Similarly, employment in Energy Storage increased eleven percent. Also over the one-year span, employment in Clean Transportation surged six percent, driven primarily by increased activity related to motor vehicles.

The composition of the Core Green Economy differs from region to region across the state. In some regions, high levels

of concentration in specific activities are emerging creating world-class green industry hubs. Areas of agglomeration are emerging. While Energy Generation is strong in many places, employment is especially concentrated in the San Diego Region. Energy Efficiency is concentrating in the Sacramento Area, Orange County and the Bay Area. Air & Environment, driven by Environmental Consulting is especially concentrated in the Sacramento Area. Energy Storage is highly concentrated in the Bay Area and is also strong in the Los Angeles Area. Clean Transportation hubs are emerging in Orange County, the Bay Area, San Diego, and the Inland Empire, but activities associated specifically with fuels and vehicles are showing up in different places. The Sacramento Valley is leading the state in Agriculture Support. Strengths in Water & Wastewater are emerging in the San Diego, Central Coast, Sierra and the North Coast regions. The sections that follow will highlight the unique regional stories across the state's eleven economic regions.

### EMPLOYMENT BY GREEN SEGMENT CALIFORNIA



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database. Analysis: Collaborative Economics

# THE *value* CHAIN

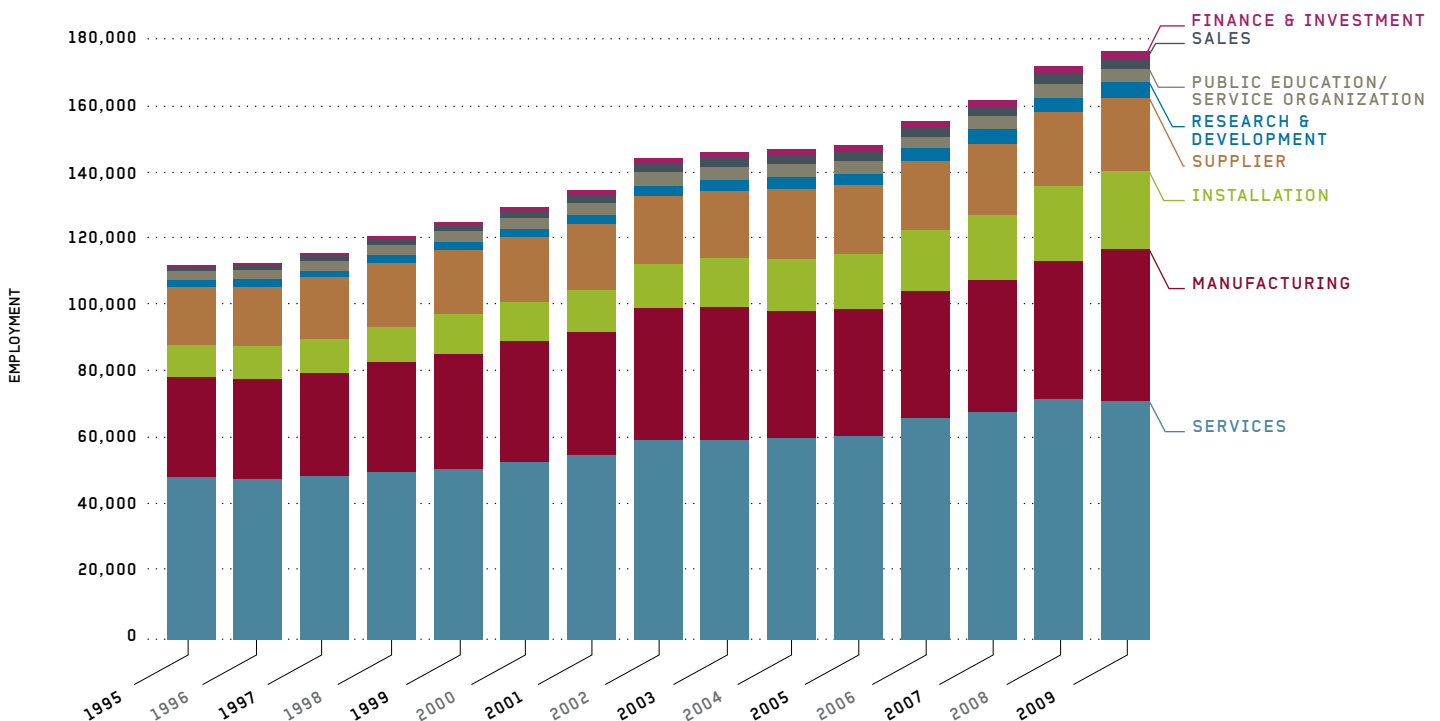
California is home to many companies that are driving technological advance in products and services that will enable the entire economy to transition to clean energy sources, improve resource efficiencies and reduce pollution. From the point of conception until the delivery to the consumer and the maintenance over the lifetime of the product, there are many distinct activities that take place in the economy.

In addition to viewing the Core Green Economy by green segment, that is, by the field of application of products and services, businesses can also be viewed by their primary functions along the production value chain. These roles include research and development, manufacturing, suppliers, installers, sales, service providers and public education

services. All of these roles are represented to varying degrees in California's Core Green Economy, which means there exist wide-ranging job opportunities across the skills spectrum and strong potential for continued green business growth building on a diverse business base rich with interrelated competencies.

California's Core Green Economy consists largely of high-value services and manufacturing. Employment in businesses that primarily offer services account for 40 percent of all jobs in California's Core Green Economy. Manufacturing employment represents 26 percent of all green employment, which is a sizable share given the fact that manufacturing represents only 11 percent of California's total economy.

**GREEN EMPLOYMENT ALONG THE VALUE CHAIN**  
CALIFORNIA



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database. Analysis: Collaborative Economics

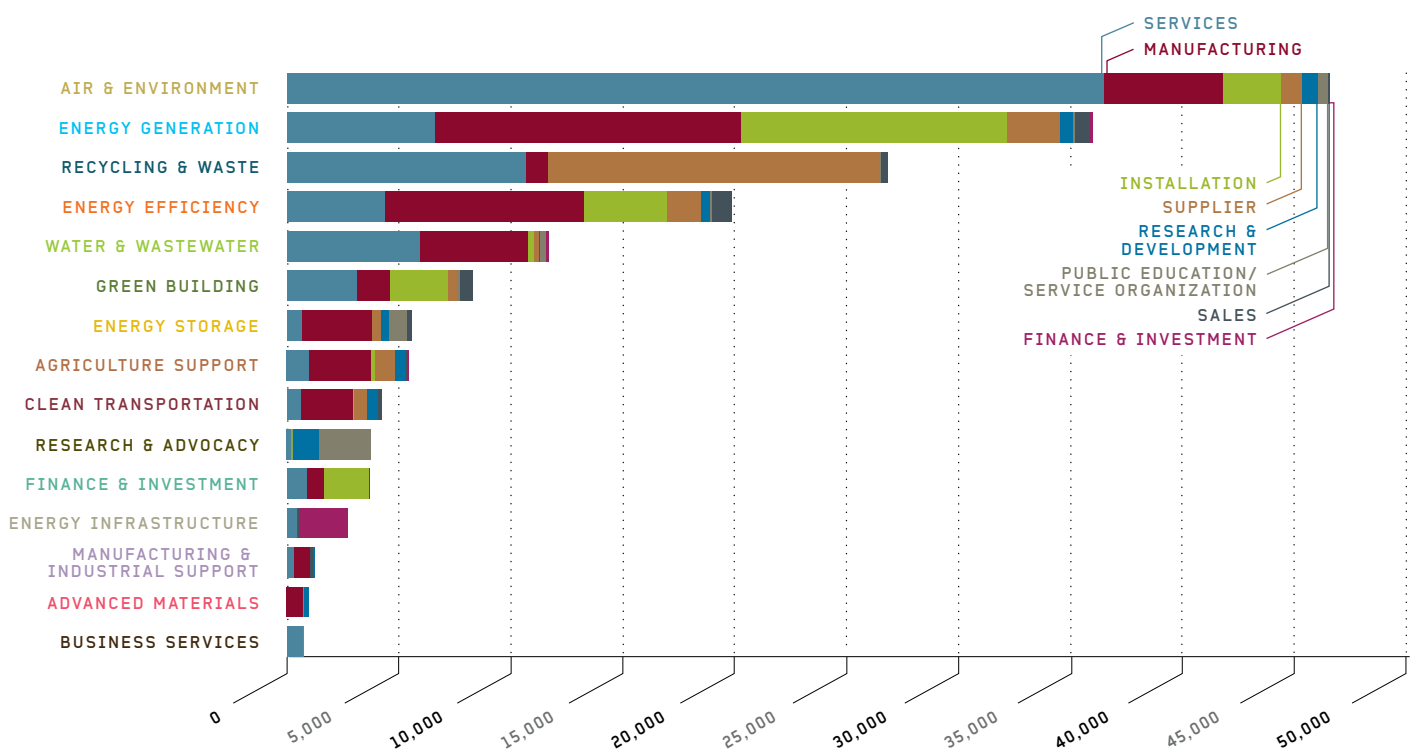
Overall employment in California's Core Green Economy increased 56 percent between 1995 and 2009, but some activities in the value chain grew faster than others. Manufacturing employment kept pace increasing 52 percent over the long term and ten percent over the most recent observable period, January 2008 to 2009. Employment in Installation, Sales, Research & Development, and Finance & Investment more than doubled over the 15-year period. Over the most recent year, Sales and Research & Development expanded by nine percent.

By green segment, Services and Manufacturing are the largest employment shares, but the mix of value chain roles varies widely. Half of all jobs in Services are in Air & Environment, which is largely dominated by businesses in Environmental Consulting. Half of all jobs in Manufacturing are split across Energy Efficiency and Energy Generation.

Within each of these two, Manufacturing makes up 45 percent of jobs in Energy Efficiency and 38 percent of jobs in Energy Generation. In Water & Wastewater, Manufacturing employment accounts for 42 percent.

Looking at other roles in the value chain, jobs in Installation are primarily in Energy Generation, Energy Efficiency and Green Building. In fact, Installation makes up 38 percent of all jobs in Energy Generation and 30 percent in Green Building. Employment in Suppliers is mainly in Recycling & Waste. In addition to manufacturing and professional and technical services, Research & Development is strong in California's Core Green Economy. Outside of research organizations, the largest numbers of the state's jobs at Research & Development facilities are in Air & Environment, Energy Storage, Energy Generation and Clean Transportation.

**GREEN EMPLOYMENT BY ESTABLISHMENT TYPE**  
CALIFORNIA / 2009



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database. Analysis: Collaborative Economics

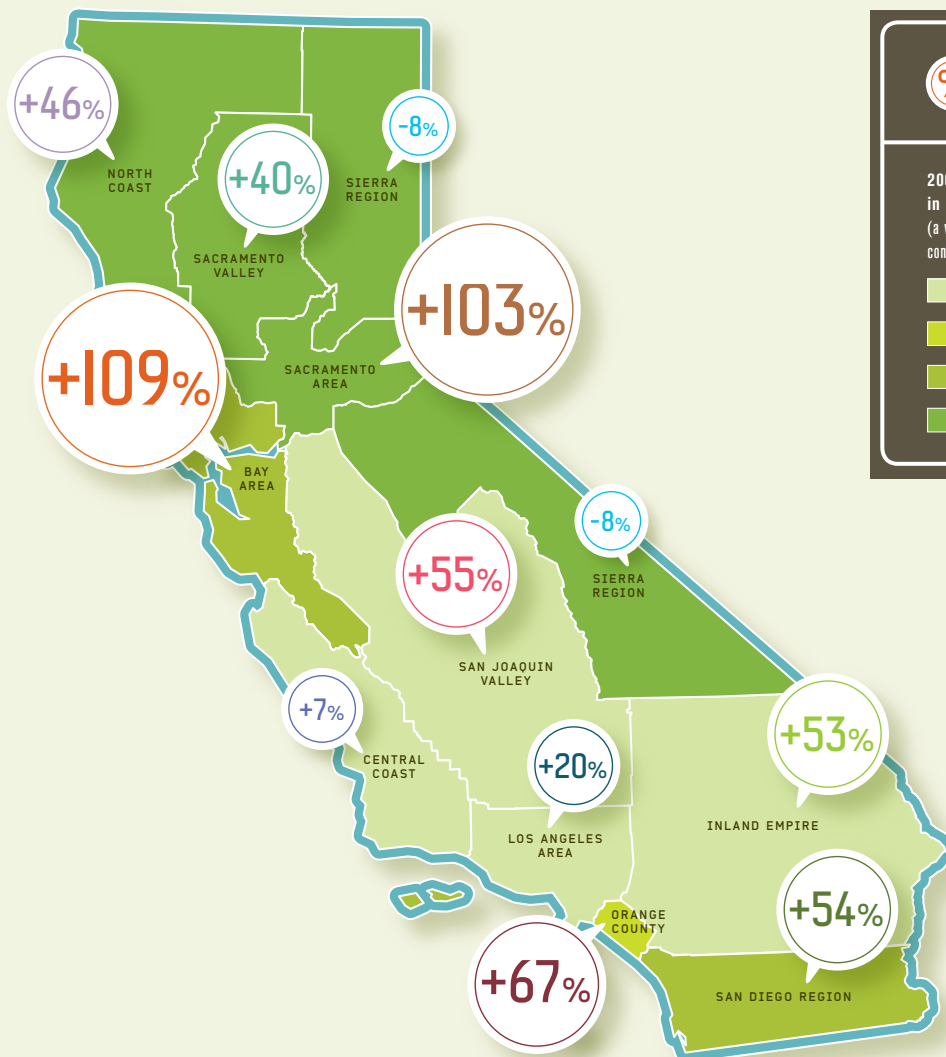
## THE FIFTEEN SEGMENTS OF THE CORE GREEN ECONOMY

GREEN SEGMENT	DESCRIPTION
<b>Energy Generation</b>	<ul style="list-style-type: none"> <li>Renewable energy generation (all forms of solar, wind, geothermal, biomass, hydro, marine and tidal, hydrogen, co-generation)</li> <li>Research and Testing in renewable energy</li> </ul>
<b>Energy Efficiency</b>	<ul style="list-style-type: none"> <li>Energy conservation consulting and engineering</li> <li>Building efficiency products and services</li> <li>Energy efficiency research</li> </ul>
<b>Clean Transportation</b>	<ul style="list-style-type: none"> <li>Alternative fuels (biodiesel, hydrogen, feedstock-neutral ethanol infrastructure)</li> </ul>
<b>Energy Storage</b>	<ul style="list-style-type: none"> <li>Advanced batteries (Li-Ion, NiMH)</li> <li>Battery components and accessories</li> </ul>
<b>Air &amp; Environment</b>	<ul style="list-style-type: none"> <li>Environmental consulting (environmental engineering, sustainable business consulting)</li> </ul>
<b>Recycling &amp; Waste</b>	<ul style="list-style-type: none"> <li>Consulting services</li> <li>Recycling (paper, metal, plastics, rubber, bottles, automotive, electronic waste and scrap)</li> </ul>
<b>Water &amp; Wastewater</b>	<ul style="list-style-type: none"> <li>Water conservation (control systems, meters and measuring devices)</li> <li>Development and manufacturing of pump technology</li> </ul>
<b>Agriculture Support</b>	<ul style="list-style-type: none"> <li>Sustainable land management and business consulting services</li> </ul>
<b>Research &amp; Advocacy</b>	<ul style="list-style-type: none"> <li>Organizations and research institutes focused on advancing science and public education in the areas of: renewable energy and alternative fuels and transportation.</li> </ul>
<b>Business Services</b>	<ul style="list-style-type: none"> <li>Environmental law legal services</li> <li>Green business portals</li> </ul>
<b>Finance &amp; Investment</b>	<ul style="list-style-type: none"> <li>Emission trading and offsets</li> <li>Venture capital and private equity investment</li> </ul>
<b>Advanced Materials</b>	<ul style="list-style-type: none"> <li>Bioplastics</li> </ul>
<b>Green Building</b>	<ul style="list-style-type: none"> <li>Design and construction</li> <li>Building materials</li> </ul>
<b>Manufacturing &amp; Industrial Support</b>	<ul style="list-style-type: none"> <li>Advanced packaging</li> <li>Process management and consulting</li> </ul>
<b>Energy Infrastructure</b>	<ul style="list-style-type: none"> <li>Consulting and management services</li> </ul>

# REGIONAL DISTRIBUTION *and* TRENDS

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

TOTAL CORE GREEN ECONOMY  
EMPLOYMENT CONCENTRATION BY REGION  
RELATIVE TO STATE, JANUARY 2009



**%** Core Green Economy Job Growth  
1995-2009 (January)

2009 Employment Concentration  
in Total Core Green Economy  
(a value of 1.0 indicates employment  
concentration equal to the state average)

