Guidehouse
Outwit Complexity

Business Energy Efficiency Rebates Program Impact Evaluation Report

Energy Efficiency Plan: Program Year 2022 (1/1/2022-12/31/2022)

Prepared for:

Nicor Gas Company

FINAL

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Table of Contents

List of Tables, Figures, and Equations

1. Introduction

This report presents the results of the Nicor Gas 2022 Business Energy Efficiency Rebates (BEER) program impact evaluation. This report includes a summary of the total program's energy impacts, broken out by program path and relevant measures. The appendices present the impact analysis methodology and Illinois total resource cost (TRC) inputs. Program year 2022 covers January 1, 2022 through December 31, 2022.

2. Program Description

The BEER program provides incentives to business (private) and public sector customers who install new, high efficiency space heating, water heating, pipe insulation, commercial kitchen, and weatherstripping equipment covered by the program. The program consists of four delivery paths:

- Rebates for prescriptive cost-effective equipment as well as services (such as boiler tune-ups) to improve the energy efficiency of existing equipment.
- Free assessments and direct install measures such as efficient faucet aerators, low-flow showerheads, and pre-rinse sprayers.
- Business optimization measures including steam traps and tune-ups.
- Midstream commercial food service (CFS) equipment incentives offering using midstream delivery channels. This path's goals are to reduce barriers for food service operators to purchasing energy efficient equipment, and to reduce energy usage in the commercial food service sector.

The program had 556 participants in 2022 and completed 635 projects as shown in Table 2-1. The program served customers in both the private and public sectors.

Table 2-1. 2022 Volumetric Findings Detail

Participation	Assessment Direct Install	Business Optimization Program	Prescriptive	Midstream CFS	Total
Private Sector					
Participants *	28	61	130	80	**298**
Installed Projects †	28	71	154	87	**340**
Measure Types Installed	6	4	23	11	**37**
Public Sector					
Participants *	90	58	118	1	**260**
Installed Projects †	90	60	144	1	**295**
Measure Types Installed	6	2	7	1	**14**
Total					
Participants *	118	119	246	81	**556**
Installed Projects †	118	131	298	88	**635**
Measure Types Installed	6	6	25	11	**38**

* Participants are defined as the distinct count of project site addresses
† Installed Projects are defined as the distinct count of 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. 2022 Installed Measure Quantities

Program Category	Program Path	Measure	Quantity Unit	Installed Quantity
Private	**Assessment Direct Install**	Faucet Aerator - Bath	Each	128
		Faucet Aerator - Bath Laminar	Each	709
		Faucet Aerator - Kitchen	Each	8
		Pre-Rinse Spray Valves	Each	9
		Showerheads	Each	21
		Weather Stripping	Ln Ft	3
	Business Optimization Program	Boiler Tune Up, Process	Each	13
		Steam Trap, Dry Cleaner	Each	481
		Steam Trap, Industrial High Pressure	Each	2
		Steam Trap, Industrial Medium Pressure	Each	4
	Prescriptive	Boiler Tune Up, Process	Each	4
		Boiler Tune Up, Space Heating	Each	41
		Combination Oven	Each	2
		Compressed Air Heat Recovery	Each	2
		Direct-Fired Space Heater	Each	5
		Fryer - E >50%	Each	15
		Fryer - Large Vat	Each	5
		High Efficiency Boiler	Each	22
		High Efficiency Furnace	Each	40
		Infrared Heaters	Each	33
		Outdoor Pool Covers	Sq Ft	5,162
		Pipe Insulation	Ln Ft	19,270
		Small Commercial Thermostat	Each	15
		Steam Trap, Commercial	Each	360
		Steam Trap, Dry Cleaner	Each	179
		Steam Trap, Industrial High Pressure	Each	117
		Steam Trap, Industrial Medium Pressure	Each	133
	Midstream CFS	Combination Oven	Each	10
		Commercial Steamer	Each	1
		Large Conveyor Oven	Each	1
		Convection Oven	Each	14

Program Category	Program Path	Measure	Quantity Unit	Installed Quantity
		Dishwasher	Each	1
		Fryer - Large Vat	Each	4
		Fryer - E >50%	Each	83
		Infrared Salamander Broiler	Each	1
		Kitchen Demand Ventilation Controls	Each	1
		Double Rack Oven	Each	8
		Griddle	Each	1
Public	**Assessment Direct Install**	Faucet Aerator - Bath	Each	1,191
		Faucet Aerator - Bath Laminar	Each	6
		Faucet Aerator - Kitchen	Each	30
		Pre-Rinse Spray Valves	Each	4
		Showerheads	Each	69
		Weather Stripping	Ln Ft	9
	Business Optimization Program	Boiler Tune Up, Space Heating	Each	144
		Steam Trap, Commercial	Each	91
	Prescriptive	Boiler Tune Up, Process	Each	1
		Boiler Tune Up, Space Heating	Each	173
		Convection Oven	Each	2
		High Efficiency Boiler	Each	75
		High Efficiency Furnace	Each	8
		Steam Trap, Commercial	Each	124
		Water Heater	Each	1
	Midstream CFS	Dishwasher	Each	1

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

3. Program Savings Detail

Table 3-1 summarizes the energy savings the BEER program achieved by path in 2022.

