



Sierra Energy Demo Plant at Fort Hunter Liggett, Monterey County

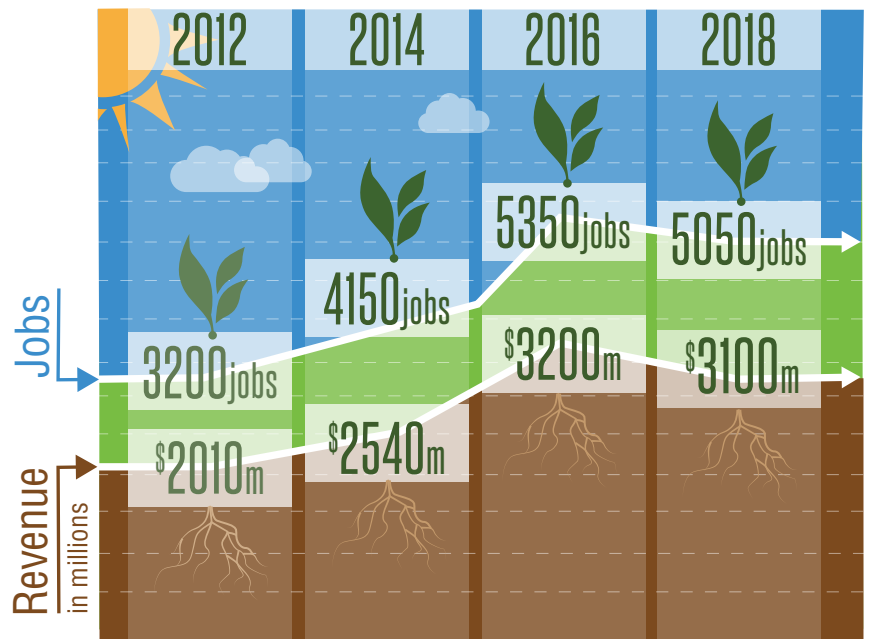
## A Major Milestone for Cleantech in the Region

For the first time, one of the companies in our core cleantech cluster has exceeded 1000 employees and in fact surpassed 1300 employees. Siemens Mobility has been breaking all records in revenue and growth, landing several significant new contracts for its light rail vehicles manufactured in South Sacramento and adding 77,000 sq ft to its facilities.

Also of significance, homegrown Sierra Energy completed construction on its demo plant at Fort Hunter Liggett in Monterey County, able to convert 20 tons of waste per day into power, hydrogen, and other byproducts. The unit has been going through testing prior to full commercial operation expected this year. Next step is building a larger facility in Southern California leading to a 50-100 ton per day standard design.

## A Consolidation Year

Since our last Progress Report in 2017, the core cleantech cluster has gotten a little smaller but is still quite healthy. According to our 2019 survey, the sector has revenues of \$3.1B v. \$3.2B in 2017 and employees 5,050 v. 5,350. The list includes 85 companies, down from 94 last time. Some of the shrinkage is due to companies that relocated after being acquired. Examples include RCS Technologies now a part of Universal Electronics and based in San Diego, Tenkiv moving to Portugal, and GridSense being acquired by Franklin Grid in Massachusetts. Some was due to a change in fortunes for several companies that disappeared from the scene such as JLM Energy. And some was due to a retrenchment of local companies with a reduction in employment, such as SMA America in Roseville. Offsetting these losses, there were new companies added to the cluster, including Renerage and SPIN Systems (both electricity storage), BoxPower (renewable microgrids- in-a-box), and Terzo Power (hybrid heavy equipment).



