NAVIGANT

Home Energy Reports Program
GPY3 Evaluation Report

Final
Energy Efficiency Plan:
Gas Plan Year 3
(06/1/2013-05/31/2014)

Presented to
Peoples Gas and North Shore Gas

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E. Executive Summary

E.1. Program Description

The Peoples Gas and North Shore Gas Home Energy Report Program were designed to generate natural gas savings by providing residential customers with information about their specific gas use and related conservation suggestions and tips. The information is provided in the form of Home Energy Reports that illustrate: a) how customers' recent gas use compares to their use in the past; b) tips on how the customers can reduce gas consumption, some of which are tailored to each customer's unique circumstances; and c) information on how the customers' gas use compares to that of neighbors with similar homes. In other studies, this type of information has stimulated customers to reduce their gas use, creating average savings of around 1%, depending on local gas use patterns.

E.1. Key Findings

Table E-1 summarizes the gas savings from the HER Program.

Table E-1. HER Total Program Gas Savings for GPY3

Savings Category	Peoples Gas Savings (Therms)	North Shore Gas Savings (Therms)
Net Savings Goal	798,924	489,573
Ex Ante Net Savings*	1,956,895	668,202
Verified Net Savings, Before Uplift Adjustment	2,072,182	662,518
Verified Net Savings, After Uplift Adjustment	2,054,727	652,718

Source: Peoples Gas and North Shore Gas billing data, Opower implementation data, and Navigant analysis.
* Savings results reported by Opower, through May 31, 2014.

Findings include:

- The HER Program is being implemented by Opower in a manner that is consistent with a randomized controlled trial.
- Total program verified net savings are 2,054,727 therms for Peoples Gas and 652,718 for North Shore Gas.
- On a percentage basis, savings per customer are lower for North Shore Gas participants, 0.63%, than for Peoples Gas participants, 0.85%.
- The HER Program resulted in an increase in participation in the Home Energy Jumpstart Program of 0.007% for Peoples Gas and 0.01% for North Shore Gas. To avoid double-counting savings, Navigant estimates the savings attributed to the uplift and discounts it from the HER program.

E.2. Recommendations

The savings rates are within the range typically achieved for HER gas programs in the first year as HER programs typically exhibit a one to two year ramping period. As a result, Navigant has no recommendations for program improvement.

An optional module offered by Opower includes promotional modules which provide information about program opportunities specific to Peoples Gas or North Shore Gas. Peoples Gas and North Shore Gas could explore options to add promotional modules to enhance cross-promotion.

1. Introduction

1.1 Program Description

The Home Energy Report (HER) Program is designed to generate gas savings by providing residential customers with sets of information about their specific gas use and related conservation suggestions and tips. The information is provided in the form of Home Energy Reports that give customers various types of information, including: a) how their recent gas use compares to their use in the past; b) tips on how to reduce consumption, some of which are tailored to the customer's circumstances; and c) information on how their gas use compares to that of neighbors with similar homes. Currently, participating households receive the reports monthly. This set of information has been shown in other studies to stimulate customers to reduce their gas use, creating average savings around 1%, depending on local gas use patterns.

An important feature of the program is that it is a randomized controlled trial (RCT). Customers in the feasible set of customers (that is, those customers meeting program criteria) are randomly assigned to a treatment (participant) group and a control (non-participant) group, for the purpose of estimating changes in gas use due to the program.

Table 1-1 provides a synopsis of the program rollout.

Table 1-1. Synopsis of the HER Program

Utility	Month of First Report†	Month of Last Report	Targeted Number of Participants‡	Targeted Number of Controls‡	Average Monthly Usage in Post Period (Therms)
Peoples Gas	September 2013	May 2014	151,200	21,000	229
North Shore Gas	September 2013	May 2014	91,350	21,000	172

Source: Peoples Gas and North Shore Gas billing data, Opower implementation data, and Navigant analysis.
† This is the month of the "first generated date" in the Opower dataset when a wave is initiated. Participants likely received their first report approximately one month later than this date.
‡ These numbers are the targeted numbers. The actual number of participants and control customers at the start of the program is used in the evaluation.

1.2 Evaluation Objectives

The primary evaluation objective is to determine the extent to which participants in Peoples Gas' HER Program and North Shore Gas' HER Program reduced their energy consumption in GPY3 due to the program. A secondary question addressed in this report concerns the tracking of how program savings change over time. This marks the first year of the program, therefore trends in savings over time are examined at the monthly level.