Table 3-1. 2022 Annual Energy Savings Summary

Program Path	Ex Ante Gross Savings (therms)	Verified Gross RR*	Verified Gross Savings (therms)	NTG†	Verified Net Savings (therms)
Private					
Assessment Direct Install	28,556	101%	28,726	0.86	24,704
Business Optimization Program	262,066	129%	338,294	0.92	311,231
Prescriptive	1,605,205	116%	1,865,240	Thermostats=0.92 All Other=0.86	1,604,255
Midstream CFS	87,727	94%	82,438	0.80	65,951
Private Subtotal	***1,983,553***	***117%***	***2,314,698***		***2,006,140***
Public					
Assessment Direct Install	8,589	100%	8,591	0.86	7,389
Business Optimization Program	207,451	101%	209,062	0.92	192,337
Prescriptive	772,385	100%	774,450	0.86	666,027
Midstream CFS	676	100%	676	0.80	541
Public Subtotal	***989,101***	***100%***	***992,779***		***866,293***
Total or Weighted Average	**2,972,654**	**111%**	**3,307,477**	**0.87**	**2,872,434**

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.
† Net-to-Gross: A deemed value. Available on the SAG website: https://www.ilsag.info/evaluator-ntg-recommendations-for-2022/.
Source: Guidehouse evaluation team analysis.

4. Program Savings by Measure

The program includes 38 reported measure names, not including assessments, which Guidehouse collapsed into 32 research categories, shown in Table 4-1; Table 4-2 and Table 4-3 present the results by program sector type. The boiler and stream trap measures contributed the most savings.

Table 4-1. 2022 Annual Energy Savings by Measure – Program Total

Program Path	Savings Category	Ex Ante Gross Savings (therms)	Verified Gross RR*	Verified Gross Savings (therms)	NTG†	Verified Net Savings (therms)
Assessment Direct Install	Faucet Aerator - Bath	7,398	100%	7,398	0.86	6,362
	Faucet Aerator - Bath Laminar	26,586	101%	26,755	0.86	23,009
	Faucet Aerator - Kitchen	431	100%	431	0.86	370
	Pre-Rinse Spray Valves	745	100%	745	0.86	641

Program Path	Savings Category	Ex Ante Gross Savings (therms)	Verified Gross RR*	Verified Gross Savings (therms)	NTG†	Verified Net Savings (therms)
	Showerheads	1,944	100%	1,947	0.86	1,675
	Weather Stripping	41	100%	41	0.86	36
Business Optimization Program	Boiler Tune Up, Process	14,999	100%	14,999	0.92	13,799
	Boiler Tune Up, Space Heating	199,402	100%	199,402	0.92	183,450
	Steam Trap, Commercial	8,049	120%	9,660	0.92	8,887
	Steam Trap, Dry Cleaner	237,982	131%	311,694	0.92	286,759
	Steam Trap, Industrial High Pressure	6,491	131%	8,483	0.92	7,804
	Steam Trap, Industrial Medium Pressure	2,594	120%	3,118	0.92	2,869
Prescriptive	Boiler Tune Up, Process	304,130	100%	304,130	0.86	261,552
	Boiler Tune Up, Space Heating	594,872	100%	594,872	0.86	511,590
	Combination Oven	727	78%	569	0.86	489
	Compressed Air Heat Recovery	22,458	100%	22,388	0.86	19,253
	Convection Oven	750	99%	743	0.86	639
	Direct-Fired Space Heater	23,545	100%	23,545	0.86	20,249
	Fryer - E >50%	23,163	100%	23,163	0.86	19,920
	Fryer - Large Vat	3,523	83%	2,910	0.86	2,502
	High Efficiency Boiler	471,040	100%	471,040	0.86	405,095
	High Efficiency Furnace	15,125	100%	15,125	0.86	13,007
	Infrared Heaters	8,373	100%	8,373	0.86	7,201
	Outdoor Pool Covers	5,214	100%	5,214	0.86	4,484
	Pipe Insulation	85,335	98%	83,312	0.86	71,649
	Small Commercial Thermostat	3,074	81%	2,476	0.92	2,278
	Steam Trap, Commercial	42,196	120%	50,640	0.86	43,551
	Steam Trap, Dry Cleaner	88,563	131%	115,994	0.86	99,755
	Steam Trap, Industrial High Pressure	556,866	136%	756,344	0.86	650,456
	Steam Trap, Industrial Medium Pressure	128,511	124%	158,728	0.86	136,506
	Water Heater	125	100%	125	0.86	108
Midstream CFS	Combination Oven	3,637	91%	3,315	0.80	2,652
	Commercial Steamer	1,731	87%	1,500	0.80	1,200
	Large Conveyor Oven	884	100%	884	0.80	707
	Convection Oven	5,154	123%	6,316	0.80	5,053
	Dishwasher	1,502	73%	1,089	0.80	871
	Fryer - Large Vat	2,813	124%	3,491	0.80	2,792
	Fryer - E >50%	50,298	91%	45,844	0.80	36,676
	Infrared Salamander Broiler	240	100%	240	0.80	192

