



Income Eligible Gas Kits Impact Evaluation Report

**Energy Efficiency Plan Year 2020
(1/1/2020-12/31/2020)**

Prepared for:

**Peoples Gas and North Shore Gas
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Table of Contents

1. Introduction.....	1
2. Program Description.....	1
3. Program Savings Detail.....	3
4. Program Savings by Measure	4
5. Impact Analysis Findings and Recommendations	6
5.1 Impact Parameter Estimates	6
5.2 Historical Realization Rates and Net-To-Gross (NTG) Values.....	8
Appendix A. Impact Analysis Methodology	9
Appendix B. Program Specific Inputs for the Illinois TRC	10

List of Tables

Table 2-1. 2020 Volumetric Summary for PGL	1
Table 2-2. 2020 Distributed Measure Quantities for PGL.....	1
Table 2-3. 2020 Volumetric Summary for NSG.....	2
Table 2-4. 2020 Distributed Measure Quantities for NSG	2
Table 3-1. 2020 Annual Energy Savings Summary for PGL	3
Table 3-2. 2020 Annual Energy Savings Summary for NSG.....	3
Table 4-1. 2020 Annual Energy Savings by Measure for PGL.....	4
Table 4-2. 2020 Annual Energy Savings by Measure for NSG	5
Table 5-1. Verified Gross Savings Parameters.....	6
Table 5-2. Historical Realization Rates and NTG Values	8
Table B-1. Verified Cost Effectiveness Inputs – PGL	10
Table B-2. Verified Cost Effectiveness Inputs – NSG.....	11

1. Introduction

This report presents the results of the impact evaluation of the Peoples Gas (PGL) and North Shore Gas (NSG) 2020 Income Eligible Gas Kits Programs. It presents a summary of the energy impacts for the total program and broken out by relevant measure and program structure details. Appendix A presents the impact analysis methodology. Program year 2020 covers January 1, 2020 through December 31, 2020.

2. Program Description

In November 2019, PGL and NSG began mail distribution of a free kit of self-installation energy saving measures. Contents of the kit include a showerhead, faucet aerators, weatherstripping, switch and outlet gaskets, water heater setback instructions, shower timer, window film kits, and water heater pipe insulation. The kits are being distributed to customers that have been verified as LIHEAP grant recipients and therefore validated as Income Eligible.

The PGL program distributed 19,999 kits in 2020 and included nine different types of measures as shown in Table 2-1.

Table 2-1. 2020 Volumetric Summary for PGL

Participation	Total
Number of Kits Distributed (9 measures per kit)	19,999

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

Table 2-2 summarizes the distributed measure quantities of the nine measures included in each kit that are the basis for verified energy savings.

Table 2-2. 2020 Distributed Measure Quantities for PGL

Measure	Quantity Unit	Quantity per Kit	Total Quantity Distributed
Low-Flow Kitchen Aerator	Unit	1	19,999
Low-Flow Bathroom Aerator	Unit	1	19,999
Low-Flow Showerhead	Unit	1	19,999
Shower Timer	Unit	1	19,999
Pipe Insulation	Linear Feet	6	119,994
Weather-stripping	Linear Feet	17	339,983
Outlet and Switch Gaskets	Unit	20	399,980
Window Kit	Square Feet	90.4	1,807,910
Water Heater Temperature Setback	Card	1	19,999

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

The NSG program distributed 2,000 kits in 2020 and included nine different types of measures as shown in Table 2-3.

Table 2-3. 2020 Volumetric Summary for NSG

Participation	Total
Number of Kits Distributed (9 measures per kit)	2,000

Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.

Table 2-4 summarizes the distributed measure quantities that are the basis for verified energy savings.

Table 2-4. 2020 Distributed Measure Quantities for NSG

Measure	Quantity Unit	Quantity per Kit	Total Quantity Distributed
Low-Flow Kitchen Aerator	Unit	1	2,000
Low-Flow Bathroom Aerator	Unit	1	2,000
Low-Flow Showerhead	Unit	1	2,000
Shower Timer	Unit	1	2,000
Pipe Insulation	Linear Feet	6	12,000
Weather-stripping	Linear Feet	17	34,000
Outlet and Switch Gaskets	Unit	20	40,000
Window Kit	Square Feet	90.4	180,800
Water Heater Temperature Setback	Card	1	2,000

Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.

