Guidehouse
Outwit Complexity

Business Energy Efficiency Rebates Impact Evaluation Report

Energy Efficiency Plan: Plan Year 2021 (1/1/2021-12/31/2021)

Prepared for:

Nicor Gas

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1. Introduction

This report presents the results of the Nicor Gas 2021 Business Energy Efficiency Rebates (BEER) Program impact evaluation. It includes a summary of the total program's energy impacts, broken out by program structure and relevant measures. Program year 2021 covers January 1, 2021 through December 31, 2021.

2. Program Description

The BEER Program provides incentives to business (private) and public sector customers who install new, highly efficient space heating, water heating, pipe insulation, commercial kitchen, and weather stripping equipment covered by the program. It also provides rebates for other prescriptive cost-effective equipment and services such as boiler tune-ups to improve the energy efficiency of existing equipment. Additionally, the program offers free assessments and direct install measures such as efficient faucet aerators, low-flow showerheads, and pre-rinse sprayers. The program also offers Business Optimization measures including steam traps and tune-ups.

The target market of the BEER Program is business and public sector customers using 60,000 or more therms per year. The program relies on wholesale and retail trade allies as well as business trade associations to help market the program to Nicor Gas end-use customers. The BEER Program is implemented by CLEAResult.

The program had 518 participants in 2021 and completed 606 projects as shown in Table 2-1. The program served customers in both the Private and Public sectors.

Table 2-1. 2021 Volumetric Findings Detail

Participation	Assessment Direct Install	Business Optimization	Prescriptive	Total
Private Sector				
Participants *	15	114	133	262
Installed Projects †	16	117	154	287
Measure Types Installed	6	7	21	34
Public Sector				
Participants *	59	119	95	273
Installed Projects †	60	126	133	319
Measure Types Installed	5	2	14	21
Program 2021 Total				
Participants *	74	233	228	518
Installed Projects †	76	243	287	606
Measure Types Installed	6	7	23	29

* Participants are defined as the number of Building Account Numbers
† Installed Projects are defined as the number 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. 2021 Installed Measure Quantities

Program Sector	Program Path	Measure	Quantity Unit	Installed Quantity
Private	Assessment Direct Install	Faucet Aerator - Bath	Each	200
		Faucet Aerator - Bath Laminar	Each	154
		Faucet Aerator - Kitchen	Each	1
		Pre-Rinse Spray Valves	Each	1
		Showerheads	Each	166
		Weather Stripping	Ln Ft	6
	Business Optimization	Boiler Tune Up, Space Heating	Each	2
		Steam Trap, Commercial	Each	531
		Steam Trap, Dry Cleaner	Each	776
		Steam Trap, Industrial High Pressure	Each	34
		Steam Trap, Industrial Medium Pressure	Each	64
	Prescriptive	Boiler Reset Controls	Each	1
		Boiler Tune Up, Process	Each	22
		Boiler Tune Up, Space Heating	Each	21
		Demand Controlled Ventilation	Each	18
		Fryer - E >50%	Each	14
		Fryer - Large Vat	Each	2
		High Efficiency Boiler	Each	10
		High Efficiency Furnace	Each	35
		Infrared Heaters	Each	5
		Ozone Laundry	Each	25
		Pipe Insulation	Ln Ft	1,235
		Small Commercial Thermostat	Each	13
		Steam Trap, Commercial	Each	4
		Steam Trap, Dry Cleaner	Each	119
		Steam Trap, Industrial High Pressure	Each	120
		Steam Trap, Industrial Medium Pressure	Each	109
		Water Heater	Each	2
Public	Assessment Direct Install	Faucet Aerator - Bath	Each	417
		Faucet Aerator - Bath Laminar	Each	14
		Faucet Aerator - Kitchen	Each	12
		Showerheads	Each	65
		Weather Stripping	Ln Ft	9
	Business Optimization	Boiler Tune Up, Space Heating	Each	266
		Steam Trap, Commercial	Each	101
	Prescriptive	Boiler Tune Up, Space Heating	Each	96
		High Efficiency Boiler	Each	55

