

**The Narragansett Electric Company  
d/b/a National Grid**

**2016 Energy Efficiency Year-End Report**

**May 1, 2017**

**nationalgrid**

May 1, 2017

**BY HAND DELIVERY AND ELECTRONIC MAIL**

Luly E. Massaro, Commission Clerk  
Rhode Island Public Utilities Commission  
89 Jefferson Boulevard  
Warwick, RI 02888

**RE: Docket 4580 – The Narragansett Electric Company d/b/a National Grid  
2016 Energy Efficiency Year-End Report**

Dear Ms. Massaro:

I have enclosed ten copies of National Grid's<sup>1</sup> 2016 Energy Efficiency Year-End Report (Year-End Report), which summarizes the gas and electric results, program highlights, and customer experiences during the 2016 program year. The Company has provided a copy of the Year-End Report to the parties in this proceeding.

Thank you for your attention to this filing. If you have any questions, please contact me at 781-907-2121.

Sincerely,



Raquel J. Webster

cc: Docket 4580 Service List  
Jon Hagopian, Esq.  
Steve Scialabba, Division

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<sup>1</sup> The Narragansett Electric Company d/b/a National Grid (National Grid or Company).

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## Attachments:

- Attachment 1: Electric Summary Tables of Year-End Results
- Attachment 2: Gas Summary Tables of Year-End Results
- Attachment 3: Case Studies
- Attachment 4: 2016 Year-End Participation Memo
- Attachment 5: 2016 Employment Supported by Energy Efficiency in Rhode Island Report
- Attachment 6: 2016 RGGI Auction Proceeds Report

# NATIONAL GRID

## 2016 ENERGY EFFICIENCY YEAR-END REPORT

### Overview

The year 2016 was a successful year for National Grid's<sup>1</sup> energy efficiency (EE) portfolio of programs and initiatives. This Year-End report summarizes the gas and electric results, program highlights, and customer experiences over the entire year. The electric and gas programs are described more fully in the Settlement of the Parties, filed in Docket No. 4580 on October 15, 2015, and approved by the Rhode Island Public Utilities Commission (PUC) at its open meeting on December 16, 2015.

The primary goal set forth in the 2016 Settlement of Parties was to "create energy and economic cost savings for Rhode Island consumers through energy efficiency."<sup>2</sup> The charts below summarize the electric and gas program benefit cost ratios, savings and expenditures compared to planned benefit cost ratios, savings goals, and budgets respectively. The benefit cost ratios exceeded expectations and are far greater than 1, indicating that the Company's programs created positive value to Rhode Island for every dollar invested in 2016. In total, the 2016 programs will create electric cost savings of \$217.9 million and gas cost savings of \$51.1 million for Rhode Island customers over the life of the installed energy efficiency measures.

In addition to cost savings, the 2016 energy efficiency programs created significant economic benefits to Rhode Island. The programs supported 702 full-time equivalent (FTE) workers in 2016. Most of the jobs created as a result of energy efficiency investments were local because they were tied to installation of equipment and other materials. In fact, of the 923 companies and agencies involved in National Grid's 2016 energy efficiency programs, 82% were located in Rhode Island.<sup>3</sup> In addition, the 2016 energy efficiency programs will add over \$355.9 million to Rhode Island's Gross State Product (GSP).

Another goal of the 2016 Plan was to achieve electric and gas savings targets established in the 2016 EE Program Plan, which were consistent with the goals established for 2016 in the 2015-2017 Three Year Least Cost Procurement Plan. The 2016 electric savings target was 199,760 MWh. At the end of the year, the Company achieved 214,329 MWh energy savings, which represents 107.3% of that goal. The savings goal represents 2.8% of the reference 2012 load. The Company also had an annual kW savings goal of 29,545 kW, and at the end of the year, it had achieved 30,530 kW savings, which represents 100.7% of that goal.

The 2016 gas savings target was 395,760 annual MMBtu. At year's end, the Company achieved 417,820 annual MMBtu, which represents 105.6% of that goal. The savings goal represents 1.2% of the reference 2012 load.<sup>4</sup> Detailed savings information can be found in Attachment 1, tables E-1 and E-2, and Attachment 2, tables G-1 and G-2.

Additional cost and savings information can be found in Attachment 1, tables E-1 and E-3, and Attachment 2, tables G-1 and G-3.

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<sup>1</sup> The Narragansett Electric Company d/b/a National Grid (National Grid or Company).

<sup>2</sup> Energy Efficiency Program Plan (EEPP) for 2016, Settlement of the Parties, October 15, 2015, Docket 4580, page 1.

<sup>3</sup> Peregrine Energy, Analysis of Job Creation from 2016 Expenditures for Energy Efficiency in Rhode Island by National Grid, April 2017. Copy included in Attachment 5.

<sup>4</sup> The gas savings goal is a percent of actual 2012 sales, not the preliminary sales data used in Docket No. 4443 - RI Energy Efficiency and Resource Management Council (EERMC) - Proposed Energy Efficiency Savings Targets for National Grid's energy efficiency procurement for the period 2015 - 2017 consistent with Least Cost Procurement (filed 9/17/13). If the preliminary 2012 sales data is used, the achieved 2015 gas savings would represent 1.11% of sales. There is no noticeable difference in the 2012 preliminary electric sales and actual sales.

	2016 Goal/Benchmark <sup>5</sup>	2016 Actual <sup>6</sup>	% of Goal
<b>Electric</b>			
<b>Annual MWh Savings</b>	199,760	214,329	107.3%
<b>Annual kW Savings</b>	30,332	30,350	100.7%
<b>Lifetime Benefits (\$Mil)</b>	\$200.6	\$234.2	117%
<b>Benefit/Cost Ratio</b>	1.77	2.16	122%
<b>Gas</b>			
<b>Annual MMBtu</b>	395,760	417,820	105.6%
<b>Lifetime Benefits (\$Mil)</b>	\$55.6	\$59.0	106%
<b>Benefit/Cost Ratio</b>	1.63	1.93	118%
	<b>2016 Budget (\$Mil)<sup>7</sup></b>	<b>2016 Actual (\$Mil)<sup>8</sup></b>	<b>% of Goal</b>
<b>Electric</b>			
<b>Total Expenditures<sup>9</sup></b>	\$87.5	\$78.4	90%
<b>Total Implementation Expenses<sup>10</sup></b>	\$84.6	\$74.3	88%
<b>Gas</b>			
<b>Total Expenditures</b>	\$27.7	\$24.6	89%
<b>Total Implementation Expenses</b>	\$26.4	\$23.1	88%

To achieve the primary goal described above, the Company employed four strategies initially introduced in the 2015-2017 Energy Efficiency and System Reliability Procurement Plan (Three Year Plan) in Docket 4522. Below are highlights from the implementation of these four strategies. Details on these strategies, other programs, and initiatives are found in subsequent sections of this Year-End Report.

The first strategy was “Promoting Cost Efficiency.” It focused on identifying strategies to deliver energy efficiency services as cost-effectively as possible, while continuing to optimize benefits to customers. Examples of promoting cost efficiency included leveraging funds to reduce costs in income-eligible single family, obtaining savings through lower-cost gas measures in the small business program, taking advantage of the reduced cost of LED lighting measures, and moving commercial water heaters upstream to take advantage of economies of scale.

The second strategy was “Empowering communities and markets to be energy efficient.” It focused on strategies to increase awareness of energy efficiency programs through the enhancement of existing programs to reach new and repeat customers.” The continued success of the Community Based Initiative “Find Your Four!” in Charlestown, Narragansett, Tiverton, Little Compton, Barrington, and Bristol were examples of empowering communities.

The third strategy was “Innovating to capture untapped savings.” National Grid focused on meeting this strategy through the Connected Solutions Demand Response pilot and contributing to the RI Zero Energy Task Whitepaper Report that outlines a 20-year roadmap for zero energy buildings to contribute to the Energy 2035 goal of reducing greenhouse gas emissions by 45% by 2035.

<sup>5</sup>See 2016 EEPP Settlement of the Parties, Docket No. 4580, adjusted to reflect a correction to the kW savings goals as detailed in Table E-1 of this report.

<sup>6</sup>Actual savings in 2016.

<sup>7</sup>See 2016 EEPP Settlement of the Parties, Docket No. 4580. Electric Budget includes \$1M in RGGI funding for delivered fuels weatherization per Section IV.A.2 in Docket 4580.

<sup>8</sup>Actual spend in 2016.

<sup>9</sup>Includes implementation costs, EERMC and OER costs, and shareholder incentive.

<sup>10</sup>Includes all program-related expenses, i.e. incentives, administration and general expenses, marketing, sales, technical assistance, evaluation, and training. Also includes Finance Costs and payments to the Rhode Island Infrastructure Bank (RIIB) as detailed in Tables E-3 and G-3 in this report.

The fourth strategy was “Developing opportunities for system-level savings and integration.” During 2016, representatives from the Office of Energy Resources (OER), the Energy Efficiency and Resource Management Council (EERMC), the Distributed Generation Board (DG Board), and National Grid continued to work together as part of the “Systems Integration Rhode Island” (SIRI) working group. The Company also continued its effort to link energy efficiency with the RI Renewable Energy Growth SolarWise Program that launched in 2016. All SolarWise applicants were required to participate in National Grid’s Energy Efficiency Programs and achieve significant energy savings in order to be eligible for the SolarWise bonus solar incentives. The RI EE Team worked with the RE Growth SolarWise team to align the EE Programs so that EE customers could understand how to use their energy savings to apply for the SolarWise Bonus Incentive Program.

The following sections outline the highlights for the different programs and initiatives that comprise the 2016 Rhode Island Energy Efficiency Portfolio. Many activities undertaken in 2016 laid the foundation for inclusion in the 2017 Energy Efficiency Program Plan, which the PUC approved in Docket 4654 at its Open Meeting on December 8, 2016.

## Residential Programs

### ***Overview***

In 2016, the residential sector was cost-effective, with total resource benefit cost (B/C) ratios of 2.36 for electric programs and 1.76 for gas programs. The Company spent 92% of the electric residential implementation budget, achieved 114.5% of electric targeted annual energy savings, and achieved 117.2% of electric targeted annual demand savings. The Company spent 90.3% of the gas residential implementation budget and achieved 105.7% of gas targeted annual energy savings. The Company was able to administer the programs so that the sector had a strong finish in both fuel types. Additional details on spending and savings by program can be found in Attachment 1, tables E-1, E-2, and E-3 and Attachment 2, tables G-1, G-2, and G-3.

### ***EnergyWise***

EnergyWise provides a whole house, no-cost home energy assessment focused on identifying ways to lower energy costs, while making a home more comfortable and healthy. After scheduling an in-home assessment, a Building Performance Institute trained energy professional will spend an average of two hours walking through the home with the homeowner from the basement to the attic. This walk through is designed to educate the homeowner on how much energy the home is using and where energy is being wasted. A home is looked at as a system where the interaction between the heating and cooling systems, appliances, lighting, and the thermal envelope of the home are all considered in assessing opportunities for improved efficiency.

During the first visit, the energy professional will also install energy saving products where opportunities exist. These products include efficient lighting, water savings devices, pipe insulation, programmable thermostats, and advanced power strips. The home's largest energy savings opportunities frequently come from reducing air leakages into and out of the home, which is improved by sealing leaks and increasing insulation levels, collectively called weatherization. Installation of weatherization improvements frequently makes a home healthier for the residents and more comfortable while also saving energy. Mechanical systems such as the heating and water heating systems, as well as new appliances, are also an area where energy savings can be realized and will be noted if efficiency opportunities exist. At the conclusion of the first visit, the energy specialist will present an Energy Action Plan of weatherization and other energy savings improvements. Available incentives and financing opportunities are also presented with the Energy Action Plan.

If a customer decides to continue with the deeper, efficiency enhancements, another home visit will be scheduled with an Independent Insulation Contractor (IIC) that will install the weatherization work. This visit could take a whole day or longer depending on the extent of the work. The IIC's will address the air leaks and insulation opportunities and other enhancements presented in the Energy Action Plan. An inspection of all the work is completed by the program's Lead Vendor before completion of the weatherization work.

### ***Overview of Performance***

In 2016, EnergyWise provided home energy assessments to over 8,700 customers. The program experienced a decline in customer interest that was driven by external factors such as warmer than average winter weather and low fuel prices. Anecdotally, Rhode Island's improving economy also contributed to a shift away from investment in a maintenance project that reduces household energy costs to investing in luxury home improvements such as kitchen and bath upgrades. The Heat Loan,

which provides 0% financing to home weatherization or efficient heating system installations, had 806 customers.

### **Highlights**

In 2016, EnergyWise was awarded the ENERGY STAR® Partner of the Year award for program implementation from the U.S. Environmental Protection Agency and Department of Energy. Each year, organizations that have made outstanding contributions to protecting the environment through energy efficiency are recognized and Rhode Island is proud that its customers, stakeholders, and contractors have worked together to create and award-winning program.

Here is a small sampling of what customers are saying about the program:

- Outstanding program/process!!! Everyone should take advantage of this program!!! A real winner!!!
- Completely satisfied with the whole process. From the first call to the final visit from the evaluation expert.
- Where do I begin? Scheduling was quick, accurate and easy. The auditor was very thorough and knew information about the construction of my home that I was not aware of. The contractor was absolutely great. Very professional with an in-depth knowledge of construction, insulation, and installation. The benefit of the process was immediately evident. Without exaggeration, this 1936 cape feels like a new house. Thank you to all!
- I am snug as a bug in a rug now, thanks to your program. You took care of all the gaping holes in my house, and I am enjoying the comfort of a warm environment so much more. Thank you!

In 2016, sixteen Independent Insulation Contractors (IICs) received the Century Club Award from ENERGY STAR® for providing 100 or more weatherization projects during 2015. The Company also incorporated ASHRAE 62.2 ventilation standards in the program and tested incorporating mechanical ventilation when needed to remove weatherization barriers. Finally, at the conclusion of the program year, all home energy assessments have moved to two-person teams promoting a better customer experience. While one energy specialist focuses on education and the assessment, another specialist installs the efficient upgrades. The assessment system has also transitioned to a tablet system and supports paperless interactions for those customers that prefer an electronic report.

### ***ENERGY STAR® Lighting***

ENERGY STAR® Lighting provides midstream (retailer) and upstream (manufacturer) rebates for high-efficiency lamps and fixtures. The lead vendor provides manufacturer and retailer outreach, recruits retail partners, conducts retail trainings, oversees point-of-purchase placement, supports special events, and coordinates the buy-down and markdown contracts. An online store is also available to customers for purchasing lighting.

#### **Overview of Performance**

The ENERGY STAR® Lighting program achieved 134% of the savings goal, while reaching over 400,000 participants. Importantly, in 2016, 73% of the lighting products receiving incentives through this program were LEDs versus the older compact fluorescent bulb (CFL) technology. Consumers are embracing LEDs, and the lighting addresses many performance concerns that CFLs were challenged to overcome.

## **Highlights**

In 2016, consumer education was a focal point in informing consumers about the best lighting product for their specific lighting needs. Lighting specialists held monthly outreach and education activities at retailers around the state where the different types of lighting were explained as well as the newer metrics such as color rendition index and lumens.

Consumers experience a lot of transition in the lighting market this past year. Some retailers announced in 2015 that they would no longer support CFL technology limiting the options for consumers. In response to this shift in the marketplace, manufacturers retailed non ENERGY STAR qualified LEDs that were priced to replace the CFLs. Layered upon this change was also a new specification introduced by ENERGY STAR, version 2.0, which propelled retailers to discount version 1.0 lighting products and introduce special promotions on introductory version 2.0 products. While there were a lot of changes for residential consumers, the program incentives provided opportunities to purchase high-quality ENERGY STAR lighting products at affordable price points.

## ***ENERGY STAR® Appliances***

In 2016, the ENERGY STAR® Appliances program focused on efficient dehumidifiers, dryers, room air cleaners, pool pumps, advanced power strips, refrigerator recycling, and efficient shower heads. This program works in tandem with ENERGY STAR® Lighting by leveraging resources with in store retailer visits and social media campaigns when appropriate.

### **Overview of Performance**

The ENERGY STAR® Appliances program reached 82% of its savings goal while serving over 25,000 customers. The higher than expected participation number resulted from a new distributor relationship for advanced power strip (APS). One APS manufacturer worked with a lighting manufacturer to distribute product with their retailer customer base. The result was a lot more APS' in the marketplace and sales.

### **Highlights**

The resulting liquidation of the refrigerator recycling vendor in 2015 still impacted performance into 2016. A replacement vendor was identified and on-boarded, but the process took two quarters resulting in a suspension of the refrigerator and freezer recycling in the first half of the year. This program element is up and running and will receive more marketing support in the following year. One great success was the collaboration with Eco Depot in Johnston, RI for dehumidifier recycling. The response from customers was robust, and more events will be planned in 2017. Pool pumps were moved from a downstream, customer incentive format, to an upstream model with manufacturers. This resulted in a tripling of pool pumps moving through the program.

## ***Home Energy Reports***

In its fourth year running, the Rhode Island Home Energy Reports (HER) program continues to encourage energy efficiency behavior through personalized print and email reports, and a seamlessly integrated website. Each of the communication channels displays energy consumption patterns and contains a normative comparison to similarly sized and similarly heated homes, as well as to an energy reduction goal for each customer. More than 13,400 customers were added to the HER program in 2016, resulting in a total of 314,000 Rhode Island customers receiving reports.

## Overview of Performance

In 2016, the HER program saved customers 28,792 MWh and 75,543 MMBtu, reaching 89.5% and 139.9% of the Company's electric and gas goals, respectively. These savings numbers are equivalent to over \$7 million dollars in customer bill savings. Further, customers seem to be accepting and welcoming of the reports, as we saw less than 0.1% of customers opting out of the program in 2016.

In crafting the 2016 EE Program Plan, the Home Energy Reports program was developed as cost-effective (Electric B/C ratio of 1.02 and Gas B/C ratio of 1.03). These ratios were informed by the best information on costs and savings available to the Company at the time the 2016 Plan was filed and approved by the PUC in December 2015. While the HER gas program ended the year with a B/C ratio of 1.39, higher than the planned ratio, the HER electric program fell just short of its planned B/C ratio goal, ending the year with a B/C ratio of 0.94. The lower electric savings were due to several contributing factors. The first factor was that weather in Providence was 6 to 15 degrees warmer during winter months, and heating degree days (HDD) declined by 25%, which created less opportunity for customer savings. In addition, the customers receiving the reports are using less energy than they were in 2015, meaning that larger overall savings will mean lower absolute savings. The Company took steps in the second half of 2016 to bring savings up as much as possible, including: adding new customers to the treatment and control groups; adjusting report cadence to include one extra report; and running Summer Coach alerts via email and phone to customers. These strategies will continue in 2017, and the program is planned to be cost-effective. Additionally, the 2017 electric program has a lower energy savings target and a lower budget compared to 2016, both of which help in ensuring the program will be cost-effective.

## Highlights

In 2016, Rhode Island continued to be a leader in behavioral energy efficiency innovation and customer engagement. National Grid launched new web functionality, designed a Summer Coach program to encourage energy savings during peak times, and upgraded the experience to version 2.0 with a fresh design, robust marketing capabilities, and a dynamic experience.

- **Web launch:** In February 2016, National Grid launched a re-designed website to all customers. As part of this upgrade, new web tools and savings tips were incorporated into National Grid's US Retail Website. In addition to providing customers with their relative energy usage compared to their neighbors, RI customers can also compare their bills over time, explore a library of energy savings tips, and interactively explore how their energy trends are impacted by weather and other factors.
- **Summer Coach:** During the summer of 2016, 150,000 RI customers received weather-triggered phone and e-mail communications encouraging them to take small actions to reduce their usage on hot days. 60% of customers enrolled in the program reduced their AC usage as a result of receiving these messages. Customers receiving these communications were also more likely to say that National Grid wants to help them save money (+10%).
- **Upgrade to report version 2.0:** 2016 was the year of upgrades for National Grid's Home Energy Reports. In March, customers began receiving the second-generation e-mail Home Energy Report (eHER 2.0), which is optimized for mobile devices and allows for better targeted marketing. In November/December, customers started to receive the second generation of the paper Home Energy Report.
- **New Movers experience:** National Grid continued to enroll eligible customers into its New Movers experience throughout 2016. The experience allows National Grid to welcome these

customers into their new homes during a significant moment ripe for behavioral changes. This included messaging such as “welcome to the neighborhood” and a checklist of energy efficiency tips relevant to the unpacking and move-in process.

- **Points & Rewards:** National Grid’s Points & Rewards offers RI customers a chance to opt-in and be rewarded for saving energy. These customers can then redeem their points for eligible gift cards. Over 10,200 customers were enrolled in this offering at the end of 2016, with 243 customers joining in 2016. Customers redeemed over \$18,000 in points during 2016 to places including, Home Depot and Amazon, or charities like Habitat for Humanity.
- **Continued Strong Engagement:** A 2016 survey of 1,000 RI customers showed that 82% of recipients recalled receiving HERs and 75% reported reading HERs. Additionally, 77% of respondents either agree or strongly agree with the following statement: “The energy efficiency information in the Home Energy Report is useful.”

### ***Residential New Construction***

The Rhode Island Residential New Construction (RNC) program guides building professionals and homeowners through the process of designing and building an energy efficient home. The RNC process includes: educational outreach, no-cost plan analysis, advanced energy consulting, in-field technical assistance, insulation and air sealing analysis, third-party blower door and duct blasting testing, installation of high-efficiency lighting (LEDs), energy-saving showerheads, a HERS (Home Energy Rating System) Index rating and energy performance-based incentives.

Based on the year over year increase in Tier II and Tier III projects in 2014 and 2016, the Company increased the Tier II minimum requirement as a means to continue transforming the market.

Tier Level	2015 % More Energy Efficient Than Baseline*	2016 % More Energy Efficient Than Baseline*
Tier I	15% - 24%	15% - 30%
Tier II	25% - 44%	31% - 44%
Tier III	45% or more	45% or more

\*Based on the 2011 User Defined Reference Home

### **Overview of Performance**

The Program significantly exceeded the goal for the number of both Tier II and Tier III homes in 2016. These numbers clearly indicate a market transformation showing that RI builders can achieve the high efficiency levels; the numbers also indicate that customers are asking for high efficiency homes. Despite a lower than projected total number of completed units, the savings goals were exceeded due to the overall performance of the buildings exceeding the planned performance.

	2016 Goals	2016 Total
Tier I (15 - 30%)*	215	143
Tier II (31% - 44%)*	175	253
Tier III (45%+)*	10	17

\*Based on the 2011 User Defined Reference Home

Type of Construction	Tier Level	# of Projects
NEW CONSTRUCTION	Tier I	140
	Tier II	183
	Tier III	15
RENO/REHAB	Tier I	3
	Tier III	70
	Tier III	2

Market rate enrollments exceeded expectations, which may indicate an upturn in the new construction industry in RI. Several of these projects were conceived or permitted almost 10 years ago when the industry was booming, and then abandoned and recently sold to new developers that wanted to rent properties.

The year 2016 brought an increase in non-gas heated homes. Developers chose to install heat pumps instead of gas heat systems in both new construction projects and renovation-rehab projects. Thirty-five percent (35%) of total completed units were not heated by natural gas, which is up from an average of 10% in prior years.

In 2016, the RNC Program participated in several efforts to further the advancement of high performing homes in RI.

- **SolarWise:** RNC participants building single-family homes achieving a minimum of Tier II savings (a minimum of 31% savings over the program User Defined Reference Home (UDRH)) were eligible to apply for the SolarWise bonus incentive. Customers who completed a Tier II or Tier III home in 2014 or 2015 were also presented with opportunity to apply for SolarWise.
- **RI Zero Energy Task Force:** In an effort to promote and capitalize on the RNC offerings, RNC team members contributed to the development of the Task Force's Whitepaper Report. The report outlines a 20-year roadmap for zero energy buildings to contribute to the Energy 2035 goal of reducing greenhouse gas emissions by 45% by 2035.
- **Zero Energy Challenge:** The Challenge was a design/build competition for single-family homes in which participants competed for cash prizes and media promotion. Homes will be judged on achieving RNC Tier III, HERS Index rating, cost per square foot, installation of connected thermostats and appliances, and indoor air quality performance. The award was presented at the 2017 RI Home Show/Energy Expo.

- RI Building Science Discussion Group: This is a bi-monthly meeting to discuss topics pertaining to High Performance Building best practices as well as high performance verification programs such as Energy Star and Passive House. Zero Energy and innovative design are also discussion topics for this group.
- Executive Climate Change Coordinating Council (EC4) Task Force: Participation in the EC4 Green House Gas Task Force technical committee, providing feedback for the 20 year plan to reduce carbon emissions in the state by 80%.

## Highlights

### New Construction Project Highlight:

Ashton Village, Cumberland, RI enrolled in the Program in 2014 and the last units were completed in February 2016. The project consists of a set of millworker cottages located next to the recently reclaimed Ashton Mill, and is considered to be one of the most intact mill villages in the region. Ashton Village was originally conceived as a self-contained village in the 19th century that clustered family housing along with a school, store, meeting hall, and church next to the mill. Valley Affordable Housing purchased 10 of these buildings with the intent to both restore and preserve these buildings, and to provide affordable housing.



A total of 53 units participated in the Program. Of these units, 42 were renovation units and 11 were new construction. These units achieved an average of 31.8% savings over the Program savings baseline, and scored an average HERS Index of 65. Boilers with an AFUE rating of 95+ were installed along with .95 EF instantaneous hot water, CFL, and LED lighting and Energy Star® appliances.

### Builder Highlight: The Road from Code Testing to Code Plus to Tier II

Team members work to encourage builders to participate in the RNC program. After several attempts, Ron, a builder in Wakefield, RI, responded to the RNC team in March of 2014; specifically because he was building houses in towns that were beginning to enforce code testing. The RNC team performed the required code testing, and provided ongoing assistance to him with both code compliance and with trying to meet RNC program requirements. At first, Ron's projects faced challenges, including compliance with the thermal enclosure checklist, the correct installation of insulation, air barriers and eave baffles, as well as ventilation. To date, the RNC team has assisted Ron with 14 homes. The first 12 homes qualified for code plus, which is for projects that provide significant savings, but do not quite meet all of the requirements. The last two homes met all program requirements and qualified for Tier II incentives. Ron continues to be interested in improving the quality of his homes, and now engages regularly with the RNC team. Through the combination of code testing enforcement, education and training, and program incentives, Ron and his projects represent a great example of market transformation.

### RI Code Compliance Enhancement Initiative (CCEI) Partnership:

The RNC Program partnered with the RI Code Compliance Enhancement Initiative (CCEI) to conduct hands-on infield training. These trainings provided a unique opportunity for participants to view projects during the construction phase to learn about both energy code requirements and how to implement best building practices.

South County Habitat for Humanity offered their project on Edwards Lane in Charlestown to demonstrate the importance of testing a home for air leaks during the rough stage of construction. The 21 participants, mainly students from the Chariho Technical School, performed much of the testing, identification of leaks, air sealing and compilation of the testing results. Attendees received copies of the RI CCEI Residential Field Guide, and learned about current and future code requirements.

### Trainings:

Twelve classroom trainings were held in 2016, with 322 attendees (9 residential trainings with 256 attendees and 3 commercial trainings with 66 attendees). Nine location trainings were held with 146 attendees. 36% of attendees were code officials, 26% were vocation school students, and 22% were builders and general contractors.

CCEI provided a training for 22 Rhode Island Construction Training Academy (RICTA) HVAC students and 2 of their teachers addressing the energy code, which included both 90 minutes of classroom instruction and a one hour hands-on duct leakage testing training. 33 Circuit Rider Trainings were conducted (26 residential and 7 commercial).

### Collaboration:

In addition to providing trainings throughout the year to builders, developers, architects, HVAC contractors, and clients, National Grid RI RNC participated in many events to promote energy efficiency, including:

- Northeast Building Official Education Association (NEBOEA)
- Supported Governor Raimondo's directive for the establishment of a high-performance code that will be mandatory for publically funded projects and promoted with National Grid incentives for private construction. The CCEI program supported the energy efficiency portion of this effort, with the State of Rhode Island Office of Energy Resources providing additional funding. A diverse stakeholder group worked toward developing a code that will facilitate high performance new construction and major renovations for the commercial sector as well as public buildings. Results of this initiative should be demonstrated in early 2017.
- 11 total site visits were conducted (10 residential and 1 commercial).

### ***High Efficiency "HVAC" (Electric and Gas) - Heating, Cooling and Hot Water***

The High-Efficiency Heating and Cooling Programs promote the installation of high efficiency gas and electric space heating and cooling equipment, water-heating measures, and controls through the use of tiered customer rebates. The programs also provide contractor training and incentives for proper equipment sizing, quality installation verification, and distribution system improvements.<sup>11</sup>

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<sup>11</sup> Residential programs do not promote or fund fuel switching. It is only after a customer decides to switch to natural gas that they are eligible for an energy efficiency rebate. At the time the customer switches from another fuel to natural gas, they become eligible for an energy efficiency incentive that covers part of the incremental cost of higher efficiency gas equipment.

## Overview of Performance

In 2016, the Electric Heating & Cooling program achieved 103.3%, and the Gas Heating program achieved 68.9% of their respective savings goals. Solid working relationships were maintained with the trade ally network of HVAC contractors and equipment distributors participating in the program. Customer demand grew for some measures, while program changes from 2015 shifted the measure mix.

## Highlights

There were some significant program changes in 2016 that led to inevitable decreases in participation for certain measures. Some measures were eliminated or had their incentive/rebate amounts reduced, and the familiar program branding was changed.<sup>12</sup> Consequently, Quality Installation Verifications (QIV) services dropped by 75%. There were apparent ripple effects, with system downsizing rebates falling by 77%, and duct sealing jobs dropping by 81%; nonetheless, the number of AC Check certified contractors increased slightly, which reflects recognition by trade allies of the value of the program's technical training. There was strong performance for some key measures: Tier 1 central AC rebates grew by 10%, and mini-split heat pump rebates grew 8% for Tier 2 and a strong 23% for Tier 1, despite rebates being reduced in April. Wi-Fi thermostats jumped by 41% compared to 2015 levels, and 95% AFUE combination boiler/water heaters increased by 575%.

The program's lead vendor continued to provide outreach and programmatic support to participating contractors to ensure they had the knowledge to effectively communicate the program offering to customers, and the technical expertise to offer quality installations. They held one trade ally program meeting, two AC Check trainings and participated in three industry events.

## Multifamily

The Multifamily program underwent a transformative year in 2016. From the meetings early in the year with an "advisory" group charged with collaborating on program design to the year-end release of a Request for Proposals (RFP) for lead vendor services, the multifamily program was granted great attention.

## Overview of Performance

The Market Rate Multifamily program achieved 103.1% of the electric goal and 77.7% of the gas goal. The Income Eligible Multifamily program achieved 111.7% of the electric goal and 78.6% of the gas goal. The under-performance on gas is currently being reviewed and was a topic of focus in the RFP. Alternatively, the C&I multifamily gas program had a very strong year finishing at 122.4% of goal.

## Highlights

Lead Vendor RFP: In early 2016, stakeholders convened in the form of an advisory committee to take a look at national best practices and current program design. After several months of investigation, the process for creating an RFP for lead vendor services was underway. Considering such things as innovation, cost competitiveness, job creation, and health and safety, the RFP looked to ensure the Company is offering the best program possible to Rhode Islanders. The RFP released in mid-December with interviews occurring during Q1 of 2017.

Income Eligible Building Benchmarking: 2015 concluded with 438 income eligible buildings being benchmarked. In 2016, the Company added another 75 buildings to this list bring the total to 513 Rhode

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<sup>12</sup> The "Cool Smart" brand was discontinued, and "QIV" was replaced with "AC Check" The following measures were modified: \$330 contractor incentive for QIV was reduced to \$130, and the \$150 QIV customer rebate was eliminated; \$400 ENERGY STAR Quality Installation contractor incentive was eliminated; Minisplit Heat Pump incentives were reduced in April from \$250/\$500 (for Tier 1 and Tier 2) to \$150/\$300. For the Gas program, the 90% AFUE boiler/water heater combination unit incentive was eliminated.

Island income eligible facilities receiving the benefits of benchmarking. The data collected during this benchmarking effort will be used throughout 2017 to identify sites for the Company’s boiler monitoring and optimization pilot.

**Attention to Scattered Sites:** In order to ensure that all customers have access to the program benefits, the Company paid special attention in 2016 to scattered sites. Traditionally, the program sees strong participation among sites with 5-20 units and 20 units or more. However, there are circumstances where multiple 1-4 unit buildings, under one owner, would benefit from the program but have the added complication of being spread among several sites, often not on the same contiguous property. This resulted in projects at approximately 11 sites consisting of 109 buildings and 318 units.

### **Community Based Initiative: Rhode Island Energy Challenge: Find Your Four!**

The Rhode Island Energy Challenge (“Challenge”) completed its fourth year in 2016 by surpassing goals and creating new partnerships. The program was recognized nationally by the U.S. Environmental Protection Agency (EPA) with the 2016 “Clean Air Excellence Award” for Education and Outreach.

Town Council President and Recreation Staff talk about the Energy Challenge with Narragansett residents at the beach.



The 2016 Challenge was constructed around a geographic effort so that all elements of the Challenge were within, or in proximity to one of the six selected municipalities. The Challenge engaged two communities simultaneously, over a three-month span, while at the same time focused on working with municipal leadership and engaging every facet of the community.

### **Overview of Performance**

The Towns of Charlestown and Narragansett passed resolutions and launched their programs in Q1 2016. Leadership in the communities introduced the program through email to local officials and opinion leaders and requested support for outreach efforts in town. In Narragansett, from April through June our partner events included the Little League opening day, library book sale, Eco Depot, community center programs, library jewelry fundraiser, recreation department beach pass and camp registration.

One unique feature in Charlestown was the Town’s announcement, at the beginning of the campaign that the grant from National Grid would be spent on efficient lighting at the senior center parking lot. Having a clear project for the energy efficiency funds was very motivating to the community.

During the second round in mid-2016, the Towns of Tiverton and Little Compton committed to meeting the 5% household signup goal and to educating residents about the Demand Link program in conjunction with Challenge. The non-profit SmartPower team worked closely with National Grid staff to incorporate the DemandLink program into community outreach activities over the summer. Through one-on-one discussions throughout both communities, the Challenge achieved 100 Home Energy Assessment requests over an 8 week period. Each community surpassed the 5% household participation Challenge goal, culminating in 647 new pledges.

In the Fall of 2016, Barrington and Bristol joined the Challenge where municipal leaders in both communities played a significant role. In Barrington, the school department personnel, parent associations, environmental club members, and parent volunteers took an active role in emailing and

sharing on social media to introduce the Challenge. Through community events and informational tabling, over 450 residents had the opportunity to join the Challenge.

The Bristol Town Council and legislative members took a hands-on approach to communicating the energy efficiency message and securing participation from residents. All members of the council signed a letter to the editor of the Bristol Phoenix. Ultimately, working together, Bristol elected officials and SmartPower staff garnered 124% of the Bristol Energy Challenge goal.

### Highlights of the 2016 Rhode Island Energy Challenge

Grassroots organizing took many forms in 2016 and helped The Challenge exceed goals in all targeted municipalities. The outreach included:

- 4,627 face-to-face customer interactions at 62 events
- 3,104 people signed up to take the Challenge
- 174,525 email communications were sent by program partners
- 501 elected officials and opinion leaders were educated on energy efficiency and the efforts of National Grid.

### Income Eligible Services

National Grid helps reduce electricity and heating costs for income eligible customers without any financial contribution from the customer. Income eligible customers are those who are currently on the A-60 Electric Low Income rate, the 1301 Low Income Heat rate, and those customers who qualify for LIHEAP funds from the state, household income level falls below 60% of the Area Median Income (AMI).

Program services are delivered by six Rhode Island Community Action Program (CAP) agencies and local Contractors. The Income Eligible Services program works in close collaboration with the State of Rhode Island Department of Human Services Weatherization program, overseen by the federal Department of Energy, and the Low Income Home Energy Assistance Program, overseen by the federal Department of Human Services. This collaboration ensures that customers receive the greatest possible benefit.

All homes receive rigorous safety evaluation before work begins and when the work is complete.

Program services offered to Income Eligible Customers include:

- An energy assessment of lighting, appliances and behavior to determine baseline consumption
- An inspection of existing insulation to identify opportunities for weatherization
- An inspection of the customer's heating system for safety and potential replacement if applicable. All customers receive all services and equipment upgrades at no cost
- Replacement of inefficient light bulbs
- Replacement of inefficient systems and equipment including



Blower Door Test Equipment

- Heating systems
- Cooling systems
- Appliances
- Installation of weatherization measures including:
  - Air sealing
  - Insulation

### **Overview of Performance**

In 2016, the Income Eligible Services (IES) Program exceeded the Program savings goals. This success was attributed to continual improvement in program management with ongoing implementation of technical trainings, quarterly best practices meetings, distribution of resources based on need within respective communities, and the development of statewide operation manuals. The program continued to focus on training and enhancing technical knowledge of tradespeople to perform thorough and consistent home energy assessments; installation of energy efficient lighting, appliances, heating systems, domestic hot water equipment, and weatherization measures.

### **Highlights**

In 2016, the RI Weatherization Assistance Program (WAP)/IES Operation Manual was developed and produced through a collaborative process with National Grid's lead vendor, CLEAResult and RI Department of Human Services (DHS). The manual provides guidance to ensure safe, effective, consistent and efficient weatherization processes across the state. This manual will align with the RI WAP/IES Field Manual and will detail all policies, procedures, forms and educational materials that will be used in the RI WAP/IES program. The RI WAP/IES Operation Manual is aligned with the Department of Energy Standardized Work System.

### **Training**

In 2016, several training opportunities were made available to the Rhode Island Community Action Program teams and their contractor base.

Mike Stahl EMGC Training, Derby CT, provided Confined Space training to Auditors, Monitors and Contractors to ensure OSHA Compliance.

Paul Raymer, Chief Investigator of Heyoka Solutions and ASHRAE 2013 Secretary, provided ASHRAE 2013/RED training to Auditors and Monitors to ensure compliance with DOE Health & Safety Guidance.

Heating system training was provided by NYSWDA to ensure Auditors are BPI certified and followed up with training by Petro (a local service provider) to educate on local system types and requirements. The goal of these training was to ensure that every Auditor would be prepared to evaluate a home's heating system.

National Grid held four Best Practice Meetings in 2016 including, trainings on Safety, Marketing, the accrual process, and the RI Discount rates.