3. Program Savings Detail

Table 3-1 summarizes the PGL Income Eligible Gas Kits Program energy savings achieved by path in 2020.

Table 3-1. 2020 Annual Energy Savings Summary for PGL

Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
Income Eligible Gas Kits	716,564	108%	771,272	1.00	771,272

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

† A deemed value. Available on the Illinois SAG web site: https://www.ilsag.info/ntg_2020.

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

Table 3-2 summarizes the NSG Income Eligible Gas Kits Program energy savings achieved by path in 2020.

Table 3-2. 2020 Annual Energy Savings Summary for NSG

Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
Income Eligible Gas Kits	71,660	108%	77,131	1.00	77,131

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

† A deemed value. Available on the Illinois SAG web site: https://www.ilsag.info/ntg_2020.

Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.

4. Program Savings by Measure

The PGL program includes nine measures as shown in Table 4-1. The Window Kit and Weather-stripping measures contributed the most savings. The largest adjustment to savings occurred for the Outlet and Switch Gasket measure, where ex ante per unit savings was based on an incorrect input value.

Table 4-1. 2020 Annual Energy Savings by Measure for PGL

Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
Low-Flow Kitchen Aerator	25,978	100%	26,003	1.00	26,003
Low-Flow Bathroom Aerator	11,304	99%	11,213	1.00	11,213
Low-Flow Showerhead	126,559	93%	117,554	1.00	117,554
Shower Timer	61,764	100%	61,860	1.00	61,860
Pipe Insulation	30,856	106%	32,603	1.00	32,603
Weather-stripping	144,343	100%	144,343	1.00	144,343
Outlet and Switch Gaskets	65,421	200%	130,841	1.00	130,841
Window Kit	230,270	100%	230,270	1.00	230,270
Water Heater Temperature Setback	20,070	83%	16,585	1.00	16,585
Total or Weighted Average	716,565	108%	771,272	1.00	771,272

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

† A deemed value. Available on the SAG web site: https://www.ilsag.info/ntg_2020.

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

The NSG program includes nine measures as shown in Table 4-2. The Window Kit and Weather-stripping measures contributed the most savings. The largest adjustment to savings occurred for the Outlet and Switch Gasket measure, where ex ante per unit savings was based on an incorrect input value.

Table 4-2. 2020 Annual Energy Savings by Measure for NSG

Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
Low-Flow Kitchen Aerator	2,598	100%	2,600	1.00	2,600
Low-Flow Bathroom Aerator	1,130	99%	1,121	1.00	1,121
Low-Flow Showerhead	12,657	93%	11,756	1.00	11,756
Shower Timer	6,177	100%	6,186	1.00	6,186
Pipe Insulation	3,086	106%	3,260	1.00	3,260
Weather-stripping	14,435	100%	14,435	1.00	14,435
Outlet and Switch Gaskets	6,542	200%	13,085	1.00	13,085
Window Kit	23,028	100%	23,028	1.00	23,028
Water Heater Temperature Setback	2,007	83%	1,659	1.00	1,659
Total or Weighted Average	71,660	108%	77,131	1.00	77,131

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

† A deemed value. Available on the Illinois SAG web site: https://www.ilsag.info/ntg_2020.

Source: North Shore Gas tracking data and Guidehouse team analysis.

5. Impact Analysis Findings and Recommendations

5.1 Impact Parameter Estimates

Table 5-1 shows the unit therms savings and realization rate findings by measure. The realization rate is the ratio of the verified savings to the ex ante savings. The verified gross savings realization rates are calculated by comparing verified savings determined by the evaluation team with the ex ante therm savings provided in the tracking database and the per unit savings numbers provided in the Master Measure Database (MMDB)¹ file. Following Table 5-1, we provide findings and recommendations, including discussion of all measures with realization rates above or below 100 percent. Appendix A provides a description of the impact analysis methodology. Table B-1 in Appendix A shows the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of producing this impact evaluation report.

