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Sidebar: Solar Panels

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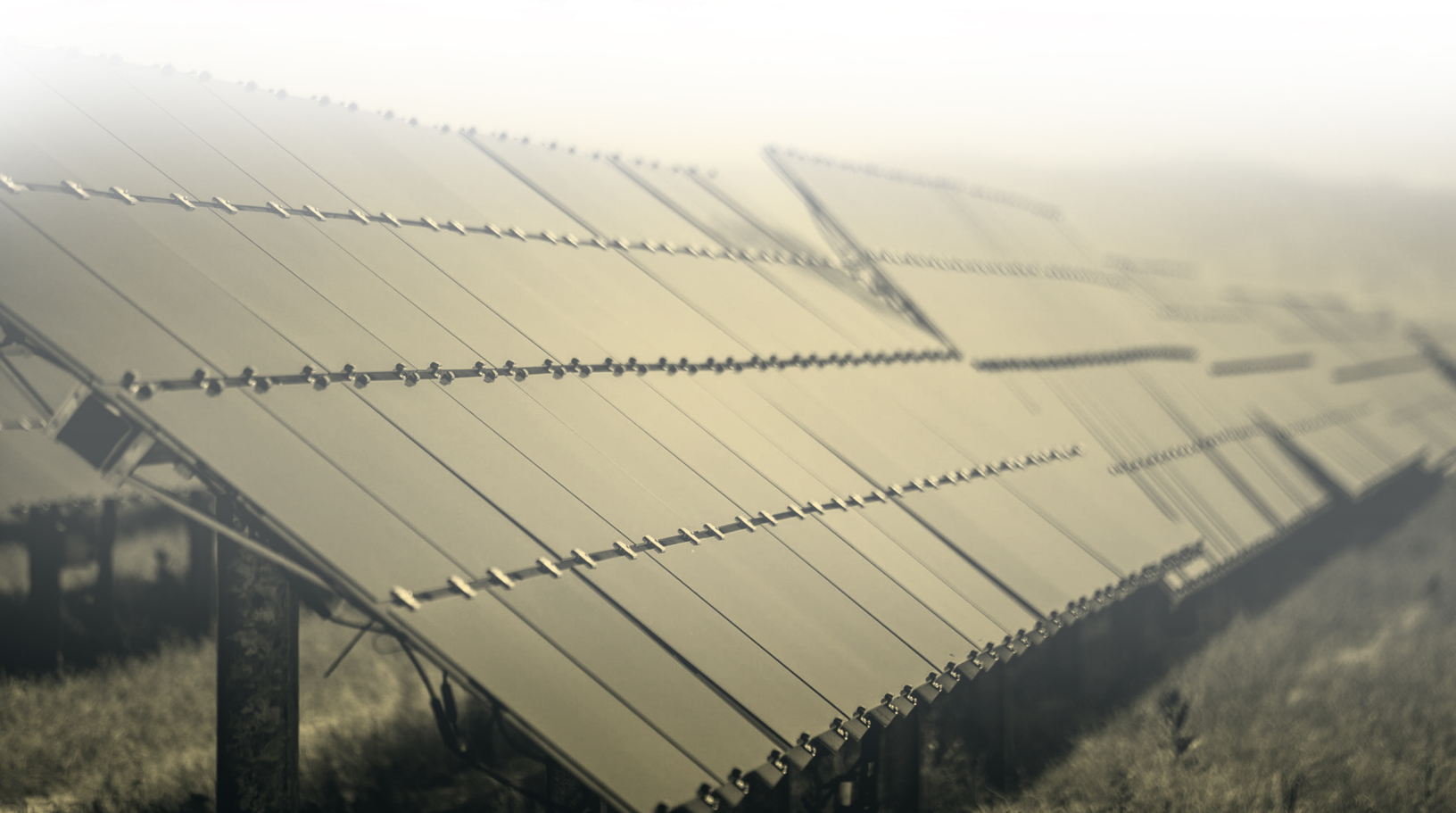
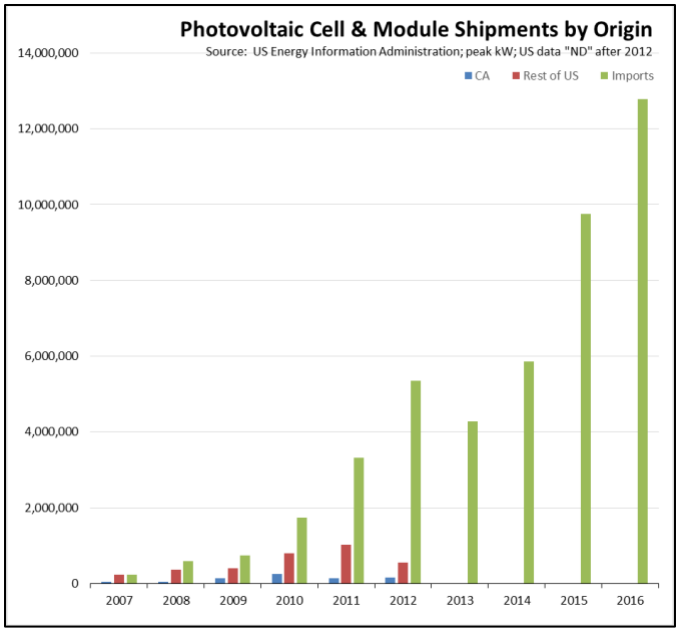