- Less than 1.0
- 1.0 to 1.1
- 1.2 to 1.3
- More than 1.3

NEXT 10 MANY SHADES OF GREEN.  
Data Source: Green Establishment Database  
Analysis and Cartography: Collaborative Economics

# BAY AREA

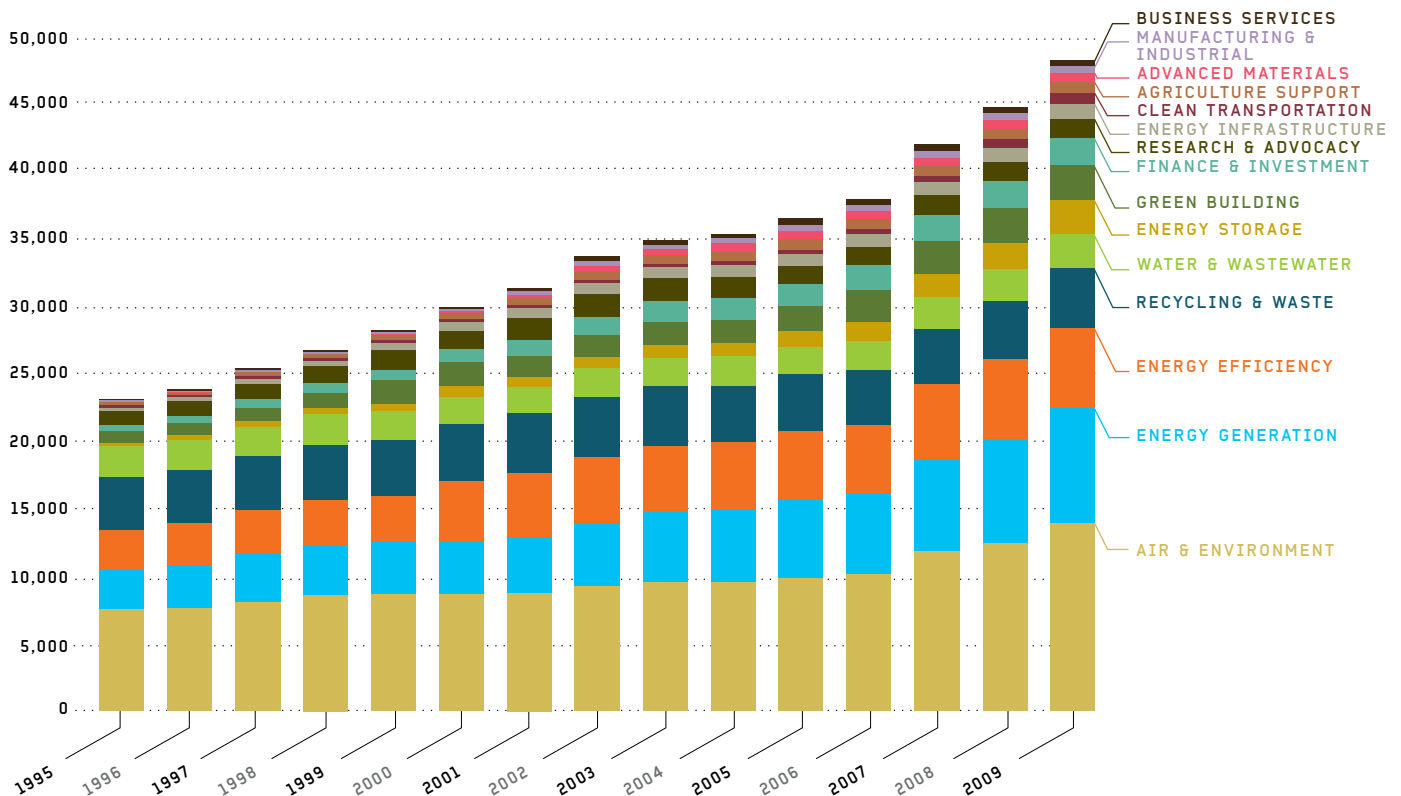
A global hub for green innovation, the Bay Area represents 28 percent of employment and 26 percent of businesses in California's growing green economy. Since 1995, green employment has increased 109 percent, adding nearly 25,000 jobs, while total employment has expanded only 12 percent. From January 2008 to 2009, green employment in the Bay Area increased eight percent adding almost 2,500 jobs. The number of green businesses increased by 76 percent, and 1,600 establishments opened over the 15 years.

Outpacing statewide green employment growth of three percent from January 2008 to 2009, the region's jump of eight percent has been driven by four segments. Employment in Energy Generation increased 11 percent in 2009 over the prior year. The twelve-percent jump in Air & Environment over the 12 months was largely due to the doubling of employment related to emissions monitoring and control devices. Also over the one-year stretch, employment shot up 30 percent in the two dynamic areas of Clean Transportation and Energy Storage. Employment in Clean Transportation quadrupled from 1995 to 2009 and added nearly 200 jobs in the recent 12-month period. With its high concentration in venture capital firms, the Bay Area represents the heart of the state's green finance and investment activity.

The Bay Area is a global hub for solar and other energy generation technology. Adding 5,500 jobs, both employment and establishments in Energy Generation nearly tripled between 1995 to 2009. Accounting for 820 new jobs, the recent growth between the start of 2008 and 2009, has been driven by gains in Solar and Geothermal. Employment shares in Energy Research are 4.3 times higher than the state average.

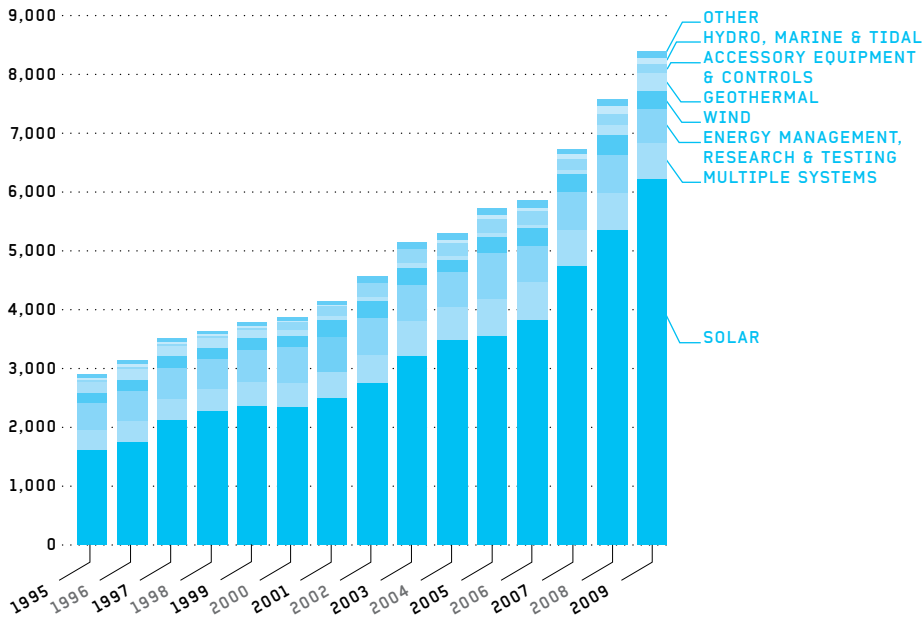
The Bay Area accounts for 45 percent of California's employment in Energy Storage. Since 1995, employment has surged 790 percent, adding nearly 2,230 jobs. Just from 2008 to 2009, expansions yielded 580 new jobs. Expanding by a factor of four from 2004 to 2009, job gains have been driven primarily by Advanced Batteries. Business growth has been strong between 1995 and 2009, increasing from 24 to 110 total establishments.

**EMPLOYMENT BY GREEN SEGMENT**  
BAY AREA



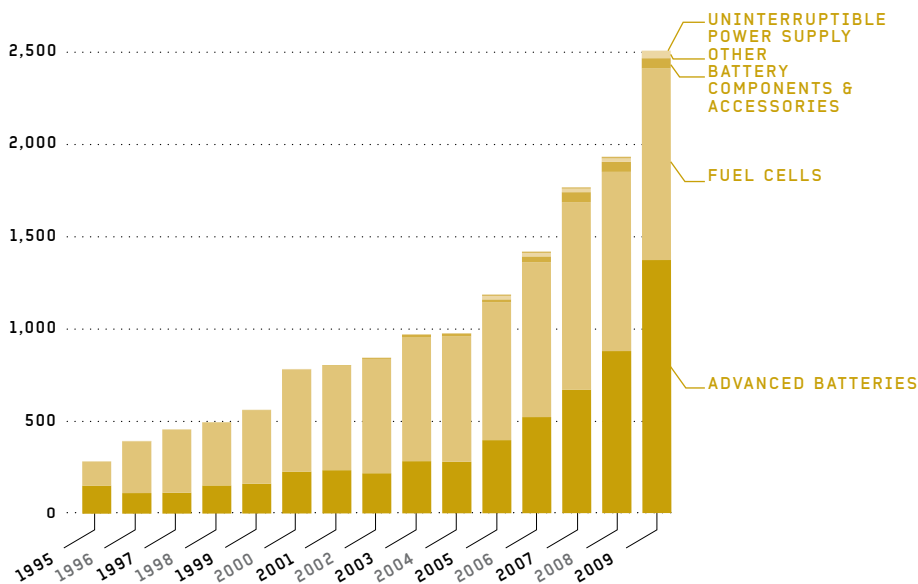
NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database. Analysis: Collaborative Economics

## ENERGY GENERATION JOBS BAY AREA



NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: Other includes Hydrogen, Biomass, Co-Generation. Data Source: Green Establishment Database. Analysis: Collaborative Economics

## ENERGY STORAGE JOBS BAY AREA



NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: Uninterruptible Power Supply has less than ten in employment in 2009. Data Source: Green Establishment Database. Analysis: Collaborative Economics

### BAY AREA EMPLOYMENT

	PERCENT CHANGE 1995-2009
GREEN	+109%
TOTAL	+12%

## SOL FOCUS

### ENERGY GENERATION

Located in Palo Alto, Sol Focus is an innovative photovoltaic system developer and manufacturer with over 40 filed and pending patents. The company uses concentrator photovoltaic (CPV) technology and advanced optical systems, which provide high efficiency by focusing and converting large amounts of sunlight energy to electrical energy. The result is high yields of energy at a low cost. Additionally, Sol Focus systems have a miniscule carbon footprint since they are 97 percent recyclable, use no water in the process of energy production, and are very durable with a long product lifespan.

Sol Focus is listed by the California Energy Commission as an approved supplier of equipment eligible for the California Solar Initiative rebates. Use of the company's products is widespread in the commercial, industrial, and utility sectors. Sol Focus systems are operating in Spain, Arizona, Hawaii and California and systems are being deployed to Greece, Italy, and Portugal.

[www.solfocus.com](http://www.solfocus.com)

# LOS ANGELES AREA

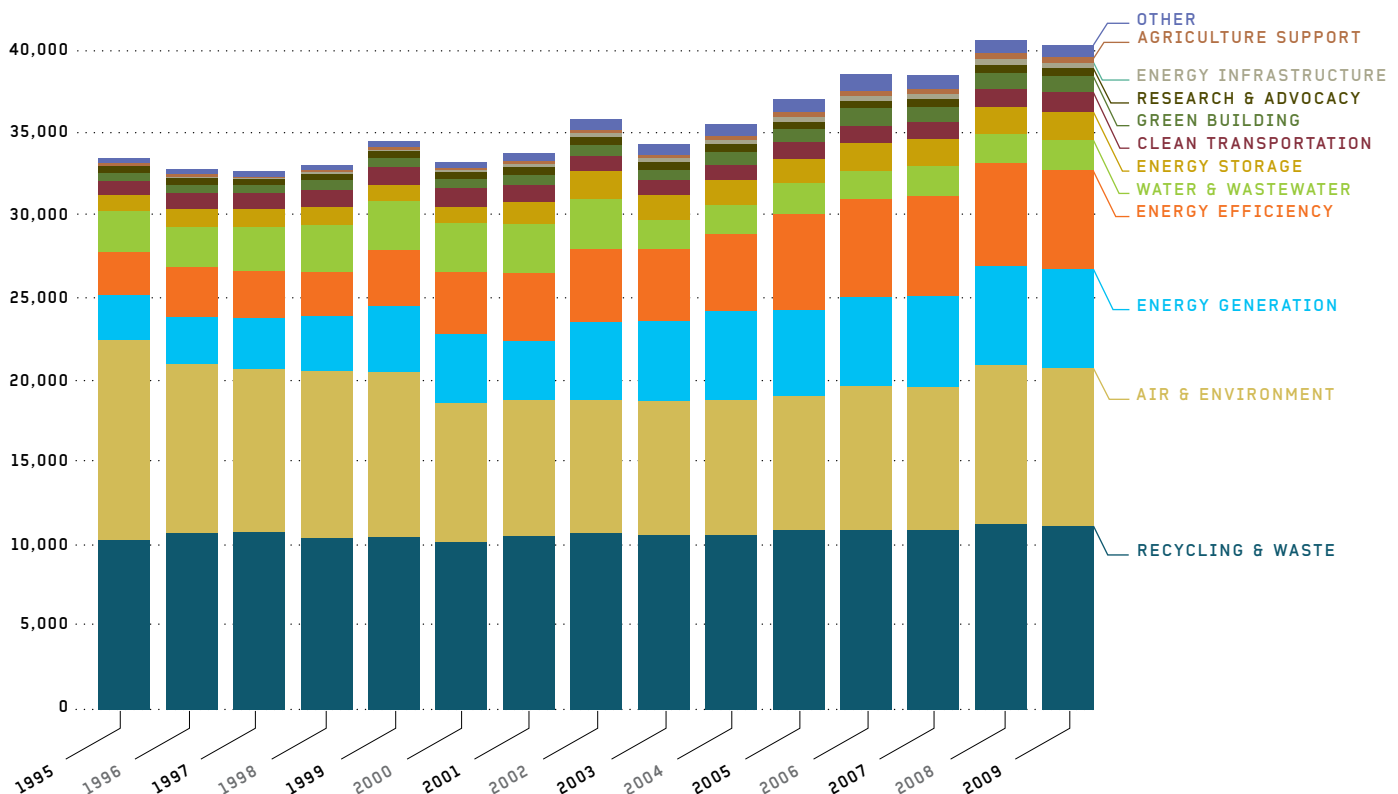
With 23 percent of employment and 22 percent of businesses, the Los Angeles Area represents a significant portion of California's Core Green Economy although less dynamic than other regions. Although slowing over the most recent year, from 1995 to 2009, green employment in the Los Angeles Area grew 20 percent, adding 6,600 jobs. This far outpaced the region's nine percent rise in total employment over the same time span. Business growth was strong from 1995 to 2009, and 1,130 new establishments were created.

While Recycling & Waste and Air & Environment represent the largest employment shares, other segments of the region's Core Green Economy are more dynamic. Energy Efficiency, Clean Transportation and Energy Generation have witnessed strong growth over the fifteen-year period. In Energy Generation, the growth has been driven by activities related to solar, wind and energy management. Most recently, employment in wind energy increased 45 percent from early 2008 to 2009. In Energy Storage, employment related specifically to advanced batteries is highly concentrated in the region and has doubled since 1995.

Energy Efficiency accounts for 15 percent of green employment in the Los Angeles Area. Although contracting slightly in the most recent year, 3,460 jobs were created representing an increase of 133 percent over the 15-year period. Employment growth has been driven primarily by business activities related to Energy Conservation Consulting as well as Conservation Products. In terms of business growth, 130 new establishments were created over this period.

