



TIP 260: A Modular and Dispatchable Battery Storage System

Context

A confluence of industry drivers -- including substantial penetration of renewable generation in the Pacific Northwest, the high capital cost of managing grid peak demands, and large capital investments in grid infrastructure for reliability -- is creating new interest in electric energy storage systems. However, despite the well-known potential benefits of energy storage, very few grid-integrated storage installations are in operation in the United States.

BPA is likely to face additional, significant balancing reserve demands within the next few years due to Balancing Authority obligations to integrate increasing amounts of variable energy. There may also be long-term issues with relying exclusively on the hydro system to provide balancing services. The use of modular, transportable, battery storage systems, which BPA and/or other parties, such as BPA's customer utilities, could quickly permit and deploy, would allow the region to better use and balance variable energy production.

In addition, energy storage may provide BPA and its customer utilities with opportunities to avoid or to defer contested and/or costly infrastructure investments.

Description

Powin Energy is working with BPA, Energy Northwest, City of Richland, and Pacific Northwest National Laboratory (PNNL) to test an energy storage system that potentially has a more efficient and economical power converter system than any other currently available in the industry. The energy storage system is being subjected to real-world trials. The focus of the project is using demand response to address the particular issues being faced by BPA and the Pacific Northwest region. Those challenges include operational reserve and capacity constraints caused by increased wind integration, Federal Columbia River Power System management, and transmission expansion challenges.

The energy storage system that will be deployed, tested, and evaluated will comprise one real 120kW/500kWh storage unit and multiple 120kW/500kWh computer-simulated-storage units. Together, this approach will simulate a utility- scale battery storage system. This system uses a real battery storage system that can potentially be scaled, readily built and deployed anywhere in the United States.

Participants will gain hands-on experience with the system, collect actual operating data to validate performance, costs and benefits, and reduce testing costs with use of simulated units.

Why It Matters

Over the next several years, the Pacific Northwest needs to find additional ways to help integrate more variable renewable generation and to better use energy produced during low-load hours. As part of the solution, energy storage systems may also be used by BPA and its customer utilities to avoid or to defer contested and/or costly infrastructure investments. For this to become a reality, the region must learn how to develop energy storage systems that provide maximum benefits at a competitive cost.

Goals and Objectives

This project will result in a fully tested and fully mission-proven modular, dispatchable battery energy storage system that can be deployed by BPA and its utility customers to help meet the energy challenges facing utilities in the Pacific Northwest.

Deliverables

Test Data and Evaluation Report of the following:

- Phase 1: Qualification Testing at BPA's Vancouver Test Facility
- Phase 2: Testing at Energy Northwest's Nine Canyon Wind Facility
- Phase 3: Testing at a City of Richland Substation Facility -
- Phase 4: Testing at a PNNL Solar Facility

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Project Start Date: October 1, 2012

Project End Date: September 26, 2014

Reports & References (Optional)

Links (Optional)

Participating Organizations

Powin Energy

PNNL

Energy Northwest

Ideal Power Converters

PowerWise New Energy Company

Shandong RealForce Enterprises Company

GDH

Funding

Total Project Cost: \$ 769,190

BPA Share: \$ 249,210

External Share: \$ 519,980

BPA FY2014 Budget: \$ 120,000

For More Information Contact:

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