

PNW-SGDP Newsletter

March-April 2015



Project Director's Update: PNW-SGDP final report coming together



It's the one major remaining task for the Pacific Northwest Smart Grid Demonstration Project (PNW-SGDP) and it's a heavy lift—literally and figuratively. We expect the project's Technology Performance Report (TPR)—the deliverable to the U.S. Department of Energy that conveys PNW-

SGDP outcomes—will tip the scales at around 1,000 pages. The document will contain project summaries, analysis and overall results, and serve not only as a record of the grid demo, but as a roadmap for future regional and national smart grid endeavors.

Battelle's **Don Hammerstrom**, the demo project's Principal Investigator, is leading the TPR effort for us, with able assistance from colleagues here in Richland and, of course, PNW-SGDP partners. Draft chapters have been completed for much of the document, with reviews under way. Our goal is to have a complete draft largely assembled in late March or early April. We'll fine-tune the draft and then finalize the document later this year, in the May-June timeframe. Don and his team are doing a great job of handling a complex task and moving the TPR toward completion.

As I've witnessed the document coming together and have read early drafts, one take-away message for me is that the PNW-SGDP was an amazingly ambitious and multi-faceted experiment. The project developed and deployed the new technology of transactive control and enabled the utility participants to deploy smart grid technology for a variety of purposes. We experienced many successes and also realized some important lessons learned through not-so-successful outcomes. Importantly, the project

outcomes will help show utilities, governmental entities, policy-makers and others some of the most beneficial approaches for achieving a smart grid—and also identify current realities, such as technology readiness issues, that are slowing down smart grid progress and need more attention.

Along with informative outcomes, the grid demo will leave behind millions of dollars in infrastructure improvements, which will continue to enhance grid operations, the customer experience and energy efficiency in the region. Also, as mentioned earlier, the PNW-SGDP has certainly advanced transactive control technology—most notably by demonstrating that the transactive control signal can facilitate two-way communication between the grid and power-consuming equipment. Additionally, the project has helped foster a new level of collaboration among utilities and other grid entities, which will spur further Northwest smart grid development and implementation.

I hope this newsletter update provides you with a sense of how the project is progressing toward closeout and our final reporting activities. We'll continue to keep you posted. If you have any feedback about the newsletter or other aspects of the PNW-SGDP, I welcome your comments. Our website is at <http://www.pnwsmartgrid.org/>.

A handwritten signature in cursive script that reads "Ron".

Ronald B. Melton, Ph.D.
Project Director

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Regional Symposium will review project, look ahead to the future

Gathering set for April 1 in Spokane

An event that will recount Pacific Northwest Smart Grid Demonstration Project (PNW-SGDP) activities and experiences, celebrate the project's completion and cast a view toward future Northwest smart grid efforts, is set for April 1 at the Davenport Hotel in Spokane, Wash.

The PNW-SGDP Regional Symposium, a meeting for project participants, northwest utilities, lawmakers, regulatory organizations, energy groups and other stakeholder audiences, will feature speakers, panel sessions and displays that examine the five-year grid demonstration project and its outcomes. In addition, symposium activities will explore the demo's impact on future smart grid development in the region.

U.S. Senator **Maria Cantwell**, U.S. Representative **Cathy McMorris Rodgers**, Department of Energy Assistant Secretary **Patricia Hoffman**, Bonneville Power Administration Administrator **Elliot Mainzer**, incoming Pacific Northwest National Laboratory Director **Steven Ashby** and other dignitaries are scheduled to speak at the symposium.

“Essentially, this event is a program review that will provide a high-level look at some of the project's results. It will be an opportunity for us to share information with individuals and groups who have been following the grid demo and who are interested in what we have learned,” says PNW-SGDP Director **Ron Melton**. “More detailed information and analysis will come in the final Technology Performance Report (TPR) for DOE, which will be completed subsequent to the symposium.”

The one-day gathering will conclude with a special reception and dinner to recognize the demo project's participating utilities, technology partners and other contributors, as well as celebrate project completion. Many elements of the PNW-SGDP began winding down last August with the conclusion of the project

phase that focused on data collection from smart grid technologies tested in the demonstration. Since then, work has centered on data analysis and development of the TPR.

Idaho Falls customers express views on smart grid experiences

Survey yields info that will help improve future grid approaches

Results from Idaho Falls Power's recent survey on customer experiences in the Pacific Northwest Smart Grid Demonstration Project (PNW-SGDP) provide some key insights into consumer expectations and use of smart grid technologies.

As part of the demonstration project, IFP offered customer volunteers three technologies: in-home display units that primarily provided households with near real-time energy use data; load control switches that turned water heaters off during peak demand; and programmable home thermostats that allowed the utility to slightly adjust temperatures up or down to reduce peak system demand.



IFP installed 860 in-home displays, 220 load control switches and 42 programmable thermostats in Idaho Falls households. The utility provided and installed the devices free of charge, but did not offer other incentives for participation, such as a monthly credit or rebate.

The survey found that a large number (65 percent) of customer volunteers participated in the project because they wanted to reduce their power costs. Additional reasons for participation included the environmental and community benefits from decreased energy consumption, and the opportunity to use new technologies.

The survey also found:

- 60 percent of in-home display customers reported no change in their electricity consumption during the program; 35 percent said their usage was slightly lower, and seven percent said they used significantly less. The vast majority of participants indicated they checked their display units on a daily or weekly basis.
- More than one-third of the in-home display customers reported a positive experience and would like the program to expand; another 25 percent would like more information about any future program plans/activities.
- 42 percent of customers with load control switches noticed little impact from the devices on hot water availability.
- Three-fourths of those with programmable thermostats said they would enroll in the program going forward.