Table 5-1. Verified Gross Savings Parameters

Measure	Unit Basis Per Kit	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	Realization Rate	Data Source(s)
Low-Flow Kitchen Aerator	One	1.30	1.30	100%	Illinois TRM, v8.0†, Section 5.4.4 and PTD*
Low-Flow Bathroom Aerator	One	0.57	0.56	99%	Illinois TRM, v8.0†, Section 5.4.4 and PTD
Low-Flow Showerhead	One	6.33	5.88	93%	Illinois TRM, v8.0, Section 5.4.5 and PTD
Shower Timer	One	3.09	3.09	100%	Illinois TRM, v8.0, Section 5.4.9 and PTD
Pipe Insulation	6 Lin. Ft.	1.54	1.63	106%	Illinois TRM, v8.0, Section 5.4.1 and PTD, ISR from Illinois TRM v9.0 Section 5.4.1
Weather-stripping	17 Lin. Ft.	7.22	7.22	100%	Illinois TRM, v8.0, Section 5.6.1 and PTD
Outlet and Switch Gaskets	20	3.27	6.54	200%	Illinois TRM, v8.0, Section 5.6.1 and PTD
Window Kit	90.4 Sq. Ft.	11.51	11.51	100%	Illinois TRM, v8.0, Section 5.6.1 and PTD
Water Heater Temperature Setback	Card	1.00	0.83	83%	Illinois TRM, v8.0, Section 5.4.6 and PTD
Overall Kit Package	Kit	35.83	38.57	108%	

* Program Tracking Data (PTD) provided by Peoples Gas and North Shore Gas, extract dated January 30, 2021.

† State of Illinois Technical Reference Manual version 8.0 from <http://www.ilsag.info/technical-reference-manual.html>.

¹ Franklin Energy Master Measure Database, Excel file *2020 MMDB - Res and MF*, provided January 23, 2020.

The PGL and NSG total ex ante energy savings of 716,564 therms and 71,660 therms, respectively, provided in the program tracking data do not match the savings of 723,348 therms and 72,335 therms provided in the 2020 portfolio summary².

Recommendation 1. Ensure the year-end portfolio savings summary matches the energy savings provided in the year-end program tracking data, and resolve any discrepancies.

5.1.1 Low-Flow Bathroom Aerator

The ex ante energy savings use weighted average energy per gallon of water (EPG) gas and faucets per household (FPH) values that are calculated using an assumption that 69.17% of the houses that received the kits are Single-Family (SF) and the remaining 30.83% are Multi-Family (MF). The Illinois Technical Reference Manual (TRM) v8.0 deems a SF and MF split of 69.00% and 31.00%. This rounding difference results in a 99% realization rate.

Recommendation 2. Use the SF and MF splits deemed in the Illinois TRM for weighting the EPG gas and FPH values.

5.1.2 Low-Flow Showerhead

The ex ante energy savings use weighted average EPG gas values that are calculated using an assumption that 76% of the houses that received the kits are Single Family (SF) and the remaining 24% are Multi-Family (MF). The TRM v8.0 deems a SF and MF split of 69% and 31%.

Recommendation 3. Use the SF and MF splits deemed in the TRM for weighting the EPG gas.

The ex ante energy savings use a throttling factor of 0.95 while determining the GPM Low value of the measure. The TRM v8.0 does not use a throttling factor while calculating the energy savings.

Recommendation 4. Do not use a throttling factor when calculating the showerhead energy savings.

5.1.3 Pipe Insulation

A custom In-Service Rate (ISR) is required for pipe insulation because a value is not deemed in TRM v8.0. The ex ante calculation uses an ISR from secondary research. Results from survey research conducted by Guidehouse with 2019 Peoples Gas Income Eligible kits recipients found an ISR of 0.56 for the pipe insulation measure. The ISR of 0.56 for kits distribution is deemed in TRM v9.0, and we recommend that value be used.

Recommendation 5. Use an ISR of 0.56 for pipe insulation described in TRM v9.0, Section 5.4.1.

² Report link provided by Franklin Energy, February 17, 2021.

5.1.4 Outlet and Switch Gaskets

The ex ante savings are calculated using the incorrect ADJRxAirsealing value of 0.4. The TRM v8.0 deems a value of 0.8 instead.

Recommendation 6. Use the ADJRxAirsealing value of 0.8 as deemed in the TRM v8.0 or TRM v9.0.

5.1.5 Water Heater Temperature Setback

The ex ante energy savings uses an ISR from secondary research that assumes customers requested a kit before the kits were sent out. This is inconsistent with an unsolicited distribution approach.

Recommendation 7. Use an ISR for an unsolicited distribution approach unless the program design is changed to send kits based on customers request.

The ex ante energy savings use a weighted average recovery efficiency (RE) gas value that is calculated using an assumption that 96.5% of the houses that received the kits are Single-Family (SF) and the remaining 3.5% are Multi-Family (MF). The TRM v8.0 deems a SF and MF split of 69.0% and 31.0%.