Sidebar: Solar Panels

Solar energy was an early focus of green jobs promotion at both the state and federal level. Panel installation was promoted through a range of subsidies including income tax credits and favorable utility rate payments as mandated through California Public Utilities Commission. Manufacturing was similarly promoted through low cost loans, direct subsidies, and targeting of employment training programs. Related measures along with the Renewable Portfolio Standard were directed at utility-scale projects.

As with electric vehicles, California's competitive factors early on limited the types and sustainability of green jobs it was able to secure from these programs. The early rise and fall of solar manufacturing in the state is illustrated in the chart below, with in-state production peaking in 2010 and the state's competitive factors instead first leading to creation of the related green jobs in other states and subsequently with the state's incentive programs promoting these jobs instead in other countries. Note that US production is not reported beginning in 2013 as concentration in manufacturing reached the point where the nondisclosure provisions in the data had been reached.



Details on the movement of these green jobs out of California by company are provided in a Senate research paper on this topic:

- **Why is manufacturing such a small subset of California's solar industry? For one thing, making photovoltaic cells and modules is a highly automated process that does not require many workers. But solar company officials also cite many other reasons – including labor costs, regulations, and government incentives – to explain why they choose to manufacture elsewhere.**

  . . . In 2010 and 2011 alone, for example, three California-based solar companies announced plans to open manufacturing facilities in Mississippi.

- **. . . In May 2011, for example, Siliken Solar moved its 130-worker solar panel assembly operation from Otay Mesa in San Diego County to Tijuana.**

- **. . . Similarly, Solaria Corporation keeps its headquarters in Fremont, but does most manufacturing in India. In October 2011, at a legislative hearing on a state sales tax break for green manufacturers, Senator Bob Huff asked Solaria human resources vice president Melissa Zucker why the company chose to produce solar modules overseas. . . "California is absolutely the place where we want to be from an innovation standpoint," she said. "We are able to attract incredibly smart, forward-thinking people who are passionate about the technology. It is a difficult state to manufacture cost-effectively in, as all of you are aware."**

- **. . . In 2010, the California Legislature carved out a small exemption [CAEATFA] to the sales and use tax on manufacturing equipment for renewable energy and clean transportation companies. . . The solar companies that haven't pursued the sales tax break include Calisolar of Sunnyvale, whose executives chose to expand in Mississippi. Calisolar chief executive officer Roy Johnson had heralded the new tax break in April 2010, when former Governor Arnold Schwarzenegger signed SB 71.**

  "Many believe it's not possible to be competitive manufacturing in Silicon Valley," stated Johnson in a company press release, "but with innovative technology and a level playing field created by this legislation, Calisolar is well positioned to effectively compete in a global market."

  Rather than install new equipment and hire more workers in Sunnyvale, however, Calisolar shifted its business focus to solar silicon production in Mississippi. The company laid off more than 100 Sunnyvale workers. In February 2012, Calisolar even erased California from its name, changing it to Silicor Materials.