Program Path	Savings Category	Ex Ante Gross Savings (therms)	Verified Gross RR*	Verified Gross Savings (therms)	NTG†	Verified Net Savings (therms)
	Kitchen Demand Ventilation Controls	4,644	100%	4,644	0.80	3,715
	Double Rack Oven	17,297	89%	15,473	0.80	12,379
	Griddle	202	157%	317	0.80	254
	Total or Weighted Average	**2,972,654**	**111%**	**3,307,477**	**0.87**	**2,872,434**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† Net-to-Gross: A deemed value. Available on the SAG website: https://www.ilsag.info/evaluator-ntg-recommendations-for-2022/.
Source: Nicor Gas tracking data and Guidehouse evaluation team analysis.

Table 4-2. 2022 Annual Energy Savings by Measure – Private Sector

Program Path	Savings Category	Ex Ante Gross Savings (therms)	Verified Gross RR*	Verified Gross Savings (therms)	NTG†	Verified Net Savings (therms)
Assessment Direct Install	Faucet Aerator - Bath	986	100%	986	0.86	848
	Faucet Aerator - Bath Laminar	26,504	101%	26,673	0.86	22,939
	Faucet Aerator - Kitchen	87	100%	87	0.86	75
	Pre-Rinse Spray Valves	516	100%	516	0.86	444
	Showerheads	454	100%	454	0.86	391
	Weather Stripping	10	100%	10	0.86	9
Business Optimization Program	Boiler Tune Up, Process	14,999	100%	14,999	0.92	13,799
	Steam Trap, Dry Cleaner	237,982	131%	311,694	0.92	286,759
	Steam Trap, Industrial High Pressure	6,491	131%	8,483	0.92	7,804
	Steam Trap, Industrial Medium Pressure	2,594	120%	3,118	0.92	2,869
Prescriptive	Boiler Tune Up, Process	265,077	100%	265,077	0.86	227,966
	Boiler Tune Up, Space Heating	275,727	100%	275,727	0.86	237,125
	Combination Oven	727	78%	569	0.86	489
	Compressed Air Heat Recovery	22,458	100%	22,388	0.86	19,253
	Direct-Fired Space Heater	23,545	100%	23,545	0.86	20,249
	Fryer - E >50%	23,163	100%	23,163	0.86	19,920
	Fryer - Large Vat	3,523	83%	2,910	0.86	2,502
	High Efficiency Boiler	70,502	100%	70,502	0.86	60,632
	High Efficiency Furnace	12,704	100%	12,704	0.86	10,926
	Infrared Heaters	8,373	100%	8,373	0.86	7,201
	Outdoor Pool Covers	5,214	100%	5,214	0.86	4,484
	Pipe Insulation	85,335	98%	83,312	0.86	71,649
	Small Commercial Thermostat	3,074	81%	2,476	0.92	2,278
	Steam Trap, Commercial	31,843	120%	38,216	0.86	32,866

