Customer Roundtables: Demand Response

August 2018

Agenda

• Role of Demand Response at BPA
• Recent DER/DR Initiatives at BPA
• Utility Based DR Programs
• What’s on the Horizon
• Wrap-Up
Role of DR at BPA: Provide a Least Cost, Reliable Option to Meet Power and Transmission Needs.

POWER CAPACITY


Demand Response Selected as a Least Cost Resource.
Role of DR at BPA: Provide a Least Cost, Reliable Option to Meet Power and Transmission Needs.

TRANSMISSION NON-WIRES & CONGESTION RELIEF

DR being explored as a Non-Wires Resource.

Current demonstration for the South of Allston (I5) Path includes the City of McMinnville (46MW).

Other areas being reviewed include but are not limited to North Idaho and the Tri-Cities.
Recent DER/DR Initiatives at BPA

- DR Potential & Barriers Study
- DER Benchmarking
- DR Demonstrations
- CTA 2045 Water Heaters
2017 Potential Study Result: >1500 MW of Achievable DR in BPA Public Service Territory

<table>
<thead>
<tr>
<th>Area</th>
<th>Winter Achievable Potential (MW)</th>
<th>Percent of Area System Peak—Winter</th>
<th>Summer Achievable Potential (MW)</th>
<th>Percent of Area System Peak—Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>West</td>
<td>1,061</td>
<td>9.9%</td>
<td>807</td>
<td>10.8%</td>
</tr>
<tr>
<td>East</td>
<td>490</td>
<td>9.6%</td>
<td>795</td>
<td>13.5%</td>
</tr>
<tr>
<td>Total</td>
<td>1,551</td>
<td>9.8%</td>
<td>1,602</td>
<td>12.0%</td>
</tr>
</tbody>
</table>

The base case was developed by benchmarking research participation rates of common programs. These participation rates are generally a median value and are intended to depict participation in a healthy, established DR program. Most of the products reach a full ramp within 7 years, and after that grow with anticipated load rate changes.

The base case values represent the mean of a range.
## 2017 Barriers Study - BPA Customers State a Clear Price Signal is Needed for DR to Grow

The table below summarizes the barriers and their impact on Demand Response (DR), Distributed Generation (DG), and Energy Storage (ES) as reported by different stakeholder groups. The data is derived from a Cadmus DER barriers rating survey.

### Economic/Market
- **Lack of power customer business case**
  - SME: 65%, STK: 75%, PC: 73%, DSP: 86%
  - SME: 56%, STK: 83%, PC: 72%
- **Lack of clearly defined need/value to BPA**
  - SME: 59%, STK: 42%, PC: 64%
  - SME: 75%, STK: 42%, PC: 100%
- **Low power costs**
  - SME: 56%, STK: 46%, PC: 70%
  - SME: 59%, STK: 92%
- **Absence of organized market for DERs**
  - SME: 61%, STK: 54%, PC: 59%
  - SME: 57%, STK: 13%
- **Cost of development/deployment**
  - SME: 50%, STK: 46%
  - SME: 68%
- **Lack of well-defined M&V framework**
  - SME: 46%, STK: 18%
  - SME: 35%

### Organizational/Operational
- **Competition for human/financial resources**
  - SME: 63%, STK: 46%
  - SME: 58%
- **Lack of staff knowledge and capability**
  - SME: 44%, STK: 50%
  - SME: 39%
- **Lack of standardized technical specs/agreements**
  - SME: 35%
  - SME: 48%
- **Insufficient intra-organizational coordination/communication**
  - SME: 27%
  - SME: 50%

### Infrastructure/Technology
- **Data issues (e.g., lack of AMI, poor "big data" tools)**
  - SME: 54%
  - SME: 39%
- **Back office systems**
  - SME: 50%
  - SME: 60%
- **Communication protocols not standard; interoperability issues**
  - SME: 36%
  - SME: 50%
- **Difficulty integrating DERs with current infrastructure**
  - SME: 24%
  - SME: 23%
- **Concerns about cybersecurity**
  - SME: 15%
  - SME: 20%
- **Lack of test facilities & infrastructure for communications to distributed devices**
  - SME: 23%
  - SME: 27%
- **Ability to control/manage EV charging and discharging**
  - SME: 25%
  - SME: 33%
- **Unstable vendor supply chain**
  - SME: 39%
  - SME: 25%

### Legal/Regulatory
- **Lack of established tariffs & contracts for DER**
  - SME: 33%
  - SME: 63%
- **Concerns about data privacy**
  - SME: 31%
  - SME: 27%
- **Environmental regulation/compliance and permitting/siting issues**
  - SME: 0%
  - SME: 0%

Source: Cadmus DER barriers rating survey

Percent of respondents rating the barrier as a 4 or 5 on a 1 to 5 significance rating scale
SME = BPA subject matter expert; STK = external stakeholder; PC = BPA power customer; DSP = DER service provider
Note: Sample sizes identified are maximum sample size for each interview group and DER category. Due to small sample sizes, results should be interpreted as directional.
BPA has Also Benchmarked How Other Utilities Have Built their Programs

Sample Topics

- What type of DR products are being used and in what quantities?
- What thermostat programs are being built?
- How were customers incentivized to participate?
- What is DR being used for?

