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Plan Year 1 through 3 Total Resource Cost (TRC) Test Results and Impact Summary Evaluation Report

FINAL

First Triennial Natural Gas Energy Efficiency Plan: (6/1/2011-5/31/2014)

Presented to Peoples Gas

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Prepared by:

Gregory Brown, Vijeta Jangra
Navigant Consulting, Inc.

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Submitted to:

Peoples Gas
200 East Randolph Street
Chicago, IL 60601

Submitted by:

Navigant Consulting, Inc.
30 S. Wacker Drive, Suite 3100
Chicago, IL 60606

Contact:

Randy Gunn,
Managing Director
312.583.5714
randy.gunn@navigant.com

Kevin Grabner,
Associate Director
608.497.2323
kevin.grabner@navigant.com

Robert Neumann,
Associate Director
312.583.2176
rob.neumann@navigant.com

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E. Executive Summary

Peoples Gas Energy Efficiency Portfolio has exceeded its key compliance requirements.[1] For Peoples Gas program year's GPY1 through GPY3,[2] the net verified savings of 21,553,308 therms exceeded its compliance filing goal of 17,356,822 net therms by 24 percent. Based on the Illinois TRC calculation, the portfolio TRC of 1.67 has met the statutory cost effectiveness test.

E.1. Portfolio Total Resource Cost (TRC) Test Results

This section summarizes findings regarding the cost-effectiveness of the Peoples Gas portfolio of energy efficiency programs during the three year time period from program year one through program year three. The calculations and results are to inform future planning for the implementation of efficiency programs, as well as to ensure Peoples Gas met its regulatory responsibility to implement a cost effective portfolio of energy efficiency programs during the three year period.

Navigant's evaluation of the cost effectiveness of the Peoples Gas energy efficiency portfolio includes three tests, including two variations on the Total Resource Cost (TRC) Test for GHG emissions:

- Utility Cost Test (UCT)
- TRC Test Results with no benefits from avoided environmental damages
- Illinois (IL) TRC Test, which includes benefits from avoided environmental damages

Importantly, the Peoples Gas portfolio is cost-effective under all three tests performed by Navigant, the results of which are presented in Section 2 of this report. The various cost-effectiveness tests and assumptions employed are meant to give a range of perspectives on the cost-effectiveness of the Peoples Gas portfolio under different scenarios.

Table-E 1 summarizes the annual and three-year combined results for the Peoples Gas portfolio at the program, sector, and portfolio levels. The results presented in this table are based on the IL TRC, which is the primary test utilized by Navigant for ascertaining the portfolio's cost effectiveness. The results show that across the entire three year period, the portfolio was cost effective with a TRC ratio of 1.67, which breaks down to 1.90 for the Residential sector and 2.22 for the Commercial and Industrial sector. Additionally, all but one program, Residential Prescriptive Rebate, were cost effective over the three year period.

[1] Integrys EE Compliance Filling June 1, 2011-May 31, 2014 (Docket 10-0564).

[2] Gas Program Year 1 (GPY1) began on June 1, 2011 and ended May 31, 2012. Gas Program Year 2 (GPY2) began on June 1, 2012 and ended May 31, 2013. Gas Program Year 3 (GPY3) began on June 1, 2013 and ended May 31, 2014.

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Table-E 1. Summary of Peoples Gas GPY1-GPY3 IL TRC Results by Program – *Peoples Gas Specific w/o Electric Data from Joint Programs*

Peoples Gas	GPY1			GPY2			GPY3			Combined GPY1 - GPY3		
Program	NPV Benefits	NPV Costs	IL TRC	NPV Benefits	NPV Costs	IL TRC	NPV Benefits	NPV Costs	IL TRC	NPV Benefits	NPV Costs	IL TRC
Residential Prescriptive Rebate	$ 1,339,043	$ 1,783,306	0.75	$ 6,574,728	$ 7,984,727	0.82	$ 6,808,288	$ 6,124,705	1.11	$ 14,722,059	$ 15,892,738	0.93
Multifamily Direct Install	$ 2,406,503	$ 581,373	4.14	$ 10,408,232	$ 1,918,463	5.43	$ 37,649,536	$ 14,819,710	2.54	$ 50,464,271	$ 17,319,547	2.91
Single Family Direct Install	$ 82,373	$ 82,370	1.00	$ 1,408,194	$ 891,391	1.58	$ 1,731,045	$ 1,437,584	1.20	$ 3,221,611	$ 2,411,344	1.34
Home Energy Reports	$ -	$ -		$ -	$ -		$ 1,410,870	$ 1,058,236	1.33	$ 1,410,870	$ 1,058,236	1.33
All Residential	$ 3,827,919	$ 2,447,049	1.56	$ 18,391,154	$ 10,794,581	1.70	$ 47,599,739	$ 23,440,235	2.03	$ 69,818,812	$ 36,681,865	1.90
C&I Prescriptive Rebate	$ 937,069	$ 436,142	2.15	$ 14,488,414	$ 7,920,855	1.83	$ 3,587,082	$ 2,896,594	1.24	$ 19,012,565	$ 11,253,591	1.69
C&I Custom	$ 1,236,903	$ 627,630	1.97	$ 11,864,896	$ 3,344,913	3.55	$ 7,125,140	$ 2,150,693	3.31	$ 20,226,939	$ 6,123,236	3.30
C&I Small Business Efficiency	$ 398,056	$ 296,640	1.34	$ 2,215,193	$ 1,031,826	2.15	$ 4,464,428	$ 2,122,690	2.10	$ 7,077,677	$ 3,451,156	2.05
C&I Retrocommissioning (RCx)	$ 2,867,113	$ 1,051,262	2.73	$ 932,781	$ 602,906	1.55	$ 837,029	$ 512,557	1.63	$ 4,636,923	$ 2,166,725	2.14
All C&I	$ 5,439,142	$ 2,411,674	2.26	$ 29,501,283	$ 12,900,500	2.29	$ 16,013,679	$ 7,682,534	2.08	$ 50,954,104	$ 22,994,707	2.22
Portfolio Level Costs		$ 629,262	0.00		$ 4,202,213	0.00		$ 7,842,809	0.00	$ -	$ 12,674,284	0.00
Total	$ 9,267,061	$ 5,487,985	1.69	$ 47,892,437	$ 27,897,293	1.72	$ 63,613,418	$ 38,965,578	1.63	$120,772,916	$ 72,350,857	1.67

Source: Navigant Analysis

Though annual results are included in Table-E 1, the remainder of the report focuses on the combined three-year results, per regulatory requirements. Summary results for all three tests are presented in Section 2.

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E.2. Portfolio Impact Evaluation Summary Results

This section summarizes numerical results of Navigant's impact evaluation of the energy efficiency programs offered by Peoples Gas in Gas Plan Years 1 through 3 (GPY1 through GPY3), which ran from June 1, 2011 to May 31, 2014.

The Peoples Gas portfolio included four programs targeted to residential customers and four programs targeted to business customers. Verified savings results are used to determine compliance with statutory goals and are provided in this section.

This report does not cover program process evaluation results or recommendations. All recommendations and process evaluation results are in each program's full evaluation report. Full program evaluation reports can be found on the Illinois Energy Efficiency Stakeholder Advisory Group website[3].

Verified energy savings are documented in Table E-2 through Table E-5. Detailed tables with verified program savings and costs are provided in Section 3.

Table-E 2. Peoples Gas Portfolio Year 1 Results – Verified Net Energy Savings

Program/Path	Verified			
	RR	Gross (Therms)	NTGR	Net (Therms)
Residential Prescriptive Rebate / Home Energy Rebate	1.00	216,191	0.72	155,658
Single Family Direct Install / Home Energy Jumpstart	1.00	17,293	0.86	14,949
Home Energy Reports	NA	NA	NA	NA
Multifamily	1.00	512,251	0.90	460,280
C&I Prescriptive Rebate	1.00	528,318	0.43	227,249
C&I Custom Rebate	1.02	252,368	0.68	171,610
Retro-Commissioning	1.06	913,820	1.02	927,535
Small Business Energy Savings	0.99	89,610	0.99	88,714
Portfolio Total		**2,529,851**		**2,045,995**

Source: Navigant research and analysis

[3] http://www.ilsag.info/evaluation-documents.html

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Table-E 3. Peoples Gas Portfolio Year 2 Results – Verified Net Energy Savings

Program/Path	Verified			
	RR	Gross (Therms)	NTGR	Net (Therms)
Residential Prescriptive Rebate / Home Energy Rebate	1.01	938,434	0.82	769,516
Single Family Direct Install / Home Energy Jumpstart	0.93	254,014	0.96	243,853
Home Energy Reports	NA	NA	NA	NA
Multifamily	1.00	1,826,567	0.90	1,643,910
C&I Prescriptive Rebate	1.00	4,651,497	0.63	2,930,443
C&I Custom Rebate	0.81	2,108,877	0.78	1,644,924
Retro-Commissioning	1.04	296,931	1.02	302,870
Small Business Energy Savings	1.02	572,451	0.99	566,727
Portfolio Total		**10,648,771**		**8,102,243**

