Quarterly Update

Pacific Northwest SMART GRID DEMONSTRATION PROJECT

Winter 2012

Smart grid takes on wind and solar

Bring on the wind, the solar and some new jobs. Lots of action is happening with the Pacific Northwest Smart Grid Demonstration Project at a high level, as well as in the communities served by participating utilities.

Our region's installation of renewable energy resources is growing – especially in the form of large wind farms. One of the project's key objectives is to help our power system deal with more renewable energy from these sources. Some renewable energy resources are installed at the local level.

I witnessed the local impact of our activities first hand a couple of weeks ago, when a drive from Richland, Wash. to Seattle took me past the City of Ellensburg's Renewables Park, with its newly-erected wind turbines. Ellensburg is one of 11 utility participants in our project and their progress was exciting to see.

Together with project participants such as Ellensburg, we are testing how a deployed smart grid could help integrate this often intermittent source of energy.

So in honor of all the excellent work at the utility level, we're focusing on one of the shining examples in a small town in Washington. It's a project that is not only helping the community, but helping the overall project to meet an important operational objective.

Ronald B. Melton, PhD
Project Director

What's inside

Project Objectives and Attributes

Primary Objectives:

- Develop and validate an interoperable distributed communication and control infrastructure using transactive control signals;
- Measure and validate smart grid costs and benefits;
- Contribute to the development of standards and transactive control; and
- Apply smart grid capabilities to support the integration of renewable resources.

Operational Objectives:

- Manage peak demand;
- Facilitate wind integration;
- Address constrained resources;
- Improve system reliability;
- Improve system efficiency; and
- Select economical resources.

Key Attributes:

- Leave an installed operational base of smart grid assets and successful operational strategies for the region.
- Stimulate the regional and national economy by creating jobs and a vibrant smart grid industry.

Renewables bring local benefit and help meet regional goals

The City of Ellensburg boasts "big city amenities and small town charm," as well as more than 300 days of sunshine each year. It would appear that this tendency for the City to be progressive, as well as good natured, is melding nicely with its blue skies in a project that is bringing solar power to a special park in the heart of the City.

The Ellensburg Renewables Park includes three green acres of earth-friendly features where folks can stroll through the latest technologies in renewable energy while they take in a ball game or walk the dog.

The park currently has 111 kilowatts of solar panels, with 30 additional kilowatts of concentrating solar dishes planned for this year. The park, which also includes small wind systems and a meteorological tower, is part of the Pacific Northwest Smart Grid Demonstration Project.

The meteorological tower will be 100 ft. tall – this will enable Ellensburg to measure wind speeds at each of the nine turbine heights. To that end, the tower will have several anemometers in addition to a hygrometer for measuring humidity, a thermometer for measuring air temperature and a pyranometer for measuring the amount of sunlight.

They plan to produce a total of 256,000 kilowatt hours per year; enough energy to power 45 homes.

"We want to show our customers what options they have to put renewable resources in their homes," says Energy Services Executive Assistant Beth Leader. "And customers can decide if they want these types of technologies in their homes. This also will be a good learning tool for schools and universities."

Customers also can participate in renewable energy programs by making contributions and getting rebates on their bills, so they enjoy the green benefits without having to make personal investments. The utility is looking for contributions from utility customers to help provide the matching half of the PNW-SGDP grant. A customer that contributes $1,000 will save approximately $140 on their utility bill per-year, combining the utility energy credits and State solar production incentive.

The City of Ellensburg was on track to implement the solar function of the Renewables Park before its involvement in the Pacific Northwest Smart Grid Demonstration Project, but participating in this regional effort added value to their local initiative by providing funds to bring on wind power.

Integrating variable renewable resources is a major focus, at a policy level, in the Pacific Northwest, and an operational objective of the PNW-SGDP. To that end, the regional project will leave behind installed assets, such as the wind turbines and solar panels in the City of Ellensburg, and it will test transactive control, a special signal that will provide two-way communication and coordination for all of the assets that are part of the demonstration throughout the five-state region.

All aspects of the system, from the generation of energy (such as power the wind turbines will produce) to its consumption in homes, businesses and educational facilities, will be connected and interactive.

One of the goals of this two-way communication is to facilitate the integration of renewable energy.

For example, when the wind blows in the City of Ellensburg and fires up the wind turbines, the project's regional signal will encourage the use of that energy through a theoretical reduction in its cost.

"Using the wind integration example, assets will respond to improve the consumption of wind energy when and where it is available," says the Principal Investigator for the project, Don Hammerstrom. "The two-way signal will discourage other generation resources, or even increase load (energy consumption), at times that wind energy is increasing. Then when the wind decreases, the signal will encourage other generation resources or even curtail load."

Ellensburg's new meteorological tower will help provide inputs to the signal in the form of wind speed and duration. The PNW-SGDP also is using wind forecasting services from technology partner 3TIER, and wind generation data from the Bonneville Power Administration.

The project also has helped create jobs for electricians, construction workers and contractors in the City of Ellensburg, an important consideration during these tough economic times.

