

Solar overtakes wind in Calif.

Daniel Cusick, Environment & Energy Publishing, 4-29-16

Utility-scale solar surpassed wind power generation in California last year for the first time, marking an evolution in the state's clean energy sector.

Data from the California Independent System Operator (CAISO) analyzed by the consulting firm Vaisala showed that from 2011 to 2015, grid-connected utility-scale solar saw a fifteenfold increase in consumption, from roughly 1,000 gigawatt-hours to 15,592 GWh.

Solar energy now constitutes 6.7 percent of the CAISO's systemwide generation, compared to 5.3 percent coming from wind energy, according to Vaisala's analysis.

"Today the state is still one of the largest U.S. wind markets in terms of capacity, but the exponential growth of large-scale solar in recent years has considerably altered the structure of the regional energy market," Vaisala said.

A spokesman for CAISO, which governs electricity markets across 80 percent of California, said he could not confirm Vaisala's solar consumption figures. He did say that solar power capacity in the state now exceeds wind power capacity, and that the shift happened fairly recently.

"Yes, it is ticking up considerably," Steven Greenlee, the CAISO spokesman, said of the state's solar capacity, which accounts for the amount of power that can be delivered to the grid -- not actual power generated or consumed.

Vaisala and CAISO both attributed solar's growth trajectory to California's renewable portfolio standard, which requires the state to generate half of its retail power from renewable energy sources by 2030. Since adopting its RPS in 2002, California has continued to raise the bar on renewable energy generation, with the latest reforms coming last year as solar installations soared in the state.

California was the first state to surpass 10 gigawatts of utility-scale solar, a milestone reached early last year, and it currently claims roughly 13.4 GW of total installed capacity, accounting for residential, commercial and utility-scale projects, according to the Solar Energy Industries Association.

According to the Smart Electric Power Alliance, four of the nation's top five solar utilities in 2015 were in California. They are Southern California Edison (1,258 megawatts), Pacific Gas and Electric Co. (787 MW), San Diego Gas & Electric (441 MW), and the Los Angeles Department of Water and Power (247 MW).

Storm clouds disturb generation

Commercial wind energy, which drew utility interest in California as far back as the early 1980s, also remains a major resource, with 5,662 MW of capacity, according to the American Wind Energy Association. But there is little question that solar growth has outpaced wind energy in California over the last several years, and that trend is expected to continue over the next two decades.

Beyond allowing California to provide increasingly large amounts of power from carbon-free resources, utilities have also benefited from steeply falling costs for solar cells and modules, as well as advances in technology that allow for the smooth transfer of solar power to the grid.

"However, as solar capacity has grown, so too has the effect of its variability on the market," Vaisala noted. "As supply rises and falls, system volatility increases, influencing prices."

To minimize volatility, Vaisala said, California regulators and utilities "must be able to anticipate these supply swings and respond accordingly," including through the use of more accurate solar forecasting, particularly for the day-ahead market.

Greenlee agreed, saying CAISO's own analyses suggest that the state's grid will have difficulty absorbing the additional renewable energy expected to come onto the system by 2030. "Most of the concerns are around congestion, but intermittency is also an issue," he said.

He noted that regulators have observed in the recent past "monsoonal clouds" blowing in from the Pacific Ocean across large operating solar plants, resulting in a generation drop of greater than 1,000 MW within 30 minutes.

"With all of that variability, we've got some issues and challenges ahead of us, and we're dedicating quality time and staff to it," he said. "Our stakeholder utilities are right in lockstep with us, and we believe, with our collective minds and expertise, we'll be able to solve it."