Program Sector	Program Path	Measure	Quantity Unit	Installed Quantity
		High Efficiency Furnace	Each	14
		Infrared Heaters	Each	14
		Ozone Laundry	Each	8
		Pipe Insulation	Ln Ft	515
		Steam Trap, Commercial	Each	280
		Steam Trap, Industrial High Pressure	Each	15
		Steam Trap, Industrial Medium Pressure	Each	17
		Water Heater	Each	16

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 2021. The three paths include Assessment Direct Install, Business Optimization, and Prescriptive measures.

Table 3-1. 2021 Annual Energy Savings Summary

Program	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
Private					
Assessment Direct Install	9,562	100%	9,547	0.86	8,210
Business Optimization	639,634	132%	843,166	0.92	775,713
Prescriptive	1,486,656	113%	1,679,632	Thermostats=0.92 All Other=0.86	1,444,581
Private Subtotal	***2,135,852***	119%	2,532,345	***0.88***	2,228,504
Public					
Assessment Direct Install	3,013	100%	3,013	0.86	2,591
Business Optimization	199,500	101%	201,214	0.92	185,117
Prescriptive	589,225	105%	620,148	Thermostats=0.92 All Other=0.86	533,327
Public Subtotal	***791,737***	104%	824,374	***0.87***	721,035
Total or Weighted Average	**2,927,589**	**115%**	**3,356,719**	***0.88***	**2,949,539**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† A deemed value, 0.92 for Business Optimization measures, 0.92 for thermostats, and 0.86 for all other measures. Available on the SAG web site: https://www.ilsag.info/evaluator-ntg-recommendations-for-2021/.
Source: Nicor Gas tracking data and Guidehouse evaluation team analysis.

4. Program Savings by Measure

The program includes 29 reported measure names, which Guidehouse collapsed into 23 Research Categories, as shown in Table 4-1 for the program overall. Table 4-2 and Table 4-3 presents the results by program sector type. The steam trap and boiler measures contributed the most savings.

Table 4-1. 2021 Annual Energy Savings by Measure – Program Total

Program Path	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
Assessment Direct Install	Faucet Aerator - Bath	2,293	100%	2,292	0.86	1,972
	Faucet Aerator - Bath Laminar	5,547	100%	5,532	0.86	4,757
	Faucet Aerator - Kitchen	75	100%	75	0.86	65
	Pre-Rinse Spray Valves	57	100%	57	0.86	49
	Showerheads	4,550	100%	4,550	0.86	3,913
	Weather Stripping	53	100%	53	0.86	46
Business Optimization	Boiler Tune Up, Space Heating	203,528	100%	203,454	0.92	187,178
	Steam Trap, Commercial	55,903	120%	67,090	0.92	61,723
	Steam Trap, Dry Cleaner	383,938	131%	502,858	0.92	462,630
	Steam Trap, Industrial High Pressure	140,394	148%	207,734	0.92	191,115
	Steam Trap, Industrial Medium Pressure	55,370	114%	63,243	0.92	58,184
Prescriptive	Boiler Reset Controls	493	100%	493	0.86	424
	Boiler Tune Up, Process	332,871	100%	332,871	0.86	286,269
	Boiler Tune Up, Space Heating	210,252	99%	208,968	0.86	179,712
	Demand Controlled Ventilation	8,235	100%	8,235	0.86	7,082
	Fryer - E >50%	36,891	100%	36,865	0.86	31,704
	Fryer - Large Vat	3,062	100%	3,060	0.86	2,632
	High Efficiency Boiler	284,451	100%	283,390	0.86	243,715
	High Efficiency Furnace	15,108	100%	15,092	0.86	12,979
	Infrared Heaters	4,114	100%	4,114	0.86	3,538
	Ozone Laundry	249,527	100%	249,585	0.86	214,643
	Pipe Insulation	14,585	100%	14,560	0.86	12,521
	Small Commercial Thermostat	1,636	100%	1,630	0.92	1,499
	Steam Trap, Commercial	25,121	120%	30,148	0.86	25,927
	Steam Trap, Dry Cleaner	58,877	131%	77,114	0.86	66,318
	Steam Trap, Industrial High Pressure	706,660	126%	892,350	0.86	767,421
	Steam Trap, Industrial Medium Pressure	120,141	114%	137,450	0.86	118,207
	Water Heater	3,856	100%	3,856	0.86	3,317
	Total or Weighted Average	**2,927,589**	**115%**	**3,356,719**	**0.88**	**2,949,539**

