

**Cost-Effectiveness Report:
National Grid's 2019 Energy Efficiency and
System Reliability Procurement Plan**

**An Assessment and Report by
The Optimal Energy Consultant Team**

Working on Behalf of the



**STATE OF RHODE ISLAND
ENERGY EFFICIENCY &
RESOURCE MANAGEMENT COUNCIL**

Submitted to the Rhode Island Public Utilities Commission

XXX XX, 2018

Summary of Consultant Team Findings

The Energy Efficiency and Resource Management Council (EERMC) Consultant Team finds that the *Annual Energy Efficiency Plan for 2019* (the "EE Plan"), reviewed and approved by the Council on October 4, 2018, and to be filed October 15, 2018 by National Grid, is cost-effective according to the "Rhode Island Test" (RI Test) and the historically referenced Total Resource Cost (TRC) test. Furthermore, the energy savings are projected to cost less than the acquisition of additional supply, as defined by the Least Cost Planning Standards as modified by the PUC on September 6, 2018.

We also find that the implementation strategies outlined in the Plan will support a reasonable and credible sustained implementation of National Grid's energy efficiency program delivery efforts and align with the savings targets proposed by the EERMC in its December 22, 2016 filing and approved by the PUC at its Open Meeting held on April 27, 2017.

Last, we find that the proposed investment in grid reliability described in the SRP is cost-effective, and will defer a substation upgrade for four years, generating substantial benefits for ratepayers.

These findings and the remainder of this report were distributed to the EERMC on October 1, 2018 and presented to the EERMC by the EERMC Consultant Team at its October 4, 2018 meeting, and were approved and adopted in a vote of the EERMC.

Because the EE Plan and the SRP Report have been approved by the EERMC and meet the cost-effectiveness requirements of R.I.G.L. § 39-1-27.7(c)(5), the EERMC recommends that they also be approved by the Commission based on the Consultant Team's analysis and report.

I. Introduction

This report was prepared by the Consultant Team and the EERMC to help fulfill the requirements of R.I.G.L. § 39-1-27.7(c)(5) related to the Public Utility Commission's approval of National Grid's three-year procurement plan and related annual energy efficiency plans. Since 2010, the EERMC has directed the Consultant Team to prepare this report for all three-year and annual plans filed with the Commission. This version addresses National Grid's proposed *Annual Energy Efficiency ("the EE Plan")* and *System Reliability Procurement Report ("the SRP Report")*, reviewed and approved by the Council at its October 4, 2018 meeting.

This report submits our finding that the EE Plan and SRP Report are cost-effective as evidence to the Commission. It also describes the nature and process of the review and documents the professional experience and qualifications of the Consultant Team that performed the review.

In order to assess the cost-effectiveness of the EE Plan and SRP Report, the EERMC Consultant Team engaged in the following plan development and review processes:

1. Consistent and on-going oversight of actual National Grid energy efficiency planning and implementation activities through direct interactions with National Grid staff and participation in the Collaborative Subcommittee process (documented in Section II).
2. Reviewing the details of National's Grid Benefit-Cost Models ("BC Models") to ensure that they accurately reflect the proposed program designs in the Plan, recent evaluation results, and relevant TRM inputs (Section III)
3. Reviewing additional inputs to the cost-effectiveness calculations, including a revised approach to assessing whether the cost of efficiency is less than the cost of supply, as defined in revised Least Cost Procurement Standards approved by the PUC on September 6, 2018 (Section III).

II. Oversight of Planning and Implementation Activities

The EERMC, consistent with its statutory obligations under the 2006 Comprehensive Energy Act, continues to play an involved and active role with National Grid to guide, facilitate, and support public and independent expert participation in the review, oversight, and evolution of utility energy efficiency procurement and program implementation. The EERMC believes this input is critical to having the energy efficiency programs and new cost saving mechanisms evolve into resource acquisition tools that can effectively implement the Rhode Island law to procure all cost-effective natural gas and electric energy efficiency. The updated Standards in Docket No. 4684 require a consistent and effective process to guide the development and submission of National Grid's Plan to the Commission.

