DRAFT Impact Evaluation of the UES Portfolio

2016 Activities
Today’s Goals

- Provide insight into draft UES evaluation plan
- Gain input from stakeholders
- Early awareness for customer utilities of data collection and timelines

**[www.bpa.gov/goto/evaluation](http://www.bpa.gov/goto/evaluation) for this presentation and the draft plan**
UES Evaluation Goals

Evaluate UES energy savings for consistency with the savings claimed

Provide strategic feedback to improve program operation and measures
And sometimes assess savings to inform RTF estimates
What’s Our Plan?
What’s Our Plan?

Target areas with largest savings
What’s Our Plan?

Make it as easy as possible (minimal burden/cost)
Where Are The Largest Savings?

FY2015 UES data summarized from IS2 data pull

- Residential: 14.6 aMW
- Lighting: 6.1 aMW
- HVAC: 3.5 aMW
- Envelope: 2.8 aMW
- Water Heating: 0.9 aMW
- Other: 1.3 aMW
- Commercial: 0.76 aMW
- Ag/Industrial: 1.1 aMW
How Can We Design An Efficient Evaluation?

Domains:
Sector/End Uses
Res Lighting

Measure groups:
Program delivery method or measure status
Res Lighting-Retail
What Should We Consider When We Select the Evaluation Approach?

- Measure Status
- Contribution to Savings
- Uncertainty In UES Savings Value
- Strategic Importance
Taking Advantage of Measure Status

*RTF Provisional status requires applying approved research
**These two steps might occur separately or simultaneously, depending on the approach.
Source: Navigant interpretation of RTF Guidelines
Evaluation Approaches

- **Engineering Review**
  - Customer Files

- **Verification**
  - Phone Survey or On-Site

- **Billing Analysis**
  - Energy Consumption Data

- **Calibrated Energy Models**
  - Energy Consumption Data

- **Direct Measurement**
  - On-Site Metering

Assess Savings

Verify Delivery

Effort

Information
What about the Results?

Report Includes
- Evaluated savings
- Realization Rates
- Cost-effectiveness
- Recommendations

Report Doesn’t Include
- Utility-specific results

Results
- Adjust historic savings in the Redbook
- Inform future measures
- Inform program design
2016 Evaluation Domains, Measure Groups & Approaches

Residential Lighting

Residential Envelope

Residential HVAC
Residential Lighting

Residential Envelope

Residential HVAC

Engineering Review
Retail & By Request
Customer Files

Billing Analysis
Envelope, Prescriptive Duct Sealing & DHP with FAF
Billing data, if issues - customer files and phone surveys

Engineering Review
HPs, CCS and Performance
Duct Sealing
PTCS QA/QC data
Residential Lighting

2016 Evaluation

• Retail
• By Request

Small sample of Direct Install and Fixture to understand data
Non-Request bulbs excluded – tiny savings
What Will We Do?

<table>
<thead>
<tr>
<th>Measure Group</th>
<th>Approach</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td>Engineering Review</td>
<td>3rd Party Imp. Simple Steps Program Data Customer File*</td>
</tr>
<tr>
<td>By Request</td>
<td></td>
<td>Utility</td>
</tr>
</tbody>
</table>

*Utilities will only be asked to provide IM-required data not available via third party implementers.*

- Use customer files/program data to verify delivery & pass through all UES value assumptions
What Will We Learn?

Verifies delivery in terms of:
- Quantity
- Measure specifications
- Measure applications

Passes through underlying assumptions
- Other research is happening
- Storage assumptions may need future review
Residential Envelope

2016 Evaluation
• Insulation
• Windows

Air Sealing not included- tiny savings, difficult to evaluate
Billing Analysis – Staged Approach

- Billing analysis; minimize utility burden
- Info from pilot analysis
- If needed: more work to explain ‘why?’

Second stage:
- Customer files for outliers
  - baseline heating system
  - home size
- Phone surveys
  - secondary heat
  - changes in occupancy
- SEEM model calibration
**What Will We Do?**

<table>
<thead>
<tr>
<th>Measure Group</th>
<th>Approach</th>
<th>Data Source</th>
<th>Second Stage Outlier Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation</td>
<td>Billing Analysis</td>
<td>Energy Consumption Data* Customer File**</td>
<td>SEEM model calibration Phone surveys</td>
</tr>
<tr>
<td>Windows</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Evaluation targets census of billing data; sample where unfeasible

**Staged request.**

- **Initial - evaluation would love any customer information that is easy for utilities to provide (project files, auditor data)**
- **Stage two - evaluation may request a sub-sample of customer files for outlier projects**
## Pilot Billing Analysis

<table>
<thead>
<tr>
<th>Working with PTCS data, SCL &amp; Tacoma Data</th>
<th>Testing to inform final plan &amp; data request</th>
</tr>
</thead>
</table>

## Draft Findings

| Appears supplemental heating is important | Additional PTCS projects not much value |
What Will We Learn?

Estimate savings directly for windows and insulation
  • If enough sample, may see savings by HZs or measure

Opportunity to investigate why savings estimates may vary from RTF claimed savings
Residential HVAC

2016 Evaluation

- Ductless Heat Pumps replacing Forced Air Furnaces
- Duct Sealing (Prescriptive and Performance)
- Heat Pumps
- Commissioning, Controls & Sizing

- Ductless Heat Pumps (all other)- postponed
- Thermostats excluded- tiny savings

Mix of Measure Status

2nd Largest Contribution to Residential Savings

Uncertainty In UES Savings Value

Strategic Importance
### What Will We Do?

