



Peoples Gas and North Shore Gas – Final Evaluation Plans for 2018-2021

Plan Years 2018-2021
(1/1/2018-12/31/2021)

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1. INTRODUCTION

This document presents draft evaluation, measurement and verification (EM&V) plans for evaluating Peoples Gas (PGL) and North Shore Gas (NSG) energy efficiency programs for 2018 through 2021, which are the four program years of Energy Efficiency Plan 2018-2021 (EEP 2018-2021).

Enacted energy legislation Section 8-104 was recently amended through Public Act 99-0906 (“PA 99-0906”) that changed the period of the energy efficiency plan and required Illinois gas utilities to provide energy efficiency programs to low income and public-sector customers. Navigant developed evaluation plans to address the new legislation. PA 99-0906 caused key changes to the previous portfolio of plans, including:

- a. Twenty-five percent (25%) of the budget is no longer allocated to the Department of Commerce and Economic Opportunity (DCEO). Likewise, twenty percent (20%) of the savings goal is no longer allocated to the DCEO. PGL and NSG are now accountable for the entire budget and savings goals. Elements of the DCEO portfolio transferred to PGL and NSG include:
 - i. Income Eligible Programs, targeted at households with incomes at or below 80 percent of area median income.
 - ii. Public Sector Programs, targeting energy efficiency measures for local government, municipal corporations, school districts and community college districts.
 - iii. Market Transformation initiatives, which represent a portion of the portfolio budget in the approved PGL and NSG plans.
- b. The PGL and NSG Energy Efficiency Plans (EEP) are now based on a calendar year.¹
- c. The EEP encompasses four (4) years versus three (3) years – the four cycle is 2018 to 2021.

The next sections include an overview of evaluation approaches and a proposed high-level schedule for EEP 2018-2021 program-specific evaluation tasks. The appendix includes detailed, program-level evaluation plans. The Navigant team will update research plans annually for the evaluation effort as part of the detailed planning step.

¹ Prior to 2018, the previous six program years began on June 1 of each year, and were designated PY1, PY2, PY3, etc. Program years ended May 31 except PY6 was extended seven months and ended December 31, 2017. Under the previous notation, program year 2018 would have been PY7.

2. GUIDING PRINCIPLES

The guiding principles for evaluation activities include the following:

Impact Evaluation

- Verify gross and net savings to be applied toward statutory goals for each PGL and NSG program year using savings calculated from the Illinois Technical Reference Manual (TRM), the Illinois Energy Efficiency Stakeholder Advisory Group (SAG) net-to-gross (NTG) consensus process, primary and secondary evaluation research, and ICC orders.
- Conduct primary NTG research once during the four-year planning cycle for each program. Estimate the NTG ratio for each program, including adjustments for free ridership and spillover, to support annual prospective NTG ratios consistent with the Illinois NTG Policy.
- Wherever possible, consider performing free ridership research online in real time (soon after the participant decision is made), and collect spillover information via telephone after participation following TRM protocols.
- Where practical, program evaluations will be conducted using randomized controlled trials or quasi-experimental design methods. When Navigant believes that randomized control trials or quasi-experimental designs are not practical, Navigant will provide an explanation and support for its decision as part of its evaluation plan.
- Conduct technical reviews and gather Illinois-specific data to update the Illinois TRM and recommend updated M&V approaches for applicable measures.

Process Evaluation and Other Research

- Gather data, perform analysis, and create recommendations to help improve the functioning and effectiveness of the PGL and NSG programs.
- Collaborate with PGL, NSG, and other Illinois utilities to suggest promising areas for energy efficiency (EE) research, industry best practices, or other topics of interest.
- Navigant will report satisfaction survey results by geography and demographics when the survey sample size can support this detail.

Support PGL and NSG Strategic Goals

- Continue evaluating more of the portfolio in real time, including:
 - Conducting program tracking database reviews earlier in each program year to ensure the latest TRM algorithms are properly applied, and
 - Conducting surveys closer to participation, drawing samples across program years when appropriate.
- Improve qualitative approaches with new data collection approaches (email or web based), supplemented with Franklin Energy's Efficiency Manager™ data tracking and reporting system and/or survey data when appropriate.
- Leverage potential investments in advanced metering infrastructure (AMI) systems.
- Provide technical expertise and data to the SAG to support statewide goals.
- Provide technical expertise for evaluation in Regulatory Dockets.
- Provide technical expertise to address ad hoc evaluation issues.
- The former DCEO programs and customer segments are new to the PGL and NSG implementation portfolios, and we will receive greater evaluation focus during this four-year cycle. It is critical to understand the impact and process aspects of these programs so PGL and NSG can optimize program design, participation levels, net impacts and lifecycle benefits.

Reporting

- Provide annual evaluation reports for PGL and NSG programs.
- Provide annual impact and cost effectiveness portfolio summary reporting.
- The target delivery date for draft reports will be March 15, with final reports by April 30. This schedule, however, is dependent on delivery of final tracking data by January 30 of each year, and may be revisited.
- Research that will be used to update TRM algorithms will be completed by April 1 each year, so that reports can be reviewed and finalized, and work papers can be drafted in time for the May 15 TRM update process.
- NTG research will be completed by August 1 each year, so that reports can be reviewed and finalized in time for the September 1 initial evaluator NTG recommendations to SAG required by the Illinois NTG Policy. In 2020, NTG research will be completed one month earlier, by July 1, to inform development of the next EEP.
- Perform the four-year *ex post* cost-effectiveness analysis per Section 8-104(f)(8).

Planning

- Provide evaluation plans for PGL and NSG programs each program year.
- The target delivery date for draft plans will be January 5, with final plans by February 20.
- Seek input from the SAG and other Illinois utilities when drafting and updating annual evaluation plans.

Coordination

- Navigant will coordinate with and/or seek input from other Illinois utilities (ComEd, Nicor Gas, Ameren Illinois) and their evaluators, the SAG including ICC staff, and the TRM administrator:
 - When planning evaluation research and survey activities
 - When conducting evaluation research where collaboration to achieve broader coverage and larger sample sizes may improve the research results.

Exceptions to these guiding principles may occur for some programs; if that is the case, exceptions will be noted in program-specific evaluation plans.

3. EVALUATION PLAN OVERVIEW

As part of the evaluation planning process, Navigant has drafted a high-level four-year plan and detailed program-level annual evaluation plans to help prioritize research plans and budgets.

Four-Year Evaluation Research Plan

The evaluation team has prepared a high-level four-year evaluation plan for the EEP 2018 – 2021 portfolio to identify research tasks by year on a preliminary basis. Final activities and allocations will be determined annually as program circumstances are better known.

The three tables in this section provide an overview of our preliminary expectations for conducting impact research studies, net-to-gross research, and in-depth process evaluation research. Gross impact savings verification occurs for each program in all four program years.

Annual Evaluation Program Plans

The evaluation team prepared evaluation plans for each program throughout EEP 2018-2021. The evaluation plans serve as a roadmap as the evaluation team carries out specific evaluation tasks. The program plans provide additional details to describe the approaches for conducting annual gross, net, and process evaluation activities. We will revisit evaluation plans annually and revise approaches as needed to maintain relevance for programs as they evolve.

The individual program evaluation plans are provided in the Appendix. Supporting information on evaluation approaches and crosscutting activities is provided in Section 4.

Table 1. Residential Programs High-Level Plan by Year

Offering	Evaluation Research Activities by Year†				
	Process Research Year(s)	NTG Research Year(s)	NTG Results (Q3)	Other Research	
				Year	Activity
Home Energy Rebate					
Equipment Rebates	2019-20	2019-20	2020		
Weatherization Rebates	2019-20	2019-20	2020		
Smart Tstat	TBD	None ²	NA	2018-19	Update TRM: Conduct Billing Analysis
RNC	2019	2019	2020	2019	Calibrated simulation
Home Energy Jumpstart					
DI	2020-21	2020-21	2021		
Smart Tstat	TBD	None	NA	2018-19	Update TRM: Conduct Billing Analysis
Education and Outreach Track					
Home Energy Reports	TBD	N/A	NA	2018-21	Net impacts through billing analysis
EEE	2019	None	NA		
Multi-Family					
Audit / DI	2018	2018	2019		
Retrofit Projects	2018	2018	2019	2018-19	Update TRM: Steam trap billing analysis (UC)

† Gross impact savings verification occurs for each program in all four program years.

Notes: Other Research Activities that are under consideration but not committed are indicated by (UC).

Research Year(s) indicates the program year(s) of participation of the research subjects.

Results (Q3) indicates the year when draft and final results are completed and recommended to SAG.

² The savings for natural gas heating provided in Illinois TRM Version 6.0, Section 5.3.16 is a net savings value.

Table 2. Income Eligible Programs High-Level Plan by Year

Offering	Evaluation Research Activities by Year†				
	Process Research Year(s)	NTG Research Year(s)	NTG Results (Q3)	Other Research	
				Year	Activity
Single-Family Retrofits					
Audit/DI/Retrofits	2018	NA	NA	2020	Update TRM: Calibrated simulation of comprehensive retrofits (UC)
Public Housing Authorities (PHA) / Multi-Family Buildings					
Audit/DI	2018	None*	NA		
Retrofit Projects	2018	None*	NA		
New Construction					
New Construction	2018	None*	NA	2019	Calibrated simulation (UC)

† Gross impact savings verification occurs for each program in all four program years.

* These programs have historically seen a deemed NTG ratio of 1.0 because the program targeted the income-eligible sector. However, because the income-eligible customers are not typically the decision makers for these programs, Navigant believes the TRM NTG working group should consider whether the Income Eligible New Construction and Public Housing Authorities (PHA) / Multi-Family Buildings Programs should have NTG research performed. If NTG research is performed, it would likely occur after 2018.

Notes: Other Research Activities that are under consideration but not committed are indicated by (UC). Research Year(s) indicates the program year(s) of participation of the research subjects. Results (Q3) indicates the year when draft and final results are completed and recommended to SAG.

Table 3. Business and Public Sector Programs High-Level Plan by Year

Offering	Evaluation Research Activities by Year†				
	Process Research Year(s)	NTG Research Year(s)	NTG Results (Q3)	Other Research	
				Year	Activity
Business Program (BP) and Public Sector Direct Install and Prescriptive Rebates					
BP Equipment Rebates	2019	2019	2020	2018 2018-19	Pipe Insulation secondary research Update TRM: Steam trap billing analysis (UC)
Public Sector Rebates	2019	2019	2020		
Assessment/DI	2019	2019	2020		
Upstream Rebates	2019	2019	2020		
Business Program and Public Sector Custom Rebates					
Custom and Public Sector	2018	2018	2019		
Public Sector Only	2020	2020	2021		
CHP	Combine with NTG	Project Specific	Project Specific		
Gas Optimization					
Gas Opt	2021	2021	2022		
Retro-Commissioning (RCx)					
RCx	2021	2021	2022		
Small Business					
Audit/DI	2020	2020	2021		
Retrofit Projects	2020	2020	2021	2018 2020	Thermostats – secondary research on savings Update TRM: Advanced thermostat billing analysis (UC)
Joint Business New Construction (BNC)					
BNC	Combine with NTG	Every Year	Every Year		

† Gross impact savings verification occurs for each program in all four program years.

Notes: Other Research Activities that are under consideration but not committed are indicated by (UC).

Research Year(s) indicates the program year(s) of participation of the research subjects.

Results (Q3) indicates the year when draft and final results are completed and recommended to SAG.

4. EVALUATION APPROACHES AND CROSSCUTTING ACTIVITIES

Impact Evaluation Approaches

The primary goal of impact analysis is to verify the gross and net savings claimed by PGL and NSG to be applied toward statutory goals. The effort has secondary goals of improving the accuracy of ex ante impact estimates, improving the accuracy and relevance of the TRM, and improving the accuracy and usefulness of the program tracking systems. The impact analysis will typically include the following components:

- **Program Tracking System Review and Quality Control Verification.** Verification procedures to measure savings values and quantities for accuracy as reported in the Efficiency Manager program tracking database.
- **Measure Verification.** Verify the type of measures installed and the quantities claimed.
- **Ex Ante Gross Measure Savings Verification.** For TRM-based measures, Navigant will verify ex ante gross measure savings against the values and algorithms provided in the relevant ICC-approved version of the TRM. For non-TRM “custom” measures, Navigant will conduct evaluation research to verify gross impacts.
- **Impact Sampling.** In general, impact-related sampling will be designed to achieve a 90%/±10% level of confidence and precision at the program level, but may also include selected high priority measures at the 90/10 level. The participant sample population may exceed one program year where the program design and implementation and market have remained relatively unchanged.
- **TRM Support.** Recommend adjustments to TRM measure values, algorithms or methods (as applicable) using primary and secondary sources, including Illinois-specific primary research.
- **NTG Ratio.** Conduct primary and secondary research to estimate free ridership and spillover and use them to recommend NTG ratios to the SAG. Complete NTG research by August 1, so that initial NTG recommendations can be made to the SAG by September 1 of each year and finalized by October 1 to be used for the following program year. In 2020, NTG research will be completed one month earlier, by July 1, to inform development of the next EEP.
- **Jointly Implemented Programs.** Evaluations of joint programs will be designed to meet the needs of PGL, NSG, and ComEd, as well as other Illinois utilities, when appropriate.
- **Timing.** Navigant will conduct “real-time” impact evaluation as the default approach for programs, except where we are limited by data availability or where there is no significant benefit from early analysis. For programs with TRM-based measures, Navigant will conduct an interim review of per-unit savings from mid-year tracking data. For programs with non-TRM measures, Navigant will draw M&V samples one to three times during the program-year, depending on the number of completed projects. We expect billing usage analyses will occur after the end of the program year, but may cut across program years to increase sample sizes and ensure completion in time for the TRM update cycle. Final impact evaluation will take place after the program-year ends, when we receive final tracking data, expected by January 30. Draft reports will be delivered by March 15, allowing for review time prior to wrapping up final versions by April 30. (If events and needs change and that date needs to shift, we can work through the implications of the date change collectively, including interested SAG parties.)

Measures that are included in the TRM are adjusted by evaluation through savings verification, while evaluation research is conducted on custom measures to estimate savings. Methods for savings verification of TRM measures that will be employed are tracking data review and engineering review

of measure savings for compliance with the TRM. Estimating the evaluation-researched ex post gross savings of custom measures will involve tracking data review and, for sampled participants, engineering review of project files, on-site measurement and verification (M&V), and/or billing analysis.

Tracking System Review

The gross impact evaluation foundation in each year will be a review of program tracking data that substantiates the type and quantity of measures installed. Navigant will perform independent verification of the program tracking database and determine level of input completeness, outliers, missing values, and potentially missing variables. If necessary, the Navigant team will include recommendations for additional fields to be added to the tracking system for use in future evaluation activities.

Through this effort, we will specifically look at each of the fields in the program tracking databases, as well as the completeness of the information being collected, and compare this to the data needs for the impact evaluation effort as well as program process monitoring.

Quality Control Verification

The Navigant team will work with PGL and NSG and the implementation contractors to review existing quality assurance and quality control (QA and QC) inspection and due diligence procedures for each program. The scope of this review will be more detailed when issues are observed in previous evaluations or substantial changes are made to implementation delivery and administration. Early priorities will focus on the Income Eligible and Public-Sector programs that were added to the portfolio from DCEO. Once a program or delivery path has been reviewed in detail, future work in this task area will be limited in scope and integrated into gross impact evaluation.

The key drivers in our review will be to assure customer eligibility, completion of installations, and the reasonableness and accuracy of savings recorded by the programs. We will work closely with program staff and those involved with developing the tracking databases to identify and define the key information needed from the tracking system for each program to support verification and evaluation tasks.

Illinois TRM Savings Verification

For programs with measures included in the TRM, tracking data review is combined with an additional step to verify all measure types for compliance with the TRM. TRM verification will occur early in each program year to ensure the latest TRM is being applied correctly, thus allowing PGL and NSG to make any necessary changes early in the program year. This will expedite the final reporting at year end.

For measures covered by the TRM, verified gross savings are calculated for each participant using appropriate TRM algorithms and customer-specific data collected in the tracking system (or, where required by the TRM, supplemented by additional research), and then summed across participants to calculate program totals. To be eligible, a TRM measure must meet the physical, operational, and baseline characteristics as defined in the applicable version of the TRM. Specifically, gross savings will be verified by (1) reviewing the tracking system to determine whether all fields are appropriately populated, (2) reviewing measure algorithms and values in the tracking system to assure that they

are appropriately applied, and (3) cross-checking total measures and savings recorded in the tracking database.

Verification of measures may also include (1) a review of project-level documentation in each program year to verify participation, installed measure quantities, and associated savings and (2) verification of installation of energy efficient measures through participant surveys or field work for a sample of participants.

