Making Great Strides in Energy Storage

First system has been just been energized

Three years after the PUD embarked on an industry-leading effort to transform the energy storage market, its first system has been energized and run through initial testing.

The components, including a 40-foot structure resembling a shipping container that houses an array of batteries, were installed in December at the Hardeson Substation in Southwest Everett.

“It was great to see that the equipment had been manufactured,” said PUD Project Manager Jason Zyskowski, who flew to North Carolina in November with PUD Principal Electrical Engineer Bob Anderson for a factory acceptance test of the battery energy storage system. “Now to see the site construction being completed, and the container sitting on the concrete slab, is really great.”

In December, two crews attached equipment to newly constructed foundations inside the substation,

(continued)
pulling power cables, communication cables and fiber optic cables between the various pieces of equipment. Those include the container, the power conversion system, a disconnect switch, step-up transformer and the controls cabinet.

Representatives from manufacturer Parker Hannifin were on site for the commissioning of the system. That marked the first time the system was energized.

In January, the controls are being run through their paces, Jason said, with different operating modes tested.

“Then we’ll be able to really use the system,” Jason said. PUD power schedulers will be able to dispatch power to and from the system, having it charge and discharge.

That’s the primary function of an energy storage system, to give power schedulers another, often more cost-effective option for dispatching power when needed, and another place to send some surplus power when market prices are deemed too low.

To fully realize the benefits of those dynamics, of course, the system will need to be scaled up.

Doing that in an economical way is a key goal of the MESA project. MESA stands for Modular Energy Storage Architecture – a system developed by Seattle-based 1Energy Systems in coordination with the PUD and other partners. The idea is to create standardized electrical and communication systems to connect the components of an energy storage system.

Creating such standards makes the MESA project revolutionary. Rather than having different manufacturers building expensive components to their own proprietary specifications, common standards will transform the market by creating economies of scale for battery, inverter and software providers, as well as affordable, off-the-shelf choices for utilities of any size – along with scalability.

That, in turn, will allow for more effective integration of renewable energy sources such as wind, which can’t produce power all the time.

That’s why the PUD is leading this effort. The Board of Commissioners has directed that the utility meet load growth first through cost-effective conservation. After that, additional power supply needs are to come from a diverse portfolio of clean, renewable sources.

Integrating intermittent sources into the power system efficiently is a challenge. After all, the wind isn’t always blowing and the sun isn’t always shining. Energy storage is a big part of the solution.

At the Hardeson Substation, it has taken a big step forward. But there’s more to come. The first battery array is a lithium-ion system from Mitsubishi International and GS Yuasa. This summer, a second lithium-ion array is scheduled for installation at Hardeson, this one from LG Chem. Later in the year, a different kind of battery system, vanadium flow, from Mukilteo-based UniEnergy Technologies is scheduled to go online at the Everett Substation.

That illustrates the modular, plug-and-play nature of the MESA project: The architecture is designed to work with different types of batteries and other components. PUD General Manager Steve Klein compares it to the evolution of personal computers, which saw expensive, proprietary hardware and software options give way to an endless variety of affordable components that work with any manufacturer’s computer.

This exciting work has been a true team effort for the PUD and its partners, Jason emphasized, involving key contributions from the Smart Grid Group, System Planning and Protection, Communications, IT, Environmental Affairs, Power Scheduling, Facilities, Safety, Substation Engineering and Substation Construction. Professional Engineer Jake Dahl was responsible for the site design and construction.

Great job, everyone. Your hard work is about to come to fruition. Let the market transformation begin!