- **. . . Paradoxically, the company that embraced the program first and used it most enthusiastically, Solyndra, filed for bankruptcy in August 2011 and fired more than 1,000 workers at its Fremont plant.**

  Besides state assistance, Solyndra had attracted tens of millions of venture capital dollars and a $535 million federal loan guarantee. But Solyndra officials said they simply could not compete with heavily subsidized Chinese solar panel manufacturers.

  By the time the company shut down, Solyndra had used $25.1 million in sales or use tax exemptions, $11 million more than all the other SB 71-qualified companies combined had used by March 2012. CAEATFA had authorized the company to waive up to $35 million in taxes. State officials said they did not expect reimbursement, because Solyndra had not duped the state. The company bought equipment, as promised, and put people to work on it – just not for as long as anyone hoped. In fact, CAEATFA staff had visited Solyndra's factory in June 2011, two months before it filed for bankruptcy and noted that the company had purchased, installed and put to use about two-thirds of the equipment it said it would. They even reported being amused by the company's robots and forklifts, which played music while moving around the Solyndra factory.

- **. . . With only a couple of exceptions, the companies producing green goods that qualified for SB 71 exemptions do not have large operations cranking out products with thousands of California employees.**

Consider, for example, SB 71 tax break recipient First Solar Inc. The Tempe, Arizona, company is one of the world's largest makers of thinfilm photovoltaic cells. First Solar operates factories in Ohio, Germany, and Malaysia. Before SB 71 passed the Legislature in 2010, the company had about 130 employees in California, most in the San Francisco area working on project development.

With the passage of SB 71, the company decided to build a pilot development and production facility in Santa Clara. Company officials told CAEATFA staff that they planned to invest roughly $40 million in the pilot plant and put 180 people to work.

First Solar had used nearly the entire $3.4 million sales tax exemption allotted it by CAEATFA when global forces triggered a restructuring. . . .In January 2012, they laid off 63 workers in Santa Clara, including engineers and technicians.

- **Another company doing only small-scale production in California is Solaria Corp. Thanks to SB 71, the company avoided use tax on equipment it brought to Fremont from its factory in India. It had used $258,678 of its tax exemption award as of March 2012.**

  Approximately 117 people now work at Solaria's Fremont plant near its research and development center, according to company officials. They say that they benefit from the synergy of doing at least some manufacturing near their innovation hub.

  "There's no comparison to having the engineers being able to put on their lab coats and go in the back to see what's going on with the process," said Solaria President Suvi Sharma. "That is a very critical part in the lifecycle of development. High-volume manufacturing is a different entity altogether."

- **Similarly, SunPower Corp., based in San Jose, manufactures solar cells and panels in Malaysia and the Philippines. With the enactment of SB 71, the company opened a small production facility in Milpitas with 100 or so jobs – the company's first manufacturing operation in the U.S.**

- **Six-year-old Stion Corporation considered building a large plant near its San Jose headquarters to manufacture thin-film solar modules. It opted instead to build a factory in Hattiesburg, Mississippi. The factory opened in September 2011 and is expected to eventually employ 1,000 people. . . Stion officials say they will also break ground this year on a factory in South Korea.**

- **San Jose-based SoloPower Inc. similarly chose to put its biggest factory out of state. SoloPower announced in January 2011 that it would build a factory in Oregon to make flexible, thin-film photovoltaic modules. By March 2012, the company had begun to hire engineers and technicians for its Portland factory, which is expected to employ 450.**

- **. . . In mid-2011, after California awarded Bloom [Energy] $208 million to lower the price of its fuel cells for customers, Bloom announced that it would build a fuel cell factory in Newark, Delaware. At full production, the factory is expected to employ 900 people.**

- **. . . In the last few years, Oregon and Mississippi have done especially well luring California companies. Calisolar, Stion, Twin Creeks Technologies, Soladigm, Peak Sun Silicon Corp., Solexant, Solaicx, SolarWorld Industries America Inc., Sanyo Solar, and SoloPower have all**

moved to or opened operations in Mississippi and Oregon in recent years. Most of the companies started in the Silicon Valley.

