



# Public Sector Impact Evaluation Report

Energy Efficiency Plan: Plan Year 6 Bridge Period (PY6-BP)  
(6/1/2017-12/31/2017)

Presented to  
Nicor Gas Company

**FINAL**

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## 1. INTRODUCTION

This report presents the results of the impact evaluation of the Nicor Gas Public Sector programs operated during the PY6 “Bridge Period” (PY6-BP). PY6-BP covers June 1, 2017 through December 31, 2017. The report presents a summary of the energy impacts for all PY6 Public Sector programs and broken out by relevant measure and program structure details. The appendix presents the impact analysis methodology.

## 2. PROGRAM DESCRIPTION

The Public Sector programs include the Savings Through Efficient Products (STEP), Standard, Boiler System Efficiency (BSE), Custom and Custom-Prescriptive Programs.

The STEP Program provided public facilities with free, gas-saving products such as low-flow faucet aerators, low-flow showerheads, and low-flow pre-rinse spray valves. This program differs from typical direct install programs since the equipment is self-installed by the program participants.

The Standard Program provided public sector customers with prescriptive incentives for installing pipe insulation and new efficient gas-consuming equipment such as furnaces, boilers, water heaters, and commercial kitchen equipment.

The BSE Program provided financial incentives to public facilities to improve boiler system efficiency. Eligible improvements include boiler tune-ups, pipe insulation, steam trap repair and replacement, and boiler controls.

The Custom Program provided public sector customers with technical assistance and custom financial incentives to install cost-effective, gas-saving projects that are not eligible as prescriptive projects. The technical assistance is provided through site assessments and engineering studies to assist customers in making educated decisions when installing energy-efficient projects.

The Custom-Prescriptive Program provided public sector customers with incentives for boiler tune-ups, boiler replacements, and pipe insulation.<sup>1</sup>

The Public Sector programs had 142 participants in PY6-BP, distributed across five program paths and completed 142 projects as shown in the following table.

**Table 2-1. PY6-BP Volumetric Summary**

Participation	STEP	Standard	BSE	Custom	Custom- Prescriptive	Total
Participants *	71	17	3	5	46	142
Installed Projects †	71	17	3	5	46	142

Source: Nicor Gas tracking data and Navigant team analysis.

\* Participants are defined as unique Building Account Number

† Installed Projects are defined as unique Vendor Project IDs

Table 2-2 summarizes the installed measure quantities that are the basis for verified energy savings.

<sup>1</sup> Custom-prescriptive includes measures under projects labelled as PSEE, MMC, custom light, and BSEP in the PY6 tracking system.

**Table 2-2. PY6-BP Installed Measure Quantities**

Measure	Quantity Unit	Installed Quantity
Faucet Aerator - Bath	Each	684
Pre-Rinse Spray Valves	Each	5
Showerheads	Each	222
Convection Oven	Each	2
Demand Controlled Ventilation	Each	17
High Efficiency Boiler	Each	9
High Efficiency Furnace	Each	7
Infrared Heaters	Each	1
Steam Trap	Each	1
Storage Water Heater	Each	1
Pipe Insulation	Linear Feet	1,373
Custom-Prescriptive	Project	46
Custom Projects	Project	5

*Source: Nicor Gas tracking data and Navigant team analysis.*

## 3. PROGRAM SAVINGS SUMMARY

Table 3-1 summarizes the energy savings the Public Sector programs achieved by path in PY6-BP.

**Table 3-1. PY6-BP Public Sector Annual Energy Savings Summary**

Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
STEP	9,784	92%	9,032	0.90	8,129
Standard	37,392	98%	36,772	0.46	16,915
BSE	18,562	100%	18,560	0.87	16,147
Custom	91,733	93%	85,664	0.74	63,391
Custom-Prescriptive	191,963	100%	191,670	0.74	141,835
<b>Total</b>	<b>349,434</b>	<b>98%</b>	<b>341,698</b>	<b>Varies</b>	<b>246,417</b>

Source: Nicor Gas tracking data and Navigant team analysis.