2. Evaluation Approach

The evaluation approach relies on statistical analysis appropriate for randomized controlled trails (RCT). In this section, Navigant presents the evaluation approach for the following:

1. **Validation of Randomization** identifies the approach used to confirm the program was implemented as a randomized controlled trail,
2. **Statistical Models used in the Impact Evaluation** identifies the model specifications used to estimate program impacts,
3. **Accounting for Uplift** identifies the method used to estimate savings that may be double-counted due to increased participation in other energy efficiency programs as a result of the HER Program, and
4. **Data** describes the data used in the evaluation.

2.1 Validation of Randomization

The HER Program was implemented by the program implementer, Opower, as a randomized controlled trial (RCT) in which individuals are randomly assigned to a treatment (participant) group and a control group. If the allocation of the households across the treatment and control groups is truly random, the two groups should have the same distribution of energy usage for each of the 12 months before the start of the program. For this analysis Navigant compared mean energy usage for the treatment and control groups by utility for each of the 12 months before the start of the program (October 2012 through September 2013)

In cases where statistically significant differences are identified, Navigant estimates a fixed effects regression model using usage data from the 12 months prior to the start of the program. This model tests whether there is a statistically significant difference in usage for the treatment and control groups *after conditioning on monthly factors affecting all households, and after accounting for correlation across months in the unobservable factors affecting energy use at the household level*. Specifically, average daily therms were regressed on a binary treatment variable and a set of monthly fixed effects, and the standard error was clustered at the household level. Formally,

$$ADU_{kt} = \alpha_1 Treatment_k + \chi_t Month_t + e_{kt}$$

Where,
ADU_{kt} = Average daily usage in therms for customer k during billing cycle t
$Treatment_k$= Binary variable indicating whether customer k is in the participant group
$Month_t$ = Matrix of binary variables indicating whether the observation was in month t
α_1, χ_t= Regression parameters corresponding to the independent variables.
e_{kt} = The cluster-robust error term for customer k during billing cycle t.

2.2 Statistical Models used in the Impact Evaluation

Navigant estimates program impacts using two approaches: linear fixed effects regression (LFER) analysis applied to monthly billing data, and a simple post-program regression (PPR) analysis with lagged controls. We run both models as a robustness check. Although the two models are structurally

very different, both generate unbiased estimates of program savings in a RCT, and assuming the RCT is well balanced with respect to the drivers of energy use, in a single sample they generate very similar estimates of program savings.

2.2.1 LFER model

The simplest version of an LFER model convenient for exposition is one in which average daily consumption of therms by household *k* in bill period t, denoted by ADU_{kt}, is a function of three terms: the binary variable $Treatment_k$, taking a value of 0 if household *k* is assigned to the control group, and 1 if assigned to the treatment group; the binary variable $Post_t$, taking a value of 0 if month *t* is in the pre-treatment period, and 1 if in the post-treatment period; and the interaction between these variables, $Treatment_k \cdot Post_t$. Formally,

$$ADU_{kt} = a_{0k} + a_1 Post_t + a_2 Treatment_k \times Post_t + e_{kt}$$

Three observations about this specification deserve comment. First, the coefficient a_{0k} captures **all** household-specific effects on energy use that do not change over time, including those that are unobservable. Examples include the square footage of a residence. Second, a_1 captures the average effect *across all households* of being in the post-treatment period. Third, the effect of being both in the treatment group and in the post period –the effect directly attributable to the program—is captured by the coefficient a_2. In other words, whereas the coefficient a_1 captures the change in average daily therms use across the pre- and post-treatment for the *control* group, the sum $a_1 + a_2$ captures this change for the treatment group, and so a_2 is the estimate of average daily therms energy savings due to the program in GPY3.

2.2.2 PPR Model

Whereas the LFER model controls for non-treatment differences in energy use between treatment and control customers using the customer-specific fixed effect, the PPR model controls for these differences using lagged energy use as an explanatory variable. In particular, energy use in calendar month *m* of the post-program period is framed as a function of both the treatment variable and energy use in the same calendar month of the pre-program period. The underlying logic is that systematic differences between control and treatment customers will be reflected in differences in their past energy use, which is highly correlated with their current energy use. Formally, the model is,

$$ADU_{kt} = b_0 + b_1 ADUlag_{kt} + b_2 Treatment_k + e_{kt},$$

where $ADUlag_{kt}$ is customer *k*'s energy use in the same calendar month of the pre-program year as the calendar month of month *t*. In this model, b_2 is the estimate of average daily therms energy savings due to the program in GPY3.