The Weatherization Technical Committee (WTC) met every 6 weeks in 2016 to review consistent audit protocols and implementation of weatherization and insulation services. Each of these meetings was provided real examples of work done in the field in order to teach the contractors about quality, consistency and completeness.

## **Commercial & Industrial Programs**

### ***Overview***

In 2016, the Commercial & Industrial (C&I) sector was cost-effective, with total resource B/C ratios of 2.27 for electric programs and 2.47 for gas programs. The Company spent 84.8% of the electric C&I implementation budget, achieved 99.4% of electric targeted annual energy savings, and achieved 87.8% of electric targeted annual demand savings. The Company spent 80.9% of the gas C&I implementation budget, and achieved 105.6% of gas targeted annual energy savings. Additional details on spending and savings by program can be found in Attachment 1, tables E-1, E-2, and E-3 and Attachment 2, tables G-1, G-2 and G-3.

### **Large Commercial and Industrial Programs**

National Grid offers two programs for large commercial and industrial customers with an average monthly peak demand in excess of 200kW. Each program contains a few common elements:

1. National Grid offers incentives to reduce the incremental cost barrier to investing in energy efficiency.
2. The programs are integrated to offer assistance with gas and electric projects at the same time.
3. National Grid reduces barriers to participation by offering a range of technical assistance from identifying opportunities to improving a company's manufacturing process.
4. Depending on the program year and budget, National Grid may also have funds available to provide business owners with zero interest loans for a defined period of time with on-bill payback.

### ***Large Commercial New Construction***

The Commercial New Construction Program encourages energy efficiency in new construction, major renovations, planned replacement of aging equipment, and replacement of failed equipment through financial incentives and technical assistance to developers, manufacturers, vendors, customers, and design professionals. The program includes initiatives such as Combined Heat and Power (CHP), Upstream Lighting, Upstream HVAC, an industrial initiative with world-renowned engineering firm Leidos (formerly SAIC), and training for trade allies among many other efforts.

In 2016, there was increased interest in new construction due to the improving economy. If the economy continues to strengthen, the Company expects to see several new construction projects materialize over the next 3-5 years.

### ***Large Commercial Retrofit***

The Large Commercial Retrofit Program encourages the replacement of existing equipment and systems with energy-efficient alternatives when the customer is not otherwise planning any investments. The program offers solutions ranging from steam trap repair, Combined Heat and Power (CHP), to multi-year Strategic Energy Management Plans (SEMPs) with some of National Grid's largest customers, and a variety of Upstream programs.

In 2016, National Grid had several notable developments in the Large Commercial and Industrial space. The Company went broader by expanding the Upstream Products Initiatives, continued its partnership and goals with its two SEMP customers, and engaged more customers in the industrial, grocery, and municipal verticals.

The Company also began a SEMP with the State of Rhode Island. In 2016, 15 scoping studies and two retro-commissioning studies were performed in state facilities.

### ***Combined Heat and Power (CHP)***

The Company continued to see interest in CHP during 2016. Several CHP projects were studied in 2016. They will continue into 2017. They include hospitals, hotels, and a waste water treatment plant.

One manufacturer completed a 75 kW project last year. Another manufacturer delayed a 1,250 kW project two months and is now up and running.

### ***Rhode Island Efficient Buildings Fund (EBF)***

#### Round One

At the end of 2015, National Grid and The Rhode Island Infrastructure Bank (RIIB) provided over 50 energy audits to support the first round of the Efficient Buildings Fund (EBF). In January of 2016, the RI OER received many applications for EBF. At the conclusion of the application review process, RIIB closed on \$17.2 million in financing for various municipalities. Fifty seven percent (57%) of the \$17.2 million went to energy efficiency projects, which went to measures such as LED streetlights, boilers, chillers, motors and drives. The balance of the \$17.2 million went to renewable projects across the state.

#### Round Two

Following the success of Round One, RI OER opened an application window for Round Two of the EBF. When this report was being prepared, the RI OER had completed its Project Priority List (PPL) for this round and RIIB opened discussions with potential borrowers.

#### Future Rounds and Potential

In 2016, the RI Department of Education (RIDE) delivered energy audits to all school districts in the State. Jacobs Engineering conducted the audits for 307 public schools. The key recommendations were as follows:

1. Replace heating systems with high efficiency
2. Provide additional ventilation with heat recovery
3. Control all HVAC systems with an Energy Management System
4. Install new LED lighting with advanced controls for occupancy control and daylight harvesting

This means that, if housing aid is made compatible with EBF, National Grid expects an uptick in schools submitting applications to the EBF in 2017 and beyond.

### ***Industrial Initiative***

In 2016, National Grid and Leidos continued to see success with its Industrial Initiative in Rhode Island. During the year more than 47 sites were visited. This was seven more than the previous year. Twenty-six (26) of these visits were building on relationships established in the past year and 21 were new to the Industrial Initiative. This resulted in 66 applications. The applications that were paid in 2016 were 89% non-lighting by application count.

### ***Grocery Initiative (EnergySmart Grocer)***

In 2016, the EnergySmart Grocer (ESG) initiative delivered cost effective, comprehensive energy savings in the Grocery market segment. The program had another strong year with independent grocery chain Dave's Marketplace, the largest independent grocery chain in Rhode Island with nine stores. This chain completed over 700,000 kWh with ESG for the second year in a row. Other customer projects included a

large controls and VFD implementation with Stop & Shop stores in Rhode Island that improved both HVAC and Refrigeration system performance. 2016 also saw an influx of smaller franchisee projects in the restaurant sector with 16 Wendy's franchisee locations completing lighting and refrigeration upgrades. Overall, the ESG initiative saved over 4 million kWh at a very reasonable cost per kWh.

### ***Street Lighting***

Customer Owned: During 2016, the first energy efficiency incentive for LED street lighting was distributed to the City of Providence. The city received over \$1 million for close to 7,000 MWh of savings. Many municipalities have purchased their own street lights with plans to convert them to energy efficient LEDs. Some of the towns, including Providence, Barrington, and West Warwick plan to also install controls. In addition, the RI Department of Transportation replaced more than 5,000 highway lights with LEDs. National Grid continues to work closely with the RIOER on this program.

Company Owned: National Grid filed a company-owned street lighting tariff in 2016. This tariff's effective date is January 2017. The tariff gives customers the option to benefit from the energy efficient technology of LED street lighting while continuing to lease their lights.

### ***Zero Energy Buildings (ZEB) Task Force***

In 2015, the Company started a Zero Energy Building (ZEB) taskforce consisting of key stakeholders from the state, associations, architects/engineers, and developers. The mission of the Rhode Island Zero Energy Task Force is to create a white paper for policies, incentives, education, financing, and partnerships that will help to foster the growth of the residential and commercial Zero Energy Building market in Rhode Island. The Task Force members represent many facets of the existing and future ZEB market and bring experience, entrepreneurship, and a desire for Rhode Island to lead the country in the ZEB market. This team will ensure that the recommendations of this Task Force are implementable and will yield measurable energy and cost savings. The proposed mission is to define a 20-year pathway for Rhode Island to advance Zero Energy Buildings (ZEB) across all building sectors in support of the Rhode Island Energy Plan 2035. The white paper was published in 2016.

### ***Small Business Direct Install***

National Grid's Small Business Direct Install program provides turn-key services to customers with less than 200 kW average monthly peak electrical demand. As part of the program, customers receive a free on-site energy assessment and a customized report detailing recommended energy-efficient improvements. National Grid then completes retrofit installations at the customer's convenience.

National Grid pays 70% of installation and equipment costs and customers can finance the remaining share of the project over as many as 60 (typically 24) months on their electric bill, interest free, using the Small Business Revolving Loan Fund providing that funds are available.

Although the program has traditionally focused on lighting and refrigeration, National Grid is constantly updating the program to apply other measures such as energy management systems, roof-top HVAC unit replacement, and new heating systems.

National Grid has also been actively pursuing new models that serve segments within what has been traditionally considered small business in more tailored and more cost effective ways. The Company's success with schools, national and regional chains, food retailers, and Upstream lighting are all signs of a more strategic approach to these customers.

In October, 2016, the SolarWise Program was launched to the small business community. This program encourages customers to consider "right sizing" their facility for energy efficiency prior to installing

solar. Those that do receive 5% or 10% more for the electricity generated by their solar panels than they otherwise would.

### ***Farm Energy Efficiency Program***

Currently exiting its pilot stage and looking to expand, the Farm Energy Efficiency Program offers Rhode Island agribusinesses incentives for prescriptive energy efficient measures. As part of the program, customers receive a free on-site energy assessment, and a report detailing recommended energy-efficient improvements. Farmers or agribusiness owners can then choose to install any number of recommended energy efficient measures for use with either electric or delivered fuels. Delivered fuels measures are eligible for incentives equal to 75% of their installed costs. Electric measure incentives vary depending on the application, but any approved electric measure cost not covered by an incentive can be paid back, interest free, through National Grid's on-bill payment system provided that funds are available.

This program was established to support Rhode Island's thriving and growing agriculture industry, and to reduce Rhode Island's greenhouse gas emissions. As a state with one of the top energy efficiency programs in the country, the Office of Energy Resources was well-positioned to address the needs of this specialized and hard-to-reach sector. By conducting a state-wide farm energy survey, farmer interest and participation obstacles were clearly identified before the program's inception. This allowed the OER, in partnership with National Grid, Commerce RI, the Farm Energy Program, and other stakeholders to design a program well-fitted to Rhode Island farmers.

## **Codes and Standards**

The Rhode Island Code Compliance Enhancement Initiative (CCEI) is designed to increase the ability and desire of architects, engineers, builders, contractors, construction managers, and energy specialists to comply with the locally mandated residential and commercial building energy codes as well as to improve the ability of local building code officials to enforce the code. The CCEI completed its fourth year in 2016 and experienced a number of significant accomplishments during the year.

### ***Performance Overview***

The year 2016 was a successful year for the Rhode Island CCEI. A total of 21 CCEI classroom and on-site training events were held during 2016 for residential and commercial design, construction, and code enforcement personnel. These trainings attracted 468 total attendees. Compared to the standard in-class trainings in the previous years, CCEI trainings expanded to other forums and reached broader audience at the 2016 Rhode Island Builders Association Annual Construction Expo and the Riverhead Building Supply Contractor's Business Conference.

Attendance at on-site field trainings, technical tours, and vocational school trainings were robust during 2016 (see below photos). Nine trainings occurred, with 146 attendees. Of these attendees, 36% were code officials, 26% were vocation school students, and 22% were builders and general contractors. Several in-field hands-on duct leakage testing trainings occurred during 2016. On-site training events were also coordinated with such entities as: Rhode Island Construction Training Academy, University of Rhode Island, Warwick Career and Tech, New England Institute of Technology, Riverhead Building Supply, and New England Building Officials Education Association.



The energy code technical support toll-free “circuit rider” number helped clarify any confusion or misunderstanding that building code officials, building design, and construction professionals had regarding energy codes, and supported their efforts to better understand and execute code compliant building designs. This important service fielded 26 residential and 7 commercial related telephone inquiries. The majority of these inquiries were successfully resolved via the phone, while 11 inquiries resulted in field visits to actual job sites or office consultations. The CCEI efforts in Rhode Island most importantly realized savings during 2016. The CCEI realized residential sector savings of 650 MWh and 61,648 therms and commercial sector savings of 3,154 MWh and 50,000 therms.

### **Codes**

In addition to attendance at energy code trainings in 2016, the Rhode Island CCEI had several additional highlights during the year. The initiative began working on updating the residential and commercial FAQs to reflect the new 2015 IECC code, created two overviews of changes to the code, and a lighting controls guide to address the new code. These documents will be finalized after the official adoption of the new code in RI.

Two commercial code tour of University of Rhode Island Chemistry Building occurred in 2016. These tours focused on how these buildings met or exceeded the various aspects of the Rhode Island commercial building code. During the two events, commercial overview of the 2015 IECC code was also provided with the goal of informing the code officials how 2015 IECC generally compares to 2012 IECC.

### **Appliance Standards**

Appliance standards efforts focused on working with a broad range of stakeholders to advocate for stronger appliance standards in Rhode Island. Working with the Appliance Standards Awareness Project (ASAP) as well as the Northeast Energy Efficiency Partnership (NEEP), a target list of suitable appliances was identified. The target list was determined based on the status of Federal standards for these appliances as well as the potential for savings throughout the state. All new appliances within a given category sold in the state would be subject to the stricter standards. The Company will continue the collaboration with the Rhode Island Office of Energy Resources (RI-OER) and other stakeholders to further appliance standards advocacy.

## **Pilots and Other Initiatives**

### ***Residential Pilots***

#### ***Connected Solutions***

In 2016, the Company ran phase one of its Connected Solutions residential demand response demonstration, with an overall goal to reduce peak demand during high peak periods and inform the design of future demand reduction programs. Over three-hundred thermostats were enrolled either by customers enrolling pre-installed Wi-Fi thermostats (aka Bring Your Own Thermostat or BYOT) or by participating in a free Wi-Fi thermostat with installation promotion in conjunction with Connected Solutions.

Overall, the Connected Solutions demonstration evaluation, “found the program was successful both in testing the effectiveness of thermostats as a residential DR technology and in customer acceptance of the program offering.”<sup>13</sup> Customers who agreed to participate in Connected Solutions had their thermostats automatically increase the thermostat set point by two-degrees during peak summer load periods. The peak load periods were called “events” and could last from 2-4 hours. Overall, there were 108 hours of program curtailment during 29 events during the summer season.

Interestingly, customers remained interested in the events even if they continued for several concurrent days. The maximum demand reduction achieved in RI was 105 kW with an average of 65 kW. When asked why they elected to participate in Connected Solutions, the majority of customers responded that they did so believing that they could achieve bill savings.

This demonstration will continue in 2017 with a goal of determining whether the program will be cost effective at scale and also to receive anecdotal information regarding winter demand response.

### ***Residential Energy Efficiency Education Programs***

In 2016, National Grid continued its support of the energy education curriculum and teacher professional development in partnership with the National Energy Education Development (NEED) Project. Rhode Island teachers had the opportunity to attend full-day workshops that focused on the science of energy, energy efficiency, and the generation of electricity. The workshops, which hosted 58 teachers from 34 schools, allowed K-12 educators to improve and enhance their science and energy skills, while helping students understand energy, and ways in which they could be more efficient at home and at school.

Teachers received hands-on kits for the classroom and curriculum. The kits included topics such as Exploring Wind, Exploring Photovoltaics, Exploring Hydropower, Building Science and The Science of Energy. Educators were able to select the resources they believed were most appropriate for their classroom goals.

### ***SolarWise***

In 2016, RI Energy Efficiency Program Strategy contributed to the program design, program filings, and program implementation for the RI Renewable Energy Growth SolarWise Program ([www.ngrid.com/ri-solarwise](http://www.ngrid.com/ri-solarwise)). All SolarWise applicants must participate in National Grid’s Energy Efficiency Programs and achieve significant energy savings to be eligible for the SolarWise bonus solar incentives. SolarWise RI was launched in 2016. The RI EE Team worked with the RE Growth SolarWise team to align the EE Programs so EE customers could understand how use their energy savings to apply for the SolarWise Bonus Incentive Program.

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<sup>13</sup> Navigant Consulting. *2016 Residential Wi-Fi Thermostat DR Evaluation Final Report*. Burlington: Navigant Consulting, 2017.

## ***System Reliability Procurement***

In System Reliability Procurement (SRP), the Company develops and implements non-wires alternative projects (NWAs). This involves identifying transmission or distribution needs that have the potential to be deferred by distributed energy resources within a specified timeline. These projects are customer-focused and can include some measures that are also offered through the Company's statewide energy efficiency programs.

Currently, these efforts are in a pilot state as the Company continues to implement its Demandlink™ pilot in Little Compton and most of Tiverton.<sup>14</sup> Launched in 2012, the pilot's primary objective is to implement a combination of energy efficiency and demand response measures in customer homes and businesses in order to reduce 1 MW of load the affected feeders by the end of 2017. In achieving this goal, the Company projects that the need to upgrade that substation will be deferred by four years.

On December 2, 2015, the PUC approved the fifth year of the pilot, which the Company plans to operate for six years. The Company maintained the same portfolio of incentives as the previous year, hoping to continue the rate of recruitment. The principle change in the plan from prior years was the deployment of additional outreach in both Pilot communities as part of the Rhode Island Energy Challenge campaign, which was added to the comprehensive campaign conducted for the Pilot. The Company also continued to leverage its statewide EnergyWise and Small Business Direct Install programs in the promotion and delivery of these measures. Eighteen demand response events were conducted between July and September 2016. One of these days was triggered by a forecasted need on the feeder, while the rest were triggered based on weather conditions. Based on year-to-date participation, the Company projects that by the end of 2016, it will have achieved approximately 56% of its planned incremental summer kW target of 170 kW. Additional SRP details on 2016 activities and 2017 plans can be found in the Company's 2017 System Reliability Procurement Report filed in Docket 4655 and approved by the PUC on December 8, 2016.

## ***Financing***

The Company offered a variety of finance options to both commercial and residential customers. Since 2011, the Company has managed several revolving loan funds that allow customers to pay for their portion of an energy efficiency project through their monthly bills. The funds allowed participants to remain cash-flow positive and helped relieve pressure on the DSM charge by reducing incentive budgets. In 2014, the Company began managing a revolving loan fund for state and municipal customers as part of the RI Public Energy Partnership (RI PEP). In 2015, the Company extended opportunities for gas projects through the Large Commercial & Industrial (LC&I) gas revolving loan fund.

### Large C&I Revolving Loan Fund

Through the electric LC&I revolving loan fund, the Company offered \$4.5 million in on-bill financing to 43 Large Commercial customers through 77 loans resulting in electric savings of 11,226 annual MWh. At the end of 2016, the fund had a balance of \$12.6 million, money that will be available for more loans in 2017 and in the future. The Company did not lend out the full balance of the loan fund due to uncertainty around whether or not it would receive future fund injections. It wanted to ensure it could meet customer demand in 2017. Based on an evaluation by The Cadmus Group, Inc. as well as interview with the C&I sales team, it's evident that having a firm schedule of future fund injections will allow for full deployment of the dollars in the loan fund.<sup>15</sup>

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<sup>14</sup> The DemandLink pilot's goal is to reduce peak load on feeders 33F3 and 33F4. These feeders serve the entire town of Little Compton and all but the northwest corner of Tiverton.

<sup>15</sup> The Cadmus Group, Inc., Large Commercial and Industrial On-Bill Repayment Program Evaluation, September 20, 2016.

Through the gas LC&I revolving loan fund, the Company offered \$822,798 in loans to 13 Large Commercial customers resulting in gas savings of 58,787 MMBtu. At the end of 2016, the fund had a balance of \$979,707, money that will be available for more loans in 2017 and in the future.

The Company continued to manage a revolving loan fund in support of the RI PEP. The Company offered \$544,772 in on-bill finance to 5 participating municipal customers. This resulted in an electric savings of 1,388 annual MWh. At the end of 2016, the fund had a balance of \$781,385. For 2017, \$500,000 of the remaining balance will be transferred to the Rhode Island Infrastructure Bank to support the Efficient Buildings Fund.

#### Small Business Revolving Loan Fund

Of the 1,118 customers that participated in the Small Business Direct Install program, each received financing to cover 30% share of the project costs, either over 24 months at zero (0) percent interest or a lump sum payment with a 15% discount. Overall, the Small Business Revolving Loan fund was able to provide \$3.08 million in loans that led to more than 12,440 MWh in annual energy savings. At year end, the fund had a balance of \$2.27 million.

#### Heat Loan

The Company also continued offering a 0% interest Heat Loan to residential customers to finance their portions of residential energy efficiency projects. The interest buy-down program was initially funded by RGGI funds in 2011. As of 2012, The RGGI funds had been fully utilized and the EnergyWise program began to provide the needed funds.

In 2016, there were six lenders participating in the initiative: Greenwood Credit Union, Coventry Credit Union, Bay Coast Bank, Navigant Credit Union, the Capital Good Fund, and Bank Five. The Heat Loan can be used for Insulation and/or Air Sealing Upgrades, Energy Efficient Heating System Replacements, Duct Sealing and Duct Insulation, Energy Efficient Domestic Hot Water Systems, or ENERGY STAR® Thermostats. Depending on the lender, customers are eligible to receive 0% interest loans up to \$25,000 for period of up to 7 years. In total, 806 Heat Loans were secured, valued at approximately \$4.7 million. An overview of the revolving loan funds and Heat Loan for 2016 is included in tables E-6 and E-7.

#### Efficient Buildings Fund (EBF)

In 2015, National Grid and the Rhode Island Infrastructure Bank provided a combined 52 audits to drive demand for the first round of the Efficient Buildings Fund (EBF). These efforts were successful and resulted in \$60 million dollars in project applications submitted to the RI Office of Energy Resources (OER) to review. After the review, ~\$17 million in projects in efficiency and renewables moved forward. The money to support these projects came from a \$1.8 million allocation of rate-payer (SBC) funds, mandated by the law, and \$3.0 million in funds from the Regional Greenhouse Gas Initiative (RGGI) controlled by OBR. These funds were then leveraged by RIIB to obtain the money required to support these projects. These projects will be completed in 2016 and 2017.

In the early Fall of 2016, National Grid, based on a request from RIIB, and working in conjunction the Collaborative, promised to provide an addition \$5 million from energy efficiency program funds to RIIB to leverage for future rounds of the EBF in 2017. National Grid, OER, and RIIB all believe there is significant potential in the municipal and quasi-state areas. The \$5 million transfer to RIIB was included in the 2017 Energy Efficiency Plan and budgets.

Applications for EBF Round 2 were due in late December 2016.

### Commercial Property Assessed Clean Energy (C-PACE)

In 2016, National Grid worked with Sustainable Real Estate Solutions (SRS), RIIB's C-PACE program administrator to begin to target select customer groups which National Grid and SRS believe are underserved and appropriate for C-PACE. This includes nursing homes, which were highlighted by Treasurer Magaziner, as a priority area. Many contacts and audits have been and performed in 2016. The Company and SRS believe the first C-PACE project involving efficiency will close soon.

## **Rhode Island Comprehensive Marketing**

In 2016, National Grid continued to increase awareness of Energy Efficiency programs for Rhode Island customers through a comprehensive campaign that targeted residential and C&I customers. The campaign communicated the ways in which Energy Efficiency makes life or business better for customers. By leveraging internal and external customer research, and focusing on non-energy benefits, we reached customers with targeted messages that resonated with them. Mass media tactics included billboards, radio, print, digital, native advertising, and social media. In addition, we partnered with grass roots community groups statewide to educate and further engage customers. According to market research studies conducted throughout the year, Rhode Island customers consistently score higher in terms of familiarity with our Energy Efficiency programs than our other jurisdictions.

## **Jobs Impacts**

National Grid hired Peregrine Energy Group, Inc. to conduct a study of the job impacts from National Grid's energy efficiency programs in 2016. The study estimates the number of full-time equivalent (FTE) employees engaged in all aspects of energy efficiency programs where National Grid provided funding support in 2016. The FTE counts cover a wide range of energy efficiency services, including independent contractors and plumbers, rebate processors, engineers, and National Grid staff. The study also includes counts of Weatherization Assistance Program (WAP) FTEs that are employed by the Community Action Program agencies that deliver low-income energy efficiency services.

Peregrine determined that 702 full-time equivalent (FTE) employees had work in 2016 as a result of investments by National Grid in energy efficiency programs provided to its Rhode Island electricity and natural gas customers. Most of the jobs created as a result of energy efficiency investments were local because they were tied to installation of equipment and other materials.

The study identified 923 companies and agencies involved in National Grid's 2016 energy efficiency programs, 82% of which were located in Rhode Island. The companies identified include those whose employees are counted in the FTE analysis, as well as additional companies who assisted customers to secure equipment rebates, for example through the New Construction, Commercial Upstream Lighting, or High Efficiency HVAC programs.

**Full-Time Equivalent (FTE) Employment Supported by Energy Efficiency Programs in Rhode Island in 2016**

<b>Programs</b>	<b>Total FTEs</b>
<b>Electric Programs</b>	
Commercial and Industrial	241.1
Residential Income Eligible	42.3
Residential Non-Income Eligible	104.0

<b>Gas Programs</b>	
Commercial and Industrial	36.1
Residential Income Eligible	41.4
Residential Non-Income Eligible	159.3
<b>National Grid EE Staffing</b>	39.9
<b>Community Action Agency staff</b>	38
<b>Total all 2016 Rhode Island FTEs</b>	702.2

The study’s findings were developed through interviews with energy services and equipment vendors and National Grid contractors, as well as through a detailed review of National Grid’s records of all energy efficiency measures installed in homes, apartment buildings, businesses, and industries throughout the state in 2016. Peregrine Energy Group calculated the labor hours required for each installation based on industry standards and discussions with contractor experts.

One FTE equals 1,760 work hours, or the total of one person working 8 hours a day for 220 work days in an average year. Because a “full-time equivalent” employee often represents the labors of more than one person over the course of a year, the number of individual workers employed as result of Rhode Island energy efficiency programs funded by National Grid is far larger than the total of FTEs. The study and a complete list of businesses are included as Attachment 5.

## Shareholder Incentive

The Company’s Shareholder Incentive earnings are determined by its performance against the established annual savings goals documented in the 2016 EEPP. Under the current incentive structure, the Company can earn a target based-incentive rate equal to 5.0% of the eligible spending budget in a program year for achieving electric and gas energy savings goals.

Beginning in 2015, the incentive structure was changed for the electric portfolio to promote both energy and demand savings. This structure allows the Company to earn a target-based incentive rate equal to 3.5% of the eligible annual spending budget for achieving MWh savings goals and 1.5% of the annual spending budget for achieving MW savings goals.

For the gas portfolio, where there is no demand savings component, the original target-based incentive rate equal to 5.0% of the eligible annual spending budget for achieving MMBtu savings goals remained in place.

The Shareholder Incentive is earned by sector. An incentive is earned if savings in a sector fall between 75% and 125% of the savings goal for the sector. An enhanced incentive up to 125% of the target incentive is available for achieving greater savings than the savings target. All sectors earned an incentive for their 2016 performance. All gas sectors earned over 100% of the target incentive. For electric, income eligible and non-income eligible earned over 100% of the target incentive.

The Company has earned a total of \$5,624,903 for the successful implementation of its energy efficiency programs in 2016.

More details on the Company’s Shareholder Incentive achievements can be found in Attachments 1 and 2, tables E-4 and G-4.

**Attachment 1**  
**Electric Year-End Results**

## **Attachment 1**

### **Electric Summary Tables of Year End**

**NATIONAL GRID ENERGY EFFICIENCY PROGRAMS IN RHODE ISLAND**

**Table E-1: Summary of 2016 Target and Year End Results**

Sector and Program	(1) Demand Reduction (Annual kW)			(2) Pct Achieved			(3) Energy Savings (Annual MWh)			(4) Pct Achieved			(5) Customer Participation			(6) Pct Achieved			(7) Implementation Expenses (\$ 000)			(8) Lifetime MWh		(9) \$/kWh	
	Target	Actual	Actual	Target	Actual	Actual	Target	Actual	Actual	Approved Target	Actual	Actual	Budget	Actual	Actual	Budget	Actual	Actual	MWh	\$/kWh					
<b>Commercial &amp; Industrial</b>																									
Large Commercial New Construction	1,540	1,702	110.5%	15,728	11,650	74.1%	209	185	88.5%	\$6,864.1	\$5,417.1	78.9%	191,882	\$0.028											
Large Commercial Retrofit	13,906	11,751	84.5%	67,030	70,221	104.8%	3,540	2,169	61.3%	\$22,545.5	\$19,719.3	87.5%	787,098	\$0.025											
Small Business Direct Install	2,507	2,310	92.2%	12,165	12,440	102.3%	905	740	81.8%	\$8,745.9	\$6,994.4	80.0%	138,824	\$0.050											
Community Based Initiatives - C&I										\$49.6	\$27.0	54.5%													
Commercial Demonstration and R&D										\$296.2	\$49.7	16.8%													
Finance Costs										\$3,000.0	N/A	N/A													
<b>SUBTOTAL</b>	<b>17,953</b>	<b>15,763</b>	<b>87.8%</b>	<b>94,922</b>	<b>94,310</b>	<b>99.4%</b>	<b>4,654</b>	<b>3,094</b>	<b>66.5%</b>	<b>\$41,501.2</b>	<b>\$32,207.5</b>	<b>77.6%</b>	<b>1,117,804</b>	<b>\$0.029</b>											
<i>Subtotal with Finance</i>										\$41,501.2	\$35,207.5	84.8%	1,117,804	\$0.031											
<b>Income Eligible Residential</b>																									
Single Family - Income Eligible Services	554	857	154.8%	4,061	4,667	114.9%	2,500	3,016	120.6%	\$8,656.1	\$7,426.4	85.8%	55,793	\$0.133											
Income Eligible Multifamily	117	183	156.0%	2,830	3,161	111.7%	5,100	5,366	105.2%	\$2,531.3	\$2,066.7	81.6%	26,919	\$0.077											
<b>SUBTOTAL</b>	<b>671</b>	<b>1,040</b>	<b>155.0%</b>	<b>6,891</b>	<b>7,828</b>	<b>113.6%</b>	<b>7,600</b>	<b>8,382</b>	<b>110.3%</b>	<b>\$11,187.4</b>	<b>\$9,493.1</b>	<b>84.9%</b>	<b>82,713</b>	<b>\$0.115</b>											
<b>Non-Income Eligible Residential</b>																									
Residential New Construction	83	120	144.6%	1,213	1,397	115.1%	512	526	102.7%	\$736.9	\$656.8	89.1%	21,201	\$0.031											
ENERGY STAR® HVAC	235	320	136.0%	1,011	1,045	103.3%	902	1,764	195.5%	\$1,219.0	\$1,169.8	96.0%	13,317	\$0.088											
EnergyWise	1,701	2,222	130.6%	11,729	14,867	126.8%	8,890	9,567	107.6%	\$10,007.7	\$8,906.4	89.0%	137,649	\$0.065											
EnergyWise Multifamily	185	246	132.9%	4,061	4,186	103.1%	4,400	7,783	176.9%	\$3,319.1	\$2,666.3	80.3%	41,239	\$0.065											
Home Energy Reports	3,759	3,363	89.5%	32,186	28,792	89.5%	294,013	270,257	91.9%	\$2,796.7	\$2,722.4	97.3%	28,792	\$0.095											
ENERGY STAR® Lighting	5,049	6,731	133.3%	43,098	58,080	134.8%	233,992	431,739	184.5%	\$7,362.1	\$7,705.9	104.7%	565,094	\$0.014											
Residential Consumer Products	696	726	104.3%	4,647	3,824	82.3%	14,095	25,171	178.6%	\$2,085.0	\$1,706.4	81.8%	26,411	\$0.065											
Energy Efficiency Education Programs										\$40.1	\$60.0	149.8%													
Residential Demonstration and R&D										\$488.1	\$236.0	48.4%													
Community Based Initiatives - Residential										\$284.4	\$194.8	68.5%													
Comprehensive Marketing - Residential										\$534.0	\$534.8	100.2%													
<b>SUBTOTAL</b>	<b>11,708</b>	<b>13,728</b>	<b>117.2%</b>	<b>97,947</b>	<b>112,191</b>	<b>114.5%</b>	<b>556,804</b>	<b>746,808</b>	<b>134.1%</b>	<b>\$28,873.1</b>	<b>\$26,559.8</b>	<b>92.0%</b>	<b>833,704</b>	<b>\$0.032</b>											
<b>Regulatory</b>																									
OER										\$793.1	\$790.6	99.7%													
EERMC										\$793.1	\$781.6	98.5%													
RI Infrastructure Bank										\$1,441.5	N/A	N/A													
<b>SUBTOTAL</b>										<b>3,027.7</b>	<b>1,572.1</b>	<b>51.9%</b>													
<i>Subtotal with RIIB</i>										3,027.7	3,013.6	99.5%													
<b>TOTAL</b>	<b>30,332</b>	<b>30,530</b>	<b>100.7%</b>	<b>199,760</b>	<b>214,329</b>	<b>107.3%</b>	<b>569,058</b>	<b>758,284</b>	<b>133.3%</b>	<b>\$84,589.4</b>	<b>\$69,832.6</b>	<b>82.6%</b>	<b>2,034,220</b>	<b>\$0.034</b>											
<i>TOTAL With Finance and RIIB</i>										\$84,589.4	\$74,274.1	87.8%	2,034,220	\$0.037											
<b>RGGI</b>										\$431.0	\$20.3	4.7%													
<b>System Reliability Procurement</b>										\$441.1	\$329.3	74.7%													

**Notes**

(1)(4) Approved Target from 2016 EEP, Attachment 5, Table E-7.

An error was found in kW planning for the ENERGY STAR® Lighting program. The filed goal was 3,620 kW and the filed Residential Sector goal was 10,673 kW. The correct kW goal is reflected in the tables above. The Company is using the corrected Residential Sector kW goal for its year-end incentive calculation. Approved by RI EE Collaborative on August 24, 2016.

An error was found in kW planning for the multifamily programs. The filed EnergyWise Multifamily goal was 579 and the filed Residential Sector goal was 10,673 kW. The filed Income Eligible Multifamily goal was 366 kW and the filed Income Eligible Sector goal was 920 kW. The correct kW goals are reflected in the tables above. The Company is using the corrected Residential Sector and Income Eligible kW goals for its year-end incentive calculation.

Approved by RI EE Collaborative on August 24, 2016.

(3) Pct Achieved is Column (2)/ Column (1).

(6) Pct Achieved is Column (5)/ Column (4).

(7) Approved Target from 2016 EEP, Attachment 5, Table E-7. Participation was planned and is reported in 'net' terms which takes into account free-ridership and spillover.

(9) Pct Achieved is Column (8)/ Column (7).

(10) Approved Budget includes Implementation and Evaluation budgets from Docket 4580, Attachment 5 Table E-2 (electric).

EnergyWise Budget includes \$1M in RGGI funding for delivered fuels weatherization per Section IV.A.2 in Docket 4580.

RGGI budget line only includes funds received for Agriculture Delivered Fuels and Heat Pump Evaluation. Does not include funds allocated to lowering the energy efficiency program charge or those allocated to loan funds.

Details on total RGGI allocation and spend can be found in Attachment 6: 2016 RGGI Auction Proceeds

(11) Year To Date Expenses include Implementation and Evaluation expenses.

\$3,000,000 in finance funds were transferred as authorized to the Large C&I Electric Revolving Loan Fund. See Table E-5.

A payment of \$1,441,475 was made to RIIB on 11/1/2016; however, the expense only shows up in fund balance due to accounting protocols.

RGGI Expenses are counted separate as those funds were not part of the approved 2016 budget. Details on RGGI spend are found in Attachment 6: 2016 RGGI Auction Proceeds.

(12) Pct Achieved is Column (11)/ Column (10).