Source: Navigant research and analysis

Table-E 4. Peoples Gas Portfolio Year 3 Results – Verified Net Energy Savings

Program/Path	Verified			
	RR	Gross (Therms)	NTGR	Net (Therms)
Residential Prescriptive Rebate / Home Energy Rebate	1.00	1,012,945	0.82	830,615
Single Family Direct Install / Home Energy Jumpstart	0.99	330,600	0.96	317,376
Home Energy Reports	NA	2,054,727	1.00	2,054,727
Multifamily	1.00	5,748,408	0.90	5,173,566
C&I Prescriptive Rebate	1.00	1,352,409	0.63	852,017
C&I Custom Rebate	0.96	1,217,000	0.81	985,064
Retro-Commissioning	1.02	264,763	1.02	270,058
Small Business Energy Savings	1.00	930,957	0.99	921,647
Portfolio Total		**12,911,809**		**11,405,070**

Source: Navigant research and analysis

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Table-E 5. Peoples Gas Portfolio Years 1 through 3 Results – Verified Net Energy Savings

Program/Path	Verified	
	Gross (Therms)	Net (Therms)
Residential Prescriptive Rebate / Home Energy Rebate	2,167,570	1,755,789
Single Family Direct Install / Home Energy Jumpstart	601,907	576,178
Home Energy Reports	2,054,727	2,054,727
Multifamily	8,087,226	7,277,756
C&I Prescriptive Rebate	6,532,224	4,009,709
C&I Custom Rebate	3,578,245	2,801,598
Retro-Commissioning	1,475,514	1,500,463
Small Business Energy Savings	1,593,018	1,577,088
Portfolio Total	**26,090,431**	**21,553,308**
Compliance Filing Goal		**17,356,822**
Percent of Compliance Filing Goal		**124%**

Source: Navigant research and analysis

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1. Overview

As part of Navigant's evaluation of Peoples Gas' (PG) energy efficiency programs for gas program years one through three, we performed cost-benefit calculations based upon a combination of assumptions made by PG, program tracking data, and other available resources. The focus of this review is on the basis and calculations used to conduct the Illinois TRC test, but the inputs and results for the Utility Cost Test (UCT) are also reported.

The Illinois TRC test is defined in the Illinois Power Agency Act SB1592 as follows:

> 'Total resource cost test' or 'TRC test' means a standard that is met if, for an investment in energy efficiency or demand-response measures, the benefit-cost ratio is greater than one. The benefit-cost ratio is the ratio of the net present value of the total benefits of the program to the net present value of the total costs as calculated over the lifetime of the measures. A total resource cost test compares the sum of avoided gas utility costs, representing the benefits that accrue to the system and the participant in the delivery of those efficiency measures, to the sum of all incremental costs of end-use measures that are implemented due to the program (including both utility and participant contributions), plus costs to administer, deliver, and evaluate each demand-side program, to quantify the net savings obtained by substituting the demand-side program for supply resources. In calculating avoided costs of energy that a gas utility would otherwise have had to acquire, reasonable estimates shall be included of financial costs likely to be imposed by future regulations and legislation on emissions of greenhouse gases."[4]

The Illinois TRC test differs from traditional TRC tests in its requirement to include a reasonable estimate of the financial costs associated with future regulations and legislation on the emissions of greenhouse gases (GHG). This difference adds an additional benefit to investments in efficiency programs that are typically included in the Societal Test in other jurisdictions. However, the Illinois TRC test differs from the Societal test in that it only includes benefits associated with avoided GHGs and the discount rate applied to future benefits is the gas utilities Weighted Average Cost of Capital (WACC), which is typically used in TRC calculations, as opposed to a societal discount rate.

1.1 IL TRC Equation

The equation used to calculate the Illinois TRC is presented below:

[4] Illinois Power Agency Act SB1592, pages 7-8.

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Equation 1 – Illinois TRC

$$BCR_{ILTRC} = B_{ILTRC} / C_{ILTRC}$$

Where,

BCR_{ILTRC}	=	Benefit-cost ratio of the Illinois Total Resource Cost test
B_{ILTRC}	=	Present value of benefits of a Illinois program or portfolio
C_{ILTRC}	=	Present value of costs of a Illinois program or portfolio

The benefits of the Illinois TRC are calculated using the following equation:

Equation 2 – IL TRC Benefits

$$B_{ILTRC} = \sum_{t=1}^{N} \frac{UAEP_t + UATD_t + EB_t}{(1+d)^{t-1}} + \sum_{t=1}^{N} \frac{UAC_{at} + PAC_{at}}{(1+d)^{t-1}}$$

The costs of the Illinois TRC are calculated using the following equation:

Equation 3 - IL TRC Costs

$$C_{ILTRC} = \sum_{t=1}^{N} \frac{PRC_t + PIC_t + PEAM_t + PCN_t + UIC_t}{(1+d)^{t-1}}$$

Where benefits are defined as:

UAEPt	=	Utility avoided energy production costs in year t
UATDt	=	Utility avoided transmission and distribution costs in year t
EBt	=	Environmental Benefits in year t
UACat	=	Utility avoided supply costs for the alternate fuel in year t
PACat	=	Participant avoided costs in year t for alternate fuel devices

And costs are defined as:

PRCt	=	Program Administrator program costs in year t
PICt	=	Program Implementation costs in year t
PEAMt	=	Program Evaluation, Measurement & Verification (EM&V), Advertising and Miscellaneous costs in year t
PCN	=	Net Participant costs
UICt	=	Utility increased supply costs in year t
d	=	Utility weighted average cost of capital, used as discount rate

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1.2 UCT Equation

The results of the Utility Cost Test are also presented in Section 2 of this report. The UCT (a subset of the Program Administrator Cost Test) approaches cost effectiveness from the perspective of the utility. It determines whether the energy supply and capacity costs avoided by the utility exceed the overhead and cost outlays that the utility incurred to implement energy efficiency programs. The structure of the calculation is similar to the IL TRC, with a few key changes. Since the UCT is primarily focused on utility outlays, incentives paid by the utility to either participants or third party implementers are included in the calculation in place of incremental or participant costs. Additionally, since non-energy benefits accrue to society rather than to the utility implementing energy efficiency programs, these benefits are not included in the UCT formula.

Using the equation terms previously defined for the IL TRC equation, the UCT equation is defined as:

Equation 4 – UCT

$$BCR_{UCT} = B_{UCT} / C_{UCT}$$

Where,

BCR*UCT*	=	Benefit-cost ratio of the Utility Cost Test
B*UCT*	=	Present value of benefits to a utility of a program or portfolio
C*UCT*	=	Present value of costs to a utility of a program or portfolio

The benefits of the UCT are calculated using the following equation:

Equation 5 – UCT Benefits

$$B_{UCT} = \sum_{t=1}^{N} \frac{UAEP_t + UATD_t}{(1+d)^{t-1}} + \sum_{t=1}^{N} \frac{UAC_{at}}{(1+d)^{t-1}}$$

The costs of the UCT are calculated using the following equation:

Equation 6 - UCT Costs

$$C_{UCT} = \sum_{t=1}^{N} \frac{PRC_t + PIC_t + PEAM_t + PIN_t + UIC_t}{(1+d)^{t-1}}$$

Where the new term, *PINt*, is defined as the program incentives provided by the utility in year t.

1.3 Cost-Effectiveness Data Requirements

The data points needed to conduct the Illinois TRC test are provided in Table 1-1 below and are divided into generic and program specific categories. The program specific data points are further subdivided

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into those that are provided by Peoples Gas prior to program implementation versus those that are a result of the Navigant's evaluation activities.

Table 1-1. Data points needed to conduct TRC

Category	Data Point	Source
Generic	• Avoided Gas Production Costs ($/MCF) • Avoided Gas Demand Costs ($/MCF-year) • Discount Rate • Escalation Rates • Environmental Damages	Peoples Gas
Program Specific	• Participants / Measure Count • Verified Ex-Post Energy Savings • Realization Rate • Net to Gross Ratio	Navigant
	• Measure life • Non-Incentive Costs • Utility Incentive Costs • Incremental Costs (Gross) • Incremental Costs (Net)	Peoples Gas / Other

Source: Research by Navigant

This document provides a summary of the results at the portfolio and program level, the program specific inputs and range of assumptions, a description of each of the data points and the basis of their determination.

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2. Summary of TRC Results & Generic Data Points

A summary of the portfolio level results, separated by benefits and cost components, is presented in Table 2-1 and Figure 1 below. Note that the primary difference between the results of the TRC Test and the IL TRC Tests are the added benefits of avoided environmental damages in the IL TRC Test.

The calculations show the portfolio to be cost effective under all scenarios.

