



Rhode Island Behavioral Program and Pilots Impact and Process Evaluation



Contact Name:

Anne Dougherty
Founding Advisor
ILLUME Advising, LLC
608 561 2019
anne@illumeadvising.com

Table of Contents

1. EXECUTIVE SUMMARY	4
1.1 PROGRAM AND PILOT DESCRIPTIONS	4
1.2 IMPACT FINDINGS	4
1.2.1 HER SAVINGS	4
1.2.2 NEW MOVERS INITIATIVE AND REWARDS AND THERMOSTAT PILOTS	6
1.3 PROCESS FINDINGS AND RECOMMENDATIONS	6
2. OVERVIEW OF THE EVALUATION	9
2.1 INTRODUCTION TO THE PROGRAM	9
2.2 EVALUATION GOALS	11
3. EVALUATION METHODOLOGY	13
3.1 OVERVIEW OF OUR APPROACH	13
3.2 INTERVIEWS WITH THE PROGRAM TEAM	13
3.3 IMPACT APPROACH	13
3.3.1 OPT-OUT HOME ENERGY REPORT (HER) IMPACT ASSESSMENT	14
3.3.2 HER NEW MOVERS IMPACT ANALYSIS METHOD	15
3.3.3 REWARDS PROGRAM IMPACT ANALYSIS METHOD	16
3.3.4 PROGRAMMABLE THERMOSTAT PILOT IMPACT EVALUATION METHODS	19
3.4 PARTICIPATION LIFT AND SAVINGS ADJUSTMENT FINDINGS	22
4. ELECTRIC HER IMPACT FINDINGS	25
4.1 ELECTRIC HOME ENERGY REPORT OVERVIEW	25
4.2 ELECTRIC HOME ENERGY REPORT IMPACTS	25
4.3 ELECTRIC HOME ENERGY REPORT IMPACTS - NEW MOVERS INITIATIVE	26
4.4 OPT-IN HOME ENERGY REPORTS	28
4.5 OVERALL ELECTRIC PARTICIPATION LIFT	28
5. GAS HER IMPACT FINDINGS	31
5.1 GAS HOME ENERGY REPORTS OVERVIEW	31
5.2 GAS HOME ENERGY REPORTS IMPACTS	31
5.3 GAS HOME ENERGY REPORTS IMPACTS – NEW MOVERS	32
5.4 OVERALL GAS PARTICIPATION LIFT AND SAVINGS FINDINGS	33
6. REWARDS PILOT IMPACT FINDINGS	36
6.1 OVERVIEW OF THE REWARDS PILOT	36
6.2 ELECTRIC REWARDS IMPACTS	38
6.3 GAS REWARDS IMPACTS	39

<u>7. SMART THERMOSTAT IMPACT FINDINGS</u>	40
7.1 OVERVIEW OF THE SMART THERMOSTAT PILOT	40
7.2 THERMOSTAT PILOT IMPACT RESULTS	41
<u>8. OVERARCHING PROCESS & DESIGN FINDINGS</u>	43

1. EXECUTIVE SUMMARY

Illume Advising, LLC (ILLUME) with subcontractor Navigant Consulting (Navigant) (henceforth the ILLUME Team), is pleased to present National Grid Rhode Island with our impact results for the Rhode Island Home Energy Reports Program (the program) and the associate rewards and thermostat pilots.

1.1 Program and Pilot Descriptions

The first of its kind, the Rhode Island Home Energy Reports (HER) program is administered across National Grid's entire Rhode Island customer base treating electric only, gas only and dual fuel customers. There are multiple program components as well as two pilot efforts, including the following: (1) home energy reports (HERs) offered to multiple population segments, (2) an initiative to offer HERs to new home owners, (3) an online web portal, (4) a rewards pilot offered to HER participants, (5) a programmable communicating thermostat (PCT) pilot offered to HER participants, and (6) mass media promotional and public relations activities. This evaluation focuses on the first five listed program components. The evaluation effort covers the first year of the program and pilot efforts implemented from April 2013-May 2014.

1.2 Impact Findings

The HER program efforts consisted of six total gas and electric treatment cohorts (or groups of customers): high usage electric only customers, gas only customers, dual fuel customers (those who have both electric and gas meters served by National Grid), and three new movers groups for electric only, gas only, and dual fuel customers. We summarize the impact findings below.