2016 and 2017 Benchmarking Reports are available per the link on final page of the DR Presentation.
Regional Demonstrations with Utility Partners Around the Region are Being Wrapped Up.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Max MW</th>
<th>Timing</th>
<th>Product Demonstrated</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Port Angeles</td>
<td>30</td>
<td>2013 - 2014</td>
<td>Imbalance Capacity</td>
<td>56% / 92%¹</td>
</tr>
<tr>
<td>Energy Northwest I</td>
<td>35</td>
<td>2014 – 2016</td>
<td>Imbalance Capacity</td>
<td>94%</td>
</tr>
<tr>
<td>EnerNOC</td>
<td>17</td>
<td>2015 - 2017</td>
<td>Winter Peak Shave</td>
<td>86%²</td>
</tr>
<tr>
<td>Energy Northwest II</td>
<td>36</td>
<td>Summer 2017</td>
<td>Summer Power Multi-use</td>
<td>100%</td>
</tr>
<tr>
<td>South of Allston</td>
<td>46³</td>
<td>Summers 2017-2018</td>
<td>Congestion Relief and Commercial Service</td>
<td>in progress</td>
</tr>
<tr>
<td><strong>Total Portfolio</strong></td>
<td>164</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Performance with 10 minute notification was 56%; with preschedule notification performance was 92%
² Events where performance met 90% of threshold. On average, demonstration delivered 136% of nominated amounts.
³ South of Allston portfolio includes 2 generation assets – not reflected in totals
Utility Partners in Large Scale DR Demonstrations – 2014 -2018

Note: Map does not include earlier pilot & technology innovation projects
CTA-2045 “Standard Plug-in” Research Pilot

- **New Technology for EWH’s and HPWH’s:**
  - Standard Port, data format
  - Meeting customer needs
  - Provides customer flexibility
  - Potential for low-cost solution

- **Partners**
  - Bonneville Power Administration
  - Portland General Electric
  - Clark Public Utilities
  - Snohomish County PUD
  - Puget Sound Energy
  - Franklin County PUD
  - Emerald People’s Utility District
  - Tacoma Power
  - Springfield Utility Board
  - PNNL
  - NEEA

- **Report to be Completed Oct 2018**
Customer Driven DR Pilots/Programs Are Being Conducted (Examples Below)

- Flathead Electric Cooperative: **Electric Water Heaters**
- City of Milton Freewater: **Electric Water Heaters, Residential Space Heating, Residential A/C, City Water Pumps and DVR**
- Kootenai Electric: **DVR**
- Midstate Electric: **Thermostats**
- Tacoma Power: **Industrial**

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**PEAK TIME REBATE PROGRAM**

**ABOUT THE PROGRAM**

DO YOU HAVE AN ELECTRIC WATER HEATER?
SAVING $48 IS AS EASY AS 1, 2, 3...

1. **CLICK OR CALL**
   Complete the form below or call 406-751-1834 to sign up for the Peak Time Rebate Program.

2. **WE INSTALL**
   A device on your water heater that helps reduce your energy demand and costs by turning it off for a short time during periods of peak demand.

3. **YOU SAVE**
   $48 per year when we pass that savings onto you via an automatic $4 per month bill credit.

For additional information or assistance, read our FAQs, call 406-751-1834 or email us.
What’s on The Horizon for BPA

✓ Possible Program for Power.
   Based on capacity needs in the 2018 Resource Program.

✓ Possible Non-Wires DR in selected areas.

✓ Possible Thermostat Program (combining EE and DR).

✓ Utility scale battery storage being evaluated.
Wrap-Up

- **BPA Contact**
  - Lee Hall, DER Program Manager
  - ljhall@bpa.gov
  - (503) 230-5189

- **Resources**
  - DR Demonstration Reports
  - 2017 DR Potential Study
  - 2016 and 2017 Benchmarking reports
    - [https://www.bpa.gov/EE/Technology/demand-response/Pages/Resources.aspx](https://www.bpa.gov/EE/Technology/demand-response/Pages/Resources.aspx)

- **Next Utility Cross-share**
  - Portland/Vancouver area – early November 2018