## Featured Companies



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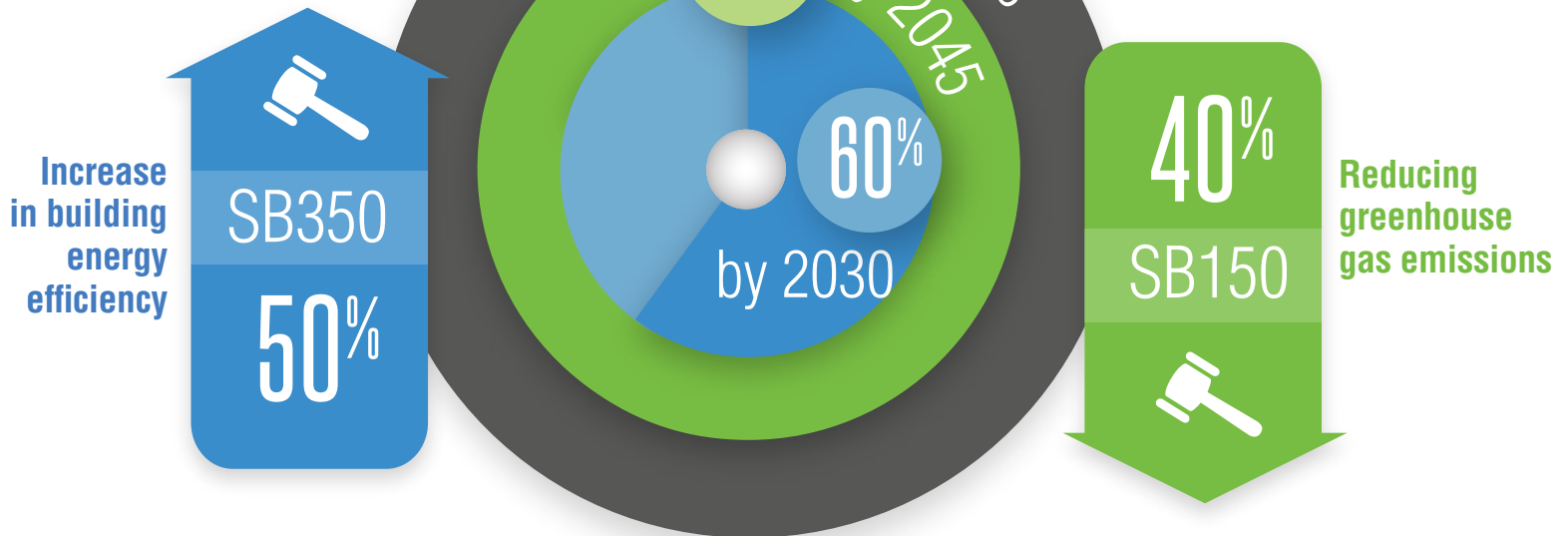
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# New Boost from Legislation & Regulations

The state reinforced its pioneering role in renewable energy, efficiency, and battling climate change, which opens up more opportunity for cleantech businesses. SB 100 mandated 60% of all power be from renewables sources by 2030 with a 100% goal by 2045. SB 350 mandated a 50% increase in building energy efficiency. SB 150 made the prior state goal to reduce greenhouse gas

emissions 40% below 1990 by 2030 into law, and required upgrades to regional transportation and land use plans to meet that goal. California hopes to achieve its carbon-neutral energy status within 30 years and in September, the California Energy Commission said the state is currently at 32% of achieving that goal. Finally in December, the CEC adopted a rule to have solar on all new homes adding \$10,000 to cost but reducing energy cost \$19,000.



## Electric Vehicle Companies

### Make a Leap

The region gained national attention on electric vehicle deployment with Electrify America selecting it as the site of its first deployment of 140 all-electric Volkswagen eGolf sedans for ridesharing at 70 sites. The first installations began in late 2018 and are due to be completed early in 2019. The program is a \$44 million investment known as Green Cities which is part of a billion dollar investment by VW stemming from their emissions fraud case. Southern California-based Envoy will be operating and maintaining the fleet locally.

But of more significance are the solid gains in this sector that have happened with much less fanfare. JUMP opened its west coast bicycle assembly plant and R&D operation in West Sacramento adding over 30 jobs. Highlands Power moved its manufacturing of a high-efficiency electric motor for electric vehicles to the area. Electric Vehicles International was acquired by First Priority Green Fleet, but still maintains its manufacturing plant in Stockton. Glide Cruisers in Rancho Cordova is expanding its sales. Marrs Cycles is making its electric motorcycles in Rescue. Clipper Creek, in Auburn, is now

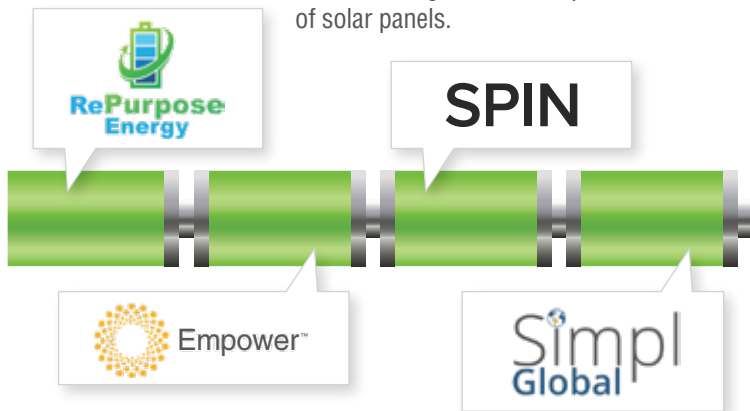
holding a 20% share of all charging station equipment sales in the US, as total sales expand exponentially.

A consortium of public agencies and private companies are planning to ramp up the regional focus on "Future Mobility" with manufacturing scale-up facilities and autonomous vehicle infrastructure, opening more opportunities for companies in this segment.