Table 2-1. Summary of Portfolio Level Costs and Benefits ($ in 000's)

	UCT Test		TRC Test		IL TRC Test	
	Benefits	Cost	Benefits	Cost	Benefits	Cost
Avoided Gas Production	104,591		104,591		104,591	
Avoided Gas Demand	10,956		10,956		10,956	
Avoided Environmental Damage					5,225	
Non-Incentives		33,420		33,420		33,420
Incentives		21,211				
Net Participant Costs				38,931		38,931
Present Value Totals	115,547	54,632	115,547	72,351	120,773	72,351
Ratio	2.12		1.60		1.67	

Source: Research by Navigant

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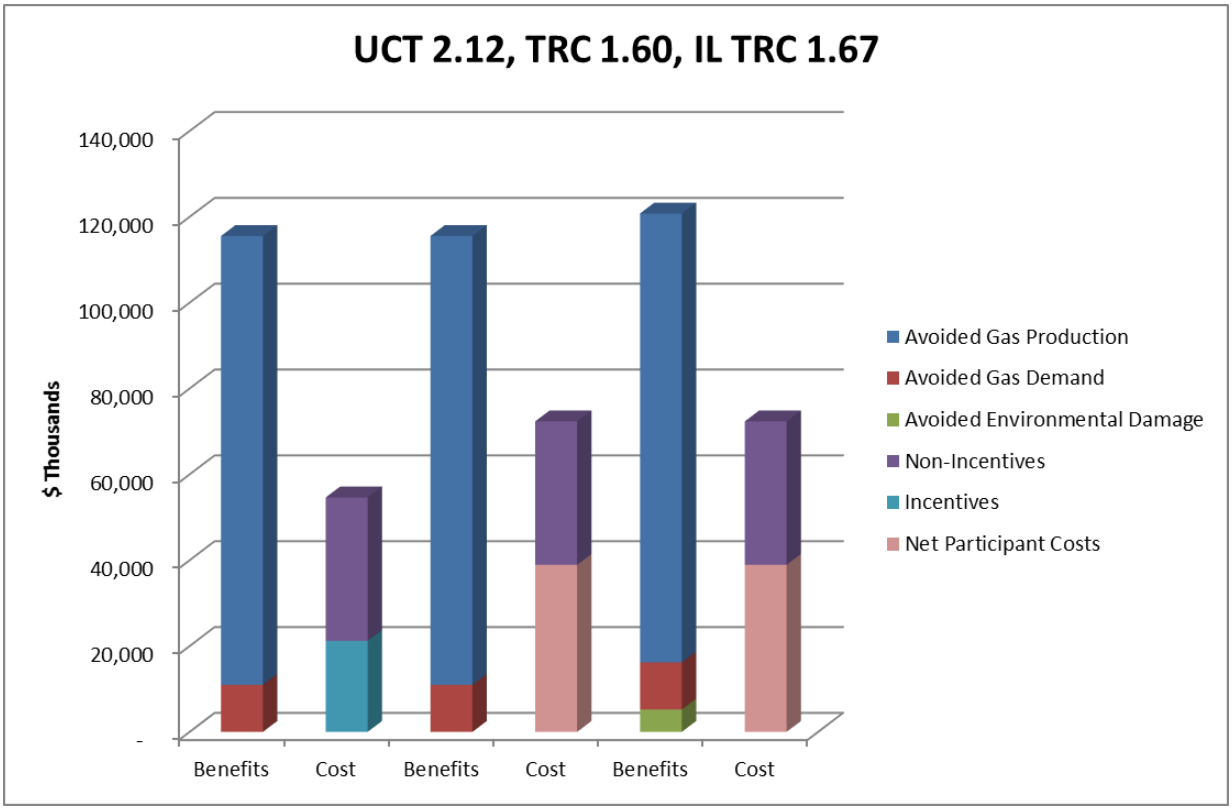
Figure 1. Summary of Portfolio Level Benefits and Costs



Source: Research by Navigant

As shown in Figure 1, the majority of the benefits in the UCT and TRC tests are derived from avoided gas production, which includes both gas commodity purchases and distribution costs. The value of avoided demand also contribute to overall portfolio benefits. For the comparison to the standard TRC test shown above, the IL TRC includes an additional components for the value of avoided environmental damages.

On the cost side, net participant costs represent the largest component followed by the non-incentive costs of program implementation, such as administration, marketing, and EM&V. For the UCT, the sum of all incentives provided is used in place of net participant costs. The sum of all incentives is less than the sum of all net incremental costs. Therefore, the UCT test ratio of 2.12 exceeds both the TRC ratio of 1.60 and the IL TRC ratio of 1.67.

2.1 Generic Data Points

Table 2-2 shows the values for the general data points used all the cost-benefit calculations for all programs and the portfolio. The table is followed by a description of what each of the component represents and how it is sourced.

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Table 2-2. Summary of Generic Data Points Used for TRC

Data Point	Value
Avoided Gas Production ($/MCF)	$0.642 (2013 base year)
Avoided Gas Demand ($/MCF-year)	$6.72 (2013 base year)
Discount Rate (Utility WACC %)	8.05%
Avoided Environmental Damages	$0.033/MCF (2013 base year)
Escalator	2.35% for Avoided Gas Costs 1.83% for Environmental Benefits

Source: Research by Navigant

2.2 Avoided Gas Production Costs ($/MCF)

Avoided gas production costs are those associated with purchasing natural gas and distributing it to end-use customers. As part of its filed Plan, Peoples Gas calculated natural gas commodity prices at Henry Hub, using the Wood Mackenzie Natural Gas Forecast, Long Term View. Peoples Gas calculated avoided supply costs by adding the pipeline delivery and gas basis charges required to transport gas from Henry Hub to the Chicago city gate, the variable distribution charges required to distribute gas from the city gate to customers, and the state taxes incurred by customers. A trend analysis was utilized to extend gas prices beyond that which is included in the forecast.

2.3 Non-Incentive Costs

Non-incentive costs are program administrator costs (related to energy efficiency) that are not otherwise classified as financial incentives paid to customers or incentives paid to third parties. In other words, non-incentive costs are equal to all program administrator costs minus incentives.

Examples of non-incentive costs include:

- Costs for overhead, labor and materials required to develop, deliver, and administer functions related to the implementation of energy efficiency programs or portfolio. This can include such things as rebate processing, measurement and verification, quality assurance, advertising and marketing, or customer relations, among others.
- Program administrator payment to a third party whose principal purpose is not to reduce the cost of the efficient measure to the customer.
- Program administrator payment to a third party to cover the cost of services that are principally intended to be a form of marketing, as opposed to being truly necessary for any customer implementation of efficient measures, should be classified as non-incentive costs.

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2.4 Incentives

Incentives[5] include financial incentives paid to customers plus incentives paid to third parties. Financial Incentives Paid to Customers means payment[6] made by a program administrator directly to an end-use Customer to encourage the Customer to participate in an efficiency Program and offset some or all of the Customer's costs to purchase and install a qualifying efficient Measure, ultimately resulting in a reduction in the net price paid by the Customer for the efficient Measure. This rebate type of Incentive is often referred to as a downstream incentive which has the result that the net price to the Customer of an Energy Efficiency Program-sponsored Measure is reduced by the amount of the Incentive.

Incentives paid to third parties means payment made by a program administrator to a third party that is principally intended to reduce the net price to the customer of purchasing and installing a qualifying efficient Measure. Incentives paid to third parties include payments made by a program administrator to trade allies, manufacturers, wholesalers, distributors, contractors, builders, retailers, implementation contractors, or other non-customer stakeholders that are principally intended to defray the incremental cost to the customer of purchasing and installing an efficient measure. Incentives paid to third parties also includes payment made by a program administrator to an implementation contractor to cover the full cost of direct installation measures (materials and labor), for the portion not covered by the customer, or the full cost of study-based services that are truly necessary for a customer to implement efficient measures, as opposed to being principally intended to be a form of marketing.

2.5 Incremental Costs

Incremental costs means the difference between the cost of the efficient measure and the cost of the most relevant baseline measure that would have been installed (if any) in the absence of the efficiency Program. Installation costs (material and labor) and Operations and Maintenance (O&M) costs shall be included if there is a difference between the efficient measure and the baseline measure. In cases where the efficient measure has a significantly shorter or longer life than the relevant baseline measure (e.g., LEDs versus halogens), the avoided baseline replacement measure costs should be accounted for in the TRC analysis. The incremental cost input in the TRC analysis is not reduced by the amount of any incentives.

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[5] The Illinois TRC test requires that "all incremental costs of end use measures (including both utility and participant contributions)" should be reflected as costs in the TRC test calculation. As long as we ensure that "all incremental costs of end-use measures" is included in the TRC test calculation, there is no need to add Program Administrator Contribution costs (i.e., Incentives) and Participant Contribution costs as separate components to the TRC test. However, Program Administrator Contribution costs (i.e., Incentives) are needed for purposes of calculating the Program Administrator Cost Test/Utility Cost Test (PACT/UCT) since those are a component of the Program Administrator expenses. Most TRC modeling software requires users to input the Incentives as a separate input in addition to providing all Incremental Costs such that the PACT/UCT can be calculated; for this reason, the separate Incentives input in the TRC model is not "used" when calculating the TRC test because these costs are already reflected in the Incremental Cost input, and if the model were to use both the Incentives input and the Incremental Cost input, it would result in double counting of costs in the TRC analysis.

[6] Payments include both Incentive checks and gift cards that are not restricted to specific retailers. Any fees incurred by the Program Administrator to obtain gift cards should be classified as Non-Incentive Costs because such fees are not principally intended to reduce the net price to the Customer of purchasing and installing the qualifying efficient Measure.