\* 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 NTGs applied are the most recent NTG ratios (without the free ridership adjustment of a "plans score" where available) calculated by DCEO's evaluator, ADM Associates, Inc (ADM) available on the Illinois Energy Efficiency Stakeholder Advisory Group (SAG) web site. Refer to the Net-to-Gross Approach discussion in Section 6 Impact Analysis Methodology for further documentation of the NTG ratios we applied and an explanation of the "plans score".

## 4. PROGRAM SAVINGS BY MEASURE

The Public Sector programs include 15 measures as shown in the following table. Custom projects contributed the most savings to the Public Sector programs, as shown in Figure 4-1.

**Table 4-1. PY6-BP Annual Energy Savings by Measure**

Program Path	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)	
STEP	Showerheads	4,803	100%	4,803	0.9	4,323	
	Faucet Aerator - Bath	4,179	82%	3,427	0.9	3,084	
	Pre-Rinse Spray Valves	802	100%	802	0.9	722	
Standard	High Efficiency Boiler	27,535	100%	27,546	0.46	12,671	
	Demand Controlled Ventilation	6,155	100%	6,155	0.46	2,831	
	High Efficiency Furnace	1,841	100%	1,843	0.46	848	
	Convection Oven	1,224	50%	612	0.46	282	
	Infrared Heaters	451	100%	451	0.46	207	
	Storage Water Heater	97	79%	77	0.46	35	
	Steam Trap	89	99%	88	0.46	41	
	BSE	Pipe Insulation	18,562	100%	18,560	0.87	16,147
	Custom	Custom Projects	91,733	93%	85,664	0.74	63,391
Custom- Prescriptive	Custom-Prescriptive - Boiler Tune-Ups	55,307	100%	55,307	0.74	40,927	
	Custom-Prescriptive - Boiler Replacements	116,961	100%	116,961	0.74	86,551	
	Custom-Prescriptive - Pipe Insulation	19,695	99%	19,402	0.74	14,357	
<b>Total‡</b>		<b>349,434</b>	<b>98%</b>	<b>341,698</b>	<b>Varies</b>	<b>246,417</b>	

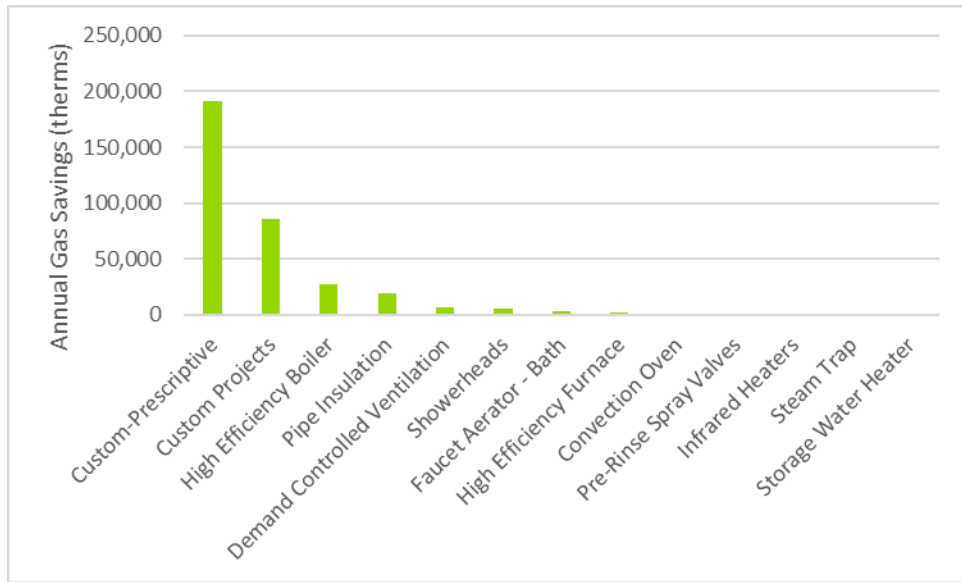
Source: Nicor Gas tracking data and Navigant team analysis.

\* 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 NTGs applied are the most recent NTG ratios (without the free ridership adjustment of a "plans score" where available) calculated by DCEO's evaluator, ADM Associates, Inc (ADM) available on the Illinois Energy Efficiency Stakeholder Advisory Group (SAG) web site.

