



Audio instructions

Welcome to BPA's Webex Meeting!

Note: **Your audio is muted upon entry.**

Audio connection **Preferred choice**

Use computer audio

Call me at +1

Call in Call me at

Don't connect to audio

Note: The incoming call may be listed as **POTENTIAL SPAM**.

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.

Call In

Call in from another application

- Call**
US Toll
+1-415-XXX-XXX
[Show all global call-in numbers](#)
- Enter**
Access code **XXX XXX XXXX #**
Attendee ID **XXXXXX #**

Last choice: Use Computer for Audio. Connect a headset to your computer for best results.

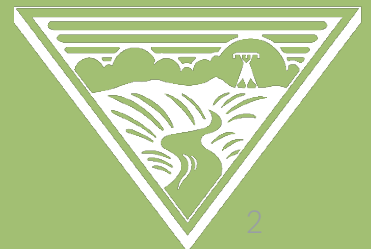
Use to mute and unmute

Use to express emotion

Use to view participant list and chat panel

Impact Evaluation Results Custom Industrial for Option 1 Utilities 2020-2021

June 2022



Agenda

Evaluation Overview

Background and Objectives

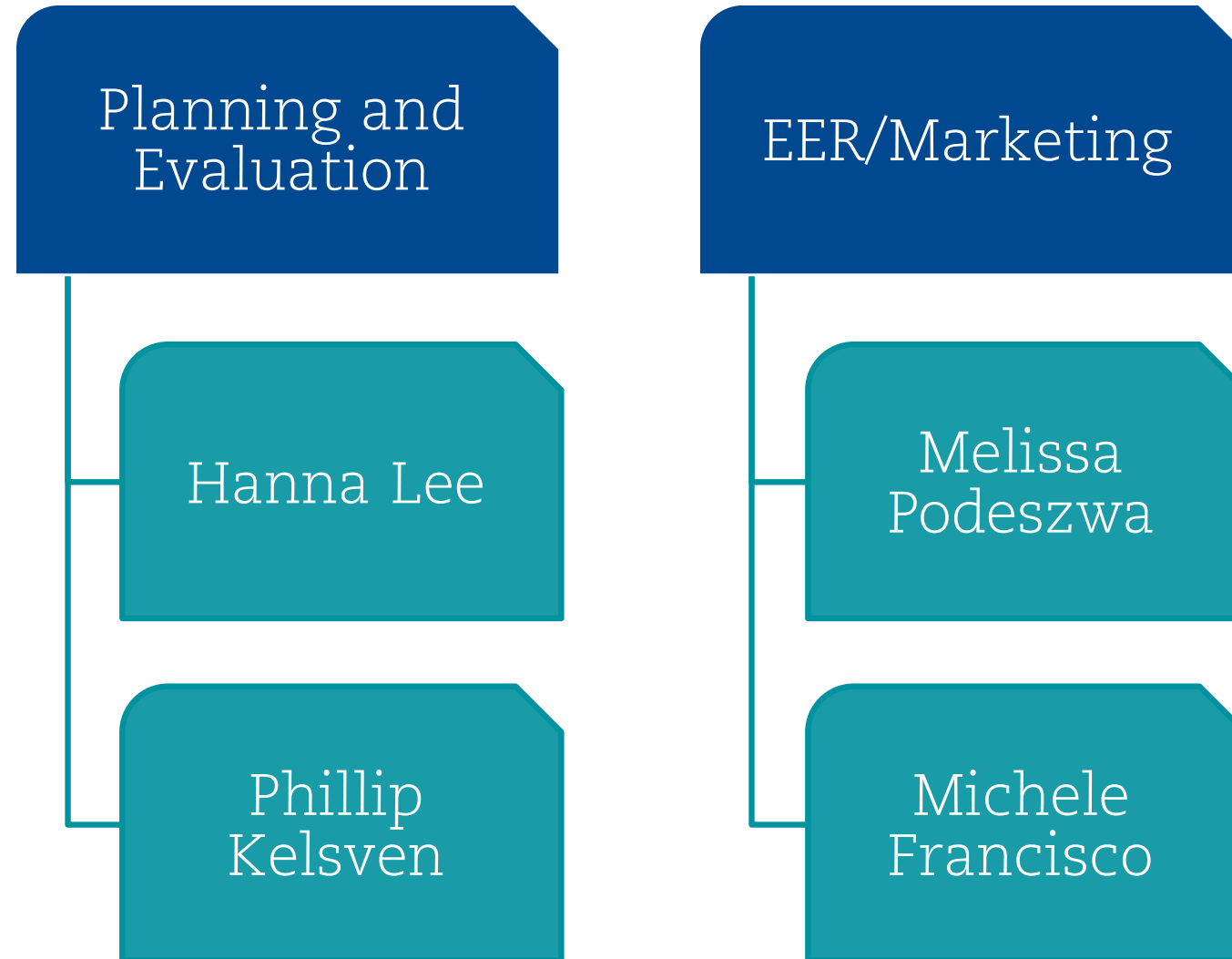
Methodology

Evaluation Findings

Recommendations

Q&A

BPA Core Team



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



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

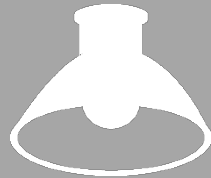
