Public Housing Energy Savings Impact Evaluation Report

Energy Efficiency Plan Year 2020
(1/1/2020-12/31/2020)

Prepared for:
Nicor Gas
Final

May 5, 2021

Prepared by:
Alan Elliott
Opinion Dynamics

Mallorie Gattie
Opinion Dynamics
Submitted to:
Nicor Gas Company
1844 Ferry Road
Naperville, IL 60563

Submitted by:
Guidehouse
150 N. Riverside Plaza, Suite 2100
Chicago, IL 60606

Contact:
Ed Balbis                  Stu Slote                  Kevin Grabner
Partner                   Director                   Associate Director
561.644.9407              802.526.5113              608.616.5805
edbalbis@guidehouse.com   stu.slote@guidehouse.com      kevin.grabner@guidehouse.com

Disclaimer: This report was prepared by Guidehouse for Nicor Gas based upon information provided by Nicor Gas and from other sources. Use of this report by any other party for whatever purpose should not, and does not, absolve such party from using due diligence in verifying the report’s contents. Neither Guidehouse nor any of its subsidiaries or affiliates assumes any liability or duty of care to such parties, and hereby disclaims any such liability.
Table of Contents

1. Introduction ......................................................................................................................... 1
2. Program Description ............................................................................................................ 1
3. Program Savings Detail ........................................................................................................ 2
4. Program Savings by Measure ............................................................................................. 2
5. Impact Analysis Findings and Recommendations ............................................................. 3
   Impact Parameter Estimates ................................................................................................ 3
Appendix A. Impact Analysis Methodology ......................................................................... 5
Appendix B. Program Specific Inputs for the Illinois TRC .................................................... 6

List of Tables

Table 2-1. 2020 Volumetric Findings Detail .......................................................................... 1
Table 2-2. 2020 Installed Measure Quantities ......................................................................... 1
Table 3-1. 2020 Annual Gas Savings Summary .................................................................... 2
Table 4-1. 2020 Annual Gas Savings by Measure ................................................................. 2
Table 5-1. Verified Gross Savings Parameters ...................................................................... 3

Table B-1. Verified Cost Effectiveness Inputs ....................................................................... 6
1. Introduction

This report presents impact evaluation results from the Nicor Gas 2020 Public Housing Energy Savings (PHES) Program. It presents a summary of the gas impacts for the total program by measure and program structure details. The appendix presents the impact analysis methodology. Program year 2020 covers January 1, 2020 through December 31, 2020.

2. Program Description

The PHES Program works with Public Housing Authorities (PHAs) in ComEd, Nicor Gas, Peoples Gas (PGL), and North Shore Gas (NSG) territories to achieve electric and gas savings. The PHA itself is the program participant, though the residents of the properties are directly affected by the program through in-unit and common area upgrades. Given the COVID-19 pandemic, the program focused on upgrades to common areas to avoid in-unit projects, where the only gas savings opportunities were envelope measures; specifically, attic insulation, air sealing, and room AC covers and gap sealer.

The program had eight participants in 2020 and completed 68 projects as shown in Table 2-1.

Table 2-1. 2020 Volumetric Findings Detail

<table>
<thead>
<tr>
<th>Participation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants *</td>
<td>8</td>
</tr>
<tr>
<td>Installed Projects †</td>
<td>8</td>
</tr>
<tr>
<td>Measure Type</td>
<td>68</td>
</tr>
<tr>
<td>Attic Insulation</td>
<td>32</td>
</tr>
<tr>
<td>Air Sealing</td>
<td>32</td>
</tr>
<tr>
<td>Room AC Cover/Gap Sealer</td>
<td>4</td>
</tr>
</tbody>
</table>

* Participants are defined by the unique account number variable in the tracking data.
† Installed Projects are defined by unique Project IDs in the tracking data and measure type.
Source: Nicor Gas tracking data and Guidehouse evaluation team analysis.

Table 2-2 summarizes the installed measure quantities that are the basis for verified energy savings.

Table 2-2. 2020 Installed Measure Quantities

<table>
<thead>
<tr>
<th>Program Category</th>
<th>Program Path</th>
<th>Research Category</th>
<th>Quantity Unit</th>
<th>Installed Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>Prescriptive</td>
<td>Attic Insulation</td>
<td>Square Feet</td>
<td>70,547</td>
</tr>
<tr>
<td>Public</td>
<td>Prescriptive</td>
<td>Air Sealing</td>
<td>Linear Feet</td>
<td>31,444</td>
</tr>
<tr>
<td>Public</td>
<td>Prescriptive</td>
<td>Room AC Cover/Gap Sealer</td>
<td>Each</td>
<td>263</td>
</tr>
</tbody>
</table>

Source: Nicor Gas tracking data and Guidehouse evaluation team analysis.
3. Program Savings Detail

Table 3-1 summarizes the gas savings the Nicor Gas Public Housing Energy Savings Program achieved in 2020.

