



**brightline**  
GROUP

# Energy Efficiency Programs Evaluation Study

Prepared for  
Rhode Island Office of Energy Resources  
Energy Efficiency and Management Resource Council

March 18, 2021

ILLUME



**Demand Side Analytics**  
DATA DRIVEN RESEARCH AND INSIGHTS



# BrightLine Team

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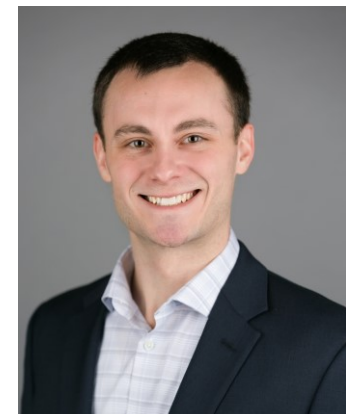
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# Topics

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- ▶ Study Scope and Objectives
  - ▶ Task 1 Activities and Findings
  - ▶ Task 2 Activities and Findings
  - ▶ Task 3 Activities and Findings
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- ▶ Study undertaken by OER as a result of an amendment made to the Lease Cost Procurement Law RIGL §39-1-27.7 in 2018 by the State Legislature to require that an energy consulting company conduct an energy savings verification study on National Grid's energy efficiency programs

# Study Scope and Research Objectives

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## ▶ Task 1: Review of EM&V Process:

- Does the current EM&V process in Rhode Island comply with national industry best practices for programs of its size and scope?
- ❖ Task complete and final report delivered February 2021

## ▶ Task 2: Saving Review & Verification

- Quantitatively, to what extent are National Grid's claimed energy savings realized?
- ❖ Task complete and final report delivered February 2021

## ▶ Task 3: Billing Analysis & Customer Experience

- Are there savings estimation and program implementation improvements needed to address issues with customer experiences not aligning with savings expectations?
- ❖ Task complete and final report delivered March 2021

# Task 1 Research Focus

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The BrightLine team gathered information on:

- ▶ EM&V planning
- ▶ Decision-making process prioritization and use of Rhode Island vs. Massachusetts-specific data for evaluation
- ▶ Approach for applying results for reporting and planning
- ▶ EM&V processes for program administrators, EERMC, and evaluation and implementation vendors, including budgets and costs, timeliness of receiving results, and application of results

# Task 1 Overview

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Activity Group	Number
Documentation Review and Summary (primarily reports and plans on EERMC website)	20+
Stakeholder Interviews	8
EM&V Vendor Interviews	5
Implementation Vendor Email Surveys	8
Benchmarking of DSM Spending and Interviews with EM&V Representatives from Other States	7

