



# Small Business Program Impact Evaluation Report

**Energy Efficiency:  
Program Year 2018  
(1/1/2018-12/31/2018)**

**Presented to  
Nicor Gas Company**

**DRAFT**

May 22, 2019

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## 1. INTRODUCTION

This report presents the results of the impact evaluation of the Nicor Gas 2018 Small Business Program. It summarizes the energy impact for the total program as well as by relevant measure and program structure details. The appendix presents the impact analysis methodology. The 2018 program covers January 1, 2018 through December 31, 2018.

## 2. PROGRAM DESCRIPTION

The Small Business (SB) Program is designed to assist qualified Nicor Gas non-residential customers<sup>1</sup> to achieve natural gas energy savings through installation of direct-install (DI) energy efficiency measures and prescriptive incentives offered for select measures. The program targets both private sector and public sector customers. The Small Business Program is implemented by CLEARResult.

As shown in Table 2-1, the 2018 SB Program had 133 participants, including 117 in the private sector and 16 in the public sector. These participants completed 681 projects (612 private sector and 69 public sector).

**Table 2-1. 2018 Volumetric Findings Detail**

Participation	Direct Install	Prescriptive	Total*
<b>Private Sector</b>			
Participants †	62	59	117
Completed Projects ‡	130	483	612
Installed Measures	696	2,366	3,062
<b>Public Sector</b>			
Participants †	12	6	16
Completed Projects ‡	34	35	69
Installed Measures	824	50	874
<b>Program 2018 Total</b>			
Participants †	74	65	133
Completed Projects ‡	164	518	681
Installed Measures	1,520	2,416	3,936

\* Total may not equal sum across rows if participants or projects take part in both DI and prescriptive measures

† Participants are defined as number of unique first and last names or business names.

‡ Installed projects are defined as the number of unique project IDs.

Source: Nicor Gas tracking data and Navigant team analysis.

Table 2-2, Table 2-3 and Table 2-4 summarize the installed measure quantities that are the basis for verified energy savings.

<sup>1</sup> The offering is available to small commercial and public sector customers of Nicor Gas territory that use less than 70,000 therms of natural gas consumption. Eligible small businesses must be a business owned or operated by an individual or a nonprofit or religious organization. If the business is a franchise, the owner/operator must own fewer than 10 franchise locations. Franchisees owning or operating more than 10 franchise locations will be addressed on a case by case basis for eligibility. For public sector customers the facility as a whole must use less than 70,000 therms a year.

**Table 2-2. 2018 Installed Measure Quantities - Program Total**

Program Path	Measure	Quantity Unit	Installed Quantity
Direct Install	DHW Pipe Insulation	Ln. Ft.	259
	Faucet Aerator – Bath	Each	1,034
	Faucet Aerator – Bath Laminar	Each	22
	Faucet Aerator – Kitchen	Each	321
	Showerheads	Each	67
	Spray Valve (Med Sized Restaurants)	Each	7
	Spray Valve (Small Restaurants)	Each	24
Prescriptive	Boiler Tune Up, Process	Each	31
	Boiler Tune Up, Space Heating	Each	28
	Combination Oven	Each	2
	Fryer	Each	1
	High Efficiency Boiler	Each	16
	High Efficiency Furnace	Each	100
	Infrared Heaters	Each	25
	Pipe Insulation	Ln. Ft.	564
	Programmable Thermostat	Each	27
	Salon Sprayer	Each	2
	Steam Trap	Each	2,179
Storage Water Heater	Each	2	

Source: Nicor Gas tracking data and Navigant team analysis.