Engineering Review of Project Files

For each project selected for the participant sample, an in-depth application review is performed to assess the engineering methods, parameters and assumptions used to generate all ex ante impact estimates. For each measure in the sampled project, engineers estimate ex post gross savings based on their review of documentation and engineering analysis. Validation of savings through gas usage billing data analysis may be used in combination with the engineering review for individual sites. To support this review, Navigant requests project documentation in electronic format for each sampled project.

Parallel Path Review

Navigant may conduct a limited number of project file reviews that fall under a “Parallel Path” designation. This approach has been applied to the Custom program since the first Plan cycle, and may be expanded to additional programs in the coming cycle. These are projects that the implementation contractor has identified early in the project application cycle that may pose a risk to realization of gross impacts, either due to the complex technical nature or difficulty in baseline determination, during evaluation efforts. Parallel Path review is initiated by a request from the implementation contractor. As budget allows, Navigant accepts the project for review and receives the preliminary application documents for the project. Navigant conducts a review of project documentation and energy saving estimates, and prepares a brief memo that identifies further questions or revisions to the gross savings estimates. The findings are discussed with the implementation contractor who then adopts the findings going forward, or proceeds as originally intended with a better knowledge of evaluation risk for the project.

On-Site Measurement and Verification

An analysis plan is developed for each project selected for on-site data collection. Each plan explains the general gross impact approach used (including measurement plans), provides an analysis of the current inputs (based on the application and other available sources at that time), and identifies sources that will be used to verify data or obtain newly identified inputs for the ex post gross impact approach.

Table 4 presents a listing of the IPMVP protocols, the nature of the performance characteristics of the measures to which M&V options typically apply, and an overview of the data requirements to support each option. Navigant’s approach to selecting M&V strategies will follow these guidelines.

Table 4. Overview of M&V Options for Non-TRM Measures

IPMVP M&V Option	Measure Performance Characteristics	Data Requirements
Option A: Engineering calculations using spot or short-term measurements, and/or historical data.	Constant performance	<ul style="list-style-type: none"> • Verified installation • Nameplate or stipulated performance parameters • Spot measurements • Run-time measurements
Option B: Engineering calculations using metered data.	Constant or variable performance	<ul style="list-style-type: none"> • Verified installation • Nameplate or stipulated performance parameters • End-use metered data
Option C: Analysis of utility meter (or sub-meter) data using techniques from simple comparison to multi-variate regression analysis.	Variable performance	<ul style="list-style-type: none"> • Verified installation • Utility metered or end-use metered data • Engineering estimate of savings input to SAE model
Option D: Calibrated energy simulation/modeling; calibrated with hourly or monthly utility billing data and/or end-use metering.	Variable performance	<ul style="list-style-type: none"> • Verified installation • Spot measurements, run-time monitoring, and/or end-use metering to prepare inputs to models • Utility billing records, end-use metering, or other indices to calibrate models

For most projects, on-site data collection includes interviews that are completed at the time of the on-site visit, visual inspection of the systems and equipment, EMS data downloads when available, spot measurements, and short-term monitoring (e. g., less than four weeks). After all the field data is collected, annual energy impacts are developed based on the on-site data, monitoring data, application information, and, in some cases, billing usage data. Engineering analysis is based on calibrated engineering models that make use of hard copy application review and on-site gathered information surrounding the equipment installed through the program (and the operation of those systems).

After completion of the engineering analysis, a site-specific impact evaluation report is prepared that summarizes the M&V plan, the data collected at the site, and all the calculations and parameters used to estimate savings.

Billing Analysis with Statistical Validation Check

A standard regression approach for estimating program natural gas energy savings is a preferred method for the evaluation of the energy use impacts of behavioral programs and measures. Navigant will perform billing analysis to evaluate behavioral and other programs when appropriate. Where practical, program evaluations will be conducted using randomized controlled trials or quasi-experimental design methods. When Navigant believes that randomized control trials or quasi-experimental designs are not practical, we will provide an explanation and support for this decision as part of the program's evaluation plan.

Support for TRM Updates

The EM&V team will provide support to improving the TRM by participating in the Technical Advisory Committee (TAC) meetings and update process. Support may include reviewing new measures; suggesting changes to current methods or approaches, algorithms, and assumptions for existing measures; and gathering primary data from other evaluation activities to support updating TRM assumptions. Navigant will provide technical review for workpapers developed by PGL and NSG and their implementation contractors.

Although the impact evaluation will use an Illinois TRM that has already been approved by the ICC for calculating gross savings, the independent evaluator will still have a responsibility to recommend updates and perform research to help improve the accuracy of the savings algorithms over time. Research priorities will be considered during the evaluation planning process, coordinated with PGL, NSG, other Illinois utilities, the TRM TAC, and the annual update process for the TRM. Potential research topics will be gathered from annual evaluation findings and recommendations and from the TRM Technical Advisory Committee.

The TRM is updated annually based on input from Program Administrators, evaluators, and other interested stakeholders through a consensus-based decision-making process. The TRM updates are completed by October 1st of each year, submitted to the ICC, and are effective January 1st, the start of the new program year, generally within three (3) months after it is submitted to the ICC. To provide precision that reflects the activities needed for future actual TRM values to be used in each program year, the following TRM schedule will be followed:

- April 1: TRM Technical Advisory Committee (TAC) informs Program Administrators, evaluators, and SAG which measures are high or medium priority measures, for which work papers need to be prepared.
- May 15: Proposed updates to existing measure work papers to clarify terms or approaches, as well as proposed work papers for new measures, are submitted to the TRM Administrator.
- May 15 – October 1: Ongoing TAC meetings and review/comment on submitted workpapers.
October 1: Submission of final TRM values.

NTG Research and Framework Application

Section 8-104 of the Public Utilities Act requires that evaluations include an assessment of net savings. The net savings analysis requires the evaluator to assess the influence of PGL and NSG programs versus other factors on the customer's decision to install energy efficiency measures, either through the programs or outside of them. These program influences could include free riders, non-participant spillover, market transformation effects, and participant spillover. Evaluation efforts will measure net savings considering free ridership and participant spillover in all programs, and where supported by the program delivery model, non-participant spillover and market transformation effects.

The NTG analysis will apply, follow and incorporate the Illinois Statewide NTG Methodologies Framework (IL NTG Framework or Framework) agreed to among the Illinois Stakeholder Advisory Group (SAG) participants, approved by the Illinois Commerce Commission and documented in the Illinois TRM Version 6 and any subsequent updates to the Illinois NTG Methodologies Framework³.

The IL NTG Framework is intended to cover most residential and non-residential programs offered in Illinois. Programs covered in the Framework are listed in tables at the beginning of Framework Section 3: Commercial, Industrial, and Public-Sector Protocols and Section 4: Residential and Low-Income Sector Protocols. As noted in the Framework, if a program design changes significantly, then it may mean that the NTG protocol listed for that program is no longer appropriate. In that instance, Navigant shall follow the procedures outlined in the Framework’s Section 1.4: Diverging from the IL-NTG Methods. The IL NTG Framework is likely to be updated periodically to incorporate new programs and to reflect recommended changes to existing methodologies. Navigant will apply those changes as they are approved and as are necessary. Navigant will follow all procedures and requirements set forth in the IL NTG Framework including the process for diverging from the IL NTG Framework and methods, procedures for non-consensus items, among others.

Navigant will continue to work with ICC Staff, the other Illinois utilities and evaluators, and the SAG to update the Illinois Energy Efficiency Policy Manual to ensure that programs across the state can be meaningfully and consistently evaluated and to develop consistent NTG evaluation methods that will be filed in the annual statewide TRM docket.

NTG research will be completed by August 1 each year, so that reports can be reviewed and finalized in time for the September 1 initial NTG recommendations to SAG required by the Illinois NTG Policy. In 2020, NTG research will be completed one month earlier, by July 1, to inform development of the next EEP. Navigant’s initial recommended NTG ratios for the upcoming program year and associated rationale will be submitted to Program Administrators, Commission Staff and the SAG by September 1 of each year. In early September of each year, we will present our initial recommended NTG Ratios for each Energy Efficiency Program, Sub-Program, and/or Measure group (where applicable) to SAG, intended to represent the best estimates of future actual NTG ratio values likely to occur for the upcoming program year. SAG participants, including Navigant, will make best efforts to reach consensus regarding NTG ratios appropriate for deeming for the upcoming program year that are representative of the best estimates of future actual NTG ratio values likely to occur for the upcoming program year. In developing the final recommended deemed NTG Ratio, Navigant will review SAG feedback, consider all comments and discussions, and report final deemed NTG values on or before October 1.

Timing and Samples to Meet Deadlines

A key part of each program evaluation plan is developing and actively managing a detailed schedule for the evaluation, one that not only delivers reports on time but provides useful feedback on potential program improvements early in the review process. To meet timely reporting requirements, Navigant will develop this evaluation schedule based on PGL and NSG and the ICC’s reporting deadlines provided in the Illinois EE Policy Manual and the availability of program data.

Navigant will conduct “real-time” impact evaluation as the default approach for programs, except where we are limited by data availability or where there is no significant benefit from early analysis. For programs with TRM-based measures, Navigant will conduct an interim review of per-unit savings from mid-year tracking data. For programs with non-TRM measures, Navigant will generally draw

³ http://www.ilsag.info/il_trm_version_6.html

M&V samples one to three times during the program-year, depending on the number of completed projects. We expect billing usage analyses will occur after the end of the program year. Final impact evaluation will take place after the program-year ends, when we receive final tracking data expected by January 30. Draft reports will be delivered by March 15, allowing for review time prior to wrapping up final versions by April 30.

Our general approach for sampling confidence and precision criteria is to attempt to achieve a 90 percent confidence interval with 10 percent precision within agreed upon sample frame segmentation. If budget and time constraints are present, the following general strategies could be implemented in response:

- Reduce sample sizes, particularly for sampling domains that are less important (e. g., measure level results for measures whose contribution to savings is relatively small).
- For Commercial/Industrial projects being evaluated, rely more heavily on desk reviews and telephone surveys, rather than on-site surveys for primary data collection.

The overarching theme is to continue using the same overall evaluation strategy, but if needed, reduce data collection and research frequency, particularly in areas that are less critical to the overall evaluation effort.

As evaluation plans are developed in more detail, additional attention will be given to selection of the optimal sampling approach for each individual study. In general, stratified samples will be used when possible to improve the efficiency of the sample design (e.g., possibly oversampling selected high priority measures). Useful stratification variables will be identified based on a review of the program tracking databases, forecasts of program impacts, budget considerations and discussions with portfolio and program management. The need to over-sample some program paths, customer types or measures will also be based on discussions from the evaluation planning process. For example, for business programs, we will likely recommend a census of those projects with the greatest savings with samples taken from the other strata based on a stratified ratio estimation method.

Another approach to enhancing sampling efficiency is to develop a rolling two or three-year sampling strategy. This approach is applied only when there are minimal changes to a program and effectively treats the multi-year results as one population. This approach leverages the research done in prior years to optimize the incremental investment in the final year. This approach is highly beneficial primarily for programs that rely on field M&V for a significant percentage of sampled projects, because on-site research is quite costly. The large Business Custom and Retro-commissioning offerings are likely to benefit most from this sampling approach. This approach can also be applied to other programs and research types, such as process and NTG research, however. The Navigant team will assess the potential for applying this approach in each year to optimize the use of the research dollars.

Navigant typically works with implementers and the utility to limit the number of duplicative contacts with customers. We have provided lists of proposed contacts (and unique identifiers) to coordinate with both the utility market research and other evaluators.

Process Evaluation Approaches

Navigant’s overarching objective with our process evaluations is to provide timely and useful information for each program using the appropriate tools at hand. This section provides a description of the approaches Navigant commonly applies to process evaluation, although not all approaches described here will be used when evaluating a specific program. The evaluation team is prepared to address key issues for individual programs on an as-needed basis and to move beyond the traditional use of participant and trade ally surveys asking satisfaction questions. The team does not anticipate conducting a process evaluation for each program in each year but rather targeting the available budget resources where they have the most value to PGL and NSG and their customers, plus leveraging surveys conducted as part of the NTG research.

We will coordinate process activities across programs and across utilities for joint programs as appropriate to address the whole of the PGL and NSG approach to the market. Part of the process analysis schedule may be driven by the needs of the impact analysis, either gross or net, where data collection efforts overlap. During the evaluation planning phase, we will identify program-specific deadlines that might affect the schedule for process evaluation activities. We will prepare early feedback memos for certain high-priority programs and deliver them as they are completed.

While the process evaluation methods for each individual program will vary depending on the program’s needs and stage of development, key tasks in conducting process evaluations using interview techniques and documenting review procedures include:

- Development of interview guides.
- Identifying appropriate parties to interview. Frequently, the evaluation will include in-depth qualitative interviews with those directly involved in each program, including program managers and implementation contractors, participating trade allies, and participating customers.
- Documentation of interviews and using findings in our evaluation reports.

Depending upon the circumstances, our team will use either a survey house to conduct structured surveys, online survey tools, or senior staff members to conduct telephone interviews. Our senior staff will be flexible in their approach to the discussion, allowing the respondent to talk about his or her experience or perspective while still shaping the discussion so that we collect the most important, relevant, and necessary information.

Navigant has a license and in-house expertise to employ Qualtrics, an online survey software tool used to design and conduct online surveys. Our team of process evaluation and survey design experts use Qualtrics to manage and monitor the flow of surveys going into programming and out into the field using high caliber, customized design elements to allow for flexibility in crafting survey batteries and to increase the likelihood of survey completion. Qualtrics allows for real-time reporting to help inform program decisions with up to the minute customer insights. It is a valuable tool used to capture the voice of the customer and identify ways to improve program engagement.

Depending on the needs of the evaluation, we might also use focus groups, in-store intercepts, or the Delphi method in our process evaluation activities.

As a practical matter, we find it important to provide early, timely, and continuous feedback to program implementers and staff. Such ongoing communication will provide PGL and NSG with process-related findings and concerns identified on an as-you-go basis, rather than waiting until the annual evaluation report is prepared many months later. These communications will be carried out at all times in a manner that preserves our independence and objectivity.

Staff/Contractor Research

Navigant will conduct in-depth interviews with PGL and NSG program management and implementation staff at the beginning of each program year evaluation cycle and as needed afterwards to establish an understanding of program context, as part of due diligence verification, and to help inform program-specific research priorities.

Customer Research

A primary objective of the process evaluation effort will be to help program designers and managers structure their programs to achieve cost-effective savings while maintaining high levels of customer satisfaction. Customer satisfaction can be measured through including a battery of questions in telephone surveys, online survey tools, or other interview instruments, and by reviewing program tracking data. Customer research will be used to help establish an understanding of program performance and to identify areas for program improvement. Customer research may also be used to inform NTG findings when deemed appropriate by the evaluation staff in accordance with program-specific evaluation goals.

Trade Ally Research

Trade allies play an essential role in the success of many of the PGL and NSG energy efficiency programs. Navigant will conduct research with the trade allies to understand their concerns and to help PGL and NSG enable the trade allies to be as effective as possible. Most typically this research involves in-depth interviews or survey administration.

Trade allies are also an essential source for analyzing the broader market impact of the PGL and NSG programs. They are best able to comment on the broader impacts (beyond measure uptake directly through the program) on both customer and contractor behaviors. Navigant will leverage the trade allies' market knowledge to measure these broader market effects, including non-participant spillover, as feasible. Our approach will typically involve in-depth interviews but could also involve telephone or online surveys, a Delphi panel, or other approach.

Benchmarking and Best Practices

Navigant has expertise conducting benchmarking research to identify best performing utilities by program or portfolio level. Navigant determines best performance by conducting data-driven research to identify comparable utilities with lower than median costs and higher than median savings at the regional and national levels, taking into account budget restrictions or other factors affecting individual utility performance. Once best performing utilities and programs are identified, Navigant may conduct additional research to identify sources of best performance. This additional research may consist of best performing program or portfolio reviews and reaching out to staff at best performing utilities to conduct in-depth interviews.

Navigant will also bring its experience and understanding of best practices gleaned from our other portfolio evaluations to bear on our process evaluation research, findings, and recommendations when appropriate. Navigant may supplement its best practice expertise with primary and/or secondary research into best practices given a program's research priorities. Navigant will work with PGL and NSG to identify individual programs and processes to apply these techniques.

Marketing Messaging

Navigant’s market messaging research consists of both secondary and primary research. Secondary research consists of conducting research into existing market messaging trends for a program segment and industry research on the state of energy efficiency market messaging. Primary research can consist of in-depth interviews with trade allies and customer research to identify the most effective marketing messaging for a market segment. Navigant’s extensive experience with research into sources of customer engagement and barriers to participation with a wide range of utilities around North America will inform any primary research conducted to help ensure findings are meaningful and actionable. Navigant will work with PGL and NSG to identify individual programs and processes to apply these techniques.