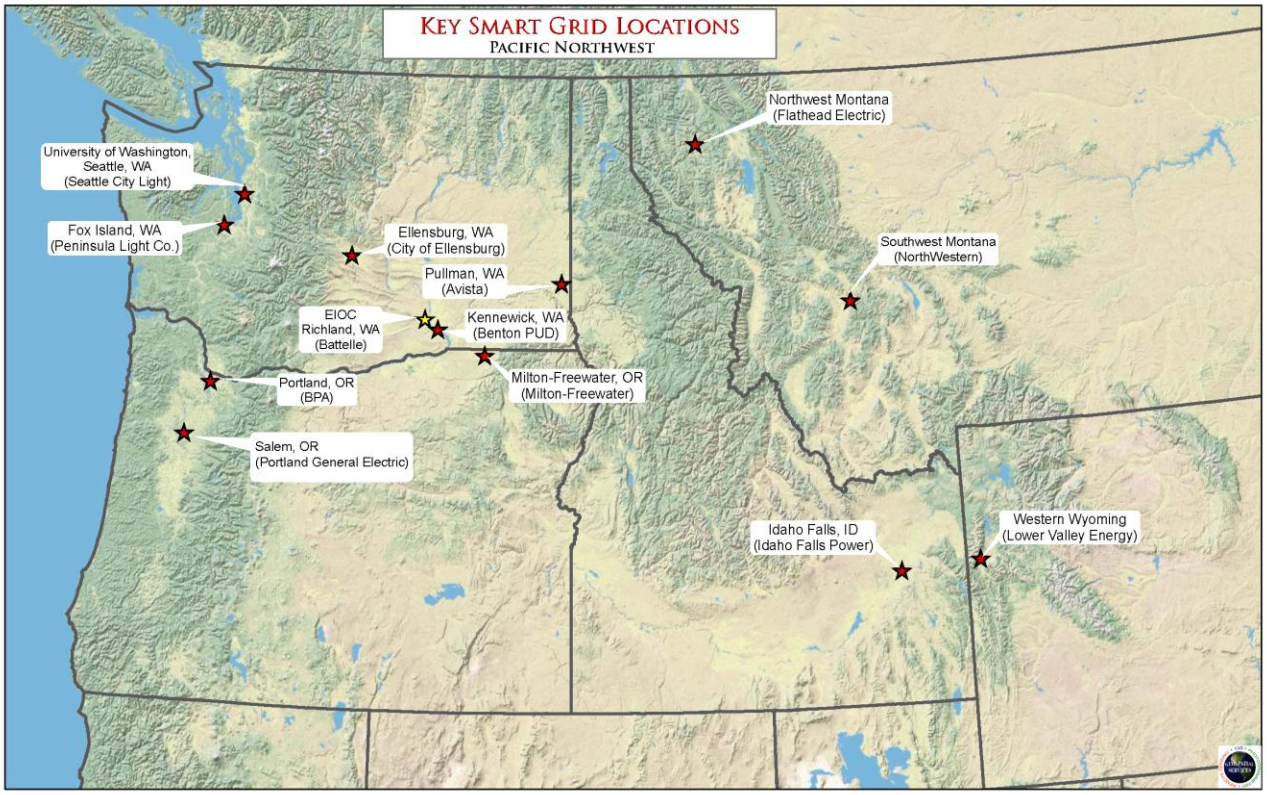
PNW-SGDP leaders are working to determine exactly how many jobs the project is creating around the region, but for now, anecdotal reports from participating utilities show that dozens of jobs are being created as utilities deploy assets and build infrastructure.

For detailed information about the project's signal, see the 2011 Winter Issue of the Pacific Northwest Smart Grid Demonstration Project quarterly update. Here is the link: http://www.pnwsmartgrid.org/docs/newsletter_Winter2011.pdf

For more information on how the PNW-SGDP is helping to provide jobs in the Pacific Northwest, check out a recent U.S. Department of Energy web article. Here is the link: http://energy.gov/articles/smart-grid-technology-gives-small-business-new-light

Outreach calendar:

- Jan. 16 – Project leaders presented at the Institute of Electrical and Electronic Engineers Power and Energy Society Innovative Smart Grid Technology conference, Washington D.C.
- Feb. 22 – Project leader will guest lecture at Evergreen State College, Olympia, Wash.



Project description

The Pacific Northwest Smart Grid Demonstration Project is a regional endeavor funded by the Department of Energy under the American Recovery and Reinvestment Act of 2009. The goal is to verify the viability of smart grid technology and quantify smart grid costs and benefits. This information will help validate new smart grid business models at a scale that can be adapted and replicated nationally.

With the 50 percent DOE matching funds, this project has a $178 million budget. To date, the project has spent $59 million.

Smart grid can help meet increasing power demands, reduce greenhouse gas emissions, promote energy independence, enhance reliability and help improve national security. It is a system that uses technology to enhance power delivery and use through intelligent two-way communication. Power generators, suppliers and users are all part of the equation.

With increased communication and information, smart grid can monitor activities in real time, exchange data about supply and demand and adjust power use to changing load requirements. Smart grid technology includes everything from interactive appliances in homes to substation automation and sensors on transmission lines.

The regional project, the largest smart grid demonstration project in the nation, is led by Battelle Memorial Institute, Pacific Northwest Division. Participants include the Bonneville Power Administration, utilities, universities and infrastructure partners. It includes 112 megawatts of responsive resources and will last for five years.