

# **Affordable Housing New Construction Impact Evaluation Report**

**Energy Efficiency Plan: Program Year 2024  
(1/1/2024-12/31/2024)**

**Prepared for:**

**Nicor Gas Company**

**FINAL**

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# Introduction

This report presents the results of the impact evaluation of the Nicor Gas 2024 Affordable Housing New Construction (AHNC) Program. It summarizes the total gas savings impacts and broken out by relevant measures. The appendices provide the impact analysis methodology and details of the total resource cost (TRC) analysis inputs. Program year 2024 covers January 1, 2024 through December 31, 2024.

# Program Description

The AHNC Program provides technical assistance and incentives for energy efficient construction and major renovation of affordable multifamily housing. The program targets developers and owners constructing housing for households with incomes at or below 80% of the area median income. The program also aims to educate developers on cost-effective energy efficient building practices. The program has two participation levels: (1) major renovation and (2) new multifamily. The AHNC Program is offered jointly to affordable housing developers and owners served by ComEd and Nicor Gas, where their service territories overlap. Slipstream implemented the program.

In 2024, the AHNC Program had 21 total projects with 1,235 total units and 1,198 income eligible residential units, as Table 1 shows. Nicor Gas served eight of these projects, including 364 total and income-eligible units.

**Table 1. 2024 Volumetric Findings Detail**

Participation	Quantity Total (ComEd & Nicor Gas)	Quantity (Nicor Gas)	Units
Participants *	21	8	Projects
Number of Affordable Units †	1,198	364	Residential Dwelling Units
Number of Total Units ‡	1,235	364	Residential Dwelling Units
Building Area	1,205,041	461,800	Square Feet

\* Participants are defined as completed projects.

† Affordable units are defined as income-eligible dwelling units.

‡ Total units are defined as total of income-eligible and market rate dwelling units.

Source: Nicor Gas tracking data and evaluation team analysis.

Natural gas savings for these projects were due to improvements to HVAC, shell, appliances, and hot water end use types. Table 2 summarizes the installed measure quantities that are the basis for verified energy savings.

**Table 2. 2024 Installed Measure Quantities**

Program Category	Measure	Quantity Unit	Installed Quantity
Shell	Higher Performance Windows	SF	37,116
Shell	Reduced Infiltration	CFM50	135,347
Shell	Reduced Thermal Bridging	SF	158,325
HVAC	High-Performance HVAC Equipment	Units	200
HVAC	Efficient Ventilation	Units	8
HVAC	Advanced HVAC Controls	Dwelling Units	127
Hot Water	High-Performance Water Heating Equipment	Units	56
Hot Water	Hot Water Conservation	Units	1,608
Appliances	Efficient Appliances	Units	567

Source: Nicor Gas tracking data and evaluation team analysis.

## Program Savings Detail

Table 3 summarizes the energy savings the Nicor Gas AHNC Program achieved in 2024. The program completed three projects in 2024, with project realization rates (RR) ranging from 98% to 108%. The overall 2024 program RR for Nicor Gas AHNC Program was 102%.

**Table 3. 2024 Annual Energy Savings Summary**

Project	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG+	Verified Net Savings (Therms)
AH0095	1,399	108%	1,506	1.00	1,506
AH0108	13,330	100%	13,330	1.00	13,330
AH0166	9,274	98%	9,068	1.00	9,068
AH0167	9,858	100%	9,858	1.00	9,858
AH0172	18,653	99%	18,454	1.00	18,454
AH0191	1,931	100%	1,929	1.00	1,929

Project	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG+	Verified Net Savings (Therms)
AH0194	25,277	107%	27,121	1.00	27,121
AH0250	553	101%	558	1.00	558
<b>Total or Weighted Average</b>	<b>80,275</b>	<b>102%</b>	<b>81,824</b>	<b>1.00</b>	<b>81,824</b>

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

† NTG, Net to Gross is the deemed value available on the SAG website: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2024/>.

