

Sacramento Region Clean Energy Technology Cluster Characteristics and Competitive Analysis

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*Sacramento Region Green Technology Firm
Database Developed in Collaboration with:*

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This brief report summarizes the key findings from the Cluster Diagnosis work completed by the Center for Strategic Economic Research (CSER) as part of the Regional Industry Clusters of Opportunity Grant. This report is also intended to act as a companion piece to the Green Capital Alliance's *Five Year Progress Report: Advancing the Clean Energy Economy in California's Capital Region*.

Cluster Characteristics

The Clean Energy Technology (CET) Cluster is one specific, narrowly-defined component of the "green economy." Unlike other elements of the green economy (such as recycling, emissions monitoring, and water treatment), this Cluster focuses exclusively on a number of emerging activities and new innovation that has really taken hold with sustainable value in the marketplace primarily only over the past decade. This study uses the following definition to set the boundaries of the Cluster:

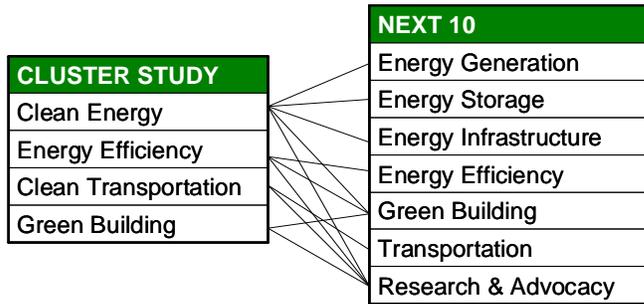
Establishments with *primary* business activities that provide products or related services (e.g. research and development, management/compliance, installation/maintenance, advocacy/awareness, etc.) focused on producing clean energy, conserving the use of energy, or creating more efficient vehicles and buildings. The cluster can be broken down into four main categories:

- Clean Energy: clean energy generation (solar, wind, geothermal, biomass, hydro, co-generation, hydrogen, marine/tidal, etc.), storage (batteries, fuel cells, components, etc.), and infrastructure (equipment, transmission, devices, etc.)
- Energy Efficiency: energy efficiency products/machinery, solutions (software, measuring devices, etc.), and design/consulting
- Clean Transportation: alternative fuels (biodiesel, hydrogen, ethanol, etc.), vehicles (electric, hybrid, natural gas, diesel, etc.), and equipment/components
- Green Building: sustainable and energy efficient building design, construction, and development

The Next 10 *Many Shades of Green* report is regularly cited by industry groups and the media to describe the core green economy in California and its major regions. While the green economy as characterized in the Next 10 report is much broader than the Cluster analyzed in this study, there is some overlap in the segments encompassed in the definitions. The graphic below shows the relationship between the identified segments in the two studies; however, it is important to note that there are several specific activities captured within the Next 10 segments that do not fit within the Cluster definition used in this study. In addition, since the Green Establishment Database used as the source for the

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Next 10 study is not available for public use, full comparisons between the two studies cannot be made.



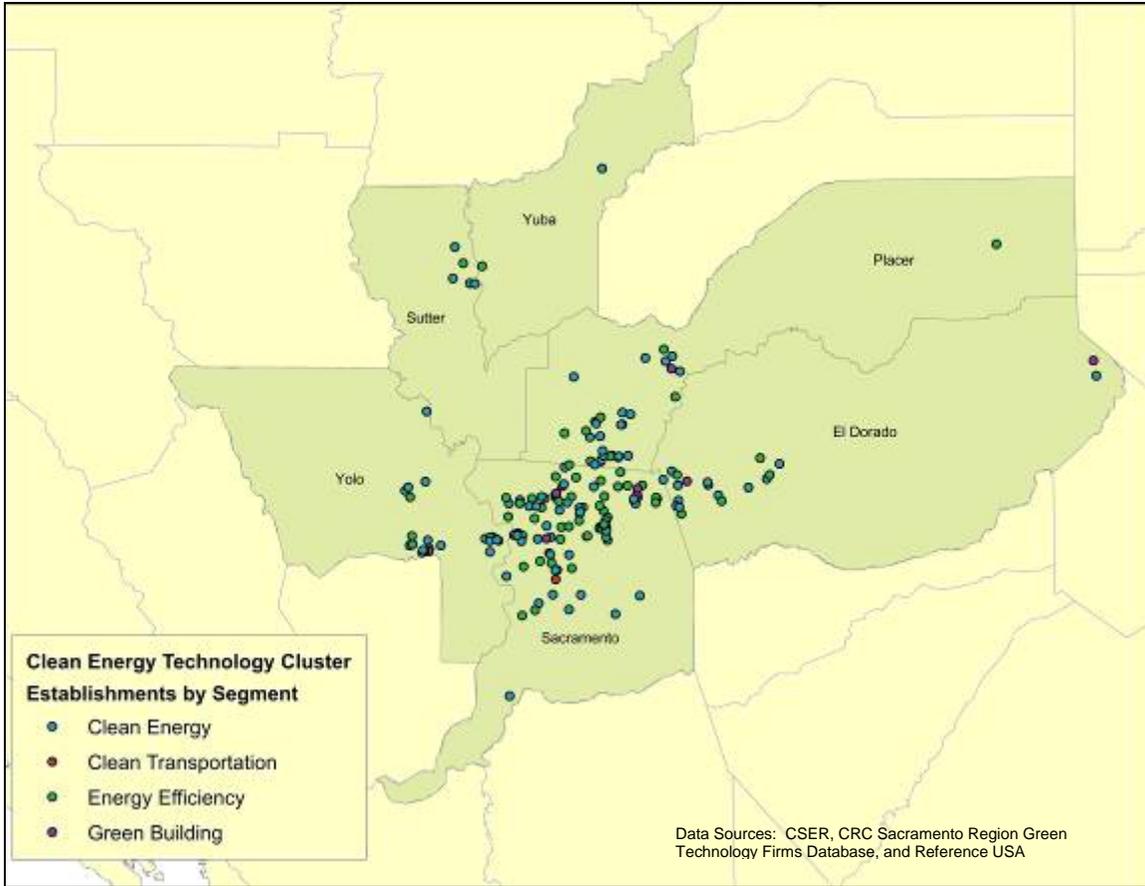
Estimates as of the beginning of 2010 show roughly 200 CET Cluster establishments in the six-county Sacramento Region (El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba Counties), supporting over 3,000 jobs and generating approximately \$846 million of sales. The cluster is fairly small, accounting for less than 1 percent of all economic activity in the Region. In fact, the average CET Cluster establishment in the Region supports an employment level of less than 20 and sales of around \$5 million. Most of the existing establishments are located in the core economic nodes within the Region with a few dispersed across the rest of the market areas. The Region’s CET Cluster includes a number of prominent headquarters locations of domestic companies and national headquarters of international companies. Many of these domestic headquarters companies started in the Region including Alteryx, Jadoo, Pacific Power Management, Premier Power, Solar Power Inc., and Synapsense.