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Examples of incremental cost calculations include:

- The incremental cost for an efficient measure that is installed in new construction or is being purchased at the time of natural installation, investment, or replacement is the additional cost incurred to purchase an efficient measure over and above the cost of the baseline/standard (i.e., less efficient) measure (including any incremental installation, replacement, or O&M costs if there is a difference between the efficient measure and baseline measure).
- For a retrofit measure where the efficiency program caused the customer to update their existing equipment, facility, or processes, where the customer would not have otherwise made a purchase, the appropriate baseline is zero expenditure, and the incremental cost is the full cost of the new retrofit measure (including installation costs).
- For the early replacement of a functioning measure with a new efficient measure, where the customer would not have otherwise made a purchase for a number of years, the appropriate baseline is a dual baseline that begins as the existing measure and shifts to the new standard measure after the expected remaining useful life of the existing measure ends. Thus, the incremental cost is the full cost of the new efficient measure (including installation costs) being purchased to replace a still-functioning measure less the present value of the assumed deferred replacement cost of replacing the existing measure with a new baseline measure at the end of the existing measure's life.
- For study-based services that are truly necessary for a customer to implement efficient measures, as opposed to being principally intended to be a form of marketing, the incremental cost is the full cost of the study-based service.
- For the early retirement of duplicative functioning equipment before its expected life is over (e.g., appliance recycling programs), the incremental costs are composed of the customer's value placed on their lost amenity, any customer transaction costs, and the pickup and recycling cost. The incremental costs include the actual cost of the pickup and recycling of the equipment because this is assumed to be the cost of recycling the equipment that would have been incurred by the customer if the customer were to recycle the equipment on their own in the absence of the efficiency program. The payment a program administrator makes to the customer serves as a proxy for the value the customer places on their lost amenity and any customer transaction costs.

2.6 Discount Rate

The discount rate is an important determinant of overall cost effectiveness. The avoided energy production, avoided water use, and GHG benefits accrue over the life of the measures included in each program. These benefits are discounted to determine the present value of the cumulative benefits. The discount rate used of 8.05% reflects Peoples Gas' weighted average cost of capital (WACC) and is appropriate rate to use for cost-benefit testing.

2.7 Miscellaneous Portfolio Costs

In addition to costs allocated directly to energy efficiency programs, portfolio level costs not directly incurred by specific programs are also included. These costs may include administrative, research and development, outreach, advertising, evaluation, measurement, and verification, legal, and other

expenses. Since statutory costs effectiveness is measured at the portfolio level, Peoples Gas does not allocate these costs to individual programs.

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3. Program Specific Data

3.1 Program Specific Data Summary

A summary of the components of the cost effectiveness calculations for each program are shown in Table 3-1 for the Illinois TRC calculations and Table 3-2 for the Utility Cost Test calculations. The tables include the value of each benefit and cost component for each program, as well as portfolio level totals for each component.

Table 3-1. Summary of Program Level Benefits, Costs ($ in 000's) and IL TRC Test

Program	Benefits				Costs				IL Total Resource Cost (TRC) Test			
	Avoided Gas Production	Avoided Gas Demand	Other Benefits	Other Benefits	Non-Incentive Costs	Incentive Costs	Incremental Costs (Gross)	Incremental Costs (Net)	IL TRC Benefits	IL TRC Costs	IL TRC Test Net Benefits	IL TRC Test
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j) = (b+c+d)	(k) = (f+l)	(l) = (j-k)	(m) = (j/k)
Residential Prescriptive Rebate	$ 12,754,703	$ 1,336,113	$ 631,243	Environmental Benefits	$ 4,716,521	$ 4,990,708	$ 13,857,999	$ 11,176,218	$ 14,722,059	$ 15,892,738	$ (1,170,679)	**0.93**
Multifamily Direct Install	$ 43,709,077	$ 4,578,725	$ 2,176,470	Environmental Benefits	$ 4,580,153	$ 7,495,656	$ 14,154,882	$ 12,739,394	$ 50,464,271	$ 17,319,547	$ 33,144,725	**2.91**
SF Direct Install	$ 2,789,155	$ 292,177	$ 140,279	Environmental Benefits	$ 1,545,939	$ 255,561	$ 904,497	$ 865,405	$ 3,221,611	$ 2,411,344	$ 810,267	**1.34**
Residential Home Energy Report	$ 1,220,285	$ 127,830	$ 62,754	Environmental Benefits	$ 1,058,304	$ -	$ -	$ -	$ 1,410,870	$ 1,058,304	$ 352,566	**1.33**
C&I Prescriptive Rebate	$ 16,460,698	$ 1,724,333	$ 827,534	Environmental Benefits	$ 3,696,563	$ 2,358,372	$ 12,096,478	$ 7,557,027	$ 19,012,565	$ 11,253,591	$ 7,758,974	**1.69**
C&I Custom	$ 17,517,894	$ 1,835,079	$ 873,965	Environmental Benefits	$ 3,777,776	$ 3,003,450	$ 3,061,500	$ 2,345,460	$ 20,226,939	$ 6,123,236	$ 14,103,703	**3.30**
C&I Small Business Efficiency	$ 6,127,017	$ 641,833	$ 308,827	Environmental Benefits	$ 1,337,856	$ 1,096,050	$ 2,134,647	$ 2,113,300	$ 7,077,677	$ 3,451,156	$ 3,626,522	**2.05**
C&I Retro Commissioning	$ 4,012,260	$ 420,302	$ 204,361	Environmental Benefits	$ 32,994	$ 2,011,331	$ 2,091,893	$ 2,133,731	$ 4,636,923	$ 2,166,725	$ 2,470,198	**2.14**
Sum of programs	$ 104,591,089	$ 10,956,393	$ 5,225,434		$ 20,746,105	$ 21,211,128	$ 48,301,896	$ 38,930,535	$ 120,772,916	$ 59,676,641	$ 61,096,275	**2.02**
Portfolio Costs					$ 12,674,284					$ 12,674,284	$ (12,674,284)	
Aggregate Portfolio	$ 104,591,089	$ 10,956,393	$ 5,225,434		$ 33,420,389	$ 21,211,128	$ 48,301,896	$ 38,930,535	$ 120,772,916	$ 72,350,925	$ 48,421,991	**1.67**

Source: Navigant Analysis

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Table 3-2. Summary of Program Level Benefits, Costs ($ in 000's) and Utility Cost Test

Program	Benefits				Costs				Utility Cost Test (UCT)			
	Avoided Energy Production	Avoided Gas Demand	Other Benefits	Other Benefits	Non-Incentive Costs	Incentive Costs	Incremental Costs (Gross)	Incremental Costs (Net)	UCT Benefits	UCT Costs	UCT Test Net Benefits	UCT Test
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j) = (b)	(k) = (f+g)	(l) = (j-k)	(m) = (j/k)
Residential Prescriptive Rebate	$ 12,754,703	$ 1,336,113	$ 631,243	Environmental Benefits	$ 4,716,521	$ 4,990,708	$ 13,857,999	$ 11,176,218	$ 14,090,816	$ 9,707,228	$ 4,383,588	**1.45**
Multifamily Direct Install	$ 43,709,077	$ 4,578,725	$ 2,176,470	Environmental Benefits	$ 4,580,153	$ 7,495,656	$ 14,154,882	$ 12,739,394	$ 48,287,802	$ 12,075,809	$ 36,211,992	**4.00**
SF Direct Install	$ 2,789,155	$ 292,177	$ 140,279	Environmental Benefits	$ 1,545,939	$ 255,561	$ 904,497	$ 865,405	$ 3,081,332	$ 1,801,500	$ 1,279,832	**1.71**
Residential Home Energy Report	$ 1,220,285	$ 127,830	$ 62,754	Environmental Benefits	$ 1,058,304	$ -	$ -	$ -	$ 1,348,116	$ 1,058,304	$ 289,812	**1.27**
C&I Prescriptive Rebate	$ 16,460,698	$ 1,724,333	$ 827,534	Environmental Benefits	$ 3,696,563	$ 2,358,372	$ 12,096,478	$ 7,557,027	$ 18,185,031	$ 6,054,935	$ 12,130,096	**3.00**
C&I Custom	$ 17,517,894	$ 1,835,079	$ 873,965	Environmental Benefits	$ 3,777,776	$ 3,003,450	$ 3,061,500	$ 2,345,460	$ 19,352,973	$ 6,781,226	$ 12,571,747	**2.85**
C&I Small Business Efficiency	$ 6,127,017	$ 641,833	$ 308,827	Environmental Benefits	$ 1,337,856	$ 1,096,050	$ 2,134,647	$ 2,113,300	$ 6,768,850	$ 2,433,906	$ 4,334,944	**2.78**
C&I Retro Commissioning	$ 4,012,260	$ 420,302	$ 204,361	Environmental Benefits	$ 32,994	$ 2,011,331	$ 2,091,893	$ 2,133,731	$ 4,432,562	$ 2,044,325	$ 2,388,237	**2.17**
Sum of programs	$ 104,591,089	$ 10,956,393	$ 5,225,434		$ 20,746,105	$ 21,211,128	$ 48,301,896	$ 38,930,535	$ 115,547,482	$ 41,957,233	$ 73,590,249	**2.75**
Portfolio Costs					$ 12,674,284					$ 12,674,284	$ (12,674,284)	
Aggregate Portfolio	$ 104,591,089	$ 10,956,393	$ 5,225,434		$ 33,420,389	$ 21,211,128	$ 48,301,896	$ 38,930,535	$ 115,547,482	$ 54,631,517	$ 60,915,965	**2.12**

Source: Navigant Analysis

A summary of the components of the verified savings and costs for each program are shown in Table 3-3 through Table 3-5 for each program year. The tables include the component values for each program, as well as portfolio level totals for each component.

