Feb 3, 2022
by Darrell Proctor

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CAISO Plan Calls for $30.5 Billion for Transmission—and More Renewable Energy

California's power grid continues to evolve and will look much different by 2040, according to a 20-year draft transmission plan released by the California Independent System Operator (CAISO). The plan calls for significant additional renewable energy resources, along with a $30.5-billion build-out of the transmission grid.

The outlook, developed by the grid operator along with the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC), provides details about how the state will meet increased demand for electricity. The plan said the state will need about 120 GW of new power generation

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resources added to the CAISO system by 2040, including energy storage, utility-scale solar, offshore wind, and imports of clean energy from other states.

“There is a critical need for more proactive, long-term transmission planning and coordination,” said Elliot Mainzer, CAISO president and CEO, in a statement released Feb. 1. “In developing the 20-year Outlook, we have worked closely with the California Energy Commission (CEC), California Public Utilities Commission (CPUC) and a diverse group of stakeholders to begin delineating the long-term architecture of the California grid and better align power and transmission planning, resource procurement and interconnection queuing. This type of forward-looking planning and coordination is essential to meeting the state’s energy policy goals in a reliable and cost-effective fashion and strengthening interconnections with our partners across the West.”

Pacific Gas & Electric (PG&E), the state’s largest utility, also this week released a plan to add nine new battery energy storage system (BESS) projects, totaling about 1.6 GW of capacity, to its generation fleet, as part of a directive for clean energy procurement issued by the CPUC last year.

Clean Energy Goals

California wants to supply all of its electric retail sales with renewable and zero-carbon resources by 2045. The state already is a leader in the electrification of transportation, and is rapidly building new installations of renewable energy and energy storage. In drafting a 20-year plan, CAISO acknowledged the need to add transmission lines and more connections to out-of-state grids. CAISO historically has had a 10-year transmission planning process, but said it recognizes securing rights-of-way and permits for transmission projects requires longer lead times, and produced a 20-year plan for the first time.

The outlook said CAISO, the CPUC and the CEC looked at what generation resources would be needed to meet the state's 2045 climate goals. It called that a "starting point." The groups then looked at CAISO's peak load forecast for 2040, and subtracted its forecast of behind-the-meter resources. The groups also considered the likely reduction of about 15 GW of natural gas-fired power generation that is expected to be retired over the next few years.

That formula resulted in projections calling for about 53 GW of utility-scale solar, 37 GW of battery energy storage, 24 GW of wind power generation, 4 GW of long-duration energy storage, and 2 GW of geothermal energy. CAISO mapped the resources on a regional basis to identify areas that will need to build additional transmission, with new lines and systems upgrades pegged at about $30.5 billion.

"California is working very diligently to ensure resource adequacy during this transition to a carbon-free system," Mainzer said. "Last year, the state brought 79 clean-energy projects onto the grid, the most it has ever added in a single year. This improved transmission planning and coordination with regulatory agencies and other partners will help ensure that California can sustain and even exceed that pace and meet the challenge of achieving a reliable clean-energy grid."

CAISO also developed a 10-year transmission plan along with the 20-year plan, with the shorter time frame recommending $2.9 billion of investment in projects to support grid reliability and add renewable energy. The grid operator's board could approve that plan as soon as next month, which would enable those projects to begin later this year.

Battery Energy Storage Projects

Pacific Gas & Electric (PG&E) earlier this week released details about nine new battery energy storage projects, with a total 1,600 MW of capacity, that the utility said would help further integrate renewable energy resources and improve the reliability of California's power grid.

The projects are the result of a competitive request for offers, or RFO, that the utility launched after a directive from the CPUC in June 2021. The CPUC ordered all the state's load-serving entities, including investor-owned utilities such as PG&E, to procure a cumulative 11.5 GW of new electricity resources over the next few years.

That output, scheduled to come online between 2023 and 2026, would support the state's goal to reduce greenhouse gas emissions. It also would help replace electricity generation that will be lost by the expected retirement of PG&E's 2,300-MW Diablo Canyon nuclear power plant, and by the closure of natural gas-fired power plants in California.