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

Table 4-2. 2021 Annual Energy Savings by Measure – Private Sector

Program Path	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
Assessment Direct Install	Faucet Aerator - Bath	697	100%	697	0.86	599
	Faucet Aerator - Bath Laminar	5,456	100%	5,441	0.86	4,679
	Faucet Aerator - Kitchen	24	100%	24	0.86	21
	Pre-Rinse Spray Valves	57	100%	57	0.86	49
	Showerheads	3,306	100%	3,306	0.86	2,843
	Weather Stripping	21	100%	21	0.86	18
Business Optimization	Boiler Tune Up, Space Heating	12,962	100%	12,962	0.92	11,925
	Steam Trap, Commercial	46,969	120%	56,368	0.92	51,859
	Steam Trap, Dry Cleaner	383,938	131%	502,858	0.92	462,630
	Steam Trap, Industrial High Pressure	140,394	148%	207,734	0.92	191,115
	Steam Trap, Industrial Medium Pressure	55,370	114%	63,243	0.92	58,184
Prescriptive	Boiler Reset Controls	493	100%	493	0.86	424
	Boiler Tune Up, Process	332,871	100%	332,871	0.86	286,269
	Boiler Tune Up, Space Heating	35,973	96%	34,688	0.86	29,831
	Demand Controlled Ventilation	8,235	100%	8,235	0.86	7,082
	Fryer - E >50%	36,891	100%	36,865	0.86	31,704
	Fryer - Large Vat	3,062	100%	3,060	0.86	2,632
	High Efficiency Boiler	25,107	100%	25,107	0.86	21,592
	High Efficiency Furnace	9,901	100%	9,885	0.86	8,501
	Infrared Heaters	1,054	100%	1,054	0.86	907
	Ozone Laundry	211,281	100%	211,335	0.86	181,748
	Pipe Insulation	10,211	100%	10,208	0.86	8,779
	Small Commercial Thermostat	1,636	100%	1,630	0.92	1,499
	Steam Trap, Commercial	354	120%	425	0.86	365
	Steam Trap, Dry Cleaner	58,877	131%	77,114	0.86	66,318
	Steam Trap, Industrial High Pressure	643,530	125%	804,533	0.86	691,899
	Steam Trap, Industrial Medium Pressure	106,721	114%	121,670	0.86	104,636
	Water Heater	458	100%	458	0.86	394
	Total or Weighted Average	**2,135,852**	**119%**	**2,532,345**	**0.88**	**2,228,504**

