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| Income Eligible Multi-Family and Public Housing Programs Impact Evaluation Report  Energy Efficiency Plan: Program Year 2023  (1/1/2023-12/31/2023) | | | | | | | |
| Prepared for:  Nicor Gas Company  DRAFT  April 4, 2024 | | | | | | | |
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Table of Contents

[1. Introduction 2](#_Toc163079588)

[2. Multi-Family Income Eligible Retrofits, Healthy Homes, and Assessment Paths 2](#_Toc163079589)

[2.1 Program Description 2](#_Toc163079590)

[2.2 Program Savings Detail 4](#_Toc163079591)

[2.3 Program Savings by Measure 4](#_Toc163079592)

[2.4 Impact Analysis Findings and Recommendations 6](#_Toc163079593)

[3. Public Housing Energy Savings 10](#_Toc163079594)

[3.1 Program Description 10](#_Toc163079595)

[3.2 Program Savings Detail 11](#_Toc163079596)

[3.3 Program Savings by Measure 12](#_Toc163079597)

[3.4 Impact Analysis Findings and Recommendations 12](#_Toc163079598)

[Appendix A. Impact Analysis Methodology A-1](#_Toc163079599)

[Appendix B. Program Specific Inputs for the Illinois TRC B-1](#_Toc163079600)

[B.1 Retrofits, Assessment and Healthy Homes B-1](#_Toc163079601)

[B.2 Public Housing Energy Savings B-3](#_Toc163079602)

List of Tables, Figures, and Equations

[Table 2‑1. 2023 MFIE Program Volumetric Findings Detail 2](#_Toc163079680)

[Table 2‑2. 2023 MFIE Program Installed Measure Quantities 2](#_Toc163079681)

[Table 2‑3. 2023 MFIE Program Annual Energy Savings Summary 4](#_Toc163079682)

[Table 2‑4. 2023 MFIE Program Annual Energy Savings by Measure 4](#_Toc163079683)

[Table 2‑5. 2023 MFIE Program Verified Gross Savings Parameters 6](#_Toc163079684)

[Table 2‑6. 2023 MFIE Program Instances with different Pipe Insulation Heat Loss values 9](#_Toc163079685)

[Table 3‑1. 2023 PHES Program Volumetric Findings Detail 11](#_Toc163079686)

[Table 3‑2. 2023 PHES Program Installed Measure Quantities 11](#_Toc163079687)

[Table 3‑3. 2023 PHES Program Annual Energy Savings Summary 12](#_Toc163079688)

[Table 3‑4. 2023 PHES Program Annual Energy Savings by Measure 12](#_Toc163079689)

[Table 3‑5. 2023 PHES Program Verified Gross Savings Parameter 13](#_Toc163079690)

[Table B‑1. 2023 MFIE Program Verified Cost Effectiveness Inputs – Retrofits, Assessment and Healthy Homes Paths B-1](#_Toc163079691)

[Table B‑2. 2023 PHES Program Verified Cost Effectiveness Inputs B-3](#_Toc163079692)

# Introduction

This report presents the results of the impact evaluation of the Nicor Gas 2023 Income Eligible Multi-Family (MFIE) program. The MFIE program includes the Retrofits, Healthy Homes, Assessments, and Energy Saving Kits program paths. The report presents a summary of the energy impacts for the total program and relevant measure and program structure details. The second section of the report presents impact results for the Public Housing Energy Savings (PHES) program. The appendix presents the impact analysis methodology. Program year 2023 covers January 1, 2023 through December 31, 2023.

# Multi-Family Income Eligible Program

## Program Description

The Nicor Gas Income Eligible Multi-Family Program offers products and energy saving measures for income-eligible customers in multi-family dwellings within the Nicor Gas service territory. The 2023 Retrofits, Healthy Homes, and Assessments and Energy Savings Kits (ESK) paths included direct installation of water heating efficiency measures (faucet aerators, showerheads, shower timer, gas water heaters), high efficiency boilers, advanced thermostats, programmable and reprogrammable thermostats, attic insulation, basement insulation, pipe insulation, air sealing, floor insulation, furnace, boiler controls, boiler tune-ups, and efficiency kits.

The ESK program path provided an option of free energy savings kits with water efficiency or air sealant measures (reported as Kit 1 MF, Kit 2 MF, and Kit 4 MF in the Nicor Gas tracking data):

* Kit 1 MF included one low flow showerhead (SH), one kitchen aerator (KA), and two bathroom aerators (BA).
* Kit 2 MF included two SH, one KA, one shower timer (ST) and two BA.
* Kit 4 MF included 12 electrical switch/outlet gaskets, one door sweep, 30 linear feet of rope caulk, 17 feet of v-seal weatherstripping, and 17 feet of closed-foam weatherstripping.

The program had 918 participants in 2023 and completed 5,626 projects, as shown in Table 2‑1.