(14) \$/lifetime kWh = Column (11)/Column (13)

**NATIONAL GRID ELECTRIC ENERGY EFFICIENCY PROGRAMS IN RHODE ISLAND**  
**Table E-2: Summary of Value, kW, and kWh by Program**  
**2016 Program Year**

	Value (000's)											kW Saved				MWh Saved		
	Total	Capacity					Energy					Non-Electric Benefits	Maximum Annual	Winter	Summer	Lifetime	Annual	Lifetime
		Generation		Trans	MDC	DRIPE	Winter		Summer		DRIPE							
		Summer	Winter				On Peak	Off Peak	On Peak	Off Peak								
<b>Commercial &amp; Industrial</b>																		
Large Commercial New Construction	\$20,944	\$4,296	\$0	\$311	\$2,284	\$0	\$6,581	\$3,357	\$3,165	\$1,373	\$58	(\$481)	1,538	1,082	1,702	24,871	11,650	191,882
Large Commercial Retrofit	\$81,085	\$19,168	\$0	\$1,506	\$11,047	\$0	\$20,730	\$17,015	\$9,340	\$6,719	\$317	(\$4,758)	10,958	8,913	11,751	119,342	70,221	787,098
Small Business Direct Install	\$17,667	\$2,260	\$0	\$1,040	\$4,464	\$0	\$3,743	\$2,137	\$1,796	\$948	\$1,512	(\$233)	2,310	2,440	2,310	25,627	12,440	138,824
<b>SUBTOTAL</b>	<b>\$119,696</b>	<b>\$25,725</b>	<b>\$0</b>	<b>\$2,858</b>	<b>\$17,795</b>	<b>\$0</b>	<b>\$31,054</b>	<b>\$22,508</b>	<b>\$14,301</b>	<b>\$9,040</b>	<b>\$1,887</b>	<b>(\$5,473)</b>	<b>14,806</b>	<b>12,435</b>	<b>15,763</b>	<b>169,840</b>	<b>94,310</b>	<b>1,117,804</b>
<b>Income Eligible Residential</b>																		
Single Family - Income Eligible Services	\$11,325	\$1,614	\$0	\$123	\$901	\$0	\$1,700	\$1,169	\$742	\$415	\$22	\$4,640	739	819	857	8,302	4,667	55,793
Income Eligible Multifamily	\$3,030	\$240	\$0	\$20	\$144	\$0	\$688	\$739	\$209	\$207	\$13	\$770	181	610	183	1,685	3,161	26,919
<b>SUBTOTAL</b>	<b>\$14,354</b>	<b>\$1,854</b>	<b>\$0</b>	<b>\$142</b>	<b>\$1,045</b>	<b>\$0</b>	<b>\$2,388</b>	<b>\$1,908</b>	<b>\$951</b>	<b>\$622</b>	<b>\$35</b>	<b>\$5,410</b>	<b>920</b>	<b>1,429</b>	<b>1,040</b>	<b>9,987</b>	<b>7,828</b>	<b>82,713</b>
<b>Non-Income Eligible Residential</b>																		
Residential New Construction	\$3,583	\$395	\$0	\$28	\$202	\$0	\$539	\$661	\$207	\$195	\$5	\$1,350	120	81	120	2,435	1,397	21,201
ENERGY STAR® HVAC	\$3,096	\$775	\$0	\$57	\$415	\$0	\$290	\$304	\$231	\$116	\$5	\$904	291	294	320	4,413	1,045	13,317
EnergyWise	\$23,885	\$2,703	\$0	\$227	\$1,662	\$0	\$4,086	\$2,559	\$1,809	\$1,001	\$72	\$9,767	1,990	3,009	2,222	18,119	14,867	137,649
EnergyWise Multifamily	\$4,022	\$299	\$0	\$25	\$184	\$0	\$1,251	\$947	\$423	\$264	\$18	\$610	245	658	246	2,143	4,186	41,239
Home Energy Reports	\$2,549	\$118	\$0	\$40	\$293	\$0	\$873	\$703	\$281	\$185	\$57	\$0	3,363	4,607	3,363	3,363	28,792	28,792
ENERGY STAR® Lighting	\$59,857	\$9,429	\$0	\$760	\$5,573	\$0	\$18,751	\$9,370	\$8,400	\$3,686	\$293	\$3,595	6,731	8,655	6,731	65,467	58,080	565,094
Residential Consumer Products	\$3,192	\$733	\$0	\$64	\$473	\$0	\$563	\$480	\$377	\$292	\$18	\$193	726	646	726	5,506	3,824	26,411
<b>SUBTOTAL</b>	<b>\$100,184</b>	<b>\$14,453</b>	<b>\$0</b>	<b>\$1,200</b>	<b>\$8,802</b>	<b>\$0</b>	<b>\$26,353</b>	<b>\$15,023</b>	<b>\$11,728</b>	<b>\$5,739</b>	<b>\$469</b>	<b>\$16,418</b>	<b>13,466</b>	<b>17,949</b>	<b>13,728</b>	<b>101,446</b>	<b>112,191</b>	<b>833,704</b>
<b>TOTAL</b>	<b>\$234,234</b>	<b>\$42,031</b>	<b>\$0</b>	<b>\$4,200</b>	<b>\$27,641</b>	<b>\$0</b>	<b>\$59,796</b>	<b>\$39,439</b>	<b>\$26,980</b>	<b>\$15,401</b>	<b>\$2,391</b>	<b>\$16,355</b>	<b>29,193</b>	<b>31,813</b>	<b>30,530</b>	<b>281,273</b>	<b>214,329</b>	<b>2,034,220</b>

**NATIONAL GRID ELECTRIC ENERGY EFFICIENCY PROGRAMS IN RHODE ISLAND**

**Table E-3: Summary of B/C Ratios, Value and Costs (\$000's)**

**2016 Program Year**

	(1) Benefit/ Cost	(2) Total Value	(3) Program Implementation Expenses	(4) Customer Contribution	(5) Shareholder Incentive
<b>Commercial &amp; Industrial</b>					
Large Commercial New Construction	3.48	\$20,944.0	\$5,417.1	\$605.2	
Large Commercial Retrofit	2.50	\$81,084.8	\$19,719.3	\$12,753.9	
Small Business Direct Install	1.87	\$17,666.8	\$6,994.4	\$2,453.2	
Community Based Initiatives - C&I			\$27.0		
Commercial Demonstration and R&D			\$49.7		
Finance Costs			\$3,000.0		
<b>SUBTOTAL</b>	<b>2.27</b>	<b>\$119,695.5</b>	<b>\$35,207.5</b>	<b>\$15,812.3</b>	<b>\$1,687.6</b>
<b>Income Eligible Residential</b>					
Single Family - Income Eligible Services	1.52	\$11,324.7	\$7,426.4	\$0.0	
Income Eligible Multifamily	1.47	\$3,029.7	\$2,066.7	\$0.0	
<b>SUBTOTAL</b>	<b>1.41</b>	<b>\$14,354.4</b>	<b>\$9,493.1</b>	<b>\$0.0</b>	<b>\$699.2</b>
<b>Non-Income Eligible Residential</b>					
Residential New Construction	2.36	\$3,582.6	\$656.8	\$858.4	
ENERGY STAR® HVAC	1.73	\$3,096.1	\$1,169.8	\$624.2	
EnergyWise	1.99	\$23,885.1	\$8,906.4	\$3,112.5	
EnergyWise Multifamily	1.45	\$4,021.9	\$2,666.3	\$115.4	
Home Energy Reports	0.94	\$2,549.3	\$2,722.4	\$0.0	
ENERGY STAR® Lighting	3.60	\$59,857.0	\$7,705.9	\$8,911.3	
Residential Consumer Products	1.45	\$3,192.2	\$1,706.4	\$501.2	
Energy Efficiency Education Programs			\$60.0		
Residential Demonstration and R&D			\$236.0		
Community Based Initiatives - Residential			\$194.8		
Comprehensive Marketing - Residential			\$534.8		
<b>SUBTOTAL</b>	<b>2.36</b>	<b>\$100,184.2</b>	<b>\$26,559.8</b>	<b>\$14,123.0</b>	<b>\$1,741.2</b>
<b>Regulatory</b>					
OER			\$790.6		
EERMC			\$781.6		
RI Infrastructure Bank			\$1,441.5		
<b>SUBTOTAL</b>			<b>\$3,013.6</b>		
<b>TOTAL</b>	<b>2.16</b>	<b>\$234,234.2</b>	<b>\$74,274.1</b>	<b>\$29,935.3</b>	<b>\$4,128.0</b>

**Notes:**

- (1) RI Total Resource Cost test Benefit/Cost Ratio = Total Value/(Program Implementation Expenses + Customer Contribution + Shareholder Incentives).
- (2) Year-End Value Total from Table E-2.
- (3) Year-End Implementation Expenses by Program from Table E-1 including payments to RIIB and Finance Costs.
- (4) Shareholder incentives from Table E-4.

**NATIONAL GRID ELECTRIC ENERGY EFFICIENCY PROGRAMS IN RHODE ISLAND**  
**Table E-4: National Grid 2016 EE Incentive Calculation**

Energy Incentive Rate: 3.50%							
Sector	(1) Approved Spending Budget	(2) Target Incentive	(3) Annual kWh Savings Goal	(3a) Actual Spending	(3b) % of Approved Spending	(3c) Budget adjusted target kWh savings	(4) Threshold kWh Savings
Income Eligible Residential	\$11,187,403	\$391,559	6,891,430	\$ 9,493,108	84.9%	5,847,745	4,385,809
Non-Income Eligible Residential	\$27,873,133	\$975,560	97,946,654	\$ 25,559,823	91.7%	89,817,643	67,363,232
Commercial & Industrial	\$38,501,209	\$1,347,542	94,922,361	\$ 32,207,508	83.7%	94,922,361	71,191,771
<b>Total</b>	<b>\$77,561,745</b>	<b>\$2,714,661</b>	<b>199,760,445</b>	<b>\$ 67,260,438</b>		<b>190,587,749</b>	<b>142,940,812</b>

Sector	(5) Actual kWh	(6) % of Target Savings	(7) Savings Eligible for Incentive	(8) Total Earned Incentive	(9) % of Target Incentive Achieved
Income Eligible Residential	7,827,859	133.9%	7,309,682	\$ 489,449	125.0%
Non-Income Eligible Residential	112,191,014	124.9%	112,191,014	\$ 1,218,569	124.9%
Commercial & Industrial	94,309,676	99.4%	94,309,676	\$ 1,321,449	98.1%
<b>Total</b>	<b>214,328,549</b>		<b>213,810,372</b>	<b>\$ 3,029,467</b>	<b>111.6%</b>

Demand Incentive Rate: 1.50%							
Sector	(1) Approved Spending Budget	(2) Target Incentive	(3) Annual kW Savings Goal	(3a) Actual Spending	(3b) % of Approved Spending	(3c) Budget adjusted target kW savings	(4) Threshold kW Savings
Low Income Residential	\$11,187,403	\$167,811	671	\$ 9,493,108	84.9%	569	427
Non-Low Income Residential	\$27,873,133	\$418,097	11,708	\$ 25,559,823	91.7%	10,737	8,052
Commercial & Industrial	\$38,501,209	\$577,518	17,953	\$ 32,207,508	83.7%	17,953	13,465
<b>Total</b>	<b>\$77,561,745</b>	<b>\$1,163,426</b>	<b>30,332</b>	<b>\$ 67,260,438</b>		<b>29,259</b>	<b>21,944</b>

Sector	(5) Actual kW	(6) % of Target Savings	(7) Savings Eligible for Incentive	(8) Total Earned Incentive	(9) % of Target Incentive Achieved
Low Income Residential	1,040	182.7%	711	\$ 209,764	125.0%
Non-Low Income Residential	13,728	127.9%	13,421	\$ 522,621	125.0%
Commercial & Industrial	15,763	87.8%	15,763	\$ 366,182	63.4%
<b>Total</b>	<b>30,530</b>	<b>104.3%</b>	<b>29,895</b>	<b>\$ 1,098,567</b>	<b>94.4%</b>

**Notes**

- (1) Budget from 2016 EEPP. Includes Implementation and Evaluation Expenses; excludes EERMC Costs, Commitments and Copays, and Outside Finance Costs. Excludes RGGI Oil funds per Docket 4580 – The Narragansett Electric Company, d/b/a National Grid 2016 Energy Efficiency Program Plan Revised Attachment 5 - filed with PUC December 21, 2016.
- (2) Equal to the incentive rate (3.5% for Energy, 1.5% for Demand) x Column (1)
- (3) Approved savings goal from 2016 EEPP
- (3a) Actual spending includes actual Implementation Expenses from Table E-1 (including evaluation expenses). It excludes EERMC costs, and Outside Finance Costs. Excludes spend from RGGI Oil funds per Docket 4580 – The Narragansett Electric Company, d/b/a National Grid 2016 Energy Efficiency Program Plan Revised Attachment 5 - filed with PUC December 21, 2016.
- (3b) Column (3a) / Column (1)
- (3c) Column (3) \* (3b), only if 100% of Target Savings were achieved in Column (3)
- (4) 75% of Target kWh Savings
- (5) Year End Savings from Table E-1
- (6) Column (6) / Column (3c)
- (7) If Column (7) is less than 75%, Column (8) = 0,  
 If Column (7) is between 75% and 125%, Column (8) = Column 6;  
 If Column (7) is greater than 125%, Column (8) = 125% of Column (3c) due to the incentive cap.
- (8) The shareholder is calculated as follow, where SB is the Spending Budget in the sector:  
 From 75% of savings to 100% of savings: Shareholder Incentive = SB x (0.15 x % of savings achieved – 0.10)  
 x 0.7 for energy savings  
 x 0.3 of demand savings  
 From 100% of savings to 125% of savings: Shareholder Incentive = SB x (0.05 x % of savings achieved)
- (9) Column (9) / Column (2)

**TABLE E-5**  
**OVERALL ANALYSIS OF ENERGY EFFICIENCY FUND BALANCE**

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	TOTAL
1. Start Of Period Balance	(\$57,523)	\$4,850,991	\$7,555,784	\$7,441,148	\$9,568,007	\$12,500,435	(\$57,523)
2. Revenue	\$7,433,477	\$6,565,824	\$6,796,850	\$6,389,495	\$7,472,722	\$5,614,663	\$40,273,031
3. Monthly EE Expenses	\$2,530,031	\$3,874,148	\$6,924,847	\$4,277,788	\$4,559,954	\$6,937,877	\$29,104,645
4. Cash Flow Over/(Under)	\$4,903,446	\$2,691,676	(\$127,996)	\$2,111,706	\$2,912,768	(\$1,323,214)	\$11,168,386
5. End Of Period Balance Before Interest	\$4,845,923	\$7,542,667	\$7,427,787	\$9,552,854	\$12,480,775	\$11,177,221	\$11,110,863
6. Interest	\$5,068	\$13,117	\$13,360	\$15,153	\$19,660	\$21,113	\$87,470
7. End Of Period Balance After Interest	\$4,850,991	\$7,555,784	\$7,441,148	\$9,568,007	\$12,500,435	\$11,198,334	\$11,198,334
	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	YEAR END TOTAL
8. Start Of Period Balance	\$11,198,334	\$15,731,900	\$19,244,516	\$21,090,403	\$22,259,091	\$20,904,359	(\$57,523)
9. Revenue	\$10,356,778	\$8,887,754	\$6,374,407	\$8,385,338	\$6,309,989	\$4,851,446	\$85,438,743
10. Monthly EE Expenses	\$5,847,203	\$5,406,298	\$4,564,453	\$7,255,269	\$7,703,173	\$9,971,856	\$69,852,897
11. Cash Flow Over/(Under)	\$4,509,575	\$3,481,456	\$1,809,954	\$1,130,069	(\$1,393,185)	(\$5,120,410)	\$15,585,846
12. End Of Period Balance Before Interest	\$15,707,909	\$19,213,356	\$21,054,470	\$22,220,472	\$20,865,906	\$15,783,949	\$15,528,323
13. Interest	\$23,991	\$31,160	\$35,933	\$38,619	\$38,453	\$32,714	\$288,340
14. End Of Period Balance After Interest	\$15,731,900	\$19,244,516	\$21,090,403	\$22,259,091	\$20,904,359	\$15,816,663	\$15,816,663
15. 2016 Incentive							\$4,128,034
16. Ending Balance after Incentive							\$11,688,629

Notes

1. Previous year's ending balance
2. Business Objects queries for revenues
3. SAP queries for expenses
4. Line 2 minus Line 3
5. Line 1 plus Line 4
6. Interest applied
7. Line 5 plus Line 6
8. Previous month's ending balance
9. Business Objects queries for revenues
10. SAP queries for expenses

11. Line 9 minus Line 10
12. Line 8 plus Line 11
13. Interest applied
14. Line 12 plus Line 13
15. 2016 Incentive

\*RIIB: C&I sector revenues reduced by 1.44MM for payment to RIIB

\*C&I Finance: Copay Fund Loan Transfer of \$3.0MM from revenues.

\*Revenues in July 2016 include \$1.525 million received from RGGI for the RI-E Municipal LED Lighting program  
 Expenses for this program are captured in WO 90000176341

**NATIONAL GRID ELECTRIC ENERGY EFFICIENCY PROGRAMS IN RHODE ISLAND**  
**Table E-6: National Grid 2016 Revolving Loan Funds**

**Large C&I Revolving Loan Fund**

(1)	Projected 2016 Funds Available	\$14,115,728
(2)	Actual 2016 Funds Available	\$13,115,729
(3)	2016 Loan Budget	\$11,000,000
(4)	Paid	\$4,530,172
(5)	Repayments	\$4,075,831
(6)	Number of loans	77
(7)	Participants	43
(8)	Savings (MWh)	11,226
(9)	Available Year-End 2016	\$12,661,388

**Small Business Revolving Loan Fund**

(1)	Projected 2016 Funds Available	\$2,242,136
(2)	Actual 2016 Funds Available	\$2,242,138
(3)	2016 Loan Budget	\$2,870,000
(4)	Paid	\$3,056,648
(5)	Repayments	\$3,082,310
(7)	Participants	1,118
(8)	Savings (MWh)	12,440
(9)	Available Year-End 2016	\$2,267,799

**Rhode Island Public Energy Partnership (RI PEP)**

(10)	2016 Funds Available	\$993,365
(11)	Paid	\$544,772
(12)	Repayments	\$332,792
(13)	Participants	5
(14)	Savings (MWh)	1,388
(15)	Available Year End 2016	\$781,385

Notes

- 1 Amount Company estimated in 2016 Plan, Table E-10
- 2 Amount of 2016 Fund Balance start balance, LC&I includes \$3,000,000 fund injection.
- 3 Budget adopted by Sales Team for 2016 operations.
- 4 Loans initiated by December 31, 2016 with savings counted in 2016.
- 5 Repayments received by December 31, 2016
- 6 Number of loans made.
- 7 Unique customer names for large business and unique accounts small business.
- 8 Savings in conjunction with the projects incentive and loan.
- 9 Does not include projected repayments or fund injections to be made in 2017.
- 10 Funds available as of January 1, 2016
- 11 Loans initiated by December 31, 2016
- 12 Repayments received by December 31, 2016
- 13 Participants are unique customers
- 14 Savings in conjunction with the projects and loans.
- 15 Available funds as of December 31, 2016. Does not include projected repayments or fund injections to be made in 2017.

# NATIONAL GRID ELECTRIC ENERGY EFFICIENCY PROGRAMS IN RHODE ISLAND

## Table E-7: 2016 Heat Loans

(1) Number of loans	806
(2) Loan amount	\$4,754,839
(3) Measures	
Pre-Weatherization	4
Weatherization	478
Heatsystems	459
DHW	30
(4) Percentage of weatherization in loans	59%

### Notes

1 Equals the number of participants. As of December 31, 2016

2 Total amount of loans dispersed in 2016.

3 Measures financed through loans.

4 Percentage of Heat Loan recipients that went through with weatherization after audit.

**Attachment 2**  
**Gas Year-End Results**

**Attachment 2**  
**Gas Summary Tables of Year End**

**NATIONAL GRID ENERGY EFFICIENCY PROGRAMS IN RHODE ISLAND**  
**Table G-1: Summary of 2016 Target and Year End Results**

Sector and Program	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Energy Savings (MMBtu)			Customer Participation			Implementation Expenses (\$ 000)			Lifetime MMBtu	\$/Lifetime MMBtu
	Approved Target	Actual	Pct Achieved	Approved Target	Actual	Pct Achieved	Approved Budget	Actual	Pct Achieved		
<b>Commercial &amp; Industrial</b>											
Large Commercial New Construction	43,424	49,358	113.7%	152	158	104.1%	\$ 1,694.7	\$ 1,664.1	98.2%	906,590	\$ 1.84
Large Commercial Retrofit	133,613	135,388	101.3%	234	139	59.6%	\$ 4,871.1	\$ 3,739.7	76.8%	1,388,729	\$ 2.69
Small Business Direct Install	3,667	4,453	121.4%	133	48	36.0%	\$ 282.4	\$ 133.8	47.4%	24,714	\$ 5.41
Commercial & Industrial Multifamily	9,490	11,613	122.4%	1,611	2,982	185.1%	\$ 754.7	\$ 580.1	76.9%	171,725	\$ 3.38
Commercial Demonstration and R&D							\$ 97.3	\$ 16.4	16.8%		
Community Based Initiatives - C&I							\$ 6.4	\$ 3.4	52.9%		
Finance Costs							\$ 500.0	N/A	N/A		
<b>SUBTOTAL</b>	<b>190,194</b>	<b>200,812</b>	<b>105.6%</b>	<b>2,131</b>	<b>3,328</b>	<b>156.1%</b>	<b>\$ 8,206.6</b>	<b>\$ 6,137.5</b>	<b>74.8%</b>	<b>2,491,757</b>	<b>\$ 2.46</b>
<i>Subtotal with Finance</i>							\$ 8,206.6	\$ 6,637.5	80.9%	2,491,757	\$ 2.66
<b>Income Eligible Residential</b>											
Single Family - Income Eligible Services	9,368	15,090	161.1%	500	722	144.4%	\$ 3,585.5	\$ 3,602.1	100.5%	301,792	\$ 11.94
Income Eligible Multifamily	19,915	15,646	78.6%	3,000	4,701	156.7%	\$ 1,763.3	\$ 1,169.1	66.3%	225,854	\$ 5.18
<b>SUBTOTAL</b>	<b>29,283</b>	<b>30,736</b>	<b>105.0%</b>	<b>3,500</b>	<b>5,423</b>	<b>154.9%</b>	<b>\$ 5,348.8</b>	<b>\$ 4,771.2</b>	<b>89.2%</b>	<b>527,646</b>	<b>\$ 9.04</b>
<b>Non-Income Eligible Residential</b>											
Energy Star® HVAC	26,064	17,968	68.9%	2,099	1,408	67.1%	\$ 1,619.2	\$ 1,252.6	77.4%	301,112	\$ 4.16
EnergyWise	68,117	68,496	100.6%	2,710	3,252	120.0%	\$ 6,929.5	\$ 6,824.1	98.5%	1,488,094	\$ 4.59
EnergyWise Multifamily	17,208	13,377	77.7%	2,625	2,232	85.0%	\$ 1,978.6	\$ 1,372.4	69.4%	212,349	\$ 6.46
Home Energy Reports	53,989	75,543	139.9%	135,689	134,177	98.9%	\$ 436.6	\$ 453.6	103.9%	75,543	\$ 6.00
Residential New Construction	10,907	10,888	99.8%	375	341	90.9%	\$ 836.9	\$ 847.0	101.2%	185,720	\$ 4.56
Comprehensive Marketing - Residential							\$ 69.8	\$ 51.2	73.3%		
Community Based Initiatives - Residential							\$ 25.8	\$ 19.1	74.0%		
Residential Demonstration and R&D							\$ 81.3	\$ 0.2	0.2%		
<b>SUBTOTAL</b>	<b>176,284</b>	<b>186,272</b>	<b>105.7%</b>	<b>143,498</b>	<b>141,410</b>	<b>98.5%</b>	<b>\$ 11,977.7</b>	<b>\$ 10,820.2</b>	<b>90.3%</b>	<b>2,262,818</b>	<b>\$ 4.78</b>
<b>Regulatory</b>											
EERMC							\$ 233.3	\$ 246.8	105.8%		
OER							\$ 233.3	\$ 230.8	99.0%		
RI Infrastructure Bank							\$ 429.0	N/A	N/A		
<b>SUBTOTAL</b>							<b>\$ 895.5</b>	<b>\$ 477.7</b>	<b>53.3%</b>		
<i>Subtotal with RIIB</i>							\$ 895.5	\$ 906.6	101.2%		
<b>TOTAL</b>	<b>395,760</b>	<b>417,820</b>	<b>105.6%</b>	<b>149,129</b>	<b>150,160</b>	<b>100.7%</b>	<b>\$ 26,428.6</b>	<b>\$ 22,206.5</b>	<b>84.0%</b>	<b>5,282,221</b>	<b>\$ 4.20</b>
<i>TOTAL With Finance and RIIB</i>							\$ 26,428.6	\$ 23,135.5	87.5%	5,282,221	\$ 4.38

**NOTES**

- (1) Approved targets from Docket 4580 - Attachment 6, Table G-7.
- (3) Pct Achieved is Column (2)/ Column (1).
- (4) Approved Target from 2016 EEPP, Attachment 6, Table G-7. Participation was planned and is reported in 'net' terms which takes into account free-ridership and spillover.
- (6) Pct Achieved is Column (5)/ Column (4).
- (7) Approved Budget from 2016 EEPP, Attachment 6, Table G-5, adjusted to reflect "Docket 4580 – The Narragansett Electric Company, d/b/a National Grid 2016 Energy Efficiency Program Plan Transfer of Funds Request" approved by the Division of Public Utilities and Carriers (Division) on December 2, 2016.
- (8) \$500,000 in finance funds were transferred as authorized to the C&I Gas Revolving Loan Fund. See Table G-5.  
A payment of \$428,972 was made to RIIB on 11/1/2016; however, the expense only shows up in fund balance due to accounting protocols.
- (9) Pct Achieved is Column (8)/ Column (7).
- (11) \$/ Lifetime MMBtu is Column (8)/ Column (10)

**NATIONAL GRID NATURAL GAS ENERGY EFFICIENCY PROGRAMS IN RHODE ISLAND**  
**Table G-2: Summary of Value and MMBTU Saved by Program**  
**2016 Program Year**

	Value (\$000)			MMBTU Gas Saved	
	(1) Total Value	(2) Natural Gas Benefits	(3) Non-Gas Benefits	(4) Annual	(5) Lifetime
<b>Commercial &amp; Industrial</b>					
Large Commercial New Construction	\$8,480	\$8,479	\$1	49,358	906,590
Large Commercial Retrofit	\$12,340	\$12,244	\$96	135,388	1,388,729
Commercial & Industrial Multifamily	\$1,673	\$1,668	\$5	11,613	171,725
Small Business Direct Install	\$602	\$187	\$416	4,453	24,714
<b>SUBTOTAL</b>	<b>\$23,095</b>	<b>\$22,577</b>	<b>\$518</b>	<b>200,812</b>	<b>2,491,757</b>
<b>Income Eligible Residential</b>					
Single Family - Income Eligible Services	\$6,059	\$3,096	\$2,963	15,090	301,792
Income Eligible Multifamily	\$3,191	\$2,196	\$995	15,646	225,854
<b>SUBTOTAL</b>	<b>\$9,250</b>	<b>\$5,292</b>	<b>\$3,958</b>	<b>30,736</b>	<b>527,646</b>
<b>Non-Income Eligible Residential</b>					
Energy Star <sup>®</sup> HVAC	\$3,465	\$2,970	\$496	17,968	301,112
EnergyWise	\$18,531	\$15,645	\$2,886	68,496	1,488,094
EnergyWise Multifamily	\$2,101	\$2,101	\$0	13,377	212,349
Home Energy Reports	\$628	\$628	\$0	75,543	75,543
Residential New Construction	\$1,952	\$1,889	\$63	10,888	185,720
<b>SUBTOTAL</b>	<b>\$26,678</b>	<b>\$23,233</b>	<b>\$3,445</b>	<b>186,272</b>	<b>2,262,818</b>
<b>TOTAL</b>	<b>\$59,023</b>	<b>\$51,103</b>	<b>\$7,921</b>	<b>417,820</b>	<b>5,282,221</b>

**Notes:**

- (1) Total Benefits equal Natural Gas Benefits plus Non-Gas Benefits.
- (3) Non-Gas Benefits include electric benefits and non-resource benefits

**NATIONAL GRID NATURAL GAS ENERGY EFFICIENCY PROGRAMS IN RHODE ISLAND**  
**Table G-3: Summary of B/C Ratios, Value and Costs (\$000's)**  
**2016 Program Year**

	(1)	(2)	(3)	(4)	(5)
	<b>Benefit/ Cost</b>	<b>Total Value</b>	<b>Program Implementation Expenses</b>	<b>Customer Contribution</b>	<b>Shareholder Incentive</b>
<b>Commercial &amp; Industrial</b>					
Large Commercial New Construction	3.32	\$8,480.3	\$1,664.1	\$886.8	
Large Commercial Retrofit	2.45	\$12,339.9	\$3,739.7	\$1,298.8	
Small Business Direct Install	4.01	\$602.3	\$133.8	\$16.5	
Commercial & Industrial Multifamily	2.68	\$1,672.9	\$580.1	\$43.6	
Commercial Demonstration and R&D			\$16.4		
Community Based Initiatives - C&I			\$3.4		
Finance Costs			\$500.0		
<b>SUBTOTAL</b>	<b>2.47</b>	<b>\$23,095.4</b>	<b>\$6,637.5</b>	<b>\$2,245.7</b>	<b>\$481.7</b>
<b>Income Eligible Residential</b>					
Single Family - Income Eligible Services	1.68	\$6,058.7	\$3,602.1	\$0.0	
Income Eligible Multifamily	2.73	\$3,191.4	\$1,169.1	\$0.0	
<b>SUBTOTAL</b>	<b>1.82</b>	<b>\$9,250.1</b>	<b>\$4,771.2</b>	<b>\$0.0</b>	<b>\$314.7</b>
<b>Non-Income Eligible Residential</b>					
Energy Star® HVAC	1.14	\$3,465.4	\$1,252.6	\$1,784.5	
EnergyWise	2.17	\$18,530.8	\$6,824.1	\$1,720.1	
EnergyWise Multifamily	1.43	\$2,101.4	\$1,372.4	\$93.9	
Home Energy Reports	1.39	\$628.5	\$453.6	\$0.0	
Residential New Construction	2.23	\$1,951.8	\$847.0	\$27.5	
Residential Demonstration and R&D			\$0.2		
Community Based Initiatives - Residential			\$19.1		
Comprehensive Marketing - Residential			\$51.2		
<b>SUBTOTAL</b>	<b>1.76</b>	<b>\$26,677.8</b>	<b>\$10,820.2</b>	<b>\$3,626.1</b>	<b>\$700.5</b>
<b>Regulatory</b>					
EERMC			\$246.8		
OER			\$230.8		
RI Infrastructure Bank			\$429.0		
<b>SUBTOTAL</b>			<b>\$906.6</b>		
<b>TOTAL</b>	<b>1.93</b>	<b>\$59,023.3</b>	<b>\$23,135.5</b>	<b>\$5,871.7</b>	<b>\$1,496.9</b>

Notes:

- 1) RI Total Resource Cost test Benefit/Cost Ratio = Total Value/(Program Implementation Expenses + Customer Contribution + Shareholder Incentives).
- 2) Year-End Value Total from Table G-2.
- 3) Year-End Implementation Expenses by Program from Table G-1 including payments to RIIB and Finance Costs.
- 4) Shareholder incentives from Table G-4.

**NATIONAL GRID NATURAL GAS ENERGY EFFICIENCY PROGRAMS IN RHODE ISLAND**  
**Table G-4: National Grid 2016 EE Incentive Calculation**

Incentive Rate:

5.00%

	(1)	(2)	(3)	(3a)	(3b)	(3c)	(4)
Sector	Approved Spending Budget	Target Incentive	Annual Savings Goal (MMBTU)	Actual Spending	% of Approved Spending	Budget Adjusted target MMBtu Savings	Threshold MMBtu Savings
<b>Income Eligible Residential</b>	\$ 5,348,777	\$ 267,439	29,283	\$ 4,771,187	89.2%	26,121	19,591
<b>Non-Income Eligible Residential</b>	\$ 11,977,711	\$ 598,886	176,284	\$ 10,820,175	90.3%	159,248	119,436
<b>Commercial &amp; Industrial</b>	\$ 7,706,602	\$ 385,330	190,194	\$ 6,137,484	79.6%	151,469	113,602
<b>Total</b>	<b>\$ 25,033,090</b>	<b>\$ 1,251,654</b>	<b>395,760</b>	<b>\$ 21,728,846</b>	<b>86.8%</b>	<b>336,838</b>	<b>252,628</b>

	(5)	(6)	(7)	(8)	(9)
Sector	Actual MMBtu	% of Target Savings	Savings Eligible for Incentive	Earned Savings Incentive	% of Target Incentive Achieved
<b>Income Eligible Residential</b>	30,736	117.7%	30,736	\$314,692	117.7%
<b>Non-Income Eligible Residential</b>	186,272	117.0%	186,272	\$700,514	117.0%
<b>Commercial &amp; Industrial</b>	200,812	132.6%	189,336	\$481,663	125.0%
<b>Total</b>	<b>417,820</b>	<b>124.0%</b>	<b>406,344</b>	<b>\$1,496,869</b>	<b>119.6%</b>

**Notes:**

- (1) Budget from 2016 EEPP. Includes Implementation Expenses. Excludes EERMC, OER, RIIB, Finance Costs and Shareholder Incentive.
- (2) Equal to the incentive rate (5.0%) x Column (1).
- (3) Approved savings goal from 2016 EEPP
- (3a) Actual spending includes actual Implementation Expenses Table G-1. Excludes Finance Costs.
- (3b) Column (3a) / Column (1)
- (3c) Column (3) \* (3b), only if 100% of Target Savings were achieved in Column (3)
- (4) 75% of Target MMBtu Savings
- (5) Year End Savings from Table G-1
- (6) Column (5) / Column (3c)
- (7) If Column (6) is less than 75%, Column (8) = 0;  
 If Column (6) is between 75% and 125%, Column (7) = Column 5;  
 If Column (6) is greater than 125%, Column (7) = 125% of Column (3c) due to the incentive cap.
- (8) The shareholder incentive will be calculated as follow, where SB is the Spending Budget in the sector:  
 From 75% of savings to 100% of savings: Shareholder Incentive = SB x (0.15 x % of savings achieved - 0.10)  
 From 100% of savings to 125% of savings: Shareholder Incentive = SB x (0.05 x % of savings achieved)
- (9) Column (9) / Column (2)

## National Grid: RIG

**TABLE G-5**  
**OVERALL ANALYSIS OF ENERGY EFFICIENCY FUND BALANCE**

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	TOTAL
1. Start Of Period Balance	\$3,963,638	\$6,318,128	\$8,762,030	\$10,691,130	\$11,462,989	\$11,425,134	\$3,963,638
2. Revenue	\$3,243,528	\$3,645,950	\$3,204,784	\$2,388,349	\$1,579,905	\$172,708	\$14,235,224
3. Monthly EE Expenses	\$895,459	\$1,211,467	\$1,287,836	\$1,630,328	\$1,632,057	\$1,517,979	\$8,175,125
4. Cash Flow Over/(Under)	\$2,348,068	\$2,434,482	\$1,916,949	\$758,021	(\$52,151)	(\$1,345,271)	\$6,060,099
5. End Of Period Balance Before Interest	\$6,311,706	\$8,752,611	\$10,678,979	\$11,449,151	\$11,410,837	\$10,079,862	\$10,023,737
6. Interest	\$6,422	\$9,419	\$12,151	\$13,838	\$14,296	\$13,441	\$69,566
7. End Of Period Balance After Interest	\$6,318,128	\$8,762,030	\$10,691,130	\$11,462,989	\$11,425,134	\$10,093,303	\$10,093,303
	<b>JULY</b>	<b>AUGUST</b>	<b>SEPTEMBER</b>	<b>OCTOBER</b>	<b>NOVEMBER</b>	<b>DECEMBER</b>	<b>YEAR END TOTAL</b>
8. Start Of Period Balance	\$10,093,303	\$9,034,948	\$8,376,341	\$6,818,847	\$5,784,374	\$4,364,855	\$3,963,638
9. Revenue	\$883,335	\$625,853	\$427,367	\$375,721	\$1,070,024	\$1,098,809	\$18,716,334
10. Monthly EE Expenses	\$1,953,638	\$1,295,336	\$1,994,351	\$1,418,067	\$2,495,881	\$4,874,123	\$22,206,522
11. Cash Flow Over/(Under)	(\$1,070,303)	(\$669,482)	(\$1,566,985)	(\$1,042,346)	(\$1,425,858)	(\$3,775,313)	(\$3,490,188)
12. End Of Period Balance Before Interest	\$9,023,000	\$8,365,466	\$6,809,356	\$5,776,502	\$4,358,516	\$589,542	\$473,450
13. Interest	\$11,948	\$10,875	\$9,491	\$7,872	\$6,339	\$3,365	\$119,457
14. End Of Period Balance After Interest	\$9,034,948	\$8,376,341	\$6,818,847	\$5,784,374	\$4,364,855	\$592,907	<b>\$592,907</b>
15. 2016 Incentive							<b>\$1,496,869</b>
16. Ending Balance after Incentive							<b>(\$903,962)</b>

Notes

1. Previous year's ending balance
2. Business Objects queries for revenues
3. SAP queries for expenses
4. Line 2 minus Line 3
5. Line 1 plus Line 4
6. Interest applied
7. Line 5 plus Line 6
8. Previous month's ending balance
9. Business Objects queries for revenues

10. SAP queries for expenses

11. Line 9 minus Line 10

12. Line 8 plus Line 11

13. Interest applied

14. Line 12 plus Line 13

15. 2016 Incentive

\*RIIB: C&I sector revenues reduced \$0.428MM for payment to RIIB.

\*C&I Finance: Copay Fund Loan Transfer of \$0.5MM from revenues.

**NATIONAL GRID ELECTRIC ENERGY EFFICIENCY PROGRAMS IN RHODE ISLAND**  
**Table G-6: National Grid 2016 Revolving Loan Funds**

<b>Large C&amp;I Gas Revolving Loan Fund</b>		<b>Rhode Island Public Energy Partnership (RI PEP) Gas</b>			
(1)	Projected 2016 Funds Available	\$1,682,732	(2)	2016 Funds Available	\$100,000
(2)	Actual 2016 Funds Available	\$1,662,732	(3)	Paid	\$8,261
(3)	Paid	\$822,798	(4)	Repayments	\$826
(4)	Repayments	\$139,773	(5)	Participants	1
(5)	Participants	13	(6)	<u>Savings (MMBtu)</u>	<u>43</u>
(6)	<u>Savings (MMBtu)</u>	<u>58,787</u>	(7)	Available Year End 2016	\$92,565
(7)	Available Year-End 2016	\$979,707			

Notes

- 1 Amount Company estimated in 2016 Plan, Table G-10
- 2 Amount of 2016 Fund Balance start blance, includes \$780,000 fund injection
- 3 Loans paid by Decement 31, 2016
- 4 Repayments received by December 31, 2016
- 5 Unique customer names for large business.
- 6 Savings in conjunction with the projects incentive and loan.
- 7 Available funds as of December 31, 2016. Does not include projected repayments or fund injections to be made in 2017.

**Attachment 3**  
**Case Studies**

## **Attachment 3**

### **Case Studies**

## Jamestown, Rhode Island

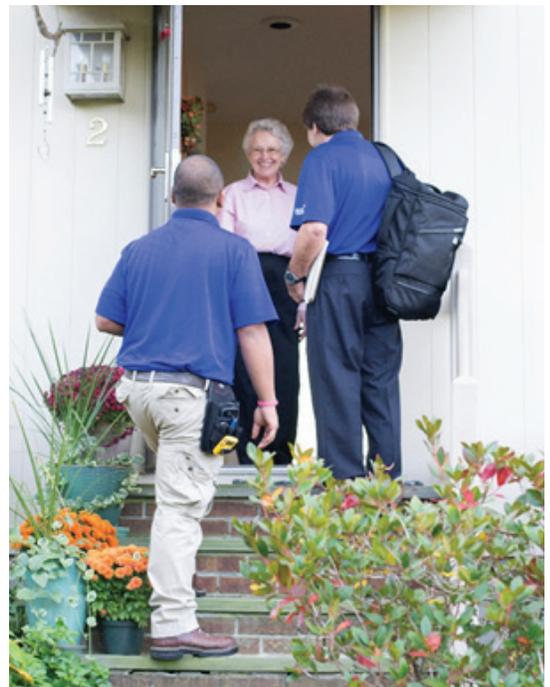
# The Armington Household

Carolyn Armington is an octogenarian homeowner who has resided in Jamestown, Rhode Island since 2004 in a two-story, 2,200-square foot contemporary home. The primary heating fuel is oil with supplemental electric heat. The home was built in 1985 on a quiet cul-de-sac adjacent to historic farmland with a water view of Narragansett Bay.

Mrs. Armington wanted to save money on energy costs and make her home more comfortable. Additionally, she is interested in environmental issues and wants to play her part with regard to energy efficiency.

In 2015, National Grid in partnership with lead vendor RISE Engineering, conducted a free comprehensive energy assessment of this property, provided instant energy savings products at no cost, and presented a recommended action plan. While on-site, the Energy Specialist installed energy-efficient LED bulbs, advanced power strips, and a new refrigerator coil cleaning brush. Mrs. Armington decided to move forward with several recommended actions, including installation of carbon monoxide detectors, replacement of the old furnace and a faulty heat pump, air sealing of leaks in drafty areas of the home, duct sealing, and duct and basement ceiling insulation.

The instant energy savings products, air sealing, and insulation following the no-cost home assessment created over \$1,100 in projected annual energy savings. Mrs. Armington is pleased with the savings and improved conditions, especially the warmth of the insulated floors. In 2016, Mrs. Armington contacted National Grid again to discuss some remaining energy improvements she is considering in the upcoming months.



