Beacon of Light: Solar Plant Shines in Mojave Desert

First Grid-Scale Battery Gets Connected at Solar Facility

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LADWP’s first utility-scale solar-plus-battery system is shining brightly in the Mojave Desert. As the Beacon Solar Plant converts the sun’s rays to 250 megawatts (MW) of solar power for Los Angeles, the Beacon Battery Energy Storage System (BESS) is working in tandem to ensure a reliable flow of this clean, sustainable energy resource to the city’s residents and businesses.

Steve Taylor, Sr. Electrical Craft Helper, works on solar array. (Photo by Chris Corsmeier)

The Beacon Solar Plant, located just north of Cantil, Calif., is a state-of-the art solar power facility featuring 903,434 panels on single-axis trackers that follow the sun in the early morning and late afternoon hours for maximum operational efficiency. When operating at full capacity, Beacon produces enough renewable solar energy to serve 102,667 Los Angeles homes, and offset emissions of about 313,311 metric tons of CO2 annually from fossil fuel power plants. That amount of avoided greenhouse gas emissions is like removing 67,117 gas-fueled vehicles from highway every year. The plant was fully energized in December 2017.

Beacon Battery Fast-Tracked

The Beacon BESS, which was fast-tracked and commissioned in October 2018, is able to store over 20 MW of renewable energy, running at full power for 30 minutes. Its main function is to stabilize and regulate solar voltage levels, which fluctuate because of cloud cover, to smooth the interconnection with LADWP's nearby switching station and transmission highway. Essentially, this enhances the reliability of the solar power flowing to L.A. along the LADWP's Barren Ridge Renewable

Transmission Project (BRRTP) from the Mojave Desert to the terminus in Sylmar. From there the energy is distributed throughout the city. The BESS can also store up solar power for use later in the day to help meet peak demand.

“The Mojave Desert averages 260 days a year of sunshine, but the sun doesn’t shine all day. We need to provide reliable, affordable electricity to our customers 24/7/365,” said Reiko Kerr, Senior Assistant General Manager of Power System Engineering, Planning and Technical Services. “The Beacon BESS helps keep the power on sustainably and cleanly, working in tandem with the Beacon Solar Power Plant and our ever growing portfolio of grid-scale renewables projects to maintain capacity.”

The Beacon BESS now stabilizes and stores energy from Beacon Solar Plant in the Mojave Desert. (Photo by Chris Corsmeier)

In addition to Beacon, LADWP has power purchase agreements for solar generated by the 260 MW Springbok Solar Projects 1 and 2, and the 60 MW RE Cinco Solar Project, all completed in 2016. Construction is underway on a third phase of Springbok, which will generate 90 MW when completed in early 2019. Adding to the

robust renewable resources, LADWP continues to own and operate its 135 MW Pine Tree Wind Farm and 8.5 MW Pine Tree Solar Plant in the nearby Tehachapi Mountains.

Andrew C. Kendall, Senior Assistant General Manager of Power System Construction, Maintenance and Operations, praised LADWP crews for designing and constructing all of the electrical infrastructure work on time and within budget. “We worked closely with the developers to get the interconnections done and successfully complete test phases with the Energy Control Center to bring this solar power smoothly into our system,” Kendall said.

Reliability Challenge

As LADWP seeks to bring more renewable energy onto the electrical grid, one of the hottest issues is how to continue providing reliable electric service to customers, especially during late afternoon and early evening when energy use rises and darkness falls.

> ***Renewable Energy Rising:***
> *LADWP is on track to meet the next state legislated renewable portfolio standard (RPS) targets of 33 percent by 2020 and 60 percent by 2030. Looking forward, LADWP is studying raising that target further—to 70 percent by 2036—under the Department’s accelerated greenhouse gas reduction plan.*

“We bring electricity to our customers 24/7. Solar obviously gathers energy during the daylight only. That means we have to put something in place that helps close the gap, especially during those peak hours,” said Tom Honles, Manager of Major Solar Transmission and Distribution Projects. “That’s why we’re looking at energy storage.”

Typically, the gap created when solar panels stop producing power as the sun sets, and energy demand peaks beginning in late afternoon, is mostly bridged by efficient use of natural gas fuel at LADWP’s in-basin generating stations. These natural gas generators are designed to provide “dispatchable” power that can ramp up quickly and maintain reliability.

However, as LADWP works to reduce fossil fuel power, the Department is developing new battery energy storage projects to offset the need for natural gas generation. Whenever a large amount of solar energy is placed on the grid, the natural fluctuations of solar can create issues with grid electrical stability.

Siting the BESS next to the Beacon Solar Plant helps address those issues in three ways, Honles said. “First, the BESS is a powerful means of keeping the electrical frequency steady, and complying with standards set by the federal government. Second, it will store energy, so we can put that solar onto our grid when the sun is not shining. Third, it will help us to control voltage levels on the transmission lines connecting the solar facilities to Los Angeles, increasing reliability,” Honles said.

The Beacon BESS will help LADWP meet its target of 178 MW of new energy storage by 2021, as set forth in AB 2514, which allows local governing bodies, such as the Los Angeles City Council and the Board of Water and Power Commissioners, to establish energy storage targets for their public power utility.

(Photo by Chris Corsmeier)