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

Table 4-3. 2021 Annual Energy Savings by Measure – Public Sector

Program Path	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
Assessment Direct Install	Faucet Aerator - Bath	1,596	100%	1,596	0.86	1,372
	Faucet Aerator - Bath Laminar	91	100%	90	0.86	78
	Faucet Aerator - Kitchen	51	100%	51	0.86	44
	Showerheads	1,244	100%	1,244	0.86	1,069
	Weather Stripping	32	100%	32	0.86	28
Business Optimization	Boiler Tune Up, Space Heating	190,566	100%	190,492	0.92	175,253
	Steam Trap, Commercial	8,934	120%	10,722	0.92	9,864
Prescriptive	Boiler Tune Up, Space Heating	174,280	100%	174,280	0.86	149,881
	High Efficiency Boiler	259,344	100%	258,282	0.86	222,123
	High Efficiency Furnace	5,207	100%	5,207	0.86	4,478
	Infrared Heaters	3,060	100%	3,060	0.86	2,631
	Ozone Laundry	38,246	100%	38,250	0.86	32,895
	Pipe Insulation	4,373	100%	4,352	0.86	3,743
	Steam Trap, Commercial	24,767	120%	29,723	0.86	25,562
	Steam Trap, Industrial High Pressure	63,129	139%	87,817	0.86	75,522
	Steam Trap, Industrial Medium Pressure	13,420	118%	15,780	0.86	13,570
	Water Heater	3,398	100%	3,398	0.86	2,923
	Total or Weighted Average	**791,737**	**104%**	**824,374**	**0.87**	**721,035**

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 Guidehouse's review. The realization rate is the ratio of the verified savings to the ex ante savings. 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 B-1 in Appendix B shows the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of producing this impact evaluation report.

Table 5-1. Verified Gross Savings Parameters

Research Category	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	Realization Rate	Data Source(s)*
Boiler Reset Controls	Each	Varies	Varies	100%	IL TRM v9.0†, 4.4.4
Boiler Tune Up, Process	Each	Varies	Varies	100%	IL TRM v9.0, 4.4.3
Boiler Tune Up, Space Heating	Each	Varies	Varies	100%	IL TRM v9.0, 4.4.2
Demand Controlled Ventilation	Each	Varies	Varies	100%	IL TRM v9.0, 4.4.19
Faucet Aerator - Bath	Each	Varies	Varies	100%	IL TRM v9.0, 4.3.2
Faucet Aerator - Bath Laminar	Each	Varies	Varies	100%	IL TRM v9.0, 4.3.2
Faucet Aerator - Kitchen	Each	Varies	Varies	100%	IL TRM v9.0, 4.3.2
Fryer - E >50%	Each	Varies	Varies	100%	IL TRM v9.0, 4.2.7
Fryer - Large Vat	Each	Varies	Varies	100%	IL TRM v9.0, 4.2.7
High Efficiency Boiler	Each	Varies	Varies	100%	IL TRM v9.0, 4.4.10
High Efficiency Furnace	Each	Varies	Varies	100%	IL TRM v9.0, 4.4.11
Infrared Heaters	Each	Varies	Varies	100%	IL TRM v9.0, 4.4.12
Ozone Laundry	Each	Varies	Varies	100%	IL TRM v9.0, 4.3.6
Pipe Insulation	Ln Ft	Varies	Varies	100%	IL TRM v9.0, 4.4.14
Pre-Rinse Spray Valves	Each	Varies	Varies	100%	IL TRM v9.0, 4.2.11
Showerheads	Each	Varies	Varies	100%	IL TRM v9.0, 4.3.3
Small Commercial Thermostat	Each	Varies	Varies	100%	IL TRM v9.0, 4.4.48
Steam Trap, Commercial	Each	Varies	Varies	120%	IL TRM v9.0, 4.4.16
Steam Trap, Dry Cleaner	Each	Varies	Varies	131%	IL TRM v9.0, 4.4.16
Steam Trap, Industrial High Pressure	Each	Varies	Varies	130%	IL TRM v9.0, 4.4.16
Steam Trap, Industrial Medium Pressure	Each	Varies	Varies	114%	IL TRM v9.0, 4.4.16
Water Heater	Each	Varies	Varies	100%	IL TRM v9.0, 4.3.1
Weather Stripping	Ln Ft	Varies	Varies	100%	IL TRM v9.0, 4.8.16

* Nicor Gas Program Tracking Data, extract dated February 9, 2022.
† State of Illinois Technical Reference Manual version 9.0 (TRM) from https://www.ilsag.info/technical-reference-manual/il-trm-version-9/.