Sacramento Region CET Cluster Characteristics

<i>Factor</i>	<i>Total</i>	<i>Average</i>	<i>% Region</i>
Employment	3,015	18.3	0.3%
Sales	\$845,669,677	\$5,125,271	0.7%
Establishments	206	-	0.1%

Data Sources: CSER, CRC Sacramento Region Green Technology Firms Database, and Reference USA

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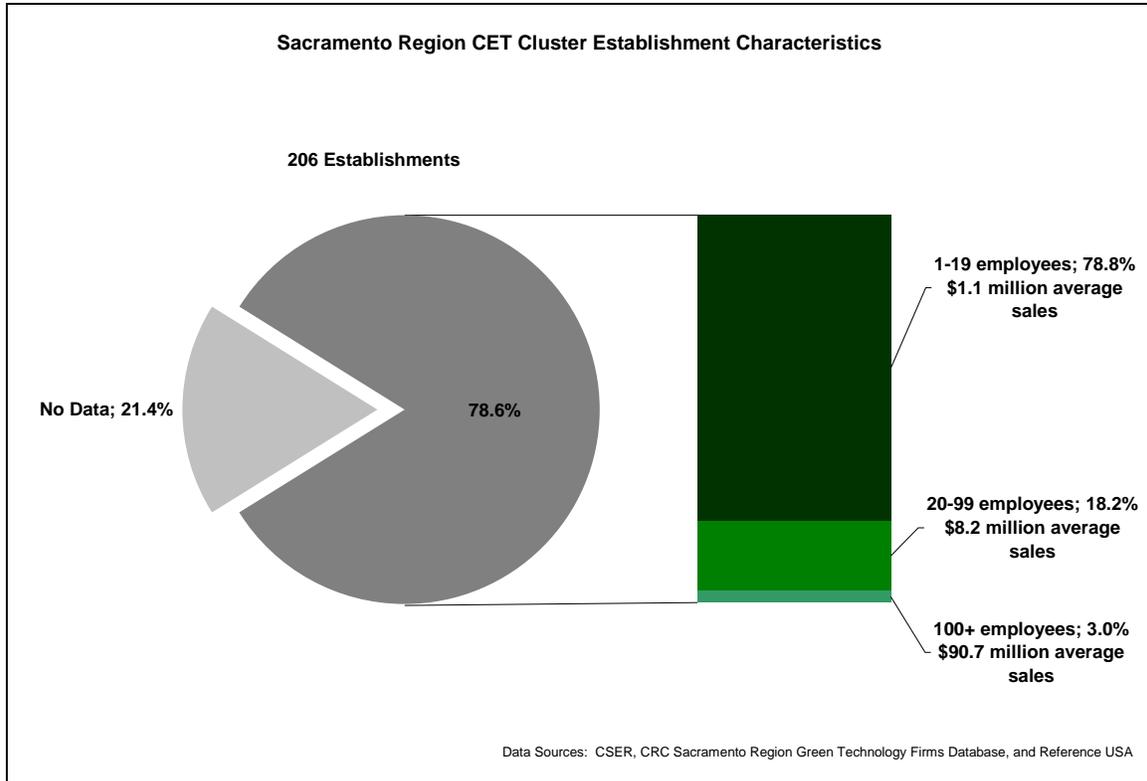


National Headquarters		
Company	Operation Date	Parent Co. Location
Rios Solar	2010	Fustiñana, Spain
Mounting Systems	2010	Rangsdorf, Germany
OPDE/Mecasolar	2010	Fustiñana, Spain
N Solar	2010	Seoul, Korea
Siemens Mobility	2009	Berlin/Munich, Germany
SMA America	2008	Niestetal, Germany
Prointec USA	2008	Madrid, Spain
Pacific Ethanol	2007	U.S.-based
Conergy (formerly SunTechnics)	2006	Hamburg, Germany
Solar Power Inc.	2006	U.S.-based
Synapsense	2006	U.S.-based
Jadoo Power	2003	U.S.-based
Pacific Power Management	2002	U.S.-based
Altery Systems	2001	U.S.-based
Premier Power	2001	U.S.-based

Source: Sacramento Area Commerce & Trade Organization

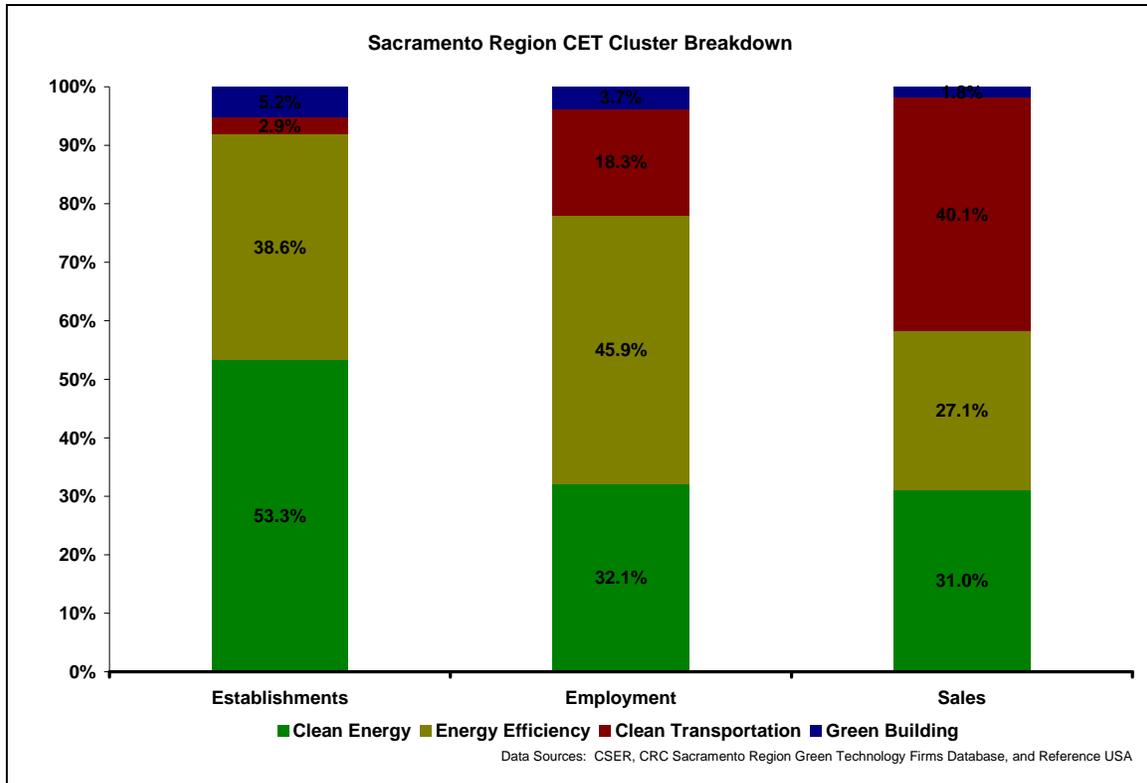
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Detailed business data is available for close to 79 percent of the existing CET Cluster establishments in the Region. These data reveal that approximately 79 percent of establishments are small businesses with between 1 and 19 employees—average sales for CET Cluster establishments in this category are around the \$1 million mark. Establishments with between 20 and 99 employees represent around 18 percent of the CET Cluster with an average sales level of about \$8 million. The smallest category with only 3 percent of establishments includes the larger companies supporting over 100 employees and average sales of close to \$91 million. This category contains many of the major established employers such as Beutler Corporation and Siemens Mobility.