# Task 1 Findings: Best Practices

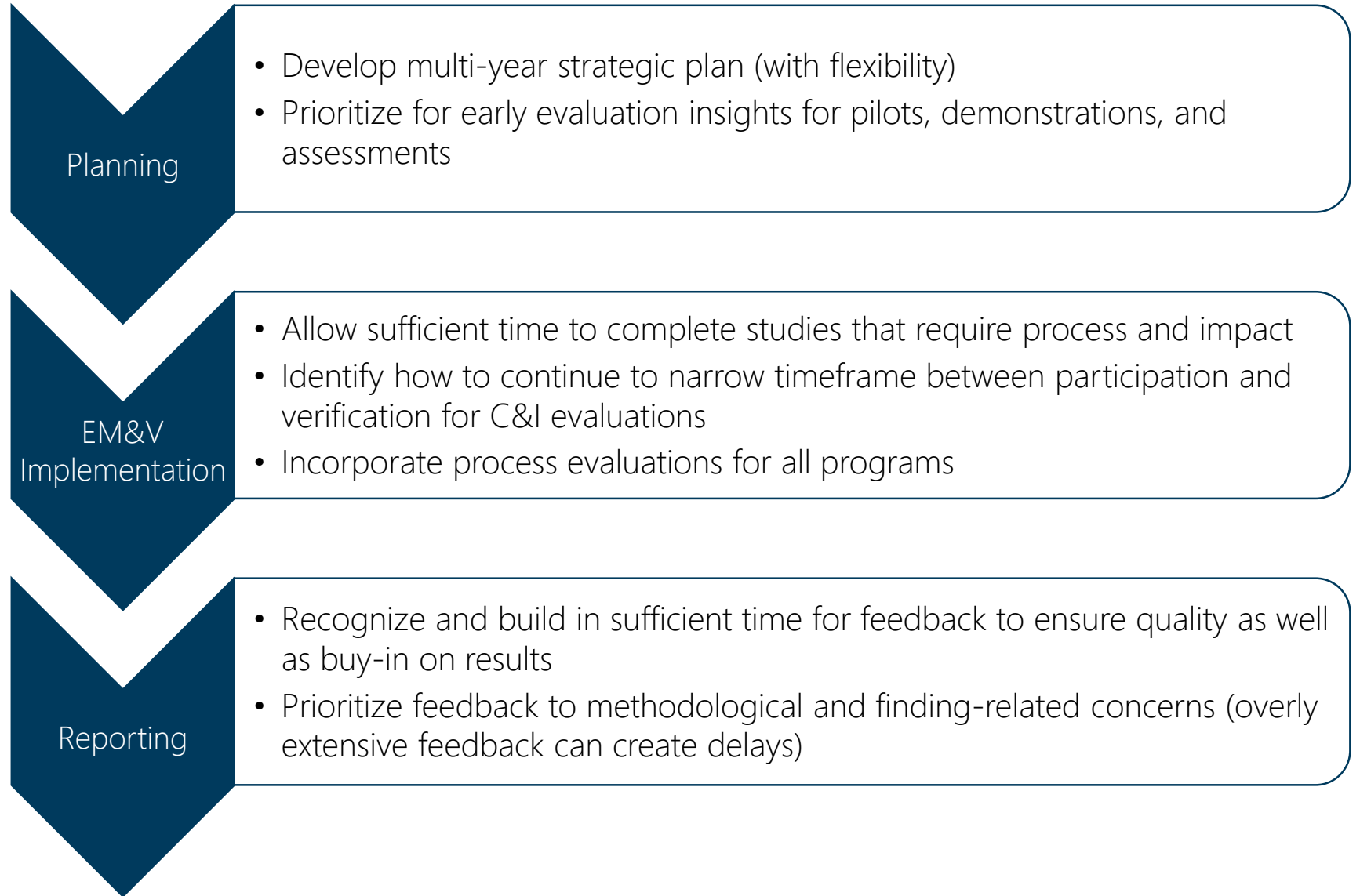
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Assessment focused on EM&V activities prior to 2020; the report highlights where those processes changed since then

- ▶ Rhode Island exhibits many best practices in EM&V
  - Evaluators are **independent**, but **collaborative** with National Grid and stakeholders
  - National Grid and the EERMC **strategically plan** EM&V activities, looking across years and programs
  - Annual EM&V planning allows for **flexibility** to adjust to program and market needs
  - EM&V is **comprehensive** for most programs integrating process, impact, and market evaluations
    - Rhode Island's market studies stand out for its DSM portfolio size
  - EM&V uses **defensible** approaches and rigor
  - **Funding**, at around 2% of portfolio spending, is **historically sufficient** given the extent RI leverages Massachusetts studies, although could require trade-offs in terms of number of studies, rigor, or cost
  - Residential and market study studies are generally **timely**, with evaluation following closely to delivery
  - EM&V reports **transparently** report results, methodologies, and study limitations
  - Results are applied and recommendations considered in **near-real-time** (for the next program year) particularly for residential programs
  - EERMC oversight and collaboration ensures methodologies and results are **sound and defensible**

# Task 1 Findings: Opportunities

Select opportunities identified by EM&V stage





# Task 2 Objective and Overview

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## ▶ Objective:

- Review how savings were calculated for major contributors to National Grid's portfolio energy savings and highlight areas for improvement

## ▶ Research activities:

- Review Rhode Island's Technical Reference Manual (TRM) algorithm and assumptions
  - 30 'priority' measures identified. Of these, energy savings for 20 of the measures are TRM based
  - These measures were benchmarked against 22 TRMs from across the country
- Review previous evaluation reports for alignment with EM&V best practices
  - Identified 25 relevant evaluation studies related to the priority measures within the past four years
  - Studies covered all customer classes and fuel types (residential, C&I, low income, electric and gas)