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Table 3-3. Summary of Verified Savings and Program Costs for GPY1

	Realization Rate	Verified Ex Post Gross		Deemed/Used	Verified Ex Post Net				Actual	Participation		Weighted Average Measure Life
	Energy Savings (Ex Ante Gross/Ex Post Gross)	First Year Annual Energy Savings	Lifetime Savings	Net-to-Gross Ratio	First Year Annual Savings	Lifetime Savings	First Year Cost per First Year Annual Savings	First Year Cost per Lifetime Savings	Program Costs	# Units	Units Definition	Years
	%	Therms	Therms	%	Therms	Therms	$/Therms	$/Therms	$			
Residential Programs												
Residential Prescriptive Rebate	100%	216,191	4,323,820	72%	155,658	3,113,160	$ 6.32	$ 0.32	$ 983,718	2,559	Measures / Units	20.0
Single Family Direct Install	100%	17,293	178,671	86%	14,949	154,453	$ 4.85	$ 0.47	$ 72,518	6,176	Measures / Units	10.3
Multifamily Direct Install	100%	512,251	4,880,452	90%	460,280	4,385,300	$ 1.22	$ 0.13	$ 560,153	47,760	Measures / Units	9.5
Total Residential		745,735	9,046,065	85%	630,887	7,652,913	$ 2.56	$ 0.21	$ 1,616,389	56,495		12.1
Business Programs												
C&I Prescriptive Rebate	100%	528,318	3,987,370	43%	227,249	1,715,114	$ 2.34	$ 0.31	$ 532,811	887	Measures / Units	7.5
C&I Custom	102%	252,368	3,785,520	68%	171,610	2,574,150	$ 2.78	$ 0.19	$ 477,058	29	Projects	15.0
Retro Commissioning	106%	913,820	4,569,100	102%	927,535	4,637,675	$ 1.09	$ 0.22	$ 1,008,422	14	Projects	5.0
Small Business Energy Savings	99%	89,610	710,391	99%	88,714	703,288	$ 2.25	$ 0.28	$ 199,349	1,295	Measures	7.9
Total Business		1,784,116	12,141,436	79%	1,415,108	9,630,228	$ 1.57	$ 0.23	$ 2,217,640	2,225		6.8
Portfolio Total		2,529,851	21,187,501	81%	2,045,995	17,283,141	$ 2.18	$ 0.26	$ 4,463,359	58,720		8.4

Source: Navigant Analysis

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Table 3-4. Summary of Verified Savings and Program Costs for GPY2

	Realization Rate	Verified Ex Post Gross		Deemed/Used	Verified Ex Post Net				Actual	Participation		Weighted Average Measure Life
	Energy Savings (Ex Ante Gross/Ex Post Gross)	First Year Annual Energy Savings	Lifetime Savings	Net-to-Gross Ratio	First Year Annual Savings	Lifetime Savings	First Year Cost per First Year Annual Savings	First Year Cost per Lifetime Savings	Program Costs	# Units	Units Definition	Years
	%	Therms	Therms	%	Therms	Therms	$/Therms	$/Therms	$			
Residential Programs												
Residential Prescriptive Rebate	101%	938,434	18,553,849	82%	769,516	15,214,159	$ 7.23	$ 0.37	$ 5,562,255	1,136,051	Measures / Units	19.8
Single Family Direct Install	93%	254,014	2,765,921	96%	243,853	2,655,279	$ 2.36	$ 0.22	$ 574,380	82,662	Measures / Units	10.9
Multifamily Direct Install	100%	1,826,567	22,919,369	90%	1,643,910	20,627,428	$ 1.63	$ 0.13	$ 2,682,815	170,088	Measures / Units	12.5
Total Residential		3,019,015	43,737,453	88%	2,657,279	38,496,866	$ 3.32	$ 0.23	$ 8,819,450	1,388,801		14.5
Business Programs												
C&I Prescriptive Rebate	100%	4,651,497	44,854,858	63%	2,930,443	28,258,559	$ 1.40	$ 0.14	$ 4,089,894	1,929,918	Measures / Units	9.6
C&I Custom	81%	2,108,877	31,633,155	78%	1,644,924	24,673,860	$ 2.16	$ 0.14	$ 3,551,377	89	Projects	15.0
Retro Commissioning	104%	296,931	1,484,655	102%	302,870	1,514,350	$ 1.82	$ 0.36	$ 550,886	17	Projects	5.0
Small Business Energy Savings	102%	572,451	3,831,147	99%	566,727	3,792,839	$ 1.17	$ 0.17	$ 662,463	2,987	Measures	6.7
Total Business		7,629,756	81,608,253	71%	5,444,964	58,239,608	$ 1.63	$ 0.15	$ 8,854,620	1,933,011		10.7
Portfolio Total		10,648,771	125,345,706	76%	8,102,243	96,736,474	$ 2.70	$ 0.23	$ 21,876,283	3,321,812		11.9

Source: Navigant Analysis

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Table 3-5. Summary of Verified Savings and Program Costs for GPY3

	Realization Rate	Verified Ex Post Gross		Deemed/Used	Verified Ex Post Net				Actual	Participation		Weighted Average Measure Life
	Energy Savings (Ex Ante Gross/Ex Post Gross)	First Year Annual Energy Savings	Lifetime Savings	Net-to-Gross Ratio	First Year Annual Savings	Lifetime Savings	First Year Cost per First Year Annual Savings	First Year Cost per Lifetime Savings	Program Costs	# Units	Units Definition	Years
	%	Therms	Therms	%	Therms	Therms	$/Therms	$/Therms	$			
Residential Programs												
Residential Prescriptive Rebate	100%	1,012,945	19,039,474	82%	830,615	15,612,370	$ 3.81	$ 0.20	$ 3,161,255	1,656,248	Measures / Units	18.8
Single Family Direct Install	99%	330,600	3,379,788	96%	317,376	3,244,597	$ 3.64	$ 0.36	$ 1,154,602	52,347	Measures / Units	10.2
Home Energy Reports	N/A	2,054,727	2,054,727	100%	2,054,727	2,054,727	$ 0.52	$ 0.52	$ 1,058,236	151,200	Reports	1.0
Multifamily Direct Install	100%	5,748,408	92,521,824	90%	5,173,566	83,269,622	$ 1.71	$ 0.11	$ 8,832,841	1,063,099	Measures / Units	16.1
Total Residential		9,146,680	113,763,235	92%	8,376,284	104,181,316	$ 1.70	$ 0.14	$ 14,206,934	2,922,894		12.4
Business Programs												
C&I Prescriptive Rebate	100%	1,352,409	10,268,416	63%	852,017	6,469,097	$ 1.68	$ 0.22	$ 1,432,230	1,013,964	Measures / Units	7.6
C&I Custom	96%	1,217,000	18,255,000	81%	985,064	14,775,960	$ 2.79	$ 0.19	$ 2,752,791	39	Projects	15.0
Retro Commissioning	102%	264,763	1,323,815	102%	270,058	1,350,290	$ 1.80	$ 0.36	$ 485,017	9	Projects	5.0
Small Business Energy Savings	100%	930,957	8,801,050	99%	921,647	8,713,035	$ 1.71	$ 0.18	$ 1,572,094	105,930	Measures	9.5
Total Business		3,765,129	38,919,916	80%	3,028,786	31,308,382	$ 2.06	$ 0.20	$ 6,242,132	1,119,942		10.3
Portfolio Total		12,911,809	152,683,151	88%	11,405,070	135,489,698	$ 2.48	$ 0.21	$ 28,291,875	4,042,836		11.9

Source: Navigant Analysis

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3.2 Program Specific Data Review

With respect to the program specific data used in TRC calculation, several were based on Peoples Gas internal tracking and accounting systems. These include implementation, utility administration and utility incentive costs. Implementation and incentives costs are tracked by program, where utility admin costs were provided by Peoples Gas' energy efficiency staff. It is worth noting that many of the programs were jointly implemented by Peoples Gas and Commonwealth Edison. These programs include Residential Prescriptive Rebate, Multifamily Direct Install, Single Family Direct Install, C&I Retro-Commissioning, and C&I Small Business Efficiency. In these cases, the utility costs were split between the utilities based on an agreed percentage.

The remaining data points that were provided by Peoples Gas in the TRC evaluation were the Measure Life and Incremental Costs. These values were confirmed or revised by Navigant based upon deemed values in the Illinois TRM Version 2.0, where appropriate. The measure life determines how long the energy and demand savings from any one measure will last. The incremental costs are the costs associated with participating in the program, before accounting for any incentives. In most cases, these costs are the difference between the more energy efficient measure purchased due to participation in the energy efficiency program and the baseline measure costs, which is what the participant would presumably have bought in absence of the program. In some instances, the "baseline" measure is to not install any measure, such as for attic insulation. In these instances, the incremental cost is the full cost of the measure. In rebate programs, participants generally pay a portion of the incremental costs, in contrast with direct install programs where the utility generally pays most or all of the incremental costs. In all these cases, the participant incremental costs should be included in the TRC calculation if non-zero.