Background and Objectives

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

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

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



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

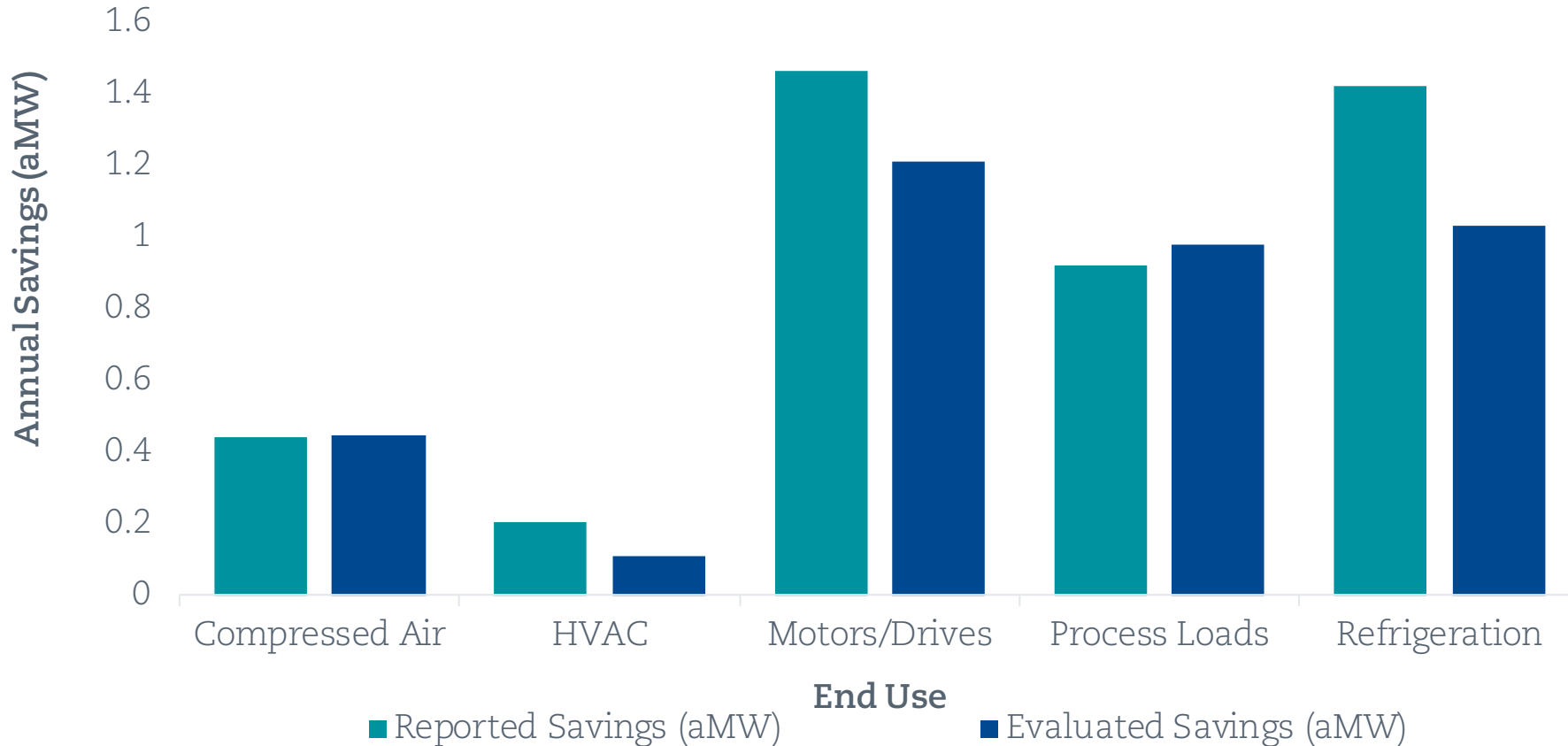
Cost Effectiveness

- Benefit-cost ratios estimated by measure and for the domain
- Compared evaluated to reported cost effectiveness

Evaluation Results

Evaluated First Year Savings

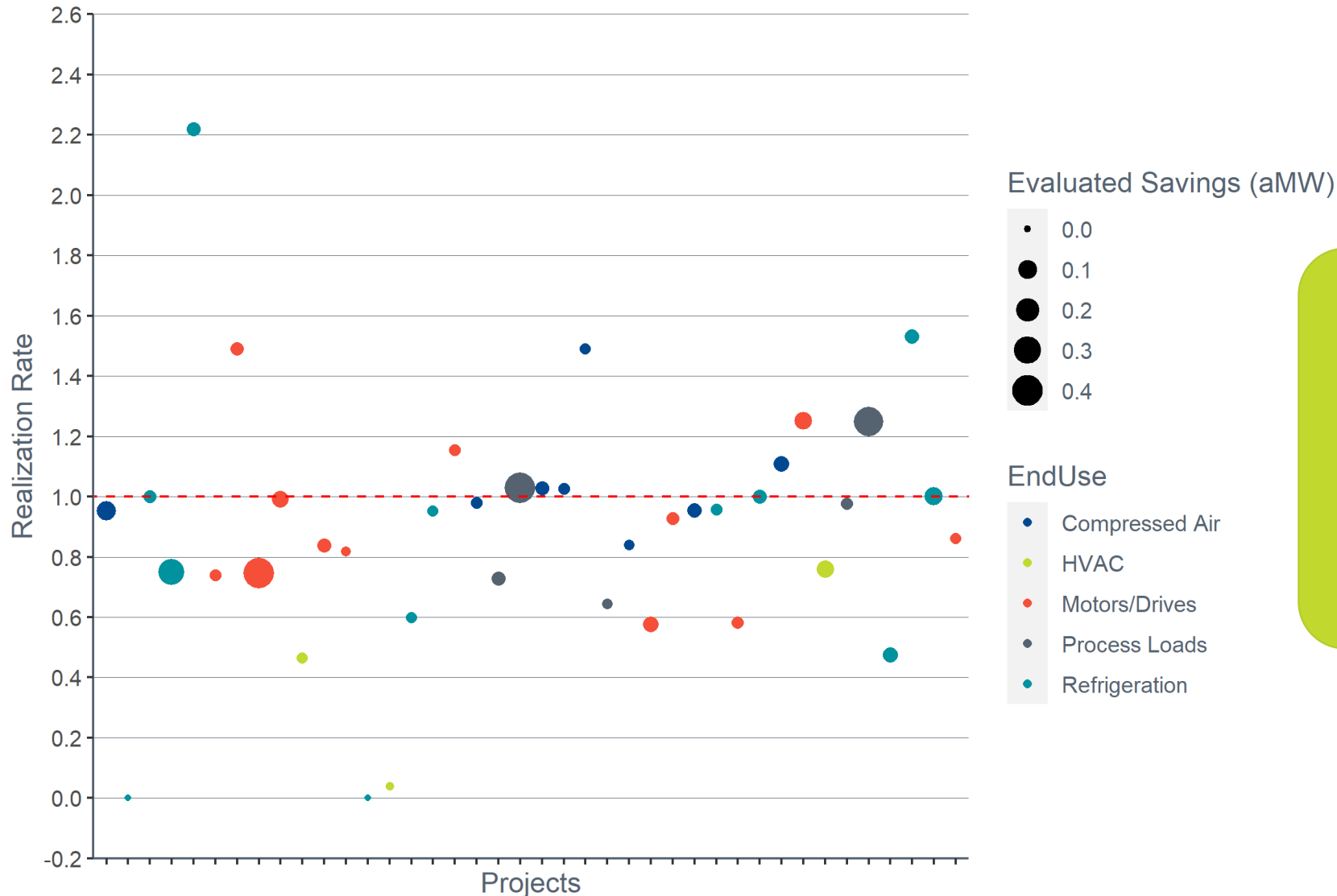
Evaluated vs Reported Savings by End Use