2.3 Accounting for Uplift

The delivered Home Energy Reports include energy saving tips, some of which encourage participants to enroll in other Peoples Gas and North Shore Gas energy efficiency programs. If participation rates in other energy efficiency programs are the same for HER participants and controls, the savings estimates from the regression analysis are not attributable to other programs, as this indicates the HER Program had no effect on participation in the other energy efficiency (EE) programs. However, if the HER Program affects participation rates in other energy efficiency programs, then savings across all programs are lower than indicated by the simple summation of savings in the HER and EE programs. For instance, if the HER Program increases participation in other EE programs, the increase in savings may be allocated to either the HER Program or the energy efficiency program, but cannot be allocated to both programs simultaneously.

As data permitted, Navigant used a difference-in-difference (DID) statistic to estimate uplift in other EE programs, in which the change in the participation rate in another EE program between EPY3 and the pre-program year for the control group was subtracted from the same change for the treatment group. For instance, if the rate of participation in an EE program during GPY3 is 5% for the treatment group and 3% for the control group, and the rate of participation during the year before the start of the HER Program is 2% for the treatment group and 1% for the control group, then the rate of uplift due to the HER Program is 1%, which is reflected the calculation (5%-2%)-(3%-1%) =1%. The DID statistic generates an unbiased estimate of uplift when the baseline average rate of participation is the same for the treatment and control groups, or when they are different due only to differences between the two groups in time-invariant factors, such as the square footage of the residence.

Multiplying the DID statistic by the number of program households produces the "uplift" in the EE program generated by the HER Program. Multiplying this uplift by deemed savings for the EE program generates the savings that must be subtracted from either the HER Program or the EE program to avoid double-counting of savings.

Navigant examined the uplift associated with two energy efficiency programs: Home Energy Jumpstart Program and Home Energy Rebate Program. The Home Energy Jumpstart Program achieves energy savings through the direct install of energy efficient measures in single family homes while the Home Energy Rebate Program provides rebates to single family household for the purchase and installation of energy efficient measures.

2.4 Data

Navigant received program tracking and monthly billing data from Opower, the program implementer, covering the period of October 2012 to May 2014. In particular, Navigant received data for 91,350 North Shore Gas participants, 151,200 Peoples Gas participants, 21,000 North Shore Gas and 21,000 Peoples Gas controls.

In preparation for the impact analysis, Navigant removed the following customers and data points from the analysis:

- Customers with no first report generation date
    - Peoples Gas : 3994 participants, 548 controls
    - North Shore Gas: 1869 participants, 425 controls

- Observations with less than 20 or more than 40 days in the billing cycle
- Observations missing billing usage data
- Observations outside of the twelve month pre-program period or the GPY3 post period
- Outliers, defined as observations with average daily usage more than one order of magnitude from the median usage[1]

The final dataset includes participants who opt-out and customers whose accounts become inactive up until the point of inactivation.

Table 2-1. depicts the number of treatment and control household by utility by month after the program began in October 2013 after the data has been cleaned. Observations fluctuate as some of the conditions are present or not present in varying degrees during different months.

Table 2-1. Number of Participant and Control Households by Utility by Month after Program Start

Month	Peoples Gas		North Shore Gas	
	Participant Households	Control Households	Participant Households	Control Households
Oct – 13	153,037	21,287	93,206	21,424
Nov – 13	135,891	18,858	83,517	19,206
Dec – 13	149,890	20,857	92,162	21,175
Jan – 14	148,628	20,667	90,501	20,828
Feb – 14	142,129	19,765	85,411	19,600
Mar – 14	146,357	20,343	89,099	20,502
Apr – 14	147,409	20,516	92,321	21,219
May – 14	143,372	19,935	87,704	20,177

Source: Peoples Gas and North Shore Gas billing data, Opower implementation data, and Navigant analysis

In addition to the HER Program tracking data and billing data, Navigant received program tracking data for the Home Energy Jumpstart Program and Home Energy Rebate Program from Franklin Energy to conduct the uplift analysis described in Section 2.3.

A summary of the data and data sources used in the evaluation are provided in Table 2-2.

[1] The median usage from October 2013 through May 2014 was 5.20 therms per day among Peoples Gas participants and 3.38 therms per day among North Shore Gas participants. Observations with usage values greater than 52.04 therms per day among Peoples Gas participants and 33.75 therms per day among North Shore Gas participants were excluded from the analysis.

Table 2-2. Data Sources

Data	Source	Description
Billing Data	Opower	HER Program participants and controls during the pre- and post-period.
Tracking Data	Opower	HER Program participants and controls during the pre- and post-period.
Tracking Data for Other Programs	Franklin Energy	Participants in Home Energy Jumpstart and Home Energy Rebates during the pre- and post-period.

