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**Demanding more: Port Angeles builds
on its legacy of demand-side management**





On the cover: An aerial view of Nippon Paper Industries, USA (NPIUSA), which partnered with the City of Port Angeles (Wash.) and the Bonneville Power Administration in 2012 in the first market demonstration project for demand response in the region. Photo provided by Nippon Paper Industries.

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by Bob Kajfasz, CEM, DSM

Demanding more: Port Angeles builds on its legacy of demand-side management

While it's not quite the same as a TV game show, participating in a demand response market and providing a load reduction is similar. It comes down to this value proposition: if "the price is right." Coming out ahead depends on having the best knowledge of the cost of what's behind Door Number One (a capacity payment for a 15-megawatt load reduction) and Door Number Two (90 minutes of industrial production at the current electric rate).

In 2012, the City of Port Angeles partnered with Nippon Paper Industries, USA (NPIUSA) and the Bonneville Power Administration (BPA) in the first market demonstration project for demand response (DR) in the region. Now in its second year, the project is helping determine the value proposition for fast DR — a load reduction within a 10-minute period. BPA calls upon NPIUSA to reduce load (cut back its energy use) in exchange for monthly capacity payments from BPA.

The current market demonstration project is the latest of a sequence of DR pilot projects that Port Angeles, NPIUSA, and BPA have explored. The goal is to determine if the resource can commercially meet BPA's needs for supplying within-hour imbalance capacity — where both availability and reliability will be key measures of success. Included in this effort are determining a market value for a DR asset and developing a contracting mechanism to be used for any potential future transactions between the parties.

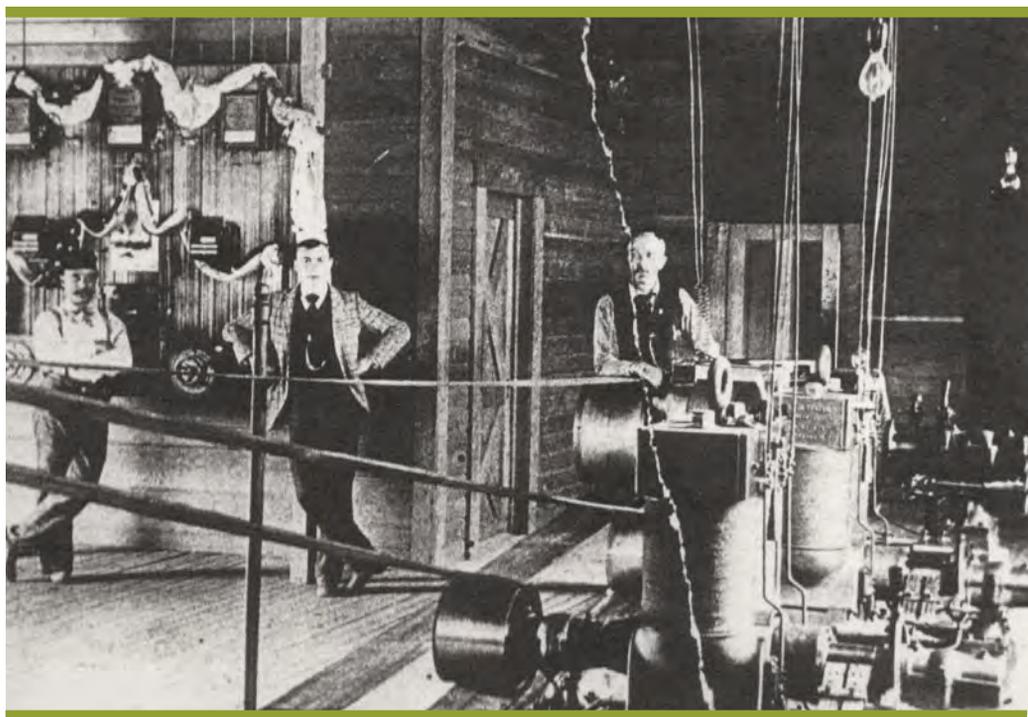
Port Angeles, a municipal utility located in western Washington state on the Olympic Peninsula, is examining DR to keep costs low and to help ensure distribution system reliability. Since its founding in 1893 with a 20-kilowatt biomass generator, the utility has enjoyed a mixed power supply which includes two hydro projects on the Elwha River, a small hydro project on nearby Morse Creek, and power purchases from wholesale power suppliers.

Today the utility now receives all of its power from BPA, which is delivered by a radial feed transmission line originating in Olympia, Wash. Phil Lusk, deputy director of Power and Telecommunications Systems, points out that while "now completely dependent on that line, Port Angeles has a vested interest in using demand-side management to keep wholesale power

purchase costs low and help maintain the health of the radial feed."

But DSM isn't anything new for Port Angeles. The municipal utility has a long history of DSM which dates back to a robust energy conservation program beginning in the late 70s. Over the years that followed, the utility has successfully kept customers engaged in energy conservation through education, rate adjustments, and rebates for energy efficiency measures. During the past decade, Port Angeles has been on the forefront for demand response in the Northwest, conducting DR pilots in all three customer sectors: residential, commercial, and industrial.

Working closely with a handful of customers, Port Angeles has implemented load reductions ranging from residential thermostat set-backs to turning off large process loads in industrial facilities. "We have confidence that a button can be pushed or a lever thrown and that a load reduction can occur when we need it," said Lusk. "However, we don't know what will motivate our customers to participate and continue in a DR program. So to continue our success in demand-side management, we want to determine an appropriate market value for demand response assets."



A look inside the first Port Angeles power house (circa 1893). Photo provided by the City of Port Angeles.



Steve Johnson, vice president and power manager at the NPIUSA pulp and paper mill, has been a champion of demand response, providing mill resources and his time to develop it as an additional asset. Photo by Keith Thorpe of the Peninsula Daily News.

