



LIVING LAB

NOVEMBER 2014

**San Diego and Imperial Counties Fostering
Smart Grid and Biorenewable Development**

ACKNOWLEDGEMENTS

We would like to thank the following people for taking the time to discuss clean economy activities in their region and/or organization:

- Jason Anderson – Cleantech San Diego
- April Bolduc – San Diego Gas & Electric
- Tim Kelley – Imperial Valley Economic Development Corporation
- Byron Washom – University of California, San Diego

Special thanks to Roxanna Smith at Cater Communications for providing comments on report drafts.

Next 10 is an independent nonpartisan organization that educates, engages and empowers Californians to improve the state's future.

Next 10 is focused on innovation and the intersection between the economy, the environment, and quality of life issues for all Californians. We provide critical data to help inform the state's efforts to grow the economy and reduce global warming emissions. **Next 10** was founded in 2003 by businessman and philanthropist F. Noel Perry.

PRODUCED BY:

Next 10

F. Noel Perry

Marcia E. Perry

Sarah Henry

Laura MacArthur

PREPARED BY:

Collaborative Economics

Doug Henton

Kim Held

John Melville

Radhika Mehlotra

Rena Steichen

Janine Kaiser

Francie Genz

DESIGN BY:

José Fernandez

SAN DIEGO & IMPERIAL VALLEY COMPANIES NOTED IN THIS REPORT

UC San Diego



ABOUT THIS REGIONAL CLEAN ECONOMY SERIES

California is a national leader in the clean economy, with companies pushing the envelope developing and deploying clean technologies, spurred by progressive state policies stimulating company growth. As a result, the core clean economy has become an important driver of California's overall economic vitality, employing over 185,000 workers as of January 2014 while protecting the state's natural resources.

California's statewide economy is comprised of regional economies, each with distinct assets and strengths. Regional stakeholders are leveraging their unique assets in innovative ways to develop and expand clean technologies within their region, with potential applications in the broader state

and global market. Across regions, innovation is the key to driving clean economy growth in California.

This report is one in a series of regional clean economy studies that explores the unique assets in California's regions and the role they play in the regional and state economy.

What is the core clean economy?

The "core clean economy" includes businesses that provide the cutting-edge products and services that allow the entire economy to transition away from fossil fuels and use natural resources more efficiently.

- San Joaquin Valley**
Water-Agriculture
Renewable Energy
- San Diego - Imperial**
Smart Grid
Biorenewables
- Los Angeles & Orange**
Advanced Transportation

- San Francisco Bay Area**
Advanced Transportation
Energy Storage
Building Energy Efficiency
- Sacramento**
Electric Vehicles
Building Energy Efficiency & Solar
Waste-to-Energy