Program Path	Savings Category	Ex Ante Gross Savings (therms)	Verified Gross RR*	Verified Gross Savings (therms)	NTG†	Verified Net Savings (therms)
	Steam Trap, Dry Cleaner	88,563	131%	115,994	0.86	99,755
	Steam Trap, Industrial High Pressure	556,866	136%	756,344	0.86	650,456
	Steam Trap, Industrial Medium Pressure	128,511	124%	158,728	0.86	136,506
Midstream CFS	Combination Oven	3,637	91%	3,315	0.80	2,652
	Commercial Steamer	1,731	87%	1,500	0.80	1,200
	Large Conveyor Oven	884	100%	884	0.80	707
	Convection Oven	5,154	123%	6,316	0.80	5,053
	Dishwasher	826	50%	413	0.80	330
	Fryer - Large Vat	2,813	124%	3,491	0.80	2,792
	Fryer - E >50%	50,298	91%	45,844	0.80	36,676
	Infrared Salamander Broiler	240	100%	240	0.80	192
	Kitchen Demand Ventilation Controls	4,644	100%	4,644	0.80	3,715
	Double Rack Oven	17,297	89%	15,473	0.80	12,379
	Griddle	202	157%	317	0.80	254
	Total or Weighted Average	**1,983,553**	**117%**	**2,314,698**	**0.87**	**2,006,140**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† Net-to-Gross: A deemed value. Available on the SAG website: https://www.ilsag.info/evaluator-ntg-recommendations-for-2022/.
Source: Nicor Gas tracking data and Guidehouse evaluation team analysis.

Table 4-3. 2022 Annual Energy Savings by Measure – Public Sector

Program Path	Savings Category	Ex Ante Gross Savings (therms)	Verified Gross RR*	Verified Gross Savings (therms)	NTG†	Verified Net Savings (therms)
Assessment Direct Install	Faucet Aerator - Bath	6,412	100%	6,412	0.86	5,515
	Faucet Aerator - Bath Laminar	82	101%	82	0.86	71
	Faucet Aerator - Kitchen	344	100%	344	0.86	296
	Pre-Rinse Spray Valves	229	100%	229	0.86	197
	Showerheads	1,490	100%	1,493	0.86	1,284
	Weather Stripping	31	100%	31	0.86	27
Business Optimization Program	Boiler Tune Up, Space Heating	199,402	100%	199,402	0.92	183,450
	Steam Trap, Commercial	8,049	120%	9,660	0.92	8,887
Prescriptive	Boiler Tune Up, Process	39,054	100%	39,054	0.86	33,586
	Boiler Tune Up, Space Heating	319,144	100%	319,144	0.86	274,464
	Convection Oven	750	99%	743	0.86	639
	High Efficiency Boiler	400,538	100%	400,538	0.86	344,463
	High Efficiency Furnace	2,420	100%	2,420	0.86	2,081
	Steam Trap, Commercial	10,353	120%	12,425	0.86	10,685
	Water Heater	125	100%	125	0.86	108
Midstream CFS	Dishwasher	676	100%	676	0.80	541
	Total or Weighted Average	**989,101**	**100%**	**992,779**	**0.87**	**866,293**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† Net-to-Gross: A deemed value. Available on the SAG website: https://www.ilsag.info/evaluator-ntg-recommendations-for-2022/.
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 our review. The realization rate is the ratio of the verified savings to the ex ante savings. Following the table are 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 5-1. Verified Gross Savings Parameters