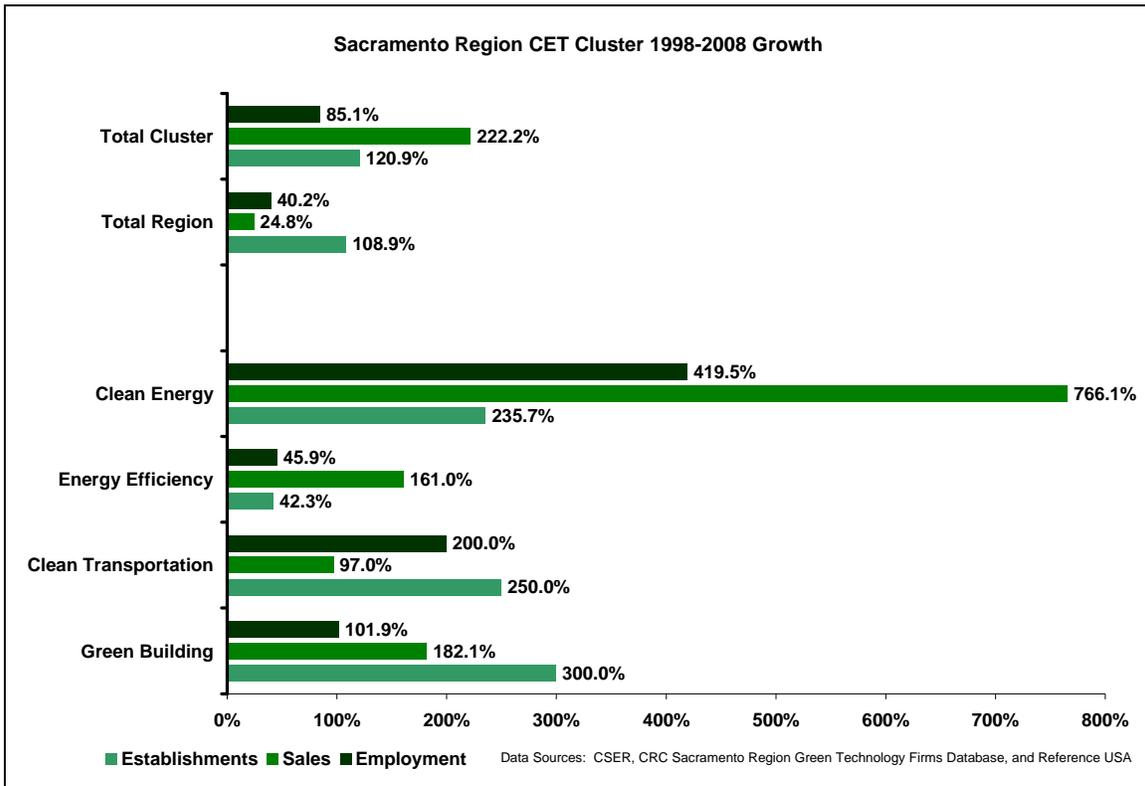
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The Sacramento Region’s CET Cluster is dominated by the Clean Energy and Energy Efficiency segments. These two segments account for approximately 92 percent of all establishments, 78 percent of all Cluster jobs, and 58 percent of total sales. The Clean Transportation segment supports a notably larger share of jobs and sales than establishments primarily due to the dominance of one major employer. The Green Building segment is rather small across the board—it is important to note that many of the types of establishments that serve the residential market are classified in the Clean Energy and Energy Efficiency segments.



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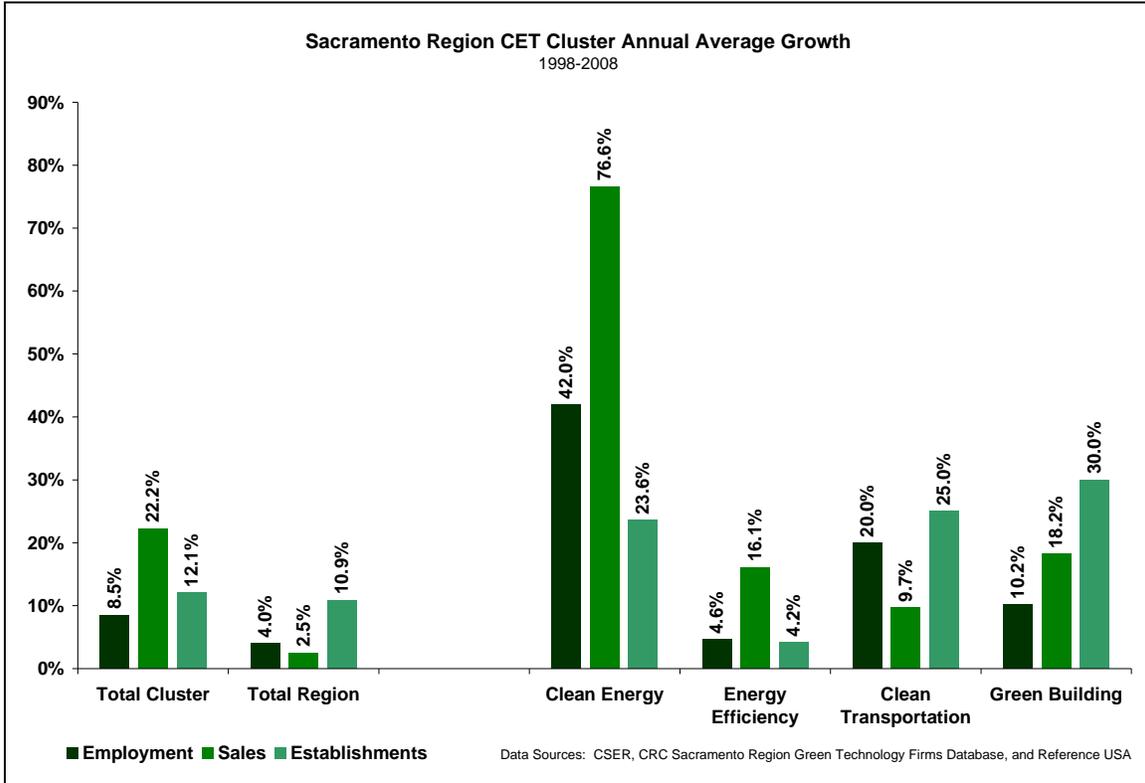
In the decade ending 2008, the CET Cluster in total experienced significantly more robust growth than the Region's economy overall. Across the CET Cluster establishments where a consistent set of historical annual business data was available, employment increased by over 85 percent in this time period, sales grew by more than 222 percent, and establishment counts expanded by almost 121 percent.* In terms of employment, the Clean Energy and Clean Transportation segments saw the strongest growth. The Clean Energy and Green Building segments posted the largest percent change in sales levels in the 1998-2008 period. Growth rates in the number of establishments were greatest in the Clean Transportation and Green Building segments. All CET Cluster segments saw stronger 10-year growth than the regional average across measures of employment, sales, and establishments, with the exception of Energy Efficiency in terms of establishments.



* This set represents close to half of all known CET Cluster establishments in the Sacramento Region. These establishments show a slightly larger average employment count than the current estimates and a somewhat smaller average sales level. Comparing the current estimates to the 2008 historical annual data for these establishments suggests that a few of the establishments have since ceased operations in the Region, but both the employment and sales levels have increased modestly.

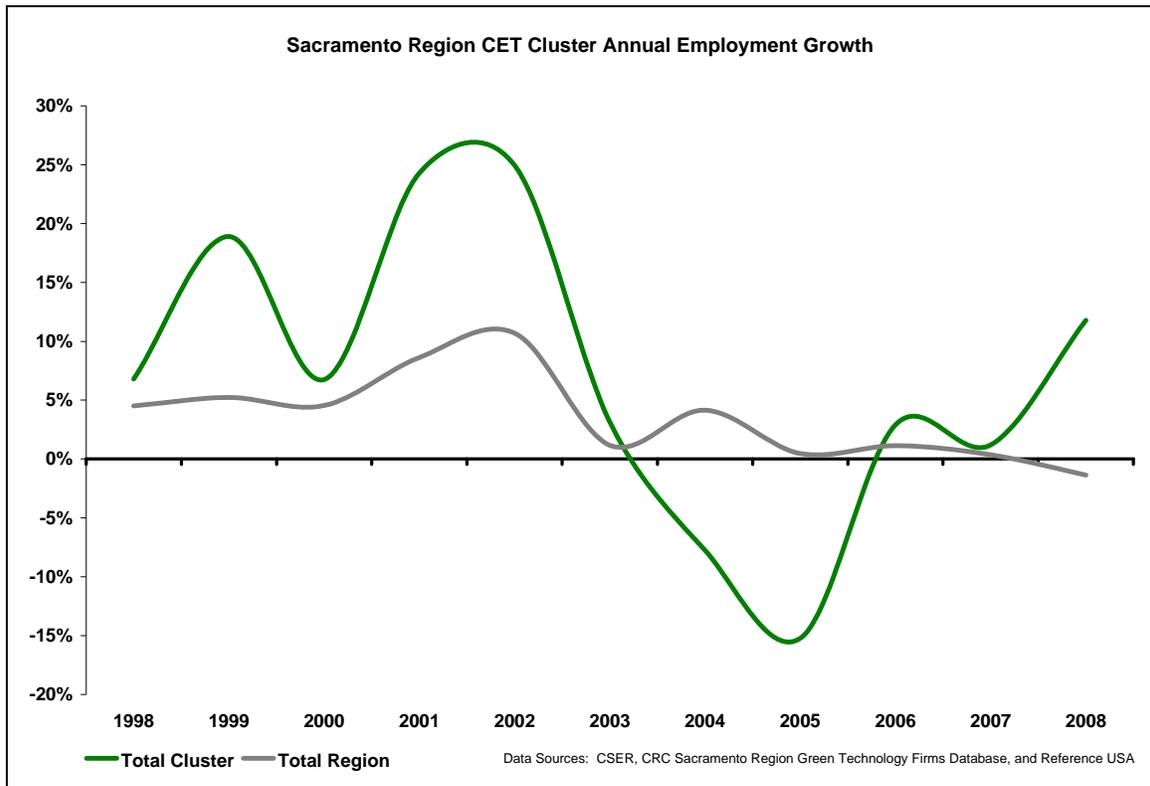
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On an annual average basis between 1998 and 2008, CET Cluster employment grew more than two times the regional average, sales growth was close to ten times larger than the Region overall, and establishment growth was only slightly greater than the total local economy. The Clean Energy segment was the dominant driver of Cluster employment and sales growth while all segments except Energy Efficiency posted strong establishment growth levels on an annual average basis.