3.3 Residential Prescriptive Rebate

In the Residential Prescriptive Rebate program, Peoples Gas offers high-efficiency furnace rebates in conjunction with Commonwealth Edison Company (ComEd) that offers cash incentives and education to encourage upgrading central air-conditioning systems. The dollar amount of the rebate depends on the size and efficiency of the replacement measures. Both rental and owner-occupied dwellings are eligible for rebates for furnaces and air-conditioning systems. In order to receive these rebates, customers must be active residential customers of Peoples Gas and ComEd, and they must use premises in existing buildings for residential purposes.

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Table 3-6. IL TRC Components for Residential Prescriptive Rebate Program

Item	Value
Ex-Post Gross Savings (Therms) @ the Meter	2,167,570
Ex-Post Net Savings (Therms) @ the Meter	1,755,789
Utility Non-Incentive Costs	$4,716,521
Utility Incentive Costs	$4,990,708
Gross Incremental Costs	$13,857,999
Net Incremental Costs	$11,176,218
Total TRC Benefits	$14,722,059
Total TRC Costs – summary	$15,892,738
Total TRC Net Benefits	-$1,170,679
TRC Test Ratio	0.93

Source: Research by Navigant

3.2.1 Measure Life

A range of measure lives were used for the Residential Prescriptive Rebate program depending on which measure group was being analyzed. The table below summarizes the measure lives used for different measures of the program. These measure lives are consistent with the current version of the Illinois TRM.[7]

Table 3-7. Measure life of the Residential Prescriptive Rebate Program Measures

Measure	Measure Life (in years)
Furnace Tune-up	3
Boiler Tune-up	5
Duct Sealing	5
Programmable Thermostats	9
Storage Water Heater	15
Attic Insulation	20
Boiler	20
Boiler Reset Controls	20
Furnace	20
Pipe Insulation	20
Indirect Storage Water Heater	20
Tankless Water Heater	20

Source: Research by Navigant

3.3.1 Participant/Incremental Costs

Incremental measures costs are deemed per measure in the Illinois TRM and were used to determine the program participant costs. Navigant began by using incremental costs that were consistent with the filed plan for GPY1 to GPY3. Many of these values were then updated to be consistent with recent iterations of the Illinois TRM or other resources where appropriate, such as program records. The table below summarizes the incremental cost used for the Residential Prescriptive Rebate program measures.

[7] Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 2.0. Effective June 1, 2013.

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Table 3-8. Incremental Cost of the of the Residential Prescriptive Rebate Program Measures

Measure	Incremental cost per unit (in $)
Boiler Tune-up	650
Duct Sealing	3
Programmable Thermostats	75
Storage Water Heater	400
Attic Insulation	1
Boiler (<=300 MBtu)	1,250 - 1,994 per unit
Boiler (>300 MBtu)	0.86 - 1.61 per MBtu
Boiler Reset Controls	200
Furnace	802 - 1,438
Furnace Tune-up	1,650
Pipe Insulation	3
Indirect Storage Water Heater	400
Tankless Water Heater	1,050

Source: Research by Navigant

3.3.2 Impact Results

Table 3-9 shows the key results of the gross and net impact evaluation using deemed savings estimates.

Table 3-9. Residential Prescriptive Rebate Incentive GPY1-GPY3 Impact Results

	GPY1 Therm Savings	GPY2 Therm Savings	GPY3 Therm Savings	GPY1-GPY3 Therm Savings
Verified Gross	216,191	938,434	1,012,945	2,167,570
Verified Net	155,658	769,516	830,615	1,755,789
NTG Ratio	0.72	0.82	0.82	0.81

Source: Research by Navigant

3.4 Single Family Direct Install

The Single Family Direct Install program is an assessment and direct install program jointly implemented by the Commonwealth Edison Company (ComEd) and Peoples Gas with Franklin Energy Services implementing the program. The main goal of this residential direct install program is to secure energy savings through direct installation of low-cost efficiency measures, such as water efficient showerheads and faucet aerators, pipe insulation, and programmable thermostats at eligible single family residences. A second objective of this program is to perform a brief assessment of major retrofit opportunities (e.g., furnace, boiler, air conditioning, insulation, and air sealing) and bring heightened awareness to the homeowners about available additional efficiency programs offered by ComEd and Peoples Gas.

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Table 3-10. IL TRC Components for Single Family Direct Install

Item	Value
Ex-Post Gross Savings (Therms) @ the Meter	601,907
Ex-Post Net Savings (Therms) @ the Meter	576,178
Utility Non-Incentive Costs	$1,545,939
Utility Incentive Costs	$255,561
Gross Incremental Costs	$904,497
Net Incremental Costs	$865,405
Total TRC Benefits	$3,221,611
Total TRC Costs – summary	$2,411,344
Total TRC Net Benefits	$810,267
TRC Test Ratio	1.34

Source: Research by Navigant

3.4.1 Measure Life

A range of measure lives were used for the Single Family Direct Install program depending on the measure group. The table below summarizes the measure lives used for different measures of the program.

Table 3-11. Measure life of the Single Family Direct Install Program Measures

Measure	Measure Life (in years)
Water Heater Set Back	3
Bathroom Aerator	5
Programmable Thermostat	9
Showerhead	10
Kitchen Aerator	10
DHW Pipe Wrap	13
Boiler Pipe Wrap	13
Pipe Insulation	20

Source: Research by Navigant

3.4.2 Participant/Incremental Costs

The table below summarizes the incremental cost used for the Single Family Direct Install program measures.

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Table 3-12. Incremental Cost of the of the Single Family Direct Install Measures

Measure	Incremental cost per unit (in $)
Water Heater Set Back	5
Bathroom Aerator	8
Programmable Thermostat	75
Showerhead	12
Kitchen Aerator	8
Showerhead	12
DHW Pipe Wrap	3
Boiler Pipe Wrap	3
Pipe Insulation	3

Source: Research by Navigant

3.4.3 Impact Results

Table 3-13 shows the key results of the gross and net impact evaluation using deemed savings estimates.

Table 3-13. Single Family Direct Install GPY1-GPY3 Impact Results

	GPY1 Therm Savings	GPY2 Therm Savings	GPY3 Therm Savings	GPY1-GPY3 Therm Savings
Verified Gross	17,293	254,014	330,600	601,907
Verified Net	14,949	243,853	317,376	576,178
NTG Ratio	0.86	0.96	0.96	0.96

Source: Research by Navigant

3.5 Multi-Family Direct Install

The Multi-Family Direct Install program achieves natural gas energy savings for customers of Peoples Gas and electric energy and demand savings for ComEd customers. Franklin Energy Services, LLC was the primary implementation contractor for the program.

During the three program years, the Multi-Family Direct Install program continued to implement its direct install components (programmable thermostats, hot water pipe wrap insulation, and water efficiency measures in residential dwelling units and common areas). Concurrently, Multi-Family Direct Install offered technical services and financial incentives to commercial contractors and multi-family decision-makers to install program measures designed to achieve energy savings in whole buildings and grounds. These measures include upgrades or improvements to central plant and heating, ventilating, and air-conditioning (HVAC) systems and controls, interior and exterior lighting systems, building shell improvements, among others. The Multi-Family Direct Install program was delivered through three channels: direct install, trade ally installation, and prescriptive incentives.

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Table 3-14. IL TRC Components for Multi-Family Direct Install GPY1-GPY3

Item	Value
Ex-Post Gross Savings (Therms) @ the Meter	8,087,226
Ex-Post Net Savings (Therms) @ the Meter	7,277,756
Utility Non-Incentive Costs	$4,580,153
Utility Incentive Costs	$7,495,656
Gross Incremental Costs	$14,154,882
Net Incremental Costs	$12,739,394
Total TRC Benefits	$50,464,271
Total TRC Costs – summary	$17,319,547
Total TRC Net Benefits	$33,144,725
TRC Test Ratio	2.91

Source: Research by Navigant

3.5.1 Measure Life

A range of measure lives were used for the Multi-Family Direct Install program depending on the measure group. The table below summarizes the measure lives used for different measures of the program. These measure lives are consistent with the current version of the Illinois TRM.

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Table 3-15. Measure life of the Multi-Family Direct Install Measures

Measure	Measure Life (in years)
MF Single-Pipe Steam System Balancing/IMP Venting	3
Boiler Tune-up	5
Furnace Tune-up	5
Bathroom Aerator	5
Draft Damper	5
Duct Sealing	5
Pre-rinse Sprayer	5
Steam Trap	6
Programmable Thermostats	9
Kitchen Aerators	10
Showerhead	10
Clothes Washer	12
HW Pipe Wrap	13
Steam Pipe Wrap	15
Large Gas Water Heater	15
Water Heater	15
MF Single-Pipe Steam Boiler Averaging Controls	16
O2 Trim	18
Pipe Insulation	20
HE Furnace	20
HE Boiler	20
HE DHW	20
Boiler Reset Controls	20
Attic Insulation	20
Tankless Water Heater	20

Source: Research by Navigant

3.5.2 Participant/Incremental Costs

The table below summarizes the incremental cost used for the Multi-Family Direct Install program measures.

