

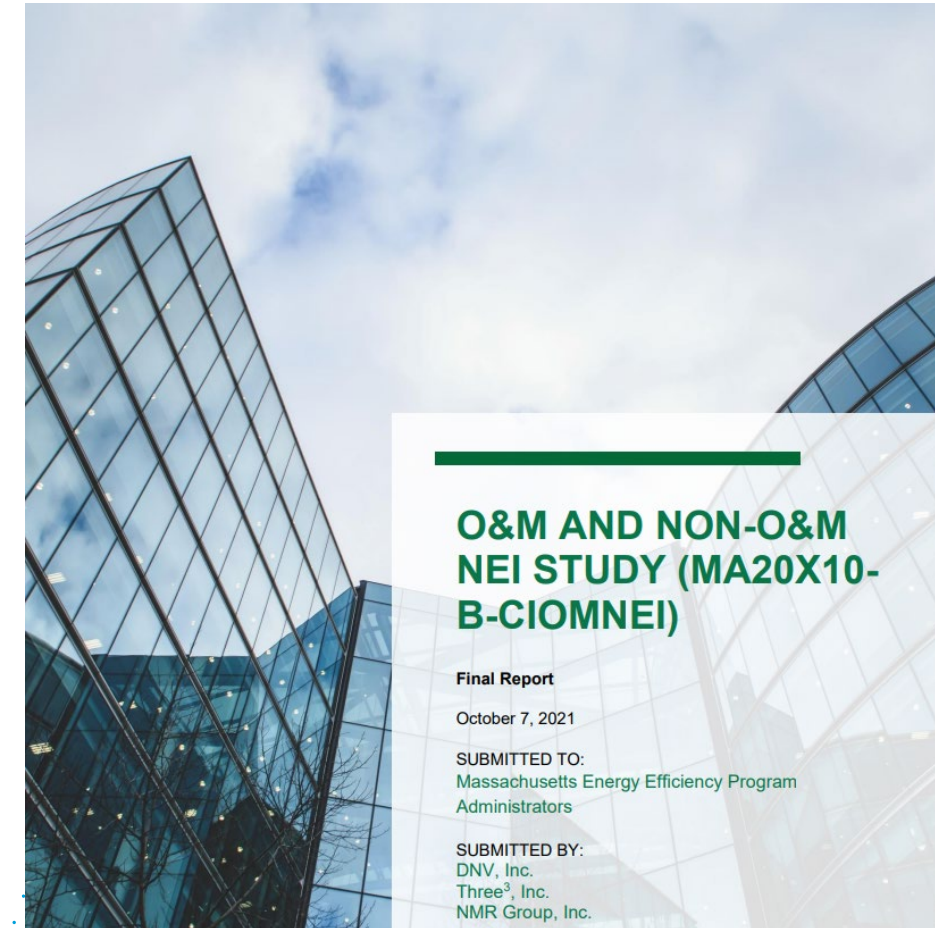


WHEN TRUST MATTERS

# I Need to Know

Understanding Non-Energy Impacts for C&I Programs

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[https://ma-eeac.org/wp-content/uploads/MA20X10-B-CIOMNEI\\_OM-NON-OM-NEIs-Report.pdf](https://ma-eeac.org/wp-content/uploads/MA20X10-B-CIOMNEI_OM-NON-OM-NEIs-Report.pdf)



BERKSHIRE  
GAS



EVERSOURCE



nationalgrid



*Cape Light Compact is interested in using these results to better align customer interests, climate goals and program infrastructure, and this study provides the foundation to continue these important efforts in the future.*