Table 2‑1. 2023 MFIE Program Volumetric Findings Detail

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Participation | Retrofits | HH MF | Assessment | Energy Savings Kits | Total |
| Participants \* | 292 | 1 | 3 | 622 | 918 |
| Installed Projects † | 4,999 | 2 | 3 | 622 | 5,626 |
| Measure Types Installed | 20 | 8 | 3 | 9 | 40 |

\* Participants are defined as unique Building Account Numbers.

† Installed Projects are defined as unique number of Vendor Project IDs.

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. 2023 MFIE Program Installed Measure Quantities

| Program Category | Program Path | Measure | Quantity Unit | Installed Quantity |
| --- | --- | --- | --- | --- |
| **Multi-Family Income Eligible** | Retrofits | Attic Insulation | Sq Ft | 657,955 |
| Air Sealing | Ln Ft | 516,505 |
| Pipe Insulation | Ln Ft | 32,249 |
| Shower Timer | Each | 4,370 |
| Basement/Sidewall Insulation | Sq Ft | 2,684 |
| Faucet Aerator - Kitchen (IU) | Unit | 2,401 |
| Showerhead (IU) | Unit | 2,302 |
| Faucet Aerator - Bathroom (IU) | Unit | 1,513 |
| Programmable Thermostat | Unit | 1,306 |
| Controls for Domestic Hot Water | Unit | 1,143 |
| Cover and Gap Sealers for AC | Unit | 661 |
| Wall Insulation | Sq Ft | 648 |
| Advanced Thermostat | Unit | 462 |
| High Efficiency Boiler | Unit | 405 |
| Thermostatic Radiator Valves | Unit | 316 |
| Steam Boiler Averaging Controls | Unit | 169 |
| Boiler Reset Controls | Unit | 121 |
| Steam Trap | Unit | 84 |
| Water Heater | Unit | 23 |
| Reprogrammable Thermostat | Unit | 3 |
| Assessment | Faucet Aerator - Kitchen (IU) | Unit | 1 |
| Programmable Thermostat | Unit | 1 |
| Healthy Homes | Attic Insulation | Sq Ft | 976 |
| Wall Insulation | Sq Ft | 600 |
| Advanced Thermostat | Unit | 1 |
| Air Sealing | Ln Ft | 1 |
| Duct Sealing | Unit | 1 |
| Faucet Aerator - Bathroom (IU) | Unit | 1 |
| Faucet Aerator - Kitchen (IU) | Unit | 1 |
| Showerhead (IU) | Unit | 1 |
| Energy Saving Kits | Kit 1 MF | Each | 1 |
| Kit 2 MF | Each | 417 |
| Kit 4 MF | Each | 193 |

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

## Program Savings Detail

Table 3‑1 summarizes the energy savings the Multi-family Income Eligible Program achieved by Retrofits, Assessment, Healthy Homes, and Energy Savings Kits paths in 2023.

Table 2‑3. 2023 MFIE Program Annual Energy Savings Summary

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Program Category | Program Path | Ex Ante Gross Savings (Therms) | Verified Gross RR\* | Verified Gross Savings (Therms) | NTG† | Verified Net Savings (Therms) |
| **Multi-Family Income Qualified** | Retrofits | 919,822 | 96% | 883,345 | 1.00 | 883,345 |
| Assessment | 83 | 100% | 83 | 1.00 | 83 |
| Healthy Homes | 669 | 62% | 411 | 1.00 | 411 |
| Energy Savings Kits | 15,614 | 102% | 15,994 | 1.00 | 15,994 |
| **Total or Weighted Average** |  | **936,188** | **96%** | **899,833** | **1.00** | **899,833** |

Note: Totals may not sum due to rounding.

\* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.

† A deemed value. Available on the SAG web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2023/>.

Source: Guidehouse evaluation team analysis.

## Program Savings by Measure

The program includes 30 measures as shown in Table 2‑4. The Pipe Insulation and Air Sealing measures of the Retrofits path contributed the most savings.