Tracking Data Analysis

Navigant can help inform program design through a review of tracking data and the impacts of program design changes on program activities. This review can be supplemented by input from other sources as needed, including participant and trade ally interviews and the like.

Other Market Actors

Navigant evaluation staff may identify opportunities to conduct in-depth interviews with other market actors depending on program-specific evaluation priorities. Interviews with other market actors can offer insights into market conditions and/or best practices. Other market actors may include industry experts, other utility staff, non-participating trade allies, and vendors and manufacturers.

Leveraging Efficiency Manager

Navigant will structure its research to leverage the Franklin Energy Efficiency Manager data tracking and reporting system. For example, Navigant will work with Franklin Energy to identify Efficiency Manager data fields that can be used to better design interview samples, and Navigant will differentiate research results for the different customer and trade ally segments tracked by the system.

Additional Research Activities

Navigant may conduct additional research above and beyond annual impact and process evaluation activities as requested on a program-by-program basis, keeping budget priorities in consideration. Priorities for additional research include billing analyses to support savings verification and TRM updates, algorithm review for prescriptive or “semi-prescriptive” measures, real-time customer feedback through web-based survey tools, and benchmarking analysis to help PGL and NSG incorporate best practices from programs administered in other jurisdictions. Navigant will work with PGL and NSG to identify the programs that could most benefit from these supplemental research activities, being mindful of overall budget availability. Additional research may be requested as needed and considered as a part of annual evaluation planning process.

Based on our review of measure-level four-year savings in the PGL and NSG plans; discussions with PGL, NSG, and Franklin Energy; and input from the SAG, TRM TAC, and other Illinois utilities we identified the following research tasks for the EEP 2018-2021 evaluation plan:

- **Residential Smart Thermostat Billing Analysis** – Navigant plans to conduct a billing analysis gas impact evaluation on residential smart thermostat installations, taking advantage of a larger population of installations, and more robust tracking data. Navigant will produce a TRM work paper if the assumptions or methodology needs to be updated based on study findings.
- **Steam Traps Impact Study** – The large contribution of steam traps to portfolio savings merits consideration of an impact study, but background research is needed to assess whether a viable study is feasible. An IL-TRM measure for steam trap replacement/repair currently exists, but a number of assumptions in the TRM are either dated or based on information that is not specific to Illinois. Given the importance of this measure, we believe a study to verify steam trap impacts (and hopefully update the IL-TRM) is desirable.

Steam trap research is likely to be highly complex. We expect on-site steam trap research to be prohibitively difficult and/or expensive, in part due to the extensive customer engagement necessary to allow for examination of steam systems. Alternative methods, including obtaining steam metering data from large industrial customers and/or conducting gas consumption analysis, may be able to be used to assess effects of steam trap replacement, but require careful timing and present a wide range of evaluation challenges. Building specific billing analyses of prior participants may be feasible for space heating and dry cleaners, depending on project counts by building type and whether other efficiency measures replaced at the same time as steam traps prevent isolating steam trap impacts. Billing analysis on industrial steam traps also faces the challenge of isolating the impact of steam traps.

In 2018, we will work with the Ameren Illinois and Nicor Gas evaluation teams to develop a scope of work to research the impacts of efficient steam traps. Our work will involve background research to understand 1) what data currently exist to support estimation of steam trap impacts, 2) what the available population of participants that have installed steam traps through energy efficiency programs in Illinois is, and 3) exploring available evaluation methods. We will provide an initial memo summarizing findings of our background research addressing the items and challenges above, with a draft scope of work to follow no more than a month later if we determine a study is viable. If our scope development yields a feasible study, we will proceed with conducting this study as soon as possible – if possible, in 2018 to inform the 2019 TRM update process, but likely stretching into 2019.

- **Non-Residential Pipe Insulation** – In 2018, Navigant will conduct a secondary research investigation of thermal regain factors. The current TRM value was drawn from residential work. Navigant will produce a TRM work paper if the assumptions or methodology needs to be updated based on study findings. As part of the secondary research, Navigant will investigate opportunities for primary research on pipe insulation savings, including examining the tracking data for project characteristics and talking with the implementer about primary data that may be available.
- **Small Business Thermostats** – In 2018, Navigant will examine secondary research from a larger population study (e.g., Michigan) to benchmark Illinois savings and assess whether their impact approach is transferrable to Illinois. For the EEP 2018-2021 period, advanced thermostats may be a higher priority for further research than standard programmable thermostats.
- **Small Business Process Research** – In consultation with program management, Navigant will consider additional process research to support the program manager and implementer. Possible topics include development of best practices in preparation for a 2018 pilot of small business behavioral programs, specifically to drive energy efficiency efforts by restaurant

staff, and broadly transform staff behavior across those industry sectors that are most impactful.

- **Income Eligible Single-Family Retrofits** – Navigant will verify projects using the TRM and custom analyses (if necessary). If program volume is sufficient, Navigant will consider a calibrated simulation study to determine the accuracy of TRM savings estimates and capture interactive savings effects.
- **Home Energy Reports Persistence Study Feasibility** – Some report recipients were recently dropped from both utility programs. A persistence study may be possible, but it would require further investigation. We first need to clarify how many participants were dropped and what procedure was used to select them. Ideally, from the perspective of doing a persistence study, the dropped recipients would have been randomly drawn from the treatment group of each program so that, in aggregate, each group would be a representative sample from their respective treatment cohort. There are additional issues we would need to investigate to determine persistence study feasibility.
- **Non-Energy Benefits (NEBs)** – NEBs are program impacts that are separate from energy savings. Navigant will inform PGL and NSG of opportunities to coordinate with ComEd or other Illinois utilities in assessing and proposing NEBs. For joint or coordinated programs, this could include coordinating on data collection and ensuring ComEd led evaluation research would cover gas-specific measures.

The four-year research plan schedule is summarized in Table 5. Some research activities identified in Table 5 are under consideration, but not committed.

Table 5. Four-Year Research Plan Schedule

Activity	Status	Plan Description	2018	2019	2020	2021
Residential Smart Thermostat Billing Analysis	Planned	HEJ and Home Energy Rebate	2Q-4Q	1Q-2Q		
Steam Traps – Background Research on Viability of Impact Study	Planned	Business - Prescriptive Rebate	1Q-2Q			
Steam Traps – Impact Study with Usage Billing Data *	Under Consideration		3Q-4Q	1Q-2Q		
Non-Residential Pipe Insulation – Thermal Regain Factors and Primary Research Opportunities	Planned	Business - Prescriptive Rebate	2Q-4Q			
Small Business Thermostats – Savings Benchmarking	Planned	Small Business Plan	2Q-4Q			
Small Business Thermostats – Billing Analysis †	Under Consideration				1Q-4Q	
Small Business Thermostats – Process Research †	Under Consideration		1Q-4Q			
Home Energy Reports – Investigate Feasibility of a Persistence Study	Planned	Home Energy Reports	Q2			
Residential New Construction – Update Calibrated Simulation Models	Planned	Home Energy Rebate		1Q-4Q		
Income Eligible Single Family Retrofits Calibrated Simulations *	Under Consideration				1Q-4Q	

* Study is under consideration, but further exploration is needed prior to starting a research study. We will research a scope of work and if a study is viable, we will develop a detailed scope of work covering approach, schedule and budget. If there is agreement on the detailed scope of work, we will conduct the study.

† Study is under consideration, but decision to proceed and timing depend on future program implementation plans.

Table 6. 2018 Research Study Schedule

Activity	Start Research	Draft Deliverable / Report	Final Deliverable / Report
Residential Smart Thermostat Billing Analysis			
<ul style="list-style-type: none"> Detailed Scope of Work 		May 15, 2018	June 30, 2018
<ul style="list-style-type: none"> Research Study 	July 9, 2018	2Q 2019	2Q 2019
Home Energy Reports – Investigate Feasibility of a Persistence Study	March 1, 2018		May 31, 2018
Steam Traps – Impact Study with Usage Billing Data *			
<ul style="list-style-type: none"> Background Research Memo 			May 31, 2018
<ul style="list-style-type: none"> Scope of Work 			June 30, 2018
Non-Residential Pipe Insulation – Thermal Regain Factors and Primary Research Opportunities	June 1, 2018	October 31, 2018	December 7, 2018
Small Business Thermostats – Savings Benchmarking	June 1, 2018	October 31, 2018	December 7, 2018

* Study is under consideration, but further exploration is needed prior to starting a research study. We will research a scope of work and if a study is viable, we will develop a detailed scope of work covering approach, schedule and budget. If there is agreement on the detailed scope of work, we will conduct the study.

Annual and Ad-hoc Reporting

Navigant’s portfolio evaluation plan(s) will provide details on the exact nature of the annual reports that it will produce. At a minimum, we will produce a draft and final report annually encompassing each specific program evaluation. The annual reports will summarize evaluation findings for the previous year and present overall energy savings for the portfolio, along with any additional information required for annual and plan-cycle reporting. In the evaluation planning process, we will work with PGL and NSG to define the key dates and deliverables to ensure that our results meet each company’s needs and those specified in the final Order for EEP 2018-2021 and the Illinois Energy Efficiency Policy Manual. Navigant will continue to collaborate with PGL and NSG and the SAG to refine report formats based on agreed upon templates.

Navigant will produce periodic ad-hoc reports, memos, and presentations providing timely feedback on the results of our data collection and analysis efforts to program managers and implementation staff. Memos produced throughout the program year will typically be included as an Appendix to the appropriate evaluation report. Customer-specific information (survey responses, site reports, etc.) will be kept confidential and excluded from public reports.

Cost Effectiveness Review and Summary Reporting

Navigant will provide a brief annual portfolio summary report for each program year, 2018 through 2021, and will produce a final report summarizing the combined results for the four program years after the conclusion of 2021. The annual portfolio summary reporting will be presented in three spreadsheet documents, using templates recommended by the SAG, accompanied by a memo describing Navigant’s approach and source of assumptions. The tables included are:

1. TRC and UCT Cost-Effectiveness Results Tables
2. Verified Energy Savings Summary Tables

3. High-Impact Measures Tables

The final evaluation summary report for the four years will summarize the results from the four annual reports in a concise format, and include the ex post cost-effectiveness report. Navigant will conduct a TRC cost-effectiveness analysis at the conclusion of the four-year program plan pursuant to Section 8-104(f)(8). Both the annual ex post TRC analysis and the four-year TRC cost-effectiveness analysis shall include both the gas and electric costs and benefits for the joint energy efficiency programs that NSG and PGL offer in conjunction with another Program Administrator such as ComEd.

Work on the annual cost effectiveness spreadsheet reports will begin after annual impact evaluation reports are final (planned for April 30), with draft results available July 15, and final results August 31.

APPENDIX A. DETAILED PROGRAM EVALUATION PLANS

Navigant has developed program-specific plans to evaluate the entire portfolio of PGL and NSG energy efficiency programs. The following programs are covered in this plan, including Income Eligible programs and Public Sector programs introduced in 2017:

- Residential Programs
 - Home Energy Rebates (includes Residential New Construction)
 - Home Energy Jumpstart
 - Elementary Energy Education (EEE)
 - Home Energy Reports
 - Multi-Family Program
- Income Eligible Programs
 - Income Eligible Single-Family Retrofits
 - Income Eligible Multi-Family / Public Housing Authority (PHA) Retrofits
 - Income Eligible New Construction
- Business Programs (includes Public Sector)
 - Direct Installation and Prescriptive Rebates
 - Custom Rebates (Custom)
 - Gas Optimization
 - Retro-Commissioning (RCx)
 - Small Business
 - Joint Business New Construction

A.1 Residential Programs

Home Energy Rebate Program 2018 – 2021 Evaluation Plan

Introduction

Under the Home Energy Rebate Program (HER), cash incentives and education are offered to encourage upgrading of water- and space-heating equipment and weatherization among residential customers of Peoples Gas and North Shore Gas. The Home Energy Rebate Program was designed to conserve natural gas and lower its participants’ monthly energy bills. Both rental and owner-occupied dwellings are eligible for rebates. Customers must be active residential customers of Peoples Gas or North Shore Gas to receive rebates for gas saving measures. The premises must be used for residential purposes in existing buildings.

Through a Residential New Construction offering, PGL and NSG will offer incentives to encourage customers and builders to push building efficiency beyond what is required through compliance with current building code. PGL and NSG will utilize support from contractors to promote the benefits of building above the current building code.

Four-Year Evaluation Plan Summary

We have prepared a four-year evaluation plan summary to identify tasks by year. Final scope and timing of activities for each year will be refined as program circumstances are better known.

Table 1. Four-Year Evaluation Plan Summary

Activity	2018	2019	2020	2021
Gross Impact - Mid-Year Review of TRM Compliance	X	X	X	X
Gross Impact - End-of-Year Savings Verification	X	X	X	X
Primary Research to Update the TRM - Smart Thermostat Billing Analysis*	2Q-4Q	1Q-2Q		
Research - Participant FR plus Process Survey		Real-time	Real-Time	
Research - Participant SO plus Process Survey			One Time	
Research – Trade Ally SO plus Process Survey			One-Time	
Present NTG Research Results			July 1	
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

* Study is under consideration.

Evaluation Plan for CY2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for CY2018:

Impact Evaluation:

1. What are the program’s verified gross savings?
2. What are the program’s verified net savings?
3. What caused gross realization rate (RR) adjustments and what corrective actions are recommended?
4. What updates are recommended for the Illinois Technical Reference Manual (TRM)?

In CY2018, Navigant will develop a scope of work for a study to conduct primary billing data research on the gross impact of Smart Thermostats, to inform future updates to the TRM. If the study goes forward, the initial steps in CY2018 will begin in Q3 with Navigant developing the detailed scope of work, data request, and methodology.

Process Evaluation:

Navigant’s CY2018 process research activities will include review of program materials and in-depth qualitative interviews with program management and implementers. These interviews will be used to develop a complete understanding of the final design, procedures, and implementation strategies for the program, including specific marketing tactics and perceived results, to understand the current program performance and inform our evaluation efforts.

Gross Impact Evaluation

For measures covered by the TRM, the evaluation team will review the TRM measure characterizations and customer-specific data collected in the tracking system that substantiates the measures installed, and make adjustments as needed to calculate verified savings. The gross impact evaluation for TRM measures will include a mid-year review and end-of-year final verification. Midway through the program year, Navigant will review the program tracking data to determine the level of input completeness, flag outliers, and identify incorrect algorithms or input assumptions. If necessary, the Navigant team will make recommendations for modifications to the tracking data for use in the impact evaluation effort. After the program year ends, verified measure savings are estimated and summed across participants to calculate the total verified savings for the program.

The gross impact evaluation approach for new construction projects will be based on engineering analysis of all or a sample of projects to verify claimed savings or make retrospective adjustment to claimed gross savings. Sampled projects will be subject to engineering file review. Gross impact estimates will mimic ex ante methods to the extent they are reasonable and accurate. The evaluation team will modify calculations if methods are not reasonable or if verified project characteristics differ from that which was used in the ex ante savings calculation. If program volume is sufficient, Navigant will consider a calibrated simulation approach in 2019 or 2020, where buildings models are calibrated using actual billing data.

Use of Randomized Controlled Trial and Quasi-Experimental Design

We are not evaluating the Home Energy Rebate Program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. In 2018, Navigant will develop a scope of work for a quasi-experimental design study to conduct primary billing data research on the natural gas impact of Smart Thermostats, to inform future updates to the TRM.

Net Impact Evaluation

The CY2018 net impact evaluation will apply the net-to-gross ratio (NTGR) deemed through the Illinois Stakeholders Advisory Group (SAG) consensus process. The deemed NTGRs are provided in Table 2.

Table 2. PGL/NSG Deemed NTGR for CY2018

Program Path/Measure	Deemed NTGR
Equipment Measures (excluding Smart Thermostats, Duct Sealing, Air Sealing, and Insulation Measures)	0.64
Weatherization Measures (Duct Sealing, Air Sealing, and Insulation)	0.90
Smart Thermostats	NA*
Residential New Construction†	0.65

Source: PGL_and_NSNG_GPY7_NTG_Values_2017-03-01_Final.xlsx.

* The savings for natural gas heating provided in Illinois TRM Version 6.0, Section 5.3.16 is a net savings value.

† PGL and NSG do not have a deemed value established for residential new construction. We propose to use the value of 0.65 that is used by ComEd and Nicor Gas, source: http://ilsagfiles.org/SAG_files/NTG/2017_NTG_Meetings/Final/ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, and Nicor Gas GPY7 NTG Values 2017-03-01 Final.xlsx.