# Task 2 Findings: TRM Review

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- ▶ National Grid regularly uses evaluation results for the enhancement of the Rhode Island TRM. Almost all measures received at least one update over the five years of evaluated TRMs
- ▶ Two measures that seem out of alignment with others in the industry in terms of calculation methods and/or assumptions: C&I Upstream Lighting and SF LED screw-in A-lamps
- ▶ Recommendations:
  - Add applicable C&I prescriptive lighting into future TRMs
  - More carefully consider hours of use assumptions for Upstream Lighting
  - Review assumptions used to calculate savings values for LED Screw-In Lamps, to ensure they accurately align with market conditions
  - Explore potential adjustments to the steam trap deemed savings value
  - Organize the TRM by equipment and measure rather than by program or in another mode that makes the TRM easier for the reader to navigate

# Task 2 Findings: Evaluation Reports Review

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- ▶ National Grid's procured evaluations are generally **high-quality work products** that provide actionable recommendations to inform future program planning and implementation
- ▶ Very few issues warranting attention - minor issues pertained to sample design targets, assumptions or achieved confidence intervals that could have been more clearly described, and studies that could have benefited from additional actionable recommendations
- ▶ Believe these issues can be sufficiently addressed going forward by ensuring that expectations related to the evaluation objectives are clearly communicated with future evaluation contractors

# Task 3 Objectives


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- ▶ “Develop weather-normalized estimates of annual energy savings via pre/post billing analysis for C&I customers that participated in National Grid’s gas or electric retrofit programs. The annual energy savings estimates drawn from the billing analysis will be compared to the gross savings estimates stored in National Grid’s tracking data. This comparison informed the second key objective...”
- ▶ “Conduct follow-up customer interviews and site visits to understand any large discrepancies between the gross savings estimates stored in the tracking data and the savings estimates derived from the billing analyses.”

# Task 3 Overview

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Activity Group	Electric	Gas
Billing Analysis Population	1,551	420
Final Billing Analysis Sample after Filters Applied	298	34
Unique Accounts Identified for Customer Interviews	145	23
Completed Customer Interviews	29	5
Projects Identified for Documentation Review	5	0



# Task 3 Findings: Billing Analysis

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- ▶ The weather-normalized annual kWh savings produced by the electric billing analysis were **positively correlated** with the savings estimates stored in the NGrid tracking data
  - The estimates derived via the billing analysis were **generally lower** (BrightLine estimates about 80% of NGrid estimates)
  - Result is not wholly unexpected - National Grid will adjust gross savings using realization rates and in-service rates (The unadjusted savings values were the point of comparison in this analysis)
  - Several other that factors could explain the differences: meter matching issues, business expansion resulting in greater energy use, operational changes leading to increased/decreased hours of operation, random year-to-year variations in energy use, data entry errors, faulty or outdated TRM assumptions, etc.
  
- ▶ The weather-normalized gas savings estimates produced by the billing analysis were **largely uncorrelated** with the savings estimates stored in the NGrid tracking data
  - Many premises had **significant increases** in gas consumption
  - Reasons could be explained by expanded businesses, electric retrofits that led to increased gas consumption, and meter matching issues

# Task 3 Findings: Customer Interviews

- ▶ **Facility and operational changes** likely account for a significant amount of the misalignment
- ▶ 23 of 34 respondents (68%) report changes in the facility or operations have occurred since project completion

Types of Facility / Operations Issues Reported	Reports of facility or operational change by respondents who...	
	Had less savings than expected	Had more savings than expected
Change in facility loads / volume of production / hours of operation	7	3
Additional energy efficiency projects / equipment improvements	0	3
Meter sharing	3	0
Potential equipment / installation failure	5	0
Discovered deficiency in equipment when installing efficiency improvement; repair increased load (e.g., some equipment had been offline)	2	0

# Task 3 Findings: Project Documentation Review

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- ▶ BrightLine team found that, for **three of five** projects reviewed, National Grid's calculated savings values are **reasonable and appropriate**
  - One lighting project miscalculated
  - One lighting project likely based on overestimated HOU (note that National Grid often reports HOU as provided by the customer, however, it is recommended that values be checked for reasonableness)
- ▶ **Reasons for variance were identified** for four of five projects reviewed
- ▶ **Overall Task 3 Assessment:** National Grid's reported electric energy savings are reasonable and reasons for variances between National Grid's reported value and the savings calculated as part of the billing analysis activity for this task are generally explainable



# Thank you!

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