Table 2‑4. 2023 MFIE Program Annual Energy Savings by Measure

| Program Category | Program Path | | Savings Category | Ex Ante Gross Savings (Therms) | Verified Gross RR\* | Verified Gross Savings (Therms) | NTG† | Verified Net Savings (Therms) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Multi-Family Income Eligible** | Retrofits | | Pipe Insulation | 228,035 | 112% | 256,150 | 1.00 | 256,150 |
| Boiler Reset Controls | 87,751 | 113% | 99,528 | 1.00 | 99,528 |
| Air Sealing | 204,750 | 100% | 204,669 | 1.00 | 204,669 |
| Programmable Thermostat | 66,594 | 79% | 52,895 | 1.00 | 52,895 |
| Attic Insulation | 115,442 | 55% | 63,723 | 1.00 | 63,723 |
| Controls for Domestic Hot Water | 56,242 | 100% | 56,242 | 1.00 | 56,242 |
| High Efficiency Boiler | 35,323 | 99% | 34,933 | 1.00 | 34,933 |
| Advanced Thermostat | 33,283 | 68% | 22,733 | 1.00 | 22,733 |
| Showerhead (IU) | 28,508 | 100% | 28,500 | 1.00 | 28,500 |
| Steam Trap | 17,586 | 100% | 17,586 | 1.00 | 17,586 |
| Shower Timer | 16,580 | 100% | 16,579 | 1.00 | 16,579 |
| Steam Boiler Averaging Controls | 9,896 | 95% | 9,408 | 1.00 | 9,408 |
| Faucet Aerator - Kitchen (IU) | 6,809 | 100% | 6,791 | 1.00 | 6,791 |
| Cover and Gap Sealers for AC | 5,302 | 121% | 6,393 | 1.00 | 6,393 |
| Thermostatic Radiator Valves | 3,686 | 100% | 3,686 | 1.00 | 3,686 |
| Basement/Sidewall Insulation | 555 | 65% | 358 | 1.00 | 358 |
| Faucet Aerator - Bathroom (IU) | 2,592 | 100% | 2,593 | 1.00 | 2,593 |
| Storage Water Heater | 655 | 66% | 434 | 1.00 | 434 |
| Reprogrammable Thermostat | 160 | 76% | 122 | 1.00 | 122 |
| Wall Insulation | 72 | 32% | 23 | 1.00 | 23 |
|  | | ***Retrofits Subtotal*** | ***919,822*** | ***96%*** | ***883,345*** | ***1.00*** | ***883,345*** |
| Assessment | | Programmable Thermostat | 80 | 100% | 80 | 1.00 | 80 |
| Faucet Aerator - Kitchen (IU) | 4 | 100% | 4 | 1.00 | 4 |
|  | | ***Assessment Subtotal*** | ***83*** | ***100%*** | ***83*** | ***1.00*** | ***83*** |
| Healthy Homes | | Attic Insulation | 420 | 47% | 199 | 1.00 | 199 |
| Advanced Thermostat | 67 | 100% | 67 | 1.00 | 67 |
| Duct Sealing | 47 | 120% | 57 | 1.00 | 57 |
| Air Sealing | 39 | 100% | 39 | 1.00 | 39 |
| Wall Insulation | 75 | 40% | 30 | 1.00 | 30 |
| Faucet Aerator - Kitchen (IU) | 13 | 100% | 13 | 1.00 | 13 |
| Showerhead (IU) | 6 | 100% | 6 | 1.00 | 6 |
| Faucet Aerator - Bathroom (IU) | 3 | 100% | 3 | 1.00 | 3 |
|  |  | | ***Healthy Homes Subtotal*** | ***669*** | ***62%*** | ***411*** | ***1.00*** | ***411*** |
|  | | Energy Savings Kits | Kit 1 MF | 20 | 107% | 21 | 1.00 | 21 |
| Kit 2 MF | 11,296 | 103% | 11,675 | 1.00 | 11,675 |
| Kit 4 MF | 4,298 | 100% | 4,297 | 1.00 | 4,297 |
| ***Energy Savings Kits Subtotal*** | ***15,614*** | ***102%*** | ***15,994*** | ***1.00*** | ***15,994*** |
| **Total or Weighted Average** | | | | **936,188** | **96%** | **899,833** | **1.00** | **899,833** |

\* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.

† A deemed value. Available on the SAG web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2023/>.

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

## Impact Analysis Findings and Recommendations

The overall realization rate for the Multi-Family Income Eligible program was 96% for therms in 2023. The program level realization rate was driven mainly by the lower verified savings for thermostat and insulation measures.

### Impact Parameter Estimates

Table 2‑5 shows the per-unit therm savings and realization rate findings by measure from the evaluation team’s review. The realization rate is the ratio of the gross verified savings to the ex ante savings. Following Table 2‑5are findings and recommendations, including discussion of all measures with realization rates more or less than 100%. Appendix A provides a description of the impact analysis methodology.

