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# C2211 - Business & Energy Sustainability (BES)

## Impact & Process Evaluation Kickoff

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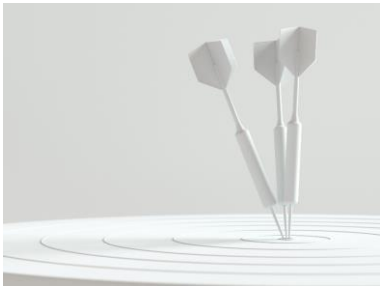
# Agenda

1. Objectives
2. Overview of programs
3. Impact Evaluation
4. Process Evaluation
5. Schedule & Budget
6. Q&A

# Impact Evaluation Objectives

1. Gross energy savings & winter/summer demand savings (kWh/kW/ccf savings for BES overall and for each sub-program)
2. Provide retrospective and prospective realization rates for energy and demand savings – potential CT PSD updates
3. Assess the accuracy of savings methodology used and identify updates where necessary





# Process Evaluation Objectives

1. Evaluate various structures of the programs such as program delivery mechanisms, customer training methods, impact of program on underserved sectors, customer satisfaction and program performance metrics
2. Identify program level challenges, provide feedback on program performance and implementation and deliver actionable recommendations on program improvements
3. Additionally:
   1. For **RCx and PRIME** – Evaluate pre/post data collection strategies adopted by the program and its implementers
   2. For **PRIME** – if normalization of baseline production data is consistently adopted for all projects and if/how PRIME acts as gateway for other program measures

# Overview of BES Programs

❑ **Operations & Maintenance (O&M)**
- Savings through operational changes/repairs
- Common measures: steam trap repair, compressed air leak studies

❑ **Retro-commissioning (RCx)**
- Identifies malfunctions in HVAC distribution systems
- Low-cost HVAC/control repairs
- Building-level screening/surveying, diagnostics

❑ **Process Re-engineering for Increased Manufacturing Efficiency (PRIME)**
- Provides lean manufacturing training
- Technical and financial assistance for lean techniques
- No-cost survey of process to ID opportunities
- Predominant measures
  - Changeover time reduction
  - Downtime reduction
  - Setup time reduction
  - Cycle time reduction
  - Increased throughput

*There is a 4th BES program (SEM), however that is not within the scope of this project and is covered in a separate evaluation



# Sample Design

❑ Expecting to include January 1st, 2019 – 2022 YTD

❑ Stratified by BES subprogram, and by size (project-level kWh and gas MMBtu savings)

❑ Target 90/10 confidence/precision for energy, 80/10 for demand

  ❑ Will be designed to meet ISO-NE FCM requirements

❑ Consideration for disadvantaged communities (DACs)

# Impact Data Collection

❑ **Operations & Maintenance (O&M)**
- Conduct virtual and in person site visits
- Verify the O&M measure installation and operability (Typically steam traps and air leak repair)
- Collect measure information (quantities, sizes, impacted equipment specs)
- Confirm baseline conditions
- Collect facility information

❑ **Retro-commissioning (RCx)**
- Conduct virtual and in person site visits
- Verify the RCx measure installation and operability
- Collect baseline conditions
- Collect high-level building data
- Request BMS trend data for fan speeds, or supply and return air flow rates and temperatures
- If BMS data not available deploy metering equipment

❑ **Process Re-engineering for Increased Manufacturing Efficiency (PRIME)**
- Conduct in person site visits
- Collect information on the implemented lean techniques
- Collect information on the impacted production lines & percentage of facility impacted
- Inventory the key impacted equipment
- Verify pre- and post-event significant changes to production throughput



# Analysis

❑ Desk Review of all of sampled projects using a priori assumptions

❑ Estimate evaluated savings based on site data collection

❑ **O&M** measures
- *Air leaks* – quantify reduced leakage rates, use manufacturer performance data for operating efficiency to estimate savings
- *Steam traps & gas O&M* – leverage findings from MA steam trap research

❑ **RCx** measures – BMS or metered data processed to key variables (OAT, facility schedule, etc.). Extrapolate to full year for savings and RRs

❑ **PRIME** measures – Savings calculated based on equipment type. CT PSD based analysis with verified facility data. Significant production changes around project period will be assessed

❑ Discrepancy analysis completed for each site

# Process Evaluation Key Topics

| BES Sub-program | Key Topics to be Addressed | Process Evaluation Methods | | | | |
|---|---|---|---|---|---|---|
| | | Program Materials Review | Program Staff IDIs | Vendor IDIs | Participant and Near-participant surveys | Benchmarking |
| **O&M** | Program delivery, customer satisfaction, customer training, underserved sectors, and performance metrics | * | ✓ | * | ✓ | ✓ |
| **RCx** | Program delivery and marketing, pre/post project data collection, customer satisfaction, customer training, underserved sectors and performance metrics | * | ✓ | ✓ | * | ✓ |
| **PRIME** | Program delivery and marketing, pre/post project data collection, production baseline data normalization, PRIME as gateway for other program measures, customer satisfaction, customer training and performance metrics | * | * | ✓ | ✓ | * |

✓= primary focus, * = secondary focus



# Program Materials Review

- ❑ Request program design and delivery documentation for O&M, RCx, and PRIME
  - ○ Review documentation: Design and/or logic model documents, implementation plans, established or informal protocols, and tracking data
  - ○ Develop understanding of how program works and inform development of IDIs and surveys.

*Data requests are currently in progress

# Program Staff and Vendor Interviews

- IDIs with up to 6 utility program staff and up to 15 relevant vendors
  - **Program staff**
    - Program objectives, design and delivery, participation, barriers, program and vendor satisfaction
    - M&V requirements
    - Program tracking data and variation between sub-programs
    - Opportunities for future program growth and collaboration between utilities
  - **Vendors**
    - Program delivery, marketing, and outreach activities, barriers
    - Available trainings provided to participant facility staff
    - Underserved markets – differences in marketing/opportunity compared to overall market



# Participant & Near-Participant Surveys

- Surveys with program participants (leveraging impact evaluation sample)
- Surveys for near-participants, as PA data allows
- Recruitment
  - Multi-modal outreach (post mailers, and CATI/phone backups for non-respondents
  - Use of third-party data sets where needed to fill contact info gaps

# Benchmarking

- ❑ Compare outcomes of BES to other similar initiatives
  - ❑ Identify gaps
  - ❑ Recommend opportunities for improvement
- ❑ Literature review of similar programs
  - MA and NY (under Prescriptive and custom offerings, except PRIME)
  - Puget Sound Energy (PSE) Commissioning and Industrial System Optimization Program
  - Energy Trust of Oregon (ETO) Operations and Maintenance Improvements
  - Bonneville Power Authority (BPA) Energy Smart Industrial Program
- ❑ Compare design and intervention strategies, program processes, marketing and customer segmentation, performance data, trade ally interactions and customer uptake



# Schedule

- **Project Planning and Data Collection:** November-December 2022
- **Impact Evaluation Tasks:** December 2022 – September 2023
- **Process Evaluation Tasks:** December 2022 – August 2023
- **Analysis and Reporting:** September 2023 – November 2023

*Report will be available in Fall 2023

# Budget

- **Task 1 – Data Prep, Sampling** – $35,000
- **Task 2 – Impact Evaluation** – $346,000
- **Task 3 – Process Evaluation** – $154,000
- **Task 4 – Analysis & Reporting** – $65,000

- **Total – $600,000**



# Discussion

- Questions, comments?

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