Carolyn Armington, Homeowner  
Jamestown, RI

continued next page>

# The Armington Household continued

## The Need

Reduce energy costs and improve efficiency and home comfort.

## The Solution

- 25 efficient light bulbs
- Refrigerator coil cleaning brush
- 2 Advanced power strips
- Air sealing of leaks in drafty areas of the home
- Duct sealing and insulation
- Basement ceiling insulation

## About National Grid:

Here with you. Here for you. At National Grid we are committed to delivering safe and reliable energy to the customers and communities we serve. We are one of the largest investor-owned energy companies in the world - covering Massachusetts, New York, Rhode Island and the UK. We are at the heart of one of the greatest challenges facing our society—delivering clean energy to support our world long into the future. Every day we work with stakeholders to promote the development and implementation of sustainable, innovative and affordable energy solutions. We are proud of the contributions our work and our people make to the prosperity and wellbeing of our customers, communities and investors.

## About RISE Engineering:

A pioneer in the delivery of turnkey energy efficiency services, RISE Engineering works with utilities and other energy program sponsors to offer residential, commercial, industrial, institutional and public sector energy users comprehensive efficiency services that reduce their environmental footprint and operating expenses.

**To schedule your free energy assessment, call us at 1-888-633-7947.**



## The Result:

**Total project cost** \$3,243

**National Grid incentive** \$1,020

**Cost to customer** \$2,223

**Annual electric savings** 1,400 kWh

**Annual oil savings** 235 gallons

**Annual energy cost savings** \$1,146

*"I paid for the energy efficiency work online with my credit card that earns points at L.L. Bean. I earned enough points to get a free down comforter... so my insulation warmed me twice!"*

**-Carolyn Armington, Homeowner  
Jamestown, RI**

# Cut your energy cost with cogeneration

## Energy-efficiency on a large scale

Managing the energy needs of a big facility can be a daunting prospect. National Grid routinely works with commercial, industrial, and municipal customers to reduce energy costs on a large scale. One way we achieve this is through cogeneration, or combined heat and power (CHP), a highly efficient form of energy conversion that generates heat and electricity simultaneously, then captures and reuses heat that would otherwise be wasted.

For qualifying customers with a large-scale facility or a multi-building complex with dependable electrical and thermal loads, National Grid can connect you with a CHP vendor to explore the feasibility of CHP installation. National Grid provides incentives to customers if the project qualifies under our CHP program guidelines.

### Current Incentives for Combined Heat and Power:

The incentives for the CHP units are designed specifically with large-scale projects in mind, with higher incentives for projects that incorporate more standard building energy efficiency measures in advance of CHP project development.

#### Available incentives are as follows\*:

Tier 1: \$900/Net kW for CHP with annual efficiency >55% and <60%.

Tier 2: \$1,000/Net kW for CHP with annual efficiency > or equal to 60%.

Tier 3: Reduce the site energy use at least 5% or identified by TA study - \$1,125/kW for CHP projects with annual efficiency >55% and <60%.

Tier 4: Reduce the site energy use at least 5% or identified by TA study - \$1,250/kW for CHP projects > or equal to 60% annual efficiency.

### Eligibility Criteria:

- Performance Incentives are available for projects that are Net Annual KW over 1 MW and can be up to \$20/kW/yr for up to 10 years.
- Advanced Gas Technology Incentives are available for projects that qualify for gas driven projects.
- Maximum incentive of all three sources cannot exceed 70% of the project cost.
- Technical Assistance Engineering subsidy is available to study projects.

For more information about our incentives for CHP  
call us at **1-800-787-1706** or visit **[ngrid.com/ri-chp](http://ngrid.com/ri-chp)**



**Attachment 4**  
**2016 Year End Participation Memo**

## 2016 Year-End Participation Memo

### I. Participation Overview

National Grid recognizes the importance of program participation in designing efficiency services, reaching diverse markets, meeting customer demand, and finding all efficiency opportunities. Complementary to the gas and electric savings that the Company seeks to achieve each year, participation contextualizes the impact of efficiency. It reveals who is benefiting from the programs and how. The objective of this memo is to measure unique participants, participation over time, and total customers reached over time.

The Company offers several types of services that enable customers to participate in a variety of ways and this complicates how to measure participation. Programs and initiatives such as EnergyWise and EnergySmart Grocer (ESG) retrofit a home or business in a deep way which may include a technical assessment and multiple measures are installed. The Company also delivers efficiency to a large number of customers through broad channels that make efficient products accessible to customers. These broad efforts tend to focus on one measure at a time and are intended to transform the market so that customers make energy efficient choices. Examples include the ENERGY STAR® Lighting program and the Commercial and Industrial (C&I) Upstream Lighting initiative. For these broad offerings, it is difficult to precisely measure participation levels cumulatively and compare to participation in other deeper programs. Therefore, this memo focuses on participation levels in deep services that offer customers the most benefits.

Programs and initiatives are designed and delivered in very specific ways in order to maximize their potential to achieve energy savings. Therefore, specific data differs among programs and what is defined as a ‘participant’ may differ as well. A breakdown of participation units used for reporting gas and electric programs in 2016 is found below. The participation numbers found in Tables E-1 and G-1 in Attachments 5 and 6, respectively, of Docket 4580 - National Grid Electric and Gas Energy Efficiency Program Plan, filed with the Commission on October 15, 2015, are in these units.

#### Participation Reporting Units

Fuel	Sector	Program	Participation Unit
Gas	Commercial & Industrial	Large Commercial New Construction	Unique Account
		Large Commercial Retrofit	Unique Account
		Small Business Direct Install	Unique Account
		C&I Multifamily	Housing Units
	Income Eligible Residential	Single Family – Income Eligible Services	Unique Account
		Income Eligible Multifamily	Housing Units
	Residential	Energy Star® HVAC	Unique Account
		EnergyWise	Unique Account

		EnergyWise Multifamily	Housing Units
		Home Energy Reports	Unique Account
		Residential New Construction	Housing Units
Electric	Commercial & Industrial	Large Commercial New Construction	Unique Account + Unique Customer names from Upstream Lighting
		Large Commercial Retrofit	Unique Account
		Small Business Direct Install	Unique Account
	Income Eligible Residential	Single Family – Income Eligible Services	Unique Account
		Income Eligible Multifamily	Housing Units
	Residential	Energy Star® HVAC	Unique Account
		EnergyWise	Unique Account
		EnergyWise Multifamily	Housing Units
		Home Energy Reports	Unique Account
		Residential New Construction	Housing Units
ENERGY STAR® Lighting		Estimated Housing Units	
	ENERGY STAR® Products	Number of Rebates	

As the table shows, participation is counted in different ways depending on the program.

1. Unique billing accounts: The predominate means for tracking participants. This is defined as one electric or gas account number.
2. Housing units: This method is used in the electric and gas Residential New Construction program and multifamily programs. For New Construction programs, buildings are typically under construction, so accounts do not yet exist. National Grid, therefore, tracks the number of housing units for participation. This method is also applied to all multifamily programs, where complexes and not individual apartments tend to have accounts. These programs are focused on the impact to the apartment dwellers, so from a program design perspective, understanding the number of housing units affected, is of greater interest. Please note that for the gas programs only gas-heated units are counted as participants. In the case that an electric or delivered-fuel-heated dwelling is part of the impacted complex, it would not be counted as a participant.
3. Rebates: In the ENERGY STAR® Products program, the Company reports the number of rebates processed because not every rebate contains account information.
4. Estimated bulbs per home: Within the ENERGY STAR® Lighting program, retailers do not disclose information identifying their customers, thereby precluding the connection of bulb purchases to utility accounts. The number of bulbs, therefore, is translated into an estimate of housing units based on purchasing pattern research.

5. Unique customer names: This method is used in the C&I Upstream Lighting Initiative. Customer account information is not attached to Upstream Lighting sales data. Therefore, the Company must analyze unique customer names and addresses to determine unique participants.

## **II. Unique Cumulative Participation**

### Objective

The integration of efficiency services, from the identification of HVAC opportunities during home audits to product offerings through the Home Energy Reports web portal, means that a single customer may be counted as a participant in multiple programs. Continued interest in efficiency, moreover, may lead that customer to participate in consecutive years. Such overlap in participation, both over time and across programs, has become important to National Grid and its stakeholders as it is important in understanding the progress that energy efficiency programs have made in benefitting Rhode Island electric and gas customers.

### Methodology

The tables and graphs below show the unique annual and cumulative customer accounts associated with certain efficiency programs, sector, and fuel for the period 2012-2016. The tables are organized using the following:

- Annual Program Counts
  - Represents the unique accounts associated with an individual program in a given year. It removes all double counting within a given program within a given year. For example, if a customer participated in the HVAC program twice in 2016, they would only be counted once.
  - Please note that some overlap exists within the home audit programs, but not because of repeat audits. Program policy requires customers wait three years before receiving another audit. However, follow-up work to an audit in 2013, such as weatherization, could occur in 2014. One account, therefore, would appear as a unique participant in two different years.
  - For the Company's 2012 and 2013 Year End Reports, the program participation counts did not remove this double counting. The program participation counts for 2012 and 2013 below, therefore, may differ from how they were reported in the 2012 and 2013 Year End Reports.
- Additive
  - The sum of Annual Program Counts.
- Cumulative

- Eliminates all double counting within a program across multiple years. For example, if a customer participated in the HVAC program in 2013 and then again in 2016, they would only be counted once. Therefore, the cumulative count may be less than the additive count since it removes customers that participate in the same program more than once.
- Sector (Residential, Income Eligible, and Commercial) Subtotals
  - Eliminates all double counting across programs for a given year. For example, if a customer participated in the HVAC program and the EnergyWise program in 2016, they would only be counted once. Therefore, the sector subtotal may be less than the sum of all the annual program counts in a given year.
- Portfolio Total
  - Eliminates all double counting across sectors for a given year. For example, if a customer participated in the Income Eligible Single Family Program and also the ENERGY STAR® Products program in 2016, they would only be counted once. Therefore the portfolio total may be less than the sum of all annual participant counts.
- Percent Unique Accounts:
  - This represents the ratio of cumulative to additive program participation counts. The result is the percentage of customers that only participated in a given program one time from 2012-2016.
- Percent Unique Program Participants:
  - This represents the ratio of the sector subtotal (unique counts) to the sum of annual participant counts in a given year. The result is the percentage of customers that only participated in one program during a given year.
- Portfolio Cumulative
  - The set of unique accounts across all programs and years, with all overlap removed. For example, if an account is found in EnergyWise for 2013 and ENERGY STAR® Products for 2014, it would only appear once in the Portfolio Cumulative Count.
- Important Exclusions
  - The counts shown below do not include participants in Home Energy Reports, ENERGY STAR® Lighting, and C&I Upstream Lighting (an initiative tracked under Commercial New Construction before 2016 and under Commercial Retrofit in 2016). While Home Energy Reports is an important program that reaches broad participation and savings while driving customers to other program opportunities, it was excluded because its hundreds of thousands of participants would overwhelm the cumulative counts, thereby obscuring any trends that could otherwise be observed. Neither ENERGY STAR® Lighting nor Commercial Upstream Lighting collects account information so neither could be

- included in this analysis. The electric and gas participants for these programs, however, are included in tables E-1 and G-1 in Attachments 1 and 2 respectively.
- Not all rebates processed through the ENERGY STAR® Products contain account information. Therefore, rebates without account information are not included in this analysis. For this reason, annual program counts below are lower than the total number of customers that participated in this program. For example, in 2016, 25,171 rebates were processed through the program compared to 2,622 participants shown below. Likewise, the number of rebates in the ENERGY STAR® Products program reported in E-1 will be higher than the number of accounts detailed below because not all rebates include account information.
  - In the year-end report, the Company counts EnergyWise Multifamily and EnergyWise Multifamily Income Eligible participation by units in treated buildings. When units are used, if 51% of the building is income-eligible, the whole building and all units within are treated and counted as income eligible. However, since this analysis uses account numbers, and account numbers track with a rate class, the results below will show a higher split of market rate to income eligible multifamily participants. Multifamily programs are included in this unique account analysis to remove overlaps with other programs to the best extent possible.
  - 2012 was chosen as the baseline year because it represents the first year of 2012-2014 Three Year Plan.

### Trends

The analysis below provides insight into participation trends across programs and years. Examining the percentage of unique program participants in a single year, it is evident that there is little overlap between programs. This trend is seen across all three sectors (C&I, Income Eligible, Residential). These results are not surprising in the Income-Eligible Sector where customers would either participate in the single family or multifamily program, nor are they in the C&I sector where programs are more segmented. However, in the residential sector, customers are encouraged to participate in multiple programs in any given year. These results indicate there may be more the Company can do in terms of cross-program promotion to drive more participation in the same year. The Company can bring back the cross-vendor meeting to encourage promoting all programs across vendor channels. In addition, these results can be shared with the marketing team to further promote a collaborative approach.

Another trend can be found in the difference between the additive versus cumulative participation in a single program across multiple years, shown in the Percent Unique Accounts column. At the sector level, electric C&I customers appear to participate in the same program, in multiple years. While one can infer that these C&I customers see enough value in these programs to participate multiple times, it also may indicate that the Company is reaching a smaller portion of the total C&I customer pool. There are several reasons this could be occurring. In the C&I sector, many customers that have not participated face barriers such as lack of financing and tenant/owner split incentives. In order to address this issue, the Company continues to grow its on-bill repayment fund to provide financing to more C&I customers.

In addition, the introduction of Commercial PACE should drive new participants from sectors like commercial office buildings and nursing homes.

In 2016, the Company continued its efforts to reach new C&I customers through its market sector approach where marketing is directed and customized to an entire commercial sector such as the grocery industry or hospitality sectors. The Company also continues to attract new C&I customers through the expansion of upstream delivery to more lighting products, gas water heaters, and HVAC products.

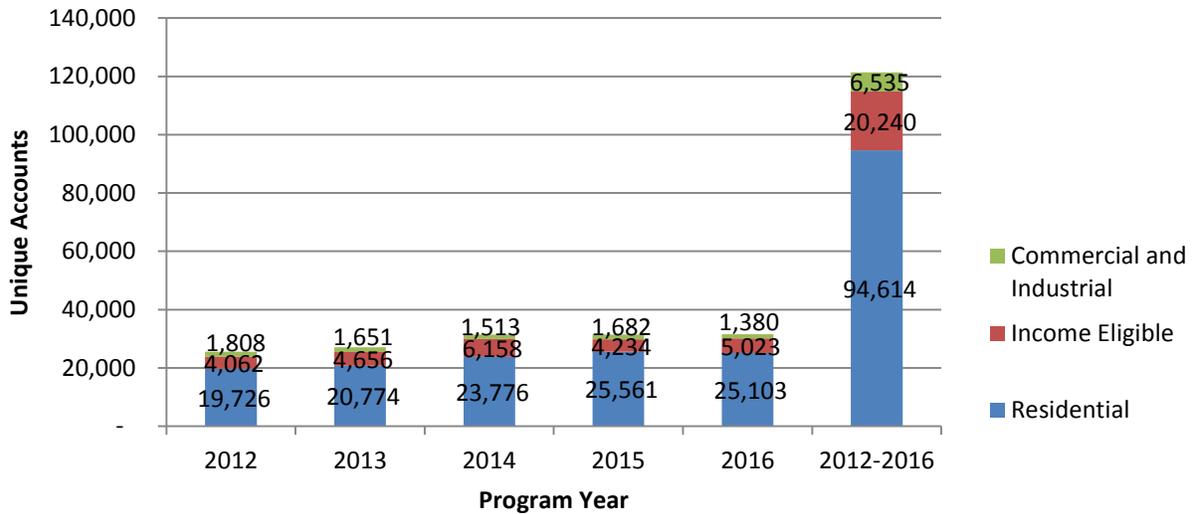
At the program level, the multifamily program-level trends are not likely representative due to the fact that the Company generally counts all units in a participating facility. The Company is conducting a participation study to assess program penetration in the RI multifamily market and will continue to monitor market conditions and assess the cross year participation trend.

## Electric Cumulative Participation 2012-2016

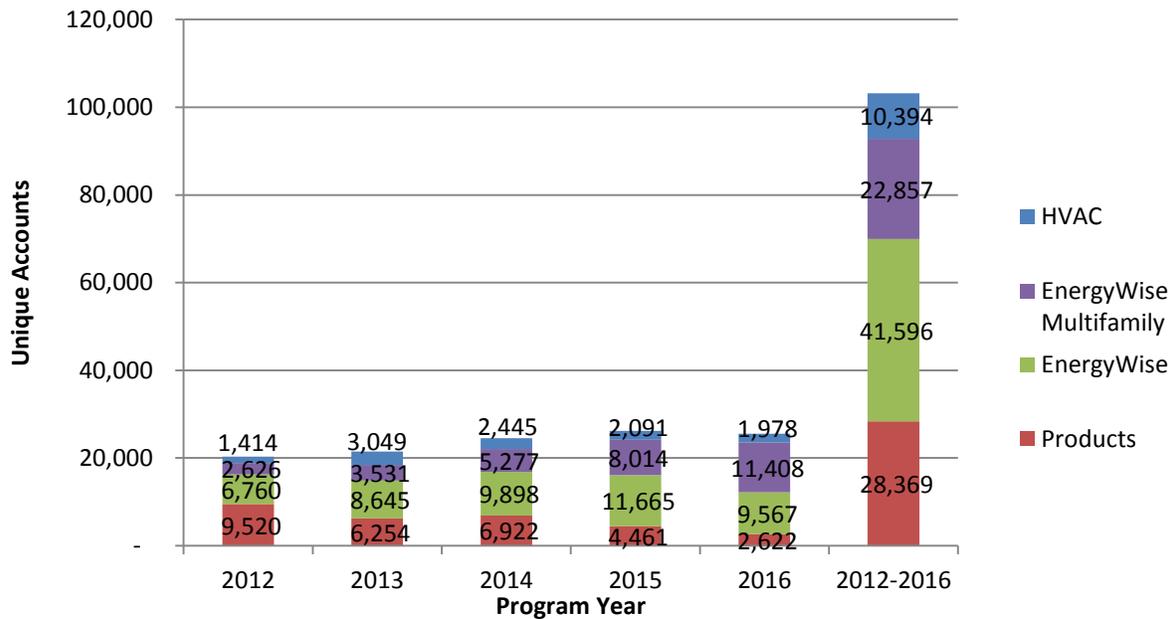
### Participation by Accounts

Sector	Program	Annual Counts					Additive	Cumulative	% Unique Accounts
		2012	2013	2014	2015	2016	2012-2016	2012-2016	
Residential	Energy Star® HVAC	1,414	3,049	2,445	2,091	1,978	10,977	10,394	95%
	ENERGY STAR® Products	9,520	6,254	6,922	4,461	2,622	29,779	28,369	95%
	EnergyWise	6,760	8,645	9,898	11,665	9,567	46,535	41,596	89%
	EnergyWise Multifamily	2,626	3,531	5,277	8,014	11,408	30,856	22,857	74%
	Residential Subtotal	19,726	20,774	23,776	25,561	25,103	114,943	94,614	82%
	% Unique Program Participants	97%	97%	97%	97%	98%			
Income Eligible	Single Family – Income Eligible Services	2,654	2,646	3,054	2,851	3,016	14,221	12,351	87%
	Income Eligible Multifamily	1,410	2,010	3,104	1,383	1,999	9,906	7,905	80%
	Income Eligible Subtotal	4,062	4,656	6,158	4,234	5,023	24,133	20,240	84%
	% Unique Program Participants	100%	100%	100%	100%	100%			
Commercial	Large Commercial New Construction	162	167	169	236	251	985	836	85%
	Large Commercial Retrofit	405	350	432	459	400	2,046	1,526	75%
	Small Business Direct Install	1,282	1,175	960	1,049	797	5,263	4,652	88%
	Commercial Subtotal	1,808	1,651	1,513	1,682	1,380	8,034	6,535	81%
	% Unique Program Participants	98%	98%	97%	96%	95%			
<b>Portfolio Total</b>		25,545	27,032	31,307	31,448	31,449	146,781	120,662	82%

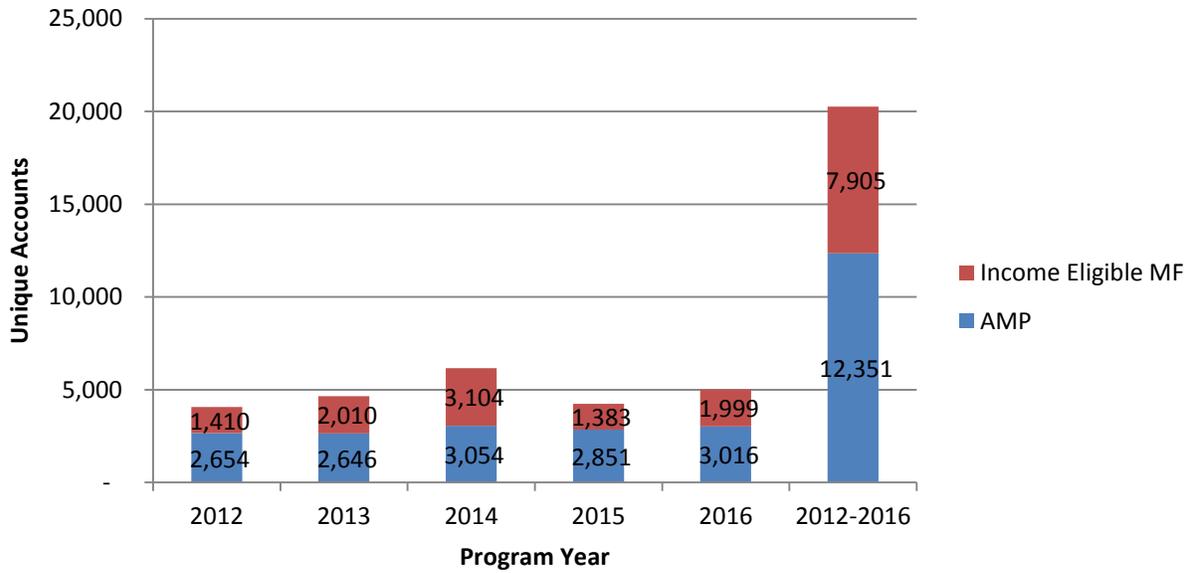
## Electric Cumulative Sector-Level Participation 2012-2016



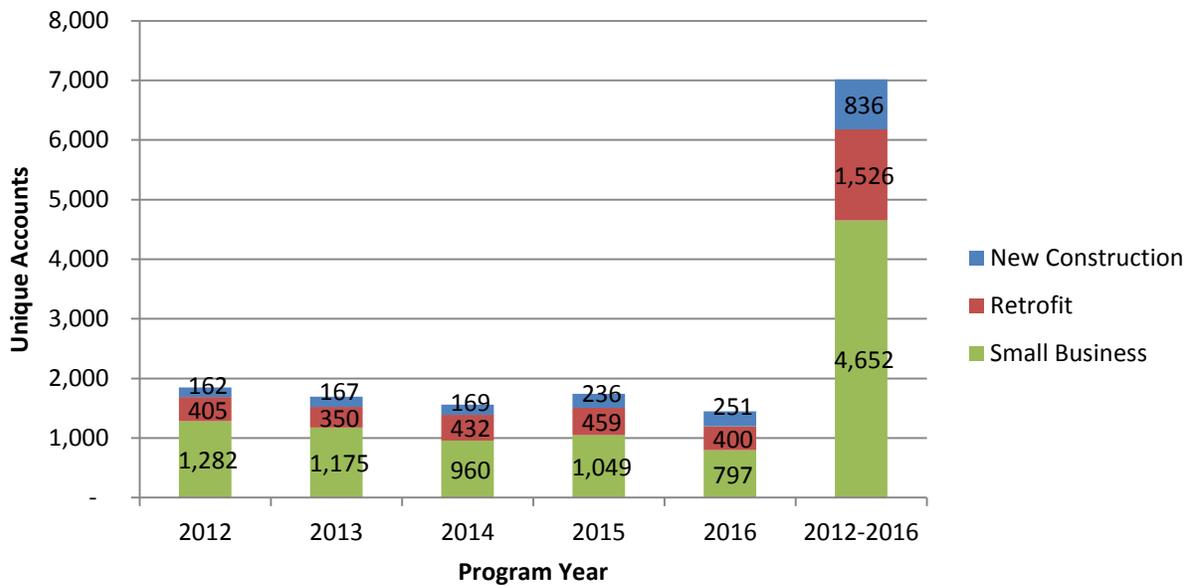
## Residential Electric Cumulative Participation by Program



### Electric Income Eligible Cumulative Participation by Program



### Electric Commercial Cumulative Participation by Program

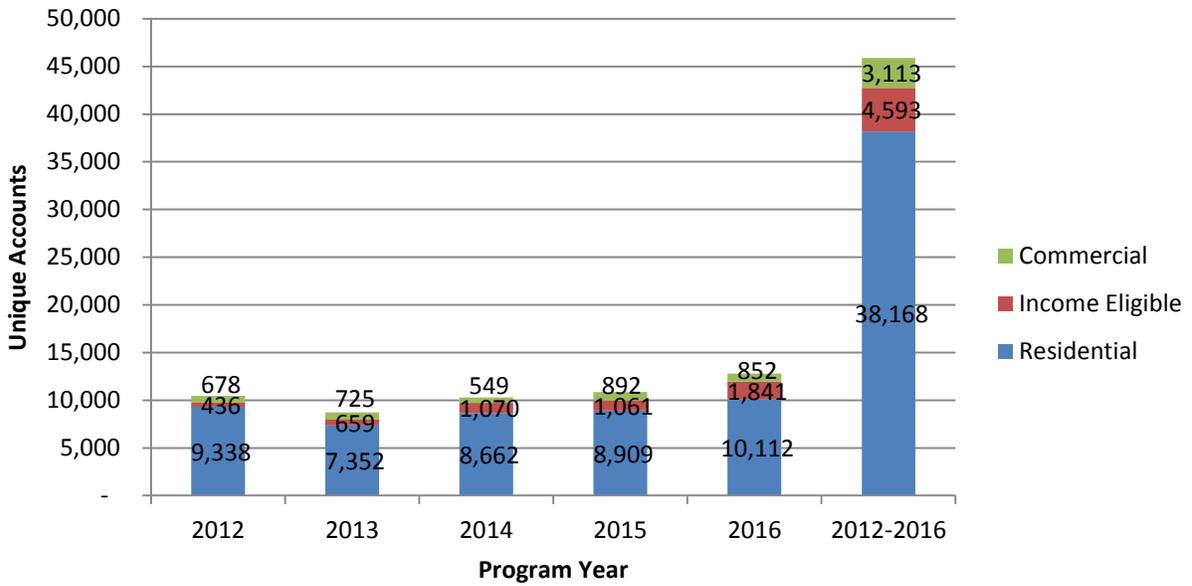


## Gas Cumulative Participation 2012-2016

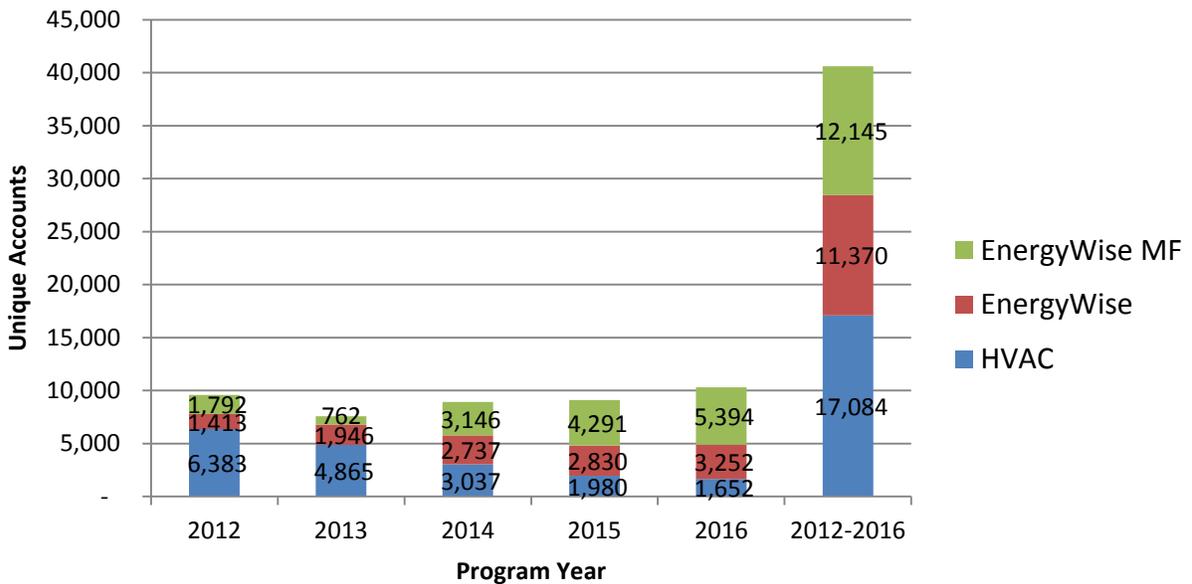
### Participation by Accounts

Sector	Program	Annual Counts					Additive	Cumulative	% Unique Accounts
		2012	2013	2014	2015	2016	2012-2016	2012-2016	
Residential	Energy Star® HVAC	6,383	4,865	3,037	1,980	1,652	17,917	17,084	95%
	EnergyWise	1,413	1,946	2,737	2,830	3,252	12,178	11,370	93%
	EnergyWise Multifamily	1,792	762	3,146	4,291	5,394	15,385	12,145	79%
	Residential Subtotal	9,338	7,352	8,662	8,909	10,112	44,373	38,168	86%
	% Unique Program Participants	97%	97%	97%	98%	98%			
Income Eligible	Single Family – Income Eligible Services	388	398	539	529	722	2,576	2,480	96%
	Income Eligible Multifamily	48	261	531	532	1,121	2,493	2,116	85%
	Income Eligible Subtotal	436	659	1,070	1,061	1,841	5,067	4,593	91%
	% Unique Program Participants	100%	100%	100%	100%	100%			
Commercial	Large Commercial New Construction	112	161	115	134	206	728	586	80%
	Large Commercial Retrofit	431	476	159	656	611	2,333	2,000	86%
	Small Business Direct Install	160	111	297	121	50	739	721	98%
	Commercial Subtotal	678	725	549	892	852	3,696	3,113	84%
	% Unique Program Participants	96%	97%	96%	98%	98%			
<b>Portfolio Total</b>		10,437	8,728	10,271	10,462	12,406	52,304	51,382	98%

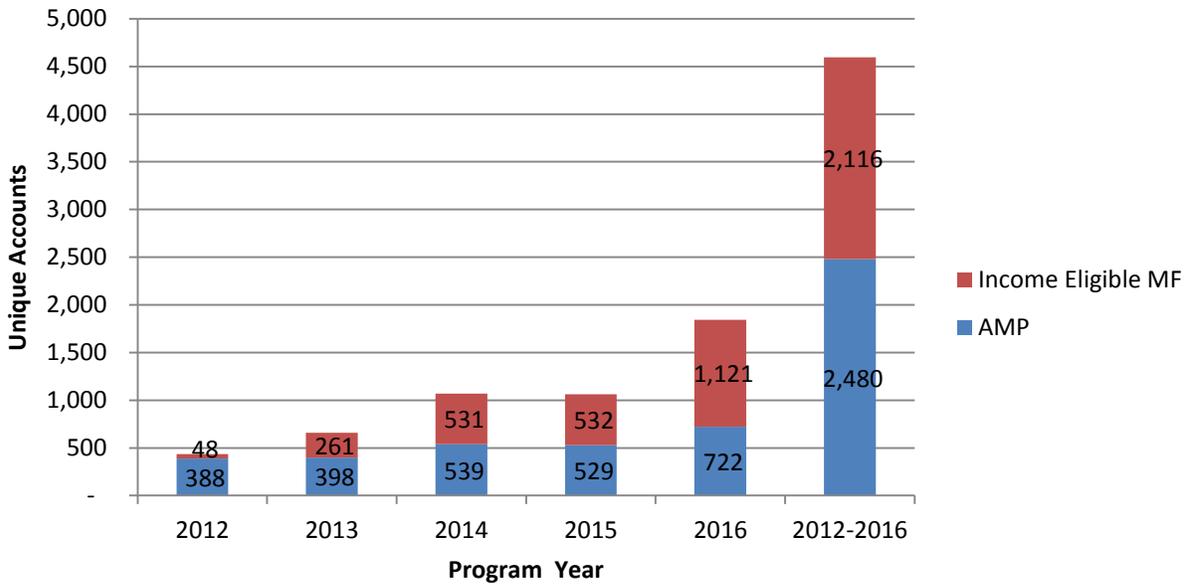
## Gas Cumulative Participation by Sector 2012-2016



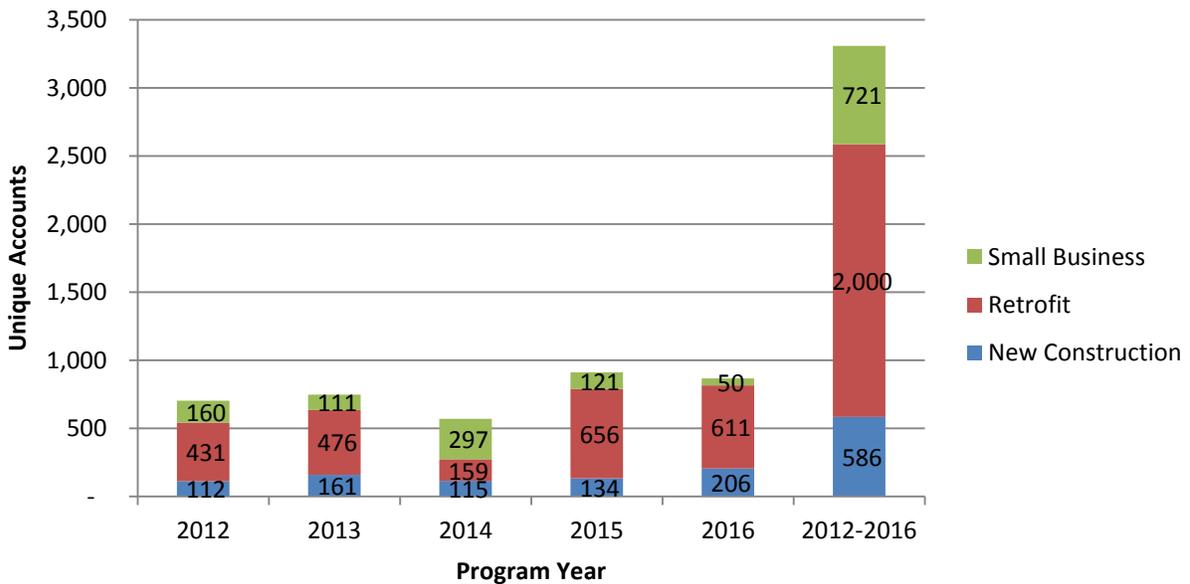
## Gas Residential Cumulative Participation by Program 2012-2016



## Gas Income Eligible Cumulative Participation by Program 2012-2016



## Gas Commercial Cumulative Participation by Program 2012-2016



### III. Housing Units

The annual housing units are defined as unique in the same sense as billing accounts. Housing units are presented below for the Electric and Gas EnergyWise Multifamily program, Electric and Gas Income Eligible Multifamily program, the Commercial and Industrial (C&I) Multifamily Gas program, and the Electric and Gas Residential New Construction Program.

In multifamily programs, the unique account counts shown in the previous section do not fully represent the participation trend for these programs. That is because not all individual units have separate accounts as a building might be master metered. Therefore, in Table E-1 and G-1 of the year-end report, the Company counts all housing units in treated buildings for participation, which is also shown below. Please note that multifamily housing units cannot be shown as cumulative because the Company does not have specific unit data within a treated facility and therefore cannot remove overlap between years.

Participation in the Residential New Construction program is also defined by housing units since accounts do not yet exist. In this program, housing units are only reported once, at the time of completion, so there is no overlap between units across multiple years. Therefore, the Company can show this program in terms of cumulative unique participation.

#### Electric Participation by Housing Units

Program	Annual Housing Units					Additive	Cumulative
	2012	2013	2014	2015	2016	2012-2016	2012-2016
Residential New Construction	406	473	573	442	526	2,420	2,420
EnergyWise Multifamily	2,660	3,539	5,322	7,710	7,783	27,014	---
Income Eligible Multifamily	3,878	5,370	5,977	4,610	5,366	25,201	---
<b>Portfolio Total</b>	<b>6,944</b>	<b>9,382</b>	<b>11,872</b>	<b>12,762</b>	<b>13,675</b>	<b>54,635</b>	---

#### Gas Participation by Housing Units

Program	Annual Housing Units					Additive	Cumulative
	2012	2013	2014	2015	2016	2012-2016	2012-2016
C&I Multifamily	0	1,066	939	2,345	2,982	7,332	---
Residential New Construction	252	425	500	366	341	1,884	1,884
EnergyWise Multifamily	1,569	984	2,496	3,147	2,232	10,428	---
Income Eligible Multifamily	977	2,773	3,090	3,956	4,701	15,497	---
<b>Portfolio Total</b>	<b>2,798</b>	<b>5,248</b>	<b>7,025</b>	<b>9,814</b>	<b>10,256</b>	<b>35,141</b>	---

#### **IV. Estimate of Customers Reached 2012-2016**

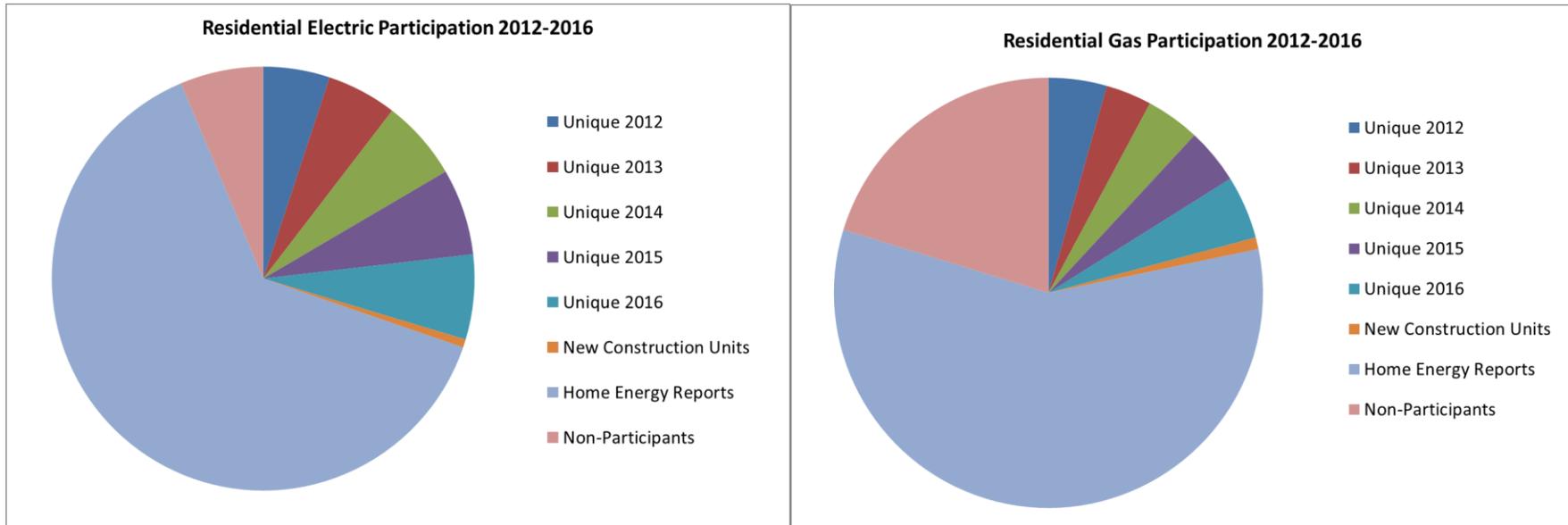
This section estimates the portion of each customer class that has participated in an energy efficiency program from 2012-2016. The graphs represent a visual estimate of the combination of unique participant counts for each year as detailed above, plus residential new construction units, Home Energy Reports, and C&I upstream lighting. ENERGY STAR® Lighting participants are excluded from the 2012-2016 counts because the program's broad participation among a large number of customers would overwhelm the data, making it difficult to analyze participation in other programs. Purchasing pattern research indicates that an estimated 431,739 housing units purchased bulbs through the program in 2016 alone. Similarly, C&I upstream lighting is also excluded from the unique participation count since the Company does not have detailed information and cannot remove overlap with other C&I programs. The Company does have customer information to remove overlap across years and includes an estimate of unique C&I upstream lighting participants in the graphs below.