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Annual growth data for the 1998-2008 period show that the CET Cluster is more volatile than the regional economy overall with much larger swings in employment growth rates. The Cluster demonstrated healthy performance early in this period before posting employment losses in 2004 and 2005. Since that point, CET Cluster establishments have added jobs on an annual basis even when the Region's economy started slipping into the ongoing recession. In 2008, when the Region lost over 1 percent of all jobs, the Cluster experienced an employment increase of close to 12 percent.



Interviews conducted with about 20 percent of the Region's existing CET Cluster establishments (most of which have been located in the area for more than 5 years) revealed that they are generally optimistic about the short-term future. Most expect employment and sales levels to increase moderately with a few anticipating performance will remain the same. This is similar to behavior over the past year where the majority of interviewed establishments saw modest employment increases. Much of the past and expected future growth has been created internally with most companies stating that they have not received external investments in the past year (e.g. angels, venture capital, and grants). The interviews also demonstrated that while momentum has been picking up for the Region's CET Cluster, this has been limited to direct Cluster establishments—nearly all interviewed establishments have relationships with suppliers outside the Sacramento Region.

Other published studies focused on California (the recognized leading state in the nation related to CET) show mixed results for Sacramento based on the broader concept of the “green economy.” The studies suggest that the Region supports a greater share of the state’s green establishments and jobs (between 5 and 8 percent depending on the study) than its overall proportion of the state’s residents, employment, and establishments (roughly 6 percent). Elements of these studies that relate more closely to the CET Cluster show that Sacramento is one of the most concentrated regions in the state, significantly above both the statewide average and the Region’s overall share of the state. However, measures of innovation activity in the green economy for Sacramento fall well short, showing less than 3 percent of all patents, venture capital investment, and federal innovation grants in the state. Sacramento has historically been characterized as having an economy based on more established companies with limited dynamics in the innovation arena and this pattern appears to describe its green economy as well. This distinction is particularly noteworthy due to the fact that several studies have established that newer, innovative companies drive most of the job growth across the economy.

The Sacramento Region has roughly 6% of the state’s population, employment, and establishments and...

Nearly 8% of the state’s green establishments

- ✓ 273 through July 2010; “California’s Growing Green Economy,” Environmental Defense Fund
- ✓ 991 in 2008; “Many Shades of Green,” Next 10/Collaborative Economics

Between 5% and 8% of California’s green jobs

- ✓ 23,261 in 2008; “California’s Green Economy,” California Employment Development Department
- ✓ 6,435 in 2008; “Many Shades of Green,” Next 10/Collaborative Economics

Almost 3% of clean tech patents filed in the state

- ✓ 31 between 2000-2008; “Innovating the Green Economy in California Regions,” Center for Community Innovation

Less than 1% of VC investments in California focused on clean tech

- ✓ \$7 million between 2000-2008; “Innovating the Green Economy in California Regions,” Center for Community Innovation

About 1% of SBIR/STTR grants for clean tech in the state

- ✓ \$0.6 million between 2000-2008; “Innovating the Green Economy in California Regions,” Center for Community Innovation

Competitive Analysis

The Sacramento Region competes regularly with other regions for business location and expansion projects related to the CET Cluster. Based on discussions with the Region’s economic development community, the SF Bay Area, Portland, Denver, and Austin can be considered some of Sacramento’s greatest competition in the CET arena. Sacramento, along with all of these competitive regions, has been recognized on various national rankings related to the green economy and sustainability. Among three of the more visible national rankings—National Resources Defense Council’s Smarter Cities, Sustain Lane’s Sustainability Rankings, and Clean Edge’s Clean Tech Job Activity—Sacramento consistently ranks among the top 15 regions. Averaging and re-ranking the competitor regions across these three sources puts Sacramento fifth, in last place. However, when isolating the elements of these rankings that focus more specifically on the CET Cluster, a similar approach puts Sacramento third, in the middle of the pack ahead of Austin and the SF Bay Area.

NRDC, Sustain Lane, and Clean Edge Rankings

<i>Region/City</i>	<i>Smarter Cities</i>	<i>Sustainability</i>	<i>Job Activity</i>	<i>Comp. Rank*</i>	<i>Focus Rank**</i>
Sacramento	7	14	15	5	3
Austin	6	13	10	4	4
Denver	9	11	5	3	2
Portland	3	1	14	1	1
SF Bay Area	-	-	1	2	5
Oakland	4	9	-	-	-
San Francisco	2	2	-	-	-
San Jose	5	21	-	-	-

Data Sources: NRDC Smarter Cities 2008, Sustain Lane Sustainability Rankings 2008, and Clean Edge Clean-Tech Job Activity 2010

*Average ranks and rescaled for five regions

**Average ranks and rescaled for five regions for:

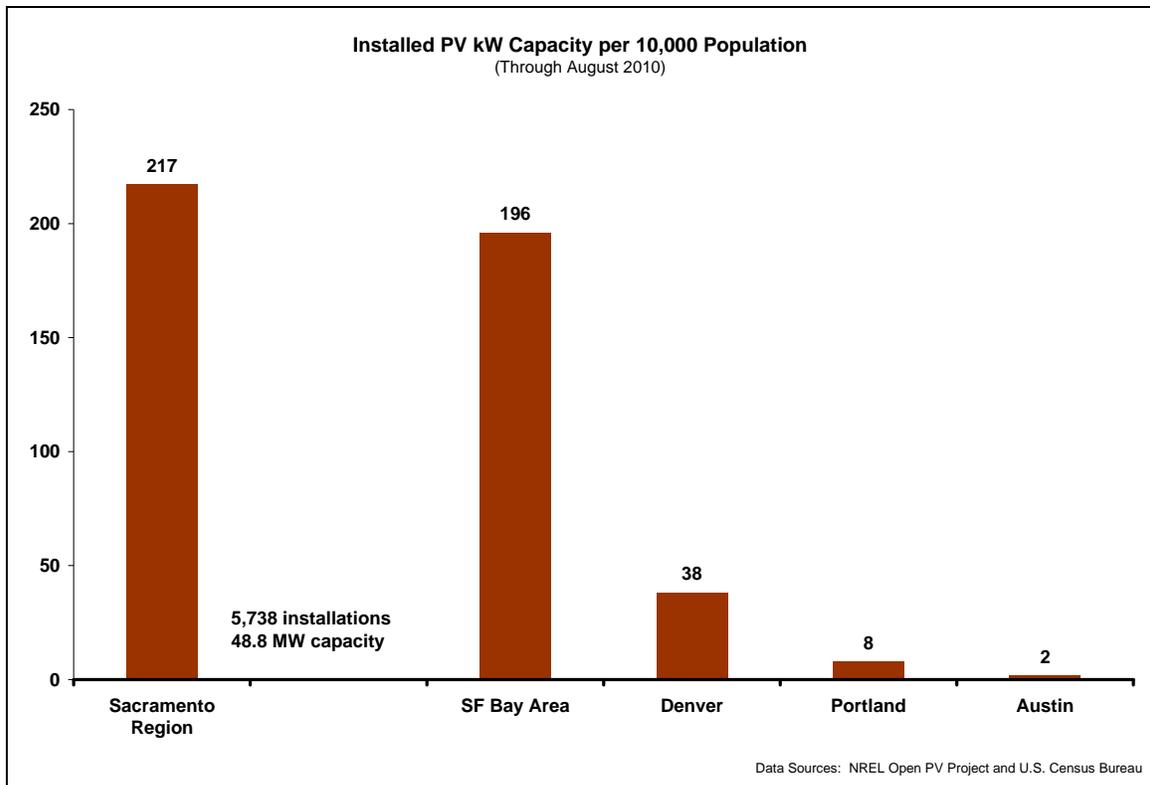
NRDC Green Building and Energy Production