**Table 2-3. 2018 Installed Measure Quantities - Private Sector**

Program Path	Measure	Quantity Unit	Installed Quantity
Direct Install	DHW Pipe Insulation	Ln. Ft.	253
	Faucet Aerator - Bath	Each	482
	Faucet Aerator - Bath Laminar	Each	22
	Faucet Aerator - Kitchen	Each	84
	Showerheads	Each	34
	Spray Valve (Med Sized Restaurants)	Each	7
	Spray Valve (Small Restaurants)	Each	23
Prescriptive	Boiler Tune Up, Process	Each	31
	Boiler Tune Up, Space Heating	Each	5
	Fryer	Each	1
	High Efficiency Boiler	Each	12
	High Efficiency Furnace	Each	81
	Infrared Heaters	Each	25
	Pipe Insulation	Ln. Ft.	564
	Programmable Thermostat	Each	27
	Salon Sprayer	Each	2
Steam Trap	Each	2,179	

Source: Nicor Gas tracking data and Navigant team analysis.

**Table 2-4. 2018 Installed Measure Quantities - Public Sector**

Program Path	Measure	Quantity Unit	Installed Quantity
Direct Install	DHW Pipe Insulation	Ln. Ft.	6
	Faucet Aerator - Bath	Each	552
	Faucet Aerator - Kitchen	Each	237
	Showerheads	Each	33
	Spray Valve (Small Restaurants)	Each	1
Prescriptive	Boiler Tune Up, Space Heating	Each	23
	Combination Oven	Each	2
	High Efficiency Boiler	Each	4
	High Efficiency Furnace	Each	19
	Storage Water Heater	Each	2

Source: Nicor Gas tracking data and Navigant team analysis.

### 3. PROGRAM SAVINGS SUMMARY

Table 3-1 summarizes the energy savings the Small Business Program achieved by sector in 2018. The private sector contributed 97 percent of the verified net savings for the program.

**Table 3-1. 2018 Annual Energy Savings Summary**

Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
<b>Private Sector</b>					
Direct Install	9,262	100%	9,270	0.87	8,065
Prescriptive	1,106,170	100%	1,106,175	0.81	896,001
<b>Private 2018 Total</b>	<b>1,115,432</b>	<b>100%</b>	<b>1,115,445</b>	<b>-</b>	<b>904,067</b>
<b>Public Sector</b>					
Direct Install	4,269	100%	4,270	0.87	3,715
Prescriptive	34,439	100%	34,452	0.81	27,906
<b>Public 2018 Total</b>	<b>38,708</b>	<b>100%</b>	<b>38,722</b>	<b>-</b>	<b>31,621</b>
<b>Direct Install Total</b>	<b>13,531</b>	<b>100%</b>	<b>13,540</b>	<b>0.87</b>	<b>11,780</b>
<b>Prescriptive Total</b>	<b>1,140,609</b>	<b>100%</b>	<b>1,140,627</b>	<b>0.81</b>	<b>923,907</b>
<b>Program 2018 Total</b>	<b>1,154,140</b>	<b>100%</b>	<b>1,154,167</b>	<b>-</b>	<b>935,688</b>

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

† Net-to-Gross (NTG) is the ratio of verified net savings to verified gross savings. The NTG is a deemed value. Source: Nicor Gas GPY7 NTG Values 2017-03-01 Final Faucet Aerator Correction 2019-03-20.xlsx, which is to be found on the Illinois SAG web site: <http://ilsag.info/net-to-gross-framework.html>.

Source: Nicor Gas tracking data and Navigant team analysis.



## 4. PROGRAM SAVINGS BY MEASURE

The Small Business Program includes 19 measure types, as shown in Table 4-1. Steam traps and process boiler tune ups contributed the most savings to the program. Steam traps accounted for 88 percent of savings and process boiler tune ups for 4 percent of net program savings. The subtotals for the private and public sectors are shown in Table 4-2 and Table 4-3, respectively.