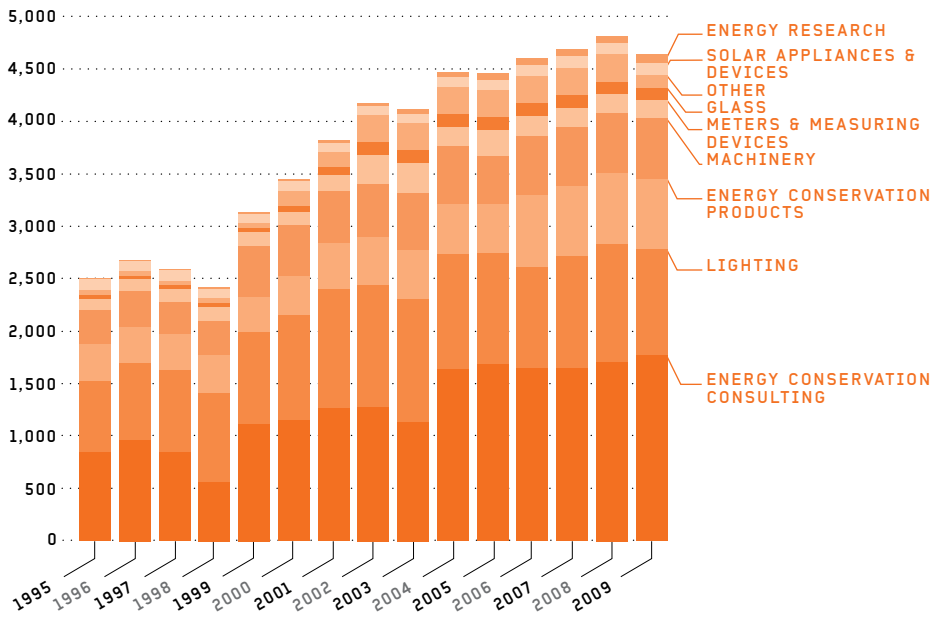
The Los Angeles Area is one of the state's hot spots for Clean Transportation. Increasing 33 percent, employment has grown steadily since 1995 and jumped nine percent between January 2008 and 2009. In particular, the region has a high concentration of employment in Motor Vehicles & Equipment which witnessed a leap of 11 percent in jobs in the recent single-year period.

**EMPLOYMENT BY GREEN SEGMENT**  
LOS ANGELES AREA



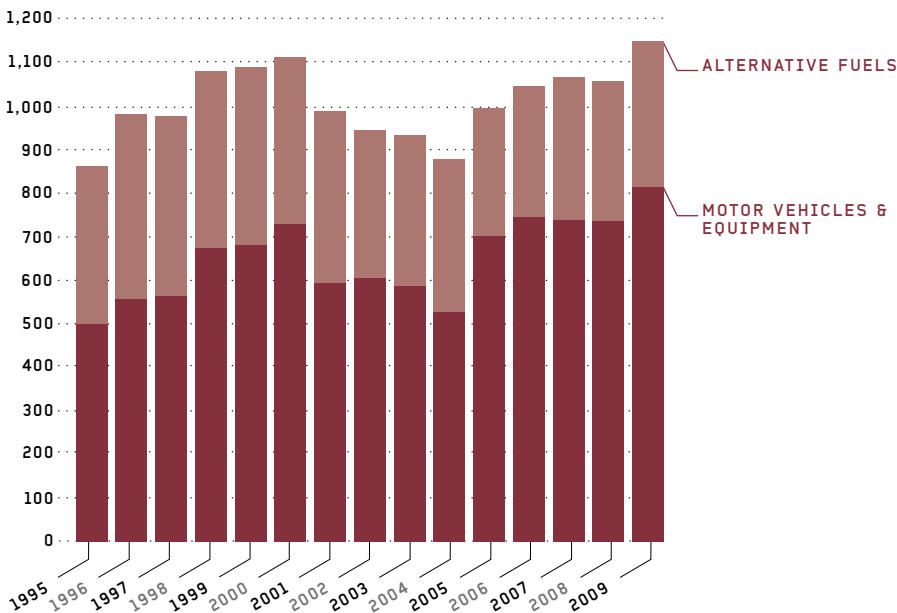
NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database. Analysis: Collaborative Economics

## ENERGY EFFICIENCY JOBS LOS ANGELES AREA



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

## CLEAN TRANSPORTATION JOBS LOS ANGELES AREA



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

### LOS ANGELES AREA EMPLOYMENT

	PERCENT CHANGE 1995-2009
GREEN	+20%
TOTAL	+9%

## TRANSONIC COMBUSTION, INC.

CLEAN TRANSPORTATION

Located in Camarillo, Transonic Combustion Inc. is a research and development firm dedicated to improving the efficiency of personal transportation through engineering clean and efficient internal combustion engines and distributing them for widespread use. The key technology produced by the company is the Transonic Combustion System TSCi.™ This technology includes the TSCi fuel injection system, which alters the ignition and combustion processes to improve fuel efficiency for traditional fossil fuels.

An additional advantage of the Transonic Combustion System is its ability to accommodate the use of biofuels. The system is compatible with modern high compression engines to allow for an easy adoption and potentially an increase in renewable fuel use.

[www.tscombustion.com](http://www.tscombustion.com)

# ORANGE COUNTY

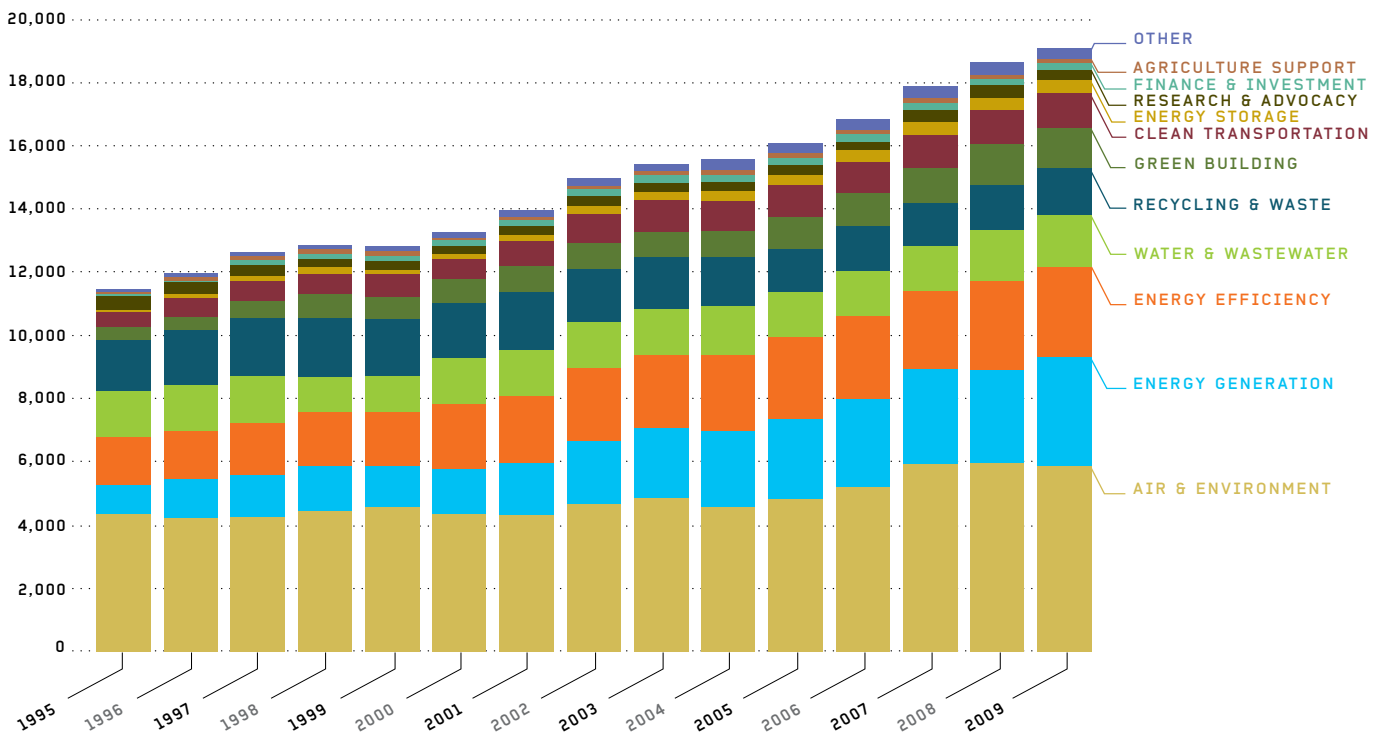
Orange County's Core Green Economy is dynamic and diverse with multiple strengths. Employment in the region's green economy is growing at a faster rate than its overall economy, and Orange County is outpacing statewide growth in green employment. From January 1995 to 2009, green employment increased 67 percent, adding 7,700 jobs, and exceeded statewide green growth of 56 percent. The total regional economy witnessed employment growth of 23 percent over the same period.

Energy Generation has driven much of Orange County's green employment growth, and key areas of specialization are emerging. Products and services related to emissions monitoring and control account for much of the employment growth in Air & Environment. Energy Efficiency represents a diverse and growing segment in the region with growing employment concentrations in energy conservation consulting as well as high-efficiency lighting. The number of businesses in Energy Efficiency increased six percent between 2008 and 2009. The high employment concentration in the Energy Storage related to fuel cells suggests the region is host to high-value business activities. Likewise, regional employment shares in research and testing related to Water & Wastewater are triple the statewide average, and jobs have increased 69 percent since 1995.

Energy Generation has powered much of Orange County's green economy and represents 18 percent of green employment. Solar accounts for a large portion of Energy Generation employment and continued to expand by 20 percent between January 2008 and 2009. Employment related to wind generation as well as accessory equipment has also continued to grow solidly.

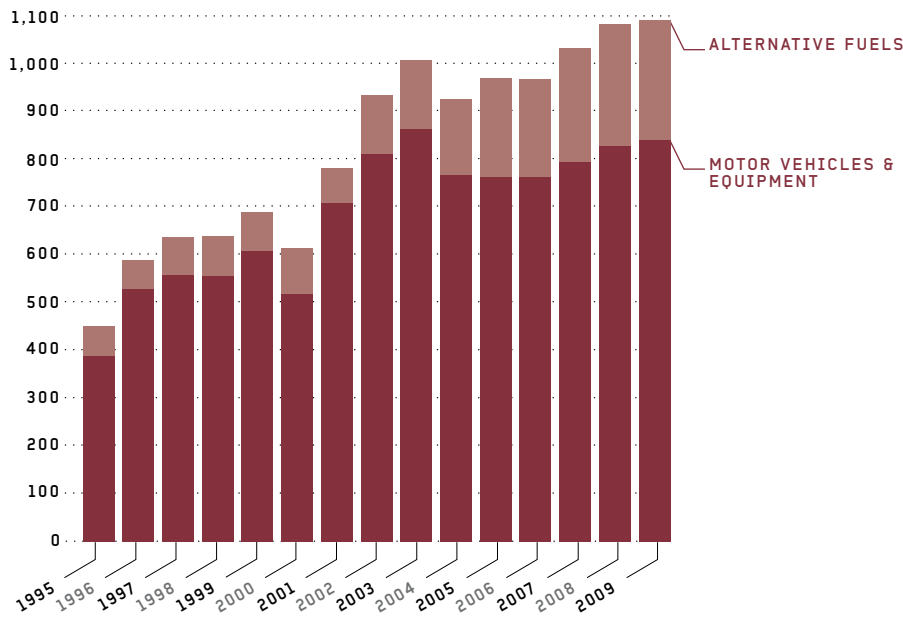
Orange County is a leader in Clean Transportation in vehicles as well as alternative fuels. With employment shares 2.1 times higher than the state average, the region reflects a mounting strength in Clean Transportation, building from expertise in its conventional auto industry. Motor Vehicles & Equipment is driving much of this growth, increasing employment by 116 percent (450 jobs) from 1995 to 2009.

## EMPLOYMENT BY GREEN SEGMENT ORANGE COUNTY



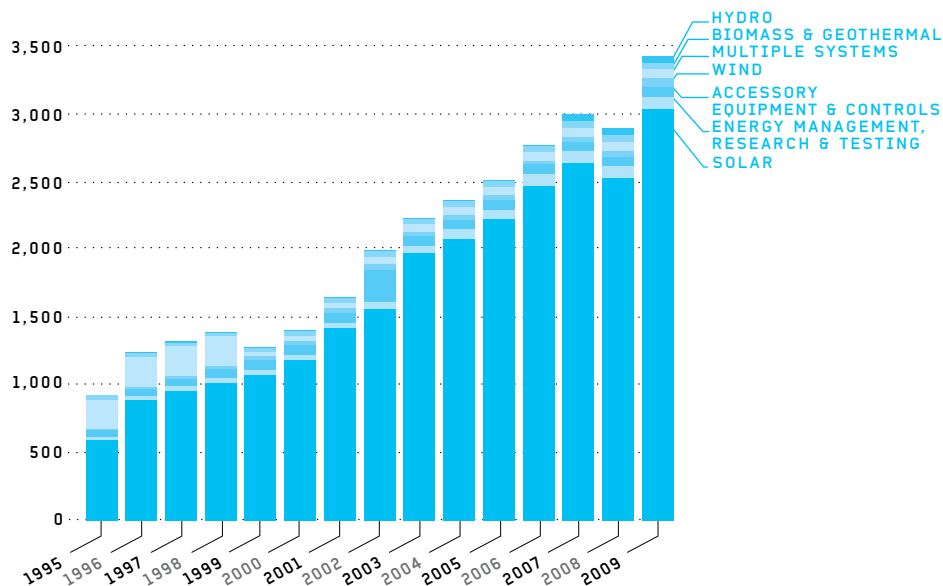
NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: Other includes Energy Infrastructure, Advanced Materials, Business Services, and Manufacturing & Industrial Support. Data Source: Green Establishment Database. Analysis: Collaborative Economics

## CLEAN TRANSPORTATION JOBS ORANGE COUNTY



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

## ENERGY GENERATION JOBS ORANGE COUNTY



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

## ORANGE COUNTY EMPLOYMENT

	PERCENT CHANGE 1995-2009
GREEN	+67%
TOTAL	+23%

## LEAR BOATS

### CLEAN TRANSPORTATION

Founded in 2005, Lear Boats is located in North Beach. The company manufactures luxury electric boats. In contrast to traditional gas motor boats, the LEAR 204 electric boat is powered by six absorbed glass mat batteries. Traditional gasoline-powered motor boats are inefficient and leak unburned gasoline into the water.

The use of an electric motor reduces the consumption of fossil fuels and the risk of emitting toxins in water environments. Additionally, the LEAR 204's efficient hull design produces no bow and very little wake during boat propulsion. This results in reduced disturbance to the aquatic environment and minimized erosion damage to shorelines. Electric motor boats permit the continuation of recreational boating without the negative environmental effects.

[www.lear-electric-boats.com](http://www.lear-electric-boats.com)

# SAN DIEGO REGION

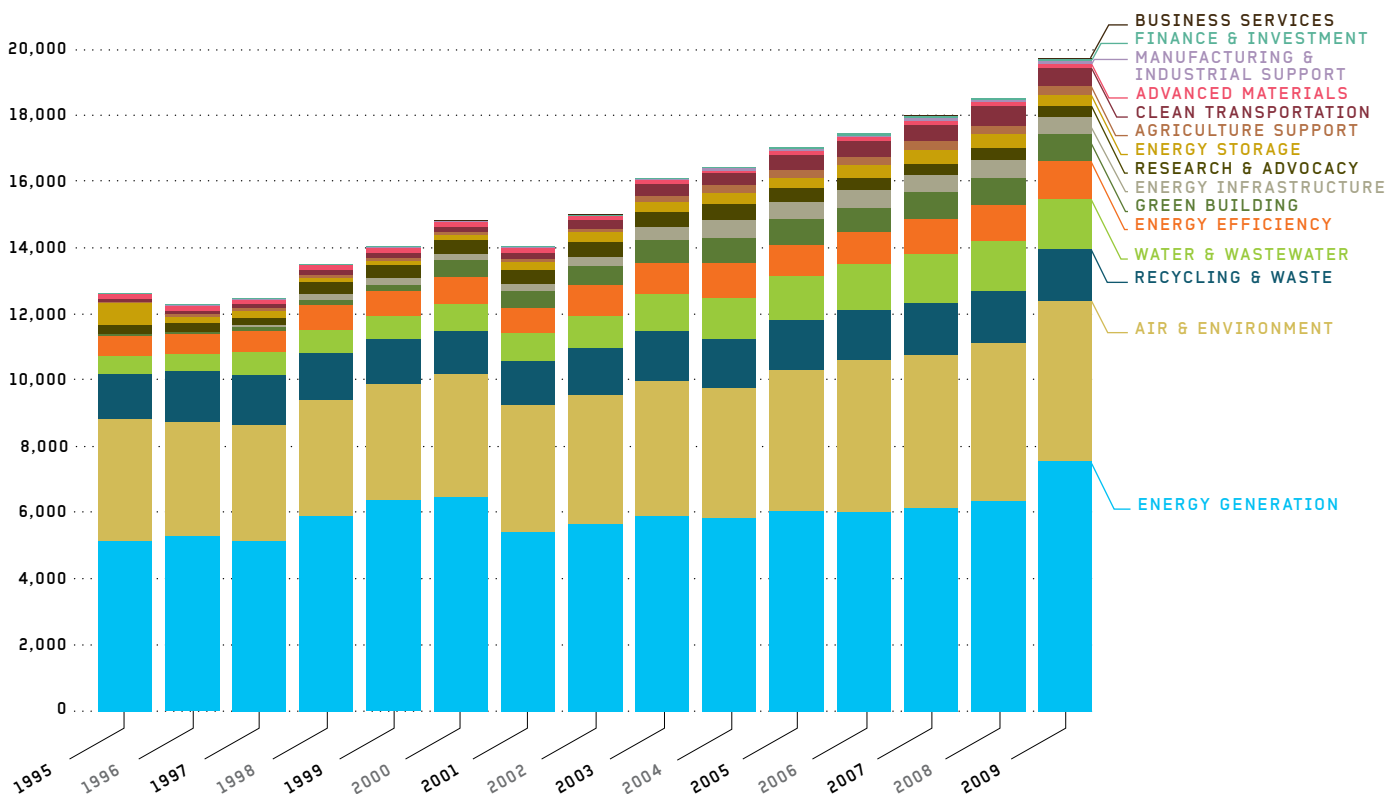
The San Diego Region is one of California's most vibrant centers of the growing green economy. Over the 15-year period as well as in the most recent year, San Diego Region's green economy has outpaced employment growth of the region's economy as a whole. Most recently, between January 2008 and 2009, green employment in the region expanded by 6.5 percent exceeding statewide growth of 2.8 percent. Green employment is highly concentrated in the San Diego Region. While the region accounts for nine percent of the state's total employment, it represents 11 percent of the state's jobs in the Core Green Economy.