Source: Evaluation team analysis.

## Program Savings by Measure

The 2024 projects completed in the Nicor Gas AHNC Program include measures in nine research categories with natural gas savings as Table 4 shows. High-performance HVAC Equipment contributed the most savings, at 42% of the program natural gas savings. High performance water heating equipment is the next largest category, at 19% of the program natural gas savings.

**Table 4. 2024 Annual Energy Savings by Measure**

Savings Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG+	Verified Net Savings (Therms)
High-Performance Windows	1,022	100%	1,021	1.00	1,021
Reduced Infiltration	5,570	103%	5,650	1.00	5,650
Reduced Thermal Bridging	2,407	103%	2,402	1.00	2,402
High-Performance HVAC Equipment	34,040	100%	33,882	1.00	33,882
Efficient Ventilation	6,720	102%	6,720	1.00	6,720
Advanced HVAC Controls	5,479	99%	5,421	1.00	5,421
High-Performance Water Heating Equipment	15,601	117%	18,270	1.00	18,270
Hot Water Conservation	8,110	96%	7,766	1.00	7,766
Efficient Appliances	1,325	52%	691	1.00	691
<b>Total or Weighted Average</b>	<b>80,275</b>	<b>102%</b>	<b>81,824</b>	<b>1.00</b>	<b>81,824</b>

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

† NTG, Net to Gross is the deemed value available on the SAG website: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2024/>.  
Source: Evaluation team analysis.

# Impact Analysis Findings and Recommendations

## Impact Parameter Estimates

Table 5 shows the data sources used for each measure type. 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 5. Verified Gross Savings Parameters**

Measure	Unit Basis	Data Source(s)
Advanced HVAC Controls (Smart Thermostats)	%Elec heat, CF_pjm, Fe, Heating_reduction, Household factor, Eff_ISR_heat, FLH, Cooling_reduction, Eff_IST_cool, Cooling_DemandReduction	IL-TRM† – Section 5.3.16, Project Documentation
Air Sealing - Infiltration	N_heat, N_cool, HDD, CDD,FLH_cooling, LM, ADJ_AirSealingCooling, ADJ_AirSealingHeatFan, IE_NetCorrection	Section 5.6.1, Project Documentation
Bathroom Aerators	GPM_base, L_base, L_low, faucets per household (FPH), drain factor (DF), EPG_electric, CF, NTG†, %DHW, Household, ISR, Hours, gallons per hour (GPH), throttling factor, Supply temperature	Section 5.4.4, Project Documentation
Kitchen Aerators	GPM_base, L_base, L_low, faucets per household (FPH), drain factor (DF), EPG_electric, CF, NTG†, %DHW, Household, ISR, Hours, gallons per hour(GPH), throttling factor, supply temperature	Section 5.4.4, Project Documentation
Clothes Dryers	Load, Ncycles, CF, CEF_base, %Electric	Section 5.1.10, Project Documentation
Clothes Washer	Ncycles, IMEF_base, %CW, %DHW, %dryer, Hours, IWF_base, CF	Section 5.1.2, Project Documentation
Dishwasher	Maximum kWh/year, Maximum gallons/cycle, %kWh_op, %kWh_heat, Hours, CF,	Section 5.1.4, Project Documentation
High-Performance Water Heating Equipment	Baseline UEF, gallons per day, Household, T_in, T_out, Location factor, LM, waste heat portion resulting in cooling savings, waste heat increasing heating load, CF, Hours	Section 5.4.3, Project Documentation

\* Program Tracking Data (PTD) provided by Nicor Gas, extract dated January 30, 2025.

† State of Illinois Technical Reference Manual version 7.0-12.0 from <http://www.ilsag.info/technical-reference-manual.html>.

‡ Project files and monthly billing data provided by Nicor Gas. Where conducted, on-site or telephone interview data collected by Guidehouse.