The EERMC has met its review and input requirements both at its regularly scheduled meetings with National Grid and through Collaborative meetings and phone calls. The Collaborative is comprised of EERMC members; the EERMC Consultant Team; RI Office of Energy Resources (OER); Acadia Center; the Division of Public Utilities and Carriers with representation from the Attorney General's Office and support from its consultant; People's Power and Light; and TEC-RI. National Grid coordinates and hosts the meetings, and has energy efficiency and system reliability representatives in attendance at all meetings.

For the EE Plan, the Consultant Team reviewed and commented on two drafts of the Plan in August and September of 2018. This included attending or participating in presentations by the Company and providing comment in both written form and through in-person and telephone conversations with the Company and EERMC members.

III. EE and SRP Plan Program Design and Evaluation Review

The Consultant Team reviewed the draft and final Plans to assess the proposed program designs and the extent to which they and the associated cost-effectiveness analyses reflect recent evaluation results and relevant TRM inputs. This review is documented in the memorandum from the Consultant to the EERMC dated October 1, 2018 regarding the review process and findings. That document is available at [<link>](#).

As a result of these activities, the Consultant Team communicated with National Grid analysts and sector managers to address pertinent issues and questions related to both program design and cost effectiveness. In some cases, this resulted in revisions to the Plan. Overall, our findings are that:

- The overwhelming majority of the modeling and cost-effectiveness assumptions reviewed were reasonable and well-supported. Any issues identified in the BC Models or in the Plan were addressed at the portfolio and program level by National Grid's analyst team.
- National Grid appropriately used new results from both Rhode Island and relevant Massachusetts evaluations that were recently completed to update multiple measure baselines, net-to-gross ratios, measure lives, and other measure assumptions.
- The objectives of the Least Cost Procurement Standards were followed to ensure that program designs and the resulting implementation secure cost-effective energy efficiency resources that are lower than the cost of supply, are prudent and reliable, and deliver hundreds of millions of dollars in bill savings to Rhode Island customers.

In general, the Consultant Team found National Grid's processes for revising their cost-effectiveness inputs and assumptions to be thorough and comprehensive. National Grid appropriately adjusts baselines for new building codes and federal standards, and incorporates

the latest findings from evaluation studies. In addition, the Company updates anticipated program costs based on recent experience and new market information.

The Consultant Team also reviewed the 2019 System Reliability Procurement Report filed by National Grid to determine if the proposed projects are cost-effective and to develop a qualitative understanding of the proposed investments. Our assessment of the cost-effectiveness of the SRP battery storage project appears in the following section.

IV. Cost-Effectiveness Review

Defining Cost-Effectiveness

Cost-effectiveness tests for energy efficiency measures and programs compare the net present value of a stream of benefits to the net present value of a corresponding stream of costs, whether they occur at the time of implementation or over several years. When the benefits exceed the costs, the measure or program is said to be “cost-effective.”¹ Several tests exist, each of which assesses cost-effectiveness from a different perspective. The Total Resource Cost (TRC) has been widely accepted and used by regulators and policy-makers to evaluate demand-side management programs because it takes an expansive view of the effects of these programs, including all of the costs borne by consumers (whether directly or indirectly through utility rates) and all of the benefits that accrue to those consumers. Historically, Rhode Island relied on the TRC test to assess whether the benefits of an efficiency measure or program outweighed the costs for Rhode Island consumers.

Beginning with the 2018 Plan, the Rhode Island Public Utilities Commission ordered National Grid to develop a benefit-cost test that “more fully reflects the policy objectives of the State.” The Commission did not specify the components of the new “Rhode Island Test” (or “RI Test”) in detail, but provided a number of principles to follow, including symmetry, transparency, and the importance of accounting for all relevant impacts, even those that are difficult to quantify or monetize. The resulting RI Test includes two additional categories of benefits in addition to those typically included in the TRC: the benefits associated with reduction in greenhouse gas (GHG) emissions, and the benefits associated with economic development resulting from investment in energy efficiency. These were described in detail in the Cost-Effectiveness Report on the 2018 Plan.

¹ The results of this analysis can be expressed as either the net benefits (i.e., total benefits minus total costs), where cost-effective is defined as positive net benefits, or as the benefit-to-cost ratio (total benefits divided by total costs), where cost-effective is defined as a ratio of greater than or equal to 1.