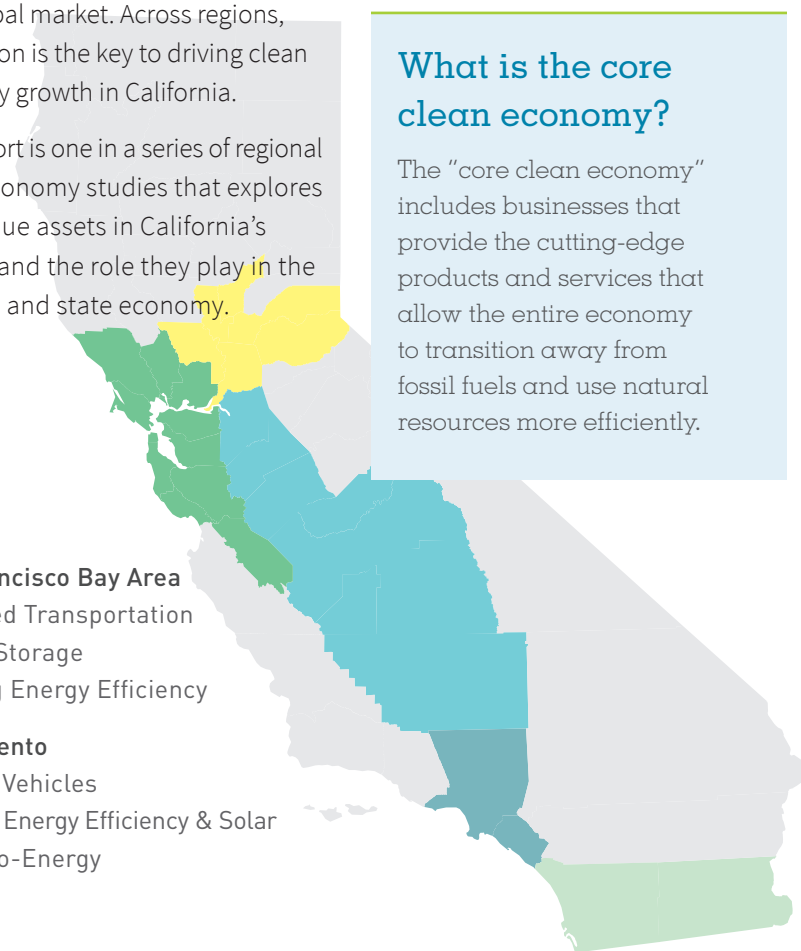


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EXECUTIVE SUMMARY

This report explores how San Diego and Imperial Counties are leveraging their unique assets to grow the regional clean economy. These assets include San Diego's robust research and development community, and Imperial County's abundance of industrial land, reliable energy, and large labor pool. This report places special emphasis on the partnership between San Diego County and Imperial County that allows the two counties to propel the regional clean economy. Based on new data analysis and interviews with regional stakeholders, microgrid and biorenewables were identified as major areas of clean economy innovation in the region, as well as areas of opportunity for continued growth and specialization. Clean economy innovation includes both developing new technologies and creating new companies, as well as applying and deploying clean technologies in new ways.

Highlights from this report include:

- **San Diego and Imperial Counties are leveraging their research and development assets, along with their land and reliable energy assets,** to create a dynamic space in which to develop microgrid and biorenewables technologies and grow the local economy.
- **The region is leading the market in smart grid innovation,** with companies creating and installing new technologies and regional stakeholders offering opportunities to pilot these breakthrough products. The University of California (UC), San Diego is at the center of the region's smart grid activities and has developed a cutting-edge microgrid that generates 92 percent of the campus energy and saves an average of \$850,000 a month in utility bills. UC San Diego collaborates closely with the local utility San Diego Gas & Electric, the U.S. Military, and regional technology companies to advance grid innovation for the local and global market.
- **San Diego and Imperial Counties have specialized in developing and scaling biorenewable technology,** including fuel, chemicals, and products derived from renewable feedstocks such as plants, algae, and waste. The region currently has eight biorenewable production facilities, with additional projects in the queue. Biorenewable companies in the region are developing innovative products and have received over \$800 million in early stage investment in the last 10 years. Academic institutions, such as UC San Diego, are also providing a hub of innovation and advancing research in the region.
- **Regional organizations such as Cleantech San Diego and Imperial Valley Economic Development Corporation are collaborating to grow the smart grid and biorenewables sectors in the region.** These organizations are connecting public, private, and academic stakeholders in the region and are working directly with companies to grow the regional economy. The two counties are combining their individual assets, such as the research facilities in San Diego County and the available land and water resources in Imperial County, to make the region a center for smart grid and biorenewable companies.

INTRODUCTION TO SAN DIEGO AND IMPERIAL COUNTIES' CLEAN ECONOMY

The San Diego and Imperial County region is leveraging its innovation assets to develop and implement technologies and catalyze its clean economy. Regional stakeholders are creating and deploying technologies in a range of sectors from advanced transportation and biorenewables to smart grid. These sectors are spurring job growth and overall economic development in the region.

The region's clean technology efforts are based around the unique assets in each county. San Diego County has a base of strong research and development assets in life sciences, materials, and technology. Academic institutions like University of California (UC), San Diego and San Diego State University, as well as private company laboratories, provide a hub for innovation activity and a skilled worker base in these sectors. In addition, the local utility, San Diego Gas & Electric (SDG&E), is helping pilot and implement innovative clean energy technologies. Imperial County offers an abundance of natural resources to the region, with ample industrial land, access to water and reliable energy sources (such as consistent sun), as well as a large labor pool. These assets provide space and resources to create new clean technology products and energy facilities.

These regional assets, in combination with a robust network of organizations such as Cleantech San Diego, and economic development groups such as the Imperial Valley Economic Development Corporation, help spur growth in the clean economy.

Advancements in the clean economy are driven by strong regional efforts across sectors. For example, the San Diego region expanded energy efficiency activities by retrofitting 90 percent of their street lights with high efficient LED lights, reducing energy consumption and saving taxpayers \$10 million annually.¹ In addition, the