Table 3-1. 2020 Annual Gas Savings Summary

<table>
<thead>
<tr>
<th>Program Path</th>
<th>Ex Ante Gross Savings (Therms)</th>
<th>Verified Gross RR*</th>
<th>Verified Gross Savings (Therms)</th>
<th>NTG†</th>
<th>Verified Net Savings (Therms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescriptive</td>
<td>18,741</td>
<td>101%</td>
<td>18,898</td>
<td>1.00</td>
<td>18,898</td>
</tr>
<tr>
<td>Total or Weighted Average</td>
<td>18,741</td>
<td>101%</td>
<td>18,898</td>
<td>1.00</td>
<td>18,898</td>
</tr>
</tbody>
</table>

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
Source: Guidehouse evaluation team analysis.

4. Program Savings by Measure

The PHES Program includes three measure types as shown in Table 4-1. Air sealing and attic insulation account for the majority (90%) of the program’s ex ante gas savings. Table 4-1 summarizes the ex ante and verified gas savings for each measure type offered through the program.

Table 4-1. 2020 Annual Gas Savings by Measure

<table>
<thead>
<tr>
<th>Program Category</th>
<th>Research Category</th>
<th>Ex Ante Gross Savings (Therms)</th>
<th>Verified Gross RR*</th>
<th>Verified Gross Savings (Therms)</th>
<th>NTG†</th>
<th>Verified Net Savings (Therms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>Attic Insulation</td>
<td>3,685</td>
<td>100%</td>
<td>3,685</td>
<td>1.00</td>
<td>3,685</td>
</tr>
<tr>
<td>Public</td>
<td>Air Sealing</td>
<td>13,081</td>
<td>100%</td>
<td>13,081</td>
<td>1.00</td>
<td>13,081</td>
</tr>
<tr>
<td>Public</td>
<td>Room AC Cover/Gap Sealer</td>
<td>1,975</td>
<td>108%</td>
<td>2,132</td>
<td>1.00</td>
<td>2,132</td>
</tr>
<tr>
<td>Total or Weighted Average</td>
<td>18,741</td>
<td>101%</td>
<td>18,898</td>
<td>1.00</td>
<td>18,898</td>
<td></td>
</tr>
</tbody>
</table>

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
Source: Nicor Gas tracking data and Guidehouse evaluation team analysis.
5. Impact Analysis Findings and Recommendations

Impact Parameter Estimates

The evaluation team calculated verified gas savings by applying the impact algorithm sources found in the Illinois Statewide Technical Reference Manual v8.0 (TRM v8.0) 1. The team leveraged program tracking data to inform savings assumptions — for example insulation R-values. For savings calculation inputs not in the tracking data, the evaluation team relied on default assumptions from the TRM v8.0.

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%. Appendix A provides a description of the impact analysis methodology. Table B-1 in Appendix B shows the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of producing this impact evaluation report.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Unit Basis</th>
<th>Ex Ante Gross (therms/unit)</th>
<th>Verified Gross (therms/unit)</th>
<th>Realization Rate</th>
<th>Data Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attic Insulation</td>
<td>Square Feet</td>
<td>0.05</td>
<td>0.05</td>
<td>1.00</td>
<td>Illinois TRM, v8.0†, Section 5.6.5 and PTD</td>
</tr>
<tr>
<td>Air Sealing</td>
<td>Linear Feet</td>
<td>0.42</td>
<td>0.42</td>
<td>1.00</td>
<td>Illinois TRM, v8.0†, Section 5.6.1 and PTD</td>
</tr>
<tr>
<td>Room AC Cover/Gap Sealer</td>
<td>Each</td>
<td>7.51</td>
<td>8.10</td>
<td>1.08</td>
<td>Illinois TRM, v8.0 errata†, Section 4.4.38 and PTD</td>
</tr>
</tbody>
</table>

Source: Nicor Gas and ComEd tracking data and Guidehouse evaluation team analysis

**Finding 1.** For all three measure types, the Nicor Gas program tracking data did not include all necessary data to verify savings, such as heating type, building type, pre- and post- R-values, etc. Verified savings calculations relied on data from the ComEd program tracking database for variables excluded from the Nicor Gas program tracking database.