‡ Totals may not sum correctly due to rounding.

4-1. Verified Gross Savings by Measure



Source: Nicor Gas tracking data and Navigant team analysis.



## 5. IMPACT ANALYSIS FINDINGS AND RECOMMENDATIONS

### 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, we provide findings and recommendations, including discussion of measures with realization rates above or below 100 percent. Appendix 1 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)
Custom Projects	Project	18,347	17,133	93%	Project File Review, IL TRM v5.0†, Monthly Billing Data‡
Custom Prescriptive - Boiler Tune-Ups	Project	1,536	1,536	100%	PTD*, Project File Review, IL TRM v5.0†
Custom Prescriptive - Boiler Replacements	Project	23,392	23,392	100%	PTD*, Project File Review, IL TRM v5.0†
Custom Prescriptive - Pipe Insulation	Project	3,939	3,880	99%	PTD*, Project File Review, IL TRM v5.0†
High Efficiency Boiler	Each	3,059.46	3,060.70	100%	PTD*, IL TRM v5.0, Section 4.4.10†
Convection Oven	Each	612	306	50%	PTD*, IL TRM v5.0, Section 4.2.5†
Infrared Heaters	Each	451	451	100%	PTD*, IL TRM v5.0, Section 4.4.12†
Demand Controlled Ventilation	Each	340	340	100%	PTD*, IL TRM v5.0, Section 4.4.19†
High Efficiency Furnace	Each	263.06	263.29	100%	PTD*, IL TRM v5.0, Section 4.4.11†
Pre-Rinse Spray Valves	Each	157.59	157.59	100%	PTD*, IL TRM v5.0, Section 4.2.11†
Storage Water Heater	Each	97.09	76.96	79%	PTD*, IL TRM v5.0, Section 4.3.1†
Steam Trap	Each	89.46	88.45	99%	PTD*, IL TRM v5.0, Section 4.4.16†
Showerheads	Each	21.64	21.64	100%	PTD*, IL TRM v5.0, Section 4.3.3†
Pipe Insulation	Ln Ft	10.8	10.79	100%	PTD*, IL TRM v5.0, Section 4.4.14†
Faucet Aerator - Bath	Each	6.11	Varies. 5.01 (average)	82%	PTD*, IL TRM v5.0, Section 4.3.2†

\* Program Tracking Data (PTD) provided by Nicor Gas, extract dated January 30, 2018.

† State of Illinois Technical Reference Manual version 5.0 from <http://www.ilsag.info/technical-reference-manual.html>.

‡ Project files and monthly billing data provided by Nicor Gas. On-site data collected by Navigant.

#### Ex Ante Net-to-Gross for STEP Faucet Aerators

The tracking data used the NTG ratio from the Business Energy Efficiency Rebates (BEER) Program for ex ante net savings calculations for faucet aerators. Navigant based the verified net savings on a different (higher) NTG value established by prior research of the STEP program, as described in Section 6 *Net-to-Gross Approach*.

**Faucet Aerator**

The ex ante savings for the direct install bathroom aerators were based on the TRM (v5.0), applicable for PY6-BP, and assumed an average of 5,000 gallons annual water usage. Navigant determined that it is appropriate to use the building-type specific usage values for consistency across the measures. Navigant used the following mapping of tracking-data building types to TRM-deemed building types:

**Table 5-2. IL TRM Building Type Mapping**

Tracking-Data Building Type	TRM-Deemed Building Type for Aerators
Elementary School	Elementary School
High School	Jr High / High School
Office – Low Rise	Small Office
Office – Mid Rise	Other
Office – High Rise	Large Office
Garage	Other
Warehouse	Other

Source: Nicor Gas tracking data and Navigant team analysis.

**Recommendation 1:** Use building type specific usage values to estimate savings, or use “other” if a building type is not listed in the TRM.

**Pre-Rinse Spray Valve**

For 75 percent of pre-rinse spray valve projects, the tracking system shows a daily water use of 1.0 hours, but the ex ante savings uses the deemed value of 1.5 hours to calculate 171.17 therms per unit. Navigant did not make any changes to the claimed savings (1.5 hours is a reasonable value). The implementer has informed Navigant they have corrected for this issue but did not make any corrections retrospectively.

