Guidehouse
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Small Business Program Impact Evaluation Report

Energy Efficiency Plan: Program Year 2023 (1/1/2023-12/31/2023)

Prepared for:

Nicor Gas Company

FINAL

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1. Introduction

This report presents the results of the impact evaluation of the Nicor Gas 2023 Small Business Energy Efficiency Program (SBEEP) and a summary of the energy impacts for the total program, as well as relevant measures and program structure details. 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.

2. Program Description

The SBEEP program is designed to assist qualified Nicor Gas non-residential customers to achieve natural gas energy savings through installation of direct-install (DI) energy efficiency measures, as well as prescriptive and custom incentives offered for select measures. The program targets both private sector and public sector customers.

The program had 472 participants in 2023 and completed 621 projects as shown in Table 2-1.

Table 2-1. 2023 Volumetric Findings Detail

Participation	Direct Install	Prescriptive	Custom	Total
Private Sector				
Participants *	249	218	**0**	**467**
Installed Projects †	372	242	**0**	**614**
Measure Types Installed	7	13	**0**	**20**
Public Sector				
Participants *	3	2	**0**	**5**
Installed Projects †	3	4	**0**	**7**
Measure Types Installed	1	2	**0**	**3**
Program 2023 Total				
Participants *	252	220	**0**	**472**
Installed Projects †	375	246	**0**	**621**
Measure Types Installed	8	15	**0**	**23**

* Participants are defined as unique business names.
† Installed Projects are defined as 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

Program Category	Program Path	Measure	Quantity Unit	Installed Quantity
Private	Direct Install	Commercial Weather Stripping	Each	6
Private	Direct Install	DHW WH Pipe Wrap - DI	Ln Ft	23
Private	Direct Install	Faucet Aerators - Bath - DI	Each	713
Private	Direct Install	Faucet Aerators - Kitchen - DI	Each	19
Private	Direct Install	Low Flow Shower Heads - DI	Each	26
Private	Direct Install	Mid Business Assessment	Each	524
Private	Direct Install	Spray Valve (Med Sized Restaurants)-DI	Each	41
Private	Direct Install	Spray Valve (Small Restaurants)-DI	Each	23
Private	Direct Install-DAC	Commercial Weather Stripping	Each	2
Private	Direct Install-DAC	Faucet Aerators - Bath - DI	Each	168
Private	Direct Install-DAC	Faucet Aerators - Kitchen - DI	Each	4
Private	Direct Install-DAC	Spray Valve (Med Sized Restaurants)-DI	Each	8
Private	Direct Install-DAC	Spray Valve (Small Restaurants)-DI	Each	8
Private	Prescriptive	Boiler Tune Up, Process	Each	2
Private	Prescriptive	Boiler Tune Up, Space Heating	Each	2
Private	Prescriptive	Combination Oven	Each	1
Private	Prescriptive	Condensing Boilers, >90%	Each	3
Private	Prescriptive	Convection Oven, E >46%	Each	1
Private	Prescriptive	Furnace, >92% AFUE	Each	3
Private	Prescriptive	Furnace, >95% AFUE	Each	9
Private	Prescriptive	Infrared Charbroiler	Each	1
Private	Prescriptive	Infrared Heaters	Each	8
Private	Prescriptive	Pipe Insulation, Indoor HPS Process Heat	Ln Ft	1
Private	Prescriptive	Small Commercial Thermostat	Each	3
Private	Prescriptive	Steam Trap, Dry Cleaner	Each	1308
Private	Prescriptive	Steam Trap, Indust MP 15-30 psig	Each	25
Private	Prescriptive-DAC	Boiler Tune Up, Space Heating	Each	1
Private	Prescriptive-DAC	Furnace, >92% AFUE	Each	1
Private	Prescriptive-DAC	Steam Trap, Dry Cleaner	Each	145
Public	Direct Install	Faucet Aerators - Bath - DI	Each	23
Public	Direct Install	Mid Business Assessment	Each	6
Public	Direct Install	Faucet Aerators - Bath - DI	Each	4

Program Category	Program Path	Measure	Quantity Unit	Installed Quantity
Public	Prescriptive	Boiler Tune Up, Space Heating	Each	2
Public	Prescriptive-DAC	Furnace, >95% AFUE	Each	2

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

3. Program Savings Detail

Table 3-1 summarizes the energy savings the Small Business Energy Efficiency Program achieved by path in 2023.