Process and NTG Research

The process analysis will include a synthesis of both qualitative and quantitative data collected during the review of program materials and in-depth qualitative interviews with program management and implementers. There will be no primary NTG research in 2018.

Data Collection, Methods, and Sample Sizes

Table 3 below summarizes data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 3. Core Data Collection Activities

What	Target	Completed Interviews	When	Comments
In Depth Interviews	Program Management	1-2	Q3 2018	Interview program staff
Mid-Year TRM Compliance Review	All Program TRM Measures		May - July 2018	Review program tracking data using the TRM measure characterizations
End-of-Year Savings Verification	All Participating Customers		Feb – March 2019	Gross savings verification using the TRM and customer-specific data collected in the tracking system

Evaluation Schedule for CY2018

Table 4 below provides the schedule for evaluation of the CY2018 HER Program. Adjustments will be made as needed as program year evaluation activities begin.

Table 4. CY2018 Evaluation Schedule

Activity/Deliverables	Responsible Party	Completion/Delivery
Mid-Year TRM Compliance Review and Findings Memo	Evaluation Team	July 20, 2018
Smart Thermostat Billing Analysis – Scope of Work	Evaluation Team	June 30, 2018
Smart Thermostat Billing Analysis – Detailed Scope of Work, Data Request, and Develop Methodology (if study proceeds)	Evaluation Team	Q3-Q4 2018
Process Findings Memo	Evaluation Team	August 15, 2018
Final Tracking Data to Navigant	Franklin Energy	January 30, 2019
Draft Impact Report to PGL & NSG and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	PGL & NSG / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 12, 2019
Comments on Redraft	PGL & NSG / SAG	April 19, 2019
Final Impact Report to PGL & NSG and SAG	Evaluation Team	April 26, 2019

Home Energy Jumpstart Program 2018 – 2021 Evaluation Plan

Introduction

The Home Energy Jumpstart (HEJ) program seeks to: (1) secure energy savings through direct installation of low-cost efficiency measures, such as water efficient showerheads and faucet aerators, pipe insulation, programmable thermostats at eligible single family residences; (2) secure energy savings through installation of energy efficiency measures with co-pays: smart thermostats; and (3) 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 additional efficiency programs. The basic program concept is currently being offered jointly between ComEd and Peoples Gas (PGL) and North Shore Gas (NSG) as the Home Energy Jumpstart program.

Four-Year Evaluation Plan Summary

We have prepared a four-year evaluation plan summary to identify tasks by year. Final scope and timing of activities for each year will be refined as program circumstances are better known.

Table 1. Four-Year Evaluation Plan Summary

Activity	2018	2019	2020	2021
Gross Impact - Mid-Year Review of TRM Compliance	X	X	X	X
Gross Impact - End-of-Year TRM Savings Verification	X	X	X	X
Primary Research to Update the TRM - Smart Thermostat Billing Analysis*	2Q-4Q	1Q-2Q		
Research - Participant FR plus Process Survey			Real-time	Real-Time
Research - Participant SO plus Process Survey				One Time
Research – Trade Ally SO plus Process Survey				One-Time
Present NTG Research Results				Q3
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

* Study under consideration.

Evaluation Plan for CY2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for 2018:

Impact Evaluation:

1. What are the program's verified gross savings?
2. What are the program's verified net savings?
3. What caused gross realization rate (RR) adjustments and what corrective actions are recommended?
4. What updates are recommended for the Illinois Technical Reference Manual (TRM)?

In CY2018, Navigant will develop a scope of work for a study to conduct primary billing data research on the gross impact of Smart Thermostats, to inform future updates to the TRM. If the study goes forward, the initial steps in CY2018 will begin in Q3 with Navigant developing the detailed scope of work, data request, and methodology.

Process Evaluation:

Navigant's CY2018 process research activities will include review of program materials and in-depth qualitative interviews with program management and implementers. These interviews will be used to develop a complete understanding of the final design, procedures, and implementation strategies for the program, including specific marketing tactics and perceived results, to understand the current program performance and inform our evaluation efforts.

Gross Impact Evaluation

Navigant anticipates all measures offered through this program will be defined in the TRM. For measures covered by the TRM, the evaluation team will review the TRM measure characterizations and customer-specific data collected in the tracking system that substantiates the measures installed, and make adjustments as needed to calculate verified savings. The gross impact evaluation for TRM measures will include a mid-year review and end-of-year final verification. Midway through the program year, Navigant will review the program tracking data to determine the level of input completeness, flag outliers, and identify incorrect algorithms or input assumptions. If necessary, the Navigant team will make recommendations for modifications to the tracking data for use in the impact evaluation effort. After the program year ends, verified measure savings are estimated and summed across participants to calculate the total verified savings for the program.

Use of Randomized Controlled Trial and Quasi-Experimental Design

We are not evaluating the HEJ Program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. In 2018, Navigant will develop a scope of work for a quasi-experimental design study to conduct primary billing data research on the natural gas impact of Smart Thermostats, to inform future updates to the TRM.

Net Impact Evaluation

The CY2018 net impact evaluation will apply the net-to-gross ratio (NTGR) deemed through the Illinois Stakeholders Advisory Group (SAG) consensus process. The deemed NTGRs are provided in Table 2.

Table 2. PGL/NSG Deemed NTGR for CY2018

Program Path/Measure	Deemed NTGR
Home Energy Jumpstart - All measures except Smart Thermostats	0.96
Smart Thermostats	NA*

Source: PGL_and_NSOG_GPY7_NTG_Values_2017-03-01_Final.xlsx.

** The savings for natural gas heating provided in Illinois TRM Version 6.0, Section 5.3.16 is a net savings value.*

Process and NTG Research

The process analysis will include a synthesis of both qualitative and quantitative data collected during the review of program materials and in-depth qualitative interviews with program management and implementers. There will be no primary NTG research in 2018.

Data Collection, Methods, and Sample Sizes

Table 3 below summarizes data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 3. Core Data Collection Activities

What	Target	Completed Interviews	When	Comments
In Depth Interviews	Program Management	1-2	Q3 2018	Interview program staff
Mid-Year TRM Compliance Review	All Program TRM Measures		May - July 2018	Review program tracking data using the TRM measure characterizations
End-of-Year TRM Savings Verification	All Participating Customers with TRM Measures		Feb – March 2019	Gross savings verification using the TRM and customer-specific data collected in the tracking system

Evaluation Schedule for CY2018

Table 4 below provides the schedule for evaluation of the CY2018 HEJ Program. Adjustments will be made as needed as program year evaluation activities begin.

Table 4. CY2018 Evaluation Schedule

Activity/Deliverables	Responsible Party	Completion/Delivery
Mid-Year TRM Compliance Review and Findings Memo	Evaluation Team	July 20, 2018
Smart Thermostat Billing Analysis – Scope of Work	Evaluation Team	June 30, 2018
Smart Thermostat Billing Analysis – Detailed Scope of Work, Data Request, and Develop Methodology (if study proceeds)	Evaluation Team	Q3-Q4 2018
Process Findings Memo	Evaluation Team	August 15, 2018
Final Tracking Data to Navigant	Franklin Energy	January 30, 2019
Draft Impact Report to PGL & NSG and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	PGL & NSG / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 12, 2019
Comments on Redraft	PGL & NSG / SAG	April 19, 2019
Final Impact Report to PGL & NSG and SAG	Evaluation Team	April 26, 2019

Elementary Energy Education Program 2018 – 2021 Evaluation Plan

Introduction

The Elementary Energy Education (EEE) Program’s primary focus is to produce electricity and natural gas savings in the residential sector by motivating students and their families to take steps to reduce energy consumption for water heating and lighting in their home. The program is offered in the electric service area of ComEd and the natural gas service areas of Nicor Gas (NG), Peoples Gas (PGL), and North Shore Gas (NSG).

Four-Year Evaluation Plan Summary

We have prepared a four-year evaluation plan summary to identify tasks by year. Final scope and timing of activities for each year will be refined as program circumstances are better known.

Table 1. Four-Year Evaluation Plan Summary

Activity	2018	2019	2020	2021
Gross Impact - Mid-Year Review of TRM Compliance	X	X	X	X
Gross Impact - End-of-Year TRM Savings Verification	X	X	X	X
Process Research		X*		
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

* For consideration

Evaluation Plan for CY2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for CY2018:

Impact Evaluation:

1. What are the program’s verified gross savings?
2. What are the program’s verified net savings?
3. What caused gross realization rate (RR) adjustments and what corrective actions are recommended?
4. What updates are recommended for the Illinois Technical Reference Manual (TRM)?
5. Should the NTGR for this program be deemed at 1.00, without conducting further primary research?

Process Evaluation:

Navigant’s CY2018 process research activities will include review of program materials and in-depth qualitative interviews with program management and implementers. These interviews will be used to develop a complete understanding of the final design, procedures, and implementation strategies for the program, including specific marketing tactics and perceived results, to understand the current program performance and inform our evaluation efforts.

Gross Impact Evaluation

Navigant anticipates all measures offered through this program will be defined in the TRM. For measures covered by the TRM, the evaluation team will review the TRM measure characterizations and customer-specific data collected in the tracking system that substantiates the measures installed, and make adjustments as needed to calculate verified savings. The gross impact evaluation for TRM measures will include a mid-year review and end-of-year final verification. Midway through the program year, Navigant will review the program tracking data to determine the level of input completeness, flag outliers, and identify incorrect algorithms or input assumptions. If necessary, the Navigant team will make recommendations for modifications to the tracking data for use in the impact evaluation effort. After the program year ends, verified measure savings are estimated and summed across participants to calculate the total verified savings for the program.

Use of Randomized Controlled Trial and Quasi-Experimental Design

We are not evaluating the EEE program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. We are not using quasi-experimental design because the savings from the program measures represents less than ~5% of whole home usage, which is not sufficient to achieve statistically significant savings estimates using this method.

Net Impact Evaluation

The CY2018 net impact evaluation will apply the net-to-gross ratio (NTGR) deemed through the Illinois Stakeholders Advisory Group (SAG) consensus process. The deemed NTGRs are provided in Table 2.

Table 2. PGL/NSG Deemed NTGR for CY2018

Program Path/Measure	Deemed NTGR
Elementary Energy Education – All Measures	1.00

Source: PGL_and_NSNG_GPY7_NTG_Values_2017-03-01_Final.xlsx.

Process and NTG Research

The process analysis will include a synthesis of both qualitative and quantitative data collected during the review of program materials and in-depth qualitative interviews with program management and implementers. There will be no primary NTG research in 2018.

Data Collection, Methods, and Sample Sizes

Table 3 below summarizes data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 3. Core Data Collection Activities

What	Target	Completed Interviews	When	Comments
In Depth Interviews	Program Management	1-2	Q3 2018	Interview program staff
Mid-Year TRM Compliance Review	All Program TRM Measures		May - July 2018	Review program tracking data using the TRM measure characterizations
End-of-Year TRM Savings Verification	All Participating Customers with TRM Measures		Feb – March 2019	Gross savings verification using the TRM and customer-specific data collected in the tracking system

Evaluation Schedule for CY2018

Table 4 below provides the schedule for evaluation of the CY2018 EEE Program. Adjustments will be made as needed as program year evaluation activities begin.

Table 4. CY2018 Evaluation Schedule

Activity/Deliverables	Responsible Party	Completion/Delivery
Mid-Year TRM Compliance Review and Findings Memo	Evaluation Team	July 20, 2018
Process Findings Memo	Evaluation Team	August 15, 2018
Present Recommendation to Deem the NTGR at 1.00	Evaluation Team	September 1, 2018
Final Tracking Data to Navigant	Franklin Energy	January 30, 2019
Draft Impact Report to PGL & NSG and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	PGL & NSG / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 12, 2019
Comments on Redraft	PGL & NSG / SAG	April 19, 2019
Final Impact Report to PGL & NSG and SAG	Evaluation Team	April 26, 2019

Home Energy Reports Program 2018 – 2021 Evaluation Plan

Introduction

The primary objective of the evaluation of the PGL and NSG Home Energy Reports (HER) programs is to estimate the natural gas savings generated by regularly mailing customers reports that provide information about their natural gas consumption and conservation. In addition, participants are invited to log onto a dedicated program website that offers suggestions of additional opportunities to save energy, including other PGL or NSG energy efficiency programs they may qualify for, and allows participants to fine-tune their profiles and report conservation steps they have taken.

In CY2018⁴, the PGL and NSG HER programs consist of the following waves:

- PGL Wave 1: 151,200 customers started receiving reports in October 2013
- NSG Wave 1: 91,349 customers started receiving reports in October 2013
- NSG Wave 2: 10,526 customers started receiving reports in September 2015

NSG Wave 2 was started to make up for expectedly low savings in GPY3 and GPY4.

All three waves were designed as randomized controlled trials (RCTs). Customers in the target group of residential customers from each utility were randomly assigned to either the recipient group or the control (non-recipient) group for the purpose of estimating changes in natural gas use due to the program. This approach simplifies the process of verifying energy savings: among other things it effectively eliminates free-ridership and participant spillover bias and thus the need for net-to-gross research. Customers may opt out of the program at any time, but they cannot opt in due to the RCT design.⁵

Four-Year Evaluation Plan Summary

We have prepared a four-year evaluation plan summary to identify tasks by year, shown in Table 1. Final scope and timing of activities for each year will be refined as program circumstances are better known.

Table 1. Four-Year Evaluation Plan Summary

Activity	2018	2019	2020	2021
Tracking System Review	X	X	X	X
Data Collection – Program Manager and Implementer Interviews	X	X	X	X
Impact – End-of-Year Savings Verification	X	X	X	X
Investigate Feasibility of Performing a Persistence Study and Summarize Findings in a Memo	X			

⁴ CY2018 spans January 1, 2018 to December 31, 2018.

⁵ HER recipients remain part of the recipient sample unless they opt out of the program or move. Control group members remain part of the control sample unless they move.

Evaluation Plan for CY2018

Evaluation Research Objectives

Impact Evaluation:

Navigant will address the following questions in the impact evaluation of the program:

1. How much natural gas savings do customers in the program save in CY2018 for PGL and NSG?
 - a. What is the apparent long-run trend in program savings?
 - b. Are CY2018 savings flat, increasing, or falling compared to prior program years?
2. What is the uplift in other PGL and NSG energy efficiency programs due to the HER program?

Navigant’s CY2018 research activities will include interviews with program management and implementers. These interviews will be used to develop a complete understanding of the final program design, the number of HERs sent and distribution dates, targeting strategies, and other aspects of the program to inform our evaluation efforts.

Some report recipients were recently dropped from both utility programs. A persistence study may be possible, but it would require further investigation. We first need to clarify how many participants were dropped and what procedure was used to select them. Ideally, from the perspective of doing a persistence study, the dropped recipients would have been randomly drawn from the treatment group of each program so that, in aggregate, each group would be a representative sample from their respective treatment cohort. There are additional issues we would need to investigate to determine persistence study feasibility.

Process Evaluation:

The process evaluation for this program will be limited to interviews with the program manager and implementation contractor.

Impact Evaluation Methodology

Table 2 summarizes the evaluation tasks for CY2018 that will be used to answer the evaluation research questions.

Table 2. CY2018 Evaluation Plan Summary

Activity	CY2018
Gross, Net Impact Approach	Regression analysis
NTG Approach†	Uplift analysis
Program Manager and Implementer Interviews/ Review Materials	Yes

† The regression analysis produces impacts which are intrinsically net savings, aside from uplift.

Gross Impact Evaluation

For PGL Wave 1 and NSG Waves 1 and 2, Navigant will measure CY2018 program impacts through billing analysis using lagged dependent variable (LDV)⁶ and linear fixed effects regression (LFER) models, both of which were used and described in the GPY5 evaluation report.⁷

Although the two regression models are structurally different, both produce unbiased estimates of program savings assuming the RCT is well-balanced with respect to the drivers of natural gas use. Billing analysis implicitly estimates net impacts so no net-to-gross adjustment is necessary. However, we will use the LDV model for reporting total program savings in CY2018, as we did in our GPY4 and GPY5 evaluations, because we believe that, on balance, it has superior statistical properties.⁸ The LFER will be reported as a robustness check.

Enrollment uplift in other energy efficiency programs due to the HER program will be estimated the same way as in previous evaluation. Uplift savings will be netted out of HER results to avoid double counting.

Verified Net Impact Evaluation

A key feature of the RCT design of the HER program is that the analysis inherently estimates net savings because there are no participants who would have received the individualized reports in the absence of the program. While some customers receiving reports may have taken energy-conserving actions or purchased high-efficiency equipment anyway, the random selection of program participants (as opposed to voluntary participation) implies that the control group of customers not receiving reports would be expected to exhibit the same degree of energy-conserving behavior and purchases. Therefore, this method estimates net savings and no further NTG adjustment is necessary.