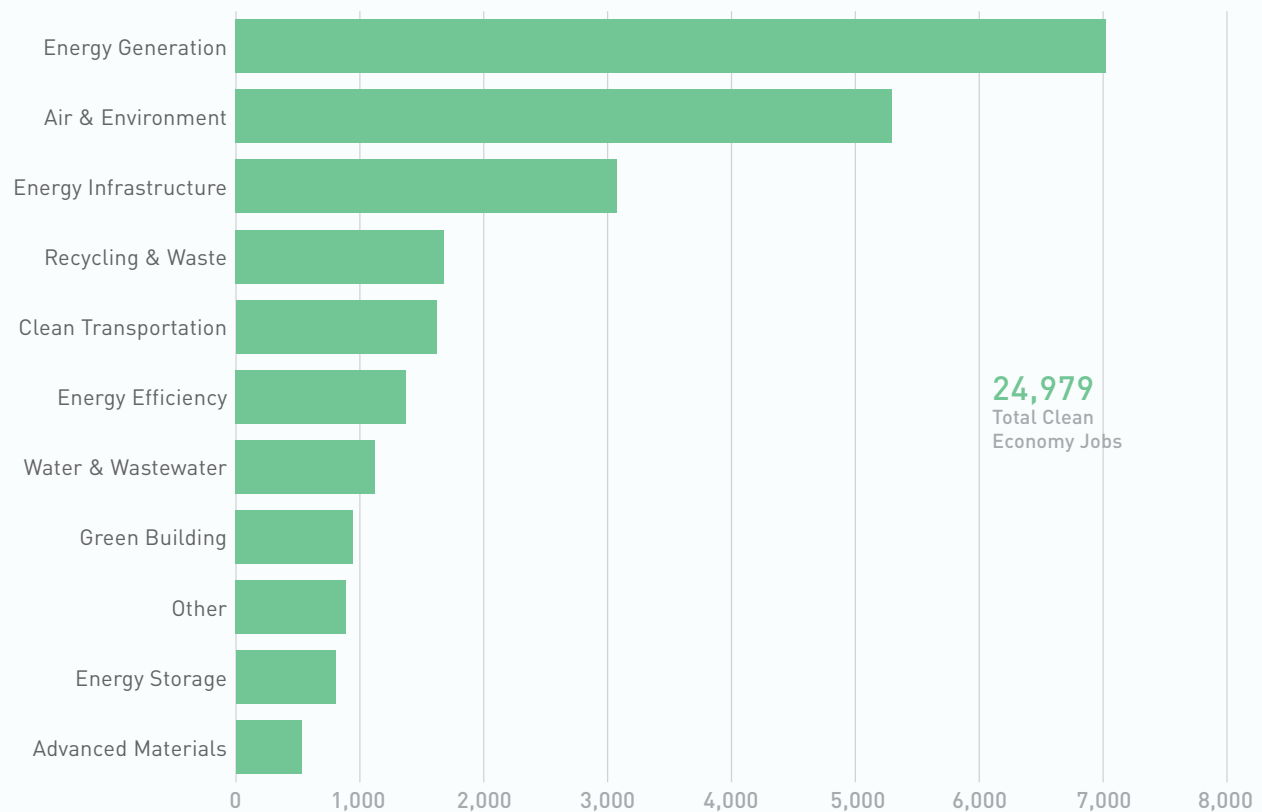
What unique assets drive Sacramento's clean economy?

Both San Diego and Imperial Counties have unique assets that they have collectively leveraged to advance the region's clean economy. San Diego's research and development facilities, as well as partnerships between academic institutions and the private sector, have helped stimulate innovation in the clean economy.

Imperial County's abundance of industrial land, reliable energy, and available workforce have contributed to the county's testing and scaling capacity. Together, San Diego and Imperial Counties have worked to leverage each of their unique strengths to position the region as a clean technology leader.

region connected its large renewable energy installations in Imperial County to the population center in San Diego with the Sunrise Powerlink transmission line, which provides 100 percent renewable energy to the area. **While the region has strong efforts in a variety of sectors, this report focuses on regional efforts to grow the smart grid and biorenewables sectors in particular.**

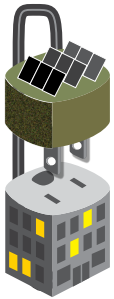
Figure 1: Core Clean Economy Jobs, San Diego and Imperial Counties, 2014



As of January 2014, there were about 25,000 jobs in San Diego and Imperial Counties’ overall “core” clean economy. These core jobs were in a range of businesses that provide the products and services that allow the entire economy to transition away from fossil fuels and improve efficiencies in the use of natural resources.

Employment in the region’s clean economy is primarily in the Energy Generation and Air & Environment segments, though the region’s clean economy includes a wide range of sectors and activities. The Air & Environment segment includes companies in environmental consulting and engineering, remediation, and emissions monitoring. This report focuses on the segments of the clean economy that are driving innovation in the region, both in terms of new technologies and deployment strategies. For a more in-depth analysis of overall employment data in the clean economy, see Next 10’s *California Green Innovation Index*, which tracks the clean economy statewide and includes an analysis of the fifteen segments of the clean economy.

