Second choice: In the example above, instead select Call in and use your phone to call into the webinar. A window will pop-up with your meeting Call in information.

Last choice: Use Computer for Audio. Connect a headset to your computer for best results.
Impact Evaluation Results
Custom Industrial for Option 1
Utilities 2020-2021

June 2022
Agenda

1. Evaluation Overview
2. Background and Objectives
3. Methodology
4. Evaluation Findings
5. Recommendations
6. Q&A
Contractor Team

Steve Grover
Project Director

Lauren Gage, Justin Spencer
Stakeholder Management, Technical Support

Tami Rasmussen, Ted Helvoigt, Sarah Monohon
Project Management, Sampling and Analysis

Mike Baker, Santiago Rodriguez-Anderson
Engineering Leads

Apex Analytics
Evergreen Economics
SBW
Why Evaluation?
Evaluation

What did we achieve?

Objectively, retrospectively document and measure the effects of a program in order to determine how well it met the intended outcomes.

How do we improve?

Understand why those effects occurred and identify potential improvements to current programs and future offerings.
Impact Evaluation

Savings reliability with independent verification + Program improvement opportunities
Relevant Evaluation Policies

Implementation Manual

- Specifies reporting requirements for energy efficiency programs that provide access to project, documentation and billing data for evaluation and oversight purposes
- Oversight and evaluation are separate functions

BPA Evaluation Policies

- Defines BPA's impact evaluation activities; generally consistent with 2020 RTF Guidelines and national standards
- BPA M&V Protocols
What’s Coming Up Next

Next Steps

• Final report
• BPA response to recommendations
• Future evaluation strategy planning (summer/fall 2022)

BPA response to recommendations => memo addressing the evaluation findings, recommendations and BPA plans for change
Thank You!

Utilities
Internal BPA Team
Evergreen/Apex/SBW
Background and Objectives
Overview of FY21-FY22 Evaluation

Custom Industrial: Option 1 Utilities
Engineering-based evaluation of projects

Custom Industrial: Option 2 Utilities (expected April 2023)
Engineering-based evaluation of projects

Strategic Energy Management (expected October 2022)
Persistence assessment to inform measure life

More detailed BPA evaluation activities can be found here: https://www.bpa.gov/energy-and-services/efficiency/evaluation
Custom Industrial Impact Evaluation Objectives

1. Estimate first-year kWh savings and cost-effectiveness
   - Overall and by end use
   - Evaluated (COVID-19 impacts removed) and observed

2. Develop recommendations to improve M&V savings estimates
   (including Engineering Calculations with Verification)
Methodology
Sampling Strategy

Sampling unit: measure (TAP) for a single project at a distinct site

Sample stratified by project size (huge projects were “in” and others were randomly selected)

BPA strives for 90/10 on studies, minimum of 80/20 (i.e., relative error of 10% at the 90% confidence level)

This study achieved 90/7 with 40 sample points
## Option 1 Custom Industrial Sample

<table>
<thead>
<tr>
<th>End Use</th>
<th>Reported Savings</th>
<th>Number of Reported Measures</th>
<th>Sample Size (Measures)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motors/Drives</td>
<td>12,792,799</td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>Refrigeration</td>
<td>12,456,922</td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>Process Loads</td>
<td>8,072,599</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Compressed Air</td>
<td>3,843,633</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>HVAC</td>
<td>1,778,498</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>38,944,452</strong></td>
<td><strong>77</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>
Data Collection Process

- **File Review**
  Leveraging ESI team and completion reports

- **Project Engineer**
  Phone/email discussions with BPA, utility and/or ESI

- **End Use Customer**
  Phone/email discussions; where necessary, site visits
  (36 virtual, 4 in-person)

- **Additional Data**
  Trend metering/billing data/weather data

- **Site-specific data to support analysis**
Analysis Process

- Review M&V Model
- Collect Supplemental Data
- Run Model
- Estimate Site Level Savings
- Extrapolate Site Results to Option 1 Custom Industrial Population
Additional Analyses

Engineering Calculations with Verification (ECwV)

- Use an ECwV protocol to estimate savings for each measure
- Compare results to best practical evaluation results and BPA ECwV result

Addressing COVID-19

- Evaluated savings removed changes in operating conditions due to COVID (self-reported)
- Additional set of “as-observed” savings were also estimated

Cost Effectiveness

- Benefit-cost ratios estimated by measure and for the domain
- Compared evaluated to reported cost effectiveness
Evaluation Results
Evaluated savings were the same or higher than reported for compressed air and process loads, and were lower than reported for motors/drives, refrigeration and HVAC.
Project Measure-Level Realization Rates

Results at the project measure level were highly variable, with realization rates ranging from 0.0-2.2.
Key Drivers of Savings Differences

Documentation Error
A documentation error in the largest sampled site

Baseline Discrepancies
BPA program guidelines for baseline determination inconsistent with RTF for evaporative cooling in potato sheds

Differences in Operating Conditions
Different observed operating conditions than what was documented
Several large projects are highly impactful on the overall realization rate; remainder have little impact.
Savings with and without COVID impacts were essentially the same.
Cost Effectiveness Results

Custom Industrial projects for Option 1 Utilities are highly cost effective

Ratio of Benefits to Costs is 2.5
($2.50 in benefits for every $1 spent)
Engineering Calculations with Verification (ECwV) analysis aligned with “full” evaluation results for small projects, while slightly underestimating savings for medium projects and substantially underestimating for large projects.
**Recommendations**

**KEY FINDING**

Small and medium projects showed little bias using the BPA (ECwV) protocol or high-rigor M&V methods.

Evaluators identified a documentation error in the largest project.

The evaluators observed multiple potato shed project baseline issues.

**RECOMMENDATION**

Apply ECwV to a wider range of projects (reduce program/engineering staff time).

Revisit QC procedures to reduce the potential for major reporting errors.

Consider updating baseline policy to be consistent with RTF guidelines (use current practice v. code).
Questions?

Thank you!

www.bpa.gov/energy-and-services/efficiency/evaluation

evaluation@bpa.gov