1.2.1 HER Savings

Below we present the savings for the core HER program cohorts, including electric and gas savings results obtained from the electric only, gas only, and dual fuel cohorts. Note these values do not include the savings associated with new movers, but do include any savings that were generated through the rewards and thermostat pilots (See the next section, 1.2.2 for more detail).¹

The HER program saved 20,066,543 kWh during the first 14 months of the program, amounting to .98% savings per household across the high usage electric only and dual fuel groups. Notably, the dual fuel electric metered households

¹ "New movers" are defined as those customers who have recently activated or reactivated an account with National Grid. This group was treated with a separate HER initiative described in more detail in Section 2.1, Introduction to the Program.

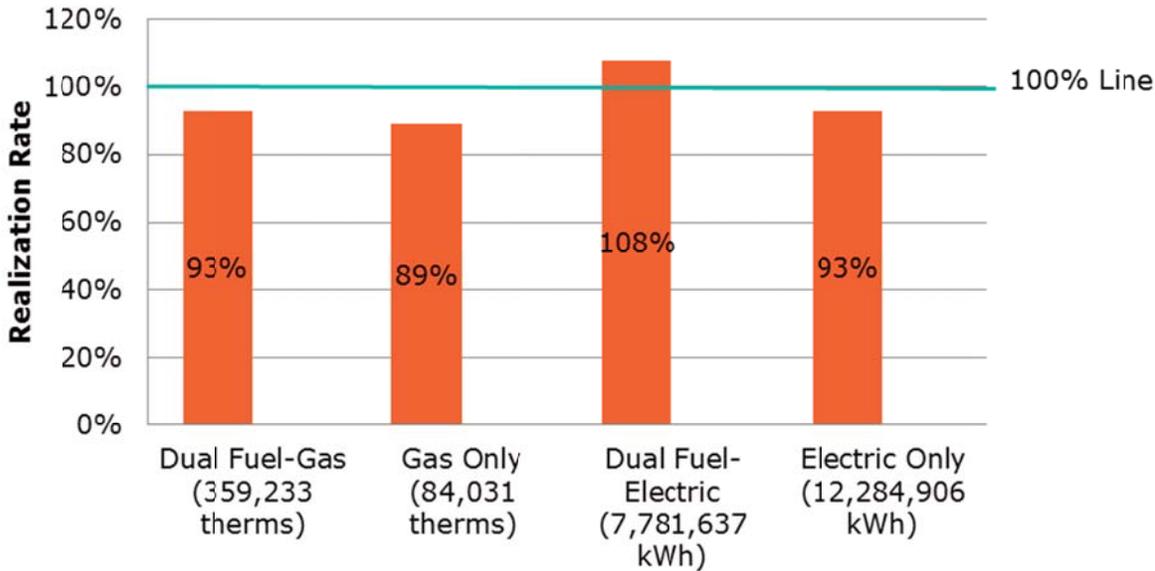
performed better than the electric only households on the realization rate, which measures the difference between the vendor estimate of savings and the evaluation estimate (Figure 1). At present, it is unclear what is driving those differences in savings performance.

The HER program saved 443,264 therms during the first 14 months of the program, amounting to .37% savings per household across the gas only and dual fuel groups. A number of factors contributed to the lower-than-expected savings for gas metered customers, including: (1) mistakes in the initial gas savings forecasts made by the program implementer, (2) fewer than expected dual fuel customers who contribute to the overall gas savings, and (3) a general tendency for gas HER programs to underperform relative to goal in the first year of the program due to a savings “ramp” effect.

Across fuels, there were very few channeled savings achieved through the HER program (savings due to participation in other program) with 695,735 kWh (3.35% of total HER savings) and 3,005 therms (.67% of total HER savings), generated through other programs. Notably, the majority of the cross-program savings were generated through the EnergyWise program.

The figure below demonstrates the Gas and Electric HER performance against the measured savings of the program implementer (in this case Opower). The goal of this ratio is to determine how greatly the savings measured by the third party evaluation vary from the savings measured by the implementation team.

Figure 1. Gas and Electric Savings Estimated Realization Ratios by Cohort*



*Note: Does not include results from the new movers initiative.

1.2.2 New Movers Initiative and Rewards and Thermostat Pilots

In addition to the core program, National Grid experimented with a new mover's HER initiatives as well as a rewards and thermostat pilot. Here, we present the results of these efforts.

The new movers initiative had small samples sizes at the time of the evaluation and thus statistically insignificant results. However, our best estimates of the initiative's effects is that the new movers initiative achieved .51% gas savings and electric usage increase of 0.83% per household total (52,193 therms and -716,522 kWh). The new movers initiative should be re-evaluated after a longer treatment period with the program implemented as originally designed.

