



CASE STUDY

PSE&G Wastewater Treatment Plant: Storm-Resistant Microgrid

Eos EnergyBlock system with Znyth™ 2.0 battery technology anchors solar + storage + diesel generation microgrid in Caldwell, New Jersey

On October 29, 2012, Superstorm Sandy struck the New Jersey coast and left over two million households without power. In 2013, the New Jersey Board of Public Utilities approved an extension to its existing Solar 4 All® initiative, encouraging investment in additional solar capacity and pilot programs for storm hardening and grid resiliency.

As part of this effort, Public Service Electric and Gas Company (PSE&G) identified a wastewater treatment plant in the Borough of Caldwell, N.J. as an ideal site for a solar-plus-storage project. A critical municipal infrastructure, it must be kept running even during extended power outages resulting from severe weather.

An ideal application of a breakthrough battery

The Eos EnergyBlock clean energy storage system was selected on the basis of its safe, scalable, efficient, and sustainable design and its optimization for 3- to 12-hour discharge applications. The EnergyBlock uses the company's proprietary Znyth aqueous zinc battery, the market's only performance- and price-competitive alternative to lithium ion technology. The Caldwell project represented Eos Energy Enterprise's first grid-connected deployment and incorporated four EnergyBlock systems totalling 576 Znyth 2.0 batteries in 48 strings. The completed installation is able to deliver 300 kW of power and 1200 kWh of energy.

Delivering local reliability and resiliency in emergency situations

Construction of the complete solar-plus-storage project was a joint effort between Eos, Advanced Solar Products, who designed and installed the 2,682 panel, 896 kW, DC solar PV system, and Siemens Energy Management, who integrated the EnergyBlock and solar systems with an existing diesel generator and provided the intelligent control technology to monitor, manage, and distribute power.

In the event of an extended power outage, the solar and EnergyBlock systems work in conjunction with the treatment plant's diesel generators to create a local microgrid. Disconnected from the primary grid, it operates autonomously, switching between the available sources as conditions warrant. The solar panels recharge each EnergyBlock and help power the wastewater treatment plant during the day; the EnergyBlocks keep the >>



Project highlights

- + 300 kW | 1.2 MWh Eos EnergyBlock system made up of 576 Znyth batteries
- + 896 kW-DC solar system made up of 2,682 panels
- + Provides wastewater plant with 10 days of backup generation when grid is down
- + Generates revenues from solar power and frequency regulation when grid is up and running

facility running at night. Together they reduce the load and fuel consumption of the diesel generator, allowing the Caldwell plant to operate for as long as 10 days without primary grid power.

“PSE&G has taken a number of major steps during the past several years to both harden our electric grid in the face of major storms and also make it more resilient,” said Courtney McCormick, vice president renewables and energy solutions, PSE&G. “The Caldwell wastewater treatment plant and our other solar storage projects around the state are an important part of that work because they all demonstrate how well-suited solar storage is for ensuring the reliability and resiliency of critical pieces of infrastructure.”

Enhancing service revenue and safety on a regular basis

During normal operation, the Caldwell site enables PSE&G to generate and deliver solar-generated electricity directly to the grid, powering about 165 homes annually. The accompanying EnergyBlock storage system provides opportunities to participate in peak shaving and fast response frequency regulation in the PJM wholesale market. Sophisticated control systems and algorithms configure different electrical orientations with the grid and the real-time market. And, should there be an outage, they activate an automatic transfer switch (ATS) to disconnect the Caldwell system from the grid and isolate the circuit to prevent feedback and mitigate safety hazards for utility linemen.

A positive impact on the community and the industry

- + Maintaining plant operations during long outages prevents ecological hazards from wastewater spilling into local waterways.
- + Generating solar power for 165 homes annually reduces CO2 emissions by more than one million pounds, equivalent to removing more than 200,000 cars from the road.
- + Building of the site provided high-quality jobs for the local construction industry.
- + Operating results prove the value of solar-plus-storage in grid mix, support the growth and development of solar and related industries in New Jersey.

Validated System Performance¹

Metric	Max	Min	Average
Primary Power	307.61 kW	169.52 kW	280.50 kW
Primary Discharge Duration	6.23 hr	2.69 hr	3.56 hr
Secondary Power	85.82 kW	30.78 kW	65.04 kW
Secondary Discharge Duration	5.97 hr	2.03 hr	4.19 hr
Temperature	34 °C	5.8 °C	20.27 °C
RTE	78.30%	75.60%	77.00%

1. Performance metrics per cycles analyzed by Black & Veatch in the Eos Battery System Technical Review.

“Increasingly, we are deploying batteries as an add-on to solar not only because they provide critical power reliability when needed but also because they can generate revenues when the grid is up and running.”

Lyle Rawlings, CEO
Advanced Solar Products



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