Collecting, Aggregating, and Analyzing Energy Efficiency Savings at a Regional Level

Lakin Garth, The Cadmus Group
Danielle Walker, Bonneville Power Administration

November 5, 2015
Energy Efficiency Savings Data

Can looking to the past help us improve our plans for the future?
Six Going on Seven

Project Overview

- Pacific Northwest (WA, OR, ID, W. MT)
- Post 6\textsuperscript{th} Plan (2010-2013)
- Bonneville Power Administration, Cadmus, Milepost Consulting, EES, and Northwest Power and Conservation Council staff
Six Going on Seven

Background

- Council adopts power plans about every five years
- 6th Power Plan adopted in 2010
- 7th Power Plan to be adopted in 2016
- Power Plan serves as basis for BPA’s EE targets
- Many NW Planners (Publics, IOUs, ETO, NEEA)
- Other NW utilities base Conservation Potential Assessments (CPAs) on Power Plan (to varying degrees)
Six Going on Seven

Project Goals

• Conduct a technical review of regional savings achievements toward the 6th Power Plan

• Conduct research on questions posed by BPA, its customer utilities, and other stakeholders

• Supplement Council staff analysis by providing data on where energy savings occurred during the development of the 7th Power Plan
Six Going on Seven

Our Vision

- Collect detailed data to better understand the regional accomplishments
- Compare accomplishments to targets
- Use data to inform development of the next plan
- Build confidence in setting acquisition rates, targets
Data Limitations

- Previously, annual regional savings collected at sector level
- Via Council’s Regional Conservation Progress Report
- Used to report relative to Plan targets
- Limited data availability hinders understanding of:
  - Areas of success and struggle
  - Measure rates of acquisition (ramp rates)
  - Updates to regional supply curves based on past accomplishments (saturations)
Analytic Process

Data Collection
Request and pleas for data to publics, IOUs, Energy Trust, and NEEA

Data Cleaning
Extract relevant data, remove gas or fuel conversion savings, no adjustments to savings

Data Mapping
Unify all data, map similar measures, overcome differences, address issues

Database Development
Compile all data in one location, updated over time, Microsoft Access

Data Analysis
Linked database to an MS Excel workbook

Presentation
Results to BPA internal and external audiences, including Council’s CRAC
Data Collection

We Requested:
- Measure-specific savings data
- Market transformation savings

Participating Utilities Provided:
- Sector, end-use, category and measure-specific EE savings data

Varied Reporting Styles:
- Wide range of granularity
- Different classification systems
Data Mapping

Mapping Analysis

- Data are mapped to common end-uses and measure categories
- Mapping allows all the utilities’ data to be summarized in one data set
- Requires a consistent set of naming parameters
- Employed BPA’s internal measure taxonomy

Measure Taxonomy

- **Sector**: Residential
- **End-Use**: Water Heating
- **Category**: Water Heaters
- **TAP**: Heat Pump Water Heaters
<table>
<thead>
<tr>
<th>Sector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Straightforward, Mostly deemed, Detailed, Fairly consistent</td>
</tr>
<tr>
<td>Commercial</td>
<td>Challenging, Some deemed; mostly custom, Less detailed, Many “unknowns”</td>
</tr>
<tr>
<td>Industrial</td>
<td>Very challenging, Few deemed; mostly custom, Scant detail, Unknowns</td>
</tr>
<tr>
<td>Agricultural</td>
<td>Less challenging, Many deemed, some custom, Good detail, Fewer unknowns</td>
</tr>
</tbody>
</table>
Results

**Successes:**
Summarized savings by:

- Year,
- Sector,
- End Use,
- Measure Category,
- Some specific measures, including:
  - DHPs, HPWH, Industrial EM

**Difficulties:**
Answering detailed questions such as:

- What % of commercial lighting is interior, exterior, controls?
- What % of residential lighting is CFLs vs. LEDs?
Outcomes

Successes:
Merged regional data at a detailed level
Compared achievements relative to targets
Viewed regional acquisition rates
Viewed gaps between targets and savings

Data used to:
Inform baseline assumptions
Adjust available potential
Inform ramp rate assumptions
Support effective CRAC participation
In a Perfect World, We Would...

1. Eliminate poorly labeled data
2. Describe custom projects with greater detail
3. Create discrete measures, not “multiple measures”
4. Employ a hierarchical taxonomy of measure labeling
5. Consistently employ accurate measure counts
Six Going on Seven

Lessons Learned

• Having a hierarchical “taxonomy” is critical
• More measure detail is preferable (but costly)
• Accurate quantities help power planning efforts
• Differences in baseline assumptions – hard to assess
• Rearview mirror improvements are difficult
Additional Resources

Project Website:
http://www.bpa.gov/EE/Utility/toolkit/Pages/Six-Going-On-Seven.aspx

Phase 1 Results CRAC Presentation:
http://www.nwcouncil.org/energy/crac/meetings/2014_11/

Phase 4 Results CRAC Presentation:
http://www.nwcouncil.org/energy/crac/meetings/2015_03/