Measure	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	Realization Rate	Data Source(s)
Boiler Tune Up, Process	Each	Varies	Varies	100%	IL-TRM v10, Section 4.4.3†
Boiler Tune Up, Space Heating	Each	Varies	Varies	100%	IL-TRM v10, Section 4.4.2
Combination Oven	Each	Varies	Varies	89%	IL-TRM v10, Section 4.2.1
Commercial Steamer	Each	Varies	Varies	87%	IL-TRM v10, Section 4.2.3
Compressed Air Heat Recovery	Each	Varies	Varies	100%	IL-TRM v10, Section 4.7.9
Convection Oven	Each	Varies	Varies	120%	IL-TRM v10, Section 4.2.5
Direct-Fired Space Heater	Each	Varies	Varies	100%	IL-TRM v10, Section 4.4.39
Dishwasher	Each	Varies	Varies	73%	IL-TRM v10, Section 4.2.6
Double Rack Oven	Each	Varies	Varies	89%	IL-TRM v10, Section 4.2.18
Faucet Aerator - Bath	Each	Varies	Varies	100%	IL-TRM v10, Section 4.3.2
Faucet Aerator - Bath Laminar	Each	Varies	Varies	101%	IL-TRM v10, Section 4.3.2
Faucet Aerator - Kitchen	Each	Varies	Varies	100%	IL-TRM v10, Section 4.3.2
Fryer - E >50%	Each	Varies	Varies	94%	IL-TRM v10, Section 4.2.7
Fryer - Large Vat	Each	Varies	Varies	105%	IL-TRM v10, Section 4.2.7
Griddle	Each	Varies	Varies	157%	IL-TRM v10, Section 4.2.8
High Efficiency Boiler	Each	Varies	Varies	100%	IL-TRM v10, Section 4.4.10
High Efficiency Furnace	Each	Varies	Varies	100%	IL-TRM v10, Section 4.4.11
Infrared Heaters	Each	Varies	Varies	100%	IL-TRM v10, Section 4.4.12
Infrared Salamander Broiler	Each	Varies	Varies	100%	IL-TRM v10, Section 4.2.14
Kitchen Demand Ventilation Controls	Each	Varies	Varies	100%	IL-TRM v10, Section 4.2.16
Large Conveyor Oven	Each	884.00	884.00	100%	IL-TRM v10, Section 4.2.4
Outdoor Pool Covers	Sq Ft	Varies	Varies	100%	IL-TRM v10, Section 4.3.4
Pipe Insulation	Ln Ft	Varies	Varies	98%	IL-TRM v10, Section 4.4.14
Pre-Rinse Spray Valves	Each	Varies	Varies	100%	IL-TRM v10, Section 4.2.11
Showerheads	Each	Varies	Varies	100%	IL-TRM v10, Section 4.3.3
Small Commercial Thermostat	Each	Varies	Varies	81%	IL-TRM v10, Section 4.4.48
Steam Trap, Commercial	Each	Varies	Varies	120%	IL-TRM v10, Section 4.4.16
Steam Trap, Dry Cleaner	Each	Varies	Varies	131%	IL-TRM v10, Section 4.4.16
Steam Trap, Industrial High Pressure	Each	Varies	Varies	136%	IL-TRM v10, Section 4.4.16
Steam Trap, Industrial Medium Pressure	Each	Varies	Varies	123%	IL-TRM v10, Section 4.4.16
Water Heater	Each	Varies	Varies	100%	IL-TRM v10, Section 4.3.1

Measure	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	Realization Rate	Data Source(s)
Weather Stripping	Ln Ft	Varies	Varies	100%	IL-TRM v10, Section 4.8.16

* Program Tracking Data (PTD) provided by Nicor Gas, extract dated January 31, 2023.
† State of Illinois Technical Reference Manual version 10.0 from **http://www.ilsag.info/technical-reference-manual.html**.
Source: Nicor Gas tracking data, IL-TRM v10, and Guidehouse evaluation team analysis.

5.2 Findings and Recommendations

Finding 1. The evaluation team was unable to identify three manufacturers provided in the tracking data in the ENERGY STAR Qualified Products Lists (QPLs). The measures and manufacturers can be seen in Table B-1. The tracking data did not provide a model number specific enough to identify a specification sheet for verification for the two Kitchen Demand Ventilation Controls measures. No model number was provided for the Double Rack Oven measure. More information is provided in Table B-1. The evaluation team used tracking data and TRM inputs to calculate verified savings for these measures.

> **Recommendation 1.** Ensure the program tracking data has accurate and detailed manufacturer and model number information.

Finding 2. Savings inputs provided in the tracking data do not align with the values in the QPL for Combination Ovens, Convection Ovens, and Fryers. Verified savings used input values from the QPL in these scenarios.

Table B-3 through Table B-5 show the values from the QPL that were used for the verified savings in place of the tracking data values. Instances where the QPL and tracking data match within these measure types are identified in the tables. For Fryers specifically, the QPL identified a discrepancy with the size type.

> **Recommendation 2.** Program tracking data should be compared to supplemental information, such as the QPLs and specification sheets, to ensure tracking data reported values match certification documentation.

Finding 3. Measure ID 1049980 is labeled as a Large Vat Fryer in the tracking data, but the QPL identifies it as a Standard Fryer. This measure's ex ante savings appear to use inputs that align with the Standard Fryer type. Measure ID 1055163 is labeled as a Standard Fryer in the tracking data, but the QPL identifies it as a Large Vat fryer. This measure's row in the tracking data contains Large Vat inputs but ex ante savings appear to use Standard Fryer type inputs in the calculation.

> **Recommendation 3.** Same as recommendation two. Compare program tracking data with QPLs and specification sheets, to ensure tracking data reported values match certification documentation.

Finding 4. Guidehouse was unable to recreate savings for a few projects. These included three Pipe Insulation measures, all Bath Laminar Faucet Aerator measures, five Large Vat Fryer measures in the Prescriptive path, two Standard Fryers in the Midstream CFS path, the Commercial Steamer measure, and the Griddle measure. The verified savings relied on IL-TRM v10.

> **Recommendation 4.** Ensure ex ante savings reflect the inputs provided in the tracking data, the IL-TRM v10 where applicable and utilize IL-TRM v10 savings algorithms.