**Recommendation 2:** Ensure that the ex ante deemed operation hours per day are consistent with the tracking system inputs.

**Storage Water Heaters**

After receiving mid-year feedback, the implementer added a “Size” field to indicate the capacity of a hot water heater in gallons to calculate HotWaterUseGallon. Navigant used values in the size field to calculate verified savings based on TRM v5.0 but ex ante savings reflected a higher value of HotWaterUseGallon.

**Recommendation 3:** Ensure that the tracked “Size” values are consistent with the tracking system inputs and ex ante savings.

**Demand Controlled Ventilation (DCV)**

The implementer used a custom value of 5,000 for the square footage of the facilities in DCV projects. It is unclear where this value originates, but the TRM instructs using actual square footage of conditioned space controlled by sensor. Navigant did not make any changes to the claimed savings.

**Recommendation 4:** For DCV measures, Navigant recommends the implementer track the actual square footage of facilities when it is feasible to do so to estimate the size of conditioned space.

**Convection Ovens**

The ex ante savings for convection ovens is 612 therms per unit, which is twice the deemed value of 306 therms from an example calculation in the TRM (v5.0). Navigant found that the tracking measure model (Vulcan VC4GD) is a single deck gas convection oven (the spec for the double deck is Vulcan VC44GD). The tracking data did not specify the measure was a double deck convection oven. Navigant adjusted the savings downwards by 50 percent. Navigant also observed that the TRM calculation for ΔDailyIdleEnergy savings input was 49,286 BTU. The correct calculation is shown below which produces 48,900 BTU. This is a minor change which would reduce the TRM savings slightly to 304.8 therms per unit. Navigant will recommend this update to the IL TRM Technical Advisory Committee (TAC).

$$\begin{aligned}
 \Delta\text{DailyIdleEnergy} &= (\text{IdleBase} * \text{IdleBaseTime}) - (\text{IdleENERGYSTAR} * \text{IdleENERGYSTARTime}) \\
 &= (18,000 * 10.3) - (13,000 * 10.5) \\
 &= 185,400 - 136,500 \\
 &= 48,900 \text{ Btu}
 \end{aligned}$$

**Recommendation 5:** The convection oven measure gross savings realization rate was maintained as 100 percent. The ΔDailyIdleEnergy input value was not changed in the savings verification estimate with the understanding that the TRM deemed the 49,286 BTU value. We recommend, however, that when Nicor Gas finds potential errata in the TRM, it should be brought to the attention of the evaluation team in advance for recommendation.

**Recommendation 6:** Ensure that convection ovens and other kitchen equipment specifications in the tracking database are consistent with the ex ante calculation. Provide additional notes that describe the size of the ovens or pans for kitchen equipment.

**Steam Traps**

There are inconsistencies in the commercial HVAC steam trap ex ante savings calculations, comparing the tracking database with the TRM deemed values. Table 5-3 below outlines the tracking inputs compared with the deemed and verified inputs for the steam trap measures. Navigant recommends updating the tracking system inputs to match the claimed savings. Key recommended actions are provided below.

**Table 5-3. Comparison of Steam Trap Algorithm Input Values**

Steam Trap Application	Savings Input Parameter	Tracking Value	Ex Ante Savings Value	TRM Deemed Value	Verified & Recommended Value
Commercial, HVAC	Steam Loss Per Trap	6.9	6.9	6.9	6.9
	Boiler Efficiency (%)	80	80	80.7	80.7
	Hours of Use	Custom (4,040)	Custom Value	Deemed by climate zone	Use deemed by climate zone
	Leaking & Blow-thru Factor	0.27	0.27	0.27 (assume unaudited)	0.27 (assume unaudited)

Source: Navigant analysis.

**Recommendation 7:** For commercial (HVAC) steam traps, update the tracking system to use the deemed 80.7 percent boiler efficiency value. The hours of use should be based on deemed values by climate zone. The source of the custom ex ante value of 4,040 hours for all projects was a PY4 savings assumption.<sup>2</sup>

<sup>2</sup> Assumes commercial hours of operation determined by the regional weighted average (60% Zone 1; 30% Zone 2; and 10% Zone 3) of the Space Heating EFLH values (Source: supplemental file titled "PY4 Savings Methodology, received Nicor Gas on 6-02-2016)

**Pipe Insulation**

For pipe insulation, Navigant found that in some cases the system description and EFLH used to calculate savings were not tracked. As shown in Table 3, some projects assume year-round recirculation, but the tracking system does not say so.