NOTE: “Other” includes Research & Advocacy, Agricultural Support, Clean Industrial Support, Finance & Investment, and Business Services segments
 SOURCE: National Establishment Time Series, Green Establishments Database
 ANALYSIS: Collaborative Economics



SMART GRID SECTOR LEADERSHIP

San Diego and Imperial Counties are leading the state in smart grid innovation, with companies creating and installing new technologies and regional stakeholders offering opportunities to pilot these breakthrough products. Smart grid technology allows for two-way communication between the utility and its customers, enabling more automation, control, and responsiveness in the electric grid. As the utility industry expands renewable energy adoptions and strives to improve energy efficiency, new grid technologies also grow in demand. By leading the smart grid sector, the region can become a global hub of smart grid innovation and a leader in creating and implementing technologies across the nation and world.

As of January 2014, more than 3,000 regional employees worked in the energy infrastructure segment, which includes smart grid companies in power management and smart meters.² These smart grid companies are providing technologies and services that can generate large economic benefits for the region from energy savings and market development. For example, the U.S. Department of Energy's \$2.96 billion investment to support smart grid projects nationwide generated \$6.8 billion in total economic output.³ In addition, a recent study showed that it is cheaper in the long term to invest in

smart grid development rather than conventional technologies.⁴

The region's smart grid sector strength lies in the strategic relationship amongst key players: the local utility SDG&E, UC San Diego, the military bases housed in the region, and businesses that are developing technologies. As a supportive utility, SDG&E collaborated with UC San Diego on the campus's microgrid and has implemented its own smart grid technologies. UC San Diego's microgrid serves as a technology development and testing center. The University leverages its research and technical expertise to develop

Smart Grid in San Diego and Imperial Counties

Economic development organizations, UC San Diego, SDG&E, the U.S. military, and local businesses are developing innovative smart grid solutions to create a more nimble, clean, and cost effective energy system.

Smart grid technology allows for two-way communication between the utility and its customers, enabling more automation, control, and responsiveness in the electric grid. The smart grid technology sector in the region includes microgrid innovations and associated software and technological developments.

a cutting-edge microgrid, and engages regional businesses to test emerging technologies. To further the region's cooperative efforts, the region's military bases have been instrumental in adopting smart grid technologies, some of which were developed in the region, signaling to the state and beyond the importance of embracing newer, cleaner technologies.

The San Diego region provides a supportive environment for companies to grow. The camaraderie among sector companies, intellectual support, and availability of financial resources help provide an incubator and launching pad for companies. Regional leadership, including that of Cleantech San Diego, UC San Diego, and SDG&E, are key to creating this support system.

– **Byron Washom**, UC San Diego

University of California, San Diego Providing a Hub of Innovation

UC San Diego is at the center of the region's smart grid activities and has developed one of the most advanced microgrids in the world. The microgrid is a self-contained component of SDG&E's larger electric grid,⁵ and serves the campus's energy needs as well as provides a test bed for new products and services. UC San Diego's microgrid serves more than 45,000 people, including students, staff, and faculty, and generates 92 percent of the campus' electricity. The microgrid powers 450 buildings on campus, meets 95 percent of the heating and cooling demand, and averages approximately \$850,000 a month in utility bill savings.

The microgrid sources its energy from two natural gas cogenerators, rooftop solar power, electric vehicle car charging stations, and a wide array of ongoing experimental projects. The East Campus Utility Plant is powered by some of the first commercial versions of fuel cells and uses gas emitted from a wastewater treatment plant to generate eight percent of the campus electricity load.⁶ The campus also houses sites for future energy storage facilities, and in September 2014 announced it will install one of the largest battery-based energy storage systems in the U.S. The new 2.5 MW system was purchased from BYD and will be directly integrated into the university's microgrid.⁷

The UC San Diego microgrid serves as a platform to showcase and test new and emerging technologies. The university offers unique flexibility to companies since its campus facilities are not subject to local permitting requirements, so approval processes for new technologies are simplified. The university also offers research support and networking opportunities within the sector.⁸ Several San Diego and Imperial County native companies are partnering to develop and pilot new technologies on UC San Diego's microgrid. Byron Washom, the director of strategic energy initiatives for UC San Diego and the microgrid's mastermind, works with companies and researchers to push the envelope on smart grid innovations, looking for "quantum innovations" to enable large productivity gains.

In the last year, SDG&E has invested more than \$150 million in its smart grid program through 63 ongoing projects and will continue to innovate to expand the market.