**Table 4-1. 2018 Annual Incremental Savings - Program Total**

Program Path	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
Direct Install	DHW Pipe Insulation	267	103%	274	0.87	238
	Faucet Aerator – Bath	6,239	100%	6,239	0.87	5,428
	Faucet Aerator – Bath Laminar	779	100%	779	0.87	678
	Faucet Aerator – Kitchen	2,015	100%	2,015	0.87	1,753
	Showerheads	1,447	100%	1,450	0.87	1,261
	Spray Valve (Med Sized Restaurants)	1,203	100%	1,203	0.87	1,047
	Spray Valve (Small Restaurants)	1,375	100%	1,375	0.87	1,197
	Salon Sprayer	205	100%	205	0.87	178
Prescriptive	Boiler Tune Up, Process	40,495	100%	40,495	0.81	32,801
	Boiler Tune Up, Space Heating	20,840	100%	20,840	0.81	16,881
	Combination Oven	727	100%	727	0.81	589
	Fryer	529	100%	529	0.81	428
	High Efficiency Boiler	24,112	100%	24,111	0.81	19,530
	High Efficiency Furnace	25,782	100%	25,806	0.81	20,903
	Infrared Heaters	11,275	100%	11,275	0.81	9,133
	Pipe Insulation	2,139	101%	2,157	0.81	1,747
	Programmable Thermostat	1,108	92%	1,014	0.81	821
	Steam Trap	1,013,385	100%	1,013,441	0.81	820,887
	Storage Water Heater	218	106%	231	0.81	187
<b>Program 2018 Total*</b>		<b>1,154,140</b>	<b>100%</b>	<b>1,154,167</b>	<b>0.81</b>	<b>935,688</b>

\* The total may not equal the sum of savings due to rounding.  
 Source: Nicor Gas tracking data and Navigant team analysis.

**Table 4-2. 2018 Annual Incremental Savings - Private Sector**

Program Path	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
Direct Install	DHW Pipe Wrap	261	103%	268	0.87	233
	Faucet Aerator – Bath	3,844	100%	3,844	0.87	3,344
	Faucet Aerator – Bath Laminar	779	100%	779	0.87	678
	Faucet Aerator – Kitchen	917	100%	917	0.87	798
	Showerheads	734	100%	736	0.87	640
	Spray Valve (Med Sized Restaurants)	1,203	100%	1,203	0.87	1,047
	Spray Valve (Small Restaurants)	1,318	100%	1,318	0.87	1,147
	Salon Sprayer	205	100%	205	0.87	178
Prescriptive	Boiler Tune Up, Process	40,495	100%	40,495	0.81	32,801
	Boiler Tune Up, Space Heating	3,451	100%	3,451	0.81	2,795
	Fryer	529	100%	529	0.81	428
	High Efficiency Boiler	12,984	100%	12,984	0.81	10,517
	High Efficiency Furnace	20,805	100%	20,829	0.81	16,872
	Infrared Heaters	11,275	100%	11,275	0.81	9,133
	Pipe Insulation	2,139	101%	2,157	0.81	1,747
	Programmable Thermostat	1,108	92%	1,014	0.81	821
Steam Trap	1,013,384	100%	1,013,441	0.81	820,887	
<b>Private Sector 2018 Total*</b>		<b>1,115,432</b>	<b>100%</b>	<b>1,115,445</b>	<b>0.81</b>	<b>904,067</b>

\* The total may not equal the sum of savings due to rounding.  
 Source: Nicor Gas tracking data and Navigant team analysis.

**Table 4-3. 2018 Annual Incremental Savings - Public Sector**

Program Path	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
Direct Install	DHW Pipe Wrap	6.18	103%	6.34	0.87	5.52
	Faucet Aerator – Bath	2,395	100%	2,395	0.87	2,083
	Faucet Aerator – Kitchen	1,098	100%	1,098	0.87	955
	Showerheads	713	100%	714	0.87	621
	Spray Valve (Small Restaurants)	57	100%	57	0.87	50
Prescriptive	Boiler Tune Up, Space Heating	17,390	100%	17,390	0.81	14,086
	Combination Oven	727	100%	727	0.81	589
	High Efficiency Boiler	11,127	100%	11,127	0.81	9,013
	High Efficiency Furnace	4,977	100%	4,977	0.81	4,031
	Storage Water Heater	218	106%	231	0.81	187
<b>Public Sector 2018 Total*</b>		<b>38,708</b>	<b>100%</b>	<b>38,722</b>	<b>0.81</b>	<b>31,621</b>

\* The total may not equal the sum of savings due to rounding.  
 Source: Nicor Gas tracking data and Navigant team analysis.