San Diego Region's growth in the Core Green Economy has been driven largely by Energy Generation, Water & Wastewater, and Clean Transportation. Energy Generation accounts for 39 percent of green employment and increased 19 percent from early 2008 to 2009. Solar and Wind make up most of the activity; however, Hydro generation and Accessory Equipment & Controls are both strong in the region with employment concentrations six-times the statewide average. In Air & Environment, Environmental Consulting represents 21 percent of green employment in the region, and increased 39 percent from 1995 to 2009. Energy Infrastructure is one of the fastest growing and most highly concentrated segments in the region.

Water & Wastewater employment more than doubled from 1995 to 2009 and represents eight percent of green employment in the region. During the same time period, green establishments grew from 50 to nearly 80, reflective of a 58 percent growth. Water Treatment employment is highly concentrated and tripled from 1995 to 2009. During the same period, Wastewater Treatment employment doubled, adding more than 300 new jobs.

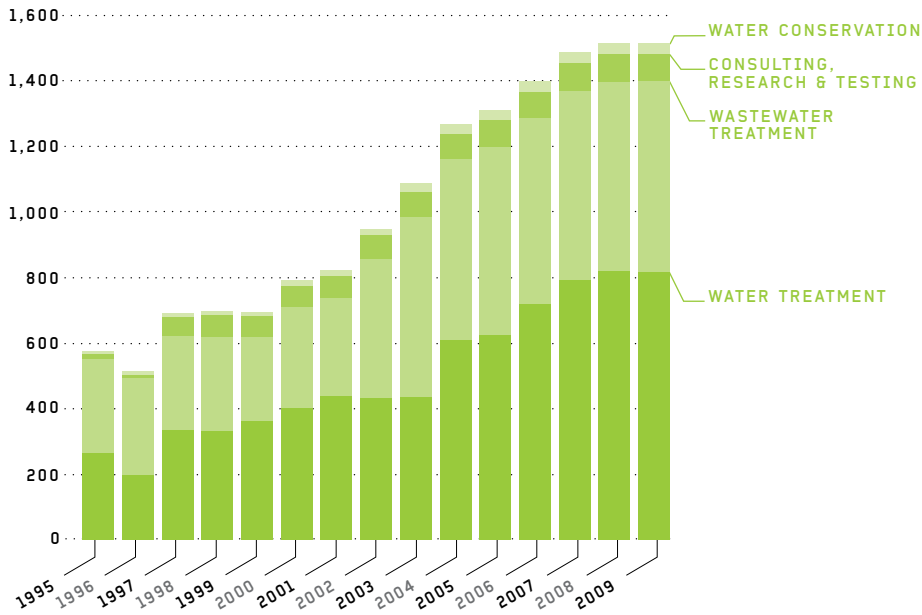
Clean Transportation employment growth accelerated by a factor of six between January 1995 and 2009. Establishments grew at a similar rate during that time. Over half of the employment in this segment is in Alternative Fuels. Employment in this subsegment soared from under 50 to over 350 between 1995 and 2009. Primarily in Imperial County, alternative fuels are taking off: employment expanded over 700 percent between 1995 and 2009.

**EMPLOYMENT BY GREEN SEGMENT  
SAN DIEGO REGION**



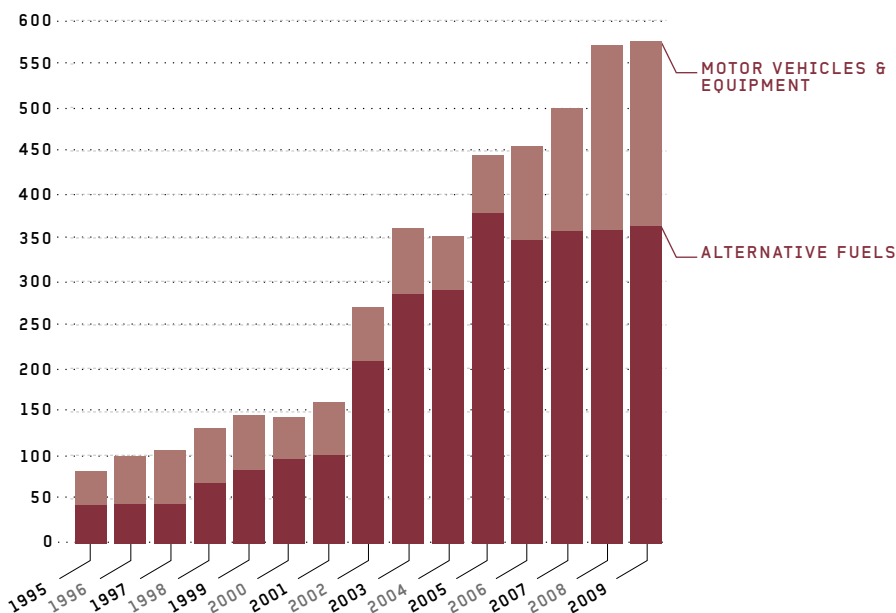
NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database. Analysis: Collaborative Economics

## WATER & WASTEWATER JOBS SAN DIEGO REGION



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

## CLEAN TRANSPORTATION JOBS SAN DIEGO REGION



NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: Large growth in Alternative Fuels is due to growth in a single Establishment. Data Source: Green Establishment Database. Analysis: Collaborative Economics

### SAN DIEGO REGION EMPLOYMENT

	PERCENT CHANGE 1995-2009
GREEN	+54%
TOTAL	+28%

## ACHATES POWER

### CLEAN TRANSPORTATION

Sharing its name with Achates, the “faithful friend” of mythological Greece, Achates Power has devoted its energies to developing diesel engine technology since its founding in 2004. In this short time period, the San Diego based company has been awarded six patents and has recently developed a 4.2 liter four-cylinder engine, which is fuel efficient and inexpensive. This densely-powered invention challenges engines twice its size, while giving off lower emissions. David Johnson, CEO of Achates Power, sees his diesel combustion engine, operating at a higher efficiency of 50 to 55 percent, as an answer to environmental sustainability and economic prosperity. This past January, Achates Power added Triangle Peak Partners to its list of investors already including Sequoia Capital, Madrone Capital Partners, and Rockport Capital Partners, whose faith in Achates innovative diesel technologies can be seen by their \$19.2 million investment.

[www.achatespower.com](http://www.achatespower.com)

# SACRAMENTO AREA

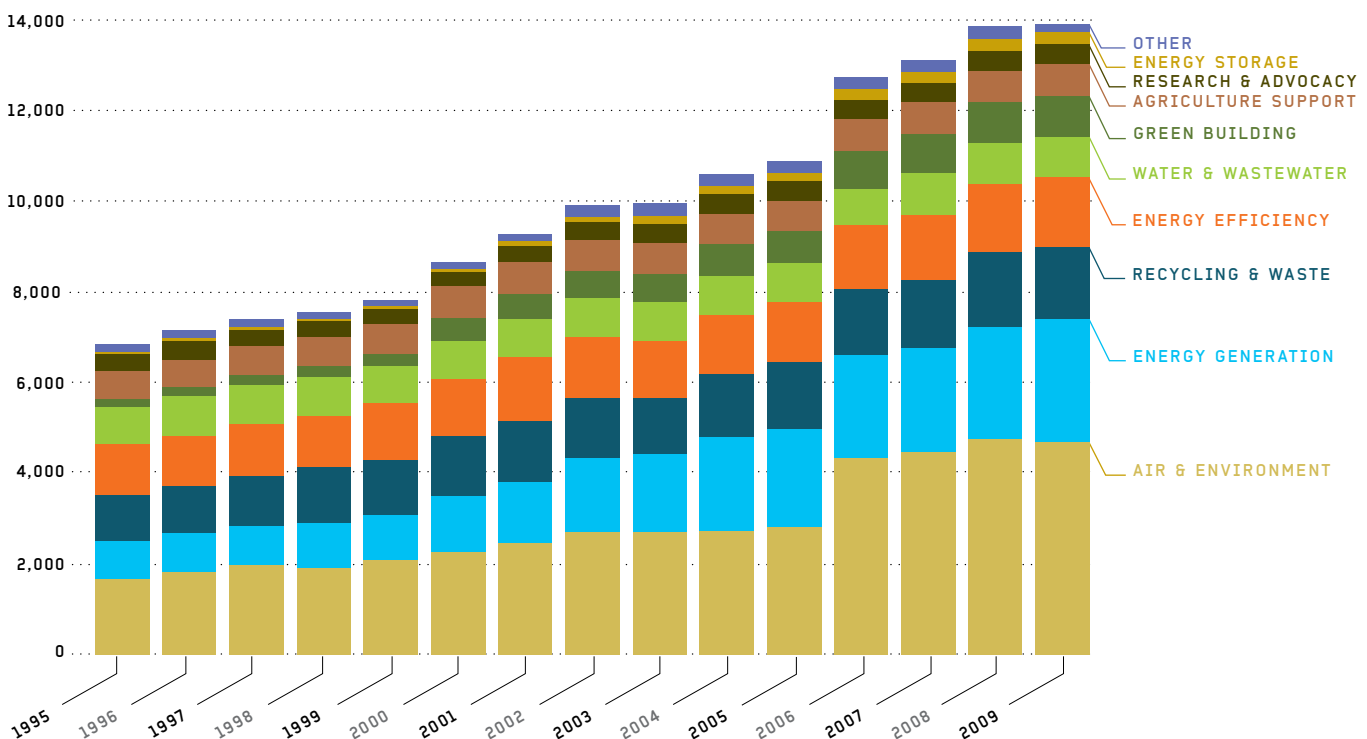
Since 1995, Sacramento Area's green economy has been growing at a faster pace than nearly every other region in the state. Due to a jump in the most recent year by the Bay Area, the two regions now lead California in growth. Compared to the economy as a whole, green employment is by far outpacing total employment in the Sacramento Area. The region gained approximately 7,100 new jobs from January 1995 to 2009, reflecting a 103 percent increase. Total employment in the region grew 28 percent. Green business and employment growth is highly concentrated in the region, roughly 40 percent higher than the statewide average.

Air & Environment and Energy Generation have been the major employment drivers in the Sacramento Area's Core Green Economy. Environmental Consulting accounts for the growth in Air & Environment, adding 3,000 jobs over the 15-year period. Energy Generation expanded to roughly 2,700 jobs to the region, and increased nine percent in the most recent observable 12 months. While Solar is a significant part of Energy Generation, Wind, Hydro and Geothermal, are all highly concentrated in the region. Jobs in Wind grew 131 percent in just one year, from January 2008 to 2009. Geothermal employment increased from fewer than 20 employees in 1995, to almost 270 in 2009. Wastewater Treatment has been driving employment growth in Water & Wastewater.

Business activity related to Energy Efficiency products and services is highly concentrated and diverse in the Sacramento Area. Within Energy Efficiency, Machinery is almost five times more concentrated than the state average. In recent years, employment in Energy Conservation Consulting has grown substantially, increasing 26 percent from January 2008 to 2009.

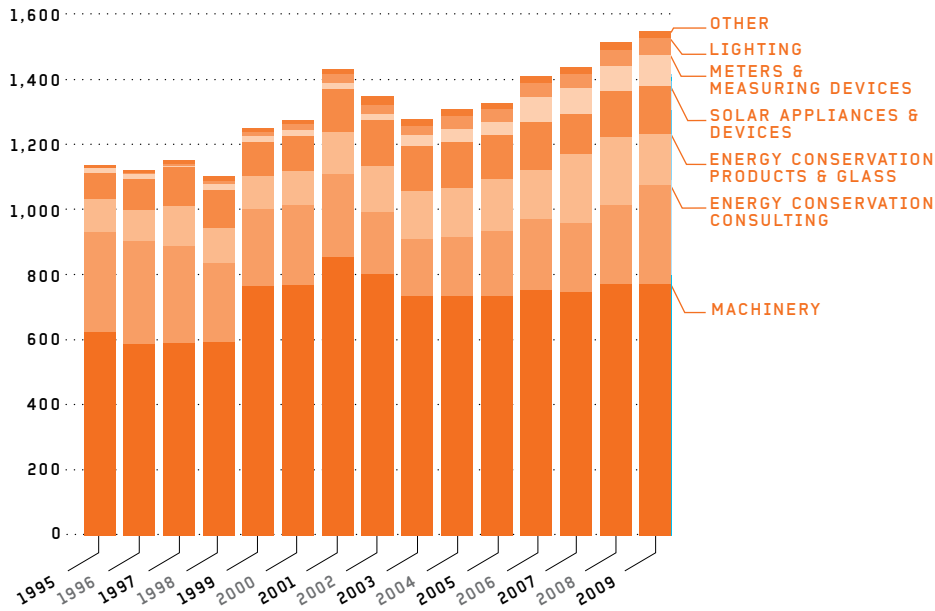
Green Building employment grew by a factor of four from January 1995 to 2009 and added nearly 700 jobs. The concentration of green employment in Green Building in the Sacramento Area is almost two times that of California as a whole. Within Green Building, Design & Construction represents a regional strength. In terms of business growth, 20 new establishments opened their doors over the 15 years.

**EMPLOYMENT BY GREEN SEGMENT  
SACRAMENTO AREA**



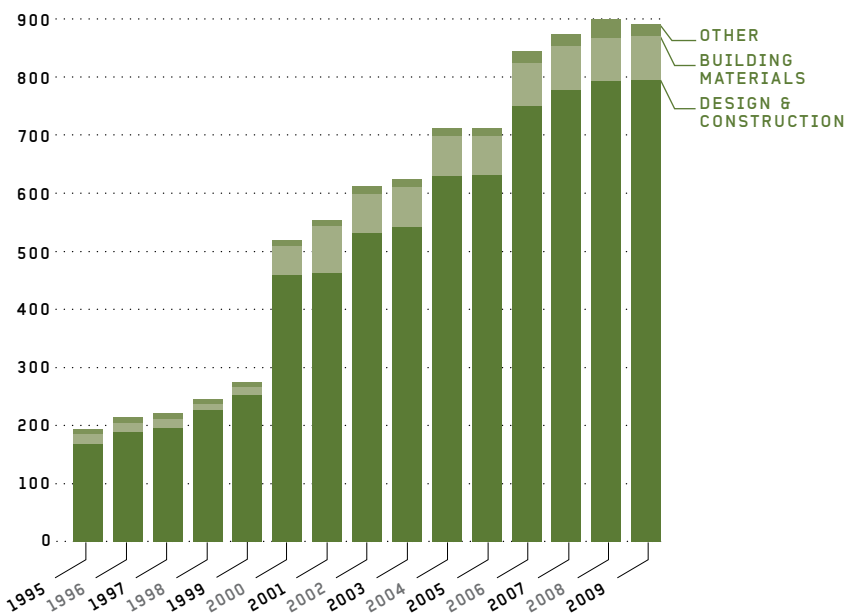
NEXT 10 MANY SHADES OF GREEN. Data as of January Note: The growth in Air & Environment in 2006 is due to the creation of a single company. Other includes Business Services, Finance & Investment, Transportation, Advanced Materials and Energy Infrastructure Data Source: Green Establishment Database Analysis: Collaborative Economics

## ENERGY EFFICIENCY JOBS SACRAMENTO AREA



NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: Other includes Energy Research and Glass  
Data Source: Green Establishment Database. Analysis: Collaborative Economics

## GREEN BUILDING JOBS SACRAMENTO AREA



NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: The growth in Design & Construction in 2000 is due to the expansion of a single company. Other includes Real Estate & Development, Other and Deconstruction. Data Source: Green Establishment Database. Analysis: Collaborative Economics

### SACRAMENTO AREA EMPLOYMENT

	PERCENT CHANGE 1995-2009
GREEN	+103%
TOTAL	+28%

## D3 LED

### ENERGY EFFICIENCY

From their office in Rancho Cordova, D3 LED engineers and manufactures dynamic digital displays like those seen in the famous Times Square in New York City. In fact, more than half of the displays found in this tourist attraction were created by D3 LED. From engineering, design, and installation, the company is involved in every aspect of creating light emitting diode (LED) displays.

