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| Home Energy Efficiency Rebates Program 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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# Introduction

This report presents the results of the impact evaluation of the Nicor Gas 2023 Home Energy Efficiency Rebates (HEER) program and a summary of the energy savings impacts achieved. The appendices present the impact analysis methodology and Illinois total resource cost (TRC) inputs. Program year 2023 covers January 1, 2023, through December 31, 2023.

# Program Description

The Nicor Gas HEER program provides Nicor Gas customers with rebate incentives for purchasing high annual fuel utilization efficiency (AFUE) furnaces and boilers, tankless water heaters, and advanced thermostats. Participants may apply for the rebates themselves, or contractors may assist them in the rebate application process. Rebates are processed and sent to residential customers after installation of qualified measures. Members of the Nicor Gas Contractor Circle may offer rebates as instant discounts.

The program had 27,673 participants in 2023 and completed 29,194 projects as shown in Table 2‑1.

Table 2‑1. 2023 Volumetric Findings Detail

|  |  |
| --- | --- |
| Participation | Total |
| Participants \* | 27,673 |
| Installed Projects † | 29,194 |

\* Participants are defined as count of unique building account numbers.

† Installed Projects are defined as count of unique 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 Installed Measure Quantities

| **Measure** | **Quantity Unit** | **Installed Quantity** |
| --- | --- | --- |
| Advanced Thermostat - Manual Baseline | Each | 8,665 |
| Advanced Thermostat - Programmable Baseline | Each | 9,813 |
| Advanced Thermostat - Unknown Baseline | Each | 1,825 |
| Boilers, >95% AFUE <300 MBH | Each | 121 |
| Combination Boilers, >95% AFUE <300 MBH | Each | 75 |
| Furnace, >95% AFUE | Each | 8,776 |
| Furnace, >97% AFUE | Each | 1,242 |
| Tankless Water Heater | Each | 448 |

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

# Program Savings Detail

Table 3‑1 summarizes the energy savings the HEER Program achieved by path in 2023. Projects in disadvantaged communities (DAC) designated sites have a verified net-to-gross ratio (NTG) of 1.00.

Table 3‑1. 2023 Annual Energy Savings Summary

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Program Category** | **Measure Type** | **Ex Ante Gross Savings (Therms)** | **Verified Gross RR\*** | **Verified Gross Savings (Therms)** | | **NTG†** | **NPSO**‡ | **Verified**  **Net**  **Savings (Therms)** |
| **Disadvantaged Communities (DAC)** | | |  |  |  | |  |  |
|  | Advanced Thermostats | 257,411 | 101% | 259,946 | 1.00 | | N/A | 259,946 |
|  | Boilers | 2,906 | 100% | 2,906 | 1.00 | | N/A | 2,906 |
|  | Furnaces | 129,281 | 100% | 129,451 | 1.00 | | N/A | 129,451 |
|  | Water Heaters | 1,386 | 100% | 1,386 | 1.00 | | N/A | 1,386 |
| ***DAC Subtotal*** |  | ***390,984*** | ***101%*** | ***393,689*** |  | |  | ***393,689*** |
| **Non-Disadvantaged Communities** | | |  |  |  | |  |  |
|  | Advanced Thermostats | 1,453,387 | 101% | 1,464,500 | 0.90 | | 1.048 | 1,381,316 |
|  | Boilers | 42,050 | 100% | 42,050 | 0.84 | | 1.048 | 37,017 |
|  | Furnaces | 1,790,325 | 100% | 1,792,715 | Furnaces > 95% = 0.84 Furnaces > 97% = 0.86 | | 1.048 | 1,583,532 |
|  | Water Heaters | 31,380 | 100% | 31,380 | 0.84 | | 1.048 | 27,624 |
| ***Non-DAC Subtotal*** | | ***3,317,142*** | ***100%*** | ***3,330,644*** |  | |  | ***3,029,490*** |
| **Total or Weighted Average** | | **3,708,126** | **100%** | **3,724,333** |  | |  | **3,423,179** |

\* 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/>. Disadvantaged communities (DAC) designated sites based on census track used a NTG of 1.0.

‡ The market rate net savings were multiplied by a residential non-participant spillover (NPSO) factor of 1.048 (not applicable to DAC designation sites).

Source: Guidehouse evaluation team analysis.

# Program Savings by Measure

The program includes eight measures as shown in Table 4‑1. Furnace and advanced thermostat measures contributed the most savings. Projects in disadvantaged communities (DAC) designated sites have a verified net-to-gross ratio (NTG) of 1.00.

