Midstream Commercial Food Service Pilot Impact Evaluation Report

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

Prepared for:

Peoples Gas and North Shore Gas

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1. Introduction

This report presents the results of the impact evaluation of the Peoples Gas (PGL) and North Shore Gas (NSG) 2021 Midstream Commercial Food Service Pilot (MCFS). The MCFS Program is a joint pilot between Nicor Gas, ComEd, Peoples Gas, and North Shore Gas. This report summarizes the natural gas savings impacts for the total program and broken out by relevant measure details for PGL and NSG[1]. The appendices provide the impact analysis methodology and details of the total resource cost (TRC) inputs. Program year 2021 covers January 1, 2021 through December 31, 2021.

2. Program Description

The MCFS Pilot incentivizes energy efficient commercial food service equipment for food service operators through a midstream approach. The MCFS Pilot launched in September 2019 and has added suppliers through December 31, 2021. GTI and Frontier Energy implement this pilot on behalf of ComEd, Nicor Gas, PGL and NSG. The implementers work with manufacturers and distributers by offering point-of-sale customer rebates, midstream incentives, and a simplified administrative process for cooking, sanitizing, and ventilation measures. The program's goal is to reduce barriers on food service operators for using energy efficient equipment, and to reduce energy usage in the commercial food service sector.

The PGL portion of the program had 50 participants in 2021 and completed 55 projects as shown in Table 2-1.

Table 2-1. 2021 Volumetric Summary for PGL

Participation	Total
Participants *	50
Installed Projects †	55
Measure Types Installed	4

* Participants are defined as the count of unique Customer Business Names and addresses if necessary.
† Installed Projects are defined as the count of unique Project IDs
Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

[1] References in this report to participation counts and savings apply only to projects in the PGL and NSG service territories claimed by PGL and NSG. Evaluators will explore presenting the results for the 2022 CFS Program in a single, statewide report to better represent program accomplishments.

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

Table 2-2. 2021 Installed Measure Quantities for PGL

Measure	Quantity Unit	Installed Quantity
ENERGY STAR Convection Oven	Each	9
ENERGY STAR Fryer	Each	52
ENERGY STAR Dishwasher	Each	2
Combination Oven	Each	12

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

The NSG portion of the program had 3 participants in 2021 and completed 3 projects as shown in Table 2-3.

Table 2-3. 2021 Volumetric Summary for NSG

Participation	Total
Participants *	3
Installed Projects †	3
Measure Types Installed	2

* Participants are defined as the count of unique Customer Business Names
† Installed Projects are defined as the count of unique Project IDs
Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.

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

Table 2-4. 2021 Installed Measure Quantities for NSG

Measure	Quantity Unit	Installed Quantity
ENERGY STAR Convection Oven	Each	3
ENERGY STAR Fryer	Each	6

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

3. Program Savings Detail

Table 3-1 summarizes the energy savings the PGL MCFS Pilot achieved in 2021.

Table 3-1. 2021 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)
Total or Weighted Average	39,099	101%	39,552	0.91	35,992

* 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/evaluator-ntg-recommendations-for-2021/
Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

Table 3-2 summarizes the energy savings the NSG MCFS Pilot achieved in 2021.

Table 3-2. 2021 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)
Total or Weighted Average	5,001	100%	4,999	0.91	4,549

* 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/evaluator-ntg-recommendations-for-2021/
Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.

4. Program Savings by Measure

The PGL program includes four measure types as shown in Table 4-1. The ENERGY STAR Fryer measure contributed the most savings. It consists of both standard and large vat fryers.

Table 4-1. 2021 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)
ENERGY STAR Convection Oven	4,581	103%	4,698	0.91	4,275
ENERGY STAR Dishwasher	339	100%	339	0.91	308
ENERGY STAR Fryer	29,283	105%	30,619	0.91	27,863
Combination Oven	4,895	80%	3,897	0.91	3,546
Total or Weighted Average	**39,098**	**101%**	**39,552**	**0.91**	**35,992**

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

The NSG program includes two measures as shown in Table 4-2. The ENERGY STAR Fryer measure again contributed the most savings.

Table 4-2. 2021 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)
ENERGY STAR Convection Oven	1,568	100%	1,566	0.91	1,425
ENERGY STAR Fryer	3,433	100%	3,433	0.91	3,124
Total or Weighted Average	**5,001**	**100%**	**4,999**	**0.91**	**4,549**

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 therm savings and realization rate findings by measure from the evaluation team's review. The realization rate is the ratio of the verified savings to the ex ante savings. Following the table are any findings and recommendations, including discussions, of all measures with realization rates other than 100%. Appendix A provides a description of the impact analysis methodology. Appendix B provides the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of producing this impact evaluation report for PG and NSG separately.