**Table 5-4. Pipe Insulation Savings Input Parameters Review**

Savings Input Parameter	Ex Ante Therms/Unit	Verified Therms/Unit	RR	Evaluation Findings Recommended Value
Pipe Insulation, Indoor HW Space Heat	Varies	Varies	100%	Rounding adjustments based on 4,963 EFLH.
Pipe Insulation, Indoor LPS Space Heat	Varies	Varies	100%	Tracks only EFLH for seasonal heating projects. Does not track 8,766 hours for projects assumed to have year-round recirculation system

Source: Navigant analysis of tracking data.

**Recommendation 8:** Update the tracking system to ensure all inputs for pipe insulation savings calculations are tracked. Indicate when a project and heating system has a year-round recirculation, and track the corresponding EFLH, especially for process heating and year-round recirculation systems.

**Custom Projects**

Projects NG06-PS-002 and NG06-PS-003 involved comprehensive gas equipment replacements, including improvements to space heating, pool heating, and domestic water heating systems. The ex ante savings estimates for these projects assumed a baseline of existing conditions. The verified savings estimates assume a baseline of code-required equipment efficiency, as specified in IECC 2015.<sup>3</sup> The decision to update the baseline was based on the broad scope of the projects, which triggers code compliance. This decision was also supported by the IL TRM definition of early replacement (EREP), which stated that baselines of existing conditions are justified when the equipment is within the expected useful life (EUL) of the equipment. In these projects, the pictures indicated that the boilers were beyond the IL TRM EUL of 20 years.<sup>4</sup>

**Recommendation 9:** Navigant recommends that ex ante analyses consider the application of code baselines in projects which involve significant systems upgrades. If there is any concern over which baseline is most appropriate, Navigant is willing to discuss and provide feedback prior to finalizing project savings.

Project NG06-PS-007 involved the replacement of leaking underground steam piping. The ex ante savings was based on a billing analysis approach, though the savings was a small percentage (0.03 percent) of the facility’s total gas usage. The percentage energy savings is too small to be considered appropriate for a billing analysis approach. For this reason, the final verified savings estimate was based on an engineering calculation. This resulted in a large increase in savings (RR = 469%), though the savings is still a small percentage (2 percent) of the facility’s overall usage.

**Recommendation 10:** Navigant recommends a billing analysis approached be avoided when project savings is less than five percent of overall usage. However, engineering judgment

<sup>3</sup> 2015 International Energy Conservation Code, <https://codes.iccsafe.org/public/document/IECC2015/chapter-4-ce-commercial-energy-efficiency>

<sup>4</sup> 4.4.10 High Efficiency Boiler, IL TRM v5.0.

should be used to determine the appropriateness of the approach, regardless of the magnitude of savings.

Project NG06-PS-013 involved the installation of a building automation system (BAS) in a high school. The ex ante savings estimate used a savings factor which was an average of 37 BAS projects that have been completed in the past. The projects included in this average involved a variety of building types, such as offices, manufacturing, and hospitals. The verified savings estimate updated the savings factor to reflect only similar building types. This approach helps account for the differences between building types (e.g., occupancy patterns, hours of use).

### *Custom-Prescriptive Projects*

The tracking data extract provided for the Public Sector “prescriptive custom” path did not include all the data elements needed to reproduce the ex ante savings. We requested additional project documentation for a sample of projects. The documentation provided by Nicor Gas included application documents and a program-developed spreadsheet workbook that included data inputs and ex ante calculations for each installed measure. Navigant had previously conducted a detailed review of the workbook covering all the measure tabs to confirm the underlying calculations. Four of the five pipe insulation projects we sampled received a 98 percent realization rate. The savings were verified by inputting the tracking data values into the savings workbook supplied by the program. The inputs used in the project documentation were identical to those used in the savings verification. The cause of this discrepancy with tracking data is unknown, and therefore Navigant has no recommendation for corrective action.