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Table 3-16. Incremental Cost of the of the Multi-Family Direct Install Measures

Measure	Incremental cost per unit (in $)
MF Single-Pipe Steam System Balancing/IMP Venting	20
Boiler Tune-up	2 per MBtu
Furnace Tune-up	1,650
Bathroom Aerator	8
Draft Damper	5
Duct Sealing	3
Pre-rinse Sprayer	60
Steam Trap	77
Programmable Thermostats	75
Kitchen Aerators	8
Showerhead	12
Clothes Washer	200
HW Pipe Wrap	3
Steam Pipe Wrap	3
Large Gas Water Heater	1
Water Heater	400
MF Single-Pipe Steam Boiler Averaging Controls	612
O2 Trim	1
Pipe Insulation	3
HE Furnace	1,511
HE Boiler	10
HE DHW	400
Boiler Reset Controls	2
Attic Insulation	1
Tankless Water Heater	1,050

Source: Research by Navigant

3.5.3 Impact Results

Table 3-17 shows the key results of the gross and net impact evaluation using deemed savings estimates.

Table 3-17. Multi-Family Direct Install Program GPY1-GPY3 Impact Results

	GPY1 Therm Savings	GPY2 Therm Savings	GPY3 Therm Savings	GPY1-GPY3 Therm Savings
Verified Gross	512,251	1,826,567	5,748,408	8,087,226
Verified Net	460,280	1,643,910	5,173,566	7,277,756
NTG Ratio	0.90	0.90	0.90	0.90

Source: Research by Navigant

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3.6 *Residential Home Energy Report*

The Home Energy Report (HER) Program is designed to generate gas savings by providing residential customers with sets of information about their specific gas use and related conservation suggestions and tips. The information is provided in the form of Home Energy Reports that give customers various types of information, including: a) how their recent gas use compares to their use in the past; b) tips on how to reduce consumption, some of which are tailored to the customer's circumstances; and c) information on how their gas use compares to that of neighbors with similar homes. Currently, participating households receive the reports monthly. This set of information has been shown in other studies to stimulate customers to reduce their gas use, creating average savings around 1%, depending on local gas use patterns.

Table 3-18. IL TRC Components for Residential Home Energy Report program

Item	Value
Ex-Post Gross Savings (Therms) @ the Meter	2,054,727
Ex-Post Net Savings (Therms) @ the Meter	2,054,727
Utility Non-Incentive Costs	$1,058,304
Utility Incentive Costs	0
Gross Incremental Costs	0
Net Incremental Costs	0
Total TRC Benefits	$1,410,870
Total TRC Costs – summary	$1,058,304
Total TRC Net Benefits	$352,566
TRC Test Ratio	1.33

Source: Research by Navigant

3.6.1 Measure Life

A measure life of one year was assumed for the Residential Home Energy Report Program. This assumes that there would be no persistence in participant savings were the delivery of the home energy reports discontinued. A recently finished persistence study determined that the presence of household savings beyond the time during which reports are delivered results in an effective measure life of approximately three years, making the measure life of one year is conservative. In future TRC evaluations, this assumption will be updated to incorporate the results of the persistence study.

3.6.2 Participant/Incremental Costs

The incremental cost is assumed to be zero.

3.6.3 Impact Results

Table 3-19 shows the key results of the gross and net impact evaluation using deemed savings estimates.

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Table 3-19. Residential Home Energy Report GPY1-GPY3 Impact Results

	GPY1 Therm Savings	GPY2 Therm Savings	GPY3 Therm Savings	GPY1-GPY3 Therm Savings
Verified Gross	N/A	N/A	2,054,727	2,054,727
Verified Net	N/A	N/A	2,054,727	2,054,727
NTG Ratio	N/A	N/A	1.0	1.0

Source: Research by Navigant

3.7 *C&I Prescriptive Rebate*

The Commercial & Industrial (C&I) Prescriptive Rebate program (C&I Prescriptive program) is targeted to all C&I customers. The C&I Prescriptive program provides rebates to customers to install, replace or retrofit qualifying equipment. While the actual list of equipment may vary over time, the program generally includes measures such as natural gas heating systems, control technologies, water heating equipment, and food service equipment. The C&I Prescriptive program is targeted to active customers of Peoples Gas. In general these customers are served under rate S.C. No. 4.

Customer rebates are based on a portion of the incremental cost difference between standard or minimum code efficiency and high efficiency equipment that varies by measure. If the common industry practice is to replace equipment with higher efficiency than the standard- or minimum code-required efficiency, the higher efficiency number is used as a baseline from which to calculate the rebate and energy savings. Customers may receive a rebate without pre-approval for participation. The C&I Prescriptive program relies on wholesale and retail trade allies to assist in the marketing of this program. Trade ally support and engagement is considered to be a key element to the success of this program. The C&I Prescriptive program may provide incentives to trade allies for specific, limited-time promotions.

Table 3-20. IL TRC Components for C&I Prescriptive Rebate Program

Item	Value
Ex-Post Gross Savings (Therms) @ the Meter	6,532,224
Ex-Post Net Savings (Therms) @ the Meter	4,009,709
Utility Non-Incentive Costs	$3,696,563
Utility Incentive Costs	$2,358,372
Gross Incremental Costs	$12,096,478
Net Incremental Costs	$7,557,027
Total TRC Benefits	$19,012,565
Total TRC Costs – summary	$11,253,591
Total TRC Net Benefits	$7,758,974
TRC Test Ratio	1.69

Source: Research by Navigant

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3.7.1 Measure Life

The C&I Prescriptive Rebate program included different measure groups and therefore a range of measure lives were used for the cost-effectiveness analysis. The table below summarizes the measure lives used for different measures of the program.

Table 3-21. Measure life of the C&I Prescriptive Rebate Program Measures

Measure	Measure Life (in years)
Industrial Burner Tune-up	3
Single-Pipe Steam System Balancing and Improved Venting	3
Boiler Tune-up	5
Kitchen Aerator	5
Bathroom Aerator	5
Pre-Rinse Sprayer	5
Steam Trap	6
Programmable Thermostat	9
Building DCV	10
Showerhead	10
Kitchen Hood DCV	10
Energy Star Convection Oven	12
Food Service Appliances	12
Energy Star Steamer	12
Infrared Heater	15
Gas Water Heater	15
Energy Star Fryer	15
Linkageless Control	16
Industrial Burner Turndown	16
Single-Pipe Steam Boiler Averaging Controls	16
O2 Trim	18
Boiler	20 - 30
Boiler Reset Control	20
Furnace	20
Indirect Water Heater	20
Tankless Water Heater	20
Pipe Insulation	20

Source: Research by Navigant

3.7.2 Participant/Incremental Costs

The table below summarizes the incremental costs used for the C&I Prescriptive Rebate program measures.

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Table 3-22. Incremental Cost of the of the C&I Prescriptive Rebate Program Measures

Measure	Incremental cost (in $)
Industrial Burner Tune-up	1
Single-Pipe Steam System Balancing and Improved Venting	20
Boiler Tune-up	2 per MBH or 650 per unit
Kitchen Aerator	8
Bathroom Aerator	8
Pre-Rinse Sprayer	60
Steam Trap	77
Programmable Thermostat	75
Building DCV	1
Showerhead	12
Kitchen Hood DCV	20
Energy Star Convection Oven	1,900
Food Service Appliances	800
Energy Star Steamer	3,700
Infrared Heater	5
Gas Water Heater (0.67 EF)	400 per unit
Gas Water Heater (0.82 EF)	1 per MBH
Energy Star Fryer	1,200
Linkageless Control	3
Industrial Burner Turndown	3
Single-Pipe Steam Boiler Averaging Controls	612
O2 Trim	1
Boiler	25 per MBH or 2,570 – 9750 per unit
Boiler Reset Control	1 per MBH
Furnace	630 – 1,511
Indirect Water Heater	400
Tankless Water Heater	1,050
Pipe Insulation	3

Source: Research by Navigant

3.7.3 Impact Results

Table 3-23 shows the key results of the gross and net impact evaluation using deemed savings estimates.

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Table 3-23. C&I Prescriptive Rebate Program GPY1-GPY3 Impact Results

	GPY1 Therm Savings	GPY2 Therm Savings	GPY3 Therm Savings	GPY1-GPY3 Therm Savings
Verified Gross	528,318	4,651,497	1,352,409	6,532,224
Verified Net	227,249	2,930,443	852,017	4,009,709
NTG Ratio	0.43	0.63	0.63	0.61

Source: Research by Navigant

3.8 C&I Custom

The C&I Custom program provides C&I customers with financial incentives for the installation of natural gas-related energy efficiency improvements that are not specified for a prescriptive rebate under the C&I Prescriptive Rebate program. The C&I Custom program is targeted to active customers of Peoples Gas. These customers are served under rate S.C. No. 4.