Sustain Lane City Innovation, Energy & Climate Change, Green Building, Green Economy, and Planning & Land Use

Clean Edge full ranking

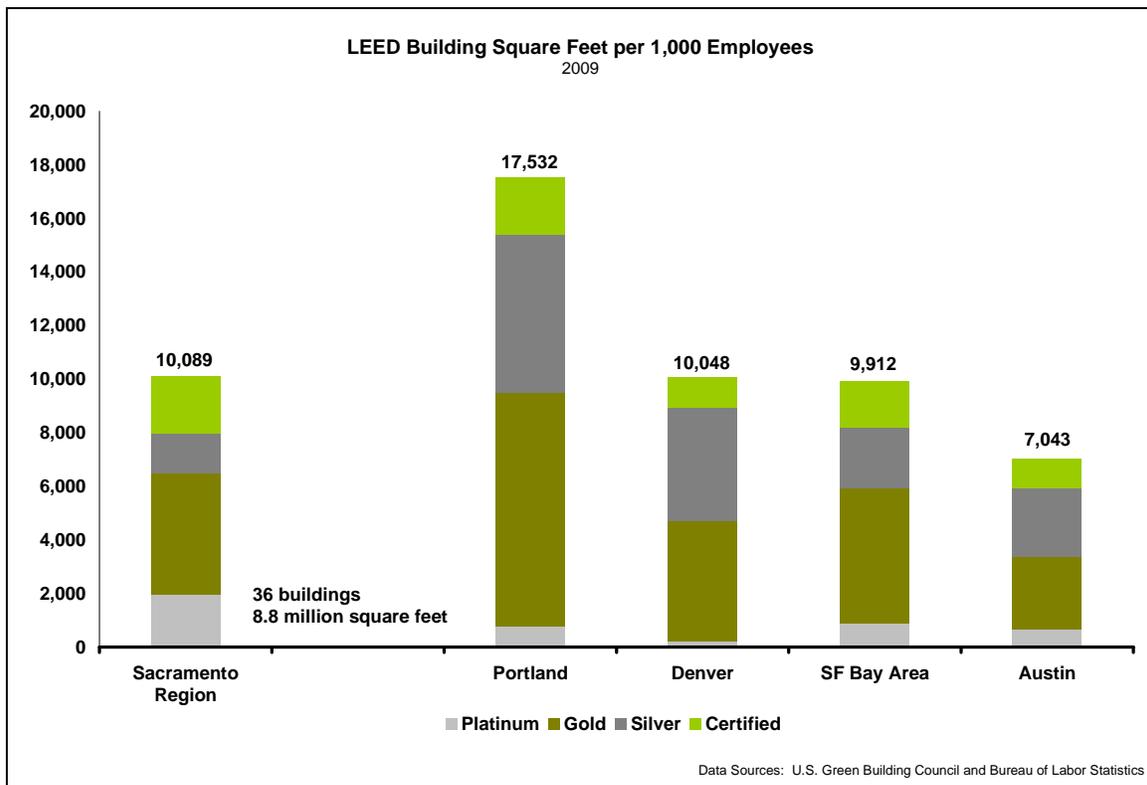
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The Sacramento Region market adoption of core products and services within the Clean Energy segment of the Cluster is considerably stronger than the competitive regions. With more than 5,700 photovoltaic installations supporting nearly 49 megawatts of capacity, the Sacramento Region has approximately 217 kilowatts of installed capacity for every 10,000 residents. Only the SF Bay Area comes close to this per capita measure with the other regions falling well short. In fact, the Sacramento Region contains one of the 25 largest photovoltaic projects in the country, Aerojet Solar Project, according to the Solar Electric Power Association (SEPA). Among the competitive areas, only the SF Bay Area and Denver, have projects included in this list. The acceptance of solar in the Region is further demonstrated by the fact that SEPA included all three of the Region's major utilities—the Sacramento Municipal Utility District (SMUD), Pacific Gas & Electric (PG&E), and Roseville Electric—among the top 10 in the country based on total solar electric capacity.



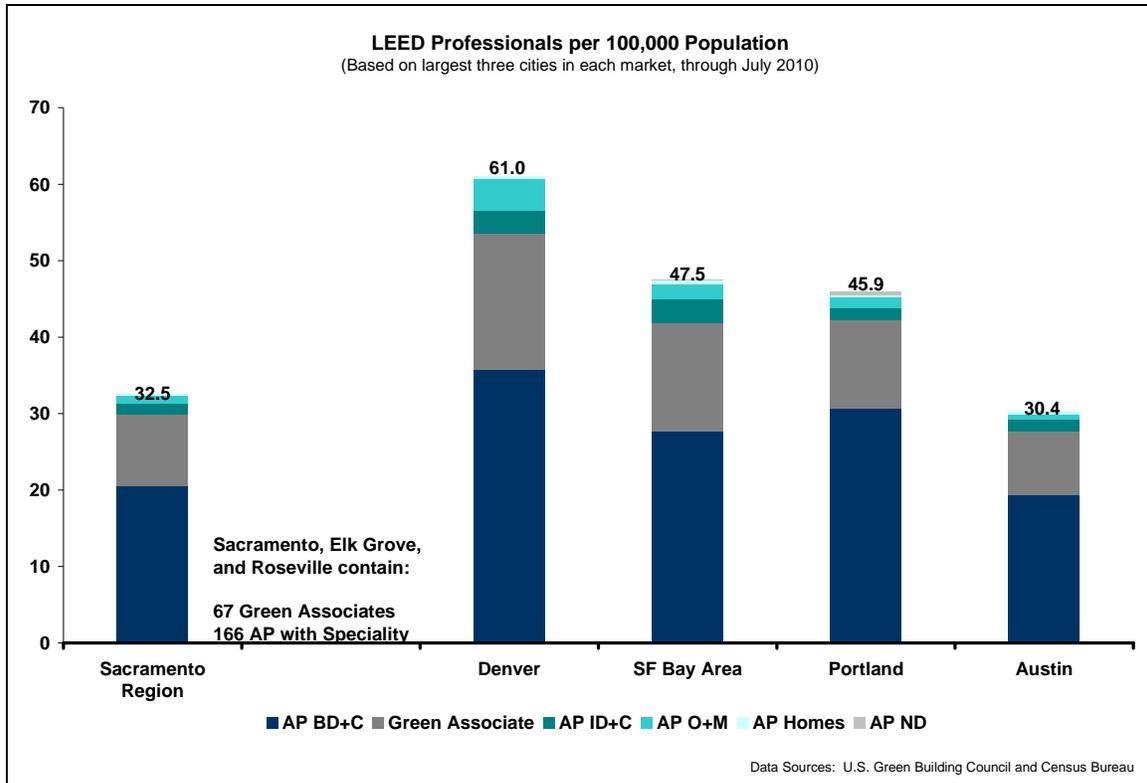
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The Sacramento Region is similar to other competitor regions in terms of building square footage meeting United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) requirements for building performance and sustainability on a per 1,000 employee basis. This measure is linked to market adoption of activities primarily within the Energy Efficiency and Green Building segments of the CET Cluster. The 36 LEED buildings in the Sacramento Region, which support nearly 9 million square feet, give the Region a measure of more than 10,000 square feet of LEED space per 1,000 employees. This level is close to Denver and the SF Bay Area, but is notably lower than Portland. Like the other regions, most of the LEED space in Sacramento is classified as Gold, the second to highest standard. According to CoStar, the Sacramento Region has the fifth highest percentage in the country of LEED-certified buildings. Another measure of green building, the Environmental Protection Agency's (EPA) Energy Star buildings, shows that Sacramento has another 8.9 square feet of certified building space per employee with a total of 130 buildings and over 13 million square feet. EPA ranked Sacramento 16th among cities with the most Energy Star labeled buildings. Sacramento places ahead of Austin, but major cities in the other competitor regions rank higher.