## 5. IMPACT ANALYSIS FINDINGS AND RECOMMENDATIONS

### 5.1 Impact Parameter Estimates

Table 5-1 shows the per-unit therm savings and realization rates by measure. 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 measures with realization rates above or below 100 percent.

**Table 5-1. Verified Gross Savings Parameters**

Measure	Unit Basis	Ex Ante Gross (Therms per unit)	Verified Gross (Therms per unit)	Realization Rate	Data Source(s)
DHW Pipe Wrap	Ln. Ft.	1.03	1.06	103%	IL TRM v6.0*, 5.4.1
Faucet Aerator - Bath	Each	Varies	Varies	100%	IL TRM v6.0, 4.3.2
Faucet Aerator - Bath Laminar	Each	35.43	35.43	100%	IL TRM v6.0, 4.3.2
Faucet Aerator - Kitchen	Each	Varies	Varies	100%	IL TRM v6.0, 4.3.2
Showerheads	Each	21.60	21.64	100%	IL TRM v6.0, 4.3.3
Spray Valve (Med Sized Restaurants)	Each	172	172	100%	IL TRM v6.0, 4.2.11
Spray Valve (Small Restaurants)	Each	57.31	57.31	100%	IL TRM v6.0, 4.2.11
Boiler Tune Up, Process	Each	Varies	Varies	100%	IL TRM v6.0, 4.4.3
Boiler Tune Up, Space Heating	Each	Varies	Varies	100%	IL TRM v6.0, 4.4.2
Combination Oven	Each	364	364	100%	IL TRM v6.0, 4.2.1
Fryer	Each	529	529	100%	IL TRM v6.0, 4.2.7
High Efficiency Boiler	Each	Varies	Varies	100%	IL TRM v6.0, 4.4.10
High Efficiency Furnace	Each	Varies	Varies	100%	IL TRM v6.0, 4.4.11
Infrared Heaters	Each	451	451	100%	IL TRM v6.0, 4.4.12
Pipe Insulation, Indoor Hot Water DHW	Ln. Ft.	3.51	3.55	101%	IL TRM v6.0, 4.4.14
Programmable Thermostat	Each	Varies	Varies. Adjusted Office Low-Rise	92%	IL TRM v6.0, 4.4.18
Salon Sprayer	Each	102.3	102.3	100%	IL TRM v6.0, 4.2.11
Steam Trap	Each	Varies	Varies	100%	IL TRM v6.0, 4.4.16
Storage Water Heater	Each	Varies	Varies. Adjusted	106%	IL TRM v6.0, 4.3.1

\* State of Illinois Technical Reference Manual version 6.0 from [http://www.ilsag.info/il\\_trm\\_version\\_6.html](http://www.ilsag.info/il_trm_version_6.html).  
Source: Nicor tracking data and Navigant team analysis.

### 5.2 Other Findings and Recommendations

#### Pipe Insulation

Navigant used the input assumptions provided in the tracking data to calculate the verified savings for the domestic hot water (DHW) Pipe Wrap (using TRM v6, section 5.4.1 for domestic pipe wrap), and Indoor Hot Water (HW) Pipe Insulation (TRM v6, section 4.4.14). The small discrepancy in the realization rates

were due to rounding differences of the input assumptions provided in the tracking database for savings calculation.