LED displays are superior to traditional lighting options in that they consume much less electricity and have about ten times the lifespan. These advantages promote energy efficiency, reduce waste, and provide cost savings to business owners. Additionally, LED displays retain visibility in daylight conditions.

[www.d3led.com](http://www.d3led.com)

# INLAND EMPIRE

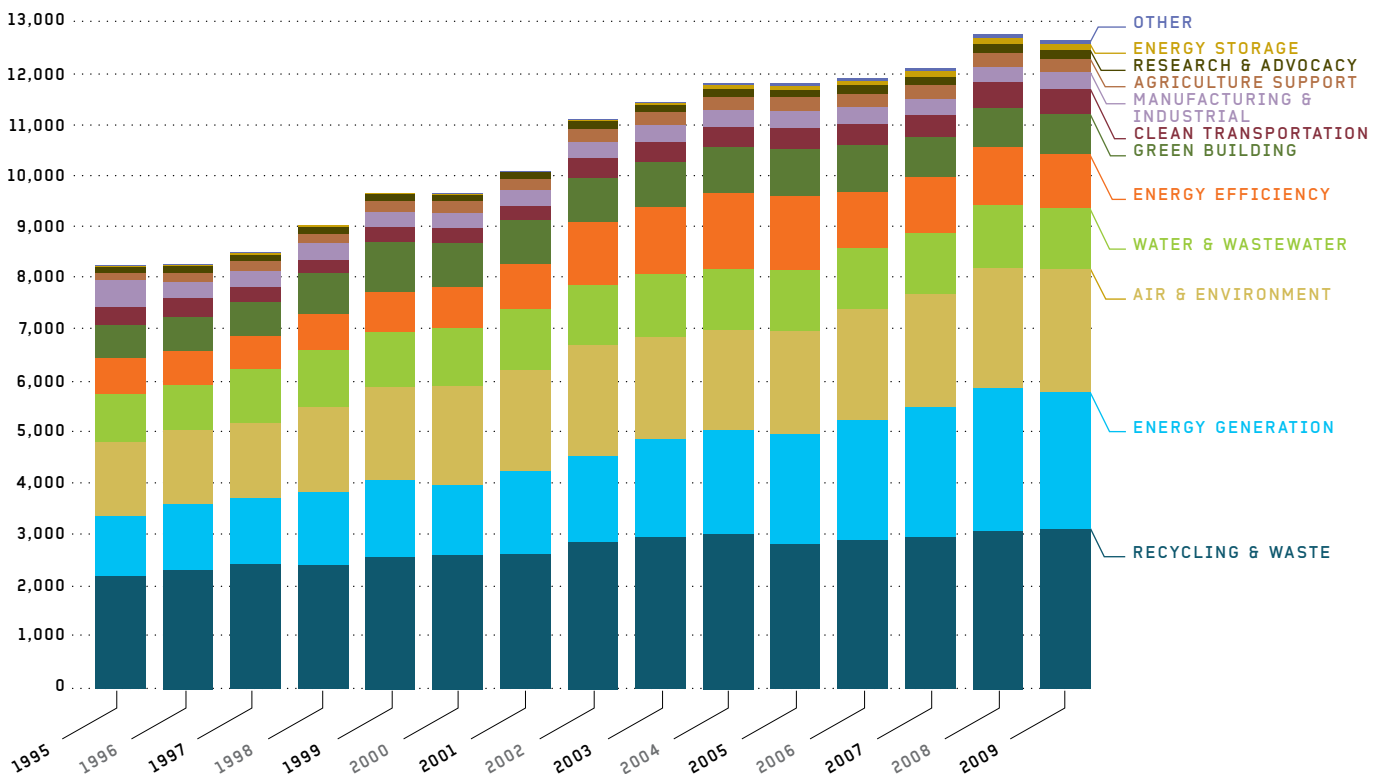
Innovative green business activity is spurring employment growth in the Inland Empire that outpaces the region's total economy. Although slowing over the most recent year, green employment grew 53 percent while total employment increased 47 percent between 1995 and 2009. During this time, approximately 4,400 jobs and over 500 business establishments were added to the region's green economy.

While Recycling & Waste accounts for the largest employment share, employment growth in the Inland Empire has been driven by other segments of the Core Green Economy. Energy Generation has been a key driver, and Clean Transportation represents a growing regional strength. Employment growth in Air & Environment resulted in 1,000 new jobs over the 15-year period mainly related to environmental consulting. In Water & Wastewater, the region reflects strong employment concentrations and growth in activities related to water treatment.

Energy Generation has powered much of the employment growth in the Inland Empire's Core Green Economy. Employment grew 129 percent from 1995 to 2009, adding roughly 1,500 jobs. Within Energy Generation, Solar accounts for the vast majority of employment. While employment in Solar stalled in this region in the recent year, growth in Wind continued at a clip of two percent from the beginning of 2008 to 2009. Employment shares in Wind are nearly twice the statewide average. Over the 15-year period, nearly 150 new businesses were created in Energy Generation.

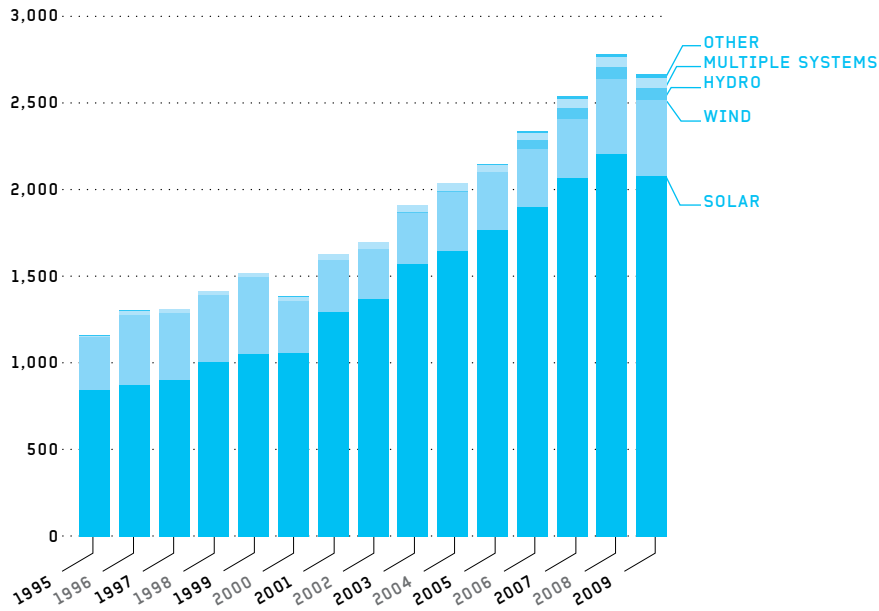
In Clean Transportation, the Inland Empire has become a leader in Alternative Fuels with employment shares nearly triple the statewide average. Overall Clean Transportation employment increased 42 percent over the 15 years. The merger of two locally-based electric vehicle companies resulted in employment losses in the nineties. The employment jump in 2002 was the result of a cheese producer leveraging its wastewater for the production of biofuels. New jobs were created in 2008 following the formation of a new electric vehicle company.

**EMPLOYMENT BY GREEN SEGMENT  
INLAND EMPIRE**



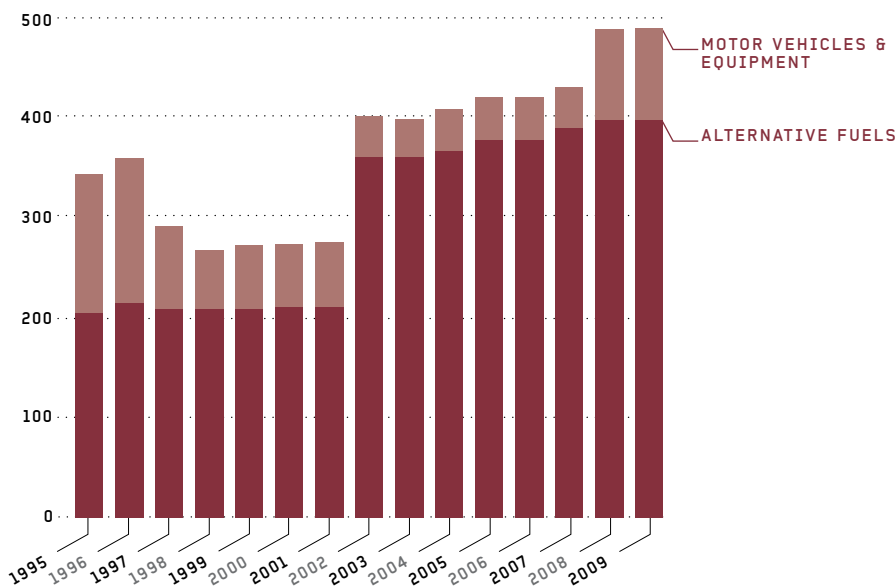
NEXT 10 MANY SHADES OF GREEN. Data as of January Note: Other includes Advanced Materials, Finance & Investment, Business Services, and Energy Infrastructure  
Data Source: Green Establishment Database Analysis: Collaborative Economics

## ENERGY GENERATION JOBS INLAND EMPIRE



NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: Other includes Accessory Equipment & Controls, Biomass, Energy Management, and Geothermal.  
Data Source: Green Establishment Database. Analysis: Collaborative Economics

## CLEAN TRANSPORTATION JOBS INLAND EMPIRE



NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: The growth in 2002 in Alternative Fuels is due to the new production of biofuels by a food producer. In 1997 employment dropped in Motor Vehicles & Equipment following the merger of two locally-based companies. The growth 2008 is due to the creation of a new electric vehicle company.  
Data Source: Green Establishment Database. Analysis: Collaborative Economics

### INLAND EMPIRE EMPLOYMENT

	PERCENT CHANGE 1995-2009
GREEN	+53%
TOTAL	+47%

## BIOTANE FUELS

### CLEAN TRANSPORTATION

Biotane Fuels is a branch of Imperial Western Products (IWP), an active player in the biofuel industry since the year 2000. Biotane Fuels realizes the importance of limiting the use of traditional fuels, which create ozone depleting emissions and health deterring pollutants. Biotane Fuels is one of the largest suppliers of its kind in the Western Hemisphere, generating over 12 million gallons of biofuel a year from renewable agricultural resources and recycled cooking oils.

In order to meet the growing demand for biofuels, the company is expanding its facilities and distribution network. As a member of the National Biodiesel Board, Biotane Fuels is dedicated not only to satisfying the current demand for biofuels, but also increasing quality standards and stimulating market growth.

[www.biotanefuels.com](http://www.biotanefuels.com)

# SAN JOAQUIN VALLEY

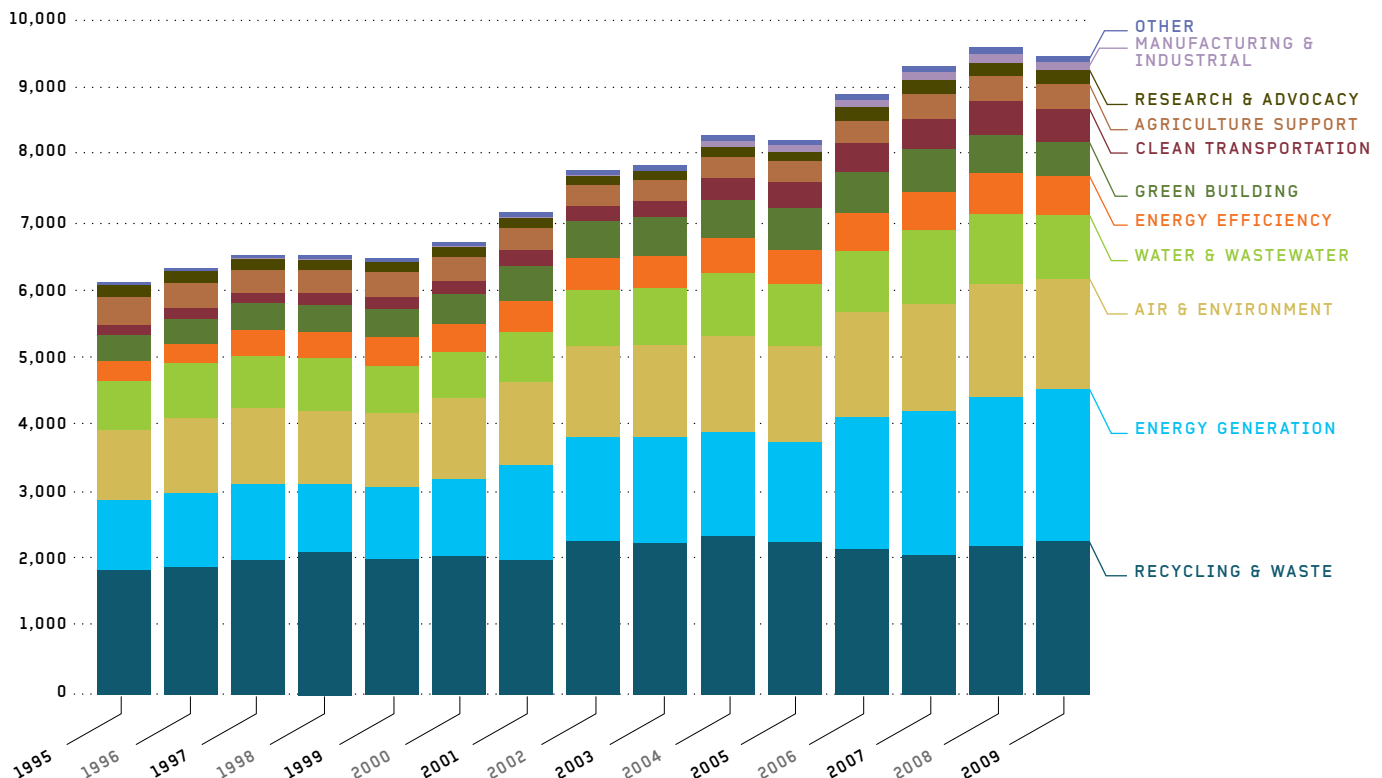
Although slowing in the most recent year, San Joaquin Valley's green economy expanded by 55 percent from 1995 to 2009. Meanwhile, overall employment growth lagged by 23 percent. This period produced nearly 3,360 jobs and 390 new business establishments in the region's Core Green Economy.

Although not the largest segments, Water & Wastewater and Clean Transportation represent important specializations in San Joaquin Valley's green economy. Energy Generation is responsible for 24 percent of green employment in the San Joaquin Valley. Employment in this segment grew 113 percent (1,200 jobs) from 1995 to 2009, and establishments grew 175 percent (120 establishments). Energy Efficiency makes up a modest portion of the region's core green employment at six percent, but it has doubled in employment since 1995. Growth in this segment is driven by consulting and machinery. The largest segment in the region is Recycling & Waste, which accounts for 24 percent of green employment. Employment in this segment increased four percent from January 2008 to 2009 and was driven almost exclusively by job growth in Recycling.

Although employment in Water & Wastewater dropped from 2007 to 2009, the presence of the International Center for Water Technology at California State University at Fresno and the region's established water technology cluster make this an important part of the region's green economy. From 1995 to 2009, employment increased 29 percent driven primarily by Water Treatment. Businesses in Water & Wastewater are 1.4 times more concentrated than in the state as a whole and grew in number by 35 percent over the 15-year period.