Assessing the Cost-Effectiveness of the 2019 EE Plan

The final Plan presents the cost-effectiveness of the proposed 2018 programs using both the TRC and the RI test. The table below summarizes the results in terms of benefit-cost ratio. Considering just the TRC, both the electric and gas portfolios are robustly cost-effective in every year; electric portfolio benefits are nearly three times the total costs of the investments, while gas portfolio benefits exceed costs by 50%. We note that the cost-effectiveness of the electric portfolio is substantially greater than in the 2018 Plan. This is a result of increased avoided capacity costs and enhanced analysis of demand reduction induced price effects (DRIPE). The gas portfolio is slightly less cost-effective than in 2018 as a result of lower natural gas avoided costs.

BCR	TRC Test	RI Test
Electric	2.9	4.3
Gas	1.5	2.7

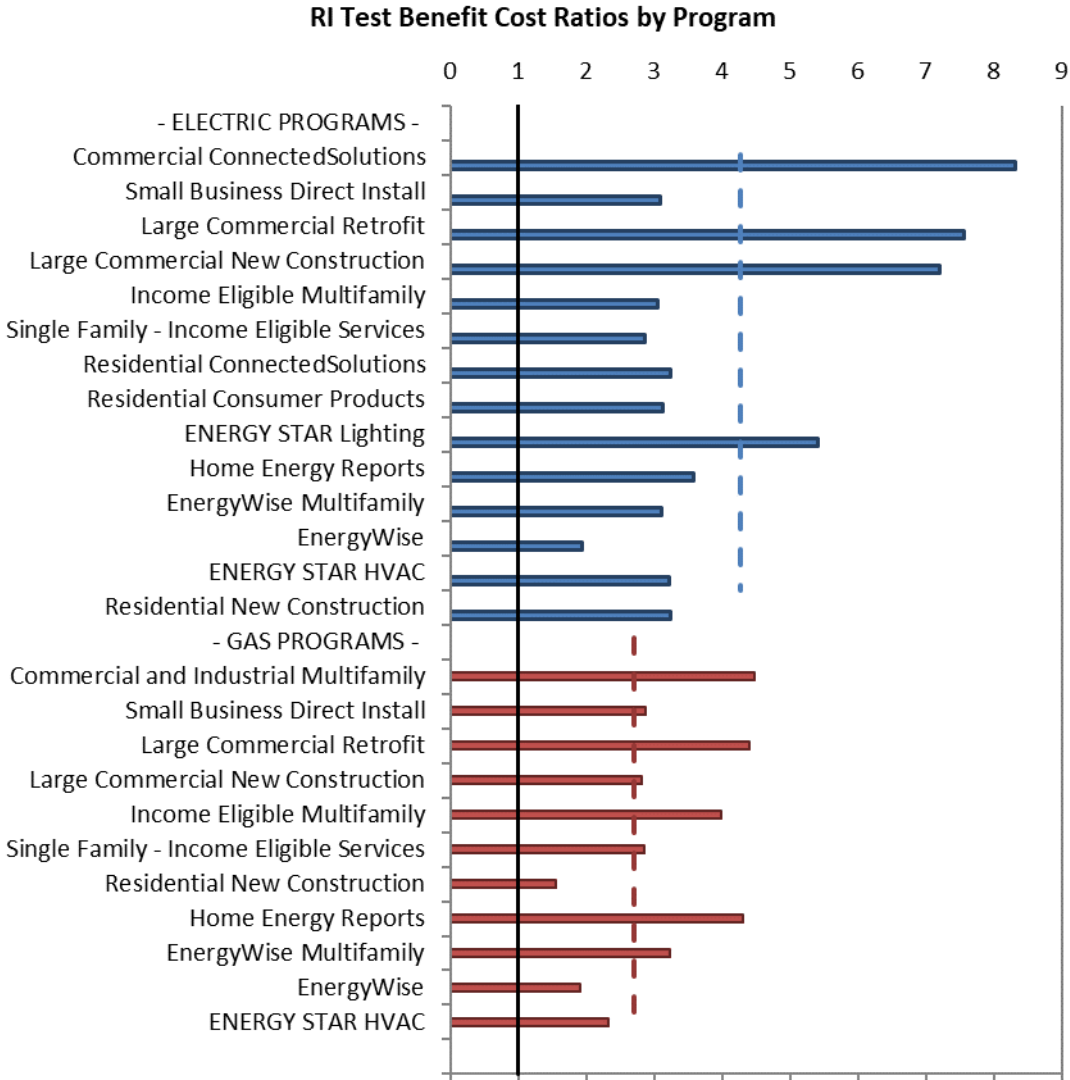
As described above, the RI Test seeks to include a more complete set of benefits that better reflects state policy. The benefits associated with reductions in greenhouse gas (GHG) emissions have been included by relying on the 2018 version of the *Avoided Energy Supply Costs in New England* report (AESC). This report projects a long-term value of reductions in carbon emission of \$100 per short ton. A small portion of this value – representing the near-term value of carbon reductions given current and likely future carbon regulation – is already included or “embedded” in the avoided energy costs that compose a portion of the benefits under the TRC Test. Therefore, the RI Test includes the remaining value of carbon emissions up to the full \$100 per ton value. The 2018 AESC also quantified new benefits for non-embedded nitrogen oxide (NOx) reduction benefits. These are much smaller than the non-embedded GHG reduction benefits, but they do appear on the figures below as an additional benefit under the RI Test.