3. Gross Impact Evaluation

As detailed below, the LFER and PPR models generate very similar results for program savings. We use PPR results for reporting total program savings for GPY3, given that gas usage is highly seasonal. Overall verified net program savings for GPY3 were 2,072,182 therms for Peoples Gas and 662,518 therms for North Shore Gas, prior to adjusting for savings uplift. Total therm savings, after accounting for uplift, were 2,054,727 for Peoples Gas and 652,718 for North Shore Gas.

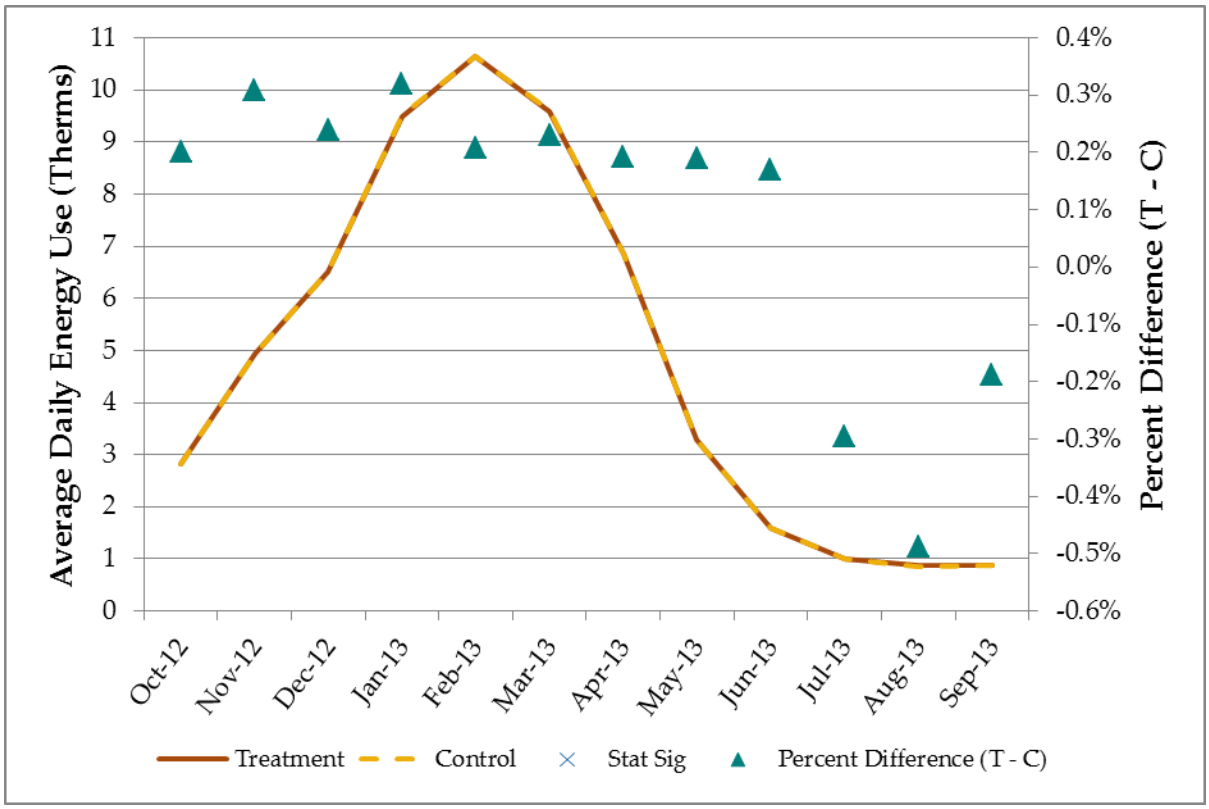
3.1 Validation of Randomization

Navigant conducted a statistical analysis to determine whether the assignment of customers to the treatment and control group is statistically consistent with an RCT design. The results of the analysis indicate that large average differences between the two groups exist in some months, but overall these differences are not statistically significant. As a result, *Navigant concludes that the HER Program was implemented in a manner consistent with an RCT design.*

Figure 3-1 and Figure 3-2 depict the average daily usage and percent difference in average daily energy usage for treatment and control households for the 12 months prior to the start of the HER Program. The black Xs indicate if the difference in usage is statistically significant at the 90% confidence level.

For Peoples Gas, Navigant found the differences to be statistically insignificant at the 90% confidence level in all months. September 2013 had a relatively large percentage difference (-0.49%). However, given that September is during the non-heating season, usage levels are quite low and so the absolute differences is quite small (-0.004 therms). Navigant also found that the control group had systematically higher usage than the treatment group during the heating season, with differences from October 2012 through May 2013 consistently falling between 0.19% and 0.32% (0.006 to 0.030 therms per day).