The graphs show that from 2012 through 2016, 30% of electric customers and 21% of gas customers participated in National Grid's energy efficiency programs at least once. This is significant when one considers this analysis does not include data back to 2009, when energy efficiency programs under the construct of Least Cost Procurement began, and does not include ENERGY STAR® Lighting. Had this data been included, the penetration rates would undoubtedly be higher.

When Home Energy Reports and C&I upstream lighting participation is added to these counts, a total of 82% of electric customers and 69% of gas customers participated over this period. Home Energy Reports are included here because the program offers significant savings and benefits to customers as well as drives customers to participate in other energy efficiency programs.

The Company will continue to conduct this analysis each year to help provide more visibility around participation levels to help gain insight into programmatic changes and improvements to reach even more customers in the future.

## Residential

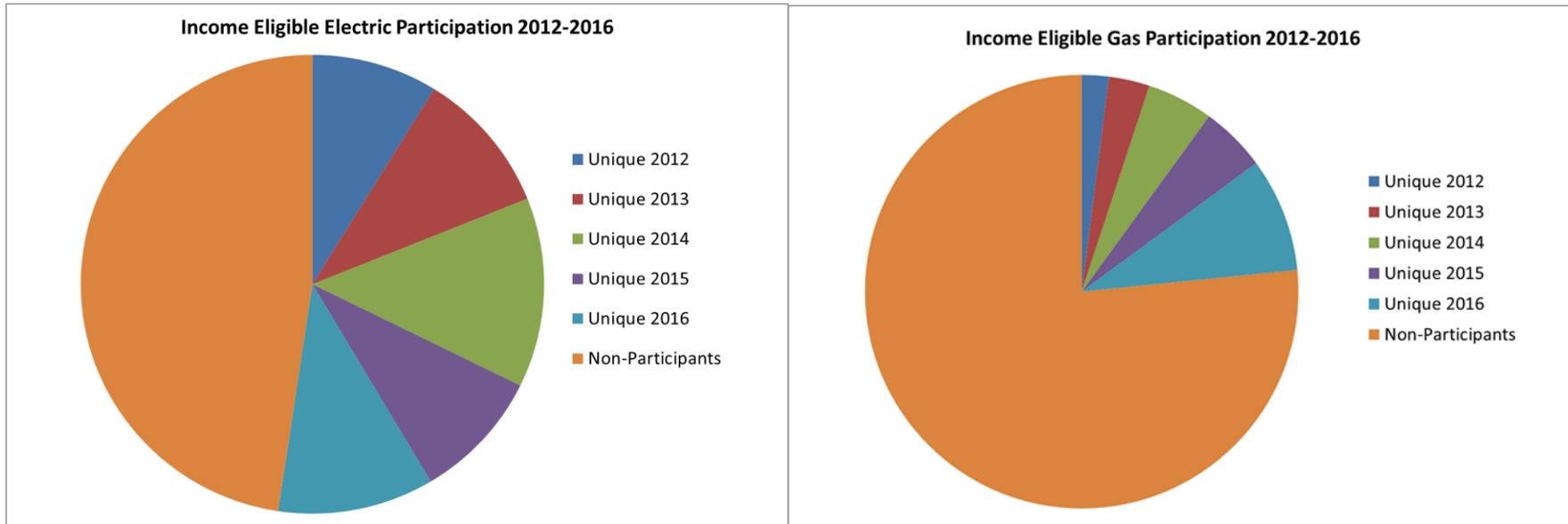


\*Does not include ENERGY STAR® Lighting

\*\*Does not include ENERGY STAR® Products Program rebates that did not contain detailed level information

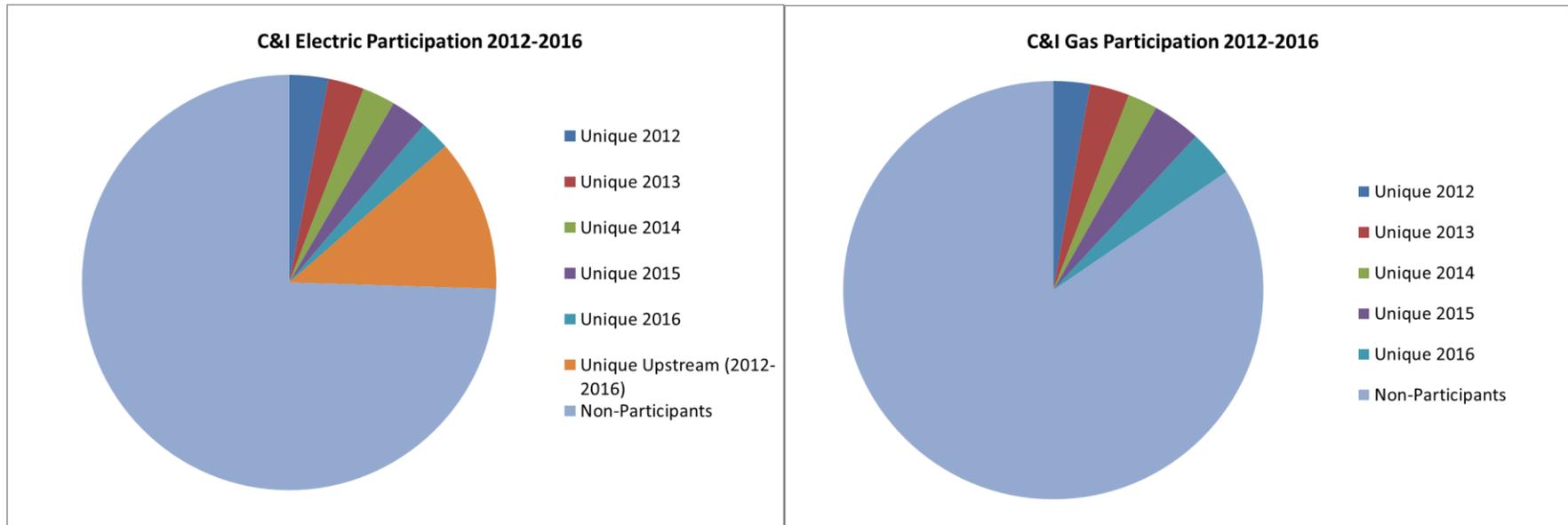
\*\* \*Home Energy Report totals have been reduced to account for estimated cross participation with other programs based on 2014 evaluation results.

## Income Eligible



\*While the Company counts Home Energy Reports, ENERGY STAR® Products, and ENERGY STAR® HVAC participation in the market rate residential sector, it's important to note that Income Eligible customers also participate in these programs as well as in the ENERGY STAR® Lighting program. Therefore, the above graphs likely under-represent the total number of Income Eligible customers served.

## Commercial and Industrial (C&I)



\*While cumulative counts remove overlap between years (2012-2016), it is not possible to remove overlap between upstream lighting and other C&I programs. Therefore there may be customers in the upstream count that are also captured in the unique participation counts for 2012-2016.



## **Attachment 5**

# **2016 Employment Supported by Energy Efficiency in Rhode Island Report**



# **ANALYSIS OF JOB CREATION from 2016 Expenditures for Energy Efficiency in Rhode Island by National Grid**

Prepared for National Grid

Prepared by:

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**April 24, 2016**

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## Executive Summary

Electric and gas energy efficiency programs and services sponsored, supported, and provided by National Grid in Rhode Island help eliminate unnecessary energy use, save money for customers, improve the environment, and increase the health, comfort, and safety of homes and businesses. In 2016, National Grid spent a total of \$97,409,593 on electric and gas energy efficiency programs and services in Rhode Island and saved 214,329 MWh and 417,820 MMBtu.

The focus of this study is less *what* was accomplished by National Grid programs than *how* it was done and by whom. In 2016, for the fourth year in a row, National Grid commissioned Peregrine Energy Group, Inc. (Peregrine) to conduct a study of the job impacts of National Grid's energy efficiency programs and services delivered in 2016 to Rhode Island electricity and natural gas customers. This study meets the requirements of General Law 39-2-1.2, enacted by the Rhode Island General Assembly in 2012. While job creation is not a formal goal of National Grid's energy efficiency programs and services, employment represents a significant additional economic benefit that investments in energy efficiency contribute to Rhode Island and to the businesses participating in National Grid's programs.

Successful delivery of the 2016 energy efficiency programs to National Grid's customers has required the active involvement of a broad range of workers associated with a diverse set of businesses. Workers were employed by companies and organizations involved in energy program design, management and delivery.

Participating employers included program design consultants, energy program management specialists, marketing and advertising specialists, equipment manufacturers and suppliers, equipment and appliance retailers, architectural firms and developers, engineers and energy analysts, installation companies and independent contractors, plumbers and electricians, quality assurance inspection companies, utility rebate processing houses, waste material recyclers, and program evaluators, as well as National Grid. In addition, six Community Action Program agencies under contract to the state Department of Human Services delivered low-income energy efficiency services co-funded by National Grid and the federal Weatherization Assistance Program (WAP).

Peregrine determined that at least 702 full-time equivalent (FTE) workers were employed in 2016 as a result of National Grid expenditures for energy efficiency programs provided to its Rhode Island electricity and natural gas customers. For purposes of this study, Peregrine and National Grid agreed that one FTE would equal 1,760 work hours, or the total of one person working 8 hours a day for 220 work days in an average year. Because a "full-time equivalent" employee very often represents the labors of more than one person over the course of a year, the number of individual workers employed as result of Rhode Island energy efficiency programs funded by National Grid is far greater than the total number of FTEs. The vast majority of the



jobs created as a result of energy efficiency investments were local because they were tied to installation of equipment and other materials.

The total number of 2016 FTEs identified by Peregrine was slightly higher than the 696 FTE workers that Peregrine had attributed to National Grid's Rhode Island energy efficiency program investments in 2015, and National Grid's programs and delivery strategies were substantively the same in 2016 as they had been in the prior year. However, at the more granular level of the three major market sectors targeted by programs (residential, residential income eligible, and commercial and industrial), there were significant, measurable gains and losses of FTEs in 2016 attributable to changes in individual market sector activity.

While 2016 was characterized program-wide by continuing strong levels of customer participation and demand for and acceptance of energy efficiency services (and all markets were positively affected by strong growth in energy efficient lighting installations fueled by falling prices for and expanded availability and increased diversity of light emitting diode or "LED" lighting products), overall FTEs associated with residential markets declined while FTEs associated with the income-eligible and commercial and industrial markets increased.

The study identified 923 companies and agencies involved in National Grid's Rhode Island programs, approximately 82% of which had Rhode Island business addresses. These findings for 2016 again confirm that job creation is an additional significant benefit that National Grid's investments in energy efficiency contribute to Rhode Island's economy overall and directly to the business owners and their employees that deliver these programs and services. A list of companies involved in the 2016 Rhode Island energy efficiency programs is provided at the end of this report.



## Introduction

As part of National Grid's commitment to encourage and assist its Rhode Island customers to use the electricity and natural gas supplies it delivers wisely, National Grid provides a state-approved portfolio of energy efficiency programs and services to all market sectors it serves in Rhode Island. The Rhode Island energy efficiency programs focus on delivering cost-effective energy savings to building owners and tenants, to all-income residential customers residing in single family and multifamily buildings, to government and non-profit institutions, to small and large commercial businesses, and to manufacturers.

2016 is the second year of the current state-approved three-year plan for energy efficiency that was developed collaboratively by National Grid with regulators, customer-advocates, and energy efficiency experts. Overall, the 2016 program offerings and budgets have been similar to those in 2015, with some modest adjustments based on emerging opportunities.

In 2016, National Grid spent a total of \$97,409,593 on electric and gas energy efficiency programs in Rhode Island. These programs created 214,329 megawatt hours (MWh) of electricity savings and 417,820 million British thermal units (MMBtus) of natural gas savings. These energy efficiency expenditures by National Grid leveraged significant spending by its Rhode Island customers, including building owners' and tenants' share of the cost of purchasing and installing energy efficient equipment and materials. It also leveraged other public funding of energy efficiency initiatives such as Regional Greenhouse Gas Initiative (RGGI) and the federal Low Income Heating Assistance Program (LIHEAP) delivered by Rhode Island Department of Human Services.

In 2016, for the fourth year in a row, National Grid commissioned Peregrine Energy Group, Inc. (Peregrine) to conduct a study of the job impacts of National Grid's energy efficiency programs and services delivered in 2016 to Rhode Island electricity and natural gas customers. This study meets the requirements of General Law 39-2-1.2, enacted by the Rhode Island General Assembly in 2012. While job creation is not a formal goal of National Grid's energy efficiency programs and services, employment represents a significant additional economic benefit that investments in energy efficiency contribute to Rhode Island and to the businesses participating in National Grid's programs.

Peregrine's research objective for 2016 was, again, to count or otherwise estimate the number of jobs directly attributable to National Grid's 2016 energy efficiency programs. Unlike the energy savings resulting from National Grid's energy efficiency programs that are predicted, analyzed, measured, and recorded, job impacts from energy efficiency spending are identified, if they are tracked at all, as labor expense. Numbers and types of employees engaged, be they full-time or part-time, and number of hours worked to deliver programs and services are not captured and reported, except by employers themselves for payroll and business planning



purposes. For this reason, calculating job impacts from the outside looking in can be more art than science.

For 2016, as in years past, Peregrine has endeavored to find and count the full-time equivalent (FTE) employees engaged in all aspects of National Grid's energy efficiency programs. In many, if not most, instances, each FTE attributable to a National Grid program represents the actual part-time labors of many individuals who are employed not only in delivery of National Grid programs in Rhode Island but also in other endeavors. Peregrine assumes that one FTE, regardless of job type or responsibilities, equals for purposes of this study 1,760 work hours, or the equivalent of one person working 8 hours a day for 220 work days in an average year.

As has been the case with prior years' studies, this year's study findings were developed through direct interviews with employers and through analysis of energy efficiency improvements installed that had been documented by National Grid. Peregrine interviewed with managers at energy services companies, equipment vendors, and contractors identified by National Grid for Peregrine or identified as sub-contractors by companies that Peregrine interviewed. These companies voluntarily shared information on how they staff their contracts and services and even researched payroll records to provide payroll hours and FTE counts. Where possible, the study cites the companies that provided information to Peregrine. Peregrine also completed a detailed review of National Grid's records of all energy efficiency measures installed in homes, apartment buildings, businesses and industrial facilities throughout Rhode Island in 2016. Peregrine then calculated typical or average labor hours required for each installed energy savings measure, based on industry standards and discussions with the contractors themselves and other experts, and extrapolated total FTE employment using counts of measures installed in 2016 that were reported to and by National Grid.

The report is divided into four primary sections:

1. An Efficiency Workforce Overview that describes the types of companies and workers engaged in providing efficiency program-related services and support in Rhode Island
2. The Delivery Approach used for individual programs
3. Summary Counts of FTEs with observations on their significance, with discussion of any year-to-year changes in job impacts attributable to National Grid investments comparing 2016 to previous years' study results.
4. Attachments describing Peregrine's methodology in more detail, providing Peregrine's interview guide, and listing specific companies that supplied the workforce.



## Efficiency Workforce Overview

Peregrine recognizes two main categories of employers/employees that participate in the delivery of National Grid’s energy efficiency programs. These categories are:

- “Program Support Service Providers” that are employers and employees involved in program planning / administration, marketing, rebate processing, and evaluation and market research.
- “Direct Service Providers” who are responsible for sales, technical assistance and training, and for supplying and installing approved efficiency measures that National Grid promotes and encourages with incentives and rebates.

### Program Support Service Providers

The Program Support Services category includes:

- Companies engaged to provide marketing, outreach, public information, and other related support services, including media placement and design of collateral marketing materials;
- Specialized firms processing and paying out rebates offered for purchase and installation of install high efficiency equipment; and
- Evaluators of the overall performance of and savings associated with the National Grid programs.

### National Grid Employees

National Grid staff engaged in energy efficiency program design, regulatory matters, administrative management of contractors, marketing, and evaluation are included in the Program Support Services category. Information provided by National Grid for 2016 identified 80,433 person-hours of time associated with Rhode Island energy efficiency program activities, equal to 39.9 FTEs, down slightly from 2015. Peregrine is reporting all National Grid FTEs as a separate category for purposes of this study and not allocating them to specific programs or groups of programs.

### Support Services Contractors

Peregrine interviewed the majority of lead vendors who supported National Grid in these activities to obtain information on their roles and responsibilities in program delivery as well as FTE counts. Often, these FTEs represented the aggregation of small numbers of hours by many employees. In some instances, this was because a contractor’s role may have been limited in duration and/or required contributions from a multi-disciplinary team. In other instances, it was because a team with multi-disciplinary capabilities was, for reasons of cost effectiveness,



providing services to National Grid in Rhode Island and other states or to National Grid and other utility companies.

Depending on the nature of the services the vendor provided and whether the support provided could be associated with specific programs, labor hours and FTEs of Support Services Contractors were allocated across the three major program sectors (Residential, Income Eligible Residential, Commercial and Industrial), consistent with the ratios of actual 2016 gas and electric program expenditures by program sector, or were allocated to a specific program sector.

### ***Program Planners and Administrators***

Vermont Energy Investment Corporation (VEIC) and its subcontractors Optimal Energy and Energy Futures Group continued to serve as consultants to Rhode Island's Energy Efficiency and Resource Management Council (EERMC) in 2016. Optimal Energy primarily provided services out of offices in Providence, Rhode Island. The VEIC team of market sector specialists assisted with ongoing program planning and refinement, provided guidance for spending of Regional Greenhouse Gas Initiative (RGGI) funds for efficiency, and helped with oversight of programs offered by National Grid. The twelve staff associated with the three organizations that provided these direct services billed approximately 2.8 FTEs of time. These services were paid for out of system benefits charges and the energy efficiency budget.

### ***Marketers***

National Grid's energy efficiency marketing spend for Rhode Island in 2016 was just over \$3,640,000, equal to just under 4% of the total Rhode Island energy efficiency expenditure. National Grid had reorganized and consolidated marketing activities in 2014 making Kelliher Samets Volk (KSV), a Vermont-based regional marketing firm specializing in the utility sector, National Grid's primary marketing consultant. KSV collaborated with and coordinated marketing activities by other additional, specialized marketing firms engaged by National Grid in a variety of marketing roles designed to increase general efficiency awareness, target specific customer segments and sub-segments for programs and services, and engage and promote trade allies. These firms conducted mailings to customers and trade allies, provided telemarketing services, and disseminated emails. KSV also coordinated its activities with National Grid's program delivery contractors to help them maintain and regulate demand for program services. Additional marketing firms supporting National Grid in Rhode Island in 2016 included Questline Inc., Ideas Agency Inc., Integrated Marketing Services, and InnerWorkings, Inc., Impressions ABA, Sacks Exhibits, and RAM Marketing, among others.



In addition to coordinating all the efforts of other specialized marketing firms supporting National Grid, KSV's role included media placement, web-based initiatives, organizing social media campaigns, and organizing phone messaging. Most of marketing budget spend was used for media message placement, printing and direct mailing, and electronic communications.

KSV researched, developed marketing strategies and designed targeted brand marketing campaigns directed at residential, commercial and industrial customer segments that focused on specific programs and generated awareness about the breadth of National Grid's energy efficiency program offerings. KSV also ran campaigns directed at trade allies and other implementers to encourage their use of the incentives and product discounts National Grid had developed and increase their active engagement with National Grid customers in programs. As KSV marketing director Ashley Nichols described it in 2016, the marketing team's goal was "the marriage of awareness and hyper-targeting." They analyzed and reported to National Grid monthly on leads generation for each market segment, monthly marketing activities by different parties, and going forward marketing efforts planned.

KSV identified 40 individuals at the firm that touched the National Grid Rhode Island account in one way or another. These included: brand and project managers; creative, art, and media directors; media and brand strategists; media buyers; a production designer, video producer, and copywriters; and the KSV executive leadership team. Ten of this number accounted for 80% of the total 5,378 hours KSV billed to Rhode Island in 2016, about the same as in 2015. Total KSV 2016 hours equaled 3.1 FTEs. Staff supporting National Grid in Rhode Island included a three quarter (0.75 FTE) time Senior Brand Manager based in Little Compton who focused on trade ally relationships.

Total marketing jobs calculated for Rhode Island equaled 3.9 FTEs. Marketing FTEs are allocated across all program sectors, consistent with the ratios of actual 2016 gas and electric program expenditures.

### ***Rebate Processors***

National Grid contacted with two firms in 2016, Blackhawk Engagement Solutions (BES), based in Texas, and Energy Federation, Inc. (EFI), based in Westborough, Massachusetts, to process rebates both to consumers who purchase targeted products and to equipment suppliers and installers providing point-of-sale discounts to customers. Point-of-sale efficiency initiatives, also called "upstream programs" are described in detail in the Delivery Approach discussion below.

Blackhawk Engagement Solutions processed incentives offered by National Grid for purchase of preferred energy efficient products installed under residential heating programs (Gas High Efficiency Heating Equipment Rebate and Programmable & WI-FI Thermostat Offer), commercial heating programs (Commercial Kitchen Equipment Incentive and Commercial High Efficiency Heating Equipment Incentive), and the Rhode Island hot water and cooling programs (Cooling



Rebate Offer and Heat Pump Hot Water Heater). BES scanned, data-entered, and validated rebate applications, processed payments, and cut and mailed checks. The staffing roles required included a senior manager, account management, data entry operators, quality assurance specialists, customer service, reward fulfillment staffing, and IT support. All told, BES required 1.72 FTEs to service Rhode Island programs, equal to just over 3,000 hours. BES also supports National Grid programs in other states and other utility clients nationwide.

EFI also provided rebate processing for programs provided by National Grid in both Massachusetts and Rhode Island, with Rhode Island accounting for about 20% of the total workforce hours for this effort. Programs supported included Upstream Commercial HVAC, ENERGY STAR® Appliances, and ENERGY STAR® Lighting. Supporting ENERGY STAR® Lighting program was far and away EFI's largest rebate processing effort for National Grid. Working closely with Lockheed Martin which managed ENERGY STAR® Lighting, EFI reimbursed manufacturers and others for point-of-sale discounts provided to residential customers. Rhode Island's share of the combined incentive processing operation for the two states was about 0.4 FTEs.

### ***Evaluators***

Contracted firms specializing in utility program evaluation included DNVGL, Opinion Dynamics Corp., The Cadmus Group, Inc., and others. Generally, outside evaluator time was attributed to specific programs and the FTEs associated with those hours added to program totals. Peregrine calculated 4 FTEs of labor were associated with evaluation activity in 2016.

### **Direct Service Providers**

The Direct Service Provider category is comprised of specialized firms engaged by National Grid to promote and deliver Rhode Island energy efficiency programs, engineers and other technical support providers, and the suppliers and installers of energy saving equipment.

This category includes, but is not limited to:

- **National Grid account managers.** National Grid staff will provide outreach and direct technical assistance to customers, particularly for large commercial and industrial retrofits, and new construction<sup>1</sup>.

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<sup>1</sup>As noted above in the National Grid description under Program Support Services, all National Grid FTEs are reported together in a separate category for purposes of this study and not allocated to specific programs or groups of programs.



- **Energy services companies specializing in providing field services and installation program management.** National Grid contracts with these firms to deliver individual programs to particular market sectors. In this capacity, they can provide outreach and intake of service requests, schedulers, technical specialists, engineers, installers and trades people, managers and supervisors, warehouse materials handlers, quality assurance inspectors, bookkeepers, and data entry staff.
- **Energy services companies specializing in logistical management and support.** These firms engage, manage, and coordinate product suppliers and distributors, retail store offerings, and service networks.
- **Electrical and mechanical engineers employed by contracted consulting firms.** National Grid assigns and dispatches these technical specialists to identify potential projects in customer facilities, quantify potential costs and savings, recommend actions that customers should take, and perform post-installation inspections to ensure that installed measures are performing as intended.
- **Equipment suppliers.** National Grid encourages suppliers throughout the Rhode Island service territory to market and sell targeted energy efficient equipment and approved materials directly to National Grid customers and installation contractors.
- **Independent installation contractors.** These are the “feet-on-the ground” that install energy efficient equipment and approved materials for National Grid customers in one or more market sectors, often as subcontractors to National Grid-designated Program leads, but also, increasingly, as self-directed installation vendors.
- **Quality assurance inspectors.** National Grid also contracts with inspectors that are independent of service delivery contractors to check a sample of completed installations to ensure that program standards are being met and that projected savings will likely be realized.

The role and contributions of Direct Service Providers is described in detail in the next section.



## Energy Efficiency Program Delivery

National Grid uses different energy efficiency program delivery strategies for different market sectors and sub-sectors. These strategies will vary with fuel type (i.e. electric vs. natural gas customers), purchasing requirements and characteristics of different customer rate classes, cost and benefits to customers of different end-use technologies, and whether the program's objective is to affect energy efficiency in current operations or to reduce future energy use in new construction.

While program strategies remained relatively constant from 2015 to 2016, individual programs were adjusted and tweaked in response to emerging technology and market opportunities. This section describes how National Grid delivered specific electric and gas energy efficiency programs and services in 2016 and who was responsible for program delivery.

### Residential Programs

In 2016, National Grid's residential programs offered a range of services and incentives to encourage residential electric and natural gas customers, be they owners or tenants, to install energy efficient equipment and materials and to operate their homes with energy efficiency in mind. Program services included home energy audits with installation of low-cost materials, facilitation of full weatherization (insulation and air sealing) and heating system replacement, rebates through National Grid-sponsored market channels to encourage purchase of high efficiency appliances and lighting, and a number of behavioral modification initiatives. Programs sought energy use reductions by all residential customers, regardless of income level, living in single-family dwellings, 2 to 4 unit buildings, and larger multi-family residences of 5 to 20 units and 20 units or greater.

One of the greatest challenges to delivering efficiency services to the large number of diverse residential customers across Rhode Island is to get their attention. In response, National Grid has created a set of residential programs that are multi-faceted market interventions, which use mass-marketing and branding strategies to deliver services at scale. Larger energy services companies who specialize in supporting utility energy efficiency initiatives have been hired to manage and deliver individual programs. An energy service company's role is, typically, to engage a wide range of players, both buyers and sellers of energy efficiency products and services, that are needed to make a residential sector sub-market work, bring them together through education, training, and technical support, and facilitate investment decisions that resulted in energy use reduction.

The primary focus of residential programs in 2016 continued to be weatherization and heating system replacement, residential lighting conversion to LED technology, energy efficient appliances and equipment, and energy efficient new construction. National Grid staff described



achieving weatherization goals in 2016 to be a “harder lift” than in 2015<sup>2</sup>. More funds had to be committed to marketing, and financial incentive levels were increased. While total customer engagement and audit delivery remained pretty consistent with 2015, the much warmer winter and low energy prices dampened interest in follow-on weatherization and replacement of heating systems.

Delivery information on each program is detailed below.

### **EnergyWise Single Family (gas and electric)**

In 2016, EnergyWise provided residential customers living in single-family homes (defined as 1 to 4-unit buildings) with a comprehensive energy assessment of energy use and building-specific recommendations for actions to take to increase home energy efficiency.

- Participants received technical assistance to identify how and where to improve building insulation and whether to replace appliances, heating systems, and thermostats with high efficiency models.
- As part of the energy assessment, field staff installed energy efficient lighting, low-flow showerheads, faucet aerators and smart power strips.
- They also wrote work orders for weatherization services (insulation and air sealing) by insulation contractors and for new high efficiency heating and hot water system installations by plumbing and heating contractors, if warranted. EnergyWise would pay a significant portion of the cost of weatherization and/or a qualifying replacement heating system.
- After the installation of insulation and heating equipment, quality assurance inspections were provided to confirm that equipment was installed properly.
- The program continued to offer the Rhode Island Heat Loan, which provides 0% interest financing to eligible single-family customers to support the adoption of recommendations made during the assessment. Customers who live in one to four unit single-family residences are eligible for a 0% interest loan of a minimum of \$500 up to \$25,000 with terms up to seven years.

#### ***Delivery:***

For 2016, National Grid again contracted with RISE Engineering, based in Cranston, Rhode Island, to manage and deliver the EnergyWise Single Family program. RISE employees, totaling 53 FTEs, involved in program delivery included program managers, office and field staff supervisors, field auditors, field installers and technicians, field inspectors, intake staff and

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<sup>2</sup> Interview with National Grid Residential Program Manager Angela Li, March 8, 2017.

schedulers, warehouse and material management staff, electricians, quality assurance / quality control inspectors, and accounting and contract oversight personnel.

RISE confirmed that demand for EnergyWise program services declined in 2016<sup>3</sup>, compared to high service demand the previous year driven by higher fuel prices and cold winter weather. While RISE had added field auditors, field technicians, and inspectors in 2015 in response to increased customer participation, RISE field staff completed 9,522 energy audits in 2016, down from 10,550 in 2015 (but still up from the 8,654 home energy audits completed in 2014)<sup>4</sup>. While RISE once again sub-contracted with Ocean State Energy Audits<sup>5</sup> to perform single-family audits and related installation work, they only required 0.5 FTEs in field support from Ocean State, compared to 3 FTEs in 2015.

Work orders written by auditors resulted in 2,674<sup>6</sup> customers proceeding with weatherization services (i.e. insulation and air sealing) in 2016. This was 5% fewer than in 2015. 25 independent insulation contractors, 17 of which were based in Rhode Island, installed the insulation and air-sealing materials recommended by RISE. Insulation crews were led by a BPI-certified crew chief. RISE received a program management fee for its services for this program that included a fee per audit, a fee per item installed by RISE staff, and a percentage mark-up (i.e. cost plus) on insulation work completed by contractors.

Independent heating contractors installed high efficiency heating system components, again using work orders generated by field auditors. Almost 1,000 gas-fired systems, up 10% from 2015, and 320 liquid fuel-fired systems (oil or propane), down 20% from 2015, were installed as a result, as well as many new energy-efficient domestic hot water systems.

As part of EnergyWise Single Family, RISE helped customers to secure HEAT loans to finance the installation of more efficient heating systems, hot water systems, and insulation upgrades. There were 806 closed HEAT loans in 2016 through private lending institutions.

CMC Energy Services, Inc. provided 864 quality assurance (QA) inspections of a sample of EnergyWise Single Family residential customers served<sup>7</sup>. QA addressed all phases of service delivery and included review of field auditors' performance, post-audit counts of installed measures, and post-weatherization site visits to confirm proper installation technique and

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<sup>3</sup> Peregrine interview with Brian Kearny of RISE Engineering, February 23, 2017

<sup>4</sup> Rise provided raw activity data for work occurring in 2016. These numbers may differ from what is included in the National Grid 2016 Annual Report due to when projects were invoiced and paid.

<sup>5</sup> Ocean State Energy Audits also provides audits for income-eligible National Grid customers on a sub-contracted basis for RI Community Action Agencies.

<sup>6</sup> Source: RISE Engineering

<sup>7</sup> Source: CMC Energy Services, Inc.



customer satisfaction with results. A unified workforce of 21 field inspectors conducted single family and multifamily residential QA visits, as well as commercial program inspections, in Rhode Island and Massachusetts, supported by schedulers and data entry staff. Approximately 2.1 FTEs of this team were engaged in all of National Grid's residential programs (single family and multifamily) in Rhode Island.

### **EnergyWise Multifamily (gas and electric)**

In 2016, EnergyWise Multifamily continued to provide comprehensive energy services to multifamily customers in buildings with five or more units, including energy assessments, incentives for heating and domestic hot water systems, cooling equipment, lighting, and appliances. These same services were available to both market rate and income-eligible multifamily properties. A designated primary point-of-contact managed and coordinated services offered through the full portfolio of National Grid programs, including EnergyWise Multifamily, Large Commercial Retrofit, Income Eligible Services (i.e. Low Income), and ENERGY STAR® HVAC.

#### ***Delivery:***

RISE Engineering also managed the EnergyWise Multifamily Program for National Grid. RISE staff included a program manager, a technical services director, field coordinators, field auditors, warehouse materials handlers, and project intake and coordination staff. This same staff was responsible for providing the Income-Eligible Multifamily Program described below. RISE had a combined 17 FTEs working on the EnergyWise and Income Eligible Multifamily programs<sup>8</sup>.

RISE engagements in this sector resulted in a total of 11,402 units (5,501 income-eligible and 5,901 market rate) participating in the program in 2016, up from 4,876 income-eligible and 4,312 market rate units in 2015. Market rate units were in 64 apartment sites and 70 condominium complexes. Income-eligible units were at 81 different sites.

RISE staff served as project managers for retrofit projects, meeting with building facility managers, making presentations to condominium boards and owners, and writing work orders and scopes of work (e.g. for air sealing, attic insulation, lighting fixtures, hot water systems and boiler resets, and even replacement refrigerators from retailers for low-income residents). RISE assigned weatherization, electrical, and plumbing installation work to 30 sub-contractor companies for 5-20 unit buildings. For larger buildings, work was competitively bid out to independent contractors who installed weatherization materials (insulation and air sealing) and other equipment. This program was coordinated with the Commercial Multi-family program for

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<sup>8</sup> Source: RISE Engineering



gas heating systems in centrally gas-metered buildings.

As noted earlier in the description of the EnergyWise Single Family program, National Grid engaged CMC Energy Services to perform independent quality assurance checks on multifamily services.

### **Residential New Construction (gas and electric)**

The Residential New Construction program promoted the construction of high-performing energy efficient single family, multifamily, and low-income homes in both 1 to 4 unit buildings and multifamily buildings up to five stories. To that end, it educated builders, developers, housing agencies, tradesmen, designers, and code officials regarding the construction requirements, performance benefits, and costs for such buildings. Changes driven by the Residential New Construction program improve lifecycle energy performance. This is primarily attributable to better materials selection and improved construction methods. Builders say that the incremental cost of these enhancements are more than offset by faster home sales and fewer call backs to address owner concerns.

In 2013, the program had adopted a performance-based tier structure with corresponding financial incentives and began to capture savings from the Renovation/Rehabilitation and Deep Energy Retrofit offerings. This continued in 2014, 2015, and 2016, with additional incentives being offered, but with increases in performance verification as well. Incentives paid were based on the percentage of improvement over an established baseline.

Program performance in 2016 exceeded performance in 2015 according to National Grid. The availability of better heat pumps resulted in an increase in the number of electrically heated homes that met program guidelines. A total of 16 homes qualified as “Tier 3”, well beyond the year’s goal of 10 homes in this Tier, meaning that their performance significantly exceeded the efficiency of the “user defined reference home”, (i.e. the average performance of actual homes). These homes received a \$4,000 incentive ‘bump’. National Grid also received two applications for its Zero Energy Challenge from homes that were energy neutral.

#### ***Delivery:***

National Grid contracted with CLEAResult, a rapidly growing national energy services provider that has been expanding its foothold in southern New England, to deliver the Residential New Construction program in 2016. CLEAResult had purchased Conservation Services Group (CSG), based in Westborough, Massachusetts, in mid-2015. CSG has delivered this program since 1998.

CLEAResult continues to provide this program out of Westborough and East Greenwich (Warwick), Rhode Island. Staff located at the Westborough office focused on program management, data management, and administrative responsibilities, while four staff based in



the Rhode Island office, up from three in 2015, provided field support and project management services for individual projects.

Field personnel provided trainings and reviewed plans submitted by builders and developers. A continued emphasis has been to try to reach out to all Rhode Island builders to continue to expand the impacts of the program statewide. Field staff also modeled proposed buildings and completed inspections that verified and certified that construction practices for participating buildings receiving performance ratings. In 2016, 526 units of housing and homes received HERS ratings, up from 442 the year before<sup>9</sup>. 351 of these units rated in 2016 were multifamily housing units, up from 239 in 2015. The program team continued to bring new builders and developers into the Residential New Construction program in 2016, continuing National Grid's success with market transformation.

With approval from National Grid, Peregrine has not included labor hours associated with any new construction affected by the program, beyond the hours for program implementation services provided by CLEAResult. While incentives offered by National Grid influence the installation of more efficient materials and products in a new home, such installations do not substantially increase total labor hours. The labor needed to construct a high-efficiency home is more or less the same as for buildings that meet current code requirements. In addition, these new homes would likely have been built without the intervention and support of the program, even though they would not achieve the same standards for efficiency in their design and function. Therefore, no construction labor component is counted for purposes of this study.

### **Residential Codes and Standards Initiative**

The Codes and Standards Initiative has been the complement to the New Construction program. The Initiative's goal has been to provide information and technical support to the construction / design community and to code officials in municipalities to increase code compliance. It has also sought to promote advanced and stretch codes like the Rhode Island Green Construction Code.