The C&I Custom program provides a mechanism for a range of customers in various market sectors to install a wide variety of natural gas savings technologies. Typical market sectors for this program include larger customers in light and heavy manufacturing, steel and metal working, plastics compounding and processing, hospitals, food processing, hotels, commercial laundry and other process heating intensive businesses. Large centrally-heated buildings are also target sectors for this program. Eligible projects receive calculated incentives aimed at improving the financial viability of the energy efficiency improvements. In GPY3, C&I Custom rebates were offered for Custom Gas Optimization projects. Custom rebates are individually determined and analyzed using the Companies' benefit-cost model to ensure that they pass the TRC test. Any measure that is pre-qualified (assessed for cost-effectiveness prior to being installed) must produce a TRC test result of under 1.0, as the program is expected to produce an overall TRC of 1.0. To enable as many customers as possible to participate in any one year, the program caps each customer's total maximum rebate at $500,000 per customer per program year.[8] The program may waive the maximum rebate limitation based on projects in the program's queue.

[8] Based on one of the following calculations: (i) $1.00 per therm saved in the first year; (ii) buy down to one-year payback; (iii) full incremental project cost or 50% of total project cost (*source: Integrys EEP Operating Plan*).

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Table 3-24. IL TRC Components for C&I Custom Program

Item	Value
Ex-Post Gross Savings (Therms) @ the Meter	3,578,245
Ex-Post Net Savings (Therms) @ the Meter	2,801,598
Utility Non-Incentive Costs	$3,777,776
Utility Incentive Costs	$3,003,450
Gross Incremental Costs	$3,061,500
Net Incremental Costs	$2,345,460
Total TRC Benefits	$20,226,939
Total TRC Costs – summary	$6,123,236
Total TRC Net Benefits	$14,103,703
TRC Test Ratio	3.30

Source: Research by Navigant

3.8.1 Measure Life

There were a number of measures included in the C&I Custom program. The measure life is assumed to be 15 years for the TRC calculation. The program involves a variety of measures with a range of measure lives. In general, the savings from the program were dominated by longer lasting measures, such as HVAC replacements, boiler replacements, and control systems. Most of the measures have longer measure lives of 15-20 years. As such, 15 years is a reasonable average to use based on weighted average savings.

3.8.2 Participant/Incremental Costs

Incremental cost data was provided by participants as part of their application for this program. Depending on the measure, the incremental cost is around $19,500.

3.8.3 Impact Results

Table 3-25 shows the key results of the gross and net impact evaluation using deemed savings estimates.

Table 3-25. C&I Custom GPY1-GPY3 Impact Results

	GPY1 Therm Savings	GPY2 Therm Savings	GPY3 Therm Savings	GPY1-GPY3 Therm Savings
Verified Gross	252,368	2,108,877	1,217,000	3,578,245
Verified Net	171,610	1,644,924	985,064	2,801,598
NTG Ratio	0.68	0.78	0.81	0.78

Source: Research by Navigant

3.9 C&I Retro-Commissioning

The C&I Retro-Commissioning program has been offered each of the three gas program years. The program was offered as a joint utility program with the Peoples Gas where service areas overlap ComEd's. The Retro-Commissioning program offering is a natural fit for joint delivery due to the

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intensive investigation and analysis of HVAC systems. Individual measures frequently save both electricity and natural gas and analyzing one power source, while neglecting the other, would be a lost energy savings opportunity.

The program helps commercial and industrial customers improve the performance and reduce energy consumption of their facilities through the systematic evaluation of existing building systems. Generally, the program pays for 100% of a detailed retro-commissioning study. This payment is contingent upon a participant's commitment to spend a defined amount of their own money implementing recommendations in the study that have a payback of 18 months or less. Retro-commissioning recommendations typically include low-cost or no-cost HVAC measures like (1) scheduling equipment with occupancy, (2) optimizing temperature set points and controls to operate equipment efficiently and (3) repairing worn-out or failed components that manifest themselves as energy waste rather than affecting the ability of the whole system to maintain comfort. The measures can usually be implemented in the course of normal maintenance or through enhancements to sensors or control sequences with existing building automation systems.

Table 3-26. IL TRC Components for C&I Retro-Commissioning Program

Item	Value
Ex-Post Gross Savings (Therms) @ the Meter	1,475,514
Ex-Post Net Savings (Therms) @ the Meter	1,500,463
Utility Non-Incentive Costs	$32,994
Utility Incentive Costs	$2,011,331
Gross Incremental Costs	$2,091,893
Net Incremental Costs	$2,133,731
Total TRC Benefits	$4,636,923
Total TRC Costs – summary	$2,166,725
Total TRC Net Benefits	$2,470,198
TRC Test Ratio	2.14

Source: Research by Navigant

3.9.1 Measure Life

Guidelines published for a Retro-Commissioning program run by Pacific Gas and Electric Company in 2010 listed 3 years as the effective measure life (EUL) for the resetting of HVAC controls and 5 years for recoding HVAC controls,[9] both of which are key components of the Retro-Commissioning program. Navigant used a 5 year measure life for this program to be consistent with the value utilized for the cost-effectiveness calculations for ComEd for the Retro-Commissioning program.

3.9.2 Participant/Incremental Costs

Incremental measure cost was determined during the EM&V process and is around $3,000. For this program, the costs of studies and assessments are included within the total net incremental costs for the incentivized projects.

[9] "RCx Project Submittal Guidelines." Pacific Gas and Electric Company. November 2010.

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3.9.3 Impact Results

Table 3-27 shows the key results of the gross and net impact evaluation using deemed savings estimates.

Table 3-27. C&I Retro-Commissioning GPY1-GPY3 Impact Results

	GPY1 Therm Savings	GPY2 Therm Savings	GPY3 Therm Savings	GPY1-GPY3 Therm Savings
Verified Gross	913,820	296,931	264,763	1,475,514
Verified Net	927,535	302,870	270,058	1,500,463
NTG Ratio	1.02	1.02	1.02	1.02

Source: Research by Navigant

3.10 C&I Small Business Efficiency

The C&I Small Business Efficiency program is designed to assist qualified Peoples Gas non-residential customers to achieve gas energy savings by educating them about energy efficiency opportunities through on-site assessments conducted by trade allies and installation of no-cost direct-install natural gas energy efficiency measures. Further savings are available to participating customers through incentives of 30 to 75 percent offered for select contractor-installed natural gas efficient measures.

Table 3-28. IL TRC Components for C&I Small Business Efficiency

Item	Value
Ex-Post Gross Savings (Therms) @ the Meter	1,593,018
Ex-Post Net Savings (Therms) @ the Meter	1,577,088
Utility Non-Incentive Costs	$1,337,856
Utility Incentive Costs	$1,096,050
Gross Incremental Costs	$2,134,647
Net Incremental Costs	$2,113,300
Total TRC Benefits	$7,077,677
Total TRC Costs – summary	$3,451,156
Total TRC Net Benefits	$3,626,522
TRC Test Ratio	2.05

Source: Research by Navigant

3.10.1 Measure Life

The C&I Small Business Efficiency program used a wide range of measure life numbers in the TRC analysis based on the program measure. The table below summarizes the measure lives used for different measures of the program.

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Table 3-29. Measure life of the C&I Small Business Efficiency

Measure	Measure Life (in years)
Furnace Tune-up	2
Single-Pipe Steam System Balancing and Improved Venting	3
Boiler Tune-up	3
Aerators	5
Pre-rinse sprayer	5
Steam-trap	6
Programmable Thermostat	9
Showerhead	10
Rake Oven	12
Infrared Heater	12
Pipe Insulation	15
Energy Star Fryer	15
Large Gas Water Heater	15
Single-Pipe Steam Boiler Averaging Controls	16
Improved Turndown Burner Replace	16
Linkageless Controls	16
Boiler Reset Controls	20
Tankless Water Heater	20
Furnace	20
Boiler	30

Source: Research by Navigant

3.10.2 Participant/Incremental Costs

The table below summarizes the incremental cost used for the C&I Small Business Efficiency program measures.

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Table 3-30. Incremental Cost of the of the C&I Small Business Efficiency

Measure	Incremental cost per unit (in $)
Furnace Tune-up	1,650
Single-Pipe Steam System Balancing and Improved Venting	20
Aerators	8
Boiler Tune-up	2 per MBH or 650 per unit
Pre-rinse sprayer	60
Steam-trap	23 - 77
Programmable Thermostat	75
Showerhead	12
Rake Oven	1,900
Energy Star Fryer	1,200
Large Gas Water Heater	1 per MBH
Single-Pipe Steam Boiler Averaging Controls	612
Improved Turndown Burner Replace	3
Linkageless Controls	3
Boiler Reset Controls	2
Infrared Heater	5
Tankless Water Heater	1,050
Pipe Insulation	3
Furnace	802
Boiler	30

Source: Research by Navigant

3.10.3 Impact Results

Table 3-31 shows the key results of the gross and net impact evaluation using deemed savings estimates.

Table 3-31. C&I Small Business Efficiency GPY1-GPY3 Impact Results

	GPY1 Therm Savings	GPY2 Therm Savings	GPY3 Therm Savings	GPY1-GPY3 Therm Savings
Verified Gross	89,610	572,451	930,957	1,593,018
Verified Net	88,714	566,727	921,647	1,577,088
NTG Ratio	0.99	0.99	0.99	0.99

Source: Research by Navigant