Table 2‑5. 2023 MFIE Program Verified Gross Savings Parameters

| Measure | Unit Basis | Ex Ante Gross (therms/unit) | Verified Gross (therms/unit) | Realization Rate | Data Source(s) |
| --- | --- | --- | --- | --- | --- |
| Advanced Thermostat | Unit | Varies | Varies | 68% | Illinois TRM, v11.0†, Section 5.3.16 and PTD\* |
| Air Sealing | Ln Ft | Varies | Varies | 100% | Illinois TRM, v11.0†, Section 5.6.1 and PTD\* |
| Attic Insulation | SQ FT | Varies | Varies | 56% | Illinois TRM, v11.0†, Section 5.6.5 and PTD\* |
| Basement/Sidewall Insulation | SQ FT | 0.21 | 0.13 | 65% | Illinois TRM, v11.0†, Section 5.6.2 and PTD\* |
| Boiler Reset Controls | Unit | Varies | Varies | 113% | Illinois TRM, v11.0†, Section 4.4.4 and PTD\* |
| Boiler Tune Up | Unit | Varies | Varies | 100% | Illinois TRM, v11.0†, Section 4.4.2 and PTD\* |
| Controls for Domestic Hot Water | Unit | 62.70 | 62.70 | 100% | Illinois TRM, v11.0†, Section 4.3.8 and PTD\* |
| Cover and Gap Sealers for AC | Unit | Varies | Varies | 123% | Illinois TRM, v11.0†, Section 4.4.38 and PTD\* |
| Duct Sealing | Unit | 47.15 | 56.58 | 120% | Illinois TRM, v11.0†, Section 5.3.4 and PTD\* |
| Faucet Aerator - Bathroom (IU) | Unit | Varies | Varies | 100% | Illinois TRM, v11.0†, Section 5.4.4 and PTD\* |
| Faucet Aerator - Kitchen (IU) | Unit | Varies | Varies | 100% | Illinois TRM, v11.0†, Section 5.4.4 and PTD\* |
| Furnace Tune Up | Unit | Varies | Varies | 99% | Illinois TRM, v11.0†, Section 5.3.13 and PTD\* |
| High Efficiency Boiler | Unit | Varies | Varies | 99% | Illinois TRM, v11.0†, Section 4.4.10 and PTD\* |
| Kit 1 MF | Each | 20.05 | 21.38 | 107% | PTD, Guidehouse research |
| Kit 2 MF | Each | Varies | Varies | 103% | PTD, Guidehouse research |
| Kit 4 MF | Each | Varies | Varies | 100% | PTD, Guidehouse research |
| Pipe Insulation | Ln Ft | Varies | Varies | 112% | Illinois TRM, v11.0†, Section 4.4.14 and PTD\* |
| Programmable Thermostat | Unit | Varies | Varies | 79% | Illinois TRM, v11.0†, Section 5.3.11 and PTD\* |
| Reprogrammable Thermostat | Unit | Varies | Varies | 76% | Illinois TRM, v11.0†, Section 5.3.11 and PTD\* |
| Shower Timer | Unit | 3.79 | 3.79 | 100% | Illinois TRM, v11.0†, Section 5.4.9 and PTD\* |
| Showerhead (IU) | Unit | Varies | Varies | 100% | Illinois TRM, v11.0†, Section 5.4.5 and PTD\* |
| Steam Boiler Averaging Controls | Unit | Varies | 61.09 | 95% | Illinois TRM, v11.0†, Section 4.4.36 and PTD\* |
| Steam Trap | Unit | 209.36 | 209.36 | 100% | Illinois TRM, v11.0†, Section 4.4.16 and PTD\* |
| Thermostatic Radiator Valves | Unit | Varies | Varies | 84% | Illinois TRM, v11.0†, Section 5.3.19 and PTD\* |
| Wall Insulation | SQ FT | Varies | 36.13 | 100% | Illinois TRM, v11.0†, Section 5.6.4 and PTD\* |
| Water Heater | Unit | Varies | Varies | 36% | Illinois TRM, v11.0†, Section 4.3.1 and PTD\* |

\* Program Tracking Data (PTD) provided by Nicor Gas, extract dated January 30, 2024.

† State of Illinois Technical Reference Manual version 11.0 from <http://www.ilsag.info/technical-reference-manual.html>.

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

### Findings and Recommendations

The evaluation team developed findings and recommendations based on the 2023 evaluation, which are organized by path type in the following sections.

#### Retrofits Path

**Finding 1.** The ex ante savings for the Programmable Thermostat (DI) MF-IU measure leveraged either an AnnualThermConsumption of 1,487.18 therms or FurnaceHeatingLoad of 1,005 therms. The evaluation team used 1,005 therms, per the Illinois Statewide Technical Reference Manual v11.0 (IL-TRM)[[1]](#footnote-2), as the gas heating consumption for all thermostat measures, consistent with the IL-TRM and previous evaluation guidance. The assumptions in the IL-TRM appear to be developed from single family furnace data.

**Recommendation 1.** Use the gas heating consumption value of 1,005 therms following the guidance in the IL-TRM. Ensure that savings are calculated using consistent inputs for a measure. Nicor Gas could facilitate adding boiler gas consumption options to the IL-TRM during the next TRM update process.

**Finding 2.** The ex ante savings for the attic insulation measure did not add a minimum value of R-3 for uninsulated assemblies to the Pre and Post R-values, except when the pre R-value was zero (two cases). The ex ante savings for 13 cases were calculated assuming a pre insulation value of R-3 even though pre R-values were populated in the tracking data. The evaluation team added a minimum value of R-3 to the Pre and Post R-values in the algorithm consistent with the IL-TRM v11.0.

