Guidehouse

Public Housing Energy Savings Impact Evaluation Report

Energy Efficiency Plan: Plan Year 2018 (1/1/2018-12/31/2018)

Presented to
Nicor Gas Company

REVISION TO 2018 NICOR GAS SAVINGS - FINAL

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1. Introduction

This report presents the results of the impact evaluation of the Nicor Gas 2018 Public Housing Energy Savings (PHES) program. It presents a summary of the energy impacts for the total program and broken out by relevant measure and program structure details. The appendix presents the impact analysis methodology. Program year 2018 covers January 1, 2018 through December 31, 2018. The verified savings, findings, and recommendations presented in this 2018 PHES impact evaluation report are based on data provided by Nicor Gas from their internal tracking data dated February 3, 2019.

This is an updated report that covers Nicor Gas 2018 PHES Program impact savings, and it replaces the Nicor Gas portion of the impact results presented in the previously distributed joint utility CY2018 PHES impact evaluation report[1]. The need for this update became apparent during the 2019 PHES impact evaluation when we observed a discrepancy in total ex ante therm savings between Nicor Gas tracking data and the joint utility tracking data received January 30, 2020. After further review, we identified discrepancies between the Nicor Gas and the implementer datasets on the program year that savings were recorded for some projects (2018 or 2019). Although it has been evaluation practice to base joint program impacts on the joint utility datasets, the Nicor Gas internal savings tracking data aligns with their reported annual program expenditures. To be consistent for both 2018 and 2019 with cost reporting, we are producing the Nicor Gas impact evaluation reporting for the PHES program to use the Nicor Gas dataset for both program years – 2018 and 2019. This report covers the 2018 Nicor Gas PHES impact evaluation – a second report covers the 2019 Nicor Gas PHES impact evaluation.

It is important to note that this update to the Nicor Gas 2018 evaluation and the 2019 Nicor Gas PHES evaluation have no impact on the PHES Program savings previously reported for the other joint program parties: ComEd, Peoples Gas, and North Shore Gas.

2. Program Description

The PHES Program works with Public Housing Authorities (PHAs) in ComEd and gas utility service territories to achieve electric and gas savings. The PHA itself is the program participant, though the residents of the properties are directly impacted by the program through in-unit and common area upgrades. In 2018, the program provided direct installation measures to residential units, including LEDs, advanced power strips, and gas-saving measures such as faucet aerators and programmable thermostats. The program also incented common area and outdoor lighting, envelope upgrades, furnace replacements, and refrigeration upgrades.

The PHES Program had 27 participants from Nicor Gas in 2018 that completed 122 projects as shown in the following table.

[1] *Joint Utility CY2018 PHES Impact Evaluation Report 2019-04-09 Final*. Report is dated April 10, 2019.

Table 2-1. 2018 PHES Volumetric Summary for Nicor Gas

Participation	Total
Participants *	27
Installed Projects †	122
Air Sealing (Projects)	14
Attic Insulation (Projects)	14
Gas High Efficiency Furnace	110
Low Flow Showerhead	148
Low Flow Faucet Aerator – Bathroom	117
Low Flow Faucet Aerator – Kitchen	130
Programmable Thermostat	231
Gas Water Heater	30

* Participants are defined as unique utility IDs
† Installed Projects are defined as unique project IDs
Source: Nicor Gas tracking data dated February 3, 2019 and Guidehouse team analysis.

3. Savings Summary

Table 3-1 summarizes the energy savings from the Nicor Gas only PHES program achieved in 2018. The table shows the previous jointly reported Nicor Gas savings, which has been revised in this report.

Table 3-1. 2018 PHES Annual Energy Savings Summary for Nicor Gas

Report Basis	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
CY2018 PHES Joint Utility Report with Joint Utility Dataset[2]	84,070	105%	88,588	1.00	88,588
Updated CY2018 PHES Nicor Gas Report with Nicor Gas Tracked Data	44,805	103%	46,272	1.00	46,272

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† Net-to-Gross (NTG) is the ratio of verified net savings to verified gross savings. The NTG is a deemed value. Source: Nicor_Gas_NTG_History_and_2019_Recommendations_2018-10-01_Final Aerator Showerhead Correction 2019-04-12.xlsx, which is to be found on the Illinois SAG web site: http://ilsag.info/net-to-gross-framework.html.
Source: Nicor Gas tracking data February 3, 2019 and Guidehouse team analysis.

4. Program Savings by Measure

The program includes 8 measures as shown in the following table. The gas high efficiency furnace and programmable thermostat measures contributed the most savings.