## 6. APPENDIX 1. IMPACT ANALYSIS METHODOLOGY

### Engineering Review of Custom Project Files

The PY6-BP custom project evaluation involved retrospective adjustments to ex ante gross savings on custom measure variables of all custom projects installed in PY6-BP. The implementer provided documentation of project applications and savings. Navigant verified project eligibility and savings based on engineering review and billing data review. Since there were only five custom projects in PY6-BP, they were treated as a census sample.

For each custom project, an in-depth application review is performed to assess the engineering methods, parameters and assumptions used to generate all ex ante impact estimates. For each measure in the sampled project, engineers estimated ex post gross savings based on their review of documentation and engineering analysis. To support this review, the implementation contractor provided project documentation in electronic format for each sampled project. Documentation included some or all scanned files of hardcopy application forms and supporting documentation from the applicant (invoices, measure specification sheets, and vendor proposals), pre-inspection reports and photos (when required), post-inspection reports and photos (when conducted), and calculation spreadsheets.

Table 6-1 provides a summary of the sample custom projects and the M&V approach.

**Table 6-1. Profile of PY6-BP Custom Gross Impact Sample**

Project ID	Ex Ante Gross Savings (therms)	Strata	M&V Approach	Measure
NG06-PS-002	48,806	Census	File Review	Comprehensive HVAC Upgrade
NG06-PS-003	36,718	Census	File Review	Comprehensive HVAC Upgrade
NG06-PS-013	3,131	Census	File Review	Building Automation System
NG06-PS-007	1,713	Census	File Review	Steam Leak Repair
NG06-PS-010	1,365	Census	File Review	Destratification Fans
<b>TOTAL</b>	<b>91,733</b>			

*Source: Nicor Gas tracking data and Navigant team analysis.*

Table 6-2 provides a summary of the sampled custom projects and the adjustments made during verification.

**Table 6-2. PY6-BP Summary of Custom Project M&V Results**

Project ID	Measure Description	Verified Gross Savings (therms)	Gross Realization Rate (%)	Summary of Adjustment
NG06-PS-002	Comprehensive HVAC Upgrade	39,556	81%	Updated baseline to code levels, and updated usage history
NG06-PS-003	Comprehensive HVAC Upgrade	34,595	94%	Updated baseline to code levels
NG06-PS-013	Building Automation System	2,121	68%	Updated savings factor to reflect similar building types
NG06-PS-007	Steam Leak Repair	8,027	469%	Updated billing analysis to engineering calculation, adjusted algorithm inputs, added leakage factors
NG06-PS-010	Destratification Fans	1,365	100%	Ok
<b>TOTAL</b>		<b>85,664</b>		

Source: Nicor Gas tracking data and Navigant team analysis.

### Net-to-Gross Approach

The most recent NTG ratios calculated by DCEO’s evaluator, ADM Associates, Inc (ADM) available on the Illinois Energy Efficiency Stakeholder Advisory Group (SAG) web site were used to calculate net savings for the former DCEO Public-Sector programs in the bridge period. Navigant presented the NTG recommendations in a January 26, 2018 memo to Nicor Gas, summarized in Table 6-3 below.

For some programs covered in the EPY7/GPY4 reports, ADM included an “Energy Efficiency Plans Score” adjustment in their calculation of free-ridership. Navigant recommended using NTG ratios without the “plans score” adjustment to be consistent with other Nicor Gas evaluations and because ADM’s approach to the “plans score” is not allowed within the TRM NTG protocols effective for GPY6. The TRM does not specify that the “had plans” criteria should be addressed in survey questions nor does it specify how the result should be treated in the algorithm. ADM reported the free ridership estimates without the “plans score” adjustment in the appendices of the EPY7/GPY4 evaluation reports for the Custom, Standard, New Construction, and Retro-Commissioning programs. Navigant used the appendices to determine the NTG without the “plans score” reported in the table below.