⁶ This model is identical to the post-program regression (PPR) model used in Navigant's previous evaluations. We have changed the nomenclature to better align with academic research and because LDV is more descriptive of the model structure than PPR.

⁷ Navigant Consulting, Inc. *PGL-NSG Home Energy Reports Program Evaluation Final Report, Gas Play Year 5*. March 31, 2017. Since Navigant previously validated the randomized designs of PGL Wave 1 and NSG Wave 1 as part of its GPY3 evaluation and the randomized design of NSG Wave 2 as part of its GPY5 evaluation, we will not repeat this step in the GPY6 evaluation.

⁸ The LDV model's superior performance results from its greater flexibility relative to the LFER model. While the LDV model can accommodate time-varying individual customer controls, the LFER model treats all unobserved inter-customer heterogeneity affecting energy usage as time-invariant – a particularly unwelcome feature given the highly seasonal nature of gas consumption.

Navigant’s analysis will consider both uplift that occurs in CY2018 and legacy uplift from previous program years.

Evaluation Schedule for CY2018

Table 3 below presents an estimate of the evaluation schedule. The schedule for the impact analysis depends on receipt of the necessary data from Oracle and Franklin Energy.

Table 3. CY2018 Evaluation Schedule

Activity/Deliverables	Responsible Party	Completion/Delivery
Investigate Feasibility of Performing a Persistence Study and Summarize Findings in a Memo	Evaluation Team	May 31, 2018
Interviews with program manager and IC	Evaluation Team	June 29, 2018
Data delivery to Navigant	Oracle	January 30, 2019
CY2018 EE Residential Program Tracking Data to Navigant	Franklin Energy	January 30, 2019
Draft Impact Report to PGL & NSG and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	PGL & NSG / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 16, 2019
Comments on Redraft	PGL & NSG / SAG	April 23, 2019
Final Impact Report to PGL & NSG and SAG	Evaluation Team	April 30, 2019

Multi-Family Program 2018-2021 Evaluation Plan

Introduction

The Multi-Family Energy Savings Program (MESP or Multi-Family Program) is jointly implemented by Peoples Gas (PGL) and North Shore Gas (NSG) companies and Commonwealth Edison Company (ComEd). The Multi-Family Program achieves natural gas energy savings for PGL and NSG and electric energy and demand savings for ComEd customers.

The PGL and NSG Multi-Family Program is designed to provide a “one-stop-shop” to multi-family property owners and managers to achieve comprehensive improvements in energy efficiency that previously would have required accessing multiple programs. The Multi-Family Program delivery approach consists of five paths:

The Direct Install (DI) and Energy Assessment “Jumpstart” path of the program provides free energy efficiency products in residential dwelling units and common areas. The energy assessment identifies additional comprehensive efficiency upgrades that allow participants to implement deeper retrofit measures through other delivery paths.

The Prescriptive Rebate path provides standardized incentives for energy efficient equipment based on the size and efficiency of the equipment installed or on a per unit basis. The Partner Trade Ally (PTA) path also provides standardized incentives for energy efficient equipment, while providing higher incentives to a network of trade allies selected, screened, and registered with the Multi-Family Program. These Partner TA's in turn offer better rebates to their customers to install energy-efficient products.

The program's Custom path provides technical services and custom rebates for non-standard building improvement upgrades. Multi-family property owners and managers may also participate in the PGL and NSG Gas Optimization Study Program that provides gas optimization assessments for multi-family buildings for operation and maintenance issues that, if corrected, deliver energy and cost savings to building owners and managers supported by financial incentives.

Four-Year Evaluation Plan Summary

We have prepared a four-year evaluation plan summary to identify tasks by year. Final scope and timing of activities for each year will be refined as program circumstances are better known.

Table 1. Four-Year Evaluation Plan Summary

Activity	2018	2019	2020	2021
Gross Impact - Mid-Year Review of TRM Compliance	X	X	X	X
Gross Impact - End-of-Year TRM Savings Verification	X	X	X	X
Gross Impact – Custom Project Savings Verification Waves and Large Project Pre-Installation Review	X	X	X	X
Gross Impact – End-of-Year Custom Project Savings Verification	X	X	X	X
Research - Participant FR plus SO plus Process Survey	X*			
Present NTG Research Results		Q3		
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

FR – Free Ridership; SO - Spillover

* The FR and SO data collection and survey completion will extend into Q2 of 2019, but will be based on 2018 program data, unless there is a particular interest to consider part of 2019 program year data.

Evaluation Plan for CY2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for CY2018:

Impact Evaluation:

1. What are the program’s verified gross savings?
2. What are the program’s verified net savings?
3. What caused gross realization rate (RR) adjustments and what corrective actions are recommended?
4. What updates are recommended for the Illinois Technical Reference Manual (TRM)?
5. What is the level of free ridership for this program, based on evaluation research?
6. What is the level of spillover for this program, based on evaluation research?

For CY2018, the evaluation team will conduct Net-to-Gross (NTG) research through interviews with participating customers (decision makers) to determine free ridership and spillover to inform NTG recommendations for 2019 and beyond.

Process Evaluation:

Navigant’s CY2018 process research activities will include review of program materials and in-depth qualitative interviews with program management and implementers. These interviews will be used to develop a complete understanding of the final design, procedures, and implementation strategies for the program, including specific marketing tactics and perceived results, to understand the current program performance and inform our evaluation efforts.

The NTG survey will include additional process questions to elicit feedback on participants’ satisfaction and suggestions for program improvement. Final process research questions will be determined as program circumstances are better known and input is received from the program implementer.

Gross Impact Evaluation

For measures covered by the TRM, the evaluation team will review the TRM measure characterizations and customer-specific data collected in the tracking system that substantiates the measures installed, and make adjustments as needed to calculate verified savings. The gross impact evaluation for TRM measures will include a mid-year review and end-of-year final verification. Midway through the program year, Navigant will review the program tracking data to determine the level of input completeness, flag outliers, and identify incorrect algorithms or input assumptions. If necessary, the Navigant team will make recommendations for modifications to the tracking data for use in the impact evaluation effort. After the program year ends, verified measure savings are estimated and summed across participants to calculate the total verified savings for the program.

The gross impact evaluation approach for custom projects will be based on engineering analysis of all or a sample of projects to verify claimed savings or make retrospective adjustment to claimed gross savings. Custom projects will be sampled by size-based strata and analyzed together. All the sampled projects will be subject to engineering file review and a subset may receive on-site inspection and verification of installed measures. Gross impact estimates will mimic *ex ante* methods to the extent they are reasonable and accurate per data collected during verification steps. The evaluation team will modify calculations if methods are not reasonable or if verified operation differs from that which was reported.

Navigant will employ IPMVP protocols for on-site measurement and verification of custom projects. The impacts for some projects will be verified by engineering review of site-collected data and determined with regression analysis of utility billing data and weather and/or other independent variables that affect energy use (for example, days of operation), as appropriate. This approach parallels IPMVP option C. If implemented measures are not amenable to regression analysis, the evaluated savings will be determined by engineering review with site verified data, incorporating historical data when available.

The sampling plan for custom projects will target overall 10 percent precision at 90 percent confidence using the stratified ratio estimation technique to optimize sample size and control evaluation costs. Due to tight end-of-year impact reporting timelines, Navigant will sample for impacts in one or two waves – approximately July and/or December, and after the final program year projects are closed. Each sample will be based on lower precision targets for the wave, but when combined at the end of the year, the overall sample will meet targets. The Large Project Pre-Installation Review

process provides evaluator feedback on savings methodology and baseline selection on large custom projects in pre-installation stages.

Use of Randomized Controlled Trial and Quasi-Experimental Design

We are not evaluating the Multi-Family program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. Navigant is not using quasi-experimental consumption data because this program contains many unique measures with significant cross-participation. In this case, quasi-experimental consumption data analysis would produce savings estimates for bundles of commonly-installed measures, rather than for each measure individually, which is not the desired output for all analysis.

Net Impact Evaluation

The CY2018 net impact evaluation will apply the net-to-gross ratio (NTGR) deemed through the Illinois Stakeholders Advisory Group (SAG) consensus process. The deemed NTGRs are provided in Table 2.

Table 2. PGL/NSG Deemed NTGR for CY2018

Program Path/Measure	Deemed NTGR
Multifamily In-Unit / Assessment/Direct Install	0.85
Multifamily Comprehensive / Prescriptive Rebates	0.76
Multifamily Comprehensive / Partner Trade Allies (PTA)	0.88
Multifamily Comprehensive / Custom Rebates	0.72
Multifamily Comprehensive / Roll-up of Prescriptive, PTA, and Custom	0.84
Multifamily Comprehensive / Gas Optimization	1.02

Source: PGL_and_NS_GPY7_NTG_Values_2017-03-01_Final.xlsx.

NTG Research

Navigant will conduct primary research to provide NTG values for potential deeming in future program years through surveys with 2018 participating decision-maker customers. We will complete a combination of real time online surveys and computer assisted telephone interviews (CATI) with contacts who participated in the 2018 program to quantify participant free-ridership and spillover. A real time online survey will collect information on free ridership close to the time the customer made the decision to participate in the program. A telephone survey will collect information on spillover at the end of the program year. Sample design will attempt to achieve a 90/10 confidence/precision level of NTG ratios at the measure category level (for measures that achieve most of the program savings), and a roll up at the program-level, through a weighted average of measure energy savings in the program.

Proposed CY2018 NTG and process research sampling timelines are shown below.

- a) Wave 1 data collection and sampling May 2018 and complete August 2018.
- b) Wave 2 data collection and sampling October 2018 and complete January 2019
- c) Final and third wave of CY2018 tracking data in February 2019 and complete in May 2019.

The Peoples Gas and North Shore Gas NTG research activities and timeline will be coordinated with similar research to be conducted by the ComEd and the Nicor Gas multi-family programs. Navigant will coordinate the data collection and survey instruments design for consistency and capture the appropriate questions in the decision maker surveys.

Process Research

The CY2018 process evaluation research will include a synthesis of both qualitative and quantitative data collected during the program staff and implementer interviews and meetings, and during the decision maker customer surveys in CY2018. The CY2018 study will include in-depth interviews with participating decision makers to learn about their perspectives and satisfaction with the program, amidst varying opportunities from program offerings and changes to program application requirements.

Data Collection, Methods, and Sample Sizes

Table 3 below summarizes data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 3. Core Data Collection Activities

What	Target	Completed Interviews	When	Comments
In Depth Interviews	Program Management	1-2	Q1/Q4 2018	Interview program staff
Process and NTG Survey Research (CATI & online)	Participating Building Owners and Managers	TBD	Q2 2018 to Q2 2019	Process, free ridership, and spillover
Mid-Year TRM Compliance Review	All Program TRM Measures		May - July 2018	Review program tracking data using the TRM measure characterizations
Custom Project Savings Verification	Completed Custom Projects		Q3 and/or Q4 2018	One or two sampling waves
Large Project Pre-Installation Review	Custom Projects in the Pre-Installation Phase		When requested during 2018	Evaluator feedback on savings methodology and baseline on large projects in pre-installation stages
End-of-Year TRM Savings Verification	All Participating Customers with TRM Measures		Feb – March 2019	Gross savings verification using the TRM and customer-specific data collected in the tracking system
End-of Year Custom Project Savings Verification	Completed Custom Projects		Feb – March 2019	Custom projects not previously sampled

Evaluation Schedule for CY2018

Table 4 below provides the schedule for evaluation of the CY2018 Multi-Family Program. Adjustments will be made as needed as program year evaluation activities begin.

Table 4. CY2018 Evaluation Schedule

Activity/Deliverables	Responsible Party	Completion/Delivery
Program Manager & Implementer Interview	Evaluation Team	March 30, 2018
Mid-Year TRM Compliance Review and Findings Memo	Evaluation Team	July 20, 2018
Custom Project Savings Verification Waves	Evaluation Team	Q3 2018 to Q1 2019
Large Custom Project Pre-Installation Review	Evaluation Team	Ten business days
Final Tracking Data to Navigant	Franklin Energy	January 30, 2019
Draft Impact Report to PGL & NSG and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	PGL & NSG / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 13, 2019
Comments on Redraft	PGL & NSG / SAG	April 20, 2019
Final Impact Report to PGL & NSG and SAG	Evaluation Team	April 27, 2019
Conduct Process and NTG Survey	Evaluation Team	Q2 2018 to Q2 2019
NTG Research Findings Memo	Evaluation Team	July 31, 2019
Process Research Findings Memo	Evaluation Team	August 31, 2019

A.2 Income Eligible Programs

Peoples Gas and North Shore Gas Income Eligible Single Family Program 2018 to 2021 Evaluation Plan

Introduction

The Income Eligible Single Family Program provides retrofits to single-family households in Peoples Gas (PGL) and North Shore Gas (NSG) service areas with incomes at or below 80% of the Area Median Income. The program offers assessments, direct installation of energy efficiency measures, replacement of inefficient equipment, technical assistance, and educational information to further save money on energy bills through two program components. One program component is delivered with the Chicago Bungalow Association and this program component is jointly offered by ComEd and Peoples Gas. The other component is delivered leveraging the State of Illinois' Home Weatherization Assistance Program ("IHWAP").

Eligible program measures include but are not limited to.

- Smart and programmable thermostats
- HVAC equipment such as boilers, furnaces, central and room air conditioners and ductless heat pumps
- High efficiency water heaters and furnaces
- Low-flow faucet aerators and showerheads
- Attic and wall insulation
- Air sealing

Four-Year Evaluation Plan Summary

We have prepared a four-year evaluation plan summary to identify tasks by year. Final scope and timing of activities for each year will be refined as program circumstances are better known.

Table 1. Evaluation Approaches – Four Year Plan

Tasks	2018	2019	2020	2021
Tracking System Review	X	X	X	X
Data Collection – Participant Surveys	X		X	
Data Collection – Program Manager and Implementer Interviews	X	X	X	X
Data Collection – Trade Ally Interviews	X			
Impact – Engineering Review	X	X	X	X
Impact – Measure-Level TRM Savings Review	X	X	X	X
Impact – Verification & Gross Realization Rate	X	X	X	X
Impact – Field Work	X		X	
Impact – Calibrated Simulation Study*			X	
Process Analysis	X	X	X	X

* Study to be considered.

Navigant will verify projects using the TRM and custom analyses (if necessary). If program volume is sufficient, Navigant will consider a calibrated simulation study to determine the accuracy of TRM savings estimates and capture interactive savings effects.

Coordination

Evaluation will coordinate closely with the other electric and gas utilities on issues common to this program. Ameren Illinois has a suite of energy efficiency programs for income eligible customers and evaluation will coordinate with Ameren Illinois on an as needed basis. Additionally, Navigant will solicit feedback from and coordinate with the Income Eligible Stakeholder Advisory Committee.

Evaluation Research Topics

The evaluation will seek to answer the following key researchable questions:

Impact Evaluation

1. What are the program’s annual total verified gross savings?
2. What is the research estimate of gross savings for the program?
3. What are the program’s verified net savings?

Process Evaluation and Other Research Topics

The process evaluation effort for program year 2018 will focus on program delivery. The process research will address the following questions:

1. What are participants’ perspectives and overall satisfaction with the program?
2. How can the program be improved?

3. How did customers become aware of the program? What marketing strategies could boost program awareness?
4. Are there any geographical gaps in participation?
5. Are there any program pain points and, if yes, what are ways to improve these points?

Evaluation Approach

The table below summarizes the evaluation tasks for program year 2018 including data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 2. Core Data Collection Activities, Sample, and Analysis

Activity	Target	Target Completes 2018	Timeline	Notes
Tracking System Review	Tracking system	Census	Two waves	Wave 1, Final Wave
In-Depth Interviews	Program Management and Implementers	2	March 2018	Augment with periodic calls
Gross Impact	TRM Measure Review	All	June 2018 – March 2019	Two Waves*
Gross Impact	Engineering Impact Review and Field Work	Sample	July 2018	Two Waves*
Participant Survey	Participants	Census		

* Navigant will coordinate with PGL and NSG to determine appropriate dates to pull tracking data extracts for each wave.

Gross Impact Evaluation

Since the Income Eligible Single Family Program savings are derived from values contained in the TRM⁹, gross savings will continue to be evaluated primarily by (1) reviewing the tracking system data to ensure that all fields are appropriately populated; (2) reviewing measure algorithms and values in the tracking system to assure that they are appropriately applied; and (3) cross-checking totals.

This approach will be supplemented with (1) a review of a sample of project documentation in each program year to verify participation, installed measure quantities, and associated savings and (2) verification of installation of energy efficient measures through participant surveys or field work.