It is generally acknowledged that increased spending from installing energy efficiency measures creates jobs in the local economy. Participant and program spending on efficiency often has positive benefits to the local economy as a greater portion of total energy costs are spent locally. Yet these benefits are typically not included in TRC benefit calculations because they are difficult to quantify, requiring a regional economic model. Such an analysis was conducted for National Grid in 2014, the results of which form the basis for the economic benefits included in the RI Test.² Depending on the sector, fuel, and source of spending (i.e., participant or

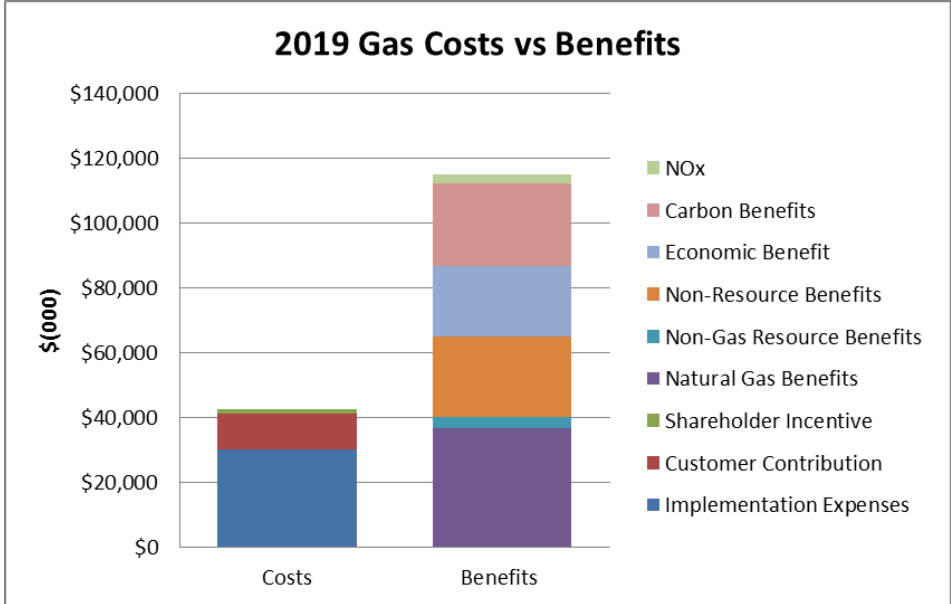
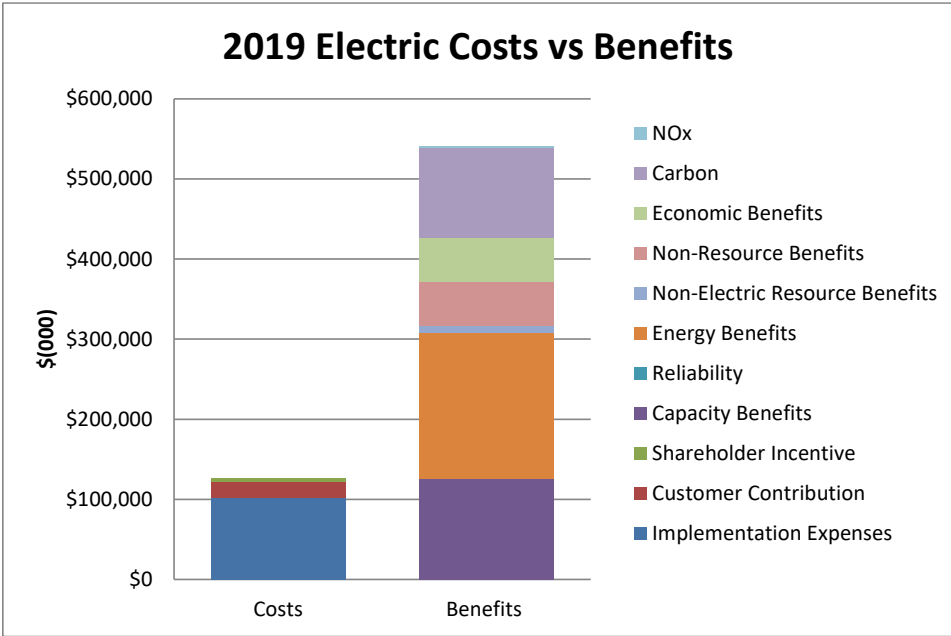
² Macroeconomic Impacts of Rhode Island Energy Efficiency Investments: REMI Analysis of National Grid’s *Energy Efficiency Programs*, National Grid Customer Department, November, 2014.