Recommendation 8. Use the SF and MF splits deemed in the TRM in effect each year for weighting the EPG gas.

5.2 Historical Realization Rates and Net-To-Gross (NTG) Values

Table 5-2 shows the historical gross realization rates and NTG values for the Income Eligible Gas Kits Program.

Table 5-2. Historical Realization Rates and NTG Values

Program Year	PGL Verified Gross RR	NSG Verified Gross RR	PGL NTG	NSG NTG
2019	100%	NA	1.00	1.00
2020	108%	108%	1.00	1.00

NA = not applicable (refers to a piece of data that cannot be produced or does not apply)
 Source: Guidehouse evaluation research

Appendix A. Impact Analysis Methodology

The evaluation team calculated gross verified savings for the Income Eligible Kits Program by applying savings algorithms from the Illinois Technical Reference Manual (TRM) v8.0³. The team determined verified gross savings for each program measure by:

- Reviewing the savings algorithm inputs in the MMDB measure workbook⁴ for agreement with the TRM v8.0 and TRM v8.0 Errata.
- Validating savings algorithms were applied correctly.
- Prioritizing project-specific information to inform savings calculations where the TRM v8.0 advises to use actual values. For variables where project information did not include project-specific actual values, the evaluation team relied on defaults from the TRM v8.0.
- Cross-checking per-unit savings values in the tracking data with the verified values in the measure workbook, or in the evaluation team's calculations if the workbook did not agree with the TRM v8.0.
- Multiplying the verified per-unit savings value by the quantity reported in the tracking data.

The evaluation team calculated verified net gas savings by multiplying the verified gross savings estimates by a net-to-gross (NTG) ratio of 1.0, which is the NTG deemed by a consensus process through the Illinois Stakeholder Advisory Group (SAG).

³ Available on the Illinois SAG web site: <http://www.ilsag.info/technical-reference-manual.html>

⁴ Franklin Energy Master Measure Database, Excel file *2020 MMDB - Res and MF*, provided January 23, 2020.

Appendix B. Program Specific Inputs for the Illinois TRC

Table B-1. and Table B-2. show the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of producing this impact evaluation report. Additional required cost data (e.g., measure costs, program level incentive and non-incentive costs) are not included in this table and will be provided to the evaluation team later. Guidehouse will include annual and lifetime water savings and greenhouse gas reductions in the end of year summary report.

Table B-1. Verified Cost Effectiveness Inputs – PGL

Research Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Low-Flow Kitchen Aerator	Unit	19,999	10.0	25,978	26,003	26,003
Low-Flow Bathroom Aerator	Unit	19,999	10.0	11,304	11,213	11,213
Low-Flow Showerhead	Unit	19,999	10.0	126,559	117,554	117,554
Shower Timer	Unit	19,999	2.0	61,764	61,860	61,860
Pipe Insulation	Linear Feet	119,994	15.0	30,856	32,603	32,603
Weather-stripping	Linear Feet	339,983	20.0	144,343	144,343	144,343
Outlet and Switch Gaskets	Unit	399,980	20.0	65,421	130,841	130,841
Window Kit	Square Feet	1,807,910	20.0	230,270	230,270	230,270
Water Heater Temperature Setback	Card	19,999	2.0	20,070	16,585	16,585
Total or Weighted Average			16.0	716,565	771,272	771,272

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

Table B-2. Verified Cost Effectiveness Inputs – NSG

Research Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Low-Flow Kitchen Aerator	Unit	2,000	10.0	2,598	2,600	2,600
Low-Flow Bathroom Aerator	Unit	2,000	10.0	1,130	1,121	1,121
Low-Flow Showerhead	Unit	2,000	10.0	12,657	11,756	11,756
Shower Timer	Unit	2,000	2.0	6,177	6,186	6,186
Pipe Insulation	Linear Feet	12,000	15.0	3,086	3,260	3,260
Weather-stripping	Linear Feet	34,000	20.0	14,435	14,435	14,435
Outlet and Switch Gaskets	Unit	40,000	20.0	6,542	13,085	13,085
Window Kit	Square Feet	180,800	20.0	23,028	23,028	23,028
Water Heater Temperature Setback	Card	2,000	2.0	2,007	1,659	1,659
Total or Weighted Average			16.0	71,660	77,131	77,131

Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.