- **"Our company won't even consider building a factory in California," said Gary Kanaby, director of wind energy sales for Ohio-based Molded Fiber Glass Companies. The company has made wind tower nose cones and the fiberglass housings for turbine machinery at a small factory in Adelanto in San Bernardino County for 25 years, Kanaby said. But when the company needed to expand, the winner was South Dakota, where the company recently built two factories with a workforce of more than 350.**

- **. . . SMA Solar, a German manufacturer of inverters for solar photovoltaic systems, maintains its U.S. headquarters in Rocklin. But in 2009, when the company sought to expand manufacturing in the U.S., it chose Colorado, not California.**

- **. . . Steve Taber founded Nordic Windpower in Berkeley in 2007 to make two-blade, utility-scale wind turbines. He located the company headquarters in the Bay Area and said that he considered locating the manufacturing in California. But after analyzing costs, his investors chose factories in Pocatello, Idaho, and Kansas City, Missouri. In 2011, after Taber left the company, his successors moved its headquarters from Berkeley to Kansas City.**

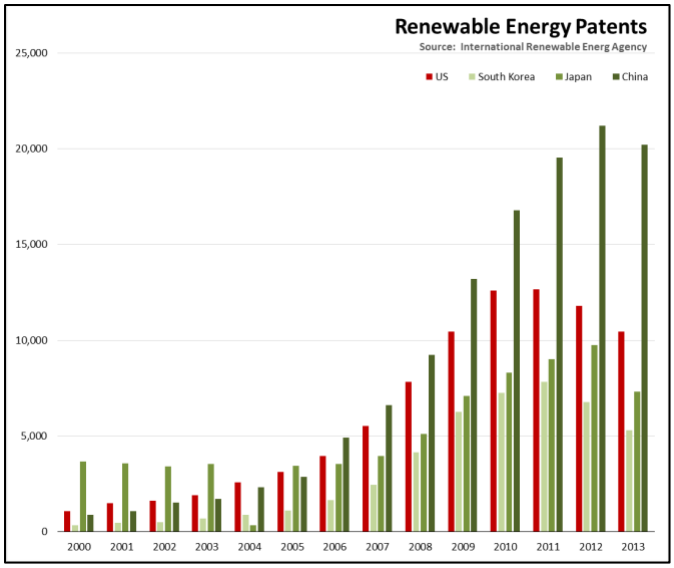
- **. . . Top concerns of the California Manufacturers & Technology Association include the state's sales tax on manufacturing equipment (California is one of only 12 states with such a tax) and the time and uncertainty associated with permitting, said Dorothy Rothrock, senior vice president of the association.**

  California needs to analyze the costs of its regulations, she said, so policymakers can eliminate those that are counter-productive. Government incentives will not heal wounds created by bad policies, said Rothrock: "If you're using that kind of approach as the basis for bringing back your economy, you're on the wrong track."

[All quotes from Vogel (2012)]

More recently, at least three companies announced plans to resume solar panel manufacturing in the US as a result of the recent tariffs. None chose to do so in California. Of the three, China's JinkoSolar Holding Co. selected Jacksonville, FL; First Solar Inc, is opening a new factory in Ohio; and SunPower Corp. acquired SolarWorld and announced plans to revive its manufacturing in Oregon.

As indicated in the outcomes listed above, California has been able to secure a relatively small number of manufacturing jobs but primarily only those associated with R&D operations and with the knowledge job components in which the state retains some competitive edge. These jobs, however, do not exist throughout the state but, along with much of the other higher wage jobs growth experienced since the recession, are concentrated within the Bay Area.



Moreover, a shift in manufacturing operations over a longer term will also begin to affect the higher wage knowledge jobs as well as the focus of R&D moves out of the research and regulatory realms, and into the commercial. Using patents as one indicator of competitiveness for innovation jobs and enterprises, this process is illustrated in the chart above. In this data—which covers patents for all renewable energy technologies, solar as well as others—the shift in technology innovation quickly followed the shift in the underlying manufacturing base from the US to the Northeastern Asian countries. Using other data sources, California still accounts for a significant share of US patents—in 2015, 29% of all domestic patents—but the broader flow of innovation has followed manufacturing for renewable energy as it has moved overseas. Moreover, the data in the chart also shows an increasing concentration of this innovation, with the four countries shown accounting for 55% of renewable energy patents in 2000 and growing to 78% in 2013.

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1301 I Street Sacramento, CA 95814

centerforjobs.org

916.553.4093