Figure 3-1. Average Daily Energy Use and Percent Difference in Usage for Treatment and Control Households by Month, Peoples Gas



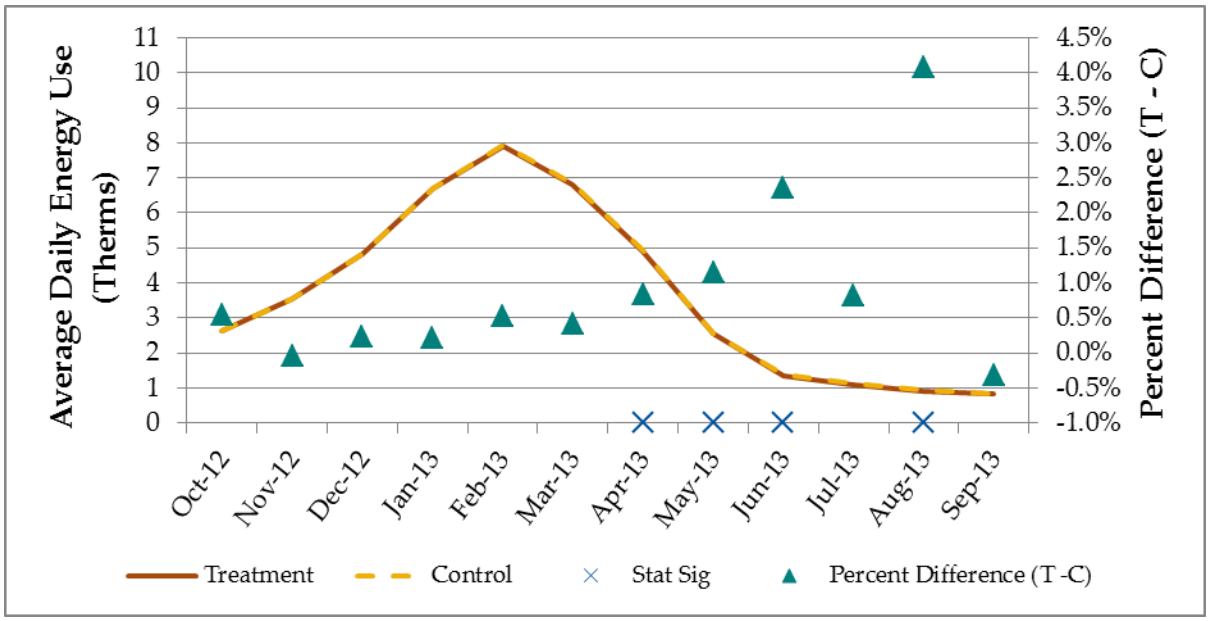
Source: Peoples Gas billing data, Opower implementation data, and Navigant analysis.

For North Shore Gas, Navigant found the differences to be statistically significant at the 90% confidence level in four months: April, May, June, and August 2013. Note that using a 90% confidence interval we expect on average one out of every ten months to have a statistically significant difference in average consumption due to random chance.

Given the anomalies identified in the month-by-month analysis, Navigant estimated a regression with monthly dummies and standard errors clustered at the household level to determine if the difference during the pre-period was statistically significant after accounting for correlation across months at the household level. The coefficient on the binary treatment variable was statistically insignificant at the 90% level. Therefore, Navigant concludes that standard regression models will appropriately account for the pre-existing difference in usage between the treatment and control groups.

It should be noted that Navigant also identified relatively large percentage differences during the non-heating season. During April through September 2013, on average the control group used 1.49% more gas than the treatment group, with differences as high as 4.07% in August. These differences are quite large relative to the expected program effect of approximately 1% savings but as noted above, are appropriately accounted for using the standard regression models.

Figure 3-2. Average Daily Energy Use and Percent Difference in Usage for Treatment and Control Households by Month, North Shore Gas



Source: North Shore Gas billing data, Opower implementation data, and Navigant analysis.

3.2 Savings Estimates

As discussed in Section 2.2, Navigant estimates savings of the HER Program using both the LFER and PPR models. Table 3-1 presents these results. Notably, the savings estimate for Peoples Gas is larger than for North Shore Gas. This finding is consistent with the HER program evaluation literature which has demonstrated that customers with higher average usage exhibit higher savings. Navigant reports savings from the PPR model; because gas usage is highly seasonal, the PPR likely does a better job of accounting for unobserved factors that cause slight average differences in gas usage between treatment and control customers over the course of a year.