Finding a market value for a DR asset will help the utility determine whether to integrate DR into the rate structure or use incentives to encourage customer participation in DR programs.

Lusk proposed this project to BPA under the Technology Innovation Program with the intent to leverage and aggregate existing DR assets from the prior pilots. While those other assets offered a mix of load size and operate on either an hour- or day-ahead notice, for this project BPA was seeking fast DR assets with loads of 10 megawatts or larger. So the city turned to one of its largest customers, NPIUSA, which had load that fit both requirements. “It is ideal for this project because NPIUSA has a variety of load centers that can be directly compared as a fungible resource to a conventional natural gas-fired peaking generator in terms of dispatchability,” said Lusk.

The NPIUSA pulp and paper mill, located on the Olympic Peninsula, is the largest electric load for Port Angeles. The mill has been in continuous operation for over 90 years. Mill management has a sophisticated understanding of plant operations, electric rate structures, and how to minimize its electric bill. NPIUSA is also improving viability with a new \$70 million biomass fuel boiler with 20-megawatt cogen-

eration capacity. As a result of the co-gen project, NPIUSA has gained increased knowledge of regional energy issues of constricted transmission and load shaping, and views DR as a potential new revenue stream for the mill.

Previously, the group tested the concept of using NPIUSA’s large thermal mechanical pulping process for balancing load at BPA. This process consists of two major pulp lines and several ancillary lines, totaling 45 megawatts of available power. Large pulp storage tanks located between the pulp plant and the paper machines allow for some variability in line operations.

The tests demonstrated NPIUSA’s ability to both shed load and increase load with a 10-minute notice from BPA. Although not actually used by BPA to balance load during the pilots, the plant demonstrated they could add or shed megawatts within the required time frame. While the mill incurred the cost of deferred pulp production and hours of staff time, participating in the project provided a better understanding of mill costs during a DR event.

Steve Johnson, vice president and power manager at the mill, has been a champion of DR, providing mill resources and his time to develop it as an additional asset. Johnson noted that NPIUSA is pleased to be working with the City of

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The City of Port Angeles is located on the Strait of Juan de Fuca in western Washington state on the Olympic Peninsula. Photo provided by the City of Port Angeles.

Port Angeles and BPA to explore the subject of demand response.

“We believe it has the potential of reducing costs for both the mill and the City of Port Angeles, better balancing electrical load in the BPA service area as well as the Olympic Peninsula and allowing additional integration of renewable electricity such as wind and solar power,” said Johnson. “Plus, the project provides an understanding of both how the mill operates and how true is the flexibility of their particular DR asset.”

In the current project, BPA is only requesting load reductions from the mill. While this simplifies the decision process for NPIUSA and Port Angeles, the rate structure for it is somewhat complex. For example, depending on what time of day a DR event is called, pulp production could be shifted from a light-load-hours period to a high-load-hours period, resulting in a higher electric rate for pulp production that normally would have occurred in a period with a lower operational cost. If there are multiple events during a cold weather month, Port Angeles and NPIUSA could incur increased demand charges if the deferred pulp production coincides with the utility’s peak energy use period. As a result, Port Angeles staff learned to be diligent to assure that other city customers incur no adverse effects from this project or future DR market transactions.

For BPA this project is a complement to a larger demand response initiative, providing an option of integrating existing assets to balance the regional load.

“This project is an example of how partnerships with our customers can be very productive,” said BPA Smart Grid and Demand Response Manager Lee Hall. “In this pilot, industrial demand response has shown strong promise in meeting BPA and regional needs, including the potential for balancing variable generation.”

Tom Brim manages the project for BPA and has drawn on expertise and resources in the agency’s Energy Efficiency,

All the project partners have committed enormous amounts of time and effort to this project which continues through the end of August 2014.

Power, and Transmission groups to address key issues such as potential effects on billing and power purchasing contracts. BPA’s cross-agency team developed a dispatch group matrix and an operating agreement — two key components of the project that define the attributes of a DR asset such as load reduction; size; duration; days and hours of availability; and recharge period. The parameters also include ramp time — the maximum number of minutes allowed before the target reduction is achieved. During any event, if the load reduction does not occur within the ramp rate or the target reduction is not maintained for the duration of the event, the event is considered unsuccessful. If a load is unavailable, provisions in the agreement allow for the temporary removal of a DR asset from the dispatch group due to maintenance or repair.

The payment for the DR asset is in the form of a monthly capacity price based on DR load size and the hours it is available during the month. The operating agreement states that the monthly capacity payment may be reduced by a predetermined amount for any unsuccessful event and any days that an asset is declared as unavailable load.

John Wellschlager and Ryan Redmond from BPA’s Bulk-hub group drew upon their experience with BPA operations and commercial capacity acquisitions to assign a dollar value to the DR assets in this project when they developed the contract. They were able to reduce the information from the dispatch matrix to a dollar/megawatt value by comparing the resource to a 24/7 generation source. The dollar/megawatt value is applied throughout the matrix to derive the monthly capacity payment and any reduction due to actual performance of the asset during the month. At this time, BPA is not actually using the load reductions in this project to help balance regional power loads. Instead, the BPA team prepares a weekly schedule of DR events in advance. The schedule is not shared with Port Angeles or NPIUSA until the week after the event. Reliability permitting, the team’s goal is to transition into actually using the resource to help manage within hour load/resource issues before the pilot ends.

All the project partners have committed enormous amounts of time and effort to this project which continues through the end of August 2014. Several check-ins are scheduled during the remaining months to review progress and explore options for refining asset definitions and performance, and communications protocol. But, for the time being we are getting closer to an understanding of what is behind Door Number One. **NWPPA**

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