**Table 6-3. Navigant Recommended NTG ratios for Natural Gas for Public-Sector Bridge Period Programs Offered by Nicor Gas**

Public-Sector and Income-Eligible Programs	Recommended Bridge Period NTG Ratios (Therms)	Source <sup>5</sup> for Recommendation
Custom and Standard	<b>Custom: 0.74</b> <b>Standard: 0.46</b>	Evaluation of Illinois Energy Now Public Sector Custom, Standard, and New Construction Incentives Programs: June 2014 through May 2015 <sup>6</sup>
New Construction	<b>NC: 0.65</b>	
Public Sector Natural Gas Boiler System Efficiency Program	<b>0.87</b>	Evaluation of Illinois Energy Now Public Sector Natural Gas Boiler System Efficiency Program: June 2014 through May 2015. <sup>7</sup>
Savings Through Efficient Products (STEP)	<b>0.90</b>	Evaluation of Illinois Energy Now Savings Through Efficient Products Program: June 2014 through May 2015 <sup>8</sup>
Public Sector Retro-Commissioning Program	<b>0.94</b>	Evaluation of Illinois Energy Now Public Sector Retro-Commissioning Program: June 2014 through May 2015 <sup>9</sup>

Source: Navigant research and analysis

<sup>5</sup> Available at: <http://www.ilsag.info/evaluation-documents.html>

<sup>6</sup> Department\_of\_Commerce\_Public\_Sector\_CS\_NC\_Programs\_EPY7-GPY4\_Final.pdf. Navigant used the EPY7-GPY4 results because the EPY8-GPY5 evaluation completed only one gas NTG interview and the type of projects covered was not provided (Department\_of\_Commerce\_Public\_Sector\_CS\_Programs\_EPY8\_GPY5\_Draft.docx). Navigant recommended NTGs do not include the “plans score” adjustment.

<sup>7</sup> DCEO\_Public\_Sector\_Boiler\_System\_Efficiency\_EPY7\_GPY4\_Final\_REVISIED\_10-04-16.pdf. A draft report is not available for EPY8/GPY5.

<sup>8</sup> DCEO\_STEP\_Program\_EPY7\_GPY4\_Final\_Report.pdf. Navigant selected the most current NTG ratios from ADM’s evaluation of STEP in EPY7/GPY4. NTG was not calculated in EPY8/GPY5 due to limited participation.

<sup>9</sup> Department\_of\_Commerce\_Public\_Sector\_Retro-Commissioning\_EPY7\_GPY4\_Final.pdf. A draft NTG result for Retro-Commissioning is not available for EPY8/GPY5. Navigant recommended NTG does not include the “plans score” adjustment.



## 7. APPENDIX 2. TOTAL RESOURCE COST DETAIL

Table 7-1, the Total Resource Cost (TRC) variable table, only includes cost-effectiveness analysis inputs available at the time of finalizing the PY6-BP Public Sector 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. Detail in this table (e.g., EULs), other than final PY6-BP savings and program data, are subject to change and are not final.

**Table 7-1. Total Resource Cost Savings Summary for Nicor Gas**

Measure	Units	Quantity	Effective Useful Life (Years)	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Custom Projects	Project	5	19.7	91,733	85,664	63,391
Custom Prescriptive - Boiler Tune-Ups	Project	36	3	55,307	55,307	40,927
Custom Prescriptive - Boiler Replacements	Project	5	20	116,961	116,961	86,551
Custom Prescriptive - Pipe Insulation	Project	5	15	19,695	19,402	14,357
High Efficiency Boiler	Each	9	20	27,535	27,546	12,671
Pipe Insulation	Ln. Ft.	1,373	15	18,562	18,560	16,147
Demand Controlled Ventilation	Each	17	10	6,155	6,155	2,831
Showerheads	Each	222	10	4,803	4,803	4,323
Faucet Aerator - Bath	Each	684	9	4,179	3,427	3,084
High Efficiency Furnace	Each	7	17	1,841	1,843	848
Convection Oven	Each	2	12	1,224	612	282
Pre-Rinse Spray Valves	Each	5	5	802	802	722
Infrared Heaters	Each	1	12	451	451	207
Storage Water Heater	Each	1	15	97	77	35
Steam Trap	Each	1	6	89	88	41

Source: Nicor Gas tracking data and Navigant team analysis.