**Recommendation 2.** Review the savings algorithm and the inputs being used in the savings calculation for attic insulation and ensure the minimum insulation levels are included per the IL-TRM (Section 5.6.5).

**Finding 3.** The reported per-unit Therm savings for In-Unit AC Cover and Gap Sealer (DI) do not match with the values reported in the *DeemedThermSavings* column in the program tracking data. The evaluation team verified the *DeemedThermSavings column was* consistent with the IL-TRM, and leveraged these values as the verified savings for this measure.

**Recommendation 3.** Review the savings algorithm and the inputs used in the program data and ensure these values match the inputs and algorithms from the IL-TRM (Section 4.4.38).

**Finding 4.** For Common Areas (CA) Steam Boiler Averaging Controls measure, the ex ante savings used a boiler efficiency of 61.6%, consistent for in-unit existing boilers. The evaluation team used a boiler efficiency of 64.8%, consistent with multifamily low pressure boilers.

**Recommendation 4.** Cross-check the appropriate boiler efficiency for the steam boiler averaging controls measure, consistent with the IL-TRM (Section 4.4.36).

**Finding 5.** For one instance for the Air Sealing – Door Sweep – DI measure (PID-2023.02.10-158845), the program data reported therm savings for an Air Sealing – Weatherstripping measure instead of a Door Sweep measure. These findings led to an overall realization rate of 99.96% for Air Sealing.

**Recommendation 5.** Use the correctClimate Zone for calculating savings.Report therm savings consistent with the measure name.

**Finding 6.** There were inconsistencies within the program data for pipe insulation measures. The technical inputs for heat loss values were not consistent with the measure name in the program data. Table 2‑6 provides a summary of the instances where inconsistencies were observed. The evaluation team used the technical inputs to determine the verified savings, which resulted in higher savings overall for pipe insulation measures.

Table 2‑6. 2023 MFIE Program Instances with different Pipe Insulation Heat Loss values

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Bare Pipe Heat Loss | Insulated Pipe Heat Loss | Reported Pipe Insulation Measure | Verified Pipe Insulation Measure | Number of Instances |
| 59.515 | 12.225 | Pipe Insulation, DHW Small <=1.25" | Pipe Insulation, DHW Medium 1.26-2" | 3 |
| 187.125 | 36.287 | Pipe Insulation, Steam Med 2.1" to 5" | Pipe Insulation, Steam Small 1" to 2" | 11 |
| Pipe Insulation, Steam Med Fitting | 8 |
| Pipe Insulation, Steam Med Valve | 6 |
| 411.183 | 64.472 | Pipe Insulation, Steam Small 1" to 2" | Pipe Insulation, Steam Med 2.1" to 5" | 1 |
| 717.9 | 114.8 | Pipe Insulation, Steam Med 2.1" to 5" | Pipe Insulation, Steam Large 5.1" to 8" | 3 |
| Pipe Insulation, Steam Med Fitting | 2 |
| Pipe Insulation, Steam Med Valve | 1 |
| 1024.1 | 154.733 | Pipe Insulation, Steam Med 2.1" to 5" | Pipe Insulation, Steam X-Large Fitting | 1 |
| Pipe Insulation, Steam Med Valve | 1 |

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

**Recommendation 6.** Ensure all inputs and measure names are consistent in the program data, and that the technical inputs and reported savings are aligned.

**Finding 7.** For four out of 78 instances, the evaluation team could not replicate the ex ante savings for the Boiler Reset Controls measure. To determine verified savings, the evaluation team used the input capacity from the tracking data and the deemed savings factor and full load hours from the TRM.

**Recommendation 7.** Review the savings algorithm and inputs used in the savings calculation and ensure these values match the inputs and algorithms from the IL-TRM (Section 4.4.4 Boiler Lockout/Reset controls).

#### Healthy Homes Path

**Finding 8.** For the Wall Insulation and Attic Insulation measures, the ex ante savings did not include the minimum insulation value (R-5 for Wall, R-3 for Attic) for uninsulated assemblies. The evaluation team added the required minimum value to the pre and post R-values, consistent with the IL-TRM.

**Recommendation 8.** Review the savings algorithm and the inputs used in the savings calculation and ensure these values match the algorithms from the IL-TRM (Section 5.6.4 and Section 5.6.5).

**Finding 9.** For the Duct Sealing measure, the evaluation team could not replicate the ex ante savings for this measure, based on the supplied program data.

**Recommendation 9.** Review the savings algorithm and the inputs used in the savings calculation and ensure these values match the inputs and algorithms from the IL-TRM (Section 5.3.4).