Table 4‑1. 2023 Annual Energy Savings by Measure

| **Program Category** | **Savings Category** | **Ex Ante Gross Savings (Therms)** | **Verified Gross RR\*** | **Verified Gross Savings (Therms)** | **NTG†** | **NPSO**‡ | **Verified Net Savings (Therms)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***Disadvantaged Communities*** | |  |  |  |  |  |  |
|  | Advanced Thermostat - Manual Baseline | 109,921 | 101% | 111,492 | 1.00 | N/A | 111,492 |
|  | Advanced Thermostat - Programmable Baseline | 65,587 | 101% | 66,404 | 1.00 | N/A | 66,404 |
|  | Advanced Thermostat - Unknown Baseline | 81,902 | 100% | 82,050 | 1.00 | N/A | 82,050 |
|  | Boilers, >95% AFUE <300 MBH | 1,803 | 100% | 1,803 | 1.00 | N/A | 1,803 |
|  | Combination Boilers, >95% AFUE <300 MBH | 1,104 | 100% | 1,104 | 1.00 | N/A | 1,104 |
|  | Furnace, >95% AFUE | 118,572 | 100% | 118,726 | 1.00 | N/A | 118,726 |
|  | Furnace, >97% AFUE | 10,709 | 100% | 10,725 | 1.00 | N/A | 10,725 |
|  | Tankless Water Heater | 1,386 | 100% | 1,386 | 1.00 | N/A | 1,386 |
| ***DAC Subtotal*** |  | ***390,984*** | ***101%*** | ***393,689*** |  |  | ***393,689*** |
| **Non-Disadvantaged Communities** | |  |  |  |  |  |  |
|  | Advanced Thermostat - Manual Baseline | 759,035 | 101% | 766,390 | 0.90 | 1.048 | 722,859 |
|  | Advanced Thermostat - Programmable Baseline | 623,379 | 101% | 626,982 | 0.90 | 1.048 | 591,370 |
|  | Advanced Thermostat - Unknown Baseline | 70,973 | 100% | 71,127 | 0.90 | 1.048 | 67,087 |
|  | Boilers, >95% AFUE <300 MBH | 24,511 | 100% | 24,511 | *0.84* | 1.048 | 21,578 |
|  | Combination Boilers, >95% AFUE <300 MBH | 17,539 | 100% | 17,539 | 0.84 | 1.048 | 15,440 |
|  | Furnace, >95% AFUE | 1,534,536 | 100% | 1,536,547 | 0.84 | 1.048 | 1,352,653 |
|  | Furnace, >97% AFUE | 255,789 | 100% | 256,168 | 0.86 | 1.048 | 230,879 |
|  | Tankless Water Heater | 31,380 | 100% | 31,380 | 0.84 | 1.048 | 27,624 |
| ***Non-DAC Subtotal*** |  | ***3,317,142*** | ***100%*** | ***3,330,645*** |  |  | ***3,029,490*** |
| **Total or Weighted Average** | | **3,708,126** | **100%** | **3,724,333** |  |  | **3,423,179** |

\* 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/>. Disadvantaged communities (DAC) designated sites based on census track used a NTG of 1.0.

‡ The market rate net savings were multiplied by a residential non-participant spillover (NPSO) factor of 1.048 (not applicable to DAC designation sites).

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

# Impact Analysis Findings and Recommendations

## Impact Parameter Estimates

Table 5‑1 shows the unit therm savings and realization rate findings by measure from the evaluation team’s review. The realization rate is the ratio of the verified savings to the gross ex ante savings. Following Table 5‑1 are 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 5‑1. 2023 Verified Gross Savings Parameters

| **Measure** | **Unit Basis** | **Ex Ante Gross (therms/unit)** | **Verified Gross (therms/unit)** | **Realization Rate** | **Data Source(s)** |
| --- | --- | --- | --- | --- | --- |
| Advanced Thermostat - Manual Baseline | Each | Varies | Varies | 101% | Illinois  TRM, v11.0†, Section 5.3.16 and PTD |
| Advanced Thermostat - Programmable Baseline | Each | Varies | Varies | 101% | Illinois  TRM, v11.0†, Section 5.3.16 and PTD |
| Advanced Thermostat - Unknown Baseline | Each | Varies | Varies | 100% | Illinois  TRM, v11.0†, Section 5.3.16 and PTD |
| Boilers, >95% AFUE <300 MBH | Each | Varies | Varies | 100% | Illinois  TRM, v11.0†, Section 5.3.6 and PTD |
| Combination Boilers, >95% AFUE <300 MBH | Each | Varies | Varies | 100% | Illinois  TRM, v11.0†, Section 5.3.17 and PTD |
| Furnace, >95% AFUE | Each | Varies | Varies | 100% | Illinois  TRM, v11.0†, Section 5.3.7 and PTD |
| Furnace, >97% AFUE | Each | Varies | Varies | 100% | Illinois  TRM, v11.0†, Section 5.3.7 and PTD |
| Tankless Water Heater | Each | Varies | Varies | 100% | Illinois  TRM, v11.0†, Section 5.4.2 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>.