## Storage a Hot Area

In line with statewide and national trends creating a rising demand for energy storage systems, several new storage companies were launched in the region. Renerage (renamed RePurpose Energy) in Davis is focused on medium-size 350 kWh systems appropriate for commercial buildings, based on used battery packs from Nissan. Empower Energy, also in Davis, has developed a small 15 kWh, battery-based smart energy storage device for homes with first deployments in Australia. SPIN Systems in Sacramento is commercializing a device that stores energy in a spinning flywheel. And Simpl Global in Rocklin specializes in a small storage unit that clips on the back of solar panels.



## Global Clean Energy Investment Stayed Strong in 2018



There is still an enormous amount of money going into cleantech each year. Total global clean energy investment in 2018 was \$332.1B according to a Bloomberg New Energy Finance survey. That was down 8% from the record \$361.7B in 2017, with much of the difference attributed to (1) the continued reduction in solar PV panel costs and (2) government-imposed restraints on the construction of new solar projects in China. These figures include all project financing, public share offerings, corporate investments and venture capital.

Global venture capital and private equity investment in clean energy jumped 127% to \$9.2B, the highest since 2010, with a big shift toward electric vehicle-related deals. There were 8 such deals in China alone.

Total US clean energy investment hit a new record high of \$64.2B in 2018, up from \$57.6B last year. The prior peak was in 2011 at \$62.3B, with a slump to \$44.6B in 2013.

China was once again the leader in total investment with \$100.1B but that was down 32% due to the drop in value of the solar project commitments.

## Investment Climate Improving

The region has been chronically low on sources of capital investment, but improvements are happening. A record in new ater-round investment was set with over \$150M in new capital going into six cleantech companies. This kind of track record is attracting even more attention. Five Star Bank created a regional pitchfest that succeeded twice in bringing three dozen investors together to hear from tech companies. CleanStart participated in the judging. Three participating cleantech companies got good responses. The Sacramento Angels heard pitches from clean tech companies and funded one, joining two investments they made previously in cleantech companies. Two companies got great exposure as they were recognized as Sustainability Innovators of the Year in the Stoel Rives, Moss Adams, Sacramento Business Journal Regional Innovation Awards, from a total of 19 nominated. Finally, seven companies were acquired, evidence that there is a light at the end of the tunnel for investors.

The state created a variety of sources of funding that is helping local companies. CleanStart has been effective in steering companies to these new sources. The California Energy Commission has over \$200 million available per year through its EPIC program, its PIER program, and through allocations of cap-and-trade proceeds from the Air Resources Board. Mostly these focus on demonstration projects, but about \$4.5 million per year is going to the CalSEED program to provide seed funding for entrepreneurs. CalSEED provides concept grants of \$150,000 to about 18 companies per year, and "continuation" grants of \$450,000 to four of those. Local companies Enerdapt and Lucent Optics each won concept grants. A new cycle for CalSEED begins in March 2019. Beyond CalSEED, Terzo Power was successful in getting two grants totaling \$3.8 million to advance its hybrid hydraulic innovation.



## Biomass and Fuels

- 1 Burst Energies
- 2 CNF Biofuel
- 3 Energy 2001, Inc
- 4 Greyrock Energy
- 5 Origin Materials
- 6 Pacific Ethanol, Inc.
- 7 Propel Fuels
- 8 Sierra Energy
- 9 Springboard Biodiesel LLC
- 10 Technikon, inc
- 11 West BioFuels
- 12 Woodland Biomass

## Efficiency

- 13 Airco Mechanical
- 14 AJO
- 15 Bagatelos Architectural Glass Systems, Inc.
- 16 Capital Energy Systems
- 17 D3 LED
- 18 Davis Energy Group
- 19 Electro Scan
- 20 Empow Lighting
- 21 Energy Exemplar
- 22 InspecTools
- 23 Integrated Comfort
- 24 Jerico Energy
- 25 SynapSense Corp.
- 26 Terzo Power
- 27 Engie Services
- 28 Johnson Controls Inc.
- 29 L&H Airco
- 30 Cardinal Glass
- 31 Smart Light Systems
- 32 Thermeshade
- 33 Arch Nexus
- 34 T3 Office Recycling Solutions

## Environmental, Refuse and Water

- 35 Marrone Bio Innovations
- 36 GreenTraks, Inc.
- 37 Novozymes, Inc.
- 38 Athena Intelligence
- 39 AQUAOSO
- 40 Global Water
- 41 Intake Works
- 42 APT Water

## Mobility

- 43 CarbonBLU
- 44 Marris Cycles
- 45 ClipperCreek
- 46 Highlands Power
- 47 Efficient Drivetrains
- 48 Electric Vehicles International
- 49 Siemens Mobility
- 50 Glide Cruisers

## Power Generation

- 51 eZESystems
- 52 ENERCharge
- 53 Trimark Associates
- 54 Henwood Associates
- 55 Grid Rabbit
- 56 Enerdapt
- 57 Box Power
- 58 Empower Energy