5.2 Findings and Recommendations

5.2.1 Steam Trap

Commercial HVAC and dry cleaner steam trap measures are not using the correct TRM algorithm. The evaluation team found the ex ante savings values appear to use the savings algorithm from TRM version 8.0. Guidehouse used TRM version 9.0 for the verified savings.

Recommendation 1. Review the ex ante savings inputs and algorithm used to calculate the commercial HVAC and dry cleaner steam trap measure savings and ensure the ex ante savings use the savings algorithm from the current year's version of the TRM.

5.2.2 Boiler Tune Up, Space Heating

Two "boiler tune-up – space heating" measures in project ID PRJ-2926094 have post-installation efficiencies that have been switched with the pre-installation efficiencies. The verified savings calculations have accounted for this and used the post-installation values for the pre-installation values and vice versa. See Table 5-2 for more details.

Recommendation 2. Ensure reported savings input values are properly recorded in the respective fields in the tracking data.

Table 5-2. Boiler Tune Up, Space Heating Negative Savings Details

Sub Program Type	Project ID	Pre-installation Efficiency	Post-installation Efficiency	Ex Ante Gross Therms	Verified Gross Therms
Business Optimization	PRJ-2926094	0.869	0.873	221	148
Business Optimization	PRJ-2926094	0.867	0.873	333	333

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

5.2.3 Pipe Insulation

The evaluation team found that ex ante savings for the pipe insulation measure in project ID PRJ-2948535 changed between the mid-year and final datasets. There is no indication in the tracking data as to why this change occurred. The verified savings calculation produced a value for this measure that aligned with the value reported during mid-year impact analysis.

Recommendation 3. Provide explanation in the tracking data or supporting documentation when savings changes occur in the final dataset from measures in the mid-year dataset.

5.2.4 Ozone Laundry

The evaluation team found the ozone laundry measures in the Fitness and Recreation category were Laundromat measures. These measures are in project IDs PRJ-2846445, PRJ-2875733, PRJ-2953862, PRJ-2953863, PRJ-2953864, and PRJ-3046531. The ex ante savings for these projects aligns closely with a savings value obtained using Laundromat inputs, however there is

no indication that these measures are in the Laundromat category. The evaluation team used Laundromat inputs for these projects.

In addition, all except one of the measures in PRJ-3046531 were in the mid-year dataset and the savings listed in the final dataset are different than those during the mid-year analysis.

> **Recommendation 4.** Provide clear details in the tracking data for Ozone Laundry building type information.

5.2.5 Tracking Data

Multiple measures provide equivalent full load hours (EFLH) values in the tracking data that differ with the other information provided in the tracking data, such as building type or climate zone. These incorrect values may have been used in the ex ante savings values. This applies to two boiler tune-up – space heating measures in project IDs PRJ-2929373 and PRJ-2992540, one high efficiency boiler in project ID PRJ-2929373, one high efficiency furnace in project ID PRJ-3041925, and one small commercial thermostat in project ID PRJ-2922231. The evaluation team used EFLH values from the TRM (v9.0) that aligned with the tracking data's provided building type and or climate zone.

The high efficiency boiler measures in project ID PRJ-2898130 have a building type of "Public Sector", however this is not an option in TRM v9.0. The evaluation team used the "Unknown" building type to determine savings inputs.

> **Recommendation 5.** Ensure the measure details and savings inputs align with the TRM and information provided in the tracking data.

The evaluation team found discrepancies in the ex ante savings when compared with the verified savings using the inputs provided in the tracking data for industrial medium and high pressure steam traps. A leaking and blow through value of 1.0 was used in verified savings calculations for all measures to match the program delivery approach that all industrial steam traps installed were audited. The tracking data included a leaking and blow through value of 0.16 for some measures, which aligns with no audit performed. It appears the ex ante calculation did not correctly implement the TRM (v9.0) updates in the savings calculation. Table 5-3 contains more details on the savings inputs used in the verified savings. The measures had gross realization rates greater than 100%.