Finding 5. All Combination Oven measures, including those in the Midstream CFS path, have ex ante savings that align with a pan number of 16. The tracking data provides a variety of pan numbers in the field 'Number of Pans', verified savings use these values for savings inputs.

> **Recommendation 5.** Ensure Combination Oven ex ante savings align with the information provided in the tracking data.

Finding 6. Ex ante savings for Convection Ovens, including those in the Midstream CFS path, do not utilize the custom values provided for Days and ENERGY STAR Idle Energy Rate. Instead, these measures use the deemed values from the IL-TRM v10. Verified savings use the custom values provided in the tracking data.

> **Recommendation 6.** Convection Ovens ex ante savings should utilize all custom values provided in the tracking data when the IL-TRM v10 instructs custom values are to be used for the given input.

Finding 7. Ex ante savings for many Fryer measures in the Midstream CFS path do not correctly utilize the information provided in the tracking data. Custom values for the ENERGY STAR Idle Energy Rate and ENERGY STAR Production Capacity are provided in the tracking data. The IL-TRM v10 advises to use custom values over the deemed value, thus verified savings use the tracking data values for these two inputs. Ex ante savings appear to use the IL-TRM v10 deemed value. In addition, ex ante savings appear to use the 'Number of Pans' tracking data field instead of Quantity.

> **Recommendation 7.** Utilize the information provided in the tracking data for ex ante savings for Fryers.

Finding 8. Double Rack Oven ex ante savings appear to use deemed values from the IL-TRM v10 for Capacity and Hours even though custom values were provided in the tracking data. Verified savings follow the IL-TRM v10 guidance to use custom values when provided.

> **Recommendation 8.** Ex ante savings should utilize all custom values provided in the tracking data when the IL-TRM v10 instructs custom values are to be used for the given input.

Finding 9. All Steam Trap measures use the IL-TRM v8 algorithm for ex ante savings values. Verified savings calculations use the algorithm outlined in the IL-TRM v10. Industrial Steam Trap measures utilize an algorithm for Steam Loss per Leaking Trap (Sa) rather than the deemed value to allow for custom hours and pressure values to be used, but ex ante savings use the IL-TRM v8 version of this algorithm.

> **Recommendation 9.** Ensure ex ante savings use the most up-to-date version of the Illinois Technical Reference Manual and algorithms.

Finding 10. The tracking data reported incorrect Equivalent Full Load Hour (EFLH) values for some Commercial Steam Trap and Pipe Insulation measures although the ex ante savings appear to use the correct EFLH values in the savings calculation. This discrepancy did not impact savings values.

> **Recommendation 10.** Update the tracking data to align with the input values used in the ex ante savings calculation and with the IL-TRM v10.

Finding 11. The tracking data does not provide a field with baseline information for Small Commercial Thermostat measures, so verified savings uses a value of 0.8 for Baseline Adjustment Factor (BAF) for all measures to align with an unknown baseline type.

> **Recommendation 11.** Provide a field in the tracking data that contains information for the baseline thermostat.

Finding 12. The tracking data reports a quantity of 0.5 for two of the three Dishwasher measures (Measure IDs 1034515 and 1038285) and both Kitchen Demand Ventilation Controls measures. Ex ante savings for the Dishwashers use a quantity of 1 while the verified savings used the reported quantity of 0.5, resulting in a 50% realization rate. Ex ante savings for the Kitchen Demand Ventilation Controls measures use the reported 0.5 quantity as do the verified savings, so the realization rate for the measure type is not impacted.

> **Recommendation 12.** Ensure the tracking data measure quantity information are used consistently across measure types.

Finding 13. The tracking data provides a net to gross ratio (NTGR) of 0.86 for some measures in the Midstream CFS path, however the NTGR for all measures in this path should be 0.80 according to the documentation on the Illinois Stakeholder Advisory Group (SAG) website. Similarly, the tracking data uses assorted NTG values for some measures within the Assessment Direct Install and Prescriptive paths that are not consistent with the SAG guidance.

> **Recommendation 13.** Tracking data NTG values should be consistent with the SAG deemed values for program measures.

Appendix A. Impact Analysis Methodology

Guidehouse calculated the verified gross savings for each measure type by conducting a review of the tracking data and applying the algorithms of the IL-TRM v10[1]. The evaluation team checked that provided savings inputs from the tracking data matched the IL-TRM v10 and that custom inputs were properly used. Then the tracking data and custom values used for the verified savings were adjusted from the tracking data, as necessary. The savings algorithms were applied to determine the verified savings of each measure. Verified gross realization rates are calculated by dividing the verified savings by the ex ante gross savings.