Use of Randomized Controlled Trial and Quasi-Experimental Design

We are not evaluating this program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. Navigant is not using quasi-experimental consumption data because this program contains many unique measures with significant cross-participation. In this case, quasi-experimental consumption data analysis would

⁹ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 6.0, <http://www.ilsag.info/technical-reference-manual.html>

produce savings estimates for bundles of commonly-installed measures, rather than for each measure individually, which is not the desired output for all analysis.

Verified Net Impact Evaluation

The TRM deems NTG at 1.0 for Income Eligible programs.

Research NTG Impact Evaluation

No NTG research is planned for this income-eligible program.

Process Evaluation

The program year 2018 process evaluation research will include a synthesis of both qualitative and quantitative data collected during the program staff and implementer interviews and meetings, and during participant surveys. The 2018 study will include in-depth interviews with participating customers to learn about their perspectives and satisfaction with the program. The process research will be coordinated with the electric utility in the joint program implementation.

Customer interview questions and geographic analysis will be used to map income-eligible census tracts and overlay income-eligible participation. The result will show any gaps in participation, underserved regions, and where the program could expand. Interviews will also help to discover barriers to participation and ways to improve. The results will inform future process research.

As a part of our initial evaluation of the program, Navigant will use geographic analysis to map income-eligible census tracts and overlay the business locations of program trade allies. The result will show the geographic distribution of trade allies, and reporting will indicate (1) whether trade allies are participating in the program for the first time; and (2) if they meet the definition of “not-for-profit entities and government agencies that have existing relationships with or experience serving low-income communities in the State.” In addition, Navigant will explore ComEd evaluation research on the reduction in energy burden for participants. Navigant will consider these opportunities to coordinate the PGL and NSG evaluation with ComEd after the ComEd evaluation team defines these activities in more detail.

Evaluation Schedule

Table 3 below provides the schedule for key deliverables and data transfer activities. (See Table 2 for other schedule details) Adjustments will be made, as needed, as evaluation activities progress.

Table 3. Schedule – Key Deadlines

Activity or Deliverable	Responsible Party	Date Delivered
2018 program tracking data for sampling Wave 1	PGL & NSG	July 2, 2018
2018 participating customer survey design	Evaluation	July 16, 2018
In Depth Interviews - Program Management and Implementers	Evaluation	March 2018
Wave 1 project documentation, engineering reviews, schedule, conduct on-site M&V, feedback	Evaluation	July 30, 2018
Tracking System Ex Ante Review Findings and Recommendations	Evaluation	August 30, 2018
Wave 1 participating customer process survey fielding	Evaluation	September 28, 2018
2018 Program tracking data for sampling Final Wave	PGL & NSG	January 30, 2019
Final Wave participating customer process survey fielding	Evaluation	February 28, 2019
Final Wave project documentation, engineering reviews, schedule, conduct on-site M&V, feedback	Evaluation	February 28, 2019
Process Analysis Findings	Evaluation	March 1, 2019
Draft Report to PGL & NSG and SAG	Evaluation	March 11, 2019
Comments on draft (15 Business Days)	PGL & NSG and SAG	April 16, 2019
Revised Draft by Navigant	Evaluation	April 17, 2019
Comments on redraft (5 Business Days)	PGL & NSG and SAG	April 25, 2019
Final Report to PGL & NSG and SAG	Evaluation	April 30, 2019

Peoples Gas and North Shore Gas Income Eligible PHA/Multi-family Buildings Program 2018 to 2021 Evaluation Plan

Introduction

The primary objectives of the program year 2018 evaluation of the Public Housing Authority (PHA)/Multi-family Buildings Program are to: (1) quantify gross and net savings impacts from the program; (2) conduct research to support the program’s transition in response to the Future Energy Jobs Act (FEJA)¹⁰; and (3) determine key process-related program strengths and weaknesses and identify ways in which the program can be improved. This four-year evaluation plan includes activities scheduled to evaluate the program savings impact and process activities for 2018 through 2021.

The PHA/Multi-family Buildings Program provides retrofits in common areas and tenant spaces in PHA buildings or other building that have a specific designation as low income. The offering provides incentives for building system updates (boilers, central plants, HVAC tune-ups, custom projects) as well as direct install opportunities for qualified buildings in the PGL and NSG service territories.

Four-Year Evaluation Plan Summary

The evaluation of this program over the coming four years will include a variety of data collection and analysis activities, including those indicated in the following table.

Table 1. Evaluation Approaches – Four Year Plan

Tasks	2018	2019	2020	2021
Tracking System Review	X	X	X	X
Data Collection – Participant Surveys	X		X	
Data Collection – Property Manager Interviews	X		X	
Data Collection – Program Manager and Implementer Interviews	X	X	X	X
Impact – Billing Analysis (as needed)	X	X	X	X
Impact – Engineering Review	X	X	X	X
Impact – Measure-Level TRM Savings Review	X	X	X	X
Impact – Verification & Gross Realization Rate	X	X	X	X
Impact – Field Work	X		X	
Net-to-Gross – Customer Self-Report Surveys (if needed)		X		
Process Analysis	X	X	X	X

¹⁰ Illinois Public Act 099-0906 (<http://www.ilga.gov/legislation/publicacts/99/099-0906.htm>).

Coordination

Evaluation will coordinate closely with the other gas and electric utilities on issues common to this program. Ameren Illinois has a suite of energy efficiency programs for income eligible customers and evaluation will coordinate with Ameren on an as needed basis. Additionally, Navigant will solicit feedback from and coordinate with the Income Eligible Stakeholder Advisory Committee.

Evaluation Research Topics

The evaluation will seek to answer the following key researchable questions:

Impact Evaluation

1. What are the program’s annual total verified gross savings?
2. What are the program’s verified net savings?

Process Evaluation and Other Research Topics

The process evaluation effort for program year 2018 will focus on program delivery. The process research will address the following questions:

1. What are participants’ perspectives and overall satisfaction with the program?
2. How can the program be improved?
3. How is the transition into 2018 impacting the program?

Evaluation Approach

The table below summarizes the evaluation tasks for 2018 including data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 2. Core Data Collection Activities, Sample, and Analysis

Activity	Target	Target Completes 2018	Timeline	Notes
Tracking System Review	Tracking system	Census	Two waves	
In Depth Interviews	Program Management and Implementers	2	April – June 2018	Augment with periodic calls
In Depth Interviews	Property Manager/Owner	Dependent on participation	May - July 2018	
Gross Impact	TRM Measure Review	All	June 2018 – March 2019	Two Waves*
Gross Impact	Engineering File Review and Field Work	Sample	June 2018 – March 2019	Two Waves*
Verified Net Impact	Calculation using deemed NTG ratio	NA	March 2019 – April 2019	
Process and Impact Research on 2018 Operations	Literature review, secondary research	Census	April 2018 – Feb 2019	Process, Impact

* Navigant will coordinate with PGL and NSG to determine appropriate dates to pull tracking data extracts for each wave.

Gross Impact Evaluation

The PHA/Multi-family Buildings Program savings verification will be based on using the applicable Illinois TRM (v6.0), or secondary research for any measure with custom savings inputs. Gross savings will be evaluated primarily by: (1) reviewing the tracking system data to ensure that all fields are appropriately populated; (2) reviewing measure algorithms and values in the tracking system to assure that they are appropriately applied; and (3) cross-checking totals.

This approach will be supplemented with a review of documentation on a sample of projects in each program year to verify participation, installed measure quantities, and associated savings, and verification of installation of energy efficient measures through participant surveys or field work. Verified gross savings will be estimated by multiplying TRM-derived per unit therm savings by the verified quantity of eligible measures.

Use of Randomized Controlled Trial and Quasi-Experimental Design

We are not evaluating this program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. We are not using quasi-experimental consumption data because this program contains many unique measures with significant cross-participation. In this case, quasi-experimental consumption data analysis would produce savings estimates for bundles of commonly-installed measures, rather than for each measure individually, which is not the desired output for all analysis. Also, it would not be possible to create a valid matched control group for the customers in this program.

Verified Net Impact Evaluation

The TRM deems NTG at 1.0 for income eligible programs.

Research NTG Impact Evaluation

No NTG research will be done for the income eligible program in 2018. Navigant may consider NTG research in 2019 or 2020, depending on findings from 2018 participant process surveys and feedback from the Illinois statewide NTG working group.

Potential NTG research activities and timeline will be coordinated with the other electric and gas utilities. Navigant will coordinate the data collection and survey instruments design to capture the appropriate questions in the decision maker surveys. The joint program evaluation and reporting timelines will be the same.

Process Evaluation

The program year 2018 process evaluation research will include a synthesis of both qualitative and quantitative data collected during the program staff and implementer interviews and meetings, and during the property owner or manager interview, or customer surveys. The 2018 study will include in-depth interviews with participating customers to learn about their perspectives and satisfaction with the program, amidst varying opportunities from program offerings. Interview questions will also seek to identify how to qualify properties and people for this program and the result will be a sector-level customer journey map to visualize customer satisfaction. The process research will be coordinated with the gas utilities in the joint program implementation.

Evaluation Schedule

Table 3 below provides the schedule for key deliverables and data transfer activities. (See Table 2 for other schedule details.) Adjustments will be made, as needed, as evaluation activities progress.

Table 3. Schedule – Key Deadlines

Activity or Deliverable	Responsible Party	Date Delivered
Program Operations Manual Review	PGL & NSG	January - March, 2018
Participating customer survey design	Evaluation	April 30, 2018
In Depth Interviews - Program Management and Implementers	Evaluation	April – June 2018
2018 program tracking data for Wave 1 early impact review and process	PGL & NSG	June 30, 2018
Wave 1 participating customer process survey fielding	Evaluation	July 15, 2018
Early impact findings memo	Evaluation	July 30, 2018
2018 program tracking data for Wave 2 process	PGL & NSG	November 15, 2018
Participating customer process survey fielding	Evaluation	November 30, 2018
Final 2018 Tracking Data to Navigant	PGL & NSG	January 30, 2019
Illinois TRM Update Research Findings	Evaluation	March 1, 2019
Process Analysis Findings	Evaluation	March 1, 2019
Draft Report to PGL & NSG and SAG	Evaluation	March 7, 2019
Comments on draft (15 Business Days)	PGL & NSG and SAG	March 28, 2019
Revised Draft by Navigant	Evaluation	April 7, 2019
Comments on redraft (5 Business Days)	PGL & NSG and SAG	April 26, 2019
Final Report to PGL & NSG and SAG	Evaluation	April 30, 2019

Peoples Gas and North Shore Gas Income Eligible New Construction Program 2018 to 2021 Evaluation Plan

Introduction

The Peoples Gas (PGL) and North Shore Gas (NSG) Income Eligible New Construction Program provides incentives for energy-efficient construction and major renovation of affordable housing. The program offers technical assistance and incentive funding and serves both single-family and multi-family housing. The program targets income eligible customers in the PGL and NSG service territories with incomes at or below 80% of the Area Median Income. An additional goal of the program is to educate housing developers on cost-effective energy efficient building practices.

Four-Year Evaluation Plan Summary

The evaluation of this program over the coming four years will include a variety of data collection and analysis activities, including those indicated in Table 1.

Table 1. Evaluation Approaches Over Time

Tasks	2018	2019	2020	2021
Tracking System Review	X	X	X	X
Data Collection – Program Manager and Implementer Interviews	X	X	X	X
Data Collection – Stakeholder Interviews	X		X	
Impact – Engineering Review	X	X	X	X
Impact – Measure-Level TRM Savings Review	X	X	X	X
Impact – Verification & Gross Realization Rate	X	X	X	X
Process Analysis	X	X	X	X

Coordination

Evaluation will coordinate closely with the other gas and electric utilities on issues common to this program. Ameren Illinois has a suite of energy efficiency programs for income eligible customers and evaluation will coordinate with Ameren Illinois on an as needed basis. Additionally, Navigant will solicit feedback from and coordinate with the Income Eligible Stakeholder Advisory Committee.

Evaluation Research Topics

The evaluation will seek to answer the following key researchable questions:

Impact Evaluation

1. What are the program’s annual total verified gross savings?
2. What are the program’s verified net savings?

Process Evaluation and Other Research Topics

The process evaluation effort for 2018 will focus on program delivery. The process research will address the following questions:

1. What are stakeholders' perspectives and overall satisfaction with the program?
2. How can the program be improved? Are there changes or improvements which could be made to the educational component of the program?
3. How is the transition into 2018 impacting the program?

Evaluation Approach

Table 2 summarizes the evaluation tasks for program year 2018 including data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 2. Core Data Collection Activities, Sample, and Analysis

Activity	Target	Target Completes 2018	Timeline	Notes
Tracking System Review	Tracking system	Census	Two waves	
In Depth Interviews	Program Management and Implementers	2	April – June 2018	Augment with periodic calls
Gross Impact	Parallel Path Review	As Needed	June 2018 – Feb 2019	Early Feedback for Large Projects
Gross Impact	TRM Measure Review	All	June 2018 – March 2019	Two Waves*
Gross Impact	Engineering Review	Sample	April 2018 – Feb 2019	Two Waves*
Verified Net Impact	Calculation using deemed NTG ratio	NA	March 2019	
Process and Impact Research on 2018 Operations	Literature review, secondary research	Census	April 2018 – Feb 2019	Process, Impact

* Navigant will coordinate with PGL and NSG to determine appropriate dates to pull tracking data extracts for each wave.

Gross Impact Evaluation

Since the Income Eligible New Construction Program savings are derived from values contained in the TRM¹¹, gross savings will be evaluated primarily by (1) reviewing the tracking system data to ensure that all fields are appropriately populated; (2) reviewing measure algorithms and values in the tracking system to assure that they are appropriately applied; and (3) cross-checking totals. This approach will be supplemented with a review of a sample of project documentation in each program year to verify participation, installed measure quantities, and associated savings.

¹¹ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 6.0 for 2018, available at: <http://www.ilsag.info/technical-reference-manual.html>

Navigant will perform a tracking system review in two waves during the 2018 evaluation period. Final program gross and net impact results will be based on the two waves combined. Proposed gross impact timelines for program year 2018 are shown below:

- a) First wave drawn in May 2018 and completed in August 2018
- b) The final tracking data is provided by PGL and NSG by January 30, 2019, with reporting finalized by April 26, 2019

Use of Randomized Controlled Trial and Quasi-Experimental Design

We are not evaluating this program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. We are not using quasi-experimental consumption data because (historically) there are not enough participants in this program to achieve statistically significant savings estimates using this method.

Verified Net Impact Evaluation

The TRM deems NTG at 1.0 for Income eligible programs.

Research NTG Impact Evaluation

The program has historically seen a deemed NTG ratio of 1.0 because the program targeted the income-eligible sector. However, because the income-eligible customers are not typically the decision makers for this program, Navigant believes the TRM NTG working group should consider whether the Income Eligible New Construction Program should have NTG research performed.

Potential NTG research activities and timeline will be coordinated with the other utilities. Navigant will coordinate the data collection and survey instruments design to capture the appropriate questions in the decision maker surveys. The joint program evaluation and reporting timelines will be the same.

Process Evaluation

The program year 2018 process evaluation research will include a synthesis of both qualitative and quantitative data collected during the program staff and implementer interviews and meetings. The focus of the interviews will be to understand the intent of program. Navigant will also interview other program stakeholders (affordable housing developers) to identify any gaps between how PGL and NSG intend to have the program work and how stakeholders see it working. The process research will be coordinated with the other electric and gas utilities in the joint program implementation.

Navigant will perform additional process research, upon the request of the program manager, to support the program manager and implementer in transitioning into the revised regulatory requirements starting in 2018.

Evaluation Schedule

Table 3 provides the schedule for key deliverables and data transfer activities. (See Table 2 for other schedule details.) Adjustments will be made, as needed, as evaluation activities progress.

Table 3. Schedule – Key Deadlines

Activity or Deliverable	Responsible Party	Date Delivered
Program Operations Manual and Workpapers	PGL & NSG	January 15, 2018
2018 program tracking data for QA/QC	PGL & NSG	May 4, 2018
In Depth Interviews - Program Management and Implementers	Evaluation	April – June 2018
In Depth Interviews - Stakeholders	Evaluation	July – September 2018
Wave 1 project documentation and engineering review	Evaluation	August 31, 2018
Tracking system ex ante review findings and recommendations	Evaluation	August 31, 2018
Process Analysis Findings	Evaluation	October 31, 2018
2018 program tracking data	PGL & NSG	January 30, 2019
2018 project documentation and engineering review	Evaluation	February 28, 2019
Illinois TRM Update Research Findings	Evaluation	March 1, 2019
Draft Report to PGL & NSG and SAG	Evaluation	March 6, 2019
Comments on draft (15 Business Days)	PGL & NSG and SAG	March 27, 2019
Revised Draft by Navigant	Evaluation	April 5, 2019
Comments on redraft (5 Business Days)	PGL & NSG and SAG	April 12, 2019
Final Report to PGL & NSG and SAG	Evaluation	April 26, 2019

A.3 Business Programs (includes Public Sector)

Business Program and Public Sector (Energy Jumpstart and Prescriptive Rebate Paths) 2018 – 2021 Evaluation Plan

Introduction

This evaluation plan covers measures installed and gas savings realized through the Business Program (BP) and Public Sector (PS) Energy Jumpstart and Prescriptive Rebate paths (participants with projects from either or both paths). The comprehensive BP and PS programs are implemented by Franklin Energy Services with trade ally engagement and technical support for program delivery and marketing. The Prescriptive Rebate path provides significantly more energy savings than the Energy Jumpstart path. Navigant will produce separate reporting of impacts, research findings, and recommendations for the Business Program and Public Sector.