Table 3-1. 2023 Energy Savings Summary

Program Category	Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
Private						
	Direct Install	22,706	101%	22,902	0.96	21,986
	Direct Install-DAC	5,340	100%	5,337	1.00	5,337
	Prescriptive	1,075,884	100%	1,075,920	All Other Measures =0.96 Thermostat =0.98	1,032,883
	Prescriptive-DAC	117,405	103%	117,586	1.00	117,586
Private Subtotal		**1,221,335**	**100%**	**1,221,745**		**1,177,792**
Public						
	Direct Install	156	100%	156	0.96	149
	Direct Install-DAC	14	100%	14	1.00	14
	Prescriptive	4,691	117%	5,447	0.96	5,229
	Prescriptive-DAC	498	95%	476	1.00	476
Public Subtotal		**5,359**	**100%**	**6,092**		**5,868**
Total or Weighted Average		**1,226,694**	**100%**	**1,227,837**		**1,183,660**

* 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/**. The DAC designated sites were based on census track and used a NTG of 1.0.
Source: Guidehouse evaluation team analysis.

4. Program Savings by Measure

The SBEEP program includes 32 measures as shown in Table 4-1. The condensing boilers and stream trap prescriptive measures contributed the most savings.

Table 4-1. 2023 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)
Private	Direct Install	Commercial Weather Stripping	62	93%	58	0.96	55
	Direct Install	DHW WH Pipe Wrap - DI	27	92%	24	0.96	23
	Direct Install	Faucet Aerators - Bath - DI	7,531	100%	7,531	0.96	7,229
	Direct Install	Faucet Aerators - Kitchen - DI	260	100%	260	0.96	250
	Direct Install	Low Flow Shower Heads - DI	344	159%	546	0.96	525
	Direct Install	Spray Valve (Med Sized Restaurants)-DI	9,338	100%	9,338	0.96	8,965
	Direct Install	Spray Valve (Small Restaurants)-DI	5,144	100%	5,144	0.96	4,938
	Direct Install-DAC	Commercial Weather Stripping	21	87%	18	1.00	18
	Direct Install-DAC	Faucet Aerators - Bath - DI	1,481	100%	1,481	1.00	1,480
	Direct Install-DAC	Faucet Aerators - Kitchen - DI	40	100%	40	1.00	40

Program Category	Program Path	Savings Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
	Direct Install-DAC	Spray Valve (Med Sized Restaurants)-DI	1,899	100%	1,899	1.00	1,899
	Direct Install-DAC	Spray Valve (Small Restaurants)-DI	1,899	100%	1,899	1.00	1,899
	Prescriptive	Boiler Tune Up, Process	1,036	62%	632	0.96	607
	Prescriptive	Boiler Tune Up, Space Heating	3,138	129%	3,158	0.96	3,032
	Prescriptive	Combination Oven	505	105%	531	0.96	510
	Prescriptive	Condensing Boilers, >90%	10,599	106%	11,258	0.96	10,808
	Prescriptive	Convection Oven, E >46%	190	99%	188	0.96	181
	Prescriptive	Furnace, >92% AFUE	1,066	109%	1,164	0.96	1,118
	Prescriptive	Furnace, >95% AFUE	3,134	101%	3,053	0.96	2,931
	Prescriptive	Infrared Charbroiler	707	100%	707	0.96	678
	Prescriptive	Infrared Heaters	2,197	100%	2,197	0.96	2,109
	Prescriptive	Pipe Insulation, Indoor HPS Process Heat	2,633	100%	2,633	0.96	2,527
	Prescriptive	Small Commercial Thermostat	652	80%	522	0.96	501
	Prescriptive	Steam Trap, Dry Cleaner	1,043,157	100%	1,043,006	0.96	1,001,286
	Prescriptive	Steam Trap, Indust MP 15-30 psig	6,871	100%	6,871	0.96	6,596