<table>
<thead>
<tr>
<th>Measure Group</th>
<th>Approach</th>
<th>Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3rd Party Imp.</td>
</tr>
<tr>
<td>Prescriptive Duct Sealing</td>
<td>Billing Analysis</td>
<td>Energy Consumption Data*</td>
</tr>
<tr>
<td>Ductless Heat Pumps replacing Forced Air Furnaces</td>
<td></td>
<td>Customer Files**</td>
</tr>
<tr>
<td>Heat Pumps, Commissioning, Controls &amp; Sizing, Performance Duct Sealing</td>
<td>Engineering Review</td>
<td>QA/QC Data</td>
</tr>
</tbody>
</table>

*Evaluation will target a census of energy consumption data for sampled utilities, a sample may drawn used where this is unfeasible  
**Staged request similar to Envelope
What Will We Learn?

Heat Pumps, CC&S, Performance Duct Sealing

- Verifies delivery in terms of:
  Quantity, Measure specifications, Measure applications
- Passes through underlying assumptions

Prescriptive Duct Sealing & DHP Replacing FAF

- Estimate savings directly
- Opportunity to investigate why savings may vary from RTF claimed savings
  - Phase 2 outlier analysis might provide insights
Preliminary Sampling Method

Determine savings contribution of each utility for each measure group. Split into:

- **Large contributors (>5%)**
  - Certainly sampled

- **Tiny contributors (smallest savers up to 5% of group)**
  - Excluded from sample

- **Medium contributors (2-5%) and small contributors (rest)**
  - Random sample of these
  - But, exclude if had FY2014 COTR oversight
### Number of Utilities in each Stratum*

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Insulation</th>
<th>Windows</th>
<th>Prescriptive Duct Sealing</th>
<th>DHP replacing FAF</th>
<th>Lighting - By Request</th>
<th>Lighting - Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Contributors</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Medium Contributors</td>
<td>11</td>
<td>14</td>
<td>8</td>
<td>9</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Small Contributors</td>
<td>32</td>
<td>39</td>
<td>3</td>
<td>28</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Tiny Contributors</td>
<td>61</td>
<td>53</td>
<td>92</td>
<td>65</td>
<td>94</td>
<td>90</td>
</tr>
</tbody>
</table>

*Current draft sample design is based on partial FY2015 data.

** PTCS Duct Sealing, HPs & CCS not listed because evaluation will use PTCS QA/QC
### Customer Files

<table>
<thead>
<tr>
<th>Measure Group</th>
<th>Number of Utilities</th>
<th>Target Number of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td>7</td>
<td>75*</td>
</tr>
<tr>
<td>By Request</td>
<td>6</td>
<td>65*</td>
</tr>
<tr>
<td>Performance Duct Sealing</td>
<td>n/a</td>
<td>(60**)</td>
</tr>
<tr>
<td>Heat Pumps – All**</td>
<td>n/a</td>
<td>(60**)</td>
</tr>
<tr>
<td>Commissioning, Controls &amp; Sizing</td>
<td>n/a</td>
<td>(51**)</td>
</tr>
</tbody>
</table>

*Includes Simple Steps and non. Sample size for request customer files is smaller than this number.

**These sample sizes include data from the PTCS QA/QC site registry and do not require customer files.
# Billing Data

<table>
<thead>
<tr>
<th>Measure Group*</th>
<th>Number of Utilities</th>
<th>Target Number of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation</td>
<td>10</td>
<td>~1700**</td>
</tr>
<tr>
<td>Windows</td>
<td>15</td>
<td>~2500**</td>
</tr>
<tr>
<td>Prescriptive Duct Sealing</td>
<td>10</td>
<td>~500**</td>
</tr>
<tr>
<td>Ductless Heat Pumps replacing Forced Air Furnaces</td>
<td>14</td>
<td>~800**</td>
</tr>
</tbody>
</table>

*Multifamily not included in 2016 evaluation due to difficulties with meters  
**Evaluation will target a census of energy consumption data for sampled utilities, a sample may drawn used where this is unfeasible
Data Collection Approach

Early March

Early heads up on sample

Early April

Notification to utilities of evaluation sample
  • Sample, data needs, templates

April 12, 2016

Brown bag to explain data requests & approaches
  • Individualized follow-up as needed

April-May

Data collection
  • Individualized support for utilities
    o Single point of contact on evaluation team
    o Multiple data transfer modes (secure FTP, email, fax, mail, on-site support)
Coordination with Region

**COTR Oversight**
- Working with COTRs to coordinate with oversight

**BPA Non-Energy Benefit (NEB) Research**
- May leverage outlier phase of envelope & HVAC measures

**Residential Building Stock Assessment (RBSA)**
- Watching timing of RBSA, will consider in contact protocols to mitigate confusion
Draft 2016 UES Evaluation Schedule

<table>
<thead>
<tr>
<th>Domain</th>
<th>Data Collection</th>
<th>Analysis</th>
<th>Final Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Res-Lighting</td>
<td>April – June</td>
<td>Mid-June – Early-September</td>
<td>Late-September</td>
</tr>
<tr>
<td>Res-Envelope</td>
<td>April – June</td>
<td>June – September</td>
<td>Mid-December</td>
</tr>
<tr>
<td>Res-HVAC</td>
<td>April – July</td>
<td>June – September</td>
<td>Mid-December</td>
</tr>
</tbody>
</table>
Comments welcome on draft evaluation plan by March 24th
Available at: www.bpa.gov/goto/evaluation
Questions?
lsmgage@bpa.gov