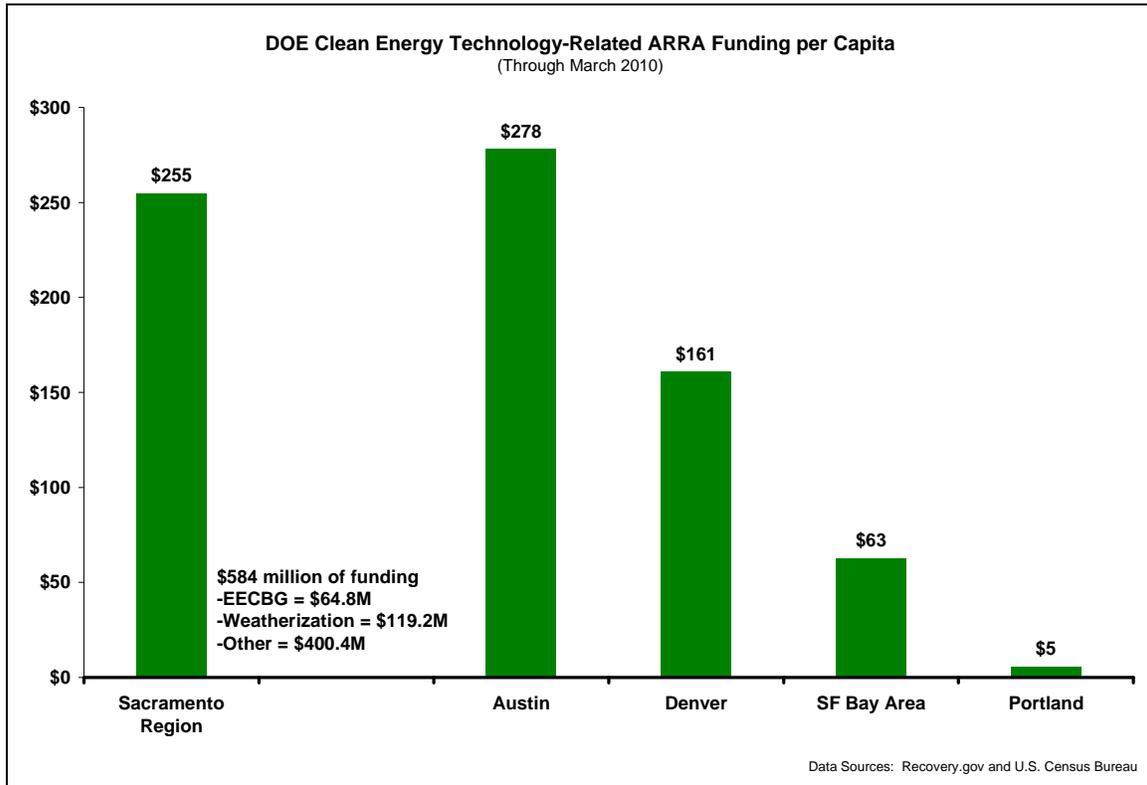
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USGBC also supports a system of LEED professional credentials for individuals, demonstrating workforce skills and knowledge in various fields. The Sacramento Region contains a smaller number of LEED professionals per 100,000 residents than most of the competitor regions. With 32.5 professionals per 100,000 population in the three largest cities, the Sacramento Region is similar to only Austin in this Cluster workforce measure. Most of the certified professionals in all regions carry the Building Design and Construction designation, which closely aligns with the Green Building segment of the CET Cluster.



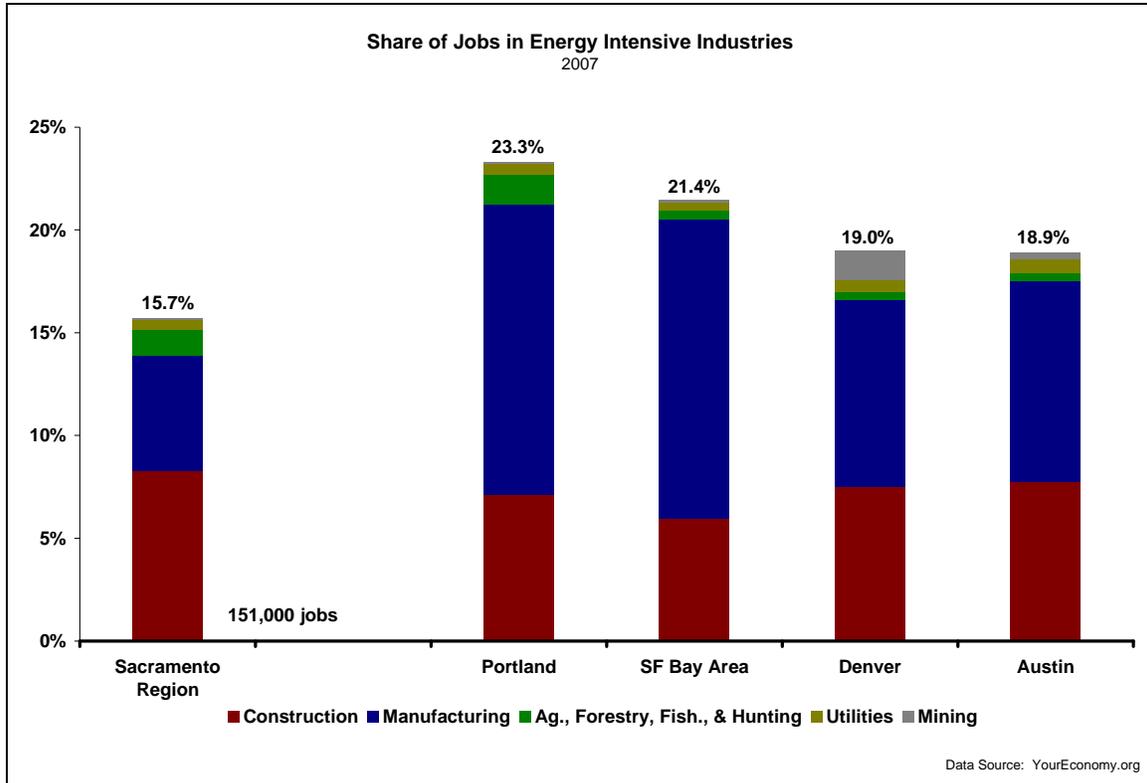
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The Sacramento Region received a notable amount of American Recovery and Reinvestment Act (ARRA) funding from the Department of Energy (DOE) related to projects touching the CET Cluster, partly due to its role as a state capital. The approximately \$584 million of funding equates to around \$255 per capita in the Sacramento Region. This level is slightly lower than related ARRA funding in Austin, but considerably higher than the other regions.