The Energy Jumpstart path provides a high-level assessment of energy saving opportunities that the customer or building owner can implement, and includes direct installation of low flow showerheads, kitchen and faucet aerators, and pre-rinse spray valves for appropriate businesses. Additionally, PGL and NSG also offer, through the Midwest Energy Efficiency Alliance (MEEA), a self-install program through the Savings Through Efficient Products (“STEP”) program. Qualified Illinois Public Sector facilities receive free facility audits and free energy efficient products, including, exit signs, aerators, shower heads, pre-rinse spray valves, various lighting measures, and cooler and vending machine measures.

The Prescriptive Rebate path provides prescriptive rebates for existing customers and new construction where applicable. These incentives focus on heating systems, water heating systems, pipe insulation, steam traps, various boiler controls, and food service equipment.

A midstream incentive pilot program begun in 2017 encourages greater adoption of energy-efficient equipment in commercial kitchens within the city of Chicago. While the PGL Natural Gas Savings program currently offers prescriptive rebates for energy-efficient commercial kitchen equipment, the mid-stream pilot seeks to increase uptake by providing instant rebates to Chicago customers purchasing equipment through area food service equipment distributors.

Four-Year Evaluation Plan Summary

We have prepared a four-year evaluation plan summary to identify tasks by year. Final scope and timing of activities for each year will be refined as program circumstances are better known.

Table 1. Four-Year Evaluation Plan Summary

Activity	2018	2019	2020	2021
Gross Impact - Mid-Year Review of TRM Compliance	X	X	X	X
Gross Impact - End-of-Year TRM Savings Verification	X	X	X	X
Secondary Research and Updated TRM Work Papers for Pipe Insulation Thermal Regain Factors	X	X		
Steam Traps – Background Research on Viability of Impact Study	X			
Primary Research to Update the TRM – Steam Trap Impact Billing Analysis (Study under consideration)	X	X		
Research – BP Participant FR+SO plus Process Survey		X*		
Research – PS Participant FR+SO plus Process Survey		X*		
Research – BP and PS Trade Ally SO plus Process Survey		X*		
Present NTG Research Results			Q3	
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

* The FR and SO data collection and survey completion will extend into Q2 of 2020 but will be based on 2019 program data, unless there is a particular interest to consider part of 2020 program year data.

Evaluation Plan for CY2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for CY2018:

Impact Evaluation:

1. What are the BP verified gross savings?
2. What are the BP verified net savings?
3. What are the PS verified gross savings?
4. What are the PS verified net savings?
5. What caused gross realization rate (RR) adjustments and what corrective actions are recommended?
6. What updates are recommended for the Illinois Technical Reference Manual (TRM)?

In 2018, Navigant will initiate a secondary research investigation of thermal regain factors for non-residential pipe insulation, and submit findings in 2019. The current TRM values were drawn from residential work. As part of the secondary research, Navigant will investigate opportunities for primary research on pipe insulation savings, including examining the tracking data for project characteristics and talking with the implementer about primary data that may be available.

In 2018, we will work with the Ameren Illinois and Nicor Gas evaluation teams to develop a scope of work to research the impacts of efficient steam traps. Our work will involve background research to understand 1) what data currently exist to support estimation of steam trap impacts, 2) what the available population of participants that have installed steam traps through energy efficiency programs in Illinois is, and 3) exploring available evaluation methods. We will provide an initial memo summarizing findings of our background research addressing the items and challenges above, with a draft scope of work to follow no more than a month later if we determine a study is viable. If our scope development yields a feasible study, we will proceed with conducting this study as soon as possible – if possible, in 2018 to inform the 2019 TRM update process, but likely stretching into 2019.

Process Evaluation:

Navigant's CY2018 process research activities will include review of program materials and in-depth qualitative interviews with program management and implementers. These interviews will be used to develop a complete understanding of the final design, procedures, and implementation strategies for the program, including specific marketing tactics and perceived results, to understand the current program performance and inform our evaluation efforts. We will note differences between Business Program and Public Sector issues.

Gross Impact Evaluation

Navigant anticipates all measures offered through the Prescriptive Rebate, Energy Jumpstart, and STEP paths will be defined in the TRM. For measures covered by the TRM, the evaluation team will review the TRM measure characterizations and customer-specific data collected in the tracking system that substantiates the measures installed, and make adjustments as needed to calculate verified savings. The gross impact evaluation for TRM measures will include a mid-year review and end-of-year final verification. Midway through the program year, Navigant will review the program tracking data to determine the level of input completeness, flag outliers, and identify incorrect algorithms or input assumptions. If necessary, the Navigant team will make recommendations for modifications to the tracking data for use in the impact evaluation effort. After the program year ends, verified measure savings are estimated and summed across participants to calculate the total verified savings for the program.

Navigant will produce separate reporting of impacts, research findings, and recommendations for the Business Program and Public Sector.

Use of Randomized Controlled Trial and Quasi-Experimental Design

Navigant is not evaluating this program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. Navigant is not using quasi-experimental consumption data for the following reasons.

- It would not be possible to create a valid matched control group for the customers in this program.
- This method would estimate average savings across all program participants which is not the desired savings estimate for this program.
- This program contains many unique measures with significant cross-participation. In this case, quasi-experimental consumption data analysis would produce savings estimates for

bundles of commonly-installed measures, rather than for each measure individually, which is not the desired output for all analysis.

Net Impact Evaluation

The CY2018 net impact evaluation will apply the net-to-gross ratio (NTGR) deemed through the Illinois Stakeholders Advisory Group (SAG) consensus process. The deemed NTGRs are provided in Table 2.

Table 2. PGL/NSG Deemed NTGR for CY2018

Program Path/Measure	Deemed NTGR
BP and PS Energy Jumpstart (including PS STEP projects)	0.79
BP and PS Prescriptive Rebates	0.79

Source: PGL_and_NSNG_GPY7_NTG_Values_2017-03-01_Final.xlsx.

Process and NTG Research

The process analysis will include a synthesis of both qualitative and quantitative data collected during the review of program materials and in-depth qualitative interviews with program management and implementers. We will note differences between Business Program and Public Sector issues. There will be no primary NTG research in 2018.

Data Collection, Methods, and Sample Sizes

Table 3 below summarizes data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 3. Core Data Collection Activities

What	Target	Completed Interviews	When	Comments
In Depth Interviews	Program Management	1-2	Q3 2018	Interview program staff
Mid-Year TRM Compliance Review	All BP and PS Program TRM Measures		May - July 2018	Review program tracking data using the TRM measure characterizations
End-of-Year TRM Savings Verification	All BP and PS Participating Customers with TRM Measures		Feb – March 2019	Gross savings verification using the TRM and customer-specific data collected in the tracking system

Evaluation Schedule for CY2018

Table 4 below provides the schedule for evaluation of the Prescriptive Rebate and Energy Jumpstart paths of the CY2018 Business Program. Adjustments will be made as needed as program year evaluation activities begin. Navigant will produce separate reporting of impacts, research findings, and recommendations for the Business Program and Public Sector.

Table 4. CY2018 Evaluation Schedule

Activity/Deliverables	Responsible Party	Completion/Delivery
Mid-Year TRM Compliance Review and Findings Memo	Evaluation Team	July 20, 2018
Process Findings Memo	Evaluation Team	August 15, 2018
Final Tracking Data to Navigant	Franklin Energy	January 30, 2019
Draft Impact Report to PGL & NSG and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	PGL & NSG / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 12, 2019
Comments on Redraft	PGL & NSG / SAG	April 19, 2019
Final Impact Report to PGL & NSG and SAG	Evaluation Team	April 26, 2019
Steam Trap Impact Study - Background Research on Study Viability, Memo	Evaluation Teams for PGL & NSG, Nicor Gas, and Ameren Illinois	May 31, 2018
Secondary Research and Updated TRM Work Papers for Pipe Insulation Thermal Regain Factors	Evaluation Team	December 7, 2018 (Research) May 15, 2019 (Draft Workpaper)

Business Program and Public Sector (Custom Rebate) 2018-2021 Evaluation Plan

Introduction

This evaluation plan covers measures installed and gas savings realized through the Custom Rebate path of the Business Program (BP) and Public Sector (PS) programs. The custom applications include any project not covered under the Prescriptive Rebate path. For example, air sealing measures may fall into the Custom Rebate category. PGL/NSG can fund ComEd-delivered Retro-Commissioning and Business New Construction projects on a negotiated \$/therm saved basis under the Custom Rebate path. The Retro-Commissioning and Business New Construction programs are covered under separate evaluation plans, while PGL and NSG Custom Rebate projects are referred to here as the “Custom Program”. The BP and PS programs are implemented by Franklin Energy Services. Navigant will produce separate reporting of impacts, research findings, and recommendations for the Business Program and Public Sector.

Four-Year Evaluation Plan Summary

We have prepared a four-year evaluation plan summary to identify tasks by year. Final scope and timing of activities for each year will be refined as program circumstances are better known.

Table 1. Four-Year Evaluation Plan Summary

Activity	2018	2019	2020	2021
Gross Impact – Custom Project Savings Verification Waves and Large Project Pre-Installation Review	X	X	X	X
Gross Impact – End-of-Year Custom Project Savings Verification	X	X	X	X
Research – BP and PS Participant FR+SO plus Process Survey	X*			
BP and PS Present NTG Research Results		Q3		
Research – PS Participant FR+SO plus Process Survey			X*	
PS Present NTG Research Results				Q3
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

* The FR and SO data collection and survey completion will extend into Q2 of 2019, but will be based on 2018 program data, unless there is a particular interest to consider part of 2019 program year data. The 2020 NTG research for the Public-Sector-only will similarly extend into 2021.

Evaluation Plan for CY2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for CY2018:

Impact Evaluation:

1. What are the BP verified gross savings?
2. What are the BP verified net savings?
3. What are the PS verified gross savings?
4. What are the PS verified net savings?
5. What caused gross realization rate (RR) adjustments and what corrective actions are recommended?
6. What is the level of free ridership and spillover for the BP program, based on evaluation research?
7. What is the level of free ridership and spillover for the PS program, based on evaluation research?

For CY2018, the evaluation team will conduct Net-to-Gross (NTG) research through interviews with participating BP and PS customers to determine free ridership and spillover to inform NTG recommendations for 2019 and beyond. We will stratify our sample to make separate Business Program and Public Sector NTG estimates.

Process Evaluation:

Navigant's CY2018 process research activities will include review of program materials and in-depth qualitative interviews with program management and implementers. These interviews will be used to develop a complete understanding of the final design, procedures, and implementation strategies for the program, including specific marketing tactics and perceived results, to understand the current program performance and inform our evaluation efforts.

The NTG survey will include additional process questions to elicit feedback on participants' satisfaction and suggestions for program improvement. Final process research questions will be determined as program circumstances are better known and input is received from the program implementer. We will note differences between Business Program and Public Sector issues.

Gross Impact Evaluation

The gross impact evaluation approach for Custom projects will be based on engineering analysis of a sample of projects to verify claimed savings or make retrospective adjustment to claimed gross savings. Projects will be sampled by size-based strata and analyzed together. All the sampled projects will be subject to engineering file review and a subset may receive on-site inspection and verification of installed measures. Gross impact estimates will mimic *ex ante* methods to the extent they are reasonable and accurate per data collected during verification steps. The evaluation team

will modify calculations if methods are not reasonable or if verified operation differs from that which was reported.

Navigant will employ IPMVP protocols for on-site measurement and verification of projects. The impacts for some projects will be verified by engineering review of site-collected data and determined with regression analysis of utility billing data and weather and/or other independent variables that affect energy use (for example, days of operation), as appropriate. This approach parallels IPMVP option C. If implemented measures are not amenable to regression analysis, the evaluated savings will be determined by engineering review with site verified data, incorporating historical data when available.

The sampling plan for custom projects will target overall 10 percent precision at 90 percent confidence using the stratified ratio estimation technique to optimize sample size and control evaluation costs. Due to tight end-of-year impact reporting timelines, Navigant will sample for impacts in two to three waves – approximately July and/or December, and after the final program year projects are closed. Each sample will be based on lower precision targets for the wave, but when combined at the end of the year, the overall sample will meet targets. The Large Project Pre-Installation Review process provides evaluator feedback on savings methodology and baseline selection on large custom projects in pre-installation stages.

Use of Randomized Controlled Trial and Quasi-Experimental Design

The evaluation team will not use the Randomized Control Trials (RCT) or Quasi-Experimental Design for process evaluation because:

- There are not enough participants in this program to achieve statistically significant savings estimates using this method.
- It would not be possible to create a valid matched control group for the customers in this program.
- This method would estimate average savings across all program participants which is not the desired savings estimate for this program

Net Impact Evaluation

The CY2018 net impact evaluation will apply the net-to-gross ratio (NTGR) deemed through the Illinois Stakeholders Advisory Group (SAG) consensus process. The deemed NTGRs are provided below.

Table 2. PGL/NSG Deemed NTGR for CY2018

Program Path/Measure	Deemed NTGR
BP Custom Rebates	0.69
PS Custom Rebates	0.69

Source: PGL_and_NSNG_GPY7_NTG_Values_2017-03-01_Final.xlsx.

NTG Research

Navigant will conduct a participating decision maker NTG study in CY2018 to provide NTG values for potential deeming in future program years through surveys with CY2018 BP and PS participating customers. We will complete a combination of real-time online surveys and computer assisted telephone interviews (CATI) with contacts who participated in the 2018 program to quantify participant free-ridership and spillover. Sample design will attempt to achieve a 90/10 confidence/precision level of NTG ratios at the program-level with separate estimates for BP and PS.

Proposed CY2018 NTG and process research sampling timelines are shown below.

- d) Wave 1 data collection and sampling May 2018 and complete August 2018.
- e) Wave 2 data collection and sampling October 2018 and complete January 2019
- f) Final and third wave of CY2018 tracking data in February 2019 and complete in May 2019.

Process Research

The CY2018 process evaluation research will include a synthesis of both qualitative and quantitative data collected during the program staff and implementer interviews and meetings, and during the decision maker customer surveys in CY2018. The CY2018 study will include in-depth interviews with participating BP and PS decision makers to learn about their perspectives and satisfaction with the program. We will note differences between Business Program and Public Sector issues and participants.

Data Collection, Methods, and Sample Sizes

Table 3 below summarizes data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 3. Core Data Collection Activities

What	Target	Completed Interviews	When	Comments
In Depth Interviews	Program Management	1-2	Q1 2018	Interview program staff
Project Savings Verification	Completed BP and PS Custom Projects		Q3 and/or Q4 2018	One or two sampling waves, separate samples for BP and PS. BP and PS waves may occur on separate timelines.
Large Project Pre-Installation Review	BP or PS Projects in the Pre-Installation Phase		When requested during 2018	Evaluator feedback on savings methodology and baseline on large projects in pre-installation stages
Process and NTG Survey Research	Participating Customer Decision Makers	TBD	Q2 2018 to Q2 2019	Process, free ridership, and spillover
End-of Year Project Savings Verification	Completed BP and PS Custom Projects		Feb – March 2019	Projects not previously sampled

Evaluation Schedule for CY2018

Table 4 below provides the schedule for evaluation of the CY2018 Custom Program. Adjustments will be made as needed as program year evaluation activities begin. Navigant will produce separate reporting of impacts, research findings, and recommendations for the Business Program and Public Sector.