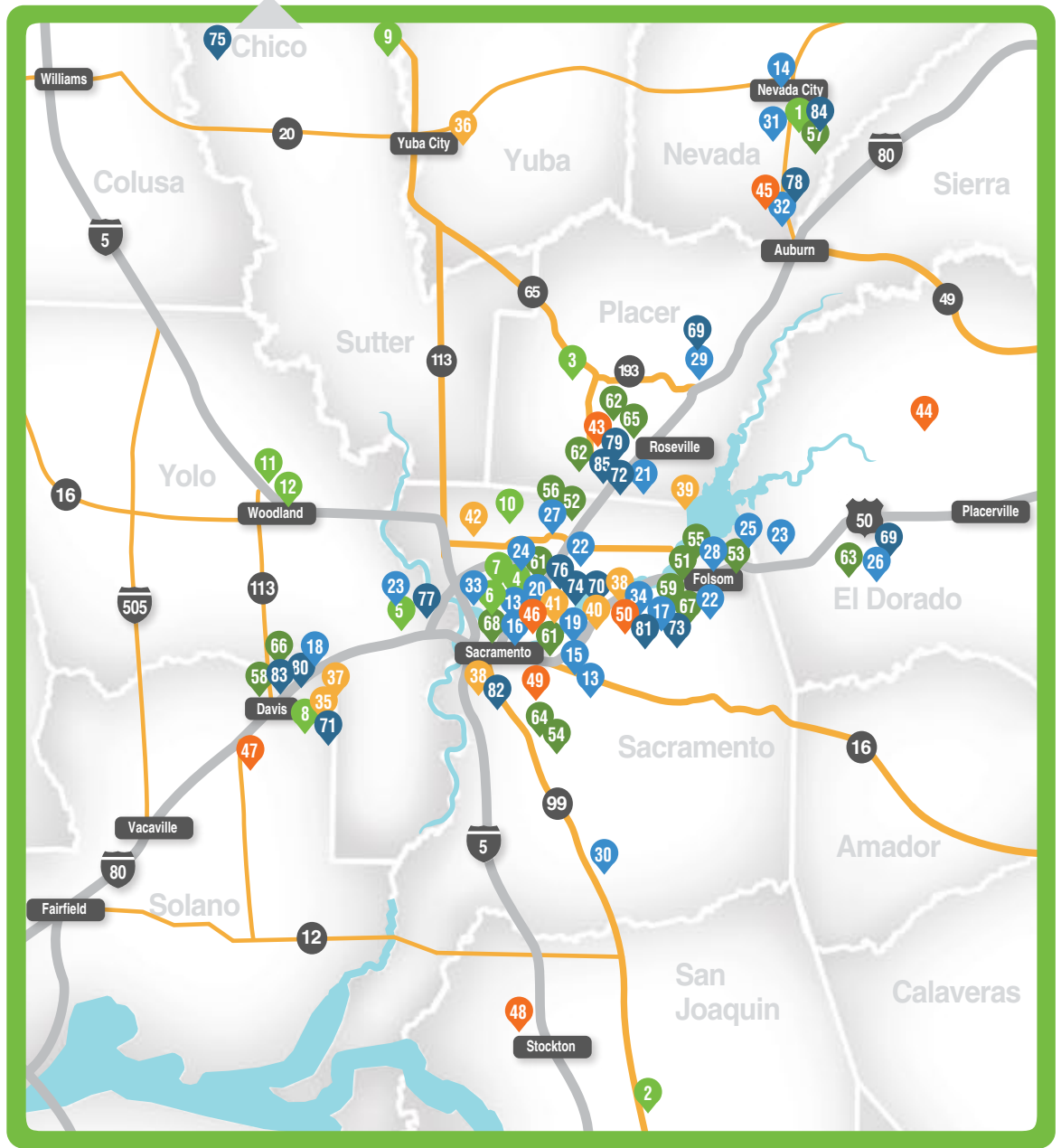
## Solar

- 59 Clean Energy Systems, Inc.
- 60 Frontier Wind
- 61 Greenleaf Power LLC
- 62 Helios Altas
- 63 NLine Energy
- 64 PowerSoft, LLC
- 65 Simpl Global
- 66 Renerege
- 67 Allergy Systems
- 68 SPIN Systems

## Solar

- 69 8minutenergy Renewables
- 70 ACR Solar International
- 71 Blue Oak Energy
- 72 Brower Mechanical
- 73 Cybo Energy
- 74 Enable Energy
- 75 FAFCO
- 76 Lucent Optics

- 77 Meca Solar
- 78 Pacific Power Renewables, Inc.
- 79 SMA America
- 80 Solar Roof Dynamics
- 81 Sun System Technology
- 82 Sunoptics Skylights
- 83 Talbott Solar & Radiant Homes
- 84 California Solar Electric Company
- 85 Capital City Solar



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