Program Category	Program Path	Savings Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
	Prescriptive-DAC	Boiler Tune Up, Space Heating	1,582	105%	1,661	1.00	1,661
	Prescriptive-DAC	Furnace, >92% AFUE	152	167%	254	1.00	254
	Prescriptive-DAC	Steam Trap, Dry Cleaner	115,672	100%	115,671	1.00	115,671
Private Subtotal			***1,221,335***	***100%***	***1,221,745***		***1,177,792***
Public	Direct Install	Faucet Aerators - Bath - DI	156	100%	156	0.96	149
	Direct Install-DAC	Faucet Aerators - Bath - DI	14	100%	14	1.00	14
	Prescriptive	Boiler Tune Up, Space Heating	4,691	117%	5,447	0.96	5,229
	Prescriptive-DAC	Furnace, >95% AFUE	498	95%	476	1.00	476
Public Subtotal			***5,359***	***114%***	***6,092***		***5,868***
Total or Weighted Average			**1,226,694**	**100%**	**1,227,837**		**1,183,660**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
** Note that data for the Mid-Business assessment was omitted since this measure was not responsible for any therm savings.
† A deemed value. Available on the SAG web site: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2023/**. The DAC designated sites were based on census track and used a NTG of 1.0.
Source: Nicor Gas tracking data and Guidehouse evaluation team analysis.

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 the evaluation team's review. The realization rate is the ratio of the verified savings to the 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		Ex Ante Gross (therms/Unit)	Verified Gross (therms/Unit)	Realization Rate	Data Source(s)
Boiler Tune Up, Process	Each	518.12	316.20	61%	IL TRM v11, Section 4.4.3
Boiler Tune Up, Space Heating	Each	1,882.21	2,053.16	109%	IL TRM v11, Section 4.4.2
Combination Oven	Each	504.64	531.32	105%	IL TRM v11, Section 4.2.1
Commercial Weather Stripping	Each	10.32	9.45	92%	IL TRM v11, Section 4.8.16
Condensing Boilers, >90%	Each	3,533.09	3,752.70	106%	IL TRM v11, Section 4.4.10
Convection Oven, E >46%	Each	189.80	188.11	99%	IL TRM v11, Section 4.2.5
DHW WH Pipe Wrap - DI	Ln Ft	1.16	1.06	92%	IL TRM v11, Section 4.4.24
Faucet Aerators - Bath - DI	Each	10.11	10.11	100%	IL TRM v11, Section 4.3.2
Faucet Aerators - Kitchen - DI	Each	13.06	13.06	100%	IL TRM v11, Section 4.3.2
Furnace, >92% AFUE	Each	304.59	354.65	116%	IL TRM v11, Section 4.4.11
Furnace, >95% AFUE	Each	330.19	320.83	97%	IL TRM v11, Section 4.4.11
Infrared Charbroiler	Each	706.68	706.68	100%	IL TRM v11, Section 4.2.12
Infrared Heaters	Each	274.60	274.60	100%	IL TRM v11, Section 4.4.12
Low Flow Shower Heads - DI	Each	13.23	21.01	159%	IL TRM v11, Section 4.3.3
Pipe Insulation, Indoor HPS Process Heat	Ln Ft	2,632.75	2,632.75	100%	IL TRM v11, Section 4.4.14
Small Commercial Thermostat	Each	217.44	173.95	80%	IL TRM v11, Section 4.8.48
Spray Valve (Med Sized Restaurants)-DI	Each	229.34	229.34	100%	IL TRM v11, Section 4.2.11
Spray Valve (Small Restaurants)-DI	Each	227.20	227.20	100%	IL TRM v11, Section 4.2.11
Steam Trap, Dry Cleaner	Each	797.54	797.44	100%	IL TRM v11, Section 4.4.16

Measure		Ex Ante Gross (therms/Unit)	Verified Gross (therms/Unit)	Realization Rate	Data Source(s)
Steam Trap, Indust MP 15-30 psig	Each	274.83	274.83	100%	IL TRM v11, Section 4.4.16

* Program Tracking Data (PTD) provided by Nicor Gas, extract dated January 30, 2024.
** Note that data for the Mid-Business assessment was omitted since this measure was not responsible for any therm savings.
† State of Illinois Technical Reference Manual version 11.0 from **http://www.ilsag.info/technical-reference-manual.html**.