Table 4. CY2018 Evaluation Schedule

Activity/Deliverables	Responsible Party	Completion/Delivery
Program Manager & Implementer Interview	Evaluation Team	March 30, 2018
Custom Project Savings Verification Waves	Evaluation Team	Q3 2018 to Q1 2019
Large Project Pre-Installation Review	Evaluation Team	Ten business days
Final Tracking Data to Navigant	Franklin Energy	January 30, 2019
Draft Impact Report to PGL & NSG and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	PGL & NSG / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 13, 2019
Comments on Redraft	PGL & NSG / SAG	April 20, 2019
Final Impact Report to PGL & NSG and SAG	Evaluation Team	April 27, 2019
Conduct Process and NTG Survey	Evaluation Team	Q2 2018 to Q2 2019
NTG Research Findings Memo	Evaluation Team	July 31, 2019
Process Research Findings Memo	Evaluation Team	August 31, 2019

Business Program and Public Sector (Gas Optimization Studies) 2018-2021 Evaluation Plan

Introduction

The evaluation plan covers measures installed and gas savings realized through the Gas Optimization Studies path offered in the Business Program (BP) and Public Sector (PS). This path provides a service where Energy Advisors and contracted engineers review a business facility for operation and maintenance issues that, if corrected, often provides short payback projects that are very attractive to owners. Examples of issues uncovered from a Gas Optimization Study include correcting condensing boiler operating temperatures to ensure condensing operation and therefore savings, and aligning actual facility operating hours and ventilation scheduling. The BP and PS programs are implemented by Franklin Energy Services with service provider engagement and technical support for program delivery and marketing. Navigant will produce separate reporting of impacts, research findings, and recommendations for the Business Program and Public Sector.

Four-Year Evaluation Plan Summary

We have prepared a four-year evaluation plan summary to identify tasks by year. Final scope and timing of activities for each year will be refined as program circumstances are better known.

Table 1. Four-Year Evaluation Plan Summary

Activity	2018	2019	2020	2021
Gross Impact – Gas Opt Project Savings Verification Waves and Large Project Pre-Installation Review	X	X	X	X
Gross Impact – End-of-Year Gas Opt Project Savings Verification	X	X	X	X
Research – BP Participant FR+SO plus Process Survey				X
Research – PS Participant FR+SO plus Process Survey				X
Research – BP and PS Trade Ally SO plus Process Survey				X
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

Evaluation Plan for CY2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for CY2018:

Impact Evaluation:

1. What are the BP verified gross savings?
2. What are the BP verified net savings?
3. What are the PS verified gross savings?
4. What are the PS verified net savings?
5. What caused gross realization rate (RR) adjustments and what corrective actions are recommended?

Process Evaluation:

Navigant's CY2018 process research activities will include review of program materials and in-depth qualitative interviews with program management and implementers. These interviews will be used to develop a complete understanding of the final design, procedures, and implementation strategies for the program, including specific marketing tactics and perceived results, to understand the current program performance and inform our evaluation efforts. We will note differences between Business Program and Public Sector issues.

Gross Impact Evaluation

The gross impact evaluation approach for Gas Optimization projects will be based on engineering analysis of a sample of projects to verify claimed savings or make retrospective adjustment to claimed gross savings. Projects will be sampled by size-based strata and analyzed together. All the sampled projects will be subject to engineering file review and a subset may receive on-site inspection and verification of installed measures. Gross impact estimates will mimic *ex ante* methods to the extent they are reasonable and accurate per data collected during verification steps. The evaluation team will modify calculations if methods are not reasonable or if verified operation differs from that which was reported.

Navigant will employ IPMVP protocols for on-site measurement and verification of projects. The impacts for some projects will be verified by engineering review of site-collected data and determined with regression analysis of utility billing data and weather and/or other independent variables that affect energy use (for example, days of operation), as appropriate. This approach parallels IPMVP option C. If implemented measures are not amenable to regression analysis, the evaluated savings will be determined by engineering review with site verified data, incorporating historical data when available.

The sampling plan for projects will target overall 10 percent precision at 90 percent confidence using the stratified ratio estimation technique to optimize sample size and control evaluation costs. Due to

tight end-of-year impact reporting timelines, Navigant will sample for impacts in two to three waves – approximately July and/or December, and after the final program year projects are closed. Each sample will be based on lower precision targets for the wave, but when combined at the end of the year, the overall sample will meet targets. The Large Project Pre-Installation Review process provides evaluator feedback on savings methodology and baseline selection on large custom projects in pre-installation stages.

Navigant will produce separate reporting of impacts, research findings, and recommendations for the Business Program and Public Sector.

Use of Randomized Controlled Trial and Quasi-Experimental Design

The evaluation team will not use the Randomized Control Trials (RCT) or Quasi-Experimental Design for process evaluation because:

- There are not enough participants in this program to achieve statistically significant savings estimates using this method.
- It would not be possible to create a valid matched control group for the customers in this program.
- This method would estimate average savings across all program participants which is not the desired savings estimate for this program

Net Impact Evaluation

The CY2018 net impact evaluation will apply the net-to-gross ratio (NTGR) deemed through the Illinois Stakeholders Advisory Group (SAG) consensus process. The deemed NTGRs are provided in Table 2.

Table 2. PGL/NSG Deemed NTGR for CY2018

Program Path/Measure	Deemed NTGR
Business Program – Gas Optimization	1.02
Public Sector – Gas Optimization	1.02

Source: PGL_and_NSQ_GPY7_NTG_Values_2017-03-01_Final.xlsx.

Process Evaluation

The process analysis will include a synthesis of both qualitative and quantitative data collected during the review of program materials and in-depth qualitative interviews with program management and implementers. We will note differences between Business Program and Public Sector issues.

Data Collection, Methods, and Sample Sizes

Table 3 below summarizes data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 3. Core Data Collection Activities

What	Target	Completed Interviews	When	Comments
In Depth Interviews	Program Management	1-2	Q3 2018	Interview program staff
Project Savings Verification	Completed BP and PS Gas Optimization Projects		Q3 and/or Q4 2018	One or two sampling waves, separate samples for BP and PS. BP and PS waves may occur on separate timelines.
Large Project Pre-Installation Review	BP or PS Projects in the Pre-Installation Phase		When requested during 2018	Evaluator feedback on savings methodology and baseline on large projects in pre-installation stages
End-of Year Project Savings Verification	Completed BP and PS Gas Optimization Projects		Feb – March 2019	Projects not previously sampled

Evaluation Schedule for CY2018

Table 4 below provides the schedule for evaluation of the CY2018 Gas Optimization Program. Adjustments will be made as needed as program year evaluation activities begin. Navigant will produce separate reporting of impacts, research findings, and recommendations for the Business Program and Public Sector.

Table 4. CY2018 Evaluation Schedule

Activity/Deliverables	Responsible Party	Completion/Delivery
Process Research Findings Memo	Evaluation Team	August 15, 2018
Gas Opt Project Savings Verification Waves	Evaluation Team	Q3 2018 to Q1 2019
Large Project Pre-Installation Review	Evaluation Team	Ten business days
Final Tracking Data to Navigant	PGL & NSG / Franklin Energy	January 30, 2019
Draft Impact Report to PGL & NSG and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	PGL & NSG / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 13, 2019
Comments on Redraft	PGL & NSG / SAG	April 20, 2019
Final Impact Report to PGL & NSG and SAG	Evaluation Team	April 27, 2019

ComEd, Nicor Gas and Peoples Gas and North Shore Gas Retro-Commissioning Program
CY2018 to CY2021 Evaluation Plan

Introduction

The Retro-Commissioning (RCx) Program seeks to realize energy savings through the RCx process where the emphasis is on restoring building systems or optimizing controls to meet the needs of the current building occupants and save energy. RCx is a study-based process that generates savings through an improved understanding and operation of the existing equipment, rather than capital outlays for installing new equipment.

The Retro-Commissioning Program is managed by ComEd. ComEd coordinates with Nicor Gas, Peoples Gas (PGL) and North Shore Gas (NSG) to account for gas savings generated through the program. The RCx program continues to evolve to serve more diverse customer segments. To reach smaller customers and market segments, the utilities began expanding the program to support additional offerings in the fifth electric and second gas program years (PY5/GPY2) and in the seventh electric and fourth gas program years (PY7/GPY4).

Traditional RCx represents the original offering for large commercial buildings and completes a four-phase RCx process (Planning, Investigation, Implementation, and Verification). Projects are unique and savings are determined using custom calculations developed by service providers, implementation contractors, and the evaluators.

Monitoring-Based Commissioning (MBCx) is a long-term engagement between the retro-commissioning service provider (RSP) and customer to identify, implement, and monitor measures over time. MBCx features the integration of monitoring software into the building automation system to assist in the identification of deeper energy saving opportunities than those found in traditional RCx. It can also be used as a process to continue and augment prior projects that will help ensure measure persistence and improve building operations over time.

Retro-Commissioning Express (RCxpress) is an offering targeted to mid-sized commercial buildings or buildings interested in a shorter project timeline. RCxpress is differentiated by a more streamlined approach to RCx with a targeted list of measures and use of calculators in addition to custom calculations for savings estimates.

RCx Building Tune-Up (Tune-Up) is for commercial and retail customers less than about 150,000 ft². This offering is more prescriptive and offers an implementation incentive.

Grocery RCx is an electric-only offering for full service and convenience grocery stores and retail refrigeration systems. It has been incorporated into the Tune-Up offering.

SEDAC (in-flight) RCx for public sector participants have been added to the evaluation scope for CY2018. The SEDAC participants enrolled in RCx program when it was under separate administration, according to SEDAC's design and implementation process. Since the SEDAC program is sufficiently different, these projects will form their own evaluation cohort, and will be treated similarly, but separately, from participants with the ComEd administered program. We expect these projects to be a mix of electric only and electric and gas projects. New public sector RCx projects will enroll in the offerings listed above.

Table 1 shows the estimated participation and savings goals as of December 2017.

Table 1. Anticipated Participation and Savings Goals by Program Offering

Retro-Commissioning Program Offering	Estimated Participants ¹² CY2018	Gross GWh Savings Goals – CY2018	Nicor Gas ¹³ Gross Therm Savings Goals – CY2018	Peoples Gas Gross Therm Savings Goals – CY2018	North Shore Gas Gross Therm Savings Goals – CY2018
RCx	10	3			
MBCx	30	8	NA	361,080	40,188
RCxpress	15	8			
Tune-Up ¹⁴	55	15	NA	NA	NA
SEDAC public sector	50	7	281,000	7,000	7,000
All Offerings	160	41	NA	368,080	47,188

Source: Implementation Contractor estimates and ComEd goals

Notable changes made from GPY6/EPY9 to CY2018 include:

- Integration of the grocery pilot offering into Tune-Up
- Increased RSP fee and implementation incentives for Tune-Up– electric only
- Integration of Public Sector customers with the current program offerings
- Increased RSP and customer incentives for RCx, RCxpress, and MBCx
- SEDAC in-flight projects will be evaluated in parallel with the coordinated program projects for 2018.

The process evaluation and NTG research will interview service providers and participants in alternating years. This schedule is consistent with the planned every-other-year process/NTG research for ComEd.

The process evaluation and NTG research will proscribe SEDAC participants, since their experience differs from the continuing offerings, and the SEDAC program model will be discontinued. SEDAC public sector participants will not be interviewed for process research or NTG.

The primary objectives of the RCx evaluation are: (1) to quantify net savings impacts in therms, kWh, and kW from the program during CY2018 and identify any systemic problems with calculators; (2) to update net-to-gross parameters for program offerings for both gas and electric savings in 2019 and 2021; and (3) to determine key process-related program strengths and weaknesses and identify ways in which the program offering(s) can be improved. The process evaluation will include program management and the experiences of active RSPs and participants.

The CY2018 gross impact evaluation will not vary significantly from the previous years, but adjustments will be made to reflect specific measure and project characterizations.

¹² Participant counts are for ComEd. Counts by gas utility are indeterminant at the time of this Plan.

¹³ Nicor Gas RCx goals are not available as they are combined with other Nicor Gas Custom Incentive offerings.

¹⁴ RCx Tune-Up includes Grocery participants in the evaluation plan.

The evaluation of this program over the coming four years will include a variety of data collection and analysis activities, including those indicated in Table 2.

Table 2. Evaluation Approaches – Four Year Plan

Tasks	CY2018	CY2019	CY2020	CY2021
Tracking System Review	X	X	X	X
Data Collection – Participant Surveys		X		X
Data Collection – Program Manager and Implementer Interviews	X	X	X	X
Data Collection – Trade Ally Interviews		X		X
Impact – Project-specific Billing Analysis	X	X	X	X
Impact – Engineering Review	X	X	X	X
Impact – Verification & Gross Realization Rate	X	X	X	X
Net-to-Gross – Customer Self-Report Surveys		X		X
Net-to-Gross – Trade Ally Interviews		X		X
Process Analysis	X	X	X	X

NTG research in alternate years follows the pattern of past research, including NTG research for natural gas and electricity in PY9. NTG research with participants and trade allies will conform to statewide NTG methodologies described in the Illinois Technical Reference Manual.

The evaluation team determined the evaluation approach for the 2018-2021 period based upon the needs of the program and program’s prior history. The 4-year evaluation approach for this program is based on the following:

- RCx measures are custom to respective applications and often use custom calculation tools to estimate savings. As a result, we will continue to review and estimate gross and net impacts each year over 2018-2021.
- Because of the longevity and stability of the program we will conduct process research with participants and service providers every other year, in keeping with past patterns. To minimize outreach costs, we will ask NTG questions during the same interview session as our process evaluation.
- CPAS will be calculated based upon the requirements of FEJA.

Coordination

Navigant will coordinate with the evaluation teams and other utilities on any issues relevant to this program. Specifically, all of the RCx offerings are administered by ComEd’s implementation contractor on behalf of ComEd and SEDAC public sector projects. A collaborative agreement between ComEd and the gas utilities promotes estimating complementary gas savings at ComEd customer sites for all RCx offerings. The ComEd RCx Program evaluation plan parallels the planned work for the Ameren Illinois (AIC) RCx Program. Both the ComEd and AIC programs will conduct annual impact evaluations. Depending on the number of completed projects the AIC impact analysis may include a sample or census of participants. Approximately 30% of sampled projects will also receive on-site verification. Ameren expects a shift toward smaller projects and more public-sector projects in CY2018-CY2021. They currently do not plan on changing their general offering.

Evaluation Research Topics

The evaluation will seek to answer the following key researchable topics:

Impact Evaluation

1. Impact review and analysis will be conducted for all Coordinated RCx offerings, Tune-Up and SEDAC in-flight public sector projects.
2. What are the program's first year verified gross savings?
3. What are the program's first year verified net savings?

Process Evaluation and Other Research Topics

The process evaluation effort for CY2018 will include participants in the ComEd offerings, but will exclude SEDAC in-flight public sector projects. Process research may focus on persistence, channeling, and program delivery, and may address the following questions:

1. Review and integrate in-progress persistence research¹⁵ and effective useful life into program results and reporting.
2. Why do Tune-Up customers drop out of the program?
3. How can controls contractor bottlenecks be alleviated?
4. How can channeling be increased across the portfolio?
5. How can reports be made more valuable to the customers and offer next steps that are easier to follow?

Some insight into these questions may be learned from current GPY6/EPY9 process evaluation research. New information will inform the 2019 TRM.

Evaluation Approach

Navigant has prepared a plan to identify evaluation tasks for each RCx offering (Table 2). We propose a full impact evaluation and reduced process evaluation research in CY2018. In keeping with the historic pattern, we will conduct full process evaluations in alternate years CY2019 and CY2021.

Navigant conducted impact research in each of the years the program has been offered since inception. Due to the custom analysis for each project, we anticipate continued impact research for each program year.

Navigant will use impact methodologies from the International Performance Measurement and Verification Protocols (IPMVP), as appropriate for the market segment we are researching. As in prior years, we expect to use engineering file review and follow-up monitoring (IPMVP – Option A or B) for RCx, MBCx, RCxpress and SEDAC public sector projects in the on-site sample; however, evaluation methods may differ based on the participant channels and individual site circumstances.

¹⁵ ComEd has contracted with a research firm to conduct RCx persistence research under the ComEd R&D budget

Depending on the measure mix (anticipated dominance of scheduling measures), Navigant may opt to use regression methods with meter data (IPMVP – Option C) for Tune-Ups or select measures in other offerings – matching lower-cost evaluation methods with a lower-savings per project program offering. If the measure-mix assumption does not bear out on a project-by-project basis, electric-only Tune-Up will be evaluated with IPMVP – Option A or B. For electric-only Grocery RCx projects submitted through the Tune Up offering, Navigant will review the refrigeration system simulation used for ex ante estimates and we anticipate the evaluation using regression methods with available data for evaluation.

Navigant will conduct secondary research into effective useful life of key RCx measures, to support updates to the TRM and other persistence study efforts.

We anticipate conducting NTG research in CY2019 and CY2021.

The table below summarizes the evaluation tasks for CY2018 including data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 3. Core Data Collection Activities, Sample, and Analysis

Activity	Target	Target Complete ^{16s} CY2018	Timeline	Notes
Tracking System Review	Tracking system	Census	Preliminary of planned and ongoing	Three