Table 4-1. 2018 PHES Annual Energy Savings by Measure for Nicor Gas

End Use Type	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
HVAC	Gas High Efficiency Furnace	23,297	102%	23,847	1.00	23,847
HVAC	Programmable Thermostat	9,282	105%	9,708	1.00	9,708
Shell	Air Sealing	5,742	100%	5,737‡	1.00	5,737
Hot Water	Low Flow Showerhead	2,609	101%	2,648‡	1.00	2,648
Shell	Attic Insulation	2,042	122%	2,486	1.00	2,486
Hot Water	Gas Water Heater	1,031	100%	1,031	1.00	1,031
Hot Water	Low Flow Aerator - Kitchen	658	101%	667‡	1.00	667
Hot Water	Low Flow Aerator - Bathroom	144	102%	146‡	1.00	146
Total		**44,805**	**103%**	**46,272**	**1.00**	**46,272**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† Net-to-Gross (NTG) is the ratio of verified net savings to verified gross savings. The NTG is a deemed value. Source: Nicor_Gas_NTG_History_and_2019_Recommendations_2018-10-01_Final Aerator Showerhead Correction 2019-04-12.xlsx, which is to be found on the Illinois SAG web site: http://ilsag.info/net-to-gross-framework.html.
‡ Higher verified savings due to rounding.
Source: Nicor Gas tracking data February 3, 2019 and Guidehouse team analysis.

[2] *Joint Utility CY2018 PHES Impact Evaluation Report 2019-04-09 Final.* Report is dated April 10, 2019.

5. Impact Analysis Findings and Recommendations

5.1 Impact Parameter Estimates

Table 5-1 shows the unit therm savings and realization rate findings by measure from our review. The realization rate is the ratio of the verified savings to the ex ante savings. Following the table, we provide findings and recommendations, including discussion of all measures with realization rates above or below 100 percent. Appendix 1 provides a description of the impact analysis methodology.

Table 5-1. 2018 PHES Verified Gross Savings Parameters

Measure	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	Realization Rate	Data Source(s)*
Gas High Efficiency Furnace	Each	Varies	Varies	102%	Illinois TRM, v6.0†, Section 5.3.7 and PTD
Programmable Thermostat	Each	Varies	Varies	105%	Illinois TRM, v6.0†, Section 5.3.11 and PTD
Air Sealing	Square Feet	Varies	Varies	100%	Illinois TRM, v6.0†, Section 5.6.1 and PTD
Low Flow Showerhead	Each	Varies	17.89	101%	Illinois TRM, v6.0†, Section 5.4.5 and PTD
Attic Insulation	Square Feet	Varies	0.070	122%	Illinois TRM, v6.0†, Section 5.6.4 and PTD
Gas Water Heater	Each	34.37	34.37	100%	Illinois TRM, v6.0†, Section 5.4.2 and PTD
Low Flow Aerator - Kitchen	Each	Varies	5.13	101%	Illinois TRM, v6.0†, Section 5.4.4 and PTD
Low Flow Aerator - Bathroom	Each	Varies	1.25	102%	Illinois TRM, v6.0†, Section 5.4.4 and PTD

* Program Tracking Data (PTD) provided by Nicor Gas, extract dated February 3, 2019.
† State of Illinois Technical Reference Manual version 6.0 from http://www.ilsag.info/technical-reference-manual.html.

5.1.1 Nicor Gas Tracking Data Ex Ante Savings Discrepancy with the Implementer

The PHES program is a joint utility program implemented for ComEd, Nicor Gas, Peoples Gas and North Shore Gas. In CY2018, the end of year final report evaluated Nicor Gas savings using ex ante savings estimates and tracking data provided directly by the program implementation contractor (IC) through ComEd. In the 2018 program year, the IC for the PHES program reported ex ante gross therms savings of 84,070 therms, as shown in Table 3-1. The verified savings were reported in the Joint Utility CY2018 PHES Impact Evaluation Report as 88,588 therms, dated April 10, 2019.

We identified discrepancies between the Nicor Gas and the implementer datasets on the program year that savings were recorded for some projects (2018 or 2019). The Nicor Gas internal savings tracking data aligns with their reported annual program expenditures. To be consistent for both 2018 and 2019 cost reporting, we are revising the Nicor Gas impact evaluation reporting for the PHES program to use the Nicor Gas dataset for both program years – 2018 and 2019. The verified savings, findings, and recommendations presented in this 2018 impact evaluation report are based on data provided by Nicor Gas from their internal tracking data from February 3, 2019.