5.2 Findings and Recommendations

Finding 1. The verified gross realization rate (RR) for high-efficiency furnaces with >92% AFUE was 116%. The Guidehouse team followed the IL TRM v11 energy savings algorithm using default values and, where available, implementor tracker data. The tracking data inputs for this case resulted in 354.7 therm/unit savings compared to the ex ante value of 304.6 therm/unit.

The verified gross realization rate (RR) for high-efficiency furnaces with >95% AFUE was 97%. In the tracking database, projects EA-0002425286 and EA-0002732972 incorrectly listed the capacity of the new equipment as 88,000 Btu. Based on product technical specifications, the evaluation team used 66,000 Btu capacity for both products. The post equipment efficiency for project EA-0002616339 was incorrectly listed as 96% in the tracking data, but evaluation changed that to 95%, based on product specifications. For project PRJ-3266328, the capacity of the new equipment was incorrectly listed as 95,000 Btu and equipment efficiency as 95%. Based on product technical specifications, the evaluation changed the capacity and equipment efficiency values to 100,000 Btu and 96%, respectively.

> **Recommendation 1.** The program should revisit and document the calculation methodology for direct high-efficiency furnaces. Ensure that product technical specifications are correctly sourced and applied and that savings input in the tracking data adequately reflect the claimed savings calculation.

Finding 2. The RR for direct install DHW WH Pipe Wrap is 92%. The evaluation team followed the IL TRM v11 energy savings algorithm using default values and inputs from the program tracking data. There were five DHW WH Pipe Wrap projects, four had a 100% RR, but project EA-0002601892 had a RR of 59%.

> **Recommendation 2.** Review all inputs in program tracking data and using the TRM, ensure that they are adequately applied to ex ante savings calculations for DHW pipe insulation measures.

Finding 3. The overall verified gross RR for condensing boilers >90% is 106%. Three measures were installed from projects EA-0002778437 and EA-0002753930. Evaluation used the appropriate IL TRM v11 energy savings algorithm default values and the inputs provided in the program tracking to calculate a RR value of 106% for all the projects.

> **Recommendation 3.** Ensure the inputs provided in the tracking data are applied correctly to ex ante savings calculations for condensing boiler measures.

Finding 4. The verified gross realization rate (RR) for commercial weather stripping is 92%. There were six commercial weather-stripping projects, five had 100% RR, but project EA-0002572157 had a RR of 88%. In this case, the city of Bloomington was incorrectly located in Cook County and identified as Climate Zone 2 directly impacting the door sweep per linear foot annual therm savings value. Based on IL TRM v11 and other sources, Bloomington was determined to be in McLean County and located in Climate Zone 3. Also, the annual therm savings from installation of door sweep per linear foot was changed from 3.44 therms to 3.03 therms.

Recommendation 4. Ensure the IL TRM default values are correctly applied to ex ante savings calculations for commercial weather-stripping measures.

Finding 5. The verified gross RR for Small Commercial Thermostats is 80%. The Guidehouse team followed the IL TRM v11 energy savings algorithm using default values, and inputs provided in the program tracker data. There were three Small Commercial Thermostat projects, all had 80% RR.

Recommendation 5. Ensure the IL TRM default values are correctly applied to ex ante savings calculations for Small Commercial Thermostat measures.

Finding 6. The verified gross realization rate (RR) for Combination Ovens is 105%. The Guidehouse team followed the IL TRM v11 energy savings algorithm using default values, and inputs from the program tracking data. There was one Combination Oven project. The verified therm calculation is highly dependent on specific project data, such as baseline and efficient case data efficiency and preheat data. The Guidehouse team noted some wide differences in the reported data, such as the baseline preheats per day listed as 0.57, while the energy star preheats per day was listed as 105.0.