## Findings and Recommendations

### Overall, the realization rate for the Home Energy Efficiency Rebates Program was 100%. The below findings are minor and will help the evaluation team with the verification process.

### Existing Furnace Annual Fuel Utilization Efficiency Rating

**Finding 1.** The ex-ante calculation for Gas High Efficiency Furnaces used a rounded value of 64.0% for AFUE percentage instead of 64.4% as defined by the TRM v11.0. This value occurs in the ‘PreInstallationEfficiency’ column listed in the HEER Evaluation Participation Report.

**Recommendation 1.** Use AFUE = 64.4%, based on the TRM. Review the tracking system inputs and ensure deemed the TRM inputs provided in the tracking data adequately reflect what were used in the ex ante savings calculation.

### Residential Building Type

**Finding 2.** Within the HEER Evaluation Participation Report file, the “ResidentialBuildingType” column contained all ‘NA’ values. Evaluation used the householder factor in the tracking data to determine the building type.

**Recommendation 2.** Populate the “ResidentialBuildingType” field in the tracking data and use it to determine household factor for advanced thermostats.

### Household Factor

**Finding 3.** In 1,225 cases, the evaluation team observed that the ex ante calculation used a different household factor than what was provided in the tracking data. In 1,045 cases, the household factor was listed as 1.00 in the data, but a different value was used in the calculation. The evaluation team relied on the household factor column to determine residential building type.

Example Project IDs: NicorTherm197993ST, NicorTherm191070ST, NicorTherm201626ST, NicorTherm198786ST, and NicorTherm183319ST

**Recommendation 3.** Review the HEER Participation Report columns and ensure these reflect the values used in the ex ante calculation. Provide the housing type in the tracking data to enable the evaluation team to confirm the savings inputs.

##### Impact Analysis Methodology

Guidehouse determined verified gross savings for each program measure by conducting a tracking system review. Guidehouse used the Illinois TRM v11.0[[1]](#footnote-2) methodology to calculate verified gross savings. Guidehouse calculated verified net energy savings by multiplying the verified gross savings estimates by a deemed net-to-gross ratio (NTG) and then by the deemed non-participant spillover factor (NPSO) of 1.048. The 2023 NTG were based on past evaluation research and defined by a consensus process through SAG.[[2]](#footnote-3) Economically-disadvantaged areas (DAC) were identified by 2020 census track and evaluation used NTG of 1.0 for DAC projects, based on Illinois Policy Manual 3.0.[[3]](#footnote-4)

##### 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 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 Verified Cost Effectiveness Inputs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Savings Category** | **Units** | **Quantity** | **Effective Useful Life** | **Ex Ante Gross Savings (Therms)** | **Verified Gross Savings (Therms)** | **Verified Net Savings (Therms)** |
| Advanced Thermostat - Manual Baseline | Each | 8,665 | 11 | 868,956 | 877,882 | 834,351 |
| Advanced Thermostat - Programmable Baseline | Each | 9,813 | 11 | 688,966 | 693,386 | 657,774 |
| Advanced Thermostat - Unknown Baseline | Each | 1,825 | 11 | 152,876 | 153,177 | 149,137 |
| Boilers, > 95% AFUE <300 MBH | Each | 121 | 25 | 26,314 | 26,314 | 23,380 |
| Combination Boilers, >95% AFUE <300 MBH | Each | 75 | 21.5 | 18,643 | 18,643 | 16,543 |
| Furnace, >95% AFUE | Each | 8,776 | 20 | 1,653,108 | 1,655,273 | 1,471,379 |
| Furnace, >97% AFUE | Each | 1,242 | 20 | 266,498 | 266,893 | 241,604 |
| Tankless Water Heater | Each | 448 | 13 | 32,766 | 32,766 | 29,010 |
| **Total or Weighted Average** | | **30,965** | **14.0** | **3,708,126** | **3,724,333** | **3,423,179** |

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

1. Available on the SAG web site: http://www.ilsag.info/technical-reference-manual.html [↑](#footnote-ref-2)
2. A deemed value. Available on the SAG website: https://www.ilsag.info/evaluator-ntg-recommendations-for-2022/ [↑](#footnote-ref-3)
3. https://www.ilsag.info/wp-content/uploads/IL\_EE\_Policy\_Manual\_Version\_3.0\_Final\_11-3-2023.pdf [↑](#footnote-ref-4)