Companies from all over the world have been drawn to test their technologies on the UC San Diego microgrid. The French company **Soitec**, for example, tested its concentrated photovoltaic technology at UC San Diego and provided two solar panels as power sources for the grid in 2009. This partnership provided a strong local connection for Soitec, and today the company also has a manufacturing plant in San Diego that will produce 280 MW per year and employ about 450 workers at full capacity.⁹ Wisconsin-based ZBB Energy is another example of a company leveraging the testing and showcase opportunity on the campus; it launched and owns an innovative zinc-bromide energy storage project at UC San Diego. **Power Analytics** is a locally-based company that tested its data management software on UC San Diego's grid, and now manages and monitors the continuous stream of UC San Diego's microgrid data. The early testing at the microgrid allowed Power Analytics to prove its software solutions, expand to other customers such as the military, and become an attractive investment to Causam Energy, which recently acquired the company.¹⁰

Moving forward, UC San Diego continues to innovate and incorporate emerging technologies to the grid. For example, the university has a project with **BMW** and **RWE** to repurpose batteries from electric vehicles into energy storage for the grid. In addition, researchers are starting to use synchrophasors (PMUs) to monitor the grid's status at the rate of sixty times per second. So far, the campus has installed nine PMUs and seeks to install another twenty soon. This highly precise device is particularly useful in preparing for power disruptions or outages.

Such technological advancement is not only cutting edge for the region, but also has the potential to serve the smart grid market globally.¹¹

UC San Diego's microgrid provides a competitive advantage for the region's smart grid sector. The university's research and testing efforts offer a supportive environment for smart grid companies to develop and grow in the region.

San Diego Gas and Electric's Support for Smart Grid

SDG&E, the investor-owned utility that serves the region, is pursuing large-scale smart grid implementation and testing new technologies. SDG&E was an early adopter of smart grid technology, starting with a 2006 preliminary analysis that determined the technical feasibility and cost effectiveness of implementing smart grid technologies in the region.¹² The utility adopted a smart grid deployment plan for 2011-2020¹³ and has converted many of its meters to smart grid technology. While other California utilities are also implementing smart meters, SDG&E's efforts were particularly successful due to its focused efforts to communicate with customers to ensure smooth transition to the new technologies. In 2013, SDG&E earned national recognition for its commitment to expanding the technology throughout the region, including the "Top Ten Best North American Utilities" award for smart grid development from Greentech Media. It was also one of four utilities recognized for "successful smart grid customer engagement efforts" by the Smart Grid Consumer Collaborative, a nonprofit that works to ensure that smart grid benefits are delivered to consumers.¹⁴

SDG&E supports local companies and stakeholders, including UC San Diego, in their smart grid efforts, and has developed its own pilot projects. The utility's Borrego Springs Microgrid, for example, is a national example of how to manage power fluctuations from sources like rooftop solar, and how best to integrate energy storage with the grid. The Borrego Springs Microgrid incorporates the utility's distribution assets with the customer's distributed energy to serve this relatively isolated community that is powered by a single sub-transmission line prone to disruptions. The installation was proof that distributed generation can increase utilization and

reliability of the grid. The Borrego Springs project was financially supported by the U.S. Department of Energy, SDG&E, the California Energy Commission, and other partners.¹⁵ In the last year, SDG&E has invested more than \$150 million in its smart grid program through 63 ongoing projects and will continue to innovate to expand the market.¹⁶

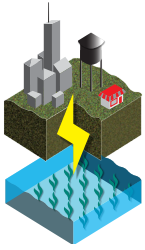
U.S. Military Demonstrating the Value of Smart Grid

The U.S. Department of Defense facilities in the region create an early-adopter market for smart grid technology. The military has multifaceted motivations to adopt smart grid technologies, including ensuring consistent energy generation, security of local power systems, and increasing the use of distributed renewable energy.

The military is an early-adopter of smart grid technologies in the region, motivated by the need for consistent energy generation, security of local power systems, and better integration of distributed renewable energy.

In 2013, the Department of Defense chose locally-based Power Analytics to centralize management and control of three separate microgrids at San Diego Naval bases. While individual microgrids have already proven their value and success, this was the first attempt at managing three geographically separate microgrids as one. The project will provide comprehensive feedback and real time status of the military's power usage across facilities and could have global applications. As a result, the U.S. Navy will be able to share energy resources across sites, allowing for continuous reliable energy and cost savings.¹⁷ The military's adoption of smart grid technology demonstrates the value of smart grid innovations to provide better security and management of energy infrastructure and generation.

In an effort to improve energy security and lower energy costs through a heightened reliance on renewable energy sources, the Naval Facilities Engineering Command Southwest engineers, along with Navy Region Southwest, Marine Corps Installation West, and SDG&E conducted a security exercise to test facility-wide electrical consumption reduction in 2012. Known as the Citadel Shield, the annual exercise aims to implement readiness amongst participants to tackle threats. The exercise allowed them to test military bases' ability to understand the need for various types of power and electricity reduction efforts during a disruption.¹⁸ Such simulations allow large organizations, like the military, to understand their energy demands and formulate appropriate responses that balance their bottom line and clean technology adoption.