#### Energy Savings Kits

**Finding 10.** The ex ante savings for Kit 1 MF and Kit 2 MF differed between two separate values depending on the “ICName” in the program tracking data. The evaluation team understands that these kits contain the same measures, and since they are delivered within the same program, should have the same savings values. The evaluation team leveraged the kit level calculations provided by Nicor Gas during the mid-year evaluation to determine the verified savings.

**Recommendation 10.** Ensure that the same types of kits leverage the same ex ante savings values within the tracking data.

# Public Housing Energy Savings

## Program Description

The Public Housing Energy Savings (PHES) program works with Public Housing Authorities (PHAs) in ComEd, Nicor Gas, Peoples Gas (PGL), and North Shore Gas (NSG) territories to achieve electricity and gas savings. The PHAs are the program participants, though the residents of the properties are directly affected by the program through in-unit and common area upgrades. Gas savings opportunities included space heating and water heating equipment upgrades and envelope measures (attic insulation, air sealing, and room AC covers/gap sealer). The program also included gas saving direct install measures, such as boiler and furnace tune up, high efficiency boilers, and water heaters.

The PHES program had 28 participants in 2023 and completed 35 projects as shown in Table 3‑1.

Table 3‑1. 2023 PHES Program Volumetric Findings Detail

|  |  |
| --- | --- |
| Participation | Public Housing |
| Participants \* | 28 |
| Installed Projects † | 35 |
| Measure Types Installed | 8 |

\* Participants are defined as unique Building Account Numbers.

† Installed Projects are defined as number of Vendor Project IDs.

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

Table 3‑2 summarizes the installed measure quantities that are the basis for verified energy savings.

Table 3‑2. 2023 PHES Program Installed Measure Quantities

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Program Category | Program Path | Measure | Quantity Unit | Installed  Quantity |
| **PHES** | Public Housing | Attic Insulation | Sq Ft | 73,656 |
| Air Sealing | Ln Ft | 17,109 |
| Assessment/No Savings | Unit | 13,350 |
| Furnace Tune Up | Unit | 720 |
| Cover and Gap Sealers for AC | Unit | 715 |
| High Efficiency Boiler | Unit | 76 |
| Storage Water Heater | Unit | 76 |
| Boiler Tune Up | Unit | 6 |

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

## Program Savings Detail

Table 3‑3 summarizes the energy savings the Multi-family Income Eligible Program achieved by the Public Housing path in 2023.

Table 3‑3. 2023 PHES Program Annual Energy Savings Summary

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Program Category | Program Path | Ex Ante Gross Savings (Therms) | Verified Gross RR\* | Verified Gross Savings (Therms) | NTG† | Verified Net Savings (Therms) |
| **PHES** | Public Housing | 49,953 | 95% | 47,301 | 1.00 | 47,301 |
| **Total or Weighted Average** |  | **49,953** | **95%** | **47,301** | **1.00** | **47,301** |

\* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.

† A deemed value. Available on the SAG web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2023/>.

Source: Guidehouse evaluation team analysis.

## Program Savings by Measure

The program includes 30 measures as shown in Table 3‑4. The Pipe Insulation and Boiler Reset Controls measures of the Retrofits path contributed the most savings.

Table 3‑4. 2023 PHES Program Annual Energy Savings by Measure

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Program Category | Program Path | Savings Category | Ex Ante Gross Savings (Therms) | Verified Gross RR\* | Verified Gross Savings (Therms) | NTG† | Verified Net Savings (Therms) |
| **PHES** | Public Housing | Air Sealing | 7,391 | 100% | 7,391 | 1.00 | 7,391 |
| Furnace Tune Up | 19,210 | 99% | 19,031 | 1.00 | 19,031 |
| Cover and Gap Sealers for AC | 6,982 | 124% | 8,669 | 1.00 | 8,669 |
| Attic Insulation | 11,386 | 63% | 7,218 | 1.00 | 7,218 |
| Boiler Tune Up | 2,197 | 100% | 2,197 | 1.00 | 2,197 |
| High Efficiency Boiler | 2,076 | 100% | 2,083 | 1.00 | 2,083 |
| Storage Water Heater | 712 | 100% | 712 | 1.00 | 712 |
| **Total or Weighted Average** | | | **49,953** | **95%** | **47,301** | **1.00** | **47,301** |

Note: Totals may not sum due to rounding.

\* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.

† A deemed value. Available on the SAG web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2023/>.

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

## Impact Analysis Findings and Recommendations

The overall realization rate for the PHES program was 95% for therms in 2023. The program level realization rate was driven mainly by the lower verified savings for thermostat and insulation measures. The evaluation team developed three findings and recommendations based on the review of program data. The

### Impact Parameter Estimates

Table 3‑5 shows the per-unit therm savings and realization rate findings by measure from our review. The realization rate is the ratio of the verified savings to the gross ex ante savings. Following Table 3‑5 are findings and recommendations, including discussion of all measures with realization rates more or less than 100%. Appendix 1 provides a description of the impact analysis methodology.