The Rhode Island Building Commission had anticipated adopting a new energy code in 2016, but the Office of Regulatory Reform requested that all sections of the building code undergo an economic analysis. This has resulted in a delay in adoption of the new energy code. While the energy code was reviewed first and successfully passed the economic test, review of the remainder of the code is ongoing and may not be completed until late 2017. National Grid had planned to support trainings concerning the new energy code in 2016, but that effort was put

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<sup>9</sup>Source: CLEAResult



off until the code is fully adopted. Instead, training in 2016 focused on areas of the existing code where compliance has been most problematic<sup>10</sup>.

***Delivery:***

National Grid continued to contract with CLEAResult in 2016 to lead this initiative in parallel with the Residential New Construction program. CLEAResult coordinated and conducted nine residential classroom trainings attracting 256 attendees and 17 in-field residential trainings that had 109 participants<sup>11</sup>. In addition, trainers delivered three commercial classroom trainings with 66 attendees and three in-field commercial trainings that had 48 attendees. Two subcontractors assisted with these trainings: Energy Resource Solutions from Andover, Massachusetts, and Steven Turner, Inc. from Providence, Rhode Island. CLEAResult also had a circuit rider to provide on-site technical assistance to municipalities as needed.

**Residential Home Energy Report Program (gas and electric)**

National Grid began offering Home Energy Reports (HER) to all residential customers in April 2013 as the first statewide behavioral program in the country and has continued the program through 2016. The Rhode Island HER program uses historical energy usage benchmarking and social comparisons to encourage energy efficient behaviors by residential customers.

The program provides a high volume of emailed and mailed reports to customers multiple times per year, with customer-personalized energy usage information, recommendations, and links to National Grid's other residential energy efficiency programs and services. The objective of these reports is to generate actual energy savings by providing "tips" for reducing energy use as well as to increase demand for and participation in other residential programs offered by National Grid.

***Delivery:***

Opower, with offices in Arlington, Virginia, originally developed the Rhode Island HER program, using proprietary behavioral analysis and energy audit software. In May 2016, Oracle Utilities purchased Opower. Oracle's HER service group continues to be staffed with behavioral scientists, marketing experts, engineers, and software product developers, with support staff, operating in cross-functional teams to develop and deliver audit reports in Rhode Island and elsewhere across the U.S. In 2016, these data-driven, software-generated reports were provided to 270,257 residential electric and 134,177 residential gas National Grid customers in Rhode Island. Comparing program participants to a control group, Opower has estimated that their

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<sup>10</sup> Source: CLEAResult

<sup>11</sup> Source: CLEAResult



reports result in a 10% – 20% lift in program participation<sup>12</sup>.

### **Residential Community Based Initiatives (gas and electric)**

Rhode Island Energy Challenge has been a collection of local marketing initiatives intended to leverage trusted community-based relationships in order to promote National Grid's residential energy efficiency programs in targeted communities. Community-based initiatives resemble political campaigns that are trying to get out the vote. They are run through communities as municipality-wide initiatives or as market-segment focused efforts, with the goal of increasing awareness of and participation in National Grid offerings and driving residential customers to make behavioral changes that reduce energy use.

#### ***Delivery:***

National Grid contracts with Connecticut-based Smart Power to coordinate the Rhode Island Energy Challenge. The program had a Rhode Island-based manager and is supported by operations staff in Connecticut. At the community level, the program enlisted volunteers to promote participation, though these volunteers are not counted for purposes of this study. Major community-based energy efficiency initiatives in 2016 targeted Charlestown, Narragansett, Bristol, and Barrington and challenged each to get 5% of its households to reduce their energy use by participating in National Grid programs and changing behaviors. Successful communities received cash prizes that could be used for local municipal energy upgrades. Another initiative in Tiverton/Little Compton focused on installation of photovoltaic technology.

### **ENERGY STAR® Lighting (electric)**

ENERGY STAR® Lighting is an “upstream” or “point-of-purchase” initiative implemented jointly with other regional utilities. The program's approach is to have retailers discount lighting products that National Grid would like residential customers to purchase, providing instant rebates and special promotions at retail stores. A mail-order catalog and online store were also available to customers for lighting purchasing.

LED lighting is at the center of this program, displacing both traditional incandescent lights and the compact fluorescent lights that dominated screw-in incandescent lighting replacement in recent years. By bringing the cost of these highly efficient and long-lasting LED lamps in line with incandescent lamps at the check-out line, the program has accelerated the transformation of this market. National Grid reported that new retailers joined the program in 2016 and that sales of LEDs were significantly higher than in 2015, with energy savings exceeding goals by 34%.

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<sup>12</sup> Source: Oracle / OPower



***Delivery:***

Lockheed Martin Services, with an office in Marlborough, Massachusetts, again supported the residential consumer lighting initiative in 2016, providing direct outreach and education to both product retailers and manufacturers. Lockheed works with corporate decision makers to enlist chains of stores such as Home Depot, Lowes, TrueValue Hardware, ACE Hardware, Aubuchon and other in the program. They have monthly calls with corporate trade allies and manufacturers to facilitate getting new products to retailers and assist retailers with design and set up of displays and signage in stores.

Staffing in 2016 included a full-time Rhode Island-based field representative and a nearly full-time (90%) Rhode Island-based account representative to work with retailers statewide, providing product information, training them to upsell to more efficient products, offering staff events, conducting in-store surveys and point-of-sale promotions. Lockheed Martin again employed a half-time School Fundraising Coordinator in 2016, who helped organize school-based lighting product and power strip purchasing and distribution.

Massachusetts-based Energy Federation, Inc. (EFI) provided a product catalogue and online store for National Grid and other regional utilities to promote and supply qualified products and to provide technical assistance to customers. This fulfillment function employed a manager, required a call center that took orders, and included warehouse personnel serving orders from Rhode Island customers, customers from elsewhere in New England, and nation-wide. As noted earlier in this report, EFI also processed incentive payments to retailers and manufacturers that provided point-of-purchase discounts for lighting.

As outlined in the program description, the ENERGY STAR® Lighting initiative provided point-of-sale discounts on preferred products at retail outlets. With respect to job impacts of the program, while both participating Lockheed Martin and EFI staff were counted by Peregrine, no retail outlet employees were included in study counts since the sale of these products had no discernible incremental effect on store employment.

**ENERGY STAR® Appliances (electric)**

In 2016, ENERGY STAR® Appliances was again run in collaboration with other regional utilities to promote the purchase of high efficiency household appliances, including kitchen appliances, and electronics. These appliances carry an ENERGY STAR® label. The program also offered refrigerator recycling, which helped address a significant barrier to purchasing a more efficient refrigerator, while removing non-efficient units from the market, recycling their components, and capturing and properly disposing of refrigerants.

Unfortunately, as ENERGY STAR® has become the standard for refrigerators, consumers have become resistant to spending more for the next level of increased efficiency, and additional



utility incentives are not cost effective for many products. On the other hand, other consumer products like energy efficient dehumidifiers and pool pumps are proving to be applicable to this upstream, point-of-purchase strategy and volume of these products sold increased in 2016.

***Delivery:***

As is the case with ENERGY STAR® Lighting, ENERGY STAR® Appliances is primarily a retail-store based initiative. And as was the case with ENERGY STAR® Lighting, retail outlet employees were not counted for this study since the sale of these products had no discernible incremental effect on store employment (i.e. it primarily resulted in different appliance choices by consumers). Again, as with ENERGY STAR® Lighting, Lockheed Martin Services engaged major retail outlets, providing the same support as for ENERGY STAR® Lighting.

National Grid and the other regional utilities contract with ARCA Recycling Inc. to recycle older refrigerators and freezers as part of the holistic strategy to encourage the purchase of energy efficient products. In 2016, ARCA acquired the assets of the previous service provider in Franklin, Massachusetts for refrigerator collection, dismemberment, and recycling. Lockheed Martin also engaged the ECO Depot (Rhode Island Resource Recovery Corporation) in Johnston, Rhode Island to recycle replaced dehumidifiers.

**ENERGY STAR® HVAC (gas and electric)**

The Rhode Island Heating and Cooling program (formerly the High-Efficiency HVAC programs: *Gas Heat* [heating] and *CoolSmart* [cooling]) promotes the installation of high efficiency gas heating and electric cooling systems via tiered rebate levels for more efficient technologies including ductless mini-splits, heat pumps, heat pump water heaters, boilers, furnaces, Wi-Fi thermostats, boiler reset controls, and furnaces equipped with high efficiency fans. The program has provided in-depth contractor training for design, installation, and testing of high efficiency systems. Furthermore, the program provided quality installation verification training, ensuring that all equipment is properly sized, installed, sealed, and performing. In 2016, the high price point for condensing gas water heaters, their relatively low efficiency, and a lack of utility incentives for purchasing this equipment resulted in very little activity in this market. With respect to electric heating products, the volume of heat pump water heaters purchased and the installation of mini-splits providing both heating and cooling has increased.

***Delivery:***

Westborough, Massachusetts-based CLEAResult delivers this program, providing training, technical support, and marketing assistance to trade allies to promote electric mini-splits and higher efficiency water heating systems. Staffing associated with this program is quite modest. Lockheed Martin Services has also been involved in this program, promoting advanced thermostats and energy efficient water heaters to big box home improvement retailers.



In evaluating FTEs associated with the program, Peregrine counted the employees of vendors under direct contract to National Grid, but did not include labor associated with installation of this equipment, since it did not increase incrementally as a result of the Program.

### Income Eligible Residential Programs

National Grid offers Income Eligible (low-income) programs to its electric and gas customers residing in single family (1-4 unit) dwellings and multifamily (5 or more unit) buildings or developments who are eligible for the Low Income Heating Assistance Program (LIHEAP). This target audience was already eligible to receive energy-related assistance through federal and state programs. National Grid's program strategy in this market was to support, complement, and leverage the resources and services provided by these other programs.

Specific 2016 Income Eligible Residential Programs included:

#### **Income Eligible Single Family (gas and electric)**

National Grid's Income Eligible Single Family program provides low-income customers in 1-4 unit buildings with home energy assessments, installation of energy efficient lighting, appliances, heating systems, domestic hot water equipment, and weatherization measures. Traditionally, energy services were provided to this market sector through local non-profit Community Action Program (CAP) agencies under contract to the Rhode Island Department of Human Services (DHS) to deliver the federally funded Weatherization Assistance Program (WAP) and the Low Income Heating Assistance Program (LIHEAP). Services were fuel-blind and available to gas, oil, and electric heat customers as budgets allowed. Six CAP agencies provided statewide coverage to income-eligible Rhode Island residents. With the participation of National Grid in energy efficiency services delivered by the CAP agencies to this market, WAP budgets were significantly leveraged and energy efficient installations significantly expanded. In 2016, 38 full-time CAP agency staff provided weatherization-related services across Rhode Island, up from 34 FTEs in 2015 and 32.5 FTEs in 2014.

#### ***Delivery:***

In July 2013, CLEARresult, working out of offices in Providence, Rhode Island, was selected by National Grid to manage its Income Eligible Single Family program and has continued in that role through 2016. Under CLEARresults' management, productivity and quality of service delivery to low income residents has markedly improved. CLEARresult has provided training, quality control, and oversight of National Grid-funded services and installations delivered through CAP agencies. CLEARresult also serves as the conduit for National Grid payments to the CAP agencies and works closely with the Rhode Island DHS staff to coordinate and optimize delivery of National Grid-funded services and traditional Weatherization Assistance. CLEARresult staffing included a program manager, an installation quality assurance / quality control inspector, and



administrative support.

Under the Income Eligible Single Family program, CAP agencies provide three types of building audits: audits focused on lighting and appliances only that install lighting products; audits providing detailed recommendations and work orders for insulation contractors, heating system installers, and fans; and comprehensive audits that do both. BPI-certified auditors complete building assessments and work orders. Special AMP (Appliance Management Program) auditors install lights and refrigerator measures. In 2016, 2,504 AMP installations were provided, up from 2,400 in 2015<sup>13</sup>.

Independent weatherization contractors install the insulation and completed air sealing for the CAP agencies. These contractors were selected off a state-approved list and offered fixed pricing statewide for installed measures. Each agency had three to five insulation contractors it typically worked with. The CAP auditing staff inspects completed insulation work post-installation to ensure it was properly installed. Heating system upgrades are put out to bid to heating contractors, and heating contractors also were used for post-installation inspections.

In 2016, CAP agencies delivering the combined National Grid program and WAP achieved weatherization (insulation and air sealing) installations for 659 National Grid gas customers and the installation of 213 high-efficiency, gas-fired heating systems. In addition, 456 oil- and propane-heated buildings received weatherization, and 270 received new oil heating systems<sup>14</sup>.

ACTION, Inc., based in Massachusetts, manages the refrigerator replacement service provided to income eligible residential customers. This included product procurement, ordering, delivery, removal and disposing of old appliances, and conducting quality assurance surveys.

### **Income Eligible Multifamily (gas and electric)**

Since 2013, National Grid has consolidated energy efficiency offerings for income eligible multifamily properties with five or more units into the EnergyWise Multifamily program. This suite of programs addresses both gas and electric opportunities. Comprehensive energy services available to these customers included energy assessments, incentives for heating and domestic hot water systems, cooling equipment, lighting and appliances. Services provided to income-eligible and market rate units through EnergyWise Multifamily program are tracked separately.

Additionally, and in parallel, the Residential New Construction program works with Rhode Island Housing, local housing authorities, and developers of income-eligible housing to encourage

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<sup>13</sup> Source: CLEARResult

<sup>14</sup> Source: CLEARResult



construction of energy efficient properties.

***Delivery:***

In conjunction with its delivery of EnergyWise Multifamily services, RISE Engineering, based in Cranston, Rhode Island, had primary responsibility for delivery and coordination of Income Eligible Multifamily services. RISE staff serve as project managers for retrofit projects, meeting with building facility managers and writing work orders and scopes of work (e.g. for air sealing, attic insulation, lighting fixtures, and even replacement refrigerators from retailers for low-income residents. Independent contractors installed weatherization materials (insulation and air sealing) and heating equipment components.

Support for energy efficient construction of new income-eligible units is provided by CLEAResult through the Residential New Construction program.

### Commercial and Industrial Programs

In 2016, Commercial and Industrial (C&I) programs, gas and electric, continued to encourage installation contractors, both technology specialists and tradespeople, to take the lead in achieving National Grid's energy efficiency goals for large and small businesses. These C&I programs also targeted municipal facilities and large non-profit institutions (e.g. colleges and universities and healthcare facilities). At the same time, National Grid increasingly made use of "upstream" or "point-of sale" strategies, particularly for LED lighting, that discounted the purchase price of preferred, more energy efficient equipment to accelerate market transformation and replacement of older technology.

C&I programs differentiate between "prescriptive" and "custom" energy efficiency measures. Prescriptive measures, often lighting, qualify for pre-determined incentives or discounts from National Grid based on cost-effectiveness guidelines (e.g. hours of operation or equipment life). Custom or "comprehensive" measures are evaluated and approved for incentives based on actual total savings these often more complex measures are projected to produce. In particular, the Large Commercial and Industrial Retrofit program encourages customers and their installation contractors to incorporate or "bundle" a mix of shorter payback, more certain, energy savings measures and longer payback, more complex, energy savings measures into projects, providing enhanced incentives for more "comprehensive" or "deeper" efficiency improvement.

Over the past five years, the delivery of C&I offerings has become increasingly "market-based", compared to residential programs (though the Small Business program, described below, uses a preferred contractor to install energy conservation measures, primarily lighting, at a heavily subsidized cost to customers, in the same way EnergyWise does in the residential market).



C&I programs are largely structured to allow and encourage independent product and service providers to market and deliver services to National Grid customers, driving sales using incentives available to them from National Grid for purchase and installation of qualifying products. This strategy enables customers to work within existing contractor relationships to receive program incentives, and likewise allows contractors to work within existing customer relationships to identify opportunities for installing energy efficient equipment that National Grid wants to promote. It also meant that multiple vendors can compete for a customer's business, while assuring the customer that they could bring the same National Grid incentives.

From both a jobs and a savings perspective, this has resulted in the numbers of energy services businesses directly participating in National Grid programs increasing significantly and has created new and additional opportunities for diverse vendors to promote emerging energy efficient technology to new and existing clients.

Comparing 2016 to 2015 commercial and industrial programs, National Grid program manager Ben Rivers observed the following trends:

- The Upstream Lighting program, described below, with its strategy of bringing LED lighting to customers at discounted prices is cutting into customer participation in the Small Business Direct Install program.
- Participation by municipalities in efficiency initiatives is increasing, with conversion of streetlights to LED technology a growing part of municipal energy reduction strategies.
- Customers are installing an increasing number of combined heat and power systems.
- More industrial process improvements are being identified and installed, and grocery stores are continuing to opt for improvements to energy efficiency in refrigeration.
- An increasing number of three-year Strategic Energy Plans for large comprehensive retrofits were negotiated with large organizations and institutions.

### **Small Business Direct Install (electric)**

In 2016, the Small Business Direct Install program continued to provide direct installation of prescriptive energy efficient lighting, non-lighting retrofit measures, and minor gas efficiency measures. Electric customers with average monthly demand of less than 200 kW were eligible to participate. The customer cost share for installations was 30% of the total cost of a retrofit.

While the program met its goal for the year, driven by new opportunities to replace linear fluorescent lighting with new linear LED products, customer participation in the program declined. This may reflect higher market saturation levels or the direct availability of discounted LED lighting to customers through the Upstream Lighting program. Other Small Business program changes in 2016 included elimination of custom measures through the program and corresponding reallocation of some program budget to other programs.



**Delivery:**

The Direct Install program's lighting and non-refrigeration measures were delivered by RISE Engineering of Cranston, Rhode Island and sourced from one product vendor (Rexel, formerly Monro Distributing). Both RISE and Rexel were selected through a competitive bidding process.

There were 1,111 customers who participated in the Direct Install program in 2016, down by 17% from the 1,340 customers who participated in this program in 2015<sup>15</sup>. RISE provided turnkey installation services to this market, with annual goals, and accounted for just over 88% of the customers serviced. The remaining 11.6% of customers served was through the Customer Directed Option or "CDO", described below. CDO projects secured 19% of incentives provided through the Direct Install program, reflecting that these projects were larger on average than those completed by RISE.

RISE employees engaged in the Small Business program were responsible for marketing and lead generation as well as staffing an intake center that was responsible for pre-qualifying potential customers. RISE energy specialists performed field audits of customers' facilities, and data entry staff used completed audits to generate proposals for customers. Audits also resulted in referrals to the Commercial and Industrial Gas Program.

RISE maintained a supervised warehouse for material distribution and materials handlers. Electricians were both RISE employees and employees of sub-contractor Superior Electric. RISE also employed back office and accounting staff to service this program. In general, RISE employees supporting this program were salaried or hourly, while subcontractors were paid for installation work on a piece basis.

When a customer accepted a RISE proposal, a RISE project manager ensured that sufficient product was available for the installation, issued that product to the installer/electricians, and closed out the work order when the installation was completed. In 2016, total employment from RISE and its sub-contractor Superior Electric associated with the Small Business program totaled 38.9 FTEs, down just over 10% from 43.5 FTEs in 2015<sup>16</sup>. RISE also used two HVAC firms as controls subcontractors for installation of custom measures.

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<sup>15</sup> Source: RISE Engineering. These numbers may differ from National Grid's year-end report participation counts due to the fact that it applies net-to-gross factors and ratios to obtain an estimate of unique participants.

<sup>16</sup> Source: RISE Engineering



As noted above, customers could also choose to use their own preferred electrician through the “Customer Directed Option” of the Small Business program. In 2016, 129 customers used this option<sup>17</sup>.

As was the case with residential programs, National Grid used CMC Energy Services, Inc. to provide quality assurance inspections of Small Business projects. Field inspectors conducted QA visits in Rhode Island and Massachusetts for the Small Business program as well as for the Large Commercial Retrofit and Upstream Lighting programs (described below), supported by schedulers and data entry staff. Approximately 2.25 FTEs of this team were engaged in National Grid’s commercial and industrial programs in Rhode Island.

### **Large Commercial Retrofit (electric)**

Large Commercial Retrofit is a comprehensive program designed to promote replacing old, but still operating, less efficient energy equipment and systems with prescriptive and custom configurations of energy efficient electric equipment. Energy efficiency improvements installed through the program include: lighting; motors and drives; heating, ventilation and air conditioning (HVAC) systems; building controls; combined heat and power systems; and street lighting.

As a retrofit program, it targeted replacement of existing equipment or reconfiguration of existing systems. All commercial, industrial, and institutional customers were eligible to participate. Participating customers tended to be larger (i.e. have a monthly demand of 200 KW or more) or were pursuing “custom” electricity saving measures not available through the prescriptive Direct Install program. As was the case for the Small Business program, National Grid paid incentives to assist with defraying part of the material and labor costs associated with installing energy efficient equipment; but incentives available through this program were generally less generous than through the Direct Install program, with customers paying a larger percentage of the installed cost of measures.

National Grid also offered technical assistance to customers to help them identify cost-effective conservation opportunities.

#### ***Delivery:***

The Large Commercial Retrofit program in 2016 continued to be primarily a market-based initiative with no formal program administrator or designated suppliers. National Grid established performance standards for energy measures and allowed customers to select suppliers and installation vendors. Again, as described above, National Grid paid incentives that

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<sup>17</sup> Source: RISE Engineering



helped defray a portion of the material and labor costs associated with installed energy efficient equipment.

National Grid statistics for the 2016 Large Commercial Retrofit program identified 520 project applications for 394 individual customer account numbers. Installers of record for these projects, based on National Grid statistics, were National Grid-approved Project Expeditors or “PEX” (177 projects or 34%), other installation contractors (246 projects or 47%), and the customers themselves (96 projects or 18%). It is likely that the customer-installed projects also involved installation contractors though no FTEs for these projects are included in counts since installer information is not available.

National Grid’s program statistics for 2016 showed that the total value of project installations performed through the electric Large Commercial Retrofit program was nearly \$40,400,000. Of this total, nearly 70% of these projects (\$27,500,000) based on project value, was lighting retrofits.

Of 177 projects pursued, secured, managed, and installed by 11 Project Expeditors, 115 (65%) were lighting retrofits, 22 were HVAC projects (including controls), eight (8) were variable speed drives, and the additional 32 were “custom” or comprehensive projects, often involving multiple energy efficient technologies that could also include lighting retrofits, that received customized incentives from National Grid. Four PEX vendors installed 158 (89%) of the 177 projects developed and installed by the PEX vendor group: Energy Source, Inc. (78), RISE Engineering (43) Energy Conservation, Inc. (21), and ENE Systems (16). Continuing a growing trend observed since 2013, these PEX engaged dedicated sales / project management staff and aggressively pursued potential customers, in many cases then subbing out the field work to licensed electrical contractors and technology specialists who received unit-based fees for completing installations.

In addition to the Project Expeditors, there were one hundred other named Installation Contractors active in 2016 in the Large Commercial Retrofit program that used the program to induce customers to upgrade existing systems to improve energy efficiency or to purchase and install qualifying energy efficient equipment. These vendors included general energy contractors and energy services companies, as well as purveyors of energy saving technologies, such as energy management systems, advanced lighting systems, process equipment, HVAC components, etc. Again, between them, they completed an additional 246 projects. Of these projects, 135 were for lighting (55%), 62 were “custom” projects, 29 were for variable speed drives, and 18 were HVAC projects.

### **Upstream Lighting (electric)**

National Grid’s Commercial and Industrial Upstream Lighting program encourages customers to choose higher efficiency lighting products at the point of purchase. The original big idea that launched this program was the recognition that commercial customers were going to larger



lighting distributors to purchase stocks of replacement lighting to have on hand as lamps burned out and for large-scale change-outs. National Grid reasoned that if a customer again purchased and installed the same product as was being replaced, this could be a major lost opportunity for efficiency improvement. But if the customer could be induced to purchase and install a more efficient product, both National Grid and the customer would realize the benefits and savings of energy use reduction. With the rapid advent and availability of more efficient and longer-lived LED alternatives to fluorescent lighting, the cost of this potential lost opportunity increased significantly.

The Upstream Lighting's success has been driven by three key program design elements: first, bring the incremental cost of the more efficient National Grid-preferred lighting products available from distributors in line with now-conventional products so customers would opt for high efficiency; second, offer instant rebates by working with manufacturers and distributors to create purchase price parity at the point-of-sale and eliminate the stigma of the mail-in rebate process; and third, stipulate that the purchased products could not be purchased and stored to replace failed lamps in the future or be resold, but must be installed immediately to generate savings for National Grid and the customer.

Over the past three years, the program has seen a rapid growth in sales of easily installed LED products that can substitute for compact and linear fluorescents in existing fixtures. While there is some market saturation already in PAR lamps, there remains considerable opportunity for substituting linear LED lamps in existing fluorescent fixtures. There is also a growing movement to drive more luminaire and fixture sales (e.g. stairway fixtures) that would result in additional savings by also replacing the ballasts in older fluorescent fixtures with the lower watt LED drivers in new fixtures<sup>18</sup>.

- In 2014, 429,034 units of lighting were sold through Upstream Lighting. Of these, 261,820 (61%) were high efficiency linear fluorescent lamps (LFLs). There were also 167,214 units of LED product sold.
- In 2015, the total volume of product sold through Upstream Lighting fell to 327,420, in part due to less promotion of the program by National Grid, a drop of 24%. During that year, the number of LFLs sold fell 75,520, a drop of 71%, while sales of LEDs increased to 251,900, growing 50%.

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<sup>18</sup> Interview with Ben Rivers, National Grid, March 6, 2017



- In 2016, 292,156 units of lighting were sold through Upstream Lighting. Of this sales volume, only 46,882 units of LFLs were sold, down 82% from 2014. LED sales through upstream represented 245,274 units of lighting, equal to 84% of total sales.<sup>19</sup>

***Delivery:***

National Grid contracts with ECOVA to manage, support, and promote Upstream Lighting. ECOVA has engaged manufacturers and enlisted a growing number of distributors, offering incentives from National Grid, if they will reduce list prices of specified energy efficient products to electrical contractors and businesses, all with the goal of transitioning and transforming stocking practices and customer purchasing behavior. ECOVA processed reimbursement of suppliers for discounts provided and managed a quality assurance process to ensure that recorded sales were legitimate. In 2016, new products continued to be added to what is available through the program to continue to accelerate the market transformation process.

National Grid also contracted with CMC Energy Services in 2016 to conduct inspections of 5-10% of sales, using lists provided monthly by ECOVA, to confirm that purchased product had been installed<sup>20</sup>. Larger distributors were audited monthly to verify that product was going to the customers of record.

In reviewing records maintained by ECOVA of who was purchasing products from distributors, Peregrine determined that installation contractors were also making use of the Upstream Lighting program. Digging into program data provided by ECOVA and National Grid, Peregrine found that over 115,000 units of product (39% of the Upstream total in 2016) were purchased by electricians that were, presumably, installing products at customer facilities. Electrical contractors were, it seems, using the discounted pricing of these products available from the lighting distributors they frequent to convince their customers to replace standard efficiency lighting with high efficiency product, further driving the market transition.

Peregrine applied the same product-specific per-unit-installed times that Peregrine used to calculate FTEs for lighting installations by electricians under the Direct Install and Large Commercial Retrofit programs. We reasoned that because those installation times reflected the high productivity of experienced electricians incentivized to work quickly, the resulting FTEs calculated would be a conservative number that did not overstate labor hours. Using this methodology, we calculated that 18.5 FTE field electricians would be needed to install the production purchased through Upstream Lighting by installation contractors. Further, it is likely that a significant portion of Upstream Lighting product sold where customers were the buyer of

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<sup>19</sup> Source: Ecova

<sup>20</sup> Source: CMC Energy Services



record was also being installed by uncounted contracted labor, though Peregrine was not able to confirm this hypothesis.

### **Technical Support Services (gas and electric)**

#### ***Engineering support***

To further support large commercial customers, National Grid contracted with consulting engineers who could be assigned at the request of an account manager to assist a customer with identifying potential custom projects and to evaluate or model the energy savings that would result, including completing required program applications. Some of these consultants brought expertise in such specialties as data center energy efficiency improvement or laboratories and clean room technology. In other situations, the customer could propose his own engineer with a scope of work that National Grid might elect to support. Additional support was available through National Grid from contracted consulting engineers to witness project commissioning, to confirm that the installed measures were operating and performing as anticipated, and to ensure that predicted savings would be achieved.

#### ***Energy Smart Grocer***

In a similar vein, National Grid contracted with CLEARResult, the parent company of Portland, Oregon-based PECl, through its Massachusetts office in Westborough, to offer the Energy Smart Grocer sub-program, which helped large and small supermarket chains identify and implement energy efficiency improvements. Working in 60 kW or larger supermarkets, CLEARResult has focused on refrigeration improvement and some lighting. CLEARResult employed auditors and other technical staff to identify and develop refrigeration improvement projects, helped them engage contractors to complete upgrades, provided technical support as needed, and performed quality assurance inspections of installations.

In 2016, as a result of CLEARResult's efforts, 133 equipment upgrades were completed at 58 locations for 14 customers, up from 114 projects in 2015<sup>21</sup>. Savings exceeded 4,000,000 kWh. Participating customers were part of local and regional chains and secured through outreach in partnership with the RI Food Dealers Association. Three CLEARResult field staff visited and worked on-site with Rhode Island retailers to develop these projects. Over 25 CLEARResult staff logged 2.3 FTEs providing support services, with installations through the Large Commercial Retrofit program completed by 19 independent contractors selected by customers.

National Grid recognized Dave's Marketplace, a local independent grocer with nine stores and a commissary all in Rhode Island, as Energy Smart Grocer of the Year for 2016, based on savings

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<sup>21</sup> Source: Peregrine interview with CLEARResult



through the program.

### ***Industrial Energy (gas and electric)***

In 2016, National Grid focused and expanded the support provided by Reston, Virginia-based Leidos Engineering, Inc. to help Rhode Island and Massachusetts manufacturers to identify and implement energy efficiency improvements in industrial processes. Working out of offices in Framingham, Massachusetts, Leidos assisted National Grid customers to prepare 53 applications for custom measures through the Large Commercial Retrofit program. Leidos provided targeted engineering support to participating customers, functioning as an owner's representative as customers developed projects with specialty vendors and contractors. A typical engagement included meetings with a customer to review existing operations, major energy users, and any current production issues. Following a guided walk-thru of the facility, Leidos engineers prepare a summary of opportunities and next steps, and depending on the interests of the facility, help identify vendors and prepare applications for National Grid incentives. Leidos had six staff supporting Rhode Island and Massachusetts manufacturers in 2016, with their Rhode Island involvement equal to 1.4 FTEs.

### **Large Commercial New Construction (electric)**

The Large Commercial New Construction program encouraged energy efficient design and construction practices in new and renovated commercial, industrial, and institutional buildings. The program also promoted the installation of high efficiency equipment in existing facilities during building remodeling and at the time of equipment failure and replacement. The program offered incentives to eliminate or significantly reduce the incremental cost of high efficiency equipment over standard efficiency equipment and provided technical support to assist customers to identify opportunities for incremental efficiency improvement in eligible buildings.

#### ***Delivery:***

The New Construction program was administered and promoted internally by National Grid staff. As noted above, it offered both technical and design assistance to customers to identify opportunities for incremental efficiency improvement in new building designs and to help customers and their architects/engineers to refine their designs to capture these opportunities.

Outside consultants were assigned to assist customers to identify and incorporate energy efficiency solutions into new construction designs and to complete detailed studies that model and quantify energy savings. Commissioning or quality assurance was also offered to ensure that the equipment and systems operate as intended.

For purposes of this study, only the engineering support assigned by National Grid has been counted towards the labor impacts associated with National Grid programs in 2016. As is the



case with Residential New Construction, construction jobs associated with commercial new construction were not counted because National Grid's involvement primarily impacts what equipment is installed, and construction labor does not measurably increase in these projects.

### **Commercial and Industrial Gas Programs**

Commercial and Industrial Gas programs supported installation of energy efficient gas heating and water heating systems, certain thermal envelope measures, and custom gas systems in existing buildings and in new construction. The program guidelines for measure eligibility were the same as for the Large Commercial Retrofit program and the New Construction program. Retrofit measures must demonstrate that they will result in added efficiency beyond existing still functional equipment. For new construction or with failed equipment, the "lost opportunity" rules apply. New equipment, to be eligible for incremental incentives, must exceed the efficiency of what codes require. All commercial, industrial, and institutional customers were eligible to participate. The Commercial and Industrial Gas programs also offered technical assistance to customers to help them identify cost-effective conservation opportunities and paid incentives to assist in defraying part of the material and labor costs associated with the energy efficient equipment.

#### ***Delivery:***

RISE Engineering served as National Grid's Program Administrator for gas programs. RISE employees working on this project included a program manager and project coordinator, mechanical and electrical engineers, field staff performing audits and minor installations, and administrative personnel and support staff. A total of 5.7 FTEs from RISE serviced the Rhode Island program.

RISE Engineering's Program Manager has described RISE's role in the program as "the gears that keep moving applications forward." In 2016, 176 custom applications for gas customers were approved, completed, and paid in Rhode Island, with an additional 177 applications handled and still being processed. RISE received leads from a variety of sources, including project expeditors, mechanical contractors, and suppliers of equipment such as steam traps. RISE would then generate a Program application and as necessary or appropriate, review the customer proposal or undertake a scoping study. If the project proposed was acceptable (i.e. met National Grid's standards), RISE issued an offer letter to the customer authorizing the project to proceed. Customers had responsibility for arranging for and completing the installation. RISE performed a post-installation inspection and closed out the application so that the rebate could be issued. Total gas savings from the program increased in 2016.



## Employment Impacts of National Grid Programs

### 2016 Program Budgets and Full Time Equivalent Employment

Peregrine found that in 2016 an estimated 702 full-time equivalent jobs or “FTEs”<sup>22</sup> resulted from National Grid Rhode Island energy efficiency programs. The following table, “2016 Full Time Equivalents by Program,” summarizes the estimated job impacts from the 2016 electric and gas energy efficiency programs, by program sector and by individual program. In the table, Program Support Service Provider FTEs have been allocated and integrated into individual program FTE counts and program sector FTE counts based on spend. These are added to the Direct Service Provider count for each program. Smaller programs with limited FTE counts, including pilots and community initiatives were combined into the category titled “other”. Community Action weatherization assistance program staff and National Grid staff are counted in the 702 FTE total, but presented separately in the table.

#### Head counts vs. FTE counts

Peregrine was not able to develop actual head counts of individual workers participating in delivery of and support for the 2016 National Grid programs in Rhode Island. However, Peregrine can say with confidence, based on interviews with companies directly involved in the implementation of National Grid’s energy efficiency programs and through our analysis of field delivery of program services, that the number of individual workers employed in and compensated for work on Rhode Island energy efficiency programs far exceeds the total FTEs. Many companies we interviewed told Peregrine that they employed multiple individuals with specialized skills or in discrete roles who were necessary and important to delivering a comprehensive, high quality product or service; but only a portion of each employee’s total annual hours were attributable to Rhode Island energy efficiency activity. Some examples:

- National Grid reported over 80,433 employee hours billed against Rhode Island energy efficiency program-related accounts, equal to 39.9 FTE employees. Those hours and that FTE count represent the aggregate contributions of 198 individual National Grid staff supporting energy efficiency in Rhode Island: a mix of Rhode Island-dedicated employees and also employees with system-wide or similar other-state responsibilities who contributed fractionally to the Rhode Island FTE total.

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<sup>22</sup> Peregrine and National Grid have defined a FTE for purposes of this study as an average 1,760 annual hours of employment (or 220 total days of employment per FTE).



## 2016 Full Time Equivalents by Program

PROGRAMS	2016 SPEND	2016 FTES
<b>ELECTRIC PROGRAMS</b>		
<b>COMMERCIAL &amp; INDUSTRIAL (C&amp;I)</b>		<b>241.1</b>
Large Commercial New Construction	\$5,417,105	1.5
Large Commercial Retrofit	\$19,719,268	192.2
Small Business Direct Install	\$6,994,396	47.4
Other	\$76,738	
<b>LOW-INCOME RESIDENTIAL</b>		<b>42.3</b>
Single family Income Eligible Services	\$7,426,401	30.6
Income Eligible Multifamily	\$2,066,708	11.7
<b>RESIDENTIAL</b>		<b>104</b>
Energy Wise	\$8,906,422	79.2
EnergyStar Appliances	\$1,706,388	1.3
EnergyWise Multifamily	\$2,666,311	15.5
Home Energy Reports - Residential	\$2,722,434	2.7
Residential New Construction	\$656,845	2.4
Energy Star HVAC	\$1,169,809	0.3
Energy Star Lighting	\$7,705,936	1.3
Other	\$1,025,686	1.3
<b>NATURAL GAS PROGRAMS</b>		
<b>COMMERCIAL &amp; INDUSTRIAL (C&amp;I)</b>		<b>36.1</b>
Large Commercial New Construction	\$1,664,051	0.3
Small Business Direct Install - Gas	\$133,794	0.9
Large Commercial Retrofit	\$3,739,711	32.3
Commercial & Industrial Multifamily	\$580,145	2.7
Other	\$19,783	
<b>LOW-INCOME</b>		<b>41.4</b>
Single family Income Eligible Services	\$3,602,082	32.3
Income Eligible Multifamily	\$1,169,105	9.1
<b>RESIDENTIAL</b>		<b>159.3</b>
Energy Star HVAC	\$1,252,642	0.3
Energy Wise	\$6,824,093	140.1
EnergyWise Multifamily	\$1,372,422	15.4
Home Energy Reports - Residential	\$453,615	0.4
Residential New Construction	\$846,968	3
Other	\$70,436	0.1
<b>COMMUNITY ACTION AGENCY STAFF</b>		<b>38</b>
<b>NATIONAL GRID STAFF</b>		<b>39.9</b>
<b>GRAND TOTAL</b>		<b>702</b>



- Engineering firms that provided technical support, both general and specialized, to Rhode Island commercial and industrial programs, also provide energy efficiency services to multiple electric and gas utility companies and/or to multiple National Grid-served states. They dispatch staff, when requested, to assist individual Rhode Island customers. The intermittency of Rhode Island service requests, the desire of National Grid to only pay for expert engineering support when it is being used, and the necessary business economics for engineering firms of maximizing staff utilization create a situation where Rhode Island customers are best, and most cost effectively, served by engineering firms that also serve other larger markets. The Energy Smart Grocer program delivered by CLEAResult exemplifies this situation, with 25 employees based in Portland, Oregon and Westborough, Massachusetts, including three “local” field staff that actually visits Rhode Island, used 2.3 FTEs in 2016 to work on 133 projects for Rhode Island customers. Over the same period, CLEAResult supported many times that many projects for National Grid customers in Massachusetts. The Industrial program operated by Leidos Engineering is another similar example of how National Grid’s Rhode Island customers benefit from multi-state vendor deployments.