program), the study found economic benefits (above and beyond the value of avoided energy and capacity) of between \$0.56 and \$0.75 for each dollar spent. These factors were used to calculate the economic benefits in the RI Test results.

The Consultant Team has reviewed the quantification of the GHG reduction and economic benefits in the RI Test and finds them to be appropriate and in keeping with the Commission's direction. Returning to the table above, the inclusion of the more complete set of benefits in the RI Test results in a 48% and 80% increase in BCR for the electric and gas portfolios, respectively. The figure below presents the results of the RI Test in graphical form and again demonstrates that both the electric and natural gas efficiency programs have a BCR greater than 1.0, as required by the Commission-approved Least Cost Procurement Standards and R.I.G.L. § 39-1-27.7 (c)(5).



The graphs below show the major components of both the costs and benefits of the portfolios for the 2019 Plan. The total resource benefits in both the gas and electric portfolios are mostly derived from primary fuel savings. Similarly, the total resource costs are largely participant incentives. The top three sections of the benefits chart are the components that are included only in the RI Test; the lower sections are included in both the TRC and RI Tests. As noted in the table above, the electric and gas portfolios are both cost-effective using the more restrictive TRC as well as the RI Test. On the cost side, note that the BCR calculation includes an allowance for National Grid's shareholder incentive at the nominal or "target" value.



The Consultant Team also reviewed National Grid's assessment of the cost of efficiency as compared to alternatives; the LCP standards require that efficiency be lower cost than acquisition of additional supply. The procedure for demonstrating compliance with this requirement has undergone several changes over the past two years. During the review phase of the 2018 Plan, the Consultant Team carefully reviewed the comparison of cost of energy efficiency and supply (First Draft Energy Efficiency Plan, Main Text, Page 5)³ and recommended two changes: remove customer contributions from the calculation of cost of energy efficiency and base the cost of supply on the Standard Offer Charge for all Residential, Commercial and Industrial customers rather than solely the Residential Standard Offer charge. The PUC approved the 2018 Plan and this revised methodology, but instructed the EERMC to propose changes to the LCP Standards to reflect this approach.

In response to the PUC's order, the EERMC and the Consultant Team engaged in a series of discussions and drafted language for the LCP Standards to reflect the new methodology. The PUC held a Technical Session on 17 July 2018 to discuss the proposed change in the LCP Standards. At this meeting, PUC Staff noted that Docket 4600 established a framework for assessing the potential costs and benefits of any action that would affect National Grid's rates, and that this framework should be applied to the determination of whether the cost of efficiency is less than the cost of supply. Extensive discussion ensued regarding which categories of costs described in the framework should be included in the cost of supply and which should be excluded. At an open meeting on 31 July 2018, the PUC voted to reject the EERMC's proposed revisions to the LCP Standards and directed Staff to propose new language for stakeholder review.