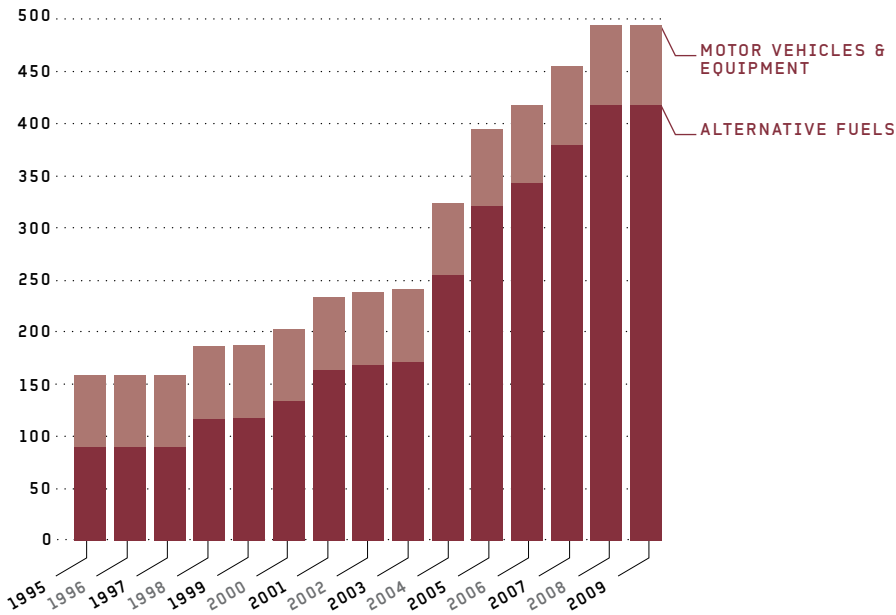
Clean Transportation employment more than tripled from 1995 to 2009. With an employment concentration 50 percent above the state average, this segment represents an important regional strength. Growth has been driven in most part by Alternative Fuels, which accounts for 85 percent of employment in Clean Transportation. Alternative fuel employment is three times more concentrated in the San Joaquin Valley than in the state as a whole and grew 364 percent from 1995 to 2009.

**EMPLOYMENT BY GREEN SEGMENT  
SAN JOAQUIN VALLEY**



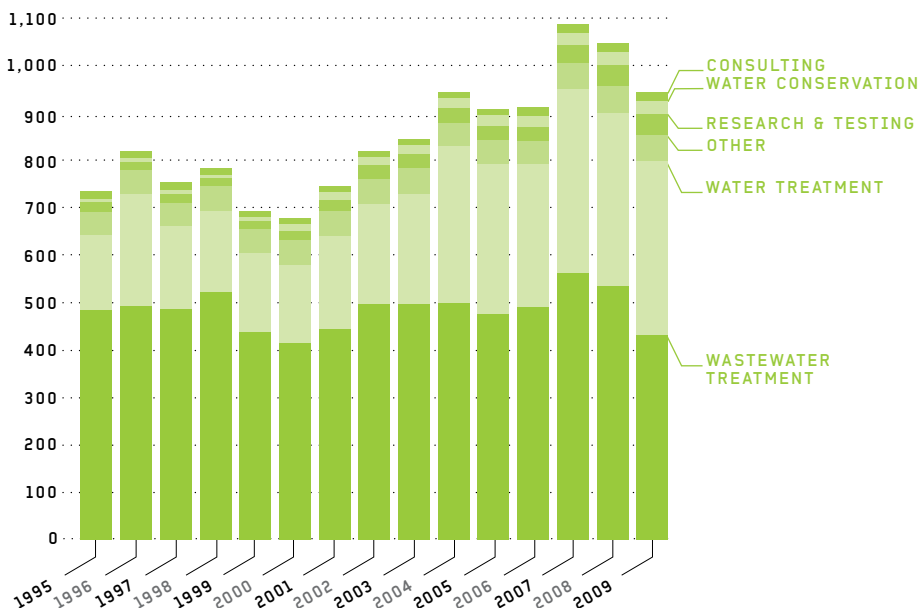
NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: Other includes Business Services, Finance & Investment, Energy Storage, Energy Infrastructure and Advanced Materials. Data Source: Green Establishment Database. Analysis: Collaborative Economics

## CLEAN TRANSPORTATION JOBS SAN JOAQUIN VALLEY



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

## WATER & WASTEWATER JOBS SAN JOAQUIN VALLEY



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

### SAN JOAQUIN VALLEY EMPLOYMENT

	PERCENT CHANGE 1995-2009
GREEN	+55%
TOTAL	+23%

## AQUA AZUL

### WATER AND WASTEWATER

Located between Fresno and Bakersfield in Hanford, Aqua Azul produces both reliable and simple ultraviolet disinfection systems and applications. Building on UV processes developed in the 1960s, Aqua Azul has designed 155 models of UV sterilization systems, proving to be both an energy efficient and economical alternative to traditional disinfecting chemicals such as chlorine. Wastewater flows past UV bulbs neutralizing waterborne pathogens without adding byproducts to the water or the air. While all products are made in the United States, Aqua Azul systems are used for industrial, residential and commercial wastewater purposes worldwide.

[www.aquaazul.com](http://www.aquaazul.com)

# CENTRAL COAST

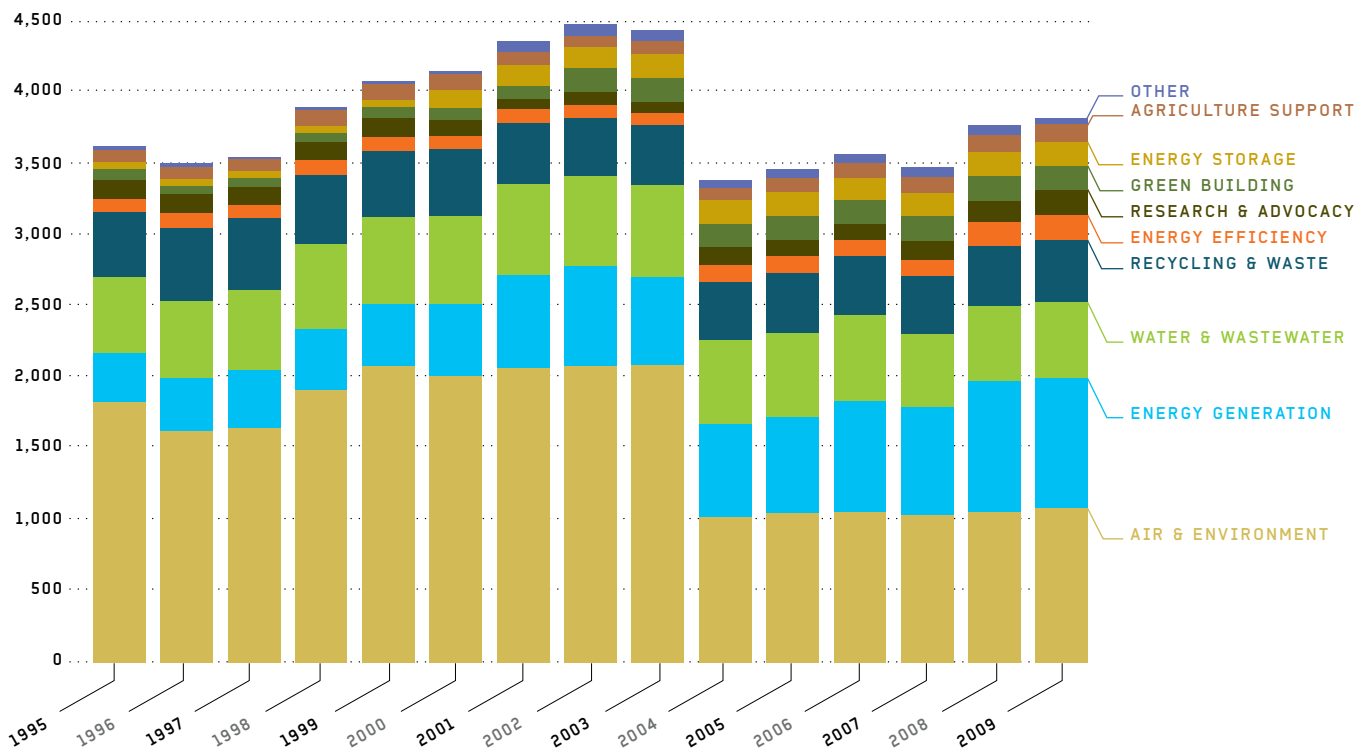
Although there are specific areas of growth in the region, the Central Coast is one of only two regions in which the Core Green Economy as a whole is lagging overall economic growth. However, this is explained by the downsizing and restructuring of a single firm resulting in the loss of nearly 1,000 jobs in 2003. It is also important to note that green employment in the Central Coast grew three percent in the most recent reported year. From 1995 to 2009, green employment expanded by seven percent and green businesses grew by 52 percent, adding approximately 170 establishments.

While overall growth has been modest, individual green segments are displaying promise. Employment in Energy Generation increased 165 percent from the start of 1995 to 2009. Energy Storage nearly tripled in employment over this period and was mainly driven by growth related to fuel cells. Largely associated with sustainable building materials, employment in Green Building doubled between 1995 and 2009. Although there were large job losses in Air & Environment in 2003, new businesses have started up since then in the region. The region reflects a very high employment concentration, nine times the state average, in Energy Conservation Software, a subsegment of Energy Efficiency.

Energy Generation represented almost 24 percent of green employment in the Central Coast in 2009. From 1995 to 2009, employment in Energy Generation expanded by approximately 570 jobs. Solar employment accounts for 59 percent of jobs in this segment. Most recently, employment in Wind picked up 18 percent between January 2008 and 2009.

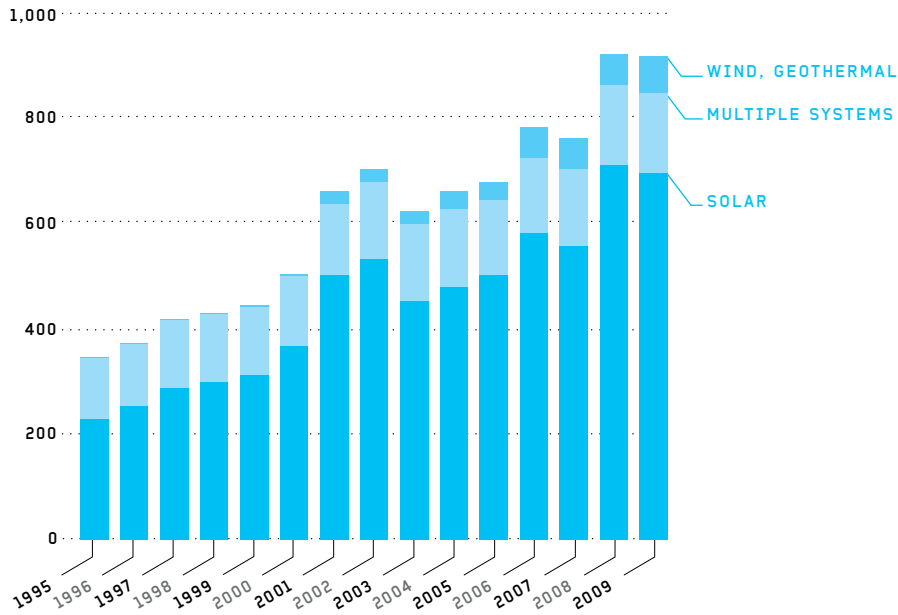
Water & Wastewater represents nearly 14 percent of employment in the Central Coast's Core Green Economy. Although growth in both jobs and establishments has been stagnant since 2004, the region reveals an area of specialization in this segment with an employment concentration sixty percent above the statewide average. This is particularly the case for business activities related to treatment and conservation.

**EMPLOYMENT BY GREEN SEGMENT  
CENTRAL COAST**



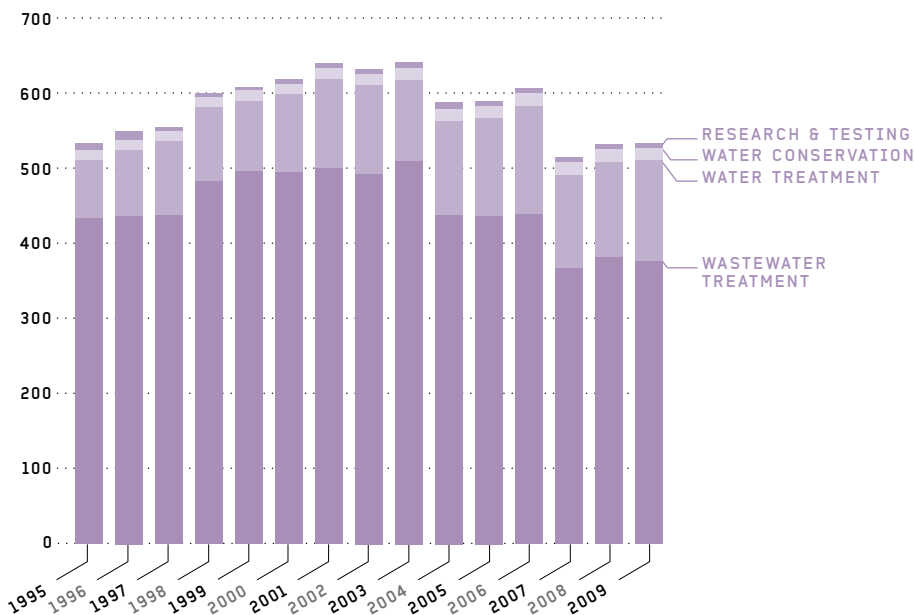
NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: The dramatic drop in employment from 2003 to 2004 was due to the bankruptcy of a company in Air & Environment. Other includes Finance & Investment, Energy Infrastructure, Transportation, Manufacturing & Industrial Support, Business Services, and Advanced Materials. Data Source: Green Establishment Database. Analysis: Collaborative Economics

## ENERGY GENERATION JOBS CENTRAL COAST



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

## WATER & WASTEWATER JOBS CENTRAL COAST



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

### CENTRAL COAST EMPLOYMENT

	PERCENT CHANGE 1995-2009
GREEN	+7%
TOTAL	+13%

## PACIFIC ENERGY COMPANY

### ENERGY GENERATION

Pacific Energy Company has been providing San Luis Obispo and the surrounding communities with alternative energy solutions since its founding in 1980. This Central Coast company specializes in solar electric equipment for residential and commercial grid systems, providing a diverse range of products from photovoltaic systems to solar powered home fans and garden lights. While their first solar electric installation was a water pump built with a Monitor ZA jack pump, batteries and solar components, Pacific Energy Company has since modernized and developed direct drive pumps that are powered by photovoltaics. Pacific Energy Company also offers a variety of fuel-efficient gas fireplaces and accessories which emit less smoke than old fashioned hearths and possess temperature controls for effective heating.

[www.alteryourenergy.com](http://www.alteryourenergy.com)

# SACRAMENTO VALLEY

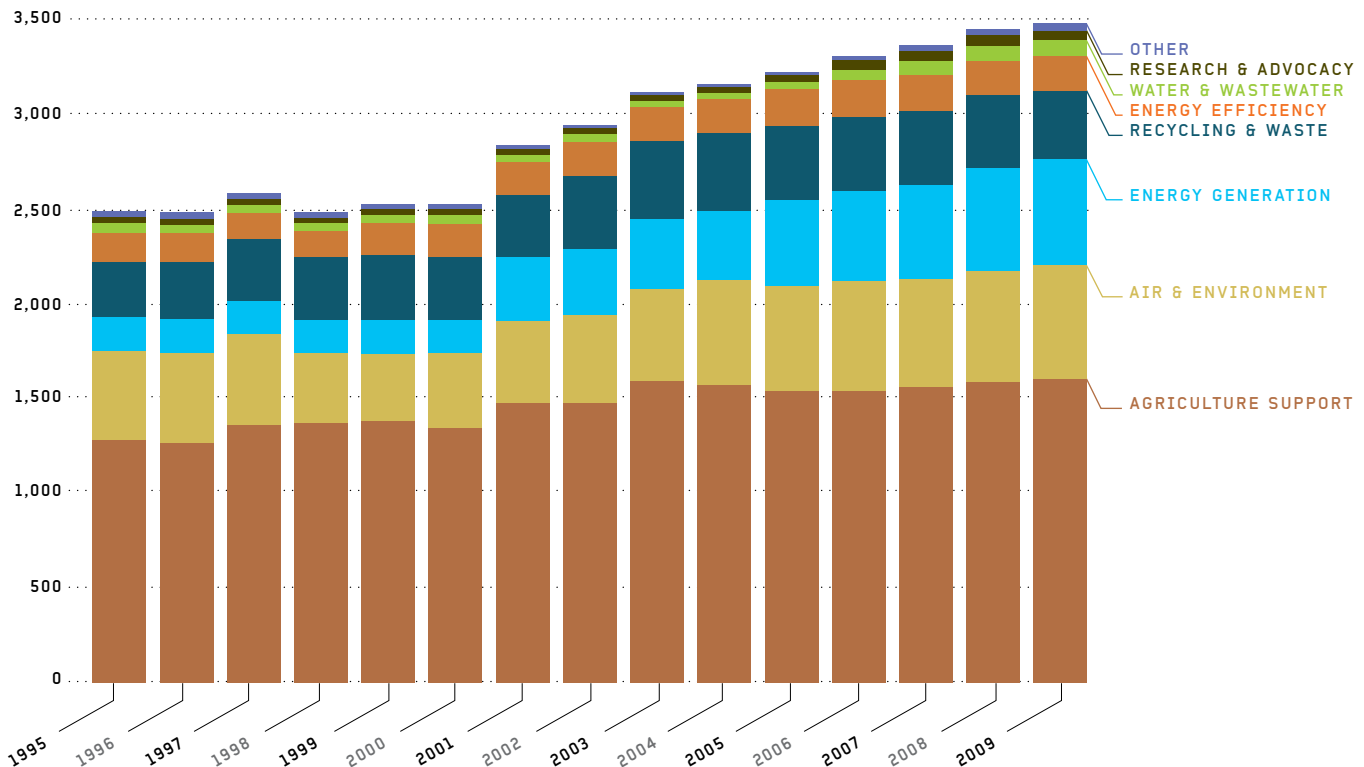
The Sacramento Valley leads the state in Agriculture Support and is a leader in the production of biofuels. These activities have driven substantial growth in green employment and establishments over the long term and helped maintain growth in more recent years. From 1995 to 2009, green employment expanded 40 percent, adding approximately 1,000 jobs and outpacing growth in the total economy. Green business establishments doubled in number over the long period and increased six percent from January 2008 to 2009.