> **Recommendation 6.** Review the industrial steam trap savings inputs in the tracking system to ensure they are consistent with the current version of the TRM and program delivery approach, and update the savings calculation in the tracking system.

Table 5-3. Industrial Steam Trap Verified Savings Inputs

Measure_Name	Sa	Hv	Hs	P1	T1	Tsource	Tracking Data Equivalent Full Load Hours	Tracking Data L	Verified L	nB
Steam Trap, Indust MP 30-75 psig	23.4	915	1.001	61.696	755.08	513.67	8766	0.16	1.0	0.807
Steam Trap, Indust MP 15-30 psig	6.5	944	1.001	30.696	706.04	513.67	Varies*	0.16	1.0	0.807
Steam Trap, Indust HP 75-125 psig	43.8	880	1.001	115.696	802.16	513.67	8766	0.16	1.0	0.807
Steam Trap, Indust HP 125-175 psig	60.9	859	1.001	160.696	827.92	513.67	Varies†	0.16	1.0	0.807
Steam Trap, Indust HP 175-250 psig	82.1	837	1.001	216.696	852.08	513.67	8766	0.16	1.0	0.807
Steam Trap, Indust HP 250 psig	105.2	816	1.001	277.696	872.65	513.67	Varies‡	1.0	1.0	0.807

Sa = steam loss per leaking trap defined in the TRM v9.0.
Hv = heat of vaporization of steam defined in the TRM v9.0.
Hs = specific heat of water, 1.001 deemed in the TRM v9.0.
T1 = temperature of saturated steam defined in the TRM v9.0.
P1 = average steam trap inlet pressure, an input of T1 defined in the TRM v9.0.
Tsource = incoming water temperature, 513.67 deemed in the TRM v9.0.
Hours = annual hours when steam system is pressurized defined in the TRM v9.0.
L = leaking & blow-thru defined in the TRM v9.0.
nB = boiler efficiency, 80.7% for steam boilers defined in the TRM v9.0.
* Tracking data hours for this measure are 8766, 4393, and 4383.
† Tracking data hours for this measure are 8766 and 4383.
‡ Tracking data hours for this measure are 8760 and 8766.
Source: Nicor Gas tracking data, Guidehouse evaluation team analysis, and TRM v9.0.

The high efficiency furnace measures had a gross realization rate of 100%, however, the evaluation team was unable to verify the ex ante savings for project ID PRJ-3058173. The tracking data inputs align with the evaluation team's expectations, but do not match the final ex ante savings value for the measure. We calculated savings based on the tracking data inputs for this project.

Recommendation 7. Ensure the ex ante savings calculations use the correct version of the TRM and the appropriate input values as provided in the tracking data.

The evaluation team found that for pipe insulation measures, the tracking data's Quantity column did not always align with the details provided in its Length column. This applies to pipe insulation measures in project IDs PRJ-2749103 and PRJ-2749104, and Weather Stripping measures. Length is important for rolling up from per-unit to total measure savings. The evaluation team used the Length column for these measures' verified savings.

Recommendation 8. Include additional notes in the tracking data for pipe insulation and weather stripping where the total quantity is found in the Length column, otherwise ensure that the Quantity column for these measures is populated appropriately to avoid evaluation adjustment.

The evaluation team found that all pipe insulation measures use a recirculation EFLH value in the ex ante savings except for the measure in project ID PRJ-2948535. This project uses a year-round EFLH value. This is not noted in the tracking data, however the evaluation team used the year round EFLH value for this measure based on prior clarification with the implementer.

> **Recommendation 9.** Provide information in the tracking data, such as in the Measure Notes field, to clarify when a pipe insulation measure is recirculation or year-round.

The tracking data has some commercial HVAC steam trap measures with incorrect EFLH values from the TRM, however the ex ante savings do appear to use the correct EFLH value associated with other measure details. This does not impact savings values.