**Recommendation 1:** Navigant recommends the tracking system use 1.06 therms for DHW Pipe Wrap, and 3.55 therms for the Indoor Hot Water (DHW) Pipe Insulation. This recommendation for Indoor HW Pipe Insulation is consistent with recommendation in the program year 6 (PY6) evaluation report.<sup>2</sup>

### *Salon Sprayer*

The direct install salon sprayer savings rely on custom pre-install and post-install flow rates (4 gallons per minute and 2.5 gallons per minute, respectively). Navigant found these assumptions to be reasonable and allowable by the TRM. The ex ante savings assume a custom value of 0.5 hour per day that the pre-rinse spray valve is used at the site, and 80 percent for equipment efficiency; however, the hours of use per day and efficiency values listed in the tracking data for these variables were zero and 0.58 respectively. Navigant did not change the ex ante savings assumptions to match the tracking data but recommends proper tracking of savings assumptions.

**Recommendation 2:** Navigant recommends the tracking system be reviewed to ensure it properly tracks the hours of use and efficiency values for calculating savings from salon sprayers.

### *Commercial Programmable Thermostats*

Programmable thermostats had a gross savings realization rate of 92 percent. Navigant observed that, in the final 2018 tracking data, CLEAResult adopted Navigant's previous recommendation of using an average savings value of 37.85 therms for building types not deemed in the TRM.<sup>3</sup> It appears that in the process of finalizing the 2018 data, the ex ante savings for Office – Low Rise were erroneously changed to the savings recommended by Navigant for Office – Mid Rise, as shown in Table 5-2 below. The ex ante per unit savings for Office – Low Rise should be 14.40 therms, not 37.85 therms.

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<sup>2</sup> Nicor Gas GPY6 Small Business Program Impact Eval Report 2018-08-16 Final.pdf

<sup>3</sup> Nicor Gas 2018 BEER Program Interim Impact Review 2019-01-24.docx

**Table 5-2. Building Type Mapping for Programmable Thermostats**

Tracking Data Building Type	Nicor Gas TRM Building Type Mapping	Navigant TRM Building Type Mapping	Ex Ante Unit Therms Savings	Verified Unit Therms Savings
Assembly	Assembly	Assembly	56.13	56.13
Elementary School	Unknown/Other*	Unknown/Other*	37.85	37.85
Healthcare Clinic	Unknown/Other*	Unknown/Other*	37.85	37.85
Manufacturing Facility	Unknown/Other*	Unknown/Other*	37.85	37.85
Office - Low Rise	Office - Mid Rise	Office - Low Rise	37.85	14.40
Office – Mid Rise†	NA	Unknown/Other*	NA	37.85
Religious Building	Religious Building	Religious Building	47.12	47.12
Restaurant	Restaurant – Full Service	Restaurant – Full Service	30.84	30.84
Retail - Department Store	Retail - Department Store	Retail - Department Store	36.31	36.31
Retail – Strip Mall	Retail – Strip Mall	Retail – Strip Mall	36.31	36.31
Warehouse	Convenience Store	Unknown/Other*	37.85	37.85

\* The TRM does not contain an “Other” or “Unknown” option. The verified unit savings value was calculated by Navigant by taking an average of the savings for each of the building types in the TRM.

† No thermostat measures were implemented in an Office – Mid Rise building. This row is included to highlight the usage difference between Office – Low Rise and Office – Mid Rise.

Source: Navigant analysis of tracking data

**Recommendation 3:** Navigant recommends that the ex ante per unit savings for Office – Low Rise measures be changed to 14.4 therms.

### Storage Water Heater

Storage Water Heater (>88% TE) had a gross savings realization rate of 96 percent. The Nicor Gas analysis approach for storage water heater is consistent with the TRM (v6.0), but the ex ante savings inputs do not produce the claimed savings. Upon review, we found an error in CLEAResult’s formula for standby savings, “100 \*  $\sqrt{([Tank Volume])}$ ...” should be “110 \*  $\sqrt{([Tank Volume])}$ ...” But this does not fully explain the discrepancy. Even if we use the same formula, the savings do not line up. Navigant was unable to identify the cause of the realization rate discrepancy and has included Table 5-3 to show the inputs used for verified savings.<sup>4</sup>

**Table 5-3. Storage Water Heater Gross Realization Rates**

Vendor Project ID	Tracking Building Type	Capacity New Equipment	Size	SLEff	Hot Water Use	Post Installation Efficiency	Ex Ante Gross Therms	Verified Gross Therms	Verified Gross RR
PRJ-2078649	Education	250,000	100	748	56800	0.96	118.2	128.2	108%
PRJ-2098802	Small Office	500,000	120	1524	61320	0.96	99.7	102.4	103%

Source: Navigant analysis of tracking data

<sup>4</sup> This discrepancy was also found in the 2018 BEER Program, and there is ongoing discussion between the implementer and Navigant to resolve this difference.