BIORENEWABLES DEVELOPMENT AND PRODUCTION

San Diego and Imperial Counties are also leading the development and production of new advanced biorenewable products. Biorenewable technologies span a range of bio-based products, including biofuels, biomass electricity and bio-based oils, chemicals, and food products, and draw on feedstocks such as algae, grain crops, manure and waste cooking oil. Within the biorenewable industry, the region has specialized in developing and scaling algae technology, as well as applying plant science and sophisticated engineering to commercialize next generation biofuels.

The region has the highest concentration of jobs in the clean transportation segment, which includes alternative fuels, relative to total clean economy workers. As of January 2014, San Diego and Imperial Counties had more than 1600 workers in clean transportation, nearly 10 percent of total clean economy jobs in the region and 20 percent of statewide clean transportation jobs.¹⁹

The rapid growth of advanced biorenewables in the region started from San Diego's historical strengths in life sciences and biotechnology research. The region combined the technical strengths in San Diego with the resources in the Imperial County, including available land, ample water resources and a friendly business environment,

to create a prime location for biorenewable companies. Imperial County is an ideal location for siting biorenewable pilot and production facilities because of these resources and also because it has a separate air board from San Diego County that has less stringent permitting requirements.

Together, the two counties have created a symbiotic relationship for the biorenewables industry within the region. Companies and universities in San Diego are targeting their efforts towards the laboratory research and early-stage development aspects of biorenewables, and then carrying out their larger-scale testing and commercialization efforts in the Imperial County.

Biorenewables in San Diego and Imperial Counties

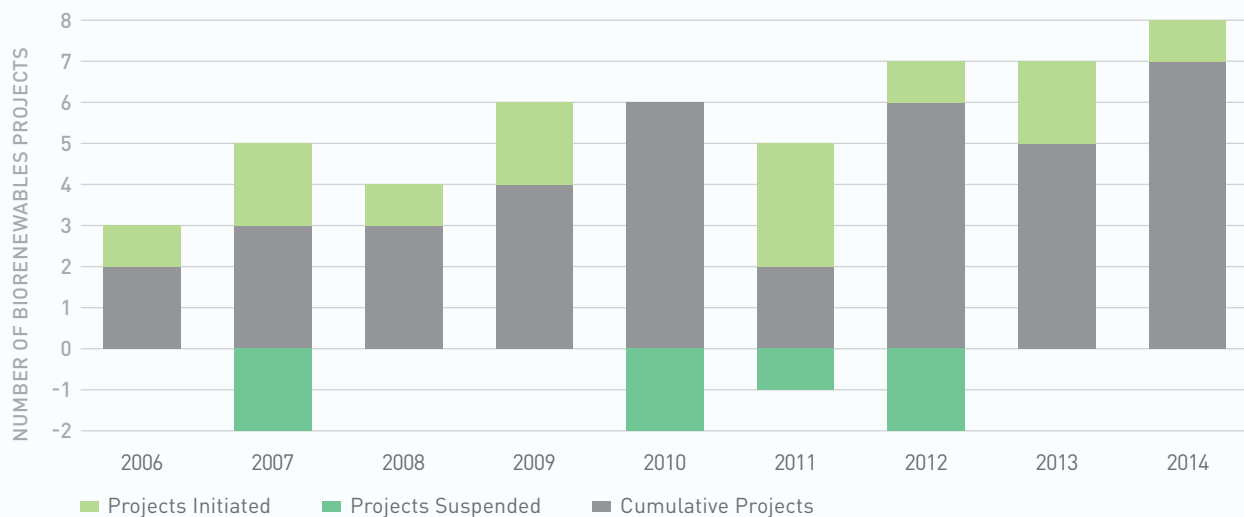
Community organizations, universities, and local, national, and international companies are driving biorenewable technology innovation in the region. The biorenewables sector utilizes local renewable resources while growing the regional economy.

The biorenewable technology sector in the region includes fuel, chemicals, and products derived from renewable feedstocks such as plants, algae, waste, and microorganisms.