While written comments about project participation generally were positive, some customers expressed disappointment that they didn't experience lower energy use and costs. Also, some felt the performance of the devices didn't live up to expectations.

The survey results, like other outcomes from the PNW-SGDP, will help inform and improve the development of future smart grid projects in the region and nation.

QualityLogic project supports future transactive energy efforts

QualityLogic, a technology partner in the Pacific Northwest Smart Grid Demonstration Project (PNW-SGDP), is implementing a node that will provide industry with a common platform for future transactive energy research and pilots. The node is based on technology that initially was developed and implemented in the demonstration project.

Transactive control is a key element of a smart grid, enabling users and suppliers of electricity to effectively negotiate electricity cost and consumption. This dynamic helps improve overall grid operation, reliability, and cost-effectiveness. Nodes are locations on the grid at which power flow, consumption and/or constraints can be managed.

QualityLogic is using Pacific Northwest National Laboratory's VOLTTRON™ technology as the underlying platform to implement the node. Essentially, VOLTTRON™'s role in the project is to supply virtual "agents" to carry out specific tasks within the node.

The node implementation is based on both improvements learned from the demonstration project, as well as QualityLogic's longstanding experience in use of smart grid standards for incentive and load information exchange and asset control.

The project is expected to be completed later this spring.

PNW-SGDP Objectives and Attributes

Primary Objectives:

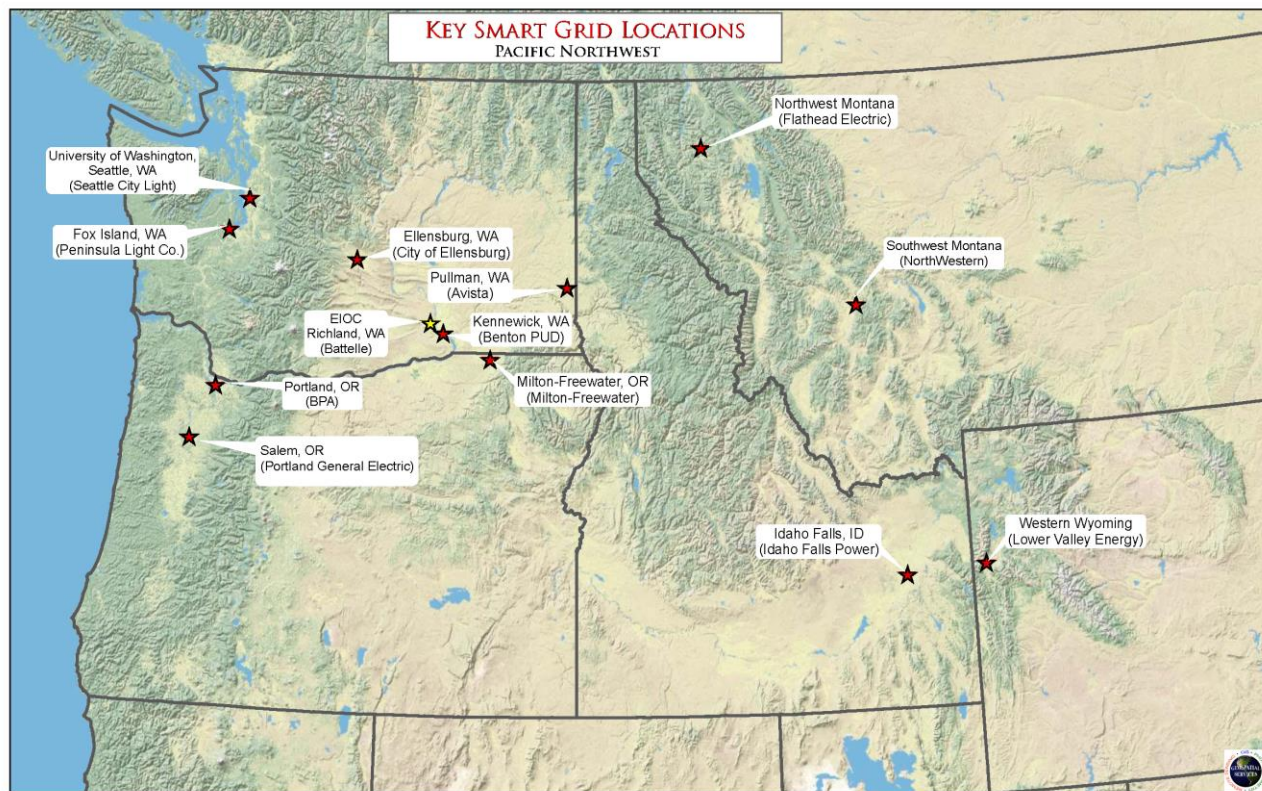
- Develop and validate an interoperable distributed communication and control infrastructure using transactive control signals;
- Measure and validate smart grid costs and benefits;
- Contribute to the development of standards and transactive control; and
- Apply smart grid capabilities to support the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



Project description

The Pacific Northwest Smart Grid Demonstration Project (PNW-SGDP), concluding in 2015, has been a regional endeavor funded by the U.S. Department of Energy under the American Recovery and Reinvestment Act of 2009.

The project goal has been 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 50 percent DOE matching funds, the project has operated with a \$178 million budget. 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, has been led by Battelle. Participants have included the Bonneville Power Administration, utilities, universities and infrastructure partners.