Margaret Song, C&I Program Manager,  
Cape Light Compact

# Research Objectives



## Develop NEIs more broadly

- O&M across all C&I
- Non-O&M with small business focus

## Produce

- Monetized NEIs
- Updated and new NEIs
- Identify differences by baseline

# Methods



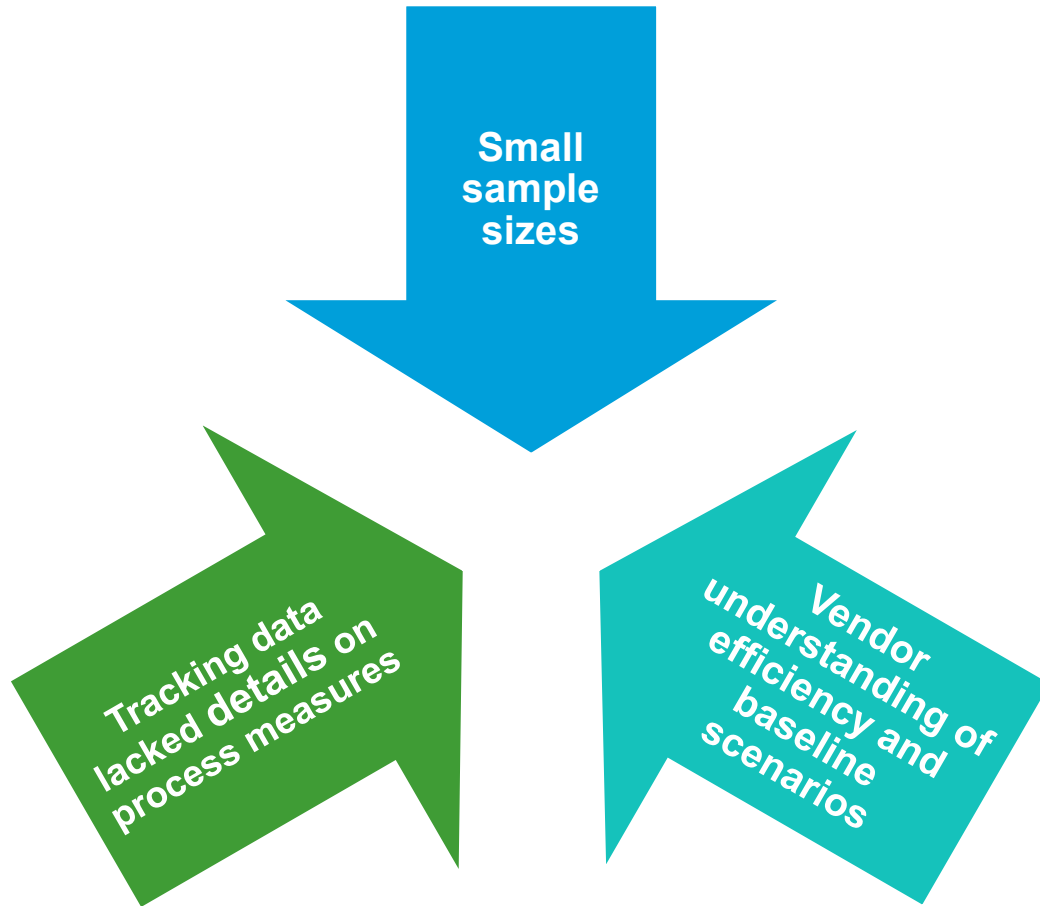
## O&M NEIs

- In-depth interviews with vendors
- Third-party data costing tools
- Expert review of results / pathways
- **No end-user surveys**

## Non-O&M NEIs

- In-depth interviews with small businesses
- Quantify incidence of non-O&M NEIs
- Identify directionality of NEIs
- Expert review of results / pathways

# Key Limitations and Threats to Validity



# Mitigating Actions Taken

- Aggregate measures by end use
- Use trimmed means to reduce anomalies
- Blend non-O&M NEIs from prior
- Consult senior engineers with expertise in Massachusetts Custom Process measures
- Review verbatim explanations
- Senior engineer reality checks on outliers
- Use trimmed means to remove outliers

# A Few Notes On Interviews



- Evaluators know what NEIs mean...
- Customers and vendors do not.
- Interviews avoided 'Non-Energy Impact' language
  - Differences in equipment life
  - Differences in required maintenance (frequency, cost, etc.)
  - Benefits or costs (increased sales, decreased spoilage, etc.)
- Screen sharing during interviews was a big plus



# O&M Estimation Methods



- Identify end-use categories and measures
- Obtain initial estimates from cost libraries
- Refine estimates based on vendor IDs
- Calculate aggregate NPV of lifetime values
- Assign NEI values to measures
  - Measure-group for similar measures
  - Value from prior study if not updated
  - No value (if not studied)

# Baseline Framework

Theory: NEIs vary by event type

- Replace on failure (ROF)
- New construction (NC)
- Early replacement (ER)
- Add-on measure (AD)

## Challenge 1

End-use customers are generally familiar with equipment in place and not alternative equipment.

## Challenge 2

Many measure categories are addons which improve efficiency of existing equipment (VFDs, EMS, RCx, lighting controls).