Regional Production of Biorenewables

The combined county assets have yielded strong economic benefits to the region, as well as resulted in highly innovative products and research collaborations. The number of biorenewables production and demonstration facilities in the region jumped from three in 2006 to eight in 2014, with

Figure 2 : Cumulative Biorenewables Projects, Initiated*, Suspended** and Cumulative Existing Projects, San Diego and Imperial Counties



*Project initiation dates are based on reported announced, permitted, financed or commissioned dates, based on available data. **Project suspension dates include reported suspended or abandoned dates

SOURCE: Bloomberg New Energy Finance, E2 Environmental Entrepreneurs, Renewable Fuels Association, Biodiesel Magazine, and National Biodiesel Board

ANALYSIS: Collaborative Economics

San Diego and Imperial Counties are actively working to be a leader in the biorenewables industry, leveraging regional assets to create a diversity of jobs, attract investment, and grow the regional economy while reducing greenhouse gas emissions in the state.

– **Jason Anderson**, Cleantech San Diego

two facilities launching in 2013 and one initiated in 2014 alone (Figure 2). These facilities are largely located in Imperial County as a result of the availability of land and other natural resources. These facilities span a wide array of biorenewable technologies, ranging from emerging biofuels such as Dimethyl Ether (DME) and next generation ethanol, to algae production for nutrients and oleochemicals, derived from plant and animal fats.

Currently, the region is home to a wide array of biorenewable companies. **Oberon Fuels**, for example, is a San Diego company with its production facility in Imperial County and has introduced

The San Diego and Imperial Counties offer complementary opportunities for biorenewable companies - San Diego has globally recognized research and innovation expertise, and Imperial County has a reputation for implementing projects along with our improved permitting process, and favorable land and utility prices. Together these have increased our global competitiveness.

– **Tim Kelley,**
Imperial Valley Economic
Development Corporation

the DME technology to North America. DME uses local biowaste products from agriculture to create fuel, and Oberon has developed a modular production method that is enabling the company to scale and replicate rapidly.

Sapphire Energy, a native San Diego company, is an algae-based crude oil production company. In 2012, Sapphire Energy entered a licensing agreement with Earthrise Nutritionals, the world's largest producer of spirulina and spirulina-related products that has its production farm located in Imperial County. Through the agreement, Sapphire Energy will rely on **Earthrise Nutritionals'** spirulina strain to diversify its algae portfolio for fuel production.²⁰

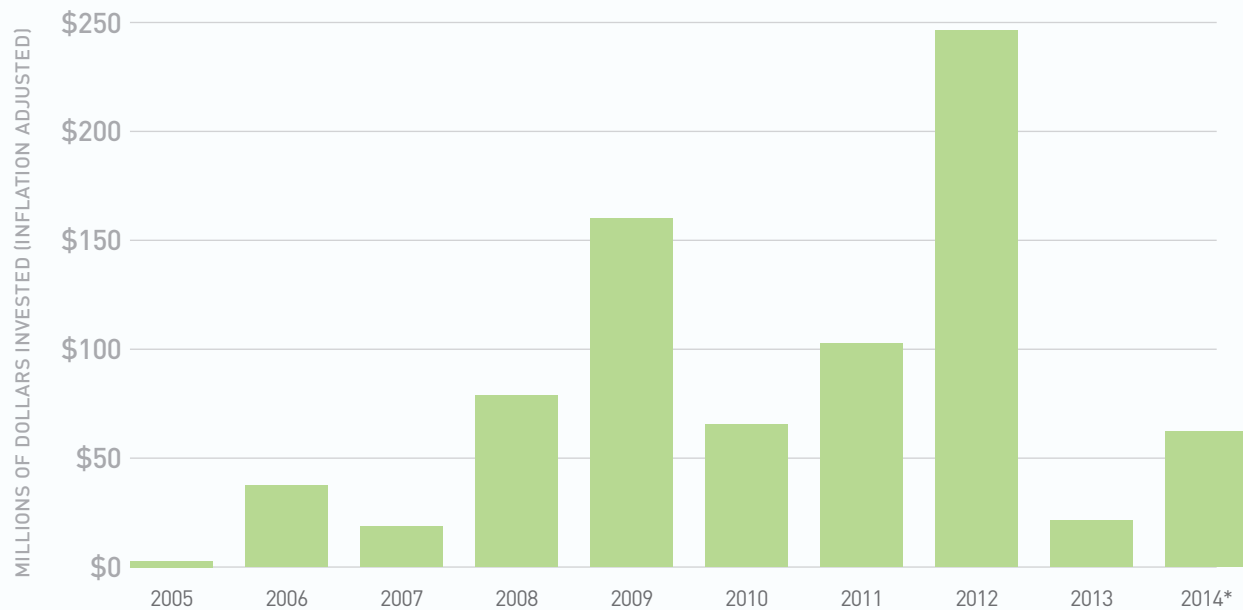
Synthetic Genomics, another prominent San Diego company, is focused on commercializing algae-based alternative fuels and chemicals. The company has established the Algae Biofuels Research and Development Program, in collaboration with ExxonMobil Research and Engineering Company (EMRE), which enables the two companies to expand and scale algal fuel to mass production levels.²¹ Synthetic Genomics currently focuses on higher value algae based products in order to attain economies of scale and position itself to be able to prove competitive in fuel markets. The company has an 81-acre site in Imperial County to expand its testing and scaling capabilities.²²