## ***Findings and Recommendations***

**Finding 1.** The evaluation team adjusted several projects due to inconsistency in equipment quantities and specifications in the calculations compared with the information in the project documentation. The evaluation team's adjustments included:

- The evaluation team adjusted areas for windows or shell areas for four projects (AH0166, AH0172, AH0191, and AH0194). These adjustments were typically small and resulted in minor adjustments savings. Adjusting the area increased the 6% increase in the window savings for this project, but a negligible change (<0.1%) in the overall program natural gas energy savings.
- Appliances for two projects (AH0166 and AH0250) were claimed to be ENERGY STAR, but the provided model numbers in the SVR reports were for non-qualifying equipment. This included clothes washers for project AH0166 and dishwashers for project AH0250.
- Project AH0194 included the installation of ENERGY STAR gas clothes dryers. However, based on the model number, the installed clothes dryer was an electric unit.
- The water heater volume for project AH0172 was slightly reduced based on the manufacturer's specifications.
- The water heater efficiency (UEF), draw pattern, and input heating capacity values (BTU/Hr) were significantly adjusted for project AH0194. The cause is unclear but appears to potentially be due to a change in installed equipment.

**Recommendation 1.** Consider adding quality control checks to ensure that claimed window areas are correct.

**Finding 2.** The evaluation team adjusted reduced infiltration savings for one project (AH0250) due to incorrect CFM50 values being used in the analysis. The source of the CFM50 value for AH0250 is unclear but does not match the blower door test results provided with the project. It is possible that the input value is also a placeholder value or was input incorrectly.

**Recommendation 2.** Consider adding quality control checks to ensure that project savings and documentation are updated to reflect as-installed equipment.

**Finding 3.** The evaluation team adjusted HVAC savings for two projects (AH0166 and AH0172) due to HVAC units installed to serve commercial spaces being listed as residential units. This change also impacted the advanced HVAC controls savings for project AH0172. These changes reduced the HVAC equipment savings by 0.5%, the advanced HVAC controls savings by 1.1%, and the overall program savings by 0.3%.

**Recommendation 3.** Ensure that calculation methodologies for HVAC equipment accurately reflect the space types served, including using correct heating and cooling effective full load hour values from the TRM.

**Finding 4.** Ex ante showerhead savings were calculated based on TRM assumptions on the number of showerheads per tenant unit. The project documentation includes sufficient information to use the actual number of showerheads per tenant unit in the calculation rather than using the TRM default assumptions, increasing the accuracy of the savings estimate. The

evaluation updated the analysis to reflect the as-installed condition for each project, which decreased the natural gas hot water conservation savings by 4.2%.

**Recommendation 4.** The calculation approach should be updated to accurately reflect the number of installed showerheads per tenant unit when that data is available.

## Appendix A. Impact Analysis Methodology

The evaluation team conducted site-specific research to verify project savings that were not based on measures specified in the TRM. Projects were randomly selected through a stratified sample design at the tracking record level using the population gross therm savings determined from program tracking data. Strata were defined by project size, based on gross energy savings boundaries that placed about one-third of program-level savings into each stratum.

### Engineering Review of Project Files

For each project, an in-depth application review is performed to assess the engineering methods, parameters and assumptions used to generate all ex ante impact estimates. For each measure in the sampled project, engineers estimated ex post gross savings based on their review of documentation and engineering analysis.

To support this review, the implementation contractor provided project documentation in electronic format for each sampled project. Documentation included some or all scanned files of hardcopy application forms and supporting documentation from the applicant (invoices, measure specification sheets, and vendor proposals), pre-inspection reports and photos, post inspection reports and photos, and calculation spreadsheets.

Table A-1 describes the natural gas savings measures included in each research category.

The natural gas savings for each measure are calculated by the template based on the specifications for the individual equipment installed and the calculation approach specified in the Illinois TRM for the installed measure.