> **Recommendation 10.** Update the tracking data to align with the input values used in the ex ante savings calculations consistent with the TRM.

The evaluation team observed that the three water heater measures that were in the mid-year data, the measures in project IDs PRJ-2874870 and PRJ-2929366, changed from a raw measure name of “Storage Water Heater, >0.67 EF” in the mid-year dataset to “Storage Water Heater, >88% TE” in the year end dataset. The savings values for these measures did not change. Guidehouse did not make any changes to the verified savings.

> **Recommendation 11.** Ensure the tracking data provides explanation behind any reclassifications between mid-year and final datasets.

Appendix A. Impact Analysis Methodology

Guidehouse calculated the verified gross savings for each research category by conducting a review of the tracking data and applying the algorithms of the TRM[1]. The evaluation team checked that provided savings inputs matched what was in the TRM, and that custom inputs were used properly or adjusted 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 calculated savings by the ex ante gross savings.

The team calculated verified net gas savings by multiplying the verified gross savings estimates by a net-to-gross (NTG) ratio deemed by a consensus process through the Illinois SAG.[2]

[1] Available on the SAG web site: https://www.ilsag.info/technical-reference-manual/il-trm-version-9/

[2] Available on the SAG web site: https://www.ilsag.info/evaluator-ntg-recommendations-for-2021/.

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

Program Path	Research 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	617	10.0	2,293	2,292	1,972
	Faucet Aerator - Bath Laminar	Each	168	10.0	5,547	5,532	4,757
	Faucet Aerator - Kitchen	Each	13	10.0	75	75	65
	Pre-Rinse Spray Valves	Each	1	5.0	57	57	49
	Showerheads	Each	231	10.0	4,550	4,550	3,913
	Weather Stripping	Ln Ft	15	10.0	53	53	46
Business Optimization	Boiler Tune Up, Space Heating	Each	268	3.0	203,528	203,454	187,178
	Steam Trap, Commercial	Each	632	6.0	55,903	67,090	61,723
	Steam Trap, Dry Cleaner	Each	776	6.0	383,938	502,858	462,630
	Steam Trap, Ind. High Pressure	Each	34	6.0	140,394	207,734	191,115
	Steam Trap, Ind. Medium Pressure	Each	64	6.0	55,370	63,243	58,184
Prescriptive	Boiler Reset Controls	Each	1	16.0	493	493	424
	Boiler Tune Up, Process	Each	22	3.0	332,871	332,871	286,269
	Boiler Tune Up, Space Heating	Each	117	3.0	210,252	208,968	179,712
	Demand Controlled Ventilation	Each	18	10.0	8,235	8,235	7,082
	Fryer - E >50%	Each	14	12.0	36,891	36,865	31,704
	Fryer - Large Vat	Each	2	12.0	3,062	3,060	2,632
	High Efficiency Boiler	Each	65	25.0	284,451	283,390	243,715
	High Efficiency Furnace	Each	49	16.5	15,108	15,092	12,979
	Infrared Heaters	Each	19	15.0	4,114	4,114	3,538
	Ozone Laundry	Each	33	10.0	249,527	249,585	214,643
	Pipe Insulation	Ln Ft	1750	15.0	14,585	14,560	12,521
	Small Commercial Thermostat	Each	13	11.0	1,636	1,630	1,499

Program Path	Research Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
	Steam Trap, Commercial	Each	284	6.0	25,121	30,148	25,927
	Steam Trap, Dry Cleaner	Each	119	6.0	58,877	77,114	66,318
	Steam Trap, Ind. High Pressure	Each	135	6.0	706,660	892,350	767,421
	Steam Trap, Ind. Medium Pressure	Each	126	6.0	120,141	137,450	118,207
	Water Heater	Each	18	15.0	3,856	3,856	3,317
Total or Weighted Average				**7.4**	**2,927,589**	**3,356,719**	**2,949,539**

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