End Use	Realization Rate
Compressed Air	100%
HVAC	54%
Motors/Drives	81%
Process Loads	108%
Refrigeration	74%
Total	85%

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

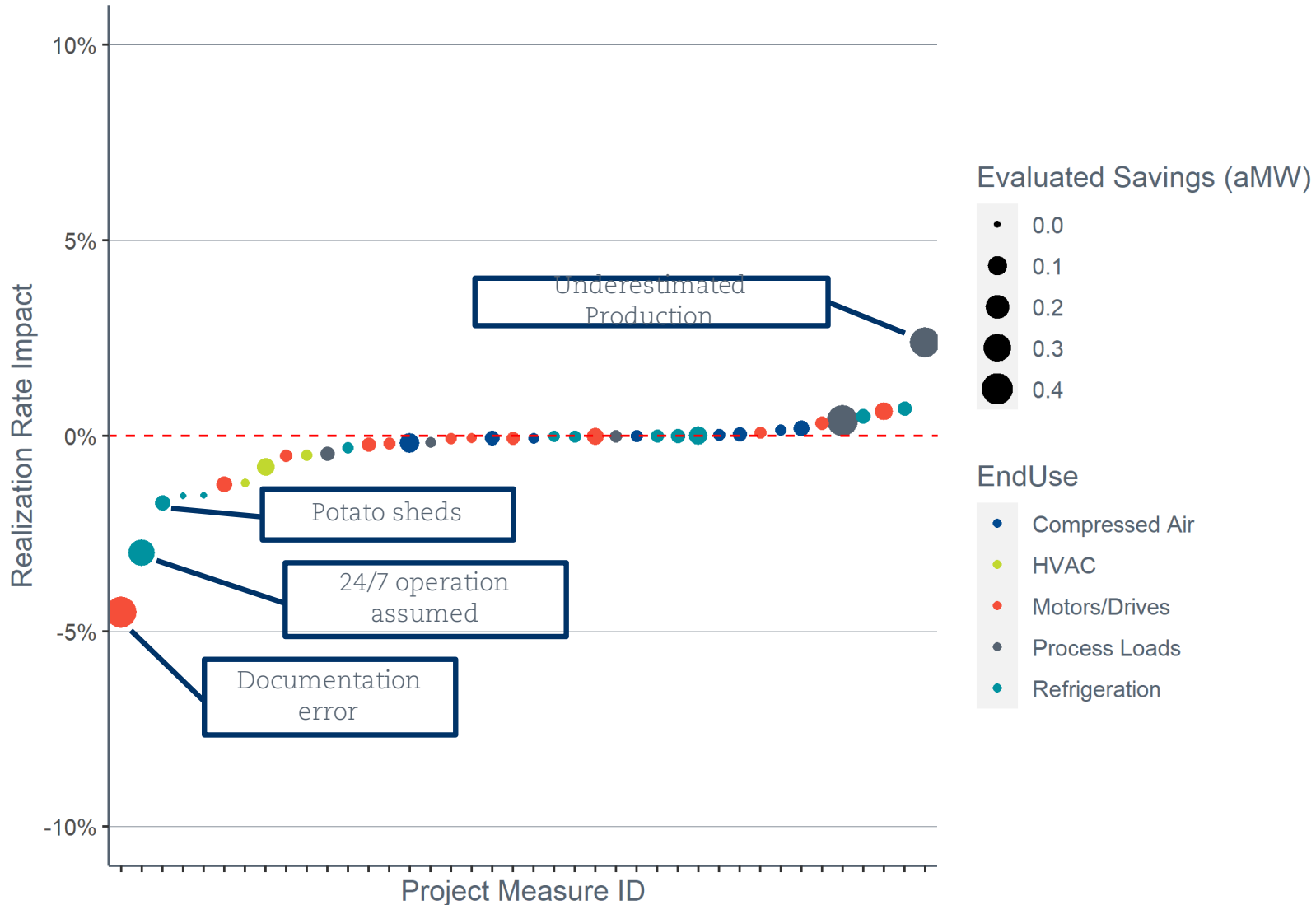
Baseline Discrepancies

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

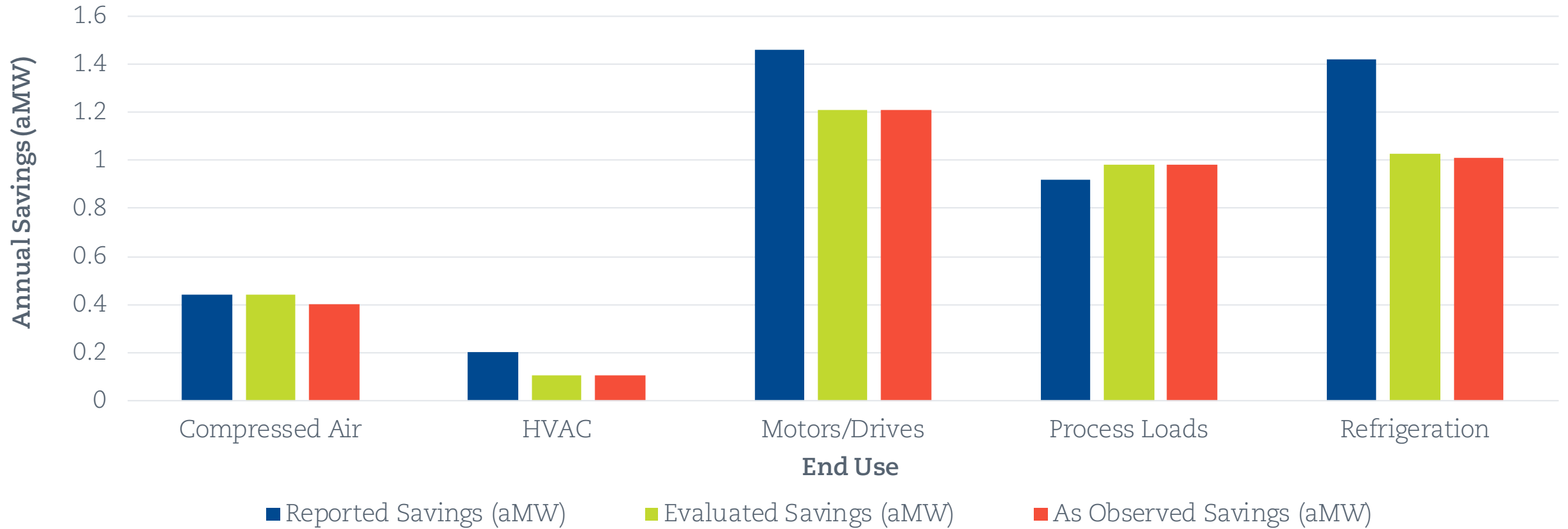
Project Measure Impact on Realization Rates