# Sample O&M Cost and Measure Life Table

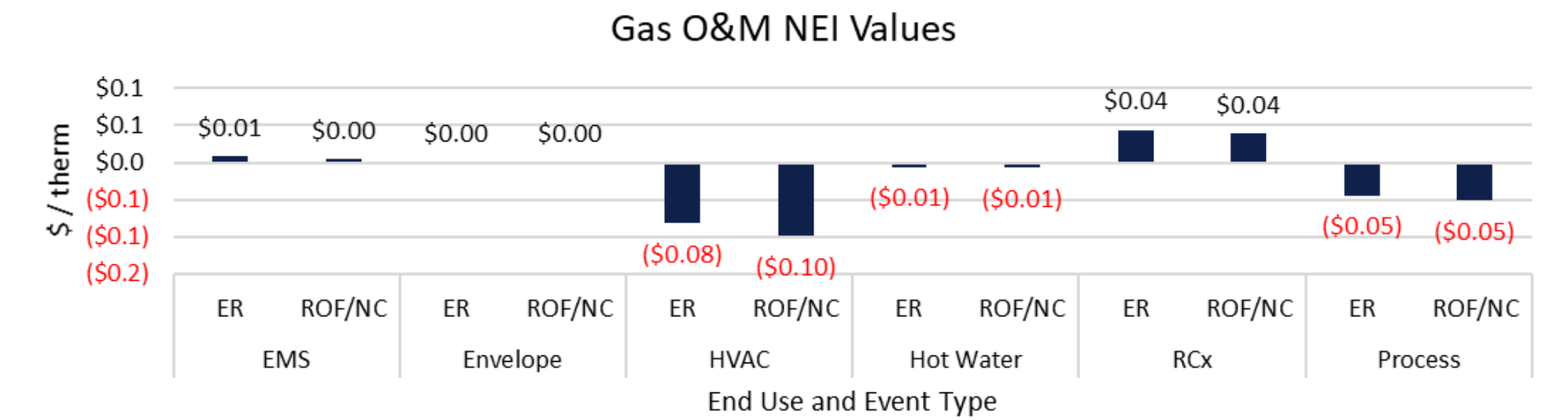
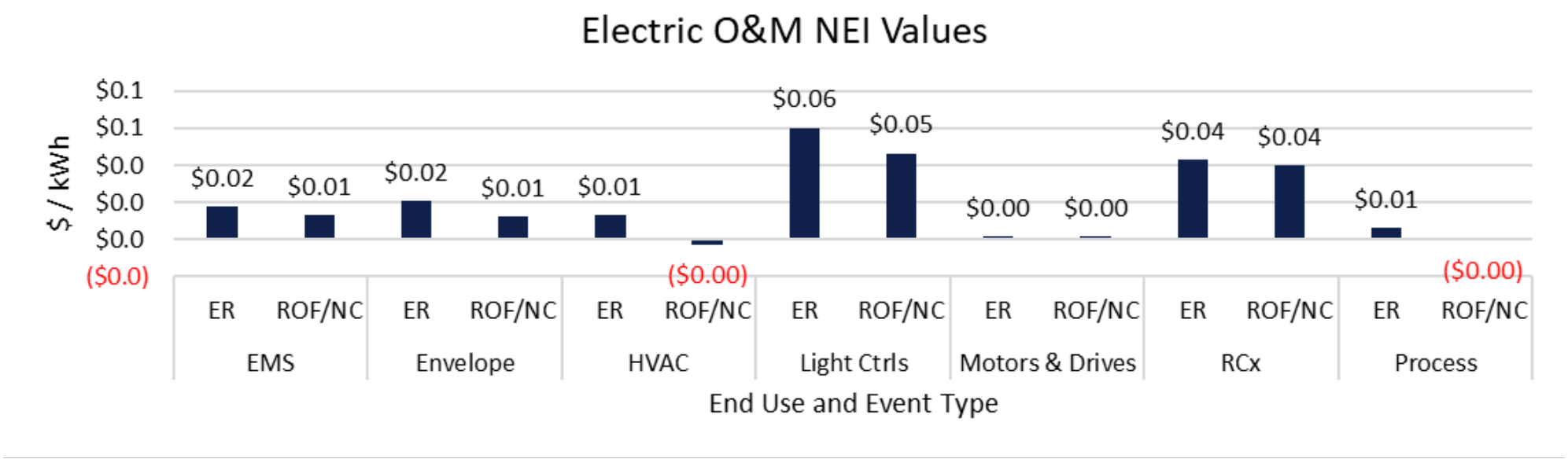
					Annual O&M			Major Maintenance				
Fuel Savings Type	Sub-Category	Efficiency	Age / Baseline	Equipment Descrip.	Labor (\$/year)	Parts (\$/year)	Downtime (N/A)	Freq (repairs / years)	Labor (\$/event)	Parts (\$)	Downtime (N/A)	Typical equipment life (Years)
Gas	Water Htr	Std	New	Storage (EF=0.61)	50	0	0	1	100	21.98	0	25
Gas	Water Htr	High	New	Tankless (EF=0.82)	50	0	0	1	100	21.98	0	25



Confirmed and updated by vendors during IDIs  
Rationale and reasoning for alternatives



# O&M Results





*NEI studies are popular with stakeholders in Massachusetts, leading to a vigorous NEI research program.*

*However, thus far the C&I sector has proven somewhat more challenging to study than residential, due to factors ranging from the diversity of business types, to the wide range of mechanisms for NEIs, to low response rates from businesses during the pandemic era.*

Ralph Prah, Prah Associates

# Lessons Learned



- Vendors broader range of projects than end-use customers
- Match target vendor with equipment
- Obtain rationale and mechanisms
- Define and explain baselines
- Speak in terms that customers understand

# Thank you

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# Non-O&M Estimation Methods

- Identify end-use categories and measures of interest for small business
- Identify possible non-O&M NEI categories
- Conduct participant interviews
  - Unprompted NEI identification
  - Prompted NEI identification
- Calculate aggregate NPV of lifetime values
- Assign NEI values to measures
  - Measure-group for similar measures
  - Value from prior study if not updated
  - No value (if not studied)

# Types of Non-O&M Costs

Verified non-O&M impacts for accuracy

Triangulated via quantitative and qualitative survey questions

Identified 'borderline' for sensitivity analysis

Categorized costs and benefits as follows:

- |                           |                             |
|---------------------------|-----------------------------|
| • Sales                   | • Materials/supplies        |
| • Other revenues          | • Labor                     |
| • Productivity            | • Product spoilage or waste |
| • Other output or benefit | • Other                     |