Sacramento Valley's green economy is highly specialized in Agriculture Support and strong in Energy Generation, and Air & Environment. Employment in Air & Environment represents 17 percent of the region's green economy and grew 28 percent from 1995 to 2009. Highly concentrated in the region, Environmental Consulting has accounted for the employment growth in this segment. Within Energy Efficiency, business activity related to solar powered appliances and devices is growing in the region.

As the state's leader in Agriculture Support, the segment represents a staggering 46 percent of green employment in the Sacramento Valley. Agriculture Support added roughly 330 jobs from 1995 to 2009. Employment in this segment is 23 times more concentrated than the statewide average which indicates a high level of specialization and potential value generation. Related activities include organic fertilizer, erosion control, and precision irrigation. Employment is almost entirely in Land Management, which grew 25 percent from 1995 to 2009.

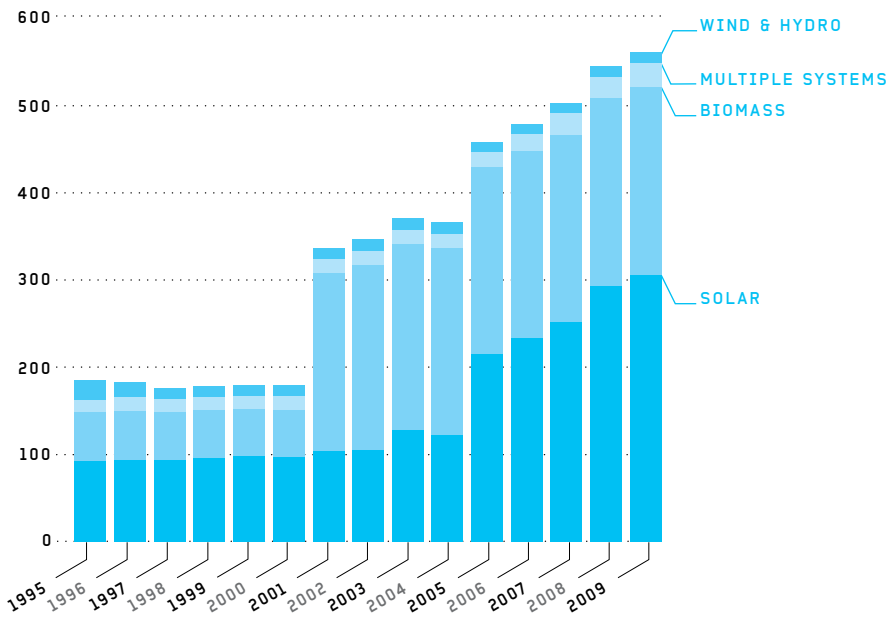
As a result surging activity related to Biomass and Solar, Energy Generation has become highly concentrated in the region and represents 16 percent of green employment there. Employment increased three percent from January 2008 to 2009 and tripled from 1995 to 2009. The dramatic jump in Biomass employment from 2000 to 2001 is attributed to the opening of a new biomass plant. Employment in Biomass nearly quadrupled from 1995 to 2009 and more than tripled for Solar.

**EMPLOYMENT BY GREEN SEGMENT**  
SACRAMENTO VALLEY



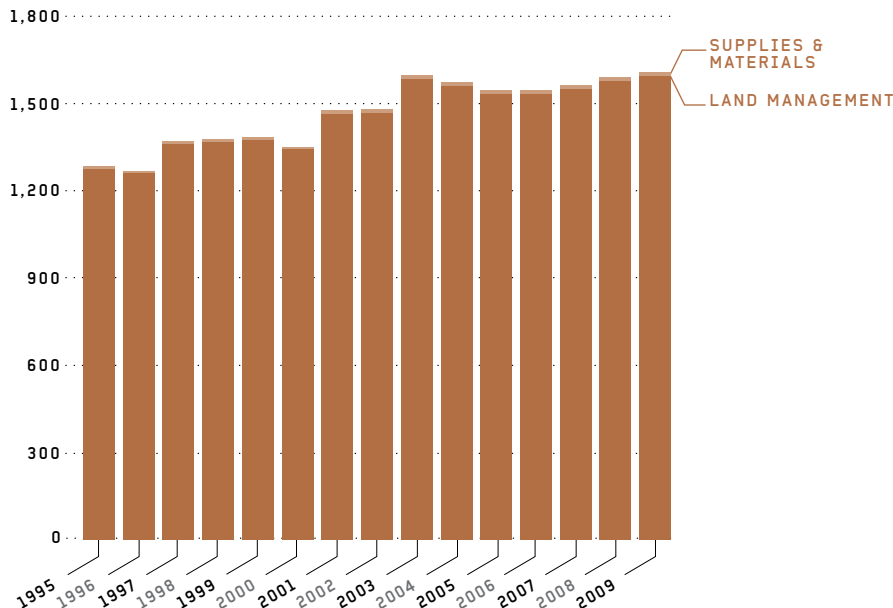
NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: Other includes Transportation and Green Building. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

## ENERGY GENERATION JOBS SACRAMENTO VALLEY



NEXT 10 MANY SHADES OF GREEN. Data as of January. The growth in Biomass in 2001 is due to the opening of a new plant. Data Source: Green Establishment Database. Analysis: Collaborative Economics

## AGRICULTURE SUPPORT JOBS SACRAMENTO VALLEY



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database. Analysis: Collaborative Economics

### SACRAMENTO VALLEY EMPLOYMENT

	PERCENT CHANGE 1995-2009
GREEN	+40%
TOTAL	+26%

## HYDRO ORGANICS WHOLESALE

### AGRICULTURE SUPPORT

Manufacturer and wholesaler of organic fertilizers and products worldwide, Hydro Organics Wholesale provides a large selection of green products for anyone from backyard gardeners to large-scale farmers. Specializing in the production of proprietary lines of liquid and dry fertilizers since 1991, the Chico-based company prides itself on its all natural products derived from ingredients including sea kelp, bat guano and cottonseed meal. Not only are these fertilizers safe for the environment, but specific varieties can effectively lower pH levels in soils, avoid clogging drip-emitters or sprayers and promote plant growth. Hydro Organics Wholesale also sells a wide variety of organic products for hydroponic growers, who cultivate plants in mineral nutrients solutions rather than in soil.

[www.hydro-organics.com](http://www.hydro-organics.com)

# NORTH COAST

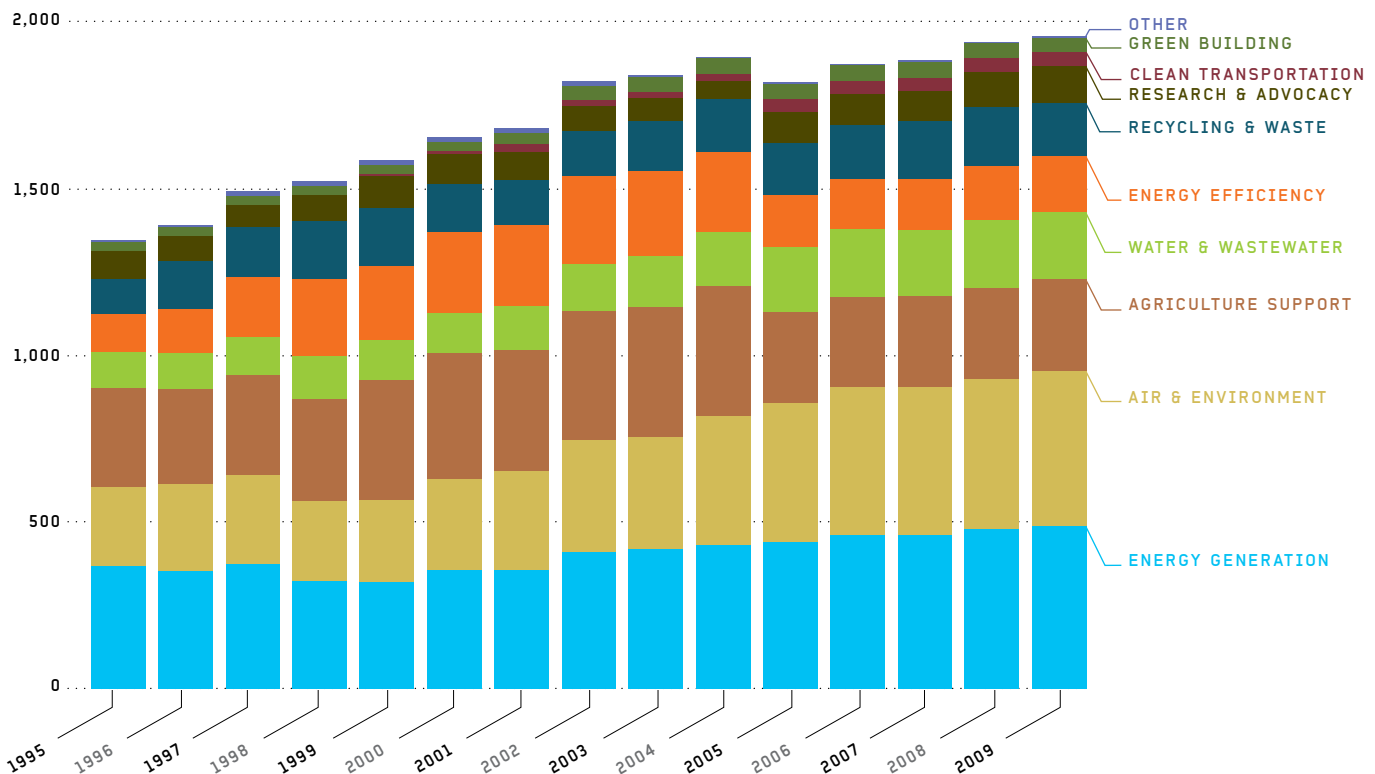
The North Coast's green economy has shown substantial growth in the past decade. Since 1995, green employment has increased 46 percent adding roughly 620 jobs, an important addition to North Coast employment, which grew only 15 percent over the same time period. Green businesses in the region have shown similar growth expanding 56 percent to nearly 290 establishments in 2009.

With consistent growth from key segments including Energy Generation and Air & Environment, the North Coast's green economy has continued to thrive. Other segments, such as Water & Wastewater and Agriculture Support, have also played a vital role in the growth of the region's Core Green Economy. Over the past 15 years, employment in Water & Wastewater increased 89 percent, mainly spurred by a jump in Wastewater Treatment jobs. Although holding steady, Agriculture Support accounts for 14 percent of the region's green employment and is primarily in Land Management.

The North Coast's largest green segment, Energy Generation accounts for 25 percent of total green employment. Since 1995, Energy Generation jobs increased 32 percent, and 25 businesses opened. While Geothermal represented the largest percentage of Energy Generation jobs, Solar has grown 284 percent over the past 15 years.

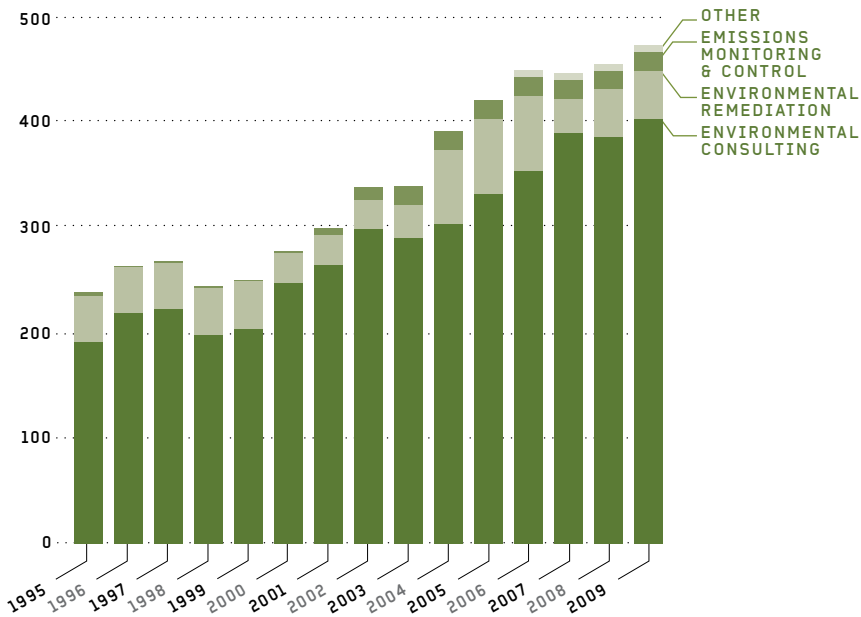
Also reflecting a large employment share, Air & Environment represents 24 percent of the region's green economy. Environmental Consulting accounted for the largest and fastest growing subsegment within Air & Environment. In 2009, Environmental Consulting accounted for 400 jobs, an increase of over 110 percent since 1995.

**EMPLOYMENT BY GREEN SEGMENT  
NORTH COAST**



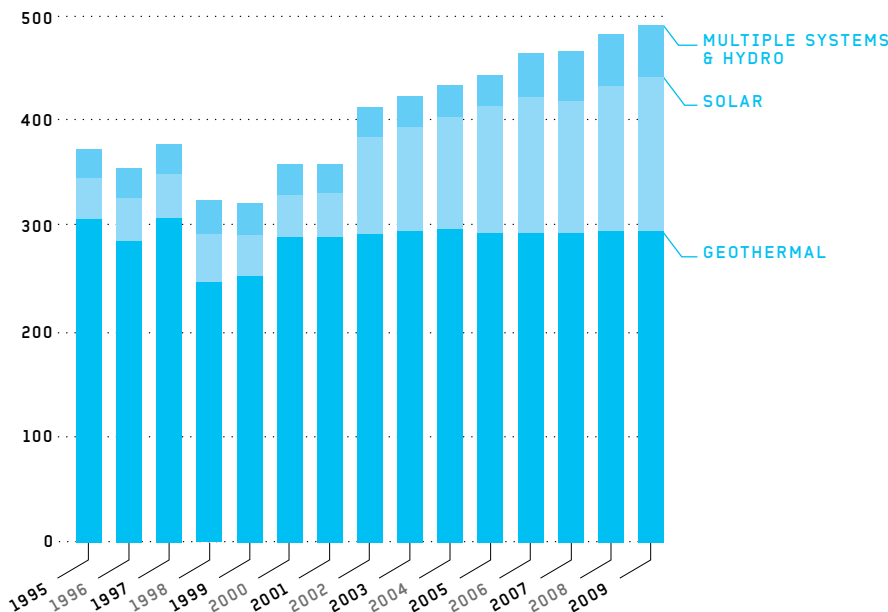
NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: Other includes Energy Storage and Business Services. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

## AIR & ENVIRONMENT JOBS NORTH COAST



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

## ENERGY GENERATION JOBS NORTH COAST



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

### NORTH COAST EMPLOYMENT

	PERCENT CHANGE 1995-2009
GREEN	+46%
TOTAL	+15%

## THE MATTOLE SALMON GROUP

### AIR AND ENVIRONMENT

The Mattole Salmon Group is a non-profit organization dedicated to working with the community and resource agencies to restore salmon populations in the Mattole Watershed to self-sustaining levels. The focus species of the group is the Coho Salmon, because of its dangerously small population. Since 1980, the group has executed programs to directly enhance the salmon living environment, monitor and improve salmon population and habitat conditions, and offer outreach and educational efforts for students and the community. Specific projects include estuary monitoring, temperature monitoring, and conducting adult escapement surveys.