**Recommendation 1.** Include all necessary data in the Nicor Gas program tracking database to carry out gas savings calculations from the TRM v8.0.

**Finding 2.** For project (PID #69339) with Room AC Cover/Gap Sealer measure, the ex ante savings applied full load heating hours from Section 4.4.40 (Gas High Efficiency Single Package Vertical Air Conditioner) from the TRM v8.0, while all other projects relied on full load heating hours from Section 4.4.38 (Covers and Gap Sealers for Room Air Conditioners) per direction from the TRM v8.0, resulting in a slight reduction in verified savings compared with the ex ante savings.

---

Recommendation 2. For the Room AC Cover/Gap Sealer measure, ensure savings calculations rely on full load heating hours from Section 4.4.38, instead of Section 4.4.40.

Finding 3. For project (PID #72784) with Room AC Cover/Gap Sealer measure, the ex ante savings applied assumptions from the TRM v8.0 for Mid-Rise Multifamily buildings. The evaluation team leveraged the Nicor Gas tracking database with the joint ComEd PHES database and identified this project as a High Rise Multifamily building type. With other verified inputs, we calculated higher verified savings compared to the ex ante savings.

Recommendation 3. Update savings assumptions so the TRM v8.0 assumptions align with the building type specified in the Nicor Gas program tracking database.

Finding 4. For all Room AC Cover/Gap Sealer measures, the program tracking database excludes variables for the terrain and shielding classes needed to perform table lookups in the TRM. The verified savings analysis relied on building type (e.g., mid-rise, high-rise) to establish terrain and shielding classes that align with building conditions.

Recommendation 4. Include terrain and shielding class specifications in future program tracking databases.
Appendix A. Impact Analysis Methodology

The evaluation team calculated gross verified savings for the PHES Program by applying savings algorithms from the Illinois TRM v8.0\(^2\). The team determined verified gross savings for each program measure by:

- Reviewing the savings algorithm inputs in the measure workbook for agreement with the TRM v8.0 and TRM v8.0 Errata.
- Validating savings algorithms were applied correctly.
- Prioritizing project-specific information to inform savings calculations where the TRM v8.0 advises to use actual values. For variables where project information did not include project-specific actual values, the evaluation team relied on defaults from the TRM v8.0.
- Cross-checking per-unit savings values in the tracking data with the verified values in the measure workbook or in the evaluation team’s calculations if the workbook did not agree with the TRM v8.0.
- Multiplying the verified per-unit savings value by the quantity reported in the tracking data.

The evaluation team calculated verified net gas savings by multiplying the verified gross savings estimates by a net-to-gross (NTG) ratio of 1.0. For 2020, the PHES Program’s NTG estimate was defined by a consensus process through the Illinois SAG.

Appendix B. Program Specific Inputs for the Illinois TRC

Table B-1 shows the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of producing 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>
<thead>
<tr>
<th>Program Path</th>
<th>Research Category</th>
<th>Units</th>
<th>Quantity</th>
<th>Effective Useful Life</th>
<th>Ex Ante Gross Savings (Therms)</th>
<th>Verified Gross Savings (Therms)</th>
<th>Verified Net Savings (Therms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescriptive</td>
<td>Attic Insulation</td>
<td>Square Feet</td>
<td>70,547</td>
<td>20.0</td>
<td>3,685</td>
<td>3,685</td>
<td>3,685</td>
</tr>
<tr>
<td>Prescriptive</td>
<td>Air Sealing</td>
<td>Linear Feet</td>
<td>31,444</td>
<td>20.0</td>
<td>13,081</td>
<td>13,081</td>
<td>13,081</td>
</tr>
<tr>
<td>Prescriptive</td>
<td>Room AC Cover/Gap Sealer</td>
<td>Each</td>
<td>263</td>
<td>5.0</td>
<td>1,975</td>
<td>2,132</td>
<td>2,132</td>
</tr>
<tr>
<td><strong>Total or Weighted Average</strong></td>
<td></td>
<td></td>
<td><strong>102,254</strong></td>
<td>20.0</td>
<td><strong>18,741</strong></td>
<td><strong>18,898</strong></td>
<td><strong>18,898</strong></td>
</tr>
</tbody>
</table>

Source: Nicor Gas tracking data and Guidehouse evaluation team analysis.