Table 3-1. Savings Estimates

	Peoples Gas		North Shore Gas	
	LFER	PPR	LFER	PPR
Percent Savings	0.81%	0.85%	0.59%	0.63%
Average Daily Therms Savings per Participant	14.55	14.21	7.03	7.42

Source: Navigant Analysis.

Regression parameter estimates for program savings by month are presented in Table 3-2. and Table 3-3. In the tables, estimates for the LFER and PPR models are presented together to provide a better sense of the similarity of estimates across the two models. The estimate of average daily savings for GPY3 is the coefficient a_2 for the LFER model and b_2 for the PPR model. Note that while the savings of the parameter estimates differ slightly by model specification, these differences are not statistically significant. Percent savings prior to uplift of both regression models and Opower's own estimates of savings are presented in Figure A-1 and Figure A-2 in Appendix A.

Table 3-2. Peoples Gas Savings Parameter Estimates

Month	Participant households	Average Monthly Usage (Therms)	LFER Model	PPR Model
13-Oct	153,037	50	NA‡	NA‡
13-Nov	135,891	151	2.10**	2.07**
13-Dec	149,890	287	2.38***	2.27***
14-Jan	148,628	374	2.93***	2.68***
14-Feb	142,129	360	2.20***	2.10***
14-Mar	146,357	328	2.22***	2.24***
14-Apr	147,409	191	1.71***	1.79***
14-May	143,372	101	1.09***	1.13***

Source: Peoples Gas billing data, Opower implementation data, and Navigant analysis.
†Statistically significant at the 10% level (*), 5% level (**), and 1% level (***).
‡Regression analysis for October was not possible because reports were sent late enough in October that the first billing period after the first report was sent fell primarily in November.

Table 3-3. North Shore Gas Savings Parameter Estimates

Month	Participant Households	Average Monthly Usage (Therms)	LFER Model	PPR Model
13-Oct	93,206	47	NA‡	NA‡
13-Nov	83,517	109	0.86	0.95
13-Dec	92,162	207	1.65**	1.45*
14-Jan	90,501	279	0.53	0.30
14-Feb	85,411	273	2.09***	2.06***
14-Mar	89,099	241	0.54	0.73
14-Apr	92,321	142	1.01**	1.31***
14-May	87,704	83	0.4	0.68

Source: North Shore Gas billing data, Opower implementation data, and Navigant analysis.
†Statistically significant at the 10% level (*), 5% level (**), and 1% level (***).
‡Regression analysis for October was not possible because reports were sent late enough in October that the first billing period after the first report was sent fell primarily in November.

3.3 Uplift

The estimates of program savings include savings resulting from the uplift in participation in other energy efficiency programs caused by the HER Program. To avoid double-counting of savings, program savings due to this uplift must be counted towards either the HER Program or the other EE programs, but not both programs.

For Peoples Gas, the uplift in savings is 17,455 therms; for North Shore Gas it is 9,799 therms. Subtracting these savings from the HER savings estimate to avoid double counting, results in total HER savings of estimates of program savings generates a savings estimate of 2,054,727 therms for Peoples Gas and 652,718 therms for North Shore Gas. To put this in perspective, the average HER percent savings for Peoples Gas in GPY3 is 0.853% - after accounting for uplift, savings is reduced to0.845%. For North Shore Gas, average HER savings for GPY3 is 0.636%, reduced to 0.626% after accounting for uplift.

Table 3-4 and Table 3-5 present the details of the calculation of the uplift in savings for each for the two energy efficiency programs considered in the analysis, the Home Energy Jumpstart Program and the Home Energy Rebate Program. Notably, the change in participation in the Home Energy Rebate Program due to the HER Program was not statistically significant for either Peoples Gas or North Shore Gas. As a result, all of the uplift in savings comes from the Home Energy Jumpstart Program for both utilities.

Table 3-4. Estimates of Double Counted Savings: Peoples Gas

	Home Energy JumpStart	Home Energy Rebate
Average program savings (annual therms per participant)	45	238
# HER Treatment Households	151,200	151,200
Rate of participation, PY3 (%)	1.32%	0.71%
Change in rate of participation from pre-program Year (%)	0.03%	-0.40%
# HER control households	21,000	21,000
Rate of participation, PY3 (%)	1.00%	0.73%
Change in rate of participation from pre-program Year (%)	-0.25%	-0.41%
DID statistic	0.28%	0.01%
Change in program participation due to HER Program	421	21
Statistically Significant at the 90% Confidence Level?	Yes	No
Savings attributable to other programs (therms)	17,455	**0**

Source: Peoples Gas billing data, Opower implementation data, and Navigant analysis.