Table 5-1. Verified Gross Savings Parameters

Measure	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	Realization Rate	Data Source(s)‡
Combination Oven	Each	Varies	Varies	80%	PGL/NSG Program Tracking Data (PTD*), TRM v9.0† Section 4.2.1
ENERGY STAR Convection Oven	Each	Varies	Varies	102%	PTD, TRM v9.0 Section 4.2.5
ENERGY STAR Dishwasher	Each	Varies	Varies	100%	PTD, TRM v9.0 Section 4.2.6
ENERGY STAR Fryer	Each	Varies	Varies	104%	PTD, TRM v9.0 Section 4.2.7

* Program Tracking Data (PTD) provided by Peoples Gas and North Shore Gas; data extracted on April 11, 2022.
† State of Illinois Technical Reference Manual version 9.0 from **http://www.ilsag.info/technical-reference-manual.html**.
‡ ENERGY STAR© Certified Product Data Sets are available at https://www.energystar.gov/productfinder/advanced

5.2 Findings and Recommendations

5.2.1 Models Missing from ENERGY STAR Qualified Products List (QPL)

The evaluation team found one Combination Oven measure was missing from the ENERGY STAR Qualified Product List (QPL). The evaluation team calculated verified savings using the model's tracking data that met efficiency requirements defined in the TRM v9.0.

Table 5-2. Oven Missing from ENERGY STAR QPL

Project ID	Measure	Quantity	Manufacturer	Model
257	Combination Oven	1	Rational	B2282*

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

Recommendation 1. Ensure all measures that receive incentives and report claimed savings are included in the ENERGY STAR QPL.

5.2.2 Combination Oven

The TRM algorithm for Combination Ovens includes many variables that have guidance to use custom inputs or TRM default values if the custom is unknown. The evaluation team used the custom equipment-specific input parameters in line with the ENERGY STAR QPL data in the verified savings calculations. These values differ slightly from the values that were listed in the tracking data and used in the ex ante savings calculations. Eleven measures had reported Steam and Convection Production Capacity values that differed from what was listed in the ENERGY STAR QPL, ten measures had differing Convection and Steam Idle Consumption Rate and Convection Cooking Efficiency values, and seven measures had differing Steam Cooking Efficiency values. The differences in the values can be seen in Table 5-3 and Table 5-4. This resulted in a gross realization rate of 80%.

Table 5-3. Reported Combination Oven Savings Inputs

Measure ID	Reported Steam Cooking Efficiency (%)	Reported Convection Cooking Efficiency (%)	Reported Steam Idle Consumption Rate	Reported Convection Idle Consumption Rate	Reported Steam Production Capacity (lbs./hr)	Reported Convection Production Capacity (lbs./hr)
695	48	60	8,506	4,918	181	117
697	48	60	8,506	4,918	181	117
741	48	63	5,347	4,144	210	131
759	48	63	5,347	4,144	210	131
779	48	67	5,302	3,990	217	119
795	48	63	5,347	4,144	210	131
797	48	63	5,347	4,144	210	131
799	48	60	8,506	4,918	181	117
865	48	63	5,347	4,144	210	131
965	47	59	5,456	8,866	250	142
977	48	63	5,347	4,144	210	131

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

Table 5-4. QPL Combination Oven Savings Inputs

Measure ID	QPL Steam Cooking Efficiency (%)	QPL Convection Cooking Efficiency (%)	QPL Steam Idle Consumption Rate	QPL Convection Idle Consumption Rate	QPL Steam Production Capacity (lbs./hr)	QPL Convection Production Capacity (lbs./hr)
695	48	57	3,869	2,330	76.76	52.38
697	48	57	3,869	2,330	76.76	52.38
741	55	66	4,106	3,847	238.94	106.97
759	55	66	4,106	3,847	238.94	106.97
779	55	66	4,106	3,847	238.94	106.97
795	55	66	4,106	3,847	238.94	106.97
797	55	66	4,106	3,847	238.94	106.97
799	48	57	3,869	2,330	76.76	52.38
865	55	66	4,106	3,847	238.94	106.97
965	47	59	5,456	5,950	249.80	141.70
977	55	66	4,106	3,847	238.94	106.97

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

Recommendation 2. Use custom equipment-specific algorithm inputs in the tracking data for savings calculations unless the values are unknown, as instructed by the TRM. The implementation contractor should verify these inputs match the specifications on the ENERGY STAR QPL.

5.2.3 ENERGY STAR Convection Oven

The evaluation team updated input values used in the verified savings calculations for Convection Cooking Efficiency, Idle Consumption Rate, and Production Capacity to align with the ENERGY STAR QPL. The ex ante savings used custom equipment-specific input values listed in the tracking data that had a slight misalignment to the ENERGY STAR QPL, resulting in a realization rate of 102%. This impacted Project IDs 44, 162, 191, 201, 228, and 313. The discrepancies between the values can be seen in Table 5-5.