Several large projects are highly impactful on the overall realization rate; remainder have little impact

COVID Results

Annual Evaluated (COVID Impacts Removed) vs As-Observed (COVID Impacts Included)



Savings with and without COVID impacts were essentially the same

Cost Effectiveness Results

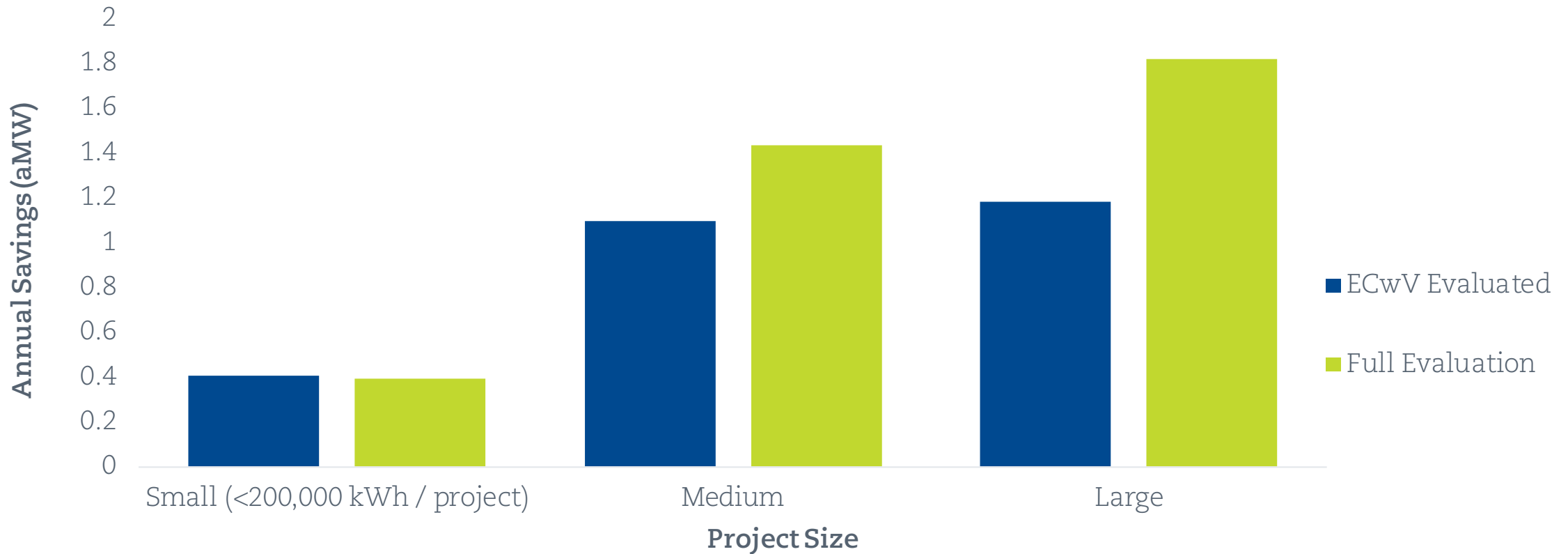


Custom Industrial projects
for Option 1 Utilities are
highly cost effective

Ratio of Benefits to Costs is 2.5
($\$2.50$ in benefits for every $\$1$ spent)

ECwV Results

Evaluated Annual Savings: ECwV vs As-Observed



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

RECOMMENDATION

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

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

Evaluators identified a documentation error in the largest project

Revisit QC procedures to reduce the potential for major reporting errors

The evaluators observed multiple potato shed project baseline issues

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