For measures in the Midstream CFS path, Guidehouse did an extra tracking data verification step. Measures defined in the IL-TRM v10 as needing to be under ENERGY STAR certification had their efficient ENERGY STAR tracking data values compared to the ENERGY STAR QPLs[2] by manufacturer and model number, and tracking data values were updated when these two documents disagreed. The evaluation team performed supplemental research for specification sheets for measures that did not need to be under ENERGY STAR certification as defined in the IL-TRM v10. This approach aligns with the process taken for the ComEd and Peoples Gas and North Shore Gas evaluations.

The evaluation team calculated verified net savings by multiplying the verified gross savings estimates by a NTGR deemed by a consensus process through the SAG.[3]

[1] Available on the Illinois Stakeholder Advisory Group website: **https://www.ilsag.info/technical-reference-manual/il-statewide-technical-reference-manual-version-10-0/**

[2] Found on the ENERGY STAR website: **https://www.energystar.gov/products/commercial_food_service_equipment**

[3] Available on the Illinois Stakeholder Advisory Group website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2022/**

Appendix B. Impact Analysis Supplemental Information

Table B-1. Measure Types with Manufacturer not in QPL

Savings Category	Manufacturer	Model Number
Fryer - E >50%	American Range	AF50HE
Griddle	Wood Stone	WS-GPL-4836-CT01NG
Commercial Steamer	Accutemp	N61201D060

Source: Nicor Gas tracking data and evaluation team analysis.

Table B-2. Measure Types Missing Information for Specification Sheets

Savings Category	Measure ID	Manufacturer	Model Number
Kitchen Demand Ventilation Controls	1040095	Accurex	Vari-Flow
Kitchen Demand Ventilation Controls	1049194	Melink	Intelli-Hood
Double Rack Oven	1064653	Revent	[left blank in tracking data]

Source: Nicor Gas tracking data and evaluation team analysis.

Table B-3. Combination Oven ENERGY STAR QPL Values Used for Verified Savings

Measure ID	Convection Production Capacity	Convection Cooking Energy Efficiency	Steam Cooking Energy Efficiency	Realization Rate
1031892	132	0.62	0.51	72%
1078986	114.3	0.59	0.5	74%
1088764	106.97	0.66	0.55	81%
1135594	N/A*	0.62	0.58	205%
1142920	106.97	0.66	0.55	81%
1142930	106.97	0.66	0.55	81%

* This measure uses the IL-TRM v10 Production Capacity value due to pan size of 40.
Source: Nicor Gas tracking data, ENERGY STAR QPL, and evaluation team analysis.

Table B-4. Convection Oven ENERGY STAR QPL Values Used for Verified Savings

Measure ID	Cooking Efficiency	Production Capacity	Preheat Length	Preheat Energy Rate	Idle Energy Rate	Realization Rate
1044389	0.51*	78.2	16.17	40000	12000*	99%
1062736	0.54	95.3	10.03	70000	10332	114%
1065404	0.54	96.1	12.2	47779	8317	145%
1065410	0.54	96.1	12.2	47779	8317	145%
1079013	0.54	96.1	12.2	47779	8317	145%
1086289	0.51*	78.2	16.17	40000	12000*	99%
1086351	0.51*	78.2	16.17	40000	12000*	99%
1103331	0.54	97.71	13	45000	8194	139%
1104762	0.51*	78.2	16.17	40000	12000*	99%
1104776	0.51*	78.2	16.17	40000	12000*	99%
1129688	0.51*	78.2	16.17	40000	12000*	99%
124-1	0.54	96.1	12.2	47779	8317	145%

*Tracking data and ENERGY STAR QPL values match
Source: Nicor Gas tracking data, ENERGY STAR QPL, and evaluation team analysis.

Table B-5. Fryer ENERGY STAR QPL Values Used for Verified Savings

Measure ID	Fryer Type	Cooking Efficiency	Idle Energy Rate	Realization Rate
1031516	Fryer - E >50%*	0.57	7940	111%
1031707	Fryer - E >50%*	0.54*	8764	103%
1043253	Fryer - E >50%*	0.57	7940	111%
1047045	Fryer - E >50%*	0.51	7124	57%
1049980	Fryer - E >50%	0.54*	8764	121%
1055163	Fryer - Large Vat	0.72	5017	124%
1073576	Fryer - E >50%*	0.54	8764	103%
1075382	Fryer - E >50%*	0.54	8764	103%
1080229	Fryer - E >50%*	0.54	8764	103%
1082012	Fryer - E >50%*	0.54	8764	103%
1090683	Fryer - E >50%*	0.54*	4429	34%
1115968	Fryer - E >50%*	0.54	8764	103%
1117274	Fryer - E >50%*	0.54	8764	107%
1117881	Fryer - E >50%*	0.54	8764	103%
1127298	Fryer - E >50%*	0.52*	7259	40%
1128180	Fryer - E >50%*	0.54	8764	103%
1146909	Fryer - E >50%*	0.54	8764	34%
125-1	Fryer - E >50%*	0.5	7639	113%
126-1	Fryer - E >50%*	0.5	7639	113%