At the same time, for other large energy services providers whose business focus is supporting one or more of the larger, labor intensive National Grid Rhode Island programs, the total FTE counts and the number of individual personnel contributing to those counts may be nearly equal. For example, Cranston, Rhode Island-based RISE Engineering was the lead vendor for many of the largest programs offered in Rhode Island by National Grid, including EnergyWise Single Family, EnergyWise Multifamily, Small Business Direct Install, and the Commercial and Industrial Gas programs.

The larger size of these programs required and enabled RISE to employ full-time staff to serve in specific program roles, such as auditors and inspectors. Also, similarities between staffing needs across multiple programs, e.g. for engineering, materials handling, or accounting, allowed RISE to pool staff to provide higher levels of utilization and improved staffing economies. Additionally, similarities in technical needs between programs, e.g. for electricians, allowed RISE to employ a baseline number of full-time technical specialists, but then supplemented them on an as needed basis with sub-contracted assistance.

This staffing has, in turn, also enabled RISE to be a major player as a Project Expediter in National Grid’s Large Commercial Retrofit program, generating business opportunities, managing more complex installations, securing equipment and materials, and providing or contracting for installation labor. And, at the same time, as new business opportunities have emerged and been secured in neighboring states, RISE has been able to grow further, shifting specialized staff back and forth between states as demand for services dictates, while maintaining or increasing the efficiency of staff utilization and improving labor economics.



## Program budgets and FTE counts

A comparison of program spending and program FTE counts in prior table shows that the number of FTE jobs attributable to each program is not proportionate to the amount spent by National Grid on programs.

Looking at the commercial retrofit and new construction programs, for example, the Large Commercial Retrofit program had both a significant budget and jobs impact because replacing old, but functioning equipment in existing facilities with new energy efficient equipment required significant incremental installation labor. Contrast that with the Commercial New Construction program, which had limited job impacts despite its significant budget. New Construction pays the customer's incremental cost of opting for higher efficiency, impacting the customer's choice of materials, equipment, and construction techniques, but does not significantly increase amount of labor and time needed to construct the building.

Another factor influencing the number of FTEs associated with program spending is whether energy efficiency measures installed, on a per dollar spent basis, are more labor intensive or equipment intensive. For example, weatherization materials (e.g., cellulose insulation, caulking, foam) to improve thermal performance and reduce air leakage in residential buildings (i.e. for installed insulation and air sealing) are simple and inexpensive. Most of the cost associated with weatherization is for labor during the installation process. Other energy efficiency measures such as energy management controls systems, chiller and boiler replacement, or major HVAC upgrades deploy sophisticated, factory-manufactured equipment where the equipment is perhaps the greatest portion of the measure cost. While these measures often require design engineering as well as field labor to install, the considerable manufacturing labor hours is not represented in program FTE counts, so the FTEs per dollar spent is lower.

A counteracting force in terms of job impacts of National Grid supported energy efficiency continues to be the importance of cost-effectiveness of program design and the ongoing desire of regulators and program administrators to increase and maximize the energy saved for each dollar spent. National Grid uses competitive bidding where practical to secure materials and labor vendors, requiring would-be contractors to devise strategies to "tighten their belts" and structure their workforce evermore cost effectively. Contractors are increasingly paid a fixed fee for services or compensated based on performance, encouraging them to keep their labor costs down, not only to be more competitive, but also to maximize margins. A vendor delivering a program or performing an installation who is not compensated on an hourly basis naturally looks for ways to maximize worker productivity, resulting in less labor required overall to achieve energy reduction goals and fewer FTEs for Peregrine to count.



## Comparing 2016, 2015, 2014, and 2013 FTEs

Over the past four years, National Grid’s program designs have remained relatively constant, except for the expanding use of Upstream-type strategies. Observed changes in year-to-year job impacts mostly reflect adjustments to program budgets, new marketing initiatives that have increased customer and trade ally participation, weather and energy prices, and opportunities created by emergence of new energy efficient products.

### FTE Job Impacts by Market Sector: 2016, 2015, 2014, and 2013

	2016 FTEs	2015 FTEs	2014 FTEs	2013 FTEs
<b>Electric Programs</b>				
Residential Non-Income Eligible	104.0	125.4	109.0	98.8
Residential Income Eligible	42.3	37.0	38.6	24.1
Commercial and Industrial	241.1	210.0	199.5	142.6
<b>Gas Programs</b>				
Residential Non-Income Eligible	159.3	172.1	178.0	159.1
Residential Income Eligible	41.4	43.8	42.5	34.9
Commercial and Industrial	36.1	32.0	27.0	30.3
<b>Community Action Agency staff</b>	38.0	34.0	32.5	30.7
<b>National Grid staff</b>	39.9	41.6	38.9	38.5
<b>TOTAL RHODE ISLAND FTE JOBS</b>	<b>702.2</b>	<b>695.8</b>	<b>666.1</b>	<b>558.9</b>

Peregrine counted or calculated 702 full-time equivalent jobs or “FTEs” attributable to National Grid’s energy efficiency program spending in 2016. This modest increase over the 696 FTEs identified in 2015 maintains the historic trend of job impact growth since 2013. While total numbers of FTEs identified were very similar in 2016 and 2015, Peregrine found there were significant gains and losses in total jobs associated with individual market sectors.

#### *Residential Non-Income Eligible*

Peregrine has seen in past years that total FTEs in the residential sector, generally associated with installation of energy efficiency measures to manage heating costs, can vary significantly year-to-year. In 2016, Peregrine calculated a 12% decrease, 35 FTEs, in jobs associated with both electric and gas programs targeting the Residential Non-Income Eligible market sector. Demand for EnergyWise Single Family building audits was down (likely due to lower energy costs and the



mild winter in 2016 compared to the previous year), resulting in less field labor needed to evaluate residences and prepare work orders; and installation contractor labor also declined as the number of both single family and multifamily customers proceeding with weatherization and heating system replacements fell, again perhaps reflecting the lower fuel prices and warmer winter weather.

#### *Residential Income Eligible*

For the Residential Income Eligible sector, combined gas and electric FTEs increased by around 4%, approximately 3 FTEs. In addition, energy staffing at Community Action Agencies increased, totaling 38 FTE, 10% above 2015 and up over 25% compared to 2013. Budgets and installation services for 1-4 unit income eligible residences were up for both gas and electric customers as an increased number of low-income residential customers received free weatherization services and new heating systems. The electric program showed a combined net FTE increase for the combined Residential Income Eligible market, single family and multifamily, of 14% (5.3 FTEs) in 2016 compared to 2015. On the other hand, installation of weatherization materials in income eligible multifamily buildings, largely gas-heated, was lower than in 2015, resulting in a net decline of just over 2 FTEs associated the Residential Income Eligible gas programs.

#### *Commercial and Industrial*

In 2016, the Commercial and Industrial sector showed a net increase of 35 FTEs (14%) over 2015 for gas and electric programs combined. Despite a fall-off in Electric Program installations and related FTE jobs associated with the Small Business Direct Install program, there was a net Electric Program Commercial and Industrial sector increase of 30 FTEs (almost 15%). This was driven by a 20% (40 FTE) increase associated with Large Commercial Retrofits. Some of this increase associated with the Large Commercial Retrofit program is attributable to Peregrine's undercounting in prior years of sales and project management staff of installation contractors. This is described in more detail in the methodologies section included as Attachment A of this report. Commercial and Industrial FTEs associated with gas programs also increased by 4 FTEs (12%) in 2016, reflecting increased program activity and savings realized.

National Grid has continued to expand the opportunities for trade allies to initiate projects with their existing or new commercial and industrial customers, supported by direct access to National Grid incentives. In both the Large Commercial Retrofit electric program and Large Custom Retrofit gas program, installation contractors and equipment suppliers, often assisted by program facilitators engaged by National Grid (i.e. RISE Engineering, CLEAResult, and Leidos Engineering), have driven the identification, acceptance, and installation of energy efficient projects. Likewise, through the Commercial Upstream Lighting, electrical contractors have been able to use the discounted pricing of products available from lighting distributors to convince customers to replace standard efficiency lighting with high efficiency product, further driving the LED market transition.



## Conclusions

The numbers of FTE jobs associated with the implementation of energy efficiency services should remain stable during the coming years as long as qualifying customers can be found and motivated to participate in National Grid programs, opportunities for equipment retrofits remain cost-effective for customers and National Grid, and funds are committed to energy efficiency improvement. While the numbers of customers who can be identified to participate in programs and the level of National Grid spending will, of course, affect the numbers of workers involved in energy efficiency activities and the FTE jobs that result, there are other factors in play that will dampen or increase such jobs over time.

- Markets are limited in size, and the cost of securing customers will increase as market penetration levels grow, potentially causing installation companies rethink their business strategies and retrench and shrink their workforce or exit certain markets altogether.
- Changing energy costs will affect customer behaviors, encouraging or discouraging customer interest in investing in energy efficiency improvements.
- Continuing evolution of and price drops for energy technology, as has been demonstrated by the emergence and growth of LED lighting, could create new cost-effective installation opportunities for energy efficient products. In the case of LEDs, the availability of low-cost LED linear lamps in the last year has resulted in an opportunity to replace all existing linear fluorescents and re-opened a huge, labor-intensive lighting retrofit market that had been maxed out by the limits of fluorescent technology.
- Program design adjustments that further encourage all natural trade allies to make use of incentives available from National Grid, enabling them to sell products and services to existing and new customers, could lead to increases in FTEs.



## Attachment A: Methodologies used for Assessing Employment

### Program Support Service Providers

#### **National Grid**

National Grid provided to Peregrine a summary of billed hours and FTE counts for employees involved with individual energy efficiency programs in Rhode Island in 2016. Responsibilities of these employees included program planning and development, program administration, regulatory affairs, marketing, evaluation, and market research. Peregrine is reporting National Grid FTEs as a separate category for purposes of this study and not allocating them to specific programs or groups of programs.

#### **Support Services Contractors**

Peregrine interviewed most of the larger contractors who supported National Grid in these activities, and they described their roles and responsibilities and provided counts and hours for employees supporting National Grid in Rhode Island. Often, the FTEs Peregrine is reporting represent the aggregation of small numbers of hours by numbers of employees. Often, this was because the contractor's role was required contributions from many members of a multi-disciplinary team. Depending on the nature of the services provided and whether the support role could be associated with specific programs, time of these contractors is assigned to programs according to the overall allocation of gas and electric spend by program sector (Residential, Residential Income Eligible, Commercial and Industrial), or allocated to a specific program sector.

### Direct Service Providers

Employee numbers reported by Direct Service Providers was a primary input to FTE counts. Peregrine interviewed the major contractors directly engaged by National Grid to support or deliver Rhode Island programs to get information about type, number, and responsibilities of personnel employed. Some of these contractors provided the same services in 2016 to National Grid customers in multiple states and in some cases to multiple utilities, often using the same team of employees. Peregrine relied on their informal calculations of allocations of time to Rhode Island when formally reported hours from time cards were not available.

Where employer-sourced information on employment was not available, Peregrine relied on program records and statistics for 2016 to calculate person-hours, person-days, and ultimately annual full time equivalent field staff. Peregrine used totals for individual energy efficiency measures installed or, in some cases, total dollar value of categories of projects completed in 2016 to calculate FTEs. Depending on the information available, Peregrine would multiply the average time required (in person-hours or person-days) for each installation by the number of



installations and converting the result to FTEs based on an assumed 1,760 work hours per year or 220 work days per year. These unit-based installation times were secured from representative installation companies that performed this work or from organizations that supervised installation activity. In other cases where the only information available was total project cost, Peregrine would estimate the labor cost component of projects and determine total hours required for installations using average hourly billing rates, again converting those total hours into annual FTEs. Finally, in cases where major employers could provide actual installer hours of work to Peregrine, those actual hours or days of work were used instead of calculated FTEs.

## **Residential Programs**

### ***EnergyWise 1 – 4 Unit Residential Program***

For the EnergyWise Residential program, RISE Engineering's program manager provided to Peregrine an overview of how the program functions and any changes from 2015, as well as updated FTE counts of RISE employees in various roles based on payroll tracking. Peregrine then allocated this total number of FTEs to gas and electric programs, using the relative size of National Grid electric and gas budgets as the basis for these allocations.

In 2014, RISE had shared general rules of thumb with Peregrine concerning how weatherization contractor crews and heating contractors perform site work. These typical installation scenarios were borne out by direct interviews with installation companies, as well as by interviews with Community Action Program supervisors with similar responsibilities for low-income residential services. Peregrine has continued to use these rules of thumb in 2016 to estimate numbers of FTE insulation and heating system contractor personnel that installed major energy efficiency measures.

Peregrine assumes it takes a weatherization crew made up of three insulation specialists an average of two days to complete an insulation and air sealing job. National Grid provided counts of numbers of weatherization jobs completed in 2016. We then used the total numbers of insulation jobs and the average number of man-days required for each installation to calculate a total number of FTEs (again, assuming work 220 days per person per year) providing insulation services in 1-4 unit buildings. FTEs were marked up by 20% to account for a contractor's support and management staff.

For heating system installations, we assume that it takes a two-person team four days on average to remove and replace a hydronic heating system. Peregrine secured counts of high efficiency heating systems and related equipment installed in 2016 from Blackhawk Engagement Solutions, which processes the incentives paid out for these installations. Since Peregrine had received differentiated counts for replacements furnaces and boilers, Peregrine assigned less installation time to replacement furnaces (due to less piping work) and adjusted time estimates



accordingly. Replacement residential gas equipment was allocated to the gas program and replacement residential oil or propane heating equipment was treated as an expense of the electric program. We multiplied average total hours required for an installation by the total number of items installed. The total number of calculated hours was then divided by 1,760 hours to convert it to FTEs, and the FTEs were marked up by 20% to account for a contractor's support and management staff.

### ***EnergyWise Multifamily Residential Program***

As with the EnergyWise 1-4 Unit Residential Program, Peregrine interviewed RISE's program manager and was provided with staffing counts. In addition to general program supervision, responsibilities included technical leadership, auditing, field coordination and inspections, and electrical installation work. Again, RISE was able to convert staff counts to FTEs associated with this particular program. Peregrine relied on installation counts from National Grid to determine numbers of individual measures that had been installed by independent weatherization contractors and heating contractors in these buildings. As was the case for contractors installing measures in 1 to 4 unit buildings, these counts were multiplied by average times for installations in hours or portions of hours, and the resulting total hour counts were divided by 1,760 hours per FTE to arrive at annual FTE counts.

### ***Residential New Construction***

#### ***Residential Home Energy Report Program***

#### ***Residential Community Based Initiatives***

#### ***ENERGY STAR® HVAC Program***

For each of these programs, there was no significant incremental labor impact associated with product installed or purchased because the program did not so much affect whether product was installed as it did which product was installed. Peregrine generated FTE counts through interviews with contractors that facilitated these programs and provided support services (e.g. marketing assistance, informational mailings, technical assistance, trade ally training, quality assurance inspections). These businesses provided staffing counts for 2016 from their accounting records. Total FTEs were then allocated to gas or electric based on the ratio of spending in each residential gas and electric program.

#### ***ENERGY STAR® Lighting***

#### ***ENERGY STAR® Products***

Both of these programs were funded solely through the residential electric budget. For both programs, there was no significant incremental labor impact associated with amount of product installed or purchased. Further, retailers' staff engaged at the point-of-sale were not counted as incremental FTEs. Peregrine generated FTE counts through interviews with individual contractors engaged by National Grid to supply services in support of the programs. These



businesses provided staffing counts for 2016 from their accounting records. Total FTEs were then allocated to the residential electric spend.

## **Low Income Residential Programs**

### ***Income Eligible 1-4 Unit Residential***

FTE counts for this program for 2016 include program management staff by the program vendor CLEAResult, Community Action Program (CAP) agency staff counts, and calculated labor required to complete installations. CLEAResult staff FTE counts came from direct interviews with CLEAResult's program manager. We determined CAP agency energy staffing for each of the six agencies operating in Rhode Island with the assistance of CLEAResult and then aggregated them to establish the statewide Community Action Agency staff count. CLEAResult also provided counts of weatherization and heating system installations completed in 2016. Peregrine used CAP agencies guidance on contractor crew sizes and installation practices to calculate the numbers of FTE installers who performed this work.

### ***Income Eligible Multifamily Residential***

Peregrine used the same approach to calculating FTEs for the Income Eligible Multifamily program as for the EnergyWise Multifamily Residential Program since both programs were administered by RISE Engineering and used the same delivery strategy.

## **Commercial and Industrial Programs**

### ***Small Business Direct Install Program***

Peregrine used counts of employees provided by RISE Engineering, the regional program administrator, to generate FTEs for RISE staff involved in program management and measure installations and for their sub-contractors as well. No actual measure counts and calculated FTEs were used to compile job counts attributable to the work of RISE and its subcontractors, as all workers were accounted for without a piecework analysis. Peregrine also calculated additional FTEs associated with the "customer-directed option" (or "CDO") that allowed customers to use an electrician they had an existing relationship with to install program measures and receive the same incentives as were available through RISE. These numbers were based on information from RISE about numbers of electrical contractors that were active through CDO and the numbers of customers they work with and then cross-tabulated installation time that would be required for actual items installed.



## ***Large Commercial Retrofit Program (electric)***

### Installations

As described in the section on energy program delivery, the Large Commercial Retrofit program was the most market-based of all electric programs provided. Customers initiated projects, as did businesses that had products or services they were trying to sell. Installations included prescriptive lighting, motors and drives, compressors, and HVAC control measures. FTEs for installation work was calculated in a number of ways, depending on which and how much information was available to Peregrine in the data sets supplied by National Grid. For prescriptive Large Commercial Retrofit installations that were part of a specific technology group (e.g. lighting, drives), we used installed item counts to generate total installation times or total project cost to generate labor cost estimates and converted this information to FTEs. For larger, more complex custom projects, where installed material counts might not be available or no separate total cost for projects was identified, Peregrine used incentive amounts paid by National Grid to tease out the total efficiency project cost. This required comparing incentives paid for simple projects with incentives paid for complex custom projects to determine the larger projects' size. Once the total dollar value of the project was determined, we could apply assumptions about the ratios of labor cost to material cost for different technologies, calculate the type and number of labor hours this represented, aggregate the total hours, and convert them to FTEs.

Upstream Lighting-related installations were rolled into the Large Commercial Retrofit FTE counts. Peregrine calculated the FTEs required for installations by electrical contractors that purchased these materials through Upstream on behalf of customers, taking counts of product purchased by the contractor, applying per unit labor times, and then calculating the total FTEs for installations.

### Sales and project management

As in past years, Peregrine interviewed the larger Project Expeditors to get counts of sales and project management staff they were employing in 2016 to secure and oversee projects. Reflecting on those interviews, Peregrine realized that, in past years, we had not accounted for sales and project management personnel that were employed by other installation contractors active in Large Commercial Retrofits. To remedy this undercounting for 2016, Peregrine extrapolated the sales and project management staffing identified for Project Expeditors to calculate numbers of like staff employed by other installation contractors. This extrapolation used the total dollar value of Large Commercial retrofit projects installed by PEX and by other contractors under to estimate the additional sales and project management staff employed by the other installation contractors. This added 24 FTEs to the total employee count.



### Engineering support

For engineering support services provided to commercial customers, Peregrine used the recorded payouts for technical assistance services provided in 2016 to calculate workforce FTEs. National Grid provided engineering services to customers through retained contractors, in particular where “custom” energy efficiency solutions required technical support to determine what could be done, what should be done, what energy savings would result, and what incentive levels were appropriate. To calculate the FTEs associated with technical assistance support provided by engineers under contract to National Grid, Peregrine took the total dollars paid out for this work and calculated how many hours of labor it represented at an assumed \$120 per hour. Total hours were then converted to FTEs. Finally, for the Smart Grocer and Industrial initiatives, Peregrine interviewed and secured staff counts from CLEAResult and Leidos Engineering.

### ***Commercial and Industrial Gas Programs***

For Commercial and Industrial Gas programs managed by RISE Engineering, Peregrine interviewed RISE to secure counts of RISE employees and FTEs. A variety of contractors installed energy efficiency measures installed and much of this work was done under the Large Custom Retrofit program. Due to a lack of specific details about the cost of these projects, Peregrine relied on statistics about incentives levels paid to develop order of magnitude estimates of total project costs for labor and equipment and then conservatively calculated hours of installation labor and total FTEs assuming an average labor rate of \$100/hour.



## Attachment B: Interview Guide

### National Grid 2016 RI Labor Study Organization Interview Guide

Interview date:

National Grid Program:

[Program overview/Targets/How delivered/Program volumes in 2016]

Supplier company/organization [with primary address]:

Interviewee/position/phone/email:

Company role (i.e. services provided):

How long has company been involved in the program? \_\_\_\_

Location(s) of office(s) providing services and activities: \_\_\_\_\_

RI based staff?: Yes/No.      Head count? \_\_\_\_\_

Changes from prior year(s):

Employees? More/Less \_\_\_\_\_

Payroll hours? More/ Less \_\_\_\_\_

Customers served? More/ Less \_\_\_\_\_

Revenue? More/ Less \_\_\_\_\_

Other? \_\_\_\_\_

Staff assigned:

[Title/Role/Name	Count/FTEs	Compensation (salary, hrly, piece, commission)]
1		
2		
3		
4		
5		
6		
7		
8		



Sub-contractors used?

[Name/Address	Roles	comp type	Add'l contact info]
---------------	-------	-----------	---------------------

1

2

3

4

Are there installation contractors involved in service delivery to Nat Grid customers?

[Name/Address	Roles	comp type	Add'l contact info]
---------------	-------	-----------	---------------------

1

2

3

4

Does Program result in increased employment in RI or additional hours for RI contractors?Additional comments:

## Attachment C: Participating Companies

The list includes contractors and subcontractors performing work directly for National Grid Energy Efficiency programs in 2016 that were counted in the FTE analysis and additional companies who assisted customers to secure equipment rebates, for example through the New Construction, High Efficiency HVAC programs, and upstream lighting. The list also includes the Community Action Program agencies and their subcontractors involved with the delivery of the low-income program, whether under National Grid funding or WAP/LIHEAP/ARRA funding.

Of the 923 companies, agencies, contractors and sub-contractors listed here, 759 (82%) are either headquartered in Rhode Island, or have a physical presence in Rhode Island. The list is organized first by state (alphabetically), and then alphabetically by company name. To find the Rhode Island companies, move to the first appearance of “RI” in the far right column.

<b>Vendor</b>	<b>Town</b>	<b>State</b>
Association of Energy Services Professionals	Phoenix	AZ
Accurate Background, Inc.	Irvine	CA
Bigspeak Inc.	Santa Barbara	CA
Crownpeak Technology	Los Angeles	CA
PLMA	Vallejo	CA
Regency Lighting	Chatsworth	CA
E Source Companies LLC	Boulder	CO
FridgeTek Inc.	Carbondale	CO
Skumatz Economic Research Associates	Superior	CO
All-phase Electric Supply/Consolidated Electrical Distributors	Windsor	CT
AMS Greensolutions LLC	Willington	CT
Efficient Lighting Consultants	Newtown	CT
JK Muir LLC	Durham	CT
Richard Electric	Putnam	CT
Upland Construction Group	North Stonington	CT
Vandale Rd Electric Co Inc.	North Stonington	CT
Wattsaver Lighting Products Inc.	East Hartford	CT
American Council for an Energy-Efficient Economy	Washington	DC
Energy Solutions Center	Washington	DC
Smartpower	Washington	DC
A Led Lights LLC	Jacksonville	FL
Apollo Lighting	Fort Lauderdale	FL
Express Lighting, Corp.	Melbourne	FL
Pro. Unlimited Inc.	Boca Raton	FL
Hill Phoenix Inc.	Conyers	GA
LIGHTFAIR International	Atlanta	GA
National Energy Educational Development Need	Manassas	GA



Innerworkings Inc.	Chicago	IL
3-D Lighting	Franklin	MA
A & M Electrical Mechanical, Inc.	Fall River	MA
ACA NE	North Attleboro	MA
Action Inc.	Fall River	MA
Ahaesy Electric	Fall River	MA
Alternative Weatherization, Inc.	Fall River	MA
Andelman and Lelek Engineering Inc.	Norwood	MA
Appel Electric Co Inc.	Norwood	MA
Automated Building Systems, Inc.	Southborough	MA
B2Q Associates Inc.	Andover	MA
Baraby Electric	Fall River	MA
Baystate Energy Reduction	Sutton	MA
Beaupre Electric	Assonet	MA
Boston E Lab Inc.	Winchester	MA
Boston Light Supply, Inc.	Lynn	MA
Boston Scientific Corporation	Quincy	MA
Bristow Electric	Attleboro	MA
Bruin Corp	North Attleboro	MA
Bulbs.Com	Worcester	MA
Carlos A Magina Electrical Inc.	Seekonk	MA
Charles H Furman Electrician	North Attleboro	MA
Commonwealth Electrical	Worcester	MA
Compressed Air Technologies Inc.	Shutesbury	MA
Conservation Services Group Inc.	Westborough	MA
Consolidated Marketing Services	Burlington	MA
Consortium For Energy Efficiency	Boston	MA
Conventures Inc.	Boston	MA
CoolGreenPower LLC	Concord	MA
Da Melo Electric And Controls	North Dartmouth	MA
David J. Black Electric, LLC	Bellingham	MA
David Rossman	Westwood	MA
DMI	Wellesley	MA
Dorrance Electric, Inc.	Rehoboth	MA
Drolet Electric	North Attleboro	MA
Ecast Video LLC	Boston	MA
Ecova Inc.	Boston	MA
Efficient Buildings LLC	Bridgewater	MA
Electric Supply Center	Mansfield	MA
ENE Systems Inc.	Canton	MA
Energy & Resource Solutions Inc.	North Andover	MA
Energy Federation Inc.	Westborough	MA



Energy Machinery Inc.	Rockland	MA
EnergySavvy Inc.	Cambridge	MA
EnerNOC Inc.	Boston	MA
Fort Hill Companies	Boston	MA
G Feigo Electric Co	Westport	MA
GH Electrical Service	Attleboro	MA
Glynn Electric	Plymouth	MA
Graybar	Boston	MA
Greenleaf Associates Inc.	Weston	MA
Hannon Electric Inc	South Easton	MA
I.N.O Electric Service	Walpole	MA
IBM Corp.	Cambridge	MA
ICS Corp.	Tyngsborough	MA
Independent Electric Supply	Somerville	MA
Insulate 2 Save	Fall River	MA
J Lafretta Electric	North Attleboro	MA
James Cordeiro Jr Electrical Services	Fall River	MA
Jason Roia Electrical	Fall River	MA
John Landry Electrician	Somerset	MA
Jones Lang LaSalle Construction	Boston	MA
KEMA	Burlington	MA
Litemor	Norwood	MA
Lockheed Martin	Burlington	MA
Main Stream Mechanical	Amesbury	MA
Mike Bell Electrician	Seekonk	MA
Motus LLC	Boston	MA
National LED Distributors	Milton	MA
National Resource Management	Canton	MA
Navigant Consulting, Inc.	Boston	MA
NESCO (Needham Electric Supply)	Canton	MA
New England Energy Management Inc.	Leominster	MA
Nexant Inc.	Burlington	MA
NMR Group Inc.	Somerville	MA
Noble Electric, Inc.	Holliston	MA
Northeast Efficiency Supply (NES)	Sutton	MA
Northeast Energy Efficiency Partnerships	Lexington	MA
O'Brien & Neville Inc.	Holliston	MA
Opinion Dynamics Corporation	Waltham	MA
Opterra Energy Services	Norwell	MA
Oracle America	Cambridge	MA
Peregrine Energy Group	Boston	MA
Ralco Electric Inc.	Westport	MA



Raymond D. Melanson Electric	Swansea	MA
Raymond Melanson Electric	Swansea	MA
Raytheon Company	Waltham	MA
Reis Electric	Westport	MA
Rethinking Power Management	Boston	MA
Retrofit Insulation	Fall River	MA
River Energy Consultants	Fall River	MA
Robshaw Electric	Holliston	MA
Ryan Suart Electric	Fall River	MA
Sacks Exhibits	Wilmington	MA
Savio Lighting	Needham	MA
Standard Electric	Wilmington	MA
Steam Trap Systems	Amesbury	MA
Superior Energy Solutions	Swansea	MA
Swanson Construction	Attleboro	MA
Tabors Caramanis Rudkevich	Boston	MA
The Cadmus Group Inc.	Waltham	MA
The Symphony Of Light	Dedham	MA
TNZ Energy Consulting Inc.	Stoughton	MA
Veolia ES Technical Solutions LLC	Boston	MA
W R Plamondon Electrical Co	Westport	MA
Wiedenbach-Brown	Norwood	MA
WIPRO LTD.	Quincy	MA
ANTARES Group Inc.	Lanham	MD
APTEC LLC	Bethesda	MD
Earth Networks Inc.	Germantown	MD
Boyko Engineering Inc.	Gorham	ME
Douglas C Baston	Alna	ME
ARCA , Inc.	Hopkins	MN
PlotWatt	Durham	NC
Carter Events Plus LLC	Hampton	NH
Daniels Equipment Co Inc.	Auburn	NH
IMMI (International Marketing Management, Inc.)	Portsmouth	NH
National Energy and Light, Inc.	Nashua	NH
Clear Energy LLC	Bloomfield	NJ
CMC Energy Services Inc.	Cranbury	NJ
Ideas Agency Inc.	Blairstown	NJ
SHI International Corp.	Somerset	NJ
CDH Energy Corp.	Cazenovia	NY
Goldstein & Lee, P.C.	New York	NY
Illuminating Engineering Society	New York	NY
Integrated Marketing Services Inc.	Liverpool	NY



Ram Marketing	Saint James	NY
SPPRO Inc.	Bronx	NY
Questline Inc.	Columbus	OH
Research Into Action, Inc.	Portland	OR
Real Winwin Inc.	Philadelphia	PA
2 Sons Electric LLC	East Providence	RI
A & A Management	Providence	RI
A & C Burner Service HVAC	East Providence	RI
A & I Electric	Pawtucket	RI
A & L Plumbing Mechanical and Consulting	Westerly	RI
A & M Compressed Air Products Inc.	Providence	RI
A E Costa Electrical Contractor LLC	Warwick	RI
A Good Plumber	Hope	RI
A Perry Plumbing and Heating	Coventry	RI
A Plumbing and Heating	East Providence	RI
A.R. Heating and Cooling Inc.	Providence	RI
A1 Electrical Construction LLC	North Providence	RI
Able Electric, Inc.	Warwick	RI
ABM Enterprises Inc.	Exeter	RI
Ace Electric	Providence	RI
Aceto Plumbing LLC	Cranston	RI
Acme Electric Inc.	North Providence	RI
ACR Construction and Management Corporation	JOHNSTON	RI
Adams Plumbing and Heating	West Warwick	RI
Adell Construction LLC	Cranston	RI
ADJ Realty, Co.	Providence	RI
Advance Electrical Corporation	Providence	RI
Advanced Comfort Systems Inc.	North Smithfield	RI
Affordable Building and Weatherization, Inc.	East Greenwich	RI
Affordable Heating and Air Conditioning Services	Providence	RI
AFM Electric, LLC	Pascoag	RI
AIA and Sons Construction	Warwick	RI
Air Metalworks Ltd	North Providence	RI
Air Quality LLC	Warwick	RI
Air Tech Heating and Air Conditioning	Rumford	RI
Air Temp	Riverside	RI
Aire Serv Heating and Air Conditioning	Pawtucket	RI
Airhart Electric Inc.	Coventry	RI
AJS Plumbing and Heating	North Providence	RI
Aladdin Electric Co. Inc.	Johnston	RI
Alan Jerauld	North Providence	RI
Alan Menard Plumbing LLC	Pawtucket	RI



Alan Paul Electric	Warwick	RI
Albert S Koenig Electrician	Pawtucket	RI
All In One Plumbing Heating and Cooling	West Warwick	RI
All Phase Heating Concepts	Woonsocket	RI
All Points Construction	Riverside	RI
All Seasons Heating and Air Inc.	Johnston	RI
All Star Insulation	Providence	RI
Allen Plumbing and Heating	North Providence	RI
Allied Electrical Group	Providence	RI
Allied Fuel	Providence	RI
Alpha Electrical Contractors Inc.	Riverside	RI
Alpha Mechanical	East Providence	RI
AMCO Inc.	Woonsocket	RI
American Development Institute Inc.	Warwick	RI
American Electric Service Inc.	Cranston	RI
AMERITEST	North Providence	RI
Amity Electric	Wyoming	RI
AMS Development	Portsmouth	RI
AMTROL Inc.	West Warwick	RI
Anchor Plumbing and Heating Company Inc.	Providence	RI
Andrew R McMahon Electrician	Lincoln	RI
Angelo DeFeo	Providence	RI
Antaya Technologies	Warwick	RI
Anthony Berard	Cumberland	RI
Anthony Handyman	Woonsocket	RI
Anthony's Quick Plumbing and Heating	Johnston	RI
Antonio J Improta LLC	Cranston	RI
Anytime Plumbing Service	Harrisville	RI
APB Plumbing and Heating	Cumberland	RI
Apple Valley Alarms	North Scituate	RI
APuzzo Plumbing and Heating	North Scituate	RI
AR Heating and Cooling Inc.	Cranston	RI
Arden Engineering Constructors LLC	Pawtucket	RI
Ardente Supply Co., Inc.	Providence	RI
Arkwright Inc.	Fiskeville	RI
Arthur W Adler	Bristol	RI
Aten Energy	Pawtucket	RI
Atlantic Control Systems	Exeter	RI
Atlantis Comfort Systems Corp	Smithfield	RI
Attaboy Electric LLC	Clayville	RI
Auburn Electric Company	Cranston	RI
Autiello Plumbing and Heating LLC	Cranston	RI



Automatic Heating Equipment Inc.	Providence	RI
AZ Corporation	Hopkinton	RI
B & B Consumers Natural Gas Service	Woonsocket	RI
B & K Electric, LLC	Cranston	RI
B & L Mechanical LLC	Woonsocket	RI
B Hughes Builders, Inc.	Barrington	RI
Baptista Electric	Cumberland	RI
Barlow Heating LLC	Warwick	RI
Barrington Plumbing and Heating	Barrington	RI
Bashaw Electric	East Greenwich	RI
Baum Energy	Warren	RI
Baynes Electric	Westerly	RI
Bayside Electric Company	Warwick	RI
Beacon Electric	East Providence	RI
Beauchemin Design	North Smithfield	RI
Berard Heating and Mechanical	Warwick	RI
Bermudez Plumbing and Heating	Pawtucket	RI
Bert Gardiner Plumbing	Charlestown	RI
Best Buy	Warwick	RI
Biello Electric Co	Fall River	RI
Bileau HVAC Inc.	Woonsocket	RI
Bill Gardiner Plumbing and Heating LLC	East Providence	RI
Bill Gornostai Electric	Warwick	RI
Bill The Plumber	North Smithfield	RI
Bills Heating Service Inc.	Warwick	RI
Blackstone Valley Community Action	Pawtucket	RI
Bob Larisas Plumbing and Heating Inc.	Barrington	RI
Bob Martel Plumbing and Heating	Central Falls	RI
Boiler Works	Coventry	RI
Boulevard Plumbing and Heating	Middletown	RI
Brada Manufacturing, Inc.	Warwick	RI
BRH Electric	East Providence	RI
Brian's Fire Alarm System Solutions, LLC	North Smithfield	RI
Brian's Heating Concepts, Inc.	Tiverton	RI
Briteswitch LLC	Warwick	RI
Brittain Electric Inc.	Jamestown	RI
Brookside Electric	Westerly	RI
Bruno & Son Electric Inc.	Providence	RI
Bryant's Lemme	Coventry	RI
BSH Heating and Appliance	Barrington	RI
BT Electric Company, Inc.	Glocester	RI
Buckley Heating and Cooling	Peace Dale	RI



Buono Electric	Johnston	RI
Burbanks Plumbing and Heating, Inc.	North Kingstown	RI
Butler and Sons Plumbing and Heating, Inc.	Providence	RI
BZ Electric, Inc.	West Warwick	RI
C & K Electric Company Inc.	Providence	RI
C & L Energy Corp	Cranston	RI
C Carr Electric LLC	Cumberland	RI
C&A	Block Island	RI
C.S.V. Mechanical Inc.	South Kingstown	RI
Cal Supply Co., Inc.	Cranston	RI
Caldwell & Johnson Inc.	North Kingstown	RI
Calyx Retrofit	Lincoln	RI
Carbone Plumbing Heating and Air	Johnston	RI
Carello Plumbing and Heating	East Providence	RI
Carjon Air Conditioning and Heating Inc.	Smithfield	RI
Carlino Electric Inc.	Coventry	RI
Carnevale Electric	Johnston	RI
Carter Plumbing and Heating Co.	Warren	RI
Cassana HVAC LLC	North Providence	RI
CBRE	Providence	RI
CCF LLC	Warwick	RI
CD Heating Inc.	Cranston	RI
Cecil E Moore Jr Inc.	Coventry	RI
Century Heating	Smithfield	RI
Chabot Associates Inc.	North Kingstown	RI
Chaput & Feeney, LLP	East Providence	RI
Charles Burton	Lincoln	RI
Charlie's Heating LLC	North Kingstown	RI
Chris Smaldone Electrician	Providence	RI
Christian Urban Electric	Pawtucket	RI
Christopher McCaughey	Smithfield	RI
Cimini & Associates	Westerly	RI
CJ Morin Electric	Lincoln	RI
CJS Plumbing and Heating Specialists, Inc.	Smithfield	RI
Clearesult	Providence	RI
Clermont Mechanical Plumbing & Heating Services	Glendale	RI
CMAGS Heating and Air Conditioning	Warwick	RI
Coast Modern Construction	Providence	RI
Coastal Electric Inc.	Newport	RI
Cobra Electric and Compaction Services, Inc.	Providence	RI
Cohen Heating Supply, Inc.	Providence	RI
Colaluca Plumbing and Heating	Johnston	RI