Table 3-5. Estimates of Double Counted Savings: North Shore Gas

	Home Energy JumpStart	Home Energy Rebate
Average program savings (annual therms per participant)	43	231
# HER Treatment Households	91,350	91,350
Rate of participation, PY3 (%)	0.59%	1.82%
Change in rate of participation from pre-program Year (%)	0.33%	0.33%
# HER control households	21,000	21,000
Rate of participation, PY3 (%)	0.32%	1.58%
Change in rate of participation from pre-program Year (%)	0.06%	0.27%
DID statistic	0.27%	0.06%
Change in program participation due to HER Program	248	53
Statistically Significant at the 90% Confidence Level?	Yes	No
Savings attributable to other programs (therms)	**9,799**	**0**

Source: North Shore Gas billing data, Opower implementation data, and Navigant analysis

It is important to note that the estimate of double-counted savings is surely an *overestimate* because it presumes participation in the other EE programs occurs at the very start of GPY3. Under the more reasonable assumption that participation occurs at a uniform rate throughout the year, the estimate of double-counted savings for Peoples Gas and North Shore Gas respectively would be approximately 8,438 therms and 4,953 therms, half the estimated value of 17,455 therms and 9,799 therms.

3.4 Verified Net Program Impact Results

Table 3-6 presents verified net therm savings for Peoples Gas and North Shore Gas. After accounting for uplift, HER savings for Peoples Gas is 2,054,727 therms and 652,718 therms for North Shore Gas.

Table 3-6. GPY3 Net Program Savings and Uplift of Savings in Other EE programs, by Utility

Type of Statistic	Peoples Gas	North Shore Gas
Number of Participants	151,200	91,350
Sample Size, Treatment (1)	145,839	89,240
Sample Size, Control (1)	20,279	20,516
Percent Savings	0.85%	0.63%
Therms Savings per customer	14.21	7.42
Verified Net Savings, Before Uplift Adjustment, Therms	2,072,182	662,518
Savings Uplift in other EE programs, Therms	17,455	9,799
Verified Net Savings, After Uplift Adjustment Therms (2)	2,054,727	652,718

Source: Peoples Gas and North Shore Gas billing data, Opower implementation data, and Navigant analysis.
(1) Sample Size varies slightly each month. The number presented is the average sample size from October 2013 through May 2014.
(2) Gross savings adjusted for savings uplift are equal to gross savings less the uplift of savings in other EE programs.

4. Conclusions and Recommendations

This section summarizes the key impact findings and recommendations.

Finding 1. The treatment and control groups had similar usage prior to the start of the program for both Peoples Gas and North Shore Gas. Therefore, Navigant employed a statistical method appropriate for use with RCTs to quantify the energy savings for the program.

Finding 2. The HER Program generated 2,054,727 verified net therms and 652,718 verified net therms for Peoples Gas and North Shore Gas respectively through May 2014 for GPY3, after accounting for uplift.

Finding 3. HER savings corresponds to a 0.85% and 0.63% reduction in usage for program participants from Peoples Gas and North Shore Gas respectively. These savings are typical for first year savings for residential gas Home Energy Report Programs.

Finding 4. Navigant did not identify an uplift in participation in the Home Energy Rebate Program as a result of the HER Program.

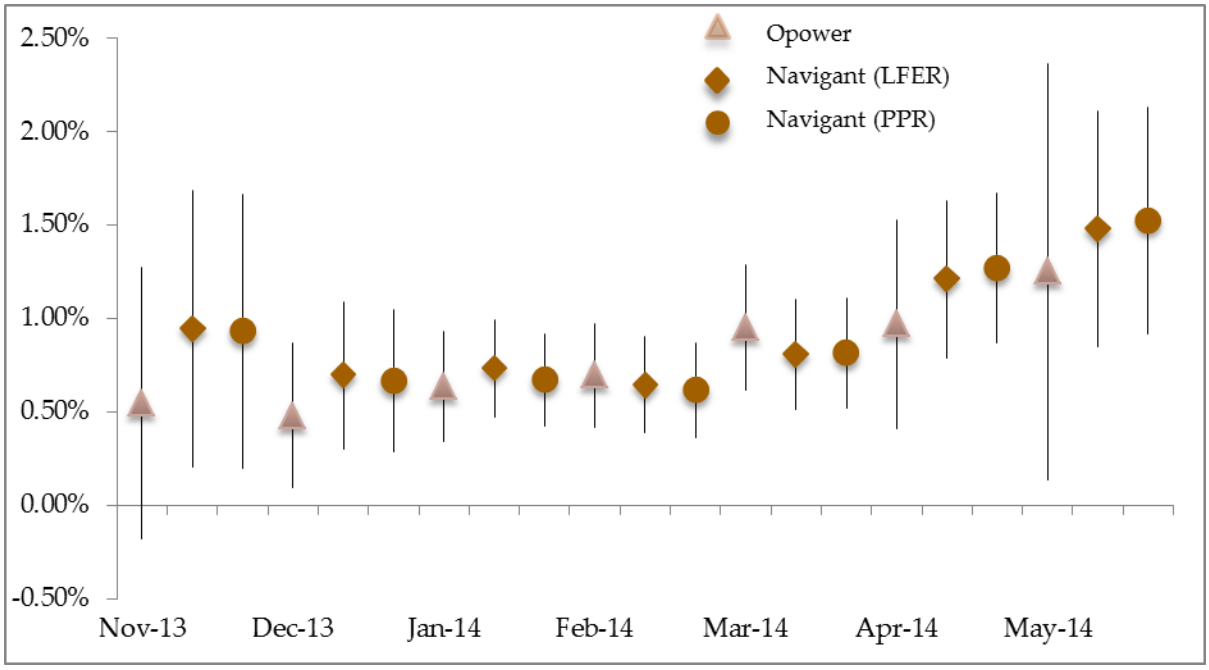
Recommendation 1. Continue the program in its current form. The savings rates are within the range typically achieved for HER gas programs in the first year as HER programs typically exhibit a one to two year ramping period.