Table 3‑5. 2023 PHES Program Verified Gross Savings Parameter

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Measure | Unit Basis | Ex Ante Gross (therms/unit) | Verified Gross (therms/unit) | Realization Rate | Data Source(s) |
| Air Sealing | Ln Ft | Varies | Varies | 100% | Illinois TRM, v11.0†, Section 5.6.1 and PTD\* |
| Attic Insulation | SQ FT | Varies | Varies | 63% | Illinois TRM, v11.0†, Section 5.6.5 and PTD\* |
| Cover and Gap Sealers for AC | Unit | Varies | Varies | 124% | Illinois TRM, v11.0†, Section 4.4.38 and PTD\* |
| Furnace Tune Up | Unit | Varies | Varies | 99% | Illinois TRM, v11.0†, Section 5.3.13 and PTD\* |
| High Efficiency Boiler | Unit | Varies | Varies | 100% | Illinois TRM, v11.0†, Section 4.4.10 and PTD\* |
| Water Heater | Unit | Varies | Varies | 100% | Illinois TRM, v11.0†, Section 4.3.1 and PTD\* |

\* Program Tracking Data (PTD) provided by Nicor Gas, extract dated January 30, 2024.

† State of Illinois Technical Reference Manual version 11.0 from <http://www.ilsag.info/technical-reference-manual.html>.

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

### Findings and Recommendations

**Finding 11.** The reported per-unit Therm savings for In-Unit AC Cover and Gap Sealer (DI) do not match with the values reported in the *DeemedThermSavings* column in the program tracking data. The evaluation team verified the *DeemedThermSavings column was* consistent with the IL-TRM, and leveraged these values as the verified savings for this measure.

**Recommendation 11.** Review the savings algorithm and the inputs used in the savings calculation and ensure these values match the inputs and algorithms from the IL-TRM (Section 4.4.38).

**Finding 12.** For the Attic Insulation measure, the ex ante savings did not include the minimum value of R-3 for uninsulated assemblies in the pre and post insulation values. The evaluation team added the minimum value when determining the verified savings, consistent with the IL-TRM.

**Recommendation 12.** Review the savings algorithm and the inputs used in the savings calculation and ensure these values match the algorithms from the IL-TRM (Section 5.6.5).

**Finding 13.** For the Furnace Tune Up measure, the evaluation team could not replicate the ex ante savings. The program data included baseline unit efficiencies of either 0.925 or 0.8, and a post tune-up efficiency of 0.95. The ex ante savings are very close to the savings ranging from 0.925 to 0.95 furnace efficiency but do not align exactly (a difference of 3%). The evaluation team used 0.925 for the baseline efficiency, and 0.95 for the post tune-up efficiency for all instances of this measure.

**Recommendation 13.** Review the savings algorithm and the inputs used in the savings calculation and ensure these values match the inputs and algorithms from the IL-TRM (Section 5.3.13).

##### Impact Analysis Methodology

The evaluation team used the same impact methodology for each component. Verified gross savings were determined for each program measure by:

* Reviewing the savings algorithm inputs in the measure workbook for agreement with the IL-TRM v11.0 and IL-TRM Errata, where applicable.
* Validating the savings algorithm was applied correctly.
* Cross-checking per-unit savings values in the program tracking data with the verified values in the measure workbook or in Guidehouse’s calculations if the workbook did not agree with the IL-TRM v11.0.
* Multiplying the verified per-unit savings value by the quantity reported in the tracking data. The team calculated verified net savings by multiplying the verified gross savings estimates by a NTG ratio. In Program Year 2023, NTG estimates used to calculate the net verified savings were based on past evaluation research and defined by a consensus process through the Illinois SAG.
* Guidehouse sourced methodologies and assumptions from the Illinois IL-TRM v11.0 and the final 2023 tracking data.

##### Program Specific Inputs for the Illinois TRC

###### Retrofits, Assessment, Healthy Homes, and Energy Savings Kits

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 Table B‑1 and will be provided to the evaluation team later. Guidehouse will include annual and lifetime water savings and greenhouse gas reductions in the end of year summary report.