*Tracking data and ENERGY STAR QPL values match
Source: Nicor Gas tracking data, ENERGY STAR QPL, and evaluation team analysis

Appendix C. Program Specific Inputs for the Illinois TRC

Table C-1 shows the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of producing this impact evaluation report. Currently, 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 C-1. Verified Cost Effectiveness Inputs

Program Path	Savings Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Assessment Direct Install	Faucet Aerator - Bath	Each	1319	10.0	7,398	7,398	6,362
	Faucet Aerator - Bath Laminar	Each	715	10.0	26,586	26,755	23,009
	Faucet Aerator - Kitchen	Each	38	10.0	431	431	370
	Pre-Rinse Spray Valves	Each	13	5.0	745	745	641
	Showerheads	Each	90	10.0	1,944	1,947	1,675
	Weather Stripping	Ln Ft	12	10.0	41	41	36
Business Optimization Program	Boiler Tune Up, Process	Each	13	3.0	14,999	14,999	13,799
	Boiler Tune Up, Space Heating	Each	144	3.0	199,402	199,402	183,450
	Steam Trap, Commercial	Each	91	6.0	8,049	9,660	8,887
	Steam Trap, Dry Cleaner	Each	481	6.0	237,982	311,694	286,759
	Steam Trap, Industrial High Pressure	Each	2	6.0	6,491	8,483	7,804
	Steam Trap, Industrial Medium Pressure	Each	4	6.0	2,594	3,118	2,869
Prescriptive	Boiler Tune Up, Process	Each	5	3.0	304,130	304,130	261,552
	Boiler Tune Up, Space Heating	Each	214	3.0	594,872	594,872	511,590
	Combination Oven	Each	2	12.0	727	569	489
	Compressed Air Heat Recovery	Each	2	15.0	22,458	22,388	19,253
	Convection Oven	Each	2	12.0	750	743	639
	Direct-Fired Space Heater	Each	5	15.0	23,545	23,545	20,249
	Fryer - E >50%	Each	15	12.0	23,163	23,163	19,920
	Fryer - Large Vat	Each	5	12.0	3,523	2,579	2,218
	High Efficiency Boiler	Each	97	25.0	471,040	471,040	405,095
	High Efficiency Furnace	Each	48	16.5	15,125	15,125	13,007
	Infrared Heaters	Each	33	15.0	8,373	8,373	7,201
	Outdoor Pool Covers	Sq Ft	5162	6.0	5,214	5,214	4,484
	Pipe Insulation	Ln Ft	19270	15.0	85,335	83,312	71,649

Program Path	Savings Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
	Small Commercial Thermostat	Each	15	11.0	3,074	2,476	2,278
	Steam Trap, Commercial	Each	484	6.0	42,196	50,640	43,551
	Steam Trap, Dry Cleaner	Each	179	6.0	88,563	115,994	99,755
	Steam Trap, Industrial High Pressure	Each	117	6.0	556,866	756,344	650,456
	Steam Trap, Industrial Medium Pressure	Each	133	6.0	128,511	158,728	136,506
	Water Heater	Each	1	15.0	125	125	108
Midstream CFS	Combination Oven	Each	10	12.0	3,637	3,315	2,652
	Commercial Steamer	Each	1	12.0	1,731	1,500	1,200
	Large Conveyor Oven	Each	1	17.0	884	884	707
	Convection Oven	Each	14	12.0	5,154	6,316	5,053
	Dishwasher	Each	2	16.9	1,502	1,089	871
	Fryer - Large Vat	Each	4	12.0	2,813	3,491	2,792
	Fryer - E >50%	Each	83	12.0	50,298	45,844	36,676
	Infrared Salamander Broiler	Each	1	12.0	240	240	192
	Kitchen Demand Ventilation Controls	Each	1	20.0	4,644	4,644	3,715
	Double Rack Oven	Each	8	12.0	17,297	15,473	12,379
	Griddle	Each	1	12.0	202	317	254
Total or Weighted Average				**8.4**	**2,972,654**	**3,307,477**	**2,872,434**

Source: Nicor Gas tracking data and evaluation team analysis.