The Staff submitted revised language for the LCP Standards on 3 August 2018. It contained two important conditions. First, it would require that National Grid propose the specific costs and factors to be included in the cost of energy supply and energy efficiency supply in their Energy Efficiency Plans. Second, it requires that the costs of energy supply and the cost of efficiency supply be assessed "using all applicable costs enumerated in the Rhode Island Benefit Cost Framework approved by the PUC in Docket No. 4600A and the Rhode Island Test." The PUC approved changes to the Standards language largely consistent with Staff's submission at the Open Meeting on September 6, 2018.

The 2019 Plan reflects the new guidance for assessing whether the cost of efficiency is less than the cost of supply. The Plan uses the RI Test as an appropriate starting point to determine which costs to include in this assessment. This test captures the aspects of the Docket 4600A Framework that pertain to energy efficiency programs. The source for many of these values is

³ Docket 4755, *National Grid's Annual Energy Efficiency Plan for 2018*

the “Avoided Energy Supply Components in New England: 2018 Report” (2018 AESC Study) prepared by Synapse Energy Economics for the AESC 2018 Study Group, June 1, 2018. The benefits in the RI Test are associated with the cost savings to Rhode Island from investing in energy efficiency instead of investing in additional energy supply. For the purpose of the RI Test, these values are described as a benefit of energy efficiency in the form of avoided costs. It is reasonable to assume that these avoided cost values can also be applied as the costs of procuring additional energy supply for the purpose of this assessment. The RI Test also details what is considered a cost of energy efficiency. These are costs incurred by the utility to implement the Plan and the expense borne by the customer for its share of the energy efficiency measure cost.

The Plan enumerates all of the cost and benefit categories included in the RI Test and indicates which are included as a cost of efficiency, which are included as a cost of supply, and which are excluded from this comparison. The major categories that are excluded are economic development benefits, non-energy resource impacts such as water and sewer cost reductions, and other non-energy impact benefits other than those associated with income eligible rate discounts and reductions in arrearages. Using this approach, for the electric sector the cost of efficiency is approximately \$126 million and the cost of supply is \$451 million; for the gas sector the values are \$43 million for efficiency and \$68 million for supply. In both cases, efficiency costs less than supply. Based on our participation in the discussions regarding this comparison and our review of the Plan, we believe that the Company has appropriately assessed the cost of efficiency and the cost of supply and determined that the former is less than the latter.

In summary, the EERMC Consultant Team concludes that the EE Plan meets the cost-effectiveness requirements of R.I.G.L. § 39-1-27.7(c)(5) as well as the revised LCP Standards guidance regarding the cost of efficiency and the cost of supply, and therefore should be approved by the Commission.

Assessing the Cost-Effectiveness of the 2018 SRP Report

The SRP report presents information regarding the projected cost-effectiveness of a battery storage project in Little Compton. This project was selected in a public RFP process to procure a replacement for an earlier pilot load curtailment program in that geographic area. The project will defer a substation upgrade for a period of four years. The value of this deferral provides the vast majority of the benefits of implementing this project, estimated at approximately \$905 thousand. Additional benefits of roughly \$100 thousand are derived from largely from avoided capacity costs, similar to an energy efficiency project. With a total cost of the project for the four years of \$438 thousand, the project is cost-effective, with net benefits of roughly \$567 thousand and a benefit-cost ratio of 2.3.

While the 2019 SRP Plan does not explain how this benefit value was determined, previous SRP Plans included greater detail on the calculation. Referring to the 2012 SRP Plan (Docket 4296), we note that the benefits of a four-year deferral in substation updates were reported as \$484 thousand. Just last year, in the 2018 SRP Plan, the benefits were reported as \$647 thousand. National Grid has stated the reason for the increase in the estimated benefits of deferring the substation upgrade compared to last year's plan relate to a change in how the project costs are accounted for, including depreciation treatment under the recent Tax Cuts and Jobs Act. Based on the information provided, the Consultant Team accepts the benefit estimate reported in the 2019 Plan, and therefore believes that the proposed battery storage project is cost-effective.

V. Conclusion

For the reasons stated herein, the EERMC and the EERMC's Consultant Team finds that National Grid's 2019 Energy Efficiency Program Plan and their 2019 System Reliability Procurement Report are cost-effective and lower cost than the acquisition of additional supply pursuant to R.I.G.L. § 39-1-27.7 (c)(5).