The evaluation team applied algorithms outlined in the IL-TRM in use when the project applications were submitted to calculate AHNC program verified gross savings. One project was based on IL-TRM v7.0, three projects were based on IL-TRM v8.0, three project were based on IL-TRM v9.0, and one was based on IL-TRM v11.0.

The team verified that these algorithms and appropriate deemed input parameters were applied correctly and validated any custom parameters through project documentation and actual equipment specifications. The evaluation team calculated verified net savings by multiplying the verified gross savings by the net-to-gross (NTG) ratio approved through a consensus process managed through the Illinois State Advisory Group (SAG). Table A-1 presents the parameters used in the verified gross and net savings calculations and indicates which were calculated through evaluation activities and which were deemed.

**Table A-1. Equipment by Savings Category**

Savings Category	Equipment	Projects
High-Performance Windows	High Performance Windows	AH0095, AH0166, AH0167, AH0172, AH0191, AH0194, AH0250
Reduced Infiltration	Air-Sealing	All
Reduced Thermal Bridging	Wall Insulation Roof/Attic Insulation	AH0095, AH0108, AH0166, AH0167
High-Performance HVAC Equipment	High Efficiency Furnaces High Efficiency Boilers	AH0166, AH0167, AH0172, AH0194, AH0250
Efficient Ventilation	Energy Recovery Units	AH0108, AH0167
Advanced HVAC Controls	Advanced Thermostats	AH0166, AH0172, AH0250
High-Performance Water Heating Equipment	In-Unit Gas Storage Water Heater In-Unit Gas Tankless Water Heater Central Gas Water Heater	All
Hot Water Conservation	Low-flow Showerhead Bathroom Faucet Aerator Kitchen Faucet Aerator	All
Efficient Appliances	ENERGY STAR Clothes Washer ENERGY STAR Clothes Dryer ENERGY STAR Dishwasher	AH0095, AH0166, AH0167, AH0191, AH0194, AH0250

\* IL-TRM is the Illinois Technical Reference Manual from <http://www.ilsag.info/technical-reference-manual.html>. Project application date determined the applicable IL-TRM version used.

† A deemed value. Available on the SAG web site: [https://www.ilsag.info/wp-content/uploads/Nicor\\_Gas\\_NTG\\_2024\\_Values\\_Final\\_2023-09-27.xlsx](https://www.ilsag.info/wp-content/uploads/Nicor_Gas_NTG_2024_Values_Final_2023-09-27.xlsx)

Source: Guidehouse evaluation team analysis.

## **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. Guidehouse will include annual and lifetime water savings and greenhouse gas reductions in the end of year summary report.

**Table B-1. Verified Cost-Effectiveness Inputs**

Savings Category	DAC Project*	Units	Quantity	Effective Useful Life	Early Replacement Flag	Verified Gross Annual Water Savings (Gallons)	Ex Ante Gross Savings (Therms)*	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
High-Performance Windows	TRUE	SF	37,116	20.0	NO	-	1,022	1,021	1,021
Reduced Infiltration	TRUE	CFM50	135,347	20.0	NO	-	5,570	5,650	5,650
Reduced Thermal Bridging	TRUE	SF	158,325	20.0	NO	-	2,407	2,402	2,402
High-Performance HVAC Equipment	TRUE	Units	200	19.5	NO	-	34,040	33,882	33,882
Efficient Ventilation	TRUE	Units	8	15.0	NO	-	6,720	6,720	6,720
Advanced HVAC Controls	TRUE	Units	127	11.0	NO	-	5,479	5,421	5,421
High-Performance Water Heating Equipment	TRUE	Units	56	16.0	NO	-	15,601	18,270	18,270
Hot Water Conservation	TRUE	Units	1,608	10.0	NO	-	8,110	7,766	7,766
Efficient Appliances	TRUE	Units	567	13.8	NO	-	1,325	691	691
<b>Total or Weighted Average</b>				<b>16.9</b>		<b>-</b>	<b>80,275</b>	<b>81,824</b>	<b>81,824</b>

Source: Evaluation team analysis.