California Leads a Quiet Revolution

Beth Gardiner, New York Times, 10-5-15

BERKELEY — California is cruising toward its 2020 goal for increasing renewable energy and is setting far more ambitious targets for the future. Its large-scale solar arrays produced more energy in 2014 than those in all other states combined. Half the nation's solar home rooftops are in the state, and thousands more are added each week.

With its progressive politics, high-tech bent and abundant sunshine, California is fast ramping up its production of clean electricity, setting an example its leaders hope the rest of the country, and other nations, will follow as they seek to cut emissions of climate-warming carbon dioxide.

"It's hard to overstate the importance of California in terms of renewables," said William Nelson, head of North American analysis at Bloomberg New Energy Finance. "It's like an experiment in terms of how quickly we can add solar to the grid."

Fifteen years after an energy crisis, caused partly by deregulation and market manipulation, brought blackouts and price spikes, the shift has been remarkably smooth, many analysts say. Even without counting the big contribution from home solar generation, 26 percent of the state's power this year will come from clean sources like the sun and wind, Bloomberg New Energy Finance estimates. The national average is about 10 percent.

Contracts already in place virtually guarantee that the state will reach its goal of getting 33 percent of electricity from renewables by 2020, a number that does not include most home generation. And at the rate California has been going, a new target of 50 percent for 2030 is within reach, Mr. Nelson said.

"It's kind of a quiet revolution," said Daniel Kammen, director of the Renewable and Appropriate Energy Laboratory at the University of California, Berkeley. "Nothing weird or strange has happened, electricity prices haven't shot up or down."

California has avoided the steep jump in prices that Germany initially suffered in its push for clean power. Renewables have added between 3 percent and 5 percent to the cost of energy, estimated the California Public Utilities Commission, a regulatory body. While per-unit prices are among the highest in the nation, stringent energy conservation measures have helped keep monthly bills $20 lower than the United States average, since Californian homes use almost 40 percent less electricity than the typical American household.

A new industry of home solar panel installation and financing, spearheaded by companies like SolarCity and Sunrun, has sprung up in California, and many of those companies have expanded elsewhere in the country, Mr. Nelson said.

"It's a breeding ground of activity that is impacting other states," he said.

California is not alone, of course, in its push toward renewables. Germany gets about 30 percent of its power from clean sources; Denmark has passed 40 percent and is aiming for 100 percent by 2050.

There have been difficulties. The big influx of solar and wind power has changed the hour-to-hour pattern of electricity production, with energy flooding the grid during the sunniest times, creating a mismatch with demand that has sometimes forced officials to temporarily switch off energy from the new sources.

The storage technologies that would help ease that imbalance are still too expensive to use widely, although California is requiring utilities to install 1.3 gigawatts of power storage by 2020.

New transmission lines are needed to keep up with the construction of solar and wind farms, and so are high-tech natural gas plants able to switch on and off quickly to complement the fluctuations of the sun and wind.

But so far the infusion of new clean energy has not caused reliability problems, as some critics had feared it might, said David Olsen, a governor on the board of the California Independent System Operator, which manages the state's electric grid.

"We've seen no impact," he said. "When we get to 40 percent, 50 percent, that will definitely be an issue. But we know what the technical issues are and we're planning for them. We're highly confident that we will be able to operate the grid reliably when it is dominated by renewable energy."

The incentives and regulations driving the change are underpinned by an order in 2005 by then-Gov. Arnold Schwarzenegger that California slash greenhouse gas emissions by 80 percent from 1990 levels by 2050. In April, Gov. Jerry Brown added an interim target of a 40 percent emissions cut by 2030, also based on 1990 levels.

Last month, legislators wrote into law Mr. Brown's goal of getting 50 percent of power from clean sources by 2030, although pressure from the oil industry forced the governor's allies to drop a related piece of their climate package, a requirement to halve petroleum use.

Fong Wan, senior vice president for energy policy and procurement at Pacific Gas & Electric, said that while the utility supported the carbon-cutting goals, it wanted more freedom to decide how to reach them. Rather than mandating specific percentages of renewable power, he said, regulations should focus on the overriding goal of cutting emissions.

"We would like the flexibility to choose how to accomplish" those cuts, he said. "We are concerned with the unintended consequences or outcome if you have very specific goals, because you may end up with a suboptimal solution."

Another utility priority has sparked a battle with the growing solar rooftop sector. Big providers like PG&E are losing revenue from customers who generate their own power, enjoying smaller monthly bills while still drawing on grid electricity at times. The utilities want those customers to pay a larger share of the cost of maintaining electricity lines and plants.

Regulators are considering revising rates to address that concern, angering rooftop panel companies who warn that a package of changes proposed by utilities would gut their industry and undermine California's position as a climate leader.

Others predict the clean energy targets will harm the wider economy.

"Small businesses are worried about their own electric rates and large businesses are worried about whether they can produce and continue to grow in California," said Loren Kaye, president of the California Foundation for Commerce and Education, a research group affiliated with the California Chamber of Commerce. "More and more industries that are even somewhat dependent on electricity are going to be lured elsewhere."

The chamber, he said, would rather see a "cap and trade" approach that lets the market find the best way of

cutting greenhouse gases. California has such an emissions trading system, but it currently has little impact on electricity, making a bigger difference in other areas, like the price of gasoline.

Officials say the renewables push has helped, not hurt, the economy.

“We have successfully delinked G.D.P. from carbon, and what that means is that we have had continued economic growth, we added 498,000 jobs, more jobs than any other state in the country in 2014, and at the same time we have greatly reduced carbon emissions,” Kevin de León, president pro tempore of the state senate, said in a phone interview. “That’s why the Chinese, the Mexicans, the European Union, the Indians are watching what happens” in California.

Chinese officials, working on their own enormous renewables program, have consulted with the state’s energy experts. California’s grid operator is helping Mexico set up its own independent grid-management body, Mr. Olsen said. And with every state required by President Obama’s Clean Power Plan to create a roadmap for cutting its carbon emissions, many are likely to look more closely at California’s efforts.

That impact, said Mr. Kammen of the University of California, Berkeley, will be critical if California’s work is to make a real difference in slowing the pace of climate change.

“The lessons from the Californias, the Denmarks, the Germanys have to really spread,” he said. “It doesn’t do us much good if a few places are really green, if the overall trajectory doesn’t change.”