The rewards pilot achieved .98% electric savings per household *in addition to the HERs* per household to total 520,741 kWh. Our best estimate of the gas rewards pilot is that it achieved .43% reduction incremental to the HERs and a savings of 8,345 therms, though the gas value is not statistically significant.² This total incremental savings is already accounted for in the total HER program savings values. However there is clear evidence that the rewards portion of the program is effective in generating savings above the HER treatment.

The best estimate of the *incremental* savings for the thermostat pilot is 2.31% in gas savings and .88% in electric savings per household, amounting to a total of 3,902 therms and 11,592 kWh overall. These values improve in the heating and cooling season. Notably, the electric and gas savings estimates improve in the cooling and heating season respectively³, with incremental electric savings at 2.42% in the cooling season and incremental gas savings at 2.35% in the heating season. To date, these values are statistically insignificant, but do provide an indicator of the incremental effect and value of the thermostat effort.

1.3 Process Findings and Recommendations

The RI HER program and pilots are, by design, aimed at targeting all National Grid customers in the state. In most HER programs nationwide, the program design focuses on high-energy users and does not treat new mover populations. As a result, the program and pilot's first year was largely exploratory; the program aimed to identify ways to successfully reach all of National Grid's customers as cost-effectively as possible. In the process, there have been a number of key process and design findings.

² The rewards pilot electricity impact was statistically significant while the gas impact was not. That said, these were the best, unbiased estimators of impact even though the 90% confidence interval around the gas estimate does include 0.

³ The cooling season is defined as June-August and the heating season as September-April.

A core mission for this program and its pilots is to enhance customer engagement and satisfaction across the state. While the program aims to generate savings associated with its efforts, National Grid also sought to increase customer engagement and satisfaction by providing enhanced service and support through the HERs, rewards, and thermostats. Overall, the program team has reported it has been successful in this respect.

The gas savings for the program underperformed due to a number of planning-related challenges. First, savings were overestimated due to errors in Opower's forecasting models and difficulties in successfully identifying dual fuel customers. Both of these issues have since been resolved in program plans. Further, the savings goals did not fully account for a traditional "ramping" year for gas programs. Often, gas programs do not achieve their expected savings in the first year. Since gas programs are heavily based on winter savings, they often need a year or two to ramp up to full savings. Finally, based on recommendations from the Massachusetts evaluation, National Grid modified the computation of gas savings to include months that have negative savings in the annual savings calculation.

- **Recommendation:** The program team should consider having implementer-derived savings forecasts reviewed by a third party in the future to avoid similar planning errors.
- **Recommendation:** The gas savings first year "ramp" should be factored into program decisions on whether or not to continue the program.

New movers definitions were too broad to inform a targeted outreach strategy. Due to customer data tracking limitations, new movers were identified broadly, including those who were new customers to National Grid as well as those who had delinquent and then reactivated accounts –two very different populations. National Grid now has an indicator in their customer database to distinguish true new movers from reactivations.

- **Recommendation:** Since this is a distinctive population not typically targeted by programs, we recommend examining this program again after it has been implemented as designed. We also recommend considering a strategy of outreach for delinquent and re-activated customers, who may benefit from the educational elements of the program.

Opt-in HER component did not generate enough interest to comprise an evaluable cohort. The opt-in component targeted lower electricity users, a group not typically included in opt-out programs. However, marketing and outreach efforts did not spur enough sign-ups to evaluate the program. National Grid concluded there was not enough interest to justify the cost and has discontinued the initiative within the HER program.

Program design and implementation details were not carefully documented. Fully interpreting and contextualizing impact and process analysis findings, particularly for a program with this complexity, requires understanding program design details.

- **Recommendation:** The program vendor should develop a single decision-making document and database to clearly delineate the program design and avoid loss of information over time due to staffing changes.

Randomized encouragement design (RED) design for opt-in efforts did not have sufficient participation levels, and statistical power, to be evaluable. The impacts of the rewards pilot were then calculated using a matching methodology, yielding similar results that were statistically significant for electric savings. The RED design may not be the best design for evaluating programs with small impacts and low participation levels.

- **Recommendation:** We recommend discontinuing the use of the RED design for the pilot rewards initiatives and using a matched comparison group for evaluation instead. Our results indicate the method is appropriate and accurate relative to the RED. Further, the matching method can support a territory-wide roll out of the rewards initiative if desired.