Table B‑1. 2023 MFIE Program Verified Cost Effectiveness Inputs

| Program Category | Program Path | Savings Category | Units | Quantity | Effective Useful Life | Ex Ante Gross Savings (Therms) | Verified Gross Savings (Therms) | Verified Net Savings (Therms) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Multi-Family Income Eligible** | Retrofits | Pipe Insulation | Ln Ft | 32,249 | 15 | 228,035 | 256,150 | 256,150 |
| Boiler Reset Controls | Each | 121 | 16 | 87,751 | 99,528 | 99,528 |
| Air Sealing | Ln Ft | 516,505 | 20 | 204,750 | 204,669 | 204,669 |
| Programmable Thermostat | Each | 1,306 | 16 | 66,594 | 52,895 | 52,895 |
| Attic Insulation | Sq Ft | 657,955 | 20 | 115,442 | 63,723 | 63,723 |
| Controls for Domestic Hot Water | Each | 1,143 | 15 | 56,242 | 56,242 | 56,242 |
| High Efficiency Boiler | Each | 405 | 25 | 35,323 | 34,933 | 34,933 |
| Advanced Thermostat | Each | 462 | 11 | 33,283 | 22,733 | 22,733 |
| Showerhead (IU) | Each | 2,302 | 10 | 28,508 | 28,500 | 28,500 |
| Steam Trap | Each | 84 | 6 | 17,586 | 17,586 | 17,586 |
| Shower Timer | Each | 4,370 | 2 | 16,580 | 16,579 | 16,579 |
| Steam Boiler Averaging Controls | Each | 169 | 20 | 9,896 | 9,408 | 9,408 |
| Faucet Aerator - Kitchen (IU) | Each | 2,401 | 10 | 6,809 | 6,791 | 6,791 |
| Cover and Gap Sealers for AC | Each | 661 | 5 | 5,302 | 6,393 | 6,393 |
| Thermostatic Radiator Valves | Each | 316 | 15 | 3,686 | 3,686 | 3,686 |
| Basement/Sidewall Insulation | Sq Ft | 2,684 | 20 | 555 | 358 | 358 |
| Faucet Aerator - Bathroom (IU) | Each | 1,513 | 10 | 2,592 | 2,593 | 2,593 |
| Storage Water Heater | Each | 23 | 13 | 655 | 434 | 434 |
| Reprogrammable Thermostat | Each | 3 | 2 | 160 | 122 | 122 |
| Wall Insulation | Sq Ft | 648 | 20 | 72 | 23 | 23 |
| Assessment | Programmable Thermostat | Each | 1 | 16 | 80 | 80 | 80 |
| Faucet Aerator - Kitchen (IU) | Each | 1 | 10 | 4 | 4 | 4 |
| Healthy Homes | Attic Insulation | Sq Ft | 976 | 20 | 420 | 199 | 199 |
| Advanced Thermostat | Unit | 1 | 11 | 67 | 67 | 67 |
| Duct Sealing | Unit | 1 | 20 | 47 | 57 | 57 |
| Air Sealing | Ln Ft | 1 | 20 | 39 | 39 | 39 |
| Wall Insulation | Sq Ft | 600 | 20 | 75 | 30 | 30 |
| Faucet Aerator - Kitchen (IU) | Each | 1 | 10 | 13 | 13 | 13 |
| Showerhead (IU) | Each | 1 | 10 | 6 | 6 | 6 |
| Faucet Aerator - Bathroom (IU) | Each | 1 | 10 | 3 | 3 | 3 |
| Energy Savings Kits | Kit 1 MF | Each | 1 | 8.58 | 20 | 21 | 21 |
| Kit 2 MF | Each | 417 | 8.92 | 11,296 | 11,675 | 11,675 |
| Kit 4 MF | Each | 193 | 20 | 4,298 | 4,297 | 4,297 |
| **Total or Weighted Average** | | |  |  | **16.5** | **936,188** | **899,833** | **899,833** |

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

###### Public Housing Energy Savings

Table B‑2 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 Table B‑2 and will be provided to the evaluation team later. Guidehouse will include annual and lifetime water savings and greenhouse gas reductions in the end of year summary report.

Table B‑2. 2023 PHES Program Verified Cost Effectiveness Inputs

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Program Category | Program Path | Savings Category | Units | Quantity | Effective Useful Life | Ex Ante Gross Savings (Therms) | Verified Gross Savings (Therms) | Verified Net Savings (Therms) |
| **PHES** | Public Housing | Air Sealing | Ln Ft | 17,109 | 20 | 7,391 | 7,391 | 7,391 |
| Furnace Tune Up | Each | 720 | 3 | 19,210 | 19,031 | 19,031 |
| Cover and Gap Sealers for AC | Each | 715 | 5 | 6,982 | 8,669 | 8,669 |
| Attic Insulation | Sq Ft | 73,656 | 20 | 11,386 | 7,218 | 7,218 |
| Boiler Tune Up | Each | 6 | 3 | 2,197 | 2,197 | 2,197 |
| High Efficiency Boiler | Each | 76 | 25 | 2,076 | 2,083 | 2,083 |
| Storage Water Heater | Each | 76 | 13 | 712 | 712 | 712 |
| Assessment/No Savings | Each | 13,350 | 0 | 0 | 0 | 0 |
| **Total or Weighted Average** | | |  |  | **9.7** | **49,953** | **47,301** | **47,301** |

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

1. In this report, unless stated otherwise, IL-TRM refers to version 11.0 (v11.0) [↑](#footnote-ref-2)