5.1.2 Gas High Efficiency Furnace Finding

The ex ante savings for one gas high efficiency furnace measure (MEA-2018.10.10-28790) was calculated without applying a derating factor to the installed furnace efficiency. A derating factor must be applied unless verified quality installation was performed and documented, as deemed by the IL TRM v6.0, and this project did not qualify as verified quality installation.

Recommendation 1. Guidehouse recommends applying the derating factor to the installed furnace efficiency when calculating gas high efficiency furnace measure savings if verified quality installation is not performed and documented.

5.1.3 Programmable Thermostat Finding

The evaluation team found that fifteen programmable thermostat measures had ex ante savings calculated with a heating degree day (HDD) value inconsistent with the project location. These measures used a value aligned with climate zone 2, whereas these projects were installed in climate zone 1, which has higher heating savings. The measures are as follows:

Table 5-2. Programmable Thermostat HDD Discrepancy

MeasureIDIC
MEA-2018.06.05-9990
MEA-2018.06.05-9989
MEA-2018.06.05-9986
MEA-2018.06.05-9987
MEA-2018.06.05-9988
MEA-2018.06.05-9991
MEA-2018.06.05-9992
MEA-2018.11.07-33930
MEA-2018.11.07-33931
MEA-2018.11.07-33935
MEA-2018.11.07-33929
MEA-2018.11.07-33932
MEA-2018.11.07-33933
MEA-2018.11.07-33936
MEA-2018.11.07-33934

Source: Nicor Gas tracking data February 3, 2019 and Guidehouse team analysis.

Recommendation 2. Guidehouse recommends evaluating savings using the HDD aligned with the project site climate zone, as deemed by the IL TRM v6.0.

5.1.4 Attic Insulation Findings

The evaluation team identified ten attic insulation measures that calculated ex ante savings using the framing factor deemed for wall insulation measures instead of the attic insulation framing factor. These measures used a value of 0.25 instead of 0.07. Additionally, these measures used the equipment efficiency value of 0.8 for the heating system instead of the system efficiency value of 0.72, as deemed by the IL TRM v6.0. These discrepancies resulted in an increased realization rate. The measures are as follows:

Table 5-3. Attic Insulation Framing Factor and System Efficiency Discrepancy

Measure IDIC
MEA-2018.12.04-39176
MEA-2018.12.04-39177
MEA-2018.12.04-39178
MEA-2018.12.04-39179
MEA-2018.12.04-39180
MEA-2018.12.04-39181
MEA-2018.12.04-39182
MEA-2018.12.04-39183
MEA-2018.12.04-39184
MEA-2018.12.04-39185

Source: Nicor Gas tracking data February 3, 2019 and Guidehouse team analysis.

Recommendation 3. Guidehouse recommends calculating savings using the attic insulation deemed framing factor of 0.07 for attic insulation measures, as deemed by the IL TRM v6.0.

Recommendation 4. Guidehouse recommends calculating savings for attic insulation measures using the system efficiency value of 0.72, as deemed by the IL TRM v6.0.

6. Appendix 1. Impact Analysis Methodology

Guidehouse followed algorithms outlined in the IL TRM v6.0 to calculate verified gross savings for the PHES program. The evaluation team verified that these algorithms and appropriate deemed input parameters were correctly applied and validated custom parameters that were used. The ex ante tracking data source was an extract provided by Nicor Gas on February 3, 2019. Guidehouse calculated verified net savings by multiplying verified gross savings by a NTG of 1.00.

7. Appendix 2. Program-Specific Inputs for the Illinois TRC

Table 7-1 shows the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of drafting this impact evaluation report. Additional required cost data (e.g., measure costs, program level incentive and non-incentive costs) are not included in this table and will be provided to the evaluation team later.

Table 7-1. 2018 PHES TRC Inputs for Nicor Gas

End Use Type	Research Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
HVAC	Gas High Efficiency Furnace	Each	110	20.0	23,297	23,847	23,847
HVAC	Programmable Thermostat	Each	13,281	5.0	9,282	9,708	9,708
Shell	Air Sealing	Square Feet	35,450	15.0	5,742	5,737	5,737
Hot Water	Low Flow Showerhead	Each	148	9.0	2,609	2,648	2,648
Shell	Attic Insulation	Square Feet	30	25.0	2,042	2,486	2,486
Hot Water	Gas Water Heater	Each	117	13.0	1,031	1,031	1,031
Hot Water	Low Flow Aerator - Kitchen	Each	231	5.0	658	667	667
Hot Water	Low Flow Aerator - Bathroom	Each	130	9.0	144	146	146
Total			**49,497**		**44,805**	**46,272**	**46,272**

Source: Nicor Gas tracking data from February 3, 2019 and Guidehouse team analysis.