Recommendation 2. An optional module offered by Opower includes promotional modules which provide information about program opportunities specific to Peoples Gas or North Shore Gas. Peoples Gas and North Shore Gas could explore options to add promotional modules to enhance cross-promotion.

Appendix A

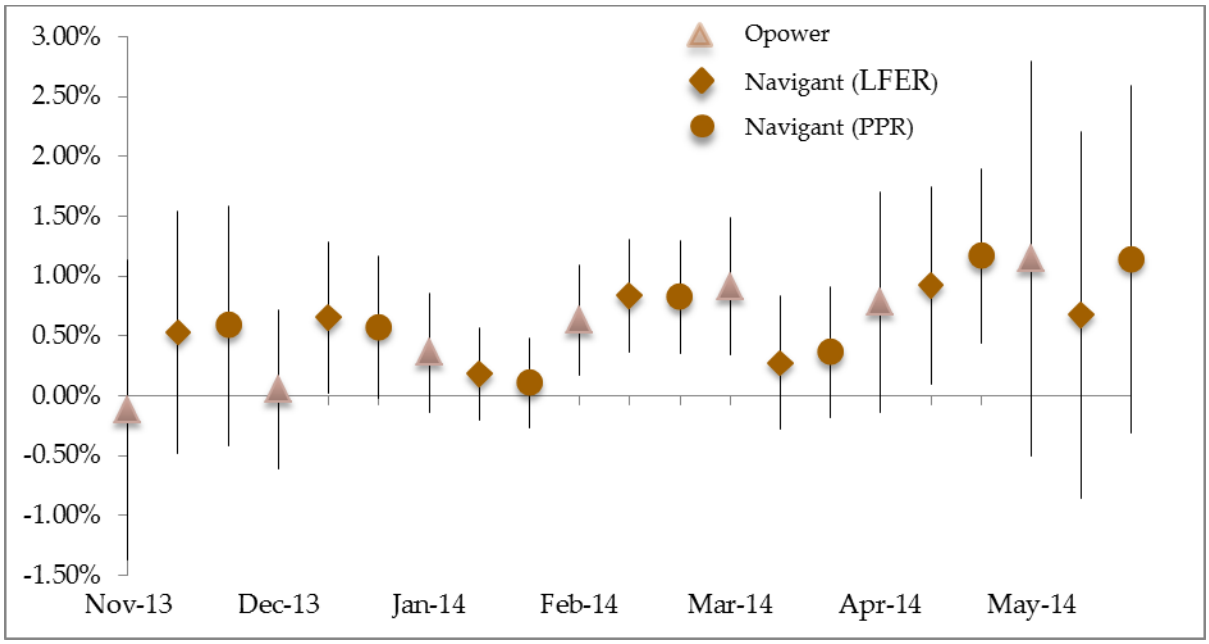
This Appendix presents a comparison of savings estimates for the LFER and PPR model, as well as savings estimates provided by the implementer, Opower.

Figure A-1. Peoples Gas Percent Savings Estimates with 90% Confidence Intervals



Source: Peoples Gas billing data, Opower implementation data, and Navigant analysis.

Figure A-2. North Shore Gas Percent Savings Estimates 90% Confidence Intervals



Source: North Shore Gas billing data, Opower implementation data, and Navigant analysis.