The CPUC's directive outlines a plan to deliver new power in phases, with at least 2,000 MW online by Aug. 1, 2023. Another 6,000 MW would enter service by June 1, 2024, with an additional 1,500 MW coming online by June 1, 2025, and then another 2,000 MW entering operation by June 1, 2026.

PG&E's nine projects, if approved by the CPUC, would bring the utility's total battery energy storage capacity to more than 3,330 MW by 2024.

"As we work year-round to strengthen our electric system, we are also planning, engineering and building the grid for a future that harnesses the power of solar plus storage on an unprecedented scale. We are committed to safely delivering reliable and clean energy in a way that achieves the greatest value for our customers. And we know we can't go it alone. We welcome continued partnerships with the best and the brightest to make California's clean energy future a reality," said Joe Bentley, PG&E senior vice president, electric engineering, in a statement.

Electricity and Ancillary Services

The new battery energy storage systems will participate in the CAISO markets, providing electricity along with ancillary services, including providing an operating reserve to help meet demand on the state's grid.

PG&E currently has more than 600 MW of battery energy storage capacity connected to California's grid including:

- 400-MW Vistra Moss Landing Battery Energy Storage Facility in Monterey County, commissioned August 2021
- 63-MW NextEra Blythe BESS located in Riverside County, commissioned August 2021
- 50-MW Gateway BESS located in San Diego, commissioned July 2021

PG&E said it expects another 1,100 MW of storage capacity to come online in 2022 and 2023. The nine projects announced Monday each feature lithium-ion battery energy storage technology, and also have a four-hour discharge duration. The projects include:

- Beaumont ESS I, LLC (a wholly owned subsidiary of Terra-Gen, LLC)—The Beaumont Energy Storage project is a 100-MW stand-alone, transmission-connected battery energy storage resource located in Beaumont, Calif. (Riverside County) and scheduled to be online by August 2023.
- Sanborn ESS I, LLC (a wholly owned subsidiary of Terra-Gen, LLC)—The Edwards Sanborn Energy Storage project is a 169-MW stand-alone, transmission-connected battery energy storage resource located in Mojave, Calif. (Kern County) and scheduled to be online by August 2023.
- Canyon Country ESS I, LLC (a wholly owned subsidiary of Terra-Gen, LLC)—The Canyon Country Energy Storage project is an 80-MW stand-alone, transmission-connected battery energy storage resource located in Santa Clarita, Calif. (Los Angeles County) and scheduled to be online by October 2023.
- Moss Landing Energy Storage 3, LLC (a wholly owned subsidiary of Vistra Corp.)—The MOSS350 Energy Storage project is a 350-MW stand-alone, transmission-connected battery energy storage resource located in Moss Landing, Calif. (Monterey County) and scheduled to be online by August 2023.
- Poblano Energy Storage, LLC (a wholly owned subsidiary of Strata Clean Energy, LLC)—The Inland Empire Energy Storage project is a 100-MW stand-alone, transmission-connected battery energy storage resource located in Rialto, Calif. (San Bernardino County) and scheduled to be online by April 2024.
- NextEra Energy Resources Development, LLC (a wholly owned subsidiary of NextEra Energy Inc.)—The Corby Energy Storage project is a 125-MW stand-alone,

transmission-connected battery energy storage resource located in Vacaville, Calif. (Solano County) and scheduled to be online by June 2024.

- NextEra Energy Resources Development, LLC (a wholly owned subsidiary of NextEra Energy Inc.)—The Kola Energy Storage project is a 275-MW stand-alone, transmission-connected battery energy storage resource located in Tracy, Calif. (Alameda County) and scheduled to be online by June 2024.
- Nighthawk Energy Storage, LLC (an affiliate of Arevon Energy)—The Nighthawk Storage project is a 300-MW stand-alone, transmission-connected battery energy storage resource located in Poway, Calif. (San Diego County) and, pending required local approvals, is scheduled to be online by June 2024.
- Caballero CA Storage, LLC (a wholly owned subsidiary of Origis USA, LLC)—The Caballero Energy Storage project is a 99.7-MW stand-alone, transmission-connected battery energy storage resource located in Nipomo, Calif. (San Luis Obispo County) and scheduled to be online by June 2024.

*—**Darrell Proctor** is a senior associate editor for POWER (@POWERmagazine).*

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