Recommendation 6. Ensure the IL TRM default values are correctly applied to ex ante savings calculations for Combination Oven measures.

Appendix A. Program Specific Inputs for the Illinois TRC

Table A-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 A-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 A-1. Verified Cost Effectiveness Inputs

Program Category	Program Path	Savings Category	Unit	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Private	Direct Install	Commercial Weather Stripping	Each	6	10	62	58	55
	Direct Install	DHW WH Pipe Wrap - DI	Ln Ft	23	15	27	24	23
	Direct Install	Faucet Aerators - Bath - DI	Each	713	10	7,531	7,531	7,229
	Direct Install	Faucet Aerators - Kitchen - DI	Each	19	10	260	260	250
	Direct Install	Low Flow Shower Heads - DI	Each	26	10	344	546	525
	Direct Install	Spray Valve (Med Sized Restaurants)-DI	Each	41	5	9,338	9,338	8,965
	Direct Install	Spray Valve (Small Restaurants)-DI	Each	23	5	5,144	5,144	4,938
	Direct Install-DAC	Commercial Weather Stripping	Each	2	10	21	18	18
	Direct Install-DAC	Faucet Aerators - Bath - DI	Each	168	10	1,481	1,481	1,480
	Direct Install-DAC	Faucet Aerators - Kitchen - DI	Each	4	10	40	40	40
	Direct Install-DAC	Spray Valve (Med Sized Restaurants)-DI	Each	8	5	1,899	1,899	1,899
	Direct Install-DAC	Spray Valve (Small Restaurants)-DI	Each	8	5	1,899	1,899	1,899

Program Category	Program Path	Savings Category	Unit	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
	Prescriptive	Boiler Tune Up, Process	Each	2	2	1,036	632	607
	Prescriptive	Boiler Tune Up, Space Heating	Each	2	3	3,138	3,158	3,032
	Prescriptive	Combination Oven	Each	1	12	505	531	510
	Prescriptive	Condensing Boilers, >90%	Each	3	12	10,599	11,258	10,808
	Prescriptive	Convection Oven, E >46%	Each	1	12	190	188	181
	Prescriptive	Furnace, >92% AFUE	Each	3	16.5	1,066	1,164	1,118
	Prescriptive	Furnace, >95% AFUE	Each	9	16.5	3,134	3,053	2,931
	Prescriptive	Infrared Charbroiler	Each	1	12	707	707	678
	Prescriptive	Infrared Heaters	Each	8	15	2,197	2,197	2,109
	Prescriptive	Pipe Insulation, Indoor HPS Process Heat	Ln Ft	1	15	2,633	2,633	2,527
	Prescriptive	Small Commercial Thermostat	Each	3	11	652	522	501
	Prescriptive	Steam Trap, Dry Cleaner	Each	1,308	6	1,043,157	1,043,006	1,001,286
	Prescriptive	Steam Trap, Indust MP 15-30 psig	Each	25	6	6,871	6,871	6,596
	Prescriptive-DAC	Boiler Tune Up, Space Heating	Each	1	3	1,582	1,661	1,661
	Prescriptive-DAC	Furnace, >92% AFUE	Each	1	16.5	152	254	254
	Prescriptive-DAC	Steam Trap, Dry Cleaner	Each	145	6	115,672	115,671	115,671
Public	Direct Install	Faucet Aerators - Bath - DI	Each	23	10	156	156	149
	Direct Install-DAC	Faucet Aerators - Bath - DI	Each	4	10	14	14	14
	Prescriptive	Boiler Tune Up, Space Heating	Each	2	3	4,691	5,447	5,229

Program Category	Program Path	Savings Category	Unit	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
	Prescriptive-DAC	Furnace, >95% AFUE	Each	2	16.5	498	476	476
Total or Weighted Average					**7.6**	**1,226,694**	**1,227,837**	**1,183,660**

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