New companies are starting to recognize the benefit of locating in the region as well. Innovative businesses such as **Canergy** and **California Ethanol and Power**, are looking to establish their technologies in the region. Canergy, a bioenergy company, has been working through the permitting process to launch a 30 million gallon cellulosic ethanol project to the Imperial County in the near future.²³ In addition, California Ethanol and Power successfully completed permitting and is moving into the development of the region's largest biorenewable facility, specializing in sugarcane ethanol production.²⁴

Regional Innovation and Collaboration to Advance Biorenewables

Biorenewable companies in the region have received over \$800 million in early stage investment in the last 10 years (Figure 3). While investment dropped in 2013, 2014 is already seeing a resurgence of biorenewable investment in the region. Sapphire Energy has received the most investment over the years, with over \$350 million in total early stage investment, while **Genomatica** has the second highest total amount at \$145 million. **Verdezyne**

Figure 3: Early Stage Investment in Biorenewable Companies, San Diego and Imperial Counties



*2014 data as of August 1, 2014

NOTE: Early Stage Investment includes Corporate minority, debt/loans, grants, venture capital, and unattributed investments in biorenewable companies.

SOURCE: California Public Utilities Commission - California Solar Initiative

ANALYSIS: Collaborative Economics

and **Synthetic Genomics** closely follow with a total of \$92 million and \$82 million, respectively.

Along with private companies developing new biorenewable technologies, academic institutions are also pioneering next generation research and development of biorenewables. In 2013, for example, researchers at UC San Diego Scripps Institute of Oceanography developed a genetic engineering method for enhanced biofuel production in marine algae.²⁵ UC San Diego’s California Center for Algae Biotechnology (Cal-CAB) is an innovation hub in the region, and is leading the way in developing new, sustainable, and commercially viable algae-based biotechnology solutions to be used for energy, products, water conservation, and greenhouse gas reduction. The Center is a research consortium, and brings together academic researchers from across the state and private sector resources to deploy and commercialize technologies.²⁶

Regional stakeholders have also been collaborating to reduce barriers to commercialization within the region. They are making the facility siting process easier by increasing the transparency of the permitting process for facilities, providing permitting support, and working to better equip the workforce with skills needed to serve this industry. UC San Diego,

for example, offers the Educating and Developing Workers for the Green Economy (EDGE) program to develop the region's workforce for positions in the advanced biofuel and biorenewable industries. The program includes both biofuels science and biofuels process certifications, and offers participants a means of specializing their knowledge.

Cleantech San Diego, a nonprofit member organization, is actively supporting the industry by facilitating public-private-academic partnerships, promoting and educating stakeholders about the industry, and encouraging investment in the region. In 2013, Cleantech San Diego, the San Diego Regional

Economic Development Corporation, and the Imperial Valley Economic Development Corporation were awarded a grant from the California Workforce Investment Board to further develop the biorenewable industry, including biofuels for vehicles. The grant is enabling organizations to work directly with the industry to better understand its growth trajectory and associated regulatory hindrances. In particular, the grant team is investigating the current permitting process and barriers for business demonstration and commercialization purposes in the Imperial County. By addressing policy barriers, the stakeholders aim to encourage economic vitality and workforce development.

While state mandates such as the California Low Carbon Fuel Standards are giving rise to the rapidly growing biofuel sector in San Diego and Imperial Counties, specific assets such as angel investing into the area, highly skilled workforce, and a unique conglomeration of company and university intellectual capacity are enabling much of the innovation in the region. In addition, the collaboration between San Diego and Imperial Counties provides the region with distinctive strengths in both developing and producing biorenewables. Regional organizations such as Cleantech San Diego and the Imperial Valley Economic Development Corporation are working to leverage these strengths and expand all aspects of the biorenewable value chain.

Along with private companies developing new biorenewable technologies, academic institutions are also pioneering next generation research and development of biorenewables.

CONCLUSION

San Diego and Imperial Counties lead the state in smart grid and biorenewables development. The region is leveraging San Diego's research and development expertise and Imperial County's abundance of space and resources to create a growing clean economy. Private and public stakeholders are utilizing local strengths to become pioneers in creating and scaling innovative technologies in smart grid and biorenewable products that have the potential to drastically reduce our dependence on fossil fuels. Such sector advancements are spurring job growth, attracting investment, and helping the state meet its greenhouse gas goals.

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