

Calif. plans 'road map' to make more energy storage a reality

Anne C. Mulkern, Environment & Energy Publishing, 8-4-14

To realize its vision for a cleaner energy future, California needs to move beyond building more solar, wind and other renewable power sources, energy leaders say. The state needs to boost the market for systems able to store that green electricity.

California's energy managers agree and last year set first-in-the-nation targets for adding more storage. That kick-started the industry, several experts said.

But multiple obstacles remain. Now the state is launching a new effort aimed at clearing those out of the way.

Agencies that deal with electricity are asking utilities, storage developers, environmental groups, consumer advocates and others to describe the barriers impeding more storage. The California Energy Commission, California Public Utilities Commission (CPUC), and California Independent System Operator (Cal ISO), which manages the grid, are crafting a storage "road map." They plan by the end of the year to issue a guide each agency could then use to address problems.

A system overhaul essentially is needed, said Mark Higgins, senior director at the California Energy Storage Alliance (CESA).

"We are moving from a grid that operated in one direction only," delivering electricity from power plants to consumers, Higgins said. "Now we're moving to a grid where the system operates in both directions. Consumers can act as buyers of power, but they also can act as sellers of power."

Rules for utilities were set up based on the earlier one-direction structure, he added. "So there's a lot of changes that we need to make."

Energy storage includes devices like batteries and spinning flywheels, which house power kinetically. There also are more traditional options like pumped water. And there are research projects into possibilities like compressed air that's put into underground reservoirs previously used for natural gas.

Energy storage also might in the future incorporate electric vehicles, several people said. The Department of Defense has a test project at a Los Angeles Air Force base, where power stored in EVs is used to keep the supply-and-demand balance exact in California's energy market. Cars every four seconds receive a signal to either release or take in power.

Growing energy storage could allow California to bank more of the electricity from windmills that turn at night and solar panels that heat up in the early afternoon. That juice could be fed back into the system when demand peaks, typically in the late afternoon or early evening. That could reduce the need for more power plants as well as transmission upgrades, officials have said.

"Energy storage is the most critical clean energy technology area that's facing the state," said Ethan Elkind, a climate research fellow at the University of California, Berkeley, School of Law. "If we don't get that ramped up in a cost-effective way, there's just no way we can reach our greenhouse gas reduction goals."

Calif. driving market worldwide

The Golden State put itself out in front of the nation on the storage issue, several officials said, when the CPUC required the largest utilities to add set amounts of power-housing capacity.

In total, Pacific Gas & Electric Co. (PG&E), Southern California Edison Co. and San Diego Gas & Electric Co. must obtain 1.325 gigawatts of storage by 2020. When the standard was set last year, that amount represented a 50 percent increase in storage capacity worldwide, not counting energy stored behind hydroelectric dams.

"That decision instantly created a big market worldwide," said Ted Ko, consultant to CalCharge, a consortium of emerging battery companies, national laboratories, electric workers and schools. "California became a focal point for the energy storage industry right away."

As soon as the CPUC issued its rule, the state's grid manager started hearing from developers that wanted to know about interconnection studies, said Heather Sanders, director of regulatory affairs and distributed energy resources at Cal ISO. Those typically are required before an energy source can link to the grid and look at what's needed to do so and how much it will cost.

The ISO reached out to the CPUC and the state Energy Commission, and they decided to launch the road map process. The agencies haven't committed to making any future policy changes but want to uncover the real or perceived problems, Sanders said.

One of the biggest obstacles to more energy storage is the cost it takes to make it and get it online. That right now costs one-and-a-half to two times more than the ideal, said Mike Gravely, deputy chief of the Energy Research & Development Division at the California Energy Commission.

Part of that is regulatory costs, and one of the goals of the road map is to shrink red tape, said Kevin Barker, senior adviser to CEC Chairman Robert Weisenmiller.

There's hope that building the market will drive prices down, as it did with solar photovoltaics, several officials said.

But because the market is so new, there's also a question about the durability of products, Gravely said.

"The most important unanswered question ... is longevity -- how are the systems going to work over time?" Gravely said. "The better they can demonstrate that, the more people are confident of what the costs are going to really be." If batteries have to be replaced in five years instead of 15, and people don't learn that for four years, he said, "that's an uncertainty."

Tension with utilities

Resolving the rules for energy storage could be a bumpy ride. Friction existed earlier this year between utilities and SolarCity Corp., which leases and sells rooftop photovoltaic systems. That company has a pilot project to test energy storage and battled the utilities to get those systems connected to the grid. Utilities wanted to charge fees as high as \$800 per household.

The CPUC this spring disallowed those fees, and customers now are coming online. There are 40 households in SolarCity's test project that are connected, with about 460 more to go.

Utilities said they support more energy storage but have concerns about the costs of any mandate.

There also are issues about worker safety, said Denny Boyles, a spokesman at utility PG&E. Energy storage systems need to be properly installed, he said, so that in the event of a power outage, they don't send electricity into the grid instead of a home.

And there will be questions about rates, Boyles said. Customers who have solar and storage shouldn't be able to charge their system battery from the grid at lower power rate and then sell that electricity back at a higher rate, he said.

"That's not an equitable situation for other customers," Boyles said.

The same concern is shared by those in the storage industry, but they fear the inverse.

One of CESA's biggest priorities, Higgins with that group said, is making sure that those with energy storage aren't charged retail rates for charging when they'd be selling it back at wholesale rates.

"That basically blows up the entire model," Higgins said.

Figuring out payments

Right now there are few means of compensating households or companies that add storage and want to offer it to those needing power, Higgins and others said.

For example, Higgins said, an industrial facility could add a storage device that had a primary purpose of helping the business avoid charges for using power during peak demand times. That device also could deliver power to the wholesale market, he said, with the grid manager making it available to others. But the framework needs to be agreed on by multiple interested groups.

SolarCity in addition to its residential energy storage pilot project has a system aimed at the commercial and industrial facilities that pay penalties for using power at peak demand times.

For both storage systems to reach their full market potential, rules need to be changed, said Andy Schwartz, director of policy and electricity markets at SolarCity.

"The technology to do all this exists and is being deployed," Schwartz said. The question, he said, is how to create the proper rules so the value of storage products is realized.

For example, the devices can be controlled remotely, he said. Utilities could essentially be given control of the "joystick" and pull power from the systems at certain times of the day.

"That's a very new concept for utilities to wrap around," Schwartz said. "The technology has outpaced the ability of the regulatory system to evolve."

The SolarCity energy storage batteries use the same technology as those found in Tesla electric vehicles. Tesla CEO Elon Musk is chairman of SolarCity.

Tesla announced last week that it had signed a formal agreement with Panasonic Corp. to build a large-scale battery manufacturing plant, dubbed the "Gigafactory." That factory would make batteries for Tesla, SolarCity and others that wanted to buy the product.

"The Gigafactory has been characterized as a game changer," Schwartz said.