**Recommendation 4:** Navigant recommends CLEAResult review the savings algorithm and the application of the algorithm used to calculate ex ante savings for storage water heaters and ensure the inputs are consistent with the claimed savings.

## 6. APPENDIX 1. IMPACT ANALYSIS METHODOLOGY

### 6.1 Verified Gross Program Savings Analysis Approach

Navigant determined verified gross savings for each program measure by conducting a tracking system review. Navigant used the Illinois TRM version 6.0 methodology to calculate verified gross savings or relied on custom inputs as provided in the tracking database.

### 6.2 Verified Net Program Savings Analysis Approach

Navigant calculated verified net energy savings by multiplying the verified gross savings estimates by a net-to-gross ratio (NTG). In 2018, the NTG estimates used to calculate the net verified savings were based on past evaluation research and defined by a consensus process through SAG, as documented in a spreadsheet.<sup>5</sup>

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<sup>5</sup> Source: Nicor Gas GPY7 NTG Values 2017-03-01 Final Faucet Aerator Correction 2019-03-20.xlsx, which is to be found on the Illinois SAG web site: <http://ilsag.info/net-to-gross-framework.html>.



## 7. APPENDIX 2. PROGRAM-SPECIFIC INPUTS FOR THE ILLINOIS TRC

Table 7 1, the Total Resource Cost (TRC) variable table, only includes cost-effectiveness analysis inputs available at the time of finalizing the 2018 SB Program 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 later. Detail in this table (e.g., EULs), other than final 2018 savings and program data, are subject to change and are not final.

**Table 7-1. Total Resource Cost Savings Summary**

Research Category (e.g., Measure)	Units	Quantity	Effective Useful Life (years)	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
DHW Pipe Insulation	Ln. Ft.	259	15	267	274	239
Faucet Aerator – Bath	Each	1034	9	6,239	6,239	5,427
Faucet Aerator – Bath Laminar	Each	22	9	779	779	678
Faucet Aerator – Kitchen	Each	321	9	2,015	2,015	1,753
Showerheads	Each	67	10	1,447	1,450	1,261
Spray Valve (Med Sized Restaurants)	Each	7	5	1,203	1,203	1,047
Spray Valve (Small Restaurants)	Each	24	5	1,375	1,375	1,197
Salon Sprayer	Each	2	5	205	205	178
Boiler Tune Up, Process	Each	31	3	40,495	40,495	32,801
Boiler Tune Up, Space Heating	Each	28	3	20,841	20,841	16,881
Combination Oven	Each	2	12	727	727	589
Fryer	Each	1	15	529	529	428
High Efficiency Boiler	Each	16	20	24,111	24,111	19,530
High Efficiency Furnace	Each	100	16.5	25,782	25,806	20,903
Infrared Heaters	Each	25	12	11,275	11,275	9,133
Pipe Insulation	Ln. Ft.	564	15	2,139	2,157	1,747
Programmable Thermostat	Each	27	4	1,108	1,014	821
Steam Trap	Each	2179	6	1,013,384	1,013,441	820,887
Storage Water Heater	Each	2	15	218	231	187
<b>Total*/Weighted Average</b>	-	<b>4,711</b>	<b>6.5</b>	<b>1,154,140</b>	<b>1,154,167</b>	<b>935,687</b>

\* The total may not equal the sum of savings due to rounding.  
 Source: Nicor tracking data and Navigant team analysis.