Comfort Systems, Inc.	Coventry	RI
Comfort Zone Inc.	Hopkinton	RI
Commercial and Residential Services	Johnston	RI
Commercial Electric, Inc.	East Providence	RI
Community Action Partnership of Providence	Providence	RI
Comprehensive Community Action	Cranston	RI
Computer Sciences Corporation	Warwick	RI
Construction Maintenance Services, Inc.	Lincoln	RI
Conti Brothers Inc.	Providence	RI
Continental Heating and Cooling Indoor Air Quality	Johnston	RI
Cooley Incorporated	Cranston	RI
Cotoia Electric	Johnston	RI
Cox Electric LLC	Narragansett	RI
Craig R Committo Electrician	Tiverton	RI
Cross Insulation	Cumberland	RI
Crown Supply Company Inc.	Providence	RI
Crystal Plumbing and Heating Inc.	Providence	RI
CSV Mechanical Inc.	Wakefield	RI
Custom Comfort	Woonsocket	RI
CW Cummings Plumbing Co.	Coventry	RI
D & D Electric Company	East Greenwich	RI
D & E Electric, Inc.	Warwick	RI
D & J Electric Corporation	Warwick	RI
D & J Plumbing and Heating Inc.	Cumberland	RI
D & L Service Inc.	Coventry	RI
D & S Construction Company	Lincoln	RI
D C ELECTRIC Co LLC	West Warwick	RI
D. Costa Electric Company LLC	East Providence	RI
D'Ambra Construction Co Inc.	Coventry	RI
Danfoss LLC	Johnston	RI
Danico LLC	North Providence	RI
Daniel Simoes Electric	Exeter	RI
D'antuono Electrician	Chepachet	RI
David Iannucci Electrician	Providence	RI
David J Loren	Warren	RI
David J O'Brian Electrician	North Kingstown	RI
David Seddon Electrician	Rumford	RI
David R Gince Electrician	Woonsocket	RI
Dayco Electric	Warwick	RI
DC Plumbing	Warwick	RI
Deal Electric	East Greenwich	RI
Degnan Plumbing and Heating	North Providence	RI



Delmonico Enterprises -Plumbing and Heating	Cranston	RI
Delta T	Warwick	RI
Desimone Electric	Cranston	RI
Desmarais Plumbing and Heating Inc.	Johnston	RI
Dessaint Electric Co Inc.	Warwick	RI
DiGregorio and Sons, Inc.	North Kingstown	RI
Dimery Electrical	Barrington	RI
Dionne and Sons	Coventry	RI
Dionne's Plumbing Systems	Cumberland	RI
Diorio Plumbing and Heating, Inc.	Barrington	RI
Direct Home Improvement	West Greenwich	RI
DiRocco Plumbing Services LLC	North Providence	RI
Donald Fournier Electrician	Providence	RI
Donald E. Lemay Electrician	Bristol	RI
Donovan and Sons Inc.	Middletown	RI
DPS Plumbing and Heating	Hope	RI
Drivers Plumbing and Mechanical Inc.	Providence	RI
DS Plumbing	Coventry	RI
DSA Mechanical	Barrington	RI
DSC Heating and Air Conditioning	North Kingstown	RI
DSL Properties, LLC	North Kingstown	RI
Dual Voltage Electric LLC	Johnston	RI
Dubes Plumbing	Woonsocket	RI
Dupuis Energy	Pawtucket	RI
Durante Electric	Lincoln	RI
DWI Group Ltd	Johnston	RI
Dynamic Air Systems Inc.	East Providence	RI
EA Marcoux and Son, Inc.	Woonsocket	RI
Eagle Electric	Ashaway	RI
East Coast Electric	Johnston	RI
Eastbay Community Action	Riverside	RI
Eastern Electric	Cranston	RI
Eastern Plumbing Co Inc.	North Kingstown	RI
Echo Electrical	Richmond	RI
Ecologic Spray Foam Insulation Inc.	Jamestown	RI
Econ Electric Contractors	Bristol	RI
Edward C Silva Plumbing and Heating	Middletown	RI
EG Electric Co.	East Greenwich	RI
EJM Electric	Middletown	RI
EKCO Tech Services LLC	Chepachet	RI
ELCO Electric Services Corporation	Cranston	RI
Electrical League of RI	Warwick	RI



Electrical Solutions	Providence	RI
Electrical Technologies	Providence	RI
Electrical Wholesaler Inc.	Cranston	RI
Elwin Palmer Electrician	Providence	RI
Emanuel Freitas	Pawtucket	RI
Emergency Response Plumbing Heating and Air Conditioning	Warwick	RI
Energiwise Inc.	East Providence	RI
Energy 4 Life Building Performance LLC	Smithfield	RI
Energy Conservation Inc.	South Kingstown	RI
Energy Efficient Exteriors, Inc.	Lincoln	RI
Energy Efficient Plumbing Technologies	Cranston	RI
Energy Electric Co, Inc.	Woonsocket	RI
Energy Geeks	North Smithfield	RI
Energy One Southern Mechanical	West Warwick	RI
Energy Source LLC	Providence	RI
Eurotech Climatesystems LLC	Pawtucket	RI
Evans	East Providence	RI
Eveready Electric	Barrington	RI
Evergreen Plumbing and Heating Co., Inc.	Warwick	RI
F & S Electric Inc.	Bristol	RI
Falcon Hydonics	West Kingston	RI
Feula Plumbing and Heating LLC	Johnston	RI
FG Lees and Son Plumbing and Heating	Providence	RI
Fico Electric	Johnston	RI
Figliozzi Plumbing and Heating	Wakefield	RI
Fletcher Heating Burner Repairs	Ashaway	RI
FLOU PHCC First Quality Installations	Saunderstown	RI
Forcier Electrical	Cumberland	RI
Foster Electric, Inc.	Tiverton	RI
Foundry Associates	Providence	RI
Frank Flowers Electric	Cranston	RI
Frank Knight Plumbing and Heating	Warwick	RI
Frank Lombardo and Sons Inc.	Providence	RI
Frontier Mechanical LLC	Providence	RI
Fullport Plumbing and Heating	Rumford	RI
Furtado Lighting & Design LLC	Bristol	RI
G & B Electric	Exeter	RI
G & L Electric Inc.	Woonsocket	RI
G Hill Plumbing and Heating, Inc.	Westerly	RI
G M Perron and Son Plumbing and Heating	North Smithfield	RI
G Marc Electric	Pawtucket	RI
G. Gagnon & Sons Ltd	Cumberland	RI



Gambit Electric Inc.	Johnston	RI
Gary Fernandes Electrician	Woonsocket	RI
Gary Ficca Electrician	North Smithfield	RI
Gas Doctor	Providence	RI
Gas Master Inc.	Little Compton	RI
Gasman NC	Warwick	RI
GASTECH	Cranston	RI
Gem Plumbing and Heating Services Inc.	Lincoln	RI
George Gaulin Electrician	Cranston	RI
Ginos Plumbing	Warwick	RI
Giorno Plumbing and Heating	Cranston	RI
Globex Industries Inc.	Narragansett	RI
GM Control Systems Inc.	North Smithfield	RI
GM Perron and Son Plumbing and Heating	North Smithfield	RI
Grace Construction LLC	Providence	RI
Granite City Electric	Pawtucket	RI
Gravel Electric Inc.	Harrisville	RI
Greenwich Insulation	West Greenwich	RI
Greenwood Plumbing and Heating	Warwick	RI
Gregg Balchette	North Smithfield	RI
Griff Electric LLC	Portsmouth	RI
Grillo Electric	Ashaway	RI
Gronski Plumbing and Heating, Inc.	Cranston	RI
Groom Energy Solutions	Providence	RI
Guy Clermont Plumbing and Heating	Cranston	RI
H & R Electric Contractor Inc.	Greenville	RI
Haley & Aldrich, Inc.	Providence	RI
Hawkes Plumbing and Heating Co Inc.	Chepachet	RI
HD Supply Facilities Maintenance	Warwick	RI
Heat Corporation	Warwick	RI
Heat Tech LLC	Warwick	RI
Henderson Electric	Warwick	RI
HF Robinson and Sons Plumbing and Heating	Cranston	RI
HH Heating	Lincoln	RI
Hill Electrical Services	Cumberland	RI
HK Heating Inc.	Greene	RI
HMC Construction LLC	Bristol	RI
Hodson Heating and Cooling	Harrisville	RI
Holland Electric	Peace Dale	RI
Horizon Solutions LLC	Smithfield	RI
Houle Plumbing and Heating	Greene	RI
Howard Saucier	Pawtucket	RI



HR Electrical Contractor Inc.	Providence	RI
Hughes Incorporated	North Kingstown	RI
Hutchins Electric	Greenwich	RI
Hynson Electrical Construction Inc.	Bristol	RI
Iasimone Plumbing-Heating & Drain Cleaning Inc.	North Providence	RI
Industrial Burner Service Inc.	Providence	RI
Innovative Plumbing and Heating Inc.	North Providence	RI
Interstate Electrical Services	Warwick	RI
Invensys Ene Inc.	Rumford	RI
Iron Mountain	Chepachet	RI
Iroquoian Plumbing and Heating	Providence	RI
Island Plumbing and Heating	Jamestown	RI
Izzo & Sons Electric	Providence	RI
J & A Electric	Providence	RI
J & J Electric	Warwick	RI
J & M Plumbing LLC	Coventry	RI
J Argenti & Sons Electric LLC	Johnston	RI
J D Electric	Cranston	RI
J Dasilva Plumbing and Drain Cleaning	Pawtucket	RI
J Fernandes HVAC	Cumberland	RI
J Joyce Plumbing and Heating Inc.	Warwick	RI
J Mac Plumbing and Heating	Warwick	RI
Jacks Electric Inc.	Jamestown	RI
Jacob Messier	Warwick	RI
Jacobson Energy Research LLC	Providence	RI
Jaedyn Construction and Restoration	Warwick	RI
James Rattray	Westerly	RI
Janton Electric Contractors	West Warwick	RI
Jatwire Electric LLC	Tiverton	RI
Jay Almeida Electrician	Johnston	RI
JC Electric Inc.	Wakefield	RI
JD Mechanical Inc.	Greenville	RI
JDV Electric	Cranston	RI
Jeff Berard Plumbing and HVAC	Warwick	RI
Jeffrey Reynolds	Westport	RI
JEM Construction Group, LLC	North Scituate	RI
Jenkins Heating	Smithfield	RI
Jeremy J Laury	Johnston	RI
Jerold M Weisman & Company	Warwick	RI
Jim Kelley Electrician	Warwick	RI
Jim Silvia Electrician	Tiverton	RI
JJ McNamara Electric	Providence	RI



JKL Engineering Company Inc.	Providence	RI
JMAC Plumbing and Heating Inc.	Warwick	RI
JN Jordan Plumbing LLC	Shannock	RI
JO Plumbing Septic and Drain Cleaning	Warwick	RI
Joe Chaves Heating and Plumbing	Middletown	RI
Joe Diorio Electric	Pawtucket	RI
Joe Lemay Electrician	Lincoln	RI
Joe the Plumber	Warwick	RI
Joe Vigneault Electrician	Riverside	RI
John Jackson	Cumberland	RI
John R Bileau HVAC	Woonsocket	RI
John Simard Electric Contractor	North Smithfield	RI
Johnny Home Solutions LLC	Central Falls	RI
Johnny Mack Electric	Narragansett	RI
Johnny's Oil and Heating Inc.	Providence	RI
Johnson and Johnson Plumbing and Heating Inc.	Saunderstown	RI
Johnston Electric Inc.	North Scituate	RI
Joseph Benoit	North Providence	RI
Joseph Botelho Electrician	Cranston	RI
Joseph Britto Jr.	Warwick	RI
Joseph C. Lopes II	Portsmouth	RI
Joseph Giorno Plumbing and Heating	Cranston	RI
Joseph Palomino Heating and Cooling	Richmond	RI
Joseph Piasczyk	Coventry	RI
Joseph Soave	North Providence	RI
Joseph Truppi Electric	Cranston	RI
Joseph RJ Lussier Electric	North Kingstown	RI
Joshua B Tait Electric	Riverside	RI
Jouberts Heating and Air Conditioning	Warwick	RI
Joun Strafach & Sons	Westerly	RI
JP Island General Services	Middletown	RI
Just Heat	Portsmouth	RI
Kafin Oil Company Inc.	Woonsocket	RI
KBA Contracting	Pawtucket	RI
KCCNE	Providence	RI
Kelly Electric	Cumberland	RI
Kens Heating	Providence	RI
Kent Country Electrical Services	Warwick	RI
Kevin Messier Electrical	Cumberland	RI
Kirkbrae Electric	Lincoln	RI
KME Electric, Inc.	Woonsocket	RI
Kwik Plumbing and Heating, Inc.	Johnston	RI



L & B Remodeling	North Providence	RI
L & F Plumbing Inc.	Cranston	RI
L & M Construction & Realty, LLC	Cranston	RI
LAD Electric LLC	Providence	RI
Lain Electric Co	Providence	RI
Lakeside Electric	Chepachet	RI
Lamplighter, Inc.	Little Compton	RI
Lance Plumbing and Heating	Scituate	RI
Landry and Martin Oil Co Inc.	Pawtucket	RI
Langan Plumbing and Heating	Woonsocket	RI
Larry Giorgi Plumbing and Heating Inc.	North Providence	RI
Lawrence Air Systems Inc.	Barrington	RI
Ledoux Electric	North Kingstown	RI
Lees Plumbing and Heating	Providence	RI
Leidos Engineering	Newport	RI
Leveille Electric	Smithfield	RI
Lighthouse Contracting Services	Johnston	RI
Lightning Electric	Riverside	RI
LJ Giorgi Plumbing and Heating, Inc.	North Providence	RI
Lombardo Electric Company	Warren	RI
Loom Studios	East Providence	RI
Luis Anastacio Electrician	East Providence	RI
Luke Beaudreault Plumbing and Heating	North Smithfield	RI
Luso Plumbing and Heating Inc.	Cumberland	RI
M & G Correias Plumbing and Heating Supplies	East Providence	RI
M & M Electric	Richmond	RI
M.J. Bouchard Heating and Air Conditioning	Greenville	RI
Madden Electric	Little Compton	RI
Maggiacomo Plumbing, Inc.	Cranston	RI
Magnetic Electric Inc.	Warwick	RI
Malone Plumbing and Heating Inc.	Cranston	RI
Manfredo Electric	Warwick	RI
Mansfield Heating, Inc.	East Greenwich	RI
Map Electric	Woonsocket	RI
Marciano Electrical Contractors	West Warwick	RI
Marinelli & Sons Electric	West Kingston	RI
Marisa Desautel	Providence	RI
Mark D'Andrea Electric, LLC	Portsmouth	RI
Mark Southwork Maintenance	Johnston	RI
Marsh Builders Inc.	Cumberland	RI
Martel Plumbing and Heating	Lincoln	RI
Martone Service Company	Narragansett	RI



Massed Electric Company	Warren	RI
Mastro Electric Supply Co Inc.	Providence	RI
Mastrocinque and Sons Plumbing and Heating LLC	Portsmouth	RI
Matt Electric	Greene	RI
Matthew A Marchetti	Cranston	RI
Matts Mechanical	Greenville	RI
Max & Jason Enterprises	Providence	RI
McCormick Electrical	North Kingstown	RI
McDonough Electric LLC	West Warwick	RI
MDR Enterprises LLC	Middletown	RI
Menard Electric	Manville	RI
Metro Electric	Woonsocket	RI
MH Electric	Cranston	RI
Michael - Rae Design LLC	Wyoming	RI
Michael Bowry	Cranston	RI
Michael Chace Electrician	Johnston	RI
Michael Freitas Plumbing and Mechanical	Pascoag	RI
Michael Moura	Riverside	RI
Michael R Lafleur	Smithfield	RI
Miller Mechanical Inc.	Rumford	RI
MJ Electric and Refrigeration	Pawtucket	RI
MJF Plumbing and Heating	Bristol	RI
MO Refrigeration	Warwick	RI
MoonWorks	Woonsocket	RI
Morgan Electric	Warwick	RI
Morra Electric Inc.	Johnston	RI
MP Samsky Corp.	North Smithfield	RI
Mr. Plumber LLC	East Providence	RI
Mr. Rooter Plumbing	Warwick	RI
MRC Electric	Woonsocket	RI
Multi State Electric Co.	North Providence	RI
Mutual Engineering Service Company	Warwick	RI
NAPPI Bros.	Bristol	RI
Nasons Heating Cooling Sheet Metal	Middletown	RI
Nathan Cordeiro Electrician	Cranston	RI
National Refrigeration Inc.	Warwick	RI
New England Boilder Works	Coventry	RI
New England Insulation	Woonsocket	RI
New England Plumbing Heating and Air LLC	Greenville	RI
Newport Electric	Portsmouth	RI
Newport Plumbing and Heating Gas Company	Portsmouth	RI
NGB Electric	Smithfield	RI



Nicholas Electric	Cranston	RI
Nightingale Heating	Providence	RI
Nolin Electric Incorporated	Providence	RI
Nordic Company Inc.	Riverside	RI
North Scituate Electric, Inc.	North Scituate	RI
Northeast Building Solutions	Cumberland	RI
Northeast Electrical Distributors	Cumberland	RI
Northern Electric	Harrisville	RI
Northern Energy Services Inc.	Providence	RI
Northern Power Electrical Services	North Scituate	RI
Ocean State Air Solutions	Portsmouth	RI
Ocean State Electric	Johnston	RI
Ocean State Mechanical, Inc.	Fiskeville	RI
O'Dowd Electric	Warwick	RI
Old Tyme Electric, Inc.	Pawtucket	RI
Omni Electric	Wakefield	RI
On Point Restoration LLC	Richmond	RI
O'Neil Electric Company	Warwick	RI
Optimal Energy	Providence	RI
P & S Electric Inc.	East Greenwich	RI
Pajan Services Inc.	North Providence	RI
Pariseault Builders Inc.	Warwick	RI
Parrella Electric	Providence	RI
Patrick Corrigan	Warwick	RI
Patrick Cunningham Electrician	Smithfield	RI
Patriot Plumbing and Heating	Coventry	RI
Paul Buono	Johnston	RI
Paul Manfredo Electric	Warwick	RI
Paul Musco	Cranston	RI
Paul Scotto Electrical	Portsmouth	RI
Paul G. Amaral Electrician	Tiverton	RI
PECI	Portsmouth	RI
Pellegrino Plumbing and Heating	Westerly	RI
Pemlico Plumbing	Warwick	RI
Percivalle Electric Inc.	Warwick	RI
Perrino Electric	Cranston	RI
Peter Bibby	Providence	RI
Peter Chilabato Sure Power Electrical	Portsmouth	RI
Peter Rodriques Electrician	Pawtucket	RI
Petes Electric Company Inc. .	Westerly	RI
Petro Home Services	Warwick	RI
Petronelli Plumbing and Heating	Cranston	RI



Pettee Electrical Contractor	Chepachet	RI
Petterson Electric	Warwick	RI
Phalanx Engineering, Inc.	Warwick	RI
Philips Precision Plumbing LLC	Greene	RI
Phillip J Bolster Plumbing and Heating	Wakefield	RI
Phillips Plumbing and Mechanical Inc.	Cranston	RI
Phil's Heating and Air Conditioning	Westerly	RI
Phoenix Property Management	Pawtucket	RI
Piazza Enterprises LLC	West Warwick	RI
Pickles Plumbing and Heating LLC	Mapleville	RI
Pinnacle Plumbing and Heating	Greenville	RI
Plumb Perfection	Johnston	RI
Plumbing and Heating by Joe Gruttadauria	Johnston	RI
Plumbing and Heating Solutions LLC	East Greenwich	RI
Potvin Enterprises Inc.	Warwick	RI
Power By Design Electrical Contracting LLC	Richmond	RI
Power Trip Electric Inc.	Hope	RI
Powercomm Systems	Warwick	RI
Pratt Plumbing and Heating LLC	Harrisville	RI
Precision Power	Wyoming	RI
Premair HVAC	Warwick	RI
Preventive Maintenance Solutions	Warwick	RI
Priority Plumbing and Heating Inc.	Providence	RI
Protect All Security Systems	Warwick	RI
Providence Mechanical Services LLC	Smithfield	RI
Quinn Electric, Inc.	Coventry	RI
R & G GENERAL CONTRACTING	CENTRAL FALLS	RI
R & J Manufacturing Company	Johnston	RI
R & M Electric Inc.	Coventry	RI
R.E. Coogan Heating Inc.	Warwick	RI
Ralph E Geiselman Plumbing and Heating	Pawtucket	RI
Ralph Ferra Plumbing	North Smithfield	RI
Rama Electric	Wakefield	RI
Ramos Electric	Providence	RI
Randall B Ayers	Warwick	RI
Ray Gagnon Electric, Inc.	Lincoln	RI
Ray lasimone Plumbing	Johnston	RI
Raymond J Reinsant Plumbing and Heating	Lincoln	RI
RB Queern Co.	Portsmouth	RI
RC Plumbing and Heating	North Providence	RI
RCS Energy Services	Providence	RI
RD Construction	Cranston	RI



Reddy Piping Concepts Inc.	Cranston	RI
Regan Heating & Air Conditioning Inc.	Providence	RI
Regent Electric CO Inc.	Coventry	RI
Reliable Electric Corp.	Coventry	RI
Reliant Electric	Cranston	RI
Renaissance Sheet Metal LLC	Cranston	RI
Renewable Energy Solutions LLC	Warwick	RI
Resendes Heating Service LLC	Coventry	RI
Restivos Heating and Air Conditioning	Johnston	RI
Rexel Energy Solutions (Munro Distributing)	Cranston	RI
Rhode Island Builders Association	East Providence	RI
Rhode Island Insulation	Hope	RI
Rhode Island Sheet Metal LLC	Pawtucket	RI
Rhodes Technologies Inc.	Coventry	RI
Rhody Electric	Warwick	RI
RI Property MGT	Providence	RI
RI Rooter and Plumbing, Inc.	Johnston	RI
Ricci Electric	Cranston	RI
Richard Brochu	Manville	RI
Richard Gayer Electric	Bristol	RI
Richard Havey	Warren	RI
Richard J. Martino Jr	Smithfield	RI
Right View Electric. Inc.	East Providence	RI
Rightway Electric, Inc.	Providence	RI
Rise Engineering	Cranston	RI
Ritacco Electric LLC	Westerly	RI
RMS Ruggieri and Sons Mechanical LLC	Richmond	RI
RN Electric	North Providence	RI
Robert Davignon	Warwick	RI
Robert Dionne Electrical Contractor	Providence	RI
Robert E Bang Plumbing and Heating	Lincoln	RI
Robert F Audet Inc.	East Greenwich	RI
Robert Perrino Electric	Cranston	RI
Robert Rachiele Electrician	Coventry	RI
Robert Squizzero Plumbing and Heating	Cranston	RI
Robert Sweet HVAC	Warwick	RI
Roberts Electric	Pawtucket	RI
Robinson Plumbing Supply	Pawtucket	RI
Roland M Belanger Plumbing and Heating	Pascoag	RI
Roland Richard	Slatersville	RI
Ronald Vento Electrician	Johnston	RI
Ross Landy Electrician	Portsmouth	RI



Rossi Electric Company	Cranston	RI
Roy Lacroix	West Warwick	RI
RR Donnelley & Sons	North Kingstown	RI
Rumford Mechanical Systems LLC	Rumford	RI
Russ Lembo Electrician	Johnston	RI
Ryan Electric Construction	Warwick	RI
S & K Electric Inc.	Charlestown	RI
S & S Electric	Chepachet	RI
S. Desmarisais Plumbing and Heating	Johnston	RI
S.B. Carbone Plumbing and Heating Company Inc.	Cranston	RI
Sakonnet Plumbing and Heating Inc.	Little Compton	RI
Sal Manzi and Son Plumbing and Heating Inc.	Cranston	RI
Sam Bliven Jr Plumbing & Heating Inc.	Westerly	RI
Sanford Electric	Bristol	RI
Santoro Oil Company Inc.	Providence	RI
Santurri Electric	East Greenwich	RI
Sasa Mechanical Contractors Inc.	Johnston	RI
Savard Oil Company Inc.	East Providence	RI
Schneider-Electric	Kingston	RI
Schwegler and Sons Plumbing and Heating Inc.	North Smithfield	RI
Scott D Horne Electric	Burrillville	RI
Scott Gatta Electric	Johnston	RI
Seekonk Supply Inc.	Providence	RI
Sensible Air	Riverside	RI
Sensible Heating and Air Conditioning LLC	Hope Valley	RI
Shamrock Electric	Middletown	RI
Shamrocks Plumbing	Pawtucket	RI
Sharpe Building Associates, LLC	Providence	RI
Sheridan Electric Inc.	Warwick	RI
Siemens Industry	Cranston	RI
Simon Olean	Portsmouth	RI
Simon's Supply	Pawtucket	RI
Sine Plumbing and Heating Co Inc.	East Providence	RI
Social Enterprise Inc.	Providence	RI
Sosa & Son Heating Air Conditioning & Refrigeration	Woonsocket	RI
South County Community Action	North Kingstown	RI
South County Gas Service	Narragansett	RI
Speeby Plumber	Johnston	RI
Spencer's Plumbing	North Kingstown	RI
Stable HVAC Service and Installation	Pawtucket	RI
Standish Heating and Air Conditioning	Coventry	RI
Stanton Electric, Inc.	Cumberland	RI



Stateside Precision Group, LLC	Newport	RI
Statewide Construction Corp	Providence	RI
Statewide Insulation	North Smithfield	RI
Statewide Plumbing and Heating Co Inc.	Cranston	RI
Stedman & Kazounis Plumbing and Heating	Charlestown	RI
Stem Electrical	Warwick	RI
Stephen Andrea Fire & Electric, LLC	Coventry	RI
Stephen Larochelle	Cumberland	RI
Stephen Mellen	Wakefield	RI
Steven Cacia Electrician	Providence	RI
Steven Maymon	Warwick	RI
Steven P Marandola	West Warwick	RI
Suburban Electrical	Providence	RI
Sullivan & McLaughlin	Greenville	RI
Summit Electrical Contractors Inc.	Lincoln	RI
Sunshine Fuels and Energy Services, Inc.	Bristol	RI
Superior Comfort Inc.	Bristol	RI
Superior Electric	Providence	RI
Superior Fire & Electrical Services	North Providence	RI
Superior Insulation	Narragansett	RI
Superior LED Light Solutions	Warwick	RI
Superior Plumbing and Heating	Cranston	RI
Supply New England	Pawtucket	RI
SW & Sons Plumbing & Heating	Johnston	RI
Swajian and Son	Cranston	RI
Sylvander Heat and AC	East Greenwich	RI
Sylvania Lighting Services	Johnston	RI
Symmes Maini & McKee Asso	Providence	RI
T & T Construction	Providence	RI
T & T Plumbing and Heating Inc.	Hope Valley	RI
T Gomes Heating and Cooling	Warwick	RI
T. Murphy Electric	Cranston	RI
T.A. Gardiner Plumbing & Heating Inc.	Bristol	RI
Taco Comfort Solutions	Cranston	RI
TD Plumbing Co.	East Providence	RI
Tebano Electric	Bristol	RI
Tebo Electric Inc.	Woonsocket	RI
The Moore Company	Westerly	RI
The Plumber Company LP	Cranston	RI
Thermal Home Energy Solutions	Cranston	RI
Therrien Mechanical Systems	Lincoln	RI
Thielsch Engineering	Cranston	RI



Thomas P McGee Plumbing and Heating	North Smithfield	RI
TIM Inc.	Rumford	RI
Tom Whitaker	Newport	RI
Toms Plumbing LLC	Manville	RI
Toner Electric Company	Middletown	RI
Tops Lighting (Electric Supply Company)	Providence	RI
Total Comfort Heating and Cooling Inc.	Lincoln	RI
Total Construction Services Inc.	Providence	RI
TPF Electrical Services	Pawtucket	RI
TR Electric Inc.	Ashaway	RI
TRC Companies, Inc.	Providence	RI
Tri-Town Community Action	North Providence	RI
Tuma Insulations	Warwick	RI
UG Nasons Inc.	Middletown	RI
Universal Electric CO Inc.	Warwick	RI
US Electrical Services	Cranston	RI
Valcourt Heating Inc.	Tiverton	RI
Valley Heating and Cooling Inc.	Hope Valley	RI
Valley Plumbing and Heating	Kingston	RI
Valmer D Montoya Air Heating and Cooling Inc.	Central Falls	RI
Van's Electric Inc.	Bristol	RI
Vaughn Oil Company Inc.	Smithfield	RI
Venco Electric LLC	Cranston	RI
Ventura Construction	Middletown	RI
Vicmir & Sons Heating and Air Conditioning Controls	Riverside	RI
Viking Electric Inc.	Providence	RI
Vintage Plumbing	Riverside	RI
Vivona Plumbing and Heating Inc.	Portsmouth	RI
VSP Plumbing and Heating Inc.	West Greenwich	RI
W Francis Plumbing and HVAC	Bristol	RI
W.W. Grainger, Inc.	Warwick	RI
Wakefield Heating Service	Wakefield	RI
Waldo Plumbing and Heating LLC	Lincoln	RI
Wayne Electric Inc.	Bristol	RI
Wayne Fernandez Electrician	Providence	RI
WESCO Distribution Inc.	Smithfield	RI
Westbay Community Action	Warwick	RI
Wickford Appliance and Lighting Inc.	Pawtucket	RI
William Calia Electrician	Johnston	RI
William Francis	Bristol	RI
William J Riley Plumbing and Heating	Warwick	RI
Woods Heating Service	East Providence	RI



Wordell Heating & Cooling LLC	Little Compton	RI
WR Construction Inc.	Providence	RI
WSCHB LLC	Warwick	RI
Zawadzki Plumbing and Heating Inc.	Warwick	RI
Zompa Plumbing and Heating	Warren	RI
Calco Electrical Services	Greenville	RI
Calson Corporation	Johnston	RI
David McMullen DBA Mister Sparky	Portsmouth	RI
Blackhawk Engagement Solutions	Lewisville	TX
Compressed Air Challenge	Alexandria	VA
Opower Inc.	Arlington	VA
Kelliher Samets Volk	Burlington	VT
Vermont Energy Investment Corporation	Burlington	VT
New Buildings Institute Inc.	White Salmon	WA





**Attachment 6**  
**2016 RGGI Auction Proceeds Report**

**Rhode Island**  
**Regional Greenhouse Gas Initiative, Inc. Auction Proceeds**  
**2016 Year End Report**  
**Presented by National Grid**  
**May 1, 2016**

## **Introduction**

From the beginning of the Regional Greenhouse Gas Initiative (RGGI) through December 2, 2015, Rhode Island (RI) has received approximately \$48 million from CO2 Allowance Auctions.<sup>1</sup> To date, the State has created allocation plans for auction proceeds occurring through December 2, 2015. As of August 11, 2016, National Grid received \$24.7 million of those funds in order to expand energy efficiency (EE) efforts throughout the state (See Table 1).

This report provides results for RGGI funds spent during National Grid EE Program Year 2016. The results from prior allocations of RGGI funds have been described in prior Year End Reports.

## **Lowering the System Benefit Charge**

Under the OER's 2015 Plan for the Allocation and Distribution of Regional Greenhouse Gas Initiative Auction Proceeds, the Company received \$3,588,674 to lower the ratepayer System Benefit Charge. Per this requirement, these funds were allocated across Residential, Income-Eligible, Commercial and Industrial electric efficiency programs managed and delivered by National grid. The Company incorporated this funding into its Energy Efficiency Program Plan for 2016 (Docket No. 4580), which is shown in Table E-1 as a reduction in total customer funding required.

The \$3,588,674 in RGGI funds used to lower the 2016 System Benefit Charge provides tremendous benefits to Rhode Island. Without this funding the overall electric program budget would have been reduced by 4%. The lower funding would have resulted in a loss of 7,990 MWh savings; 71,697 MWh lifetime savings; and \$8 million in benefits to ratepayers.

## **Agriculture**

The 2013 RGGI Plan allocated \$200,000 and the 2015 Plan allocated another \$100,000 to provide energy efficiency rebates to commercial businesses, including the agricultural sector, that use deliverable fuels (oil and propane) for heat. During the second quarter of 2015, \$5,700 was transferred from this initiative to the Community Buildings initiative to support high customer demand.

During the fourth quarter, two additional farms were sent summary proposals and the vendor is waiting for sign-offs. In addition, site visits were scheduled for three farms for site inspections. The Company anticipates it will be able to submit final savings on these farms by the first quarter of 2017.

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<sup>1</sup> Source: [http://www.rggi.org/market/co2\\_auctions/results](http://www.rggi.org/market/co2_auctions/results)

## **Residential Delivered Fuels**

During program year 2015, National Grid received \$1,500,000 for Residential Delivered Fuels. In May of 2016, the Company received \$1,000,000.96 from the 2016 RGGI Allocation Plan to complete additional projects.

At the end of the fourth quarter, the Company spent the total 2015 allocation of \$1.5 million and \$978,517 of the 2016 allocation on oil weatherization jobs.

To date, these funds have enabled the completion of 2,231 oil weatherization jobs, resulting in 39,238 MMBtu of oil savings and 556,752 kWh of electricity savings.

There is a balance of \$21,484.26 that will likely be spent in the first quarter of 2017.

## **Rhode Island Public Energy Partnership**

RIPEP builds on a Department of Energy Grant and is intended to help state agencies and local governments attain high levels of energy savings and improved building operations. The primary objectives of RIPEP are to:

- Create a comprehensive inventory of energy consumption in public facilities, both state and municipally owned or managed;
- Implement energy efficiency measures in approximately 100 facilities and attain an average of 20% energy reduction; and
- Identify and mitigate barriers to efficiency improvements in the public sector. Initial priority will be given to water supply facilities, schools, and state buildings, followed by other municipal facilities.

The 2012 Allocation Plan added \$1,515,851 for RIPEP, to be administered by National Grid. Of this amount \$500,000 was set aside for incentives and \$1,015,851 was placed into a revolving loan fund for on-bill repayment. In 2015, the Company received an additional \$1,000,000 for RIPEP. Of this amount, \$100,000 was added to incentives; \$800,000 was injected into the electric loan fund; and \$300,000 was used to set up a gas revolving loan fund.

As of year-end 2016, the on-bill repayment portion of RIPEP supported 19 applications by 5 municipal entities with \$544,772 in financing. These projects resulted in 1,388 MWh of savings. In addition, a total of \$401,340 was spent on electric incentives for 23 applications, equaling 1,065 MWh in electric savings.

For the RIPEP gas loan fund, no new loans were allocated in the fourth quarter. The 2016 year-end total for loans was \$8,261 to one municipal customer, creating 425.8 therms in gas savings.

**Table 1: Spending & Reporting**

Auctions	Received	EE Funding	Initiative	Budget	2011 Spend	2012 Spend	2013 Spend	2014 Spend	2015 Spend	2016 Spend	
1-5	March 2010	\$ 3,950,152	Program Spending	\$ 3,950,152	\$ 3,950,152						
	December 2010	\$ 2,633,434	Heat Loan	\$ 449,463	\$ 146,698	\$ 302,765					
			Homes Tier III Pilot	\$ 65,000	\$ -	\$ -					
			Deep Energy Retrofit Pilot	\$ 260,000	\$ 27,848	\$ 297,152*					
			Small Bus. Revolving Loan Fund	\$ 1,858,971	\$ 1,843,371	\$ 15,600					
6-10	January 2012	\$ 4,034,678	Small Bus. Revolving Loan Fund	\$ 2,300,000	n/a	\$ 2,300,000					
			Large Bus. Revolving Loan Fund	\$ 1,734,678	n/a	\$ 1,734,678					
11-14	August 2013	\$ 1,813,732	RI Public Energy Partnership	\$ 1,515,851							
			Loan Fund	\$1,015,851			\$ 1,015,851				
			Incentives**	\$ 417,340			\$ -	\$ -	\$ 401,340		
			Small Bus Community Bldgs	\$ 372,288			\$ 303,851	\$ 68,437			
15-18	February 2014	\$ 1,427,713	Residential Delivered Fuels	\$ 800,000			\$ 800,000				
			Agricultural Delivered Fuels	\$ 194,300			\$ 1,600	\$ 38,854	\$ 15,331		
			Small Bus Community Bldgs	\$ ***433,413			\$ 363,931	\$ 69,482			
19-22	January 2015	\$ 3,635,495	Lower 2015 System Benefit Charge	\$ 3,635,495				\$ 3,635,495			
23-28	October 2015	\$ 6,118,674	Lower 2016 System Benefit Charge	\$ 3,588,674						\$ 3,588,674	
			RI Public Energy Partnership	\$ 1,000,000							
			Electric Loan Fund	\$800,000							\$ 800,000
			Gas Loan Fund	\$100,000							\$ 100,000
			Incentives	\$100,000							
			Residential Delivered Fuels	\$ 1,500,000					\$ 1,199,867	\$ 300,133	
			Agricultural Delivered Fuels	\$ 100,000							
29-30	May 2016	\$ 1,000,001	Residential Delivered Fuels	\$ 1,000,001						\$ 978,517	
<b>Total</b>				<b>\$ 24,758,286</b>	<b>\$ 5,968,069</b>	<b>\$ 4,650,195</b>	<b>\$ 303,851</b>	<b>\$ 2,181,382</b>	<b>\$ 5,012,135</b>	<b>\$ 6,183,995</b>	
*Deep Energy Retrofit Pilot includes funds from Homes Tier III Pilot as detailed in the 2012 RGGI Report to OER											
**In May 2015, \$82,660 was transferred from RI PEP incentives back to the RI Office of Energy Resources for the Block Island project. 2016 Spend is a correction from the Q2 report.											
***In June 2015, \$5,700 was transferred from Agricultural Delivered Fuels to Small Business Community Buildings to meet high customer demand.											

**Table 2: Rhode Island Public Energy Partnership (RI PEP) Electric and Gas Loan Funds**

**Rhode Island Public Energy Partnership (RI PEP) Electric**

(1)	2016 Funds Available	\$993,365
(2)	Paid	\$544,772
(3)	Repayments	\$332,792
(4)	Participants	5
(5)	Savings (MWh)	1,388
(6)	<u>Available Year End 2016</u>	<u>\$781,385</u>

**Rhode Island Public Energy Partnership (RI PEP) Gas**

(1)	2016 Funds Available	\$100,000
(2)	Paid	\$8,261
(3)	Repayments	\$826
(4)	Participants	1
(5)	<u>Savings (MMBtu)</u>	<u>43</u>
(6)	<u>Available Year End 2016</u>	<u>\$92,565</u>

1 Funds available as of January 1, 2016

2 Loans initiated by Decement 31, 2016

3 Repayments received by December 31, 2016

4 Participants are unique customers

5 Savings in conjunction with the projects and loans.

6 Available funds as of December 31, 2016. Does not include projected repayments or fund injections to be made in 2017.