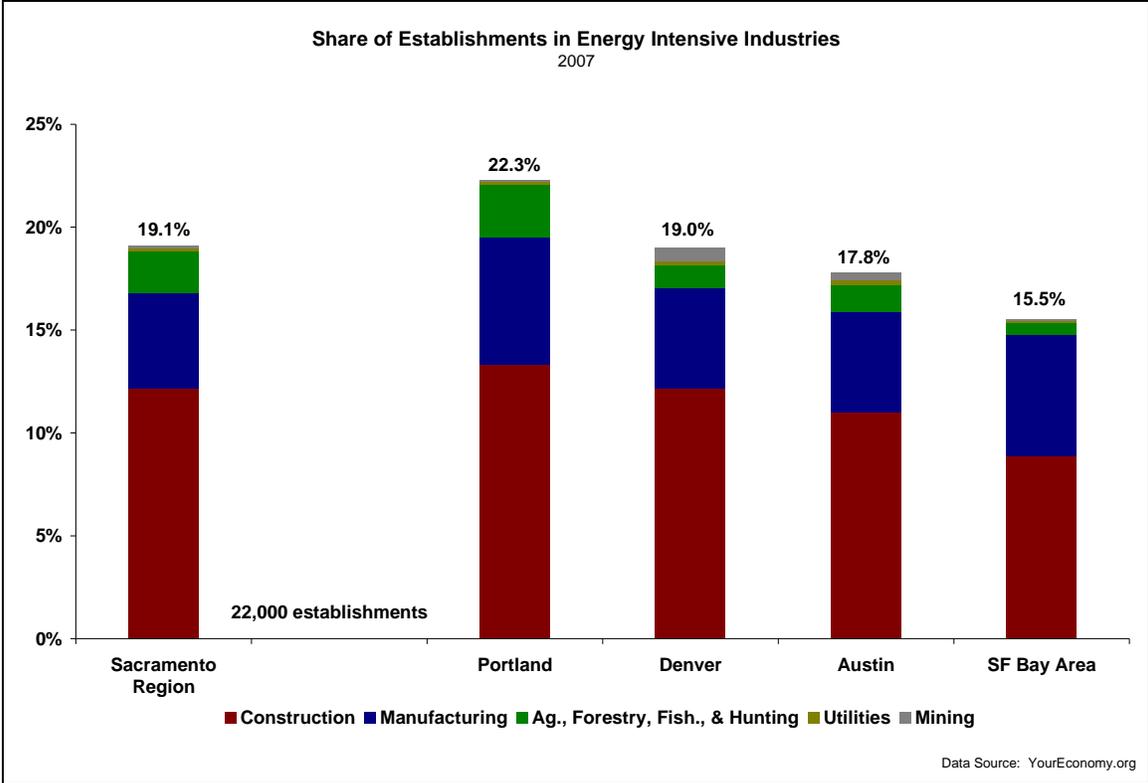


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Five major industries are typically defined as being the most energy intensive including Construction, Manufacturing, Agriculture, Utilities, and Mining. Regions with a strong presence in one or more of these industries present the potential for adoption of and innovation in the products and services that affect energy consumption, particularly those within the CET Cluster. The Sacramento Region maintains a smaller overall share of jobs in the energy intensive industries than the competitive regions, but supports a similar proportion of establishments in these industries. The most notable difference between the Sacramento Region and the other regions is the lower concentration in the Manufacturing industry.

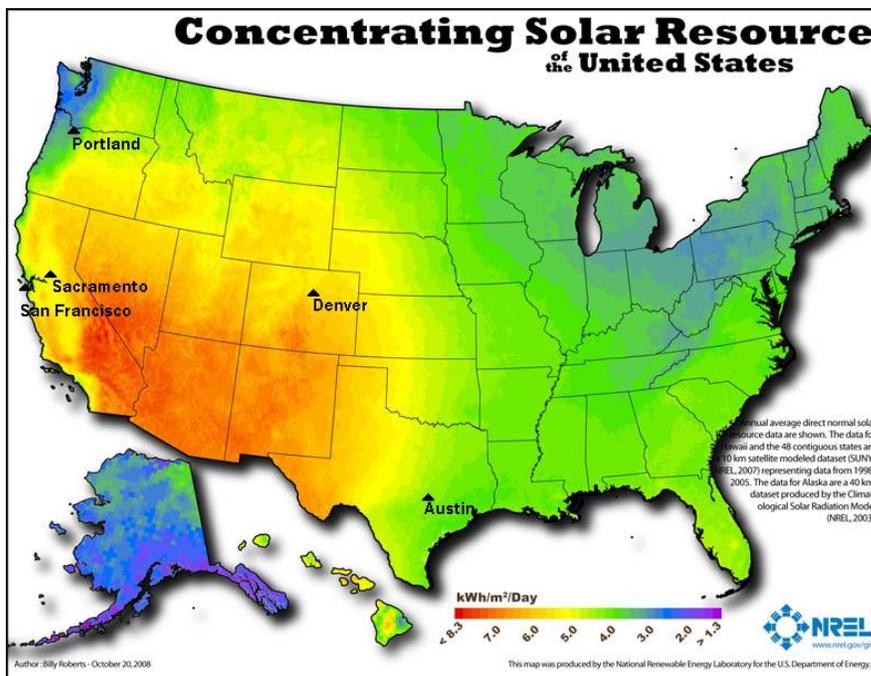
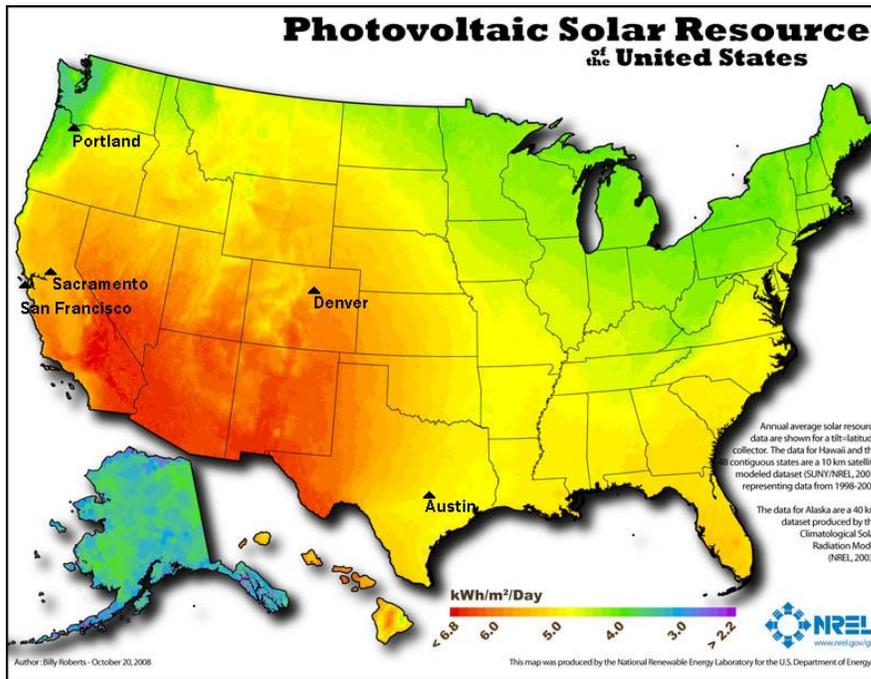