[www.mattolesalmon.org](http://www.mattolesalmon.org)

# SIERRA REGION

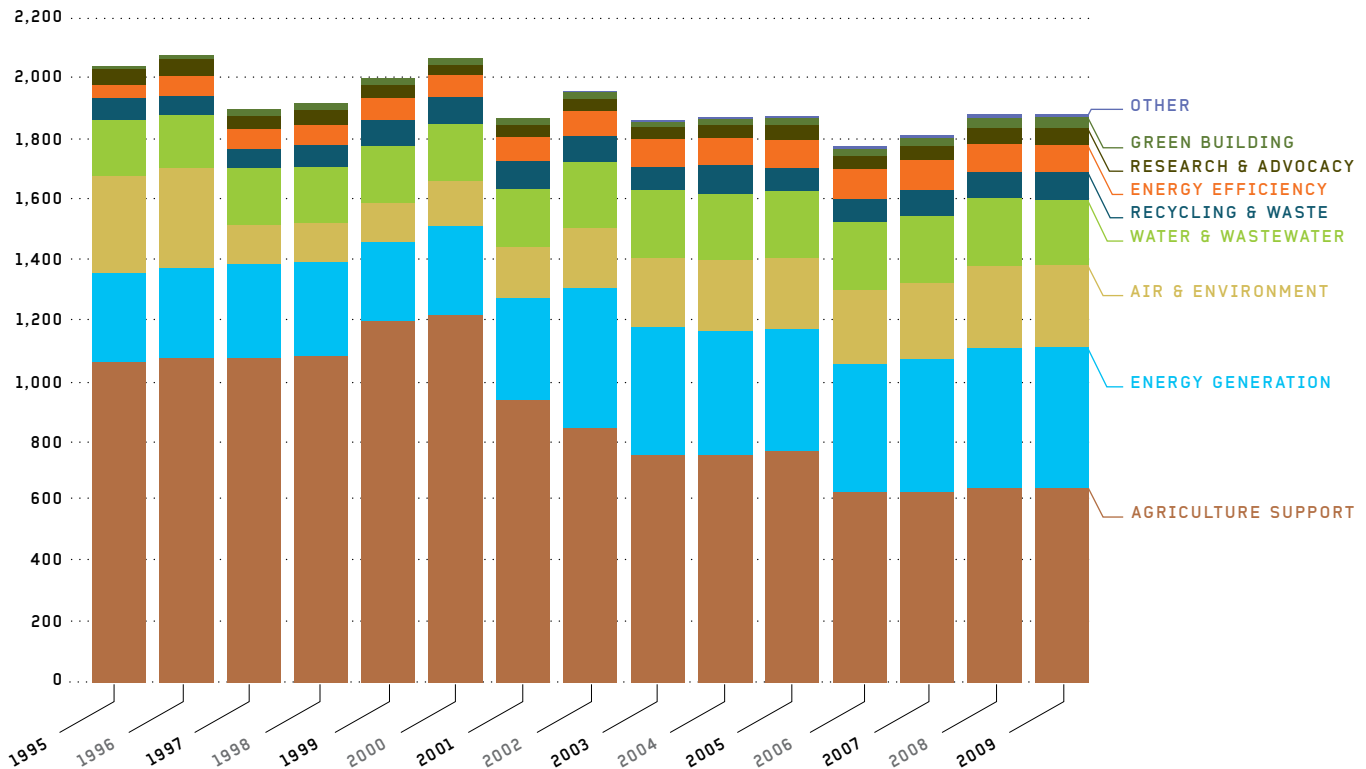
The Sierra Region is one of two regions in the state in which green employment has lagged behind total employment growth. The drop in employment is due to the downsizing of a single company in Agriculture Support related to sustainable forestry. Without Agriculture Support, green employment in the region expanded by 27 percent. In terms of business growth, the number of green establishments in the region increased 50 percent between 1995 and 2009.

While Agriculture Support has accounted for a diminishing percentage of green employment over the last 15 years, the region boasts solid employment growth and high concentrations in other green segments. Energy Generation increased 60 percent and accounted for 465 jobs in the region as of January 2009. Growth in Energy Efficiency has been powered mostly by business activity related to solar appliances and devices. Building design and construction account for the growth in Green Building in the region. Employment in Water & Wastewater is highly concentrated in the region, and although employment has slipped recently, employment increased 18 percent over the 15-year period. While diminishing over the last 15 years, Agriculture Support accounts for the largest share of green employment (640 jobs) in the Sierra Region and is 14 times more concentrated than the statewide average.

Water & Wastewater employment has grown 18 percent since 1995. The vast majority of employment in this segment is in the area of Wastewater Treatment, which accounts for nine percent of the Sierra region's green employment. The number of business establishments in Water & Wastewater increased 31 percent over the 15-year period.

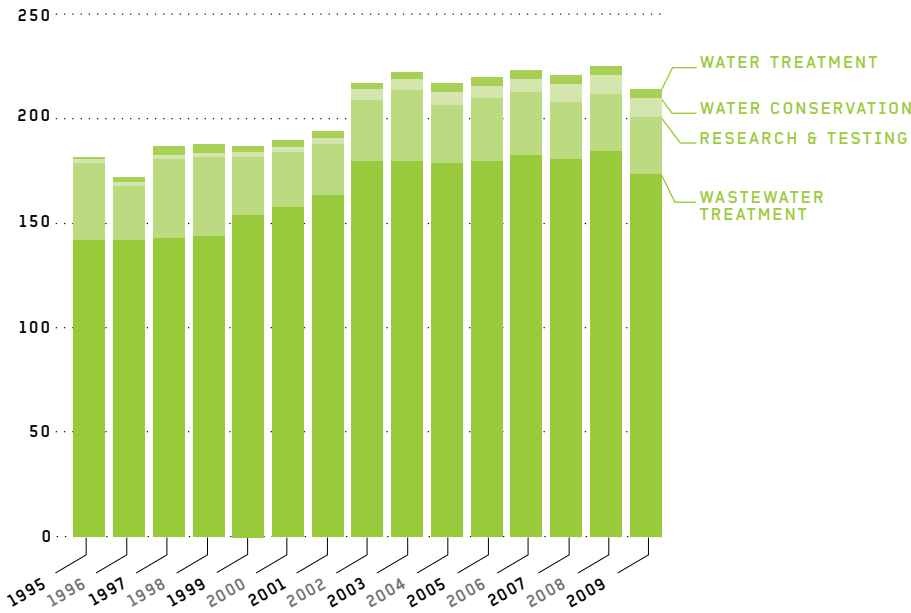
With employment shares 60 percent above the statewide average, Energy Generation is highly concentrated in the region. Solar and Wind have driven this growth. Over the course of the most recent observable twelve months, employment in Wind swept up 24 percent. Biomass jobs have held steady over the period. In Energy Generation, 29 new business establishments opened their doors between 1995 and 2009.

**EMPLOYMENT BY GREEN SEGMENT**  
SIERRA REGION



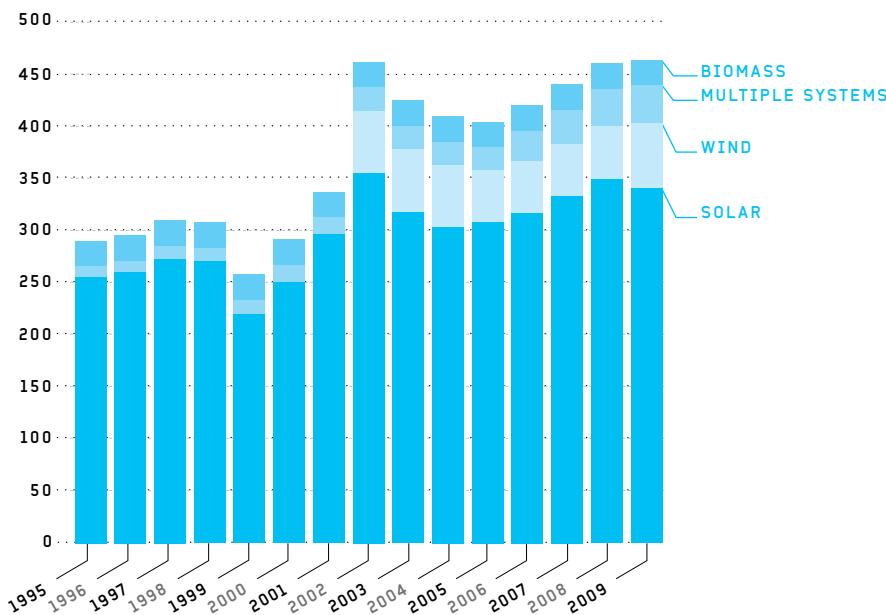
NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: Other includes Transportation, Energy Storage, Energy Infrastructure and Finance & Investment  
Data Source: Green Establishment Database. Analysis: Collaborative Economics

## WATER & WASTEWATER JOBS SIERRA REGION



NEXT 10 MANY SHADES OF GREEN. Data as of January. Data Source: Green Establishment Database  
Analysis: Collaborative Economics

## ENERGY GENERATION JOBS SIERRA REGION



NEXT 10 MANY SHADES OF GREEN. Data as of January. Note: Multiple Systems includes Geothermal. Sudden increase in Wind in 2002 is due to a single company. Data Source: Green Establishment Database.  
Analysis: Collaborative Economics

### SIERRA REGION EMPLOYMENT

	PERCENT CHANGE 1995-2009
GREEN	-8%
TOTAL	+24%

## CALIFORNIA SOLAR ELECTRIC COMPANY

### ENERGY GENERATION

California Solar Electric Company, located in Grass Valley, has been developing and installing commercial, industrial, governmental and residential solar electric systems since 2000. Committed to slowing global climate change through clean energy technologies, California Solar Electric Company offers a wide assortment of solar technology solutions. These services include solar site analysis, system and financial performance projections, and grid-tied system installation, maintenance and repair. California Solar Electric Company also specializes in off-grid solar electric system design in which solar modules produce direct current electricity that is stored in a battery until it is converted into alternating current power for in home use. Solar water pumps, an alternative to pumps powered by engine generators, are also an environmentally friendly answer when utility power is not accessible.

[www.californiasolarco.com](http://www.californiasolarco.com)

## CONCLUSION

IN CONCLUSION, OUR GLOBAL CONTEXT IS CHANGING, AND CALIFORNIA IS WELL POSITIONED TO EFFECTIVELY LEVERAGE EMERGING BUSINESS OPPORTUNITIES. AS BUSINESSES, HOUSEHOLDS AND PUBLIC AGENCIES SEEK OUT NEW SAVINGS THROUGH IMPROVING RESOURCE EFFICIENCY, THE BUSINESSES IN THE CORE GREEN ECONOMY, WHICH PROVIDE THE PRODUCTS AND SERVICES THAT ENABLE THIS TRANSITION WILL CONTINUE TO GROW. THIS GROWING BUSINESS ACTIVITY RELATED TO IMPROVING RESOURCE PRODUCTIVITY IS YIELDING NEW JOB OPPORTUNITIES AS WELL AS IMPROVED RESOURCE PRODUCTIVITY AND ECONOMIC COMPETITIVENESS.

CALIFORNIA'S CORE GREEN ECONOMY HAS BEEN GROWING AT A FASTER RATE THAN THE ECONOMY AS A WHOLE. SINCE 1995, JOBS IN THE CORE GREEN ECONOMY HAVE EXPANDED BY 56 PERCENT WHILE THE TOTAL ECONOMY GREW BY 18 PERCENT. EVEN OVER THE MOST RECENT 12-MONTH PERIOD, JOB GAINS OF THREE PERCENT EXCEEDED TOTAL EMPLOYMENT GROWTH OF ONE PERCENT.

ACROSS THE 15 GREEN INDUSTRY SEGMENTS, ENERGY GENERATION, ENERGY EFFICIENCY, GREEN BUILDING, ENERGY STORAGE, AND CLEAN TRANSPORTATION HAVE VASTLY EXCEEDED THE STATEWIDE AVERAGE JOB GAINS OF 56 PERCENT BETWEEN 1995 AND 2009. MOST RECENTLY, EMPLOYMENT SURGED IN ENERGY GENERATION (8%), ENERGY STORAGE (11%) AND CLEAN TRANSPORTATION (6%) FROM JANUARY 2008 TO 2009.

THE CORE GREEN ECONOMY IS GROWING ACROSS CALIFORNIA'S ELEVEN ECONOMIC REGIONS AT DIFFERENT RATES AND WITH DIFFERENT EMERGING INDUSTRY STRENGTHS. OVER THE MOST RECENT PERIOD, THE BAY AREA AND THE SAN DIEGO REGION HAVE OUTPACED STATEWIDE GROWTH WITH GREEN EMPLOYMENT GAINS OF EIGHT PERCENT AND SEVEN PERCENT RESPECTIVELY. WHILE EMPLOYMENT IN ENERGY GENERATION IS WIDELY DISTRIBUTED ACROSS THE STATE, A UNIQUE MIX OF GREEN SECTORS IS EMERGING IN EACH REGION.

## APPENDIX

### **California's Core Green Economy: Green Business Establishments Database**

Collaborative Economics has developed an approach for identifying and tracking the growth of businesses with primary activities in the Core Green Economy. This methodology was originally developed for work carried out on behalf of Next 10, a California-based nonprofit, and published in the *California Green Innovation Index* (2008, 2009, 2010). Building on this work, CEI designed and conducted the nationwide analysis of green business activity on behalf of the Pew Charitable Trusts. The Pew Center on the States reformatted the results of the analysis and developed the report, *The Clean Energy Economy* (June 2009).

The accounting of green business establishments and jobs is based on multiple data sources (including New Energy Finance and the Cleantech Group,™ LLC) for the identification 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 PlanetMaggie, a Bay Area-based IT service company. The National Establishments Time-Series (NETS) database based on Dun & Bradstreet business-unit data was sourced to extract business information such as jobs. The operational definition of green is based primarily on the definition of cleantech defined by the Cleantech Network. The results reported in this document are based on a new version of the data collection, categorization and verification process. Each year, the methodology is adjusted to reflect continued learning about the green economy and tools for measuring its growth. This version is based on an entirely new software tool developed specifically for the Green Establishment Database and yields more comprehensive results than previous versions.

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.

While this approach does not examine specifically green occupations that are appearing across the entire economy (such as Chief Sustainability Officer), it does account for the businesses behind the products and services that these new professionals need to use in their jobs (such as advanced metering devices, co-generation equipment, and various high-efficiency materials).

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 database offers a conservative estimate for the numbers of establishments and jobs in the Core Green Economy.

### **Employer Survey by the California Employment Development Department's Labor Market Information Division**

EDD's Labor Market Information Division surveyed private and public employers of all sizes and types throughout the state to develop baseline measures for the number of workers in jobs with green activities, the number of businesses that have adopted green practices, and emerging occupations that require further study. The working definition of "green" is any activity or service that performs at least one of the following:

- G**enerating and storing renewable energy
- R**ecycling existing materials
- E**nergy efficient product manufacturing, distribution, construction, installation, and maintenance
- E**ducation, compliance and awareness
- N**atural and sustainable product manufacturing

The complete survey is available online:

<http://www.labormarketinfo.edd.ca.gov/contentpub/GreenDigest/Green-Economy-Survey.pdf>

NORTH COAST\_*Del Norte / Humboldt / Lake / Mendocino / Siskiyou / Trinity*

SIERRA REGION\_*Alpine / Amador / Calaveras / Inyo / Lassen / Mariposa / Modoc / Mono / Nevada / Plumas / Sierra / Tuolumne*

SACRAMENTO VALLEY\_*Butte / Colusa / Glenn / Shasta / Tehama*

WWW.NEXT10.ORG

SACRAMENTO AREA\_*El Dorado / Placer / Sacramento / Sutter / Yolo / Yuba*

BAY AREA\_*Alameda / Contra Costa / Marin / Napa / San Benito / San Francisco / San Mateo / Santa Clara / Santa Cruz / Solano / Sonoma*

SIERRA REGION\_*Alpine / Amador / Calaveras / Inyo / Lassen / Mariposa / Modoc / Mono / Nevada / Plumas / Sierra / Tuolumne*

SAN JOAQUIN VALLEY\_*Fresno / Kern / Kings / Madera / Merced / San Joaquin / Stanislaus / Tulare*

INLAND EMPIRE\_*Riverside / San Bernadino*

LOS ANGELES AREA\_*Los Angeles / Ventura*

ORANGE COUNTY\_*Orange*

CENTRAL COAST\_*Monterey / San Luis Obispo / Santa Barbara*

SAN DIEGO REGION\_*Imperial / San Diego*



MANY SHADES OF GREEN:  
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