Table 5-5. ENERGY STAR Convection Oven Savings Input Discrepancies

Project ID	Reported Cooking Efficiency (%)	QPL Cooking Efficiency (%)	Reported Idle Consumption Rate	QPL Idle Consumption Rate	Reported Production Capacity	QPL Production Capacity
44	48	53	11,850	9,747	NR	99.50
162	51	54	7,344	9,265	97	104.59
191	55	54	8,866	8,866	95	95.30
201	55	54	8,866	8,866	95	95.30
228	53	54	7,179	7,620	90	97.71
313	53	54	7,179	7,620	90	97.71

Source: Peoples Gas and North Shore Gas tracking data and Guidehouse evaluation team analysis.
NR = Not reported

Recommendation 3. Use custom equipment-specific algorithm inputs in the tracking data for savings calculations unless the values are unknown, as instructed by the TRM. The implementation contractor should verify these inputs match the specifications on the ENERGY STAR QPL.

The tracking data was missing all relevant efficient inputs related to Daily Preheat Energy. The verified savings calculations for Convection Ovens used the appropriate deemed unknown values from the TRM for the Daily Preheat Energy calculation.

Recommendation 4. Record all input efficient parameters related to Daily Preheat Energy calculations in the tracking data for each Convection Oven installed.

5.2.4 ENERGY STAR Fryer

The evaluation team updated values for Cooking Efficiency and Idle Consumption Rate supplied in the tracking data for verified savings calculations. The ex ante calculations used custom equipment-specific input values listed in the tracking data that had a slight misalignment to the ENERGY STAR QPL, resulting in a realization rate of 104%. This impacted Project IDs 44, 203, and 235. The differences between the reported and QPL values can be seen in Table 5-6.

Table 5-6. ENERGY STAR Fryer Savings Input Discrepancies

Project ID	Reported Cooking Efficiency (%)	QPL Cooking Efficiency (%)	Reported Idle Consumption Rate	QPL Idle Consumption Rate
44	61	63	4,318	4,610
203	54	53	9,953	9,631
235	54	53	9,953	9,631

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

Recommendation 5. Use custom equipment-specific algorithm inputs in the tracking data for savings calculations unless the values are unknown, as instructed by the TRM. The implementation contractor should verify these inputs match the specifications on the ENERGY STAR QPL.

Project ID 44 listed three Fryers as large vat types in the tracking data. The evaluation team referenced the ENERGY STAR QPL, which listed these fryers as standard vat types. This impacted the baseline inputs for Idle Energy Rate, Production Capacity, and expected Daily Hours of Operation. Therefore, the claimed savings for these three measures – Measure IDs 133, 135, and 137 – were underestimated.

Recommendation 6. Ensure the fryer-type installed for each measure is recorded in line with the specifications in the ENERGY STAR QPL, as fryer-type determines three baseline inputs. Use type-specific algorithm inputs in the tracking data for savings calculations, when applicable, as instructed by the TRM.

5.3 Historical Realization Rates and NTG Values

Table 5-7 shows the historical gross realization rates and NTG values for the MCFS Pilot Program. 2021 is the second year Guidehouse is evaluating this program for PGL and NSG.

Table 5-7. Historical Realization Rates and NTG Values

Program Year	PGL Verified Gross RR	NSG Verified Gross RR	PGL NTG	NSG NTG
2020	114%	112%	0.80	0.80
2021	101%	100%	0.91	0.91

Source: Guidehouse evaluation research.

Appendix A. Impact Analysis Methodology

The evaluation team determined verified gross savings for each pilot measure by:

- Checking the reported measure names and algorithm inputs in the program tracking data for agreement with the TRM and adjusting accordingly.[2]
- Verifying measure specifications with the ENERGY STAR QPL[3] for food service equipment and updating as needed.
- Validating savings algorithms were applied correctly.
- Multiplying the verified per-unit savings value by the quantity reported in the tracking data.

The gross realization rates are calculated by dividing the verified ex post gross savings by the reported ex ante gross savings. The evaluation team calculated verified net therms using a deemed NTG value of 0.91 for all PGL/NSG of the MCFS Pilot.[4]

[2] Illinois Statewide Technical Reference Manual for Energy Efficiency Version 9.0 from http://www.ilsag.info/technical-reference-manual.html

[3] ENERGY STAR Certified Product Data Sets are available at https://www.energystar.gov/productfinder/advanced

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

Appendix B. Program Specific Inputs for the Illinois TRC

Table B-1 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)
ENERGY STAR Convection Oven	Each	9	12.0	4,581	4,698	4,275
ENERGY STAR Dishwasher	Each	2	14.3	339	339	308
ENERGY STAR Fryer	Each	52	12.0	29,283	30,619	27,863
Combination Oven	Each	12	12.0	4,895	3,897	3,546
Total or Weighted Average		75	12.0	39,098	39,552	35,992

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)
ENERGY STAR Convection Oven	Each	3	12.0	1,568	1,566	1,425
ENERGY STAR Fryer	Each	6	12.0	3,433	3,433	3,124
Total or Weighted Average		9	12.0	5,001	4,999	4,549

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