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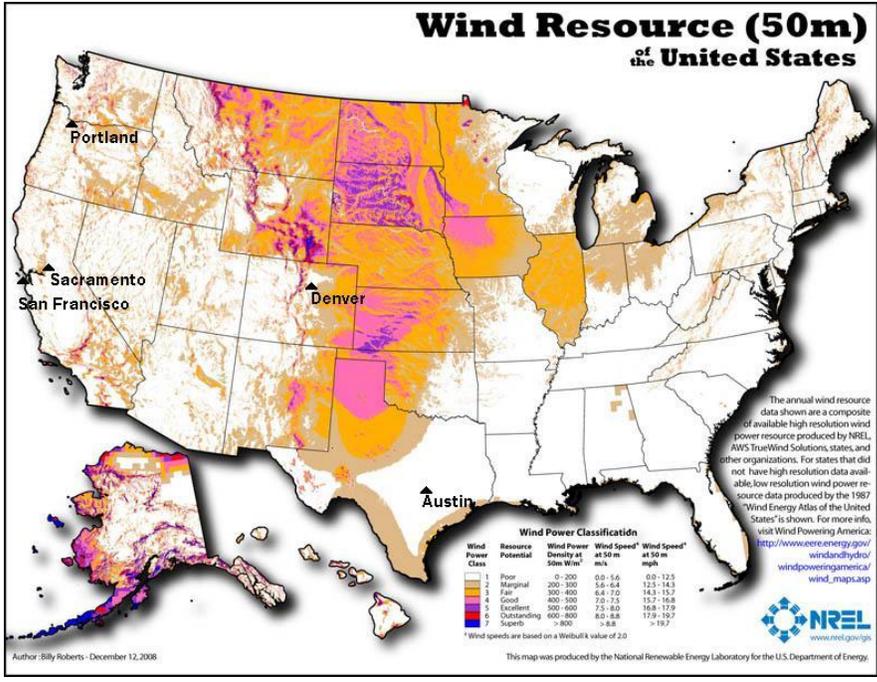
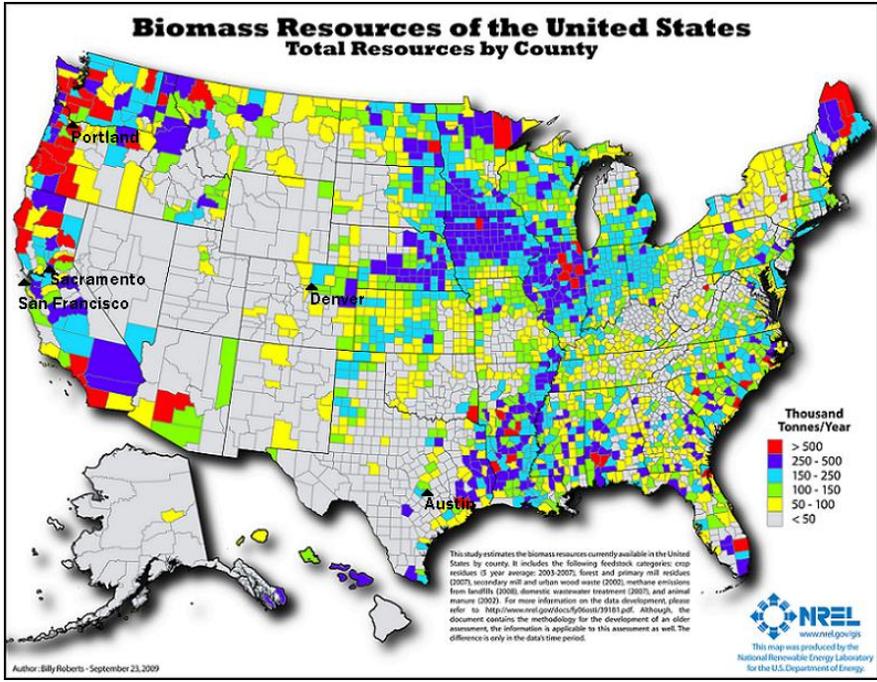


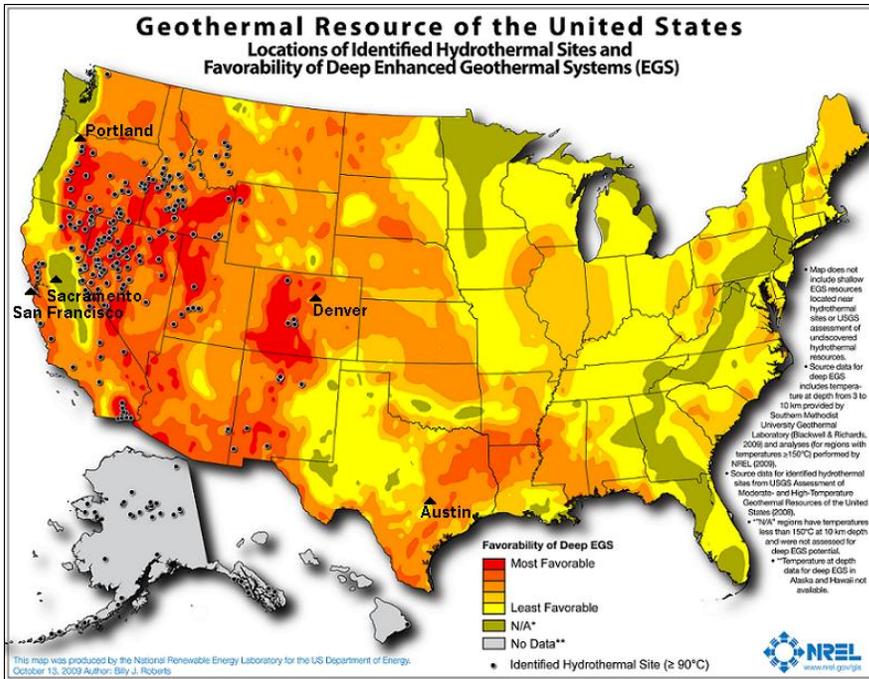
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The Sacramento Region shows promising potential as a market for photovoltaic and concentrating solar, both part of the Clean Energy segment of the Cluster, based on its geography. Only Denver sits in an equally promising geographic location for these resources. Sacramento also shows decent prospects for biomass resources behind only Portland in market location. Two resources appear marginal for the Sacramento market including geothermal and wind, suggesting limited potential for these aspects of the Clean Energy segment.



CET CLUSTER





Research Notes

CSER refined its previous definition of the Clean Energy Technology Cluster based on a review of published reports, analysis of Collaborative Economics Green Establishment Database summary information, and feedback from project partners and various regional stakeholders. As defined, the cluster does not currently fit within the standard industry classification system due to the emerging nature of the associated economic activities and aggregation of data with unrelated activities within specific industry sectors. In addition, no published report appears to reasonably address the scope of the cluster as defined in this project. As a result, the scope of the cluster and related descriptive economic data had to be created internally using several different primary and secondary data sources.

In order to describe the scope of the cluster, CSER developed a list of establishments that fit the cluster definition. The first step in this process involved a review and consolidation of existing company lists from regional organizations and published reports. These lists were supplemented with establishments from available industry databases, industry association member listings, and industry trade show attendee rosters. Keyword and similar industry sector searches were also conducted using various Internet search engines, media sites, and proprietary company databases. Finally, additional establishments were identified through direct contact and referrals from the roundtable and interview outreach efforts conducted throughout this project. Verification of establishment status, location, and primary activities was completed through web site searches, company databases, and direct contact.

CSER partnered with the UC Davis Center for Regional Change to create the Sacramento Region Green Technology Firms database to incorporate descriptive economic data into the list of cluster establishments. The database was populated with economic data from three primary sources. The first source, the National Employment Time Series database, provides annual establishment-level data covering a time period from 1990 to 2008 based on snapshots of Dunn & Bradstreet information. The second source, ReferenceUSA, offers current establishment-level data with limited historical information based on Infogroup information. The third source of information made use of the project roundtable and interview outreach efforts. While the list of cluster establishments is presented as part of this project, individual establishment economic data cannot be made available due to database license restrictions and company confidentiality assurances.

Both Next 10 and the Brookings Institution are scheduled to release new studies on the green economy in early 2011, which will both contain Sacramento information. It is important to note that the findings from this project will likely differ substantially from these two studies primarily as a result of varying definitions of associated economic activities, data collection and verification approaches, and economic research methodologies. For the purposes of this project, CSER believes that the data presented represent a reasonable assessment of the Clean Energy Technology cluster in the Sacramento Region based on a combination of primary and secondary data sources.