Luanda energy storage for microgrids

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Long-duration energy storage (LDES) is best-suited for applications in which power is needed for longer time frames and when renewables or distributed energy resources aren’t producing power. And these technologies can bring added resiliency to microgrids, said Jana Gerber, president of Microgrid North America at Schneider Electric.

And in California, where wildfires are sparking outages and public safety power events, the California Energy Commission (CEC) is working with Indian Energy – a Native American-owned microgrid developer that focuses on government and tribal utility installations – to learn as much as possible about LDES technologies through a number of grants.

For outage-prone tribal communities, LDES could play an important role. A major goal for these communities is becoming energy resilient through the deployment of microgrids and renewable energy. They’re also looking to take control of their energy future and lower their energy costs.

LDES technologies are capable of storing electricity for more than 10 hours, while the more common utility-scale lithium-ion batteries store between 1.7 hours and 4 hours of electricity, according to the U.S. Department of Energy (DOE).

Options for LDES include chemical, thermal and electrochemical technologies. Most LDES technologies are scalable, have modular designs and use relatively inexpensive and abundant materials. They’re also less likely than lithium ion to catch fire.

Providers of LDES are working to lower the levelized cost of the technologies as much as possible, with the DOE targeting a levelized cost of $50/MWh. Larry Zulch, CEO of Invinity Energy Systems, which provides vanadium flow batteries, said its batteries’ levelized costs are now below $100/MWh. And ESS, which provides iron flow batteries, expects that by 2030, the levelized cost of its batteries will drop below $200/MWh, said Hugh McDermott, senior vice president of business development and sales at ESS.

Recently, the CEC funded the use of 18 Invinity vanadium flow batteries, with a capacity of 4 MWh total, in a solar microgrid project for the Rincon Band of Luiseño Indians at the Rincon Reservation near Valley Center, California. The batteries, to be installed by PowerFlex near a new 1-MW expansion to an existing photovoltaic array, will be used to store excess solar that can be discharged to provide power during the day or night.

Jan Petrenko, Invinity’s regional manager for North America, said the solar in the microgrid is .96 MW AC, which will be added to the 1 MW now deployed on the reservation. Without the use of diesel or other fuels, the microgrid can be islanded for up to 10 hours. The facility will provide grid services to San Diego

Gas & Electric, reducing demand charges on the reservation’s monthly bill, she said.

Meanwhile, Marine Corps Air Station Miramar’s Rapid Integration and Commercialization Unit (RICU) is testing how advanced LDES technologies can be incorporated into utility-scale microgrids. The effort is a collaboration between Indian Energy, the CEC and the Department of Defense. A second phase of the research was funded in May by the CEC through a $4.85 million agreement between the CEC and Indian Energy, according to a press release from ESS, which is participating in the project.

In addition to the ESS battery, the LDES technologies being studied at RICU include the vanadium battery, an EOS zinc-based aqueous liquid battery, and supercapacitor and flywheels from Amber Kinetics, said Craig Reiter, general manager and chief sustainability officer at Maada’oozh, a Native American-owned energy and environmental company participating in the project.

The studies may lead to deployment of more than one LDES technology at a site because different technologies provide different opportunities to supply power, he said.

In addition to the CEC, the U.S. DOE is supporting LDES projects. The DOE’s Loan Programs Office has made a conditional commitment to provide a $72.8 million partial loan guarantee for the development of a solar plus LDES microgrid for the Viejas Band of the Kumeyaay Indians. Being built is a 10-MWh Invinity flow battery system, funded as part of a $31 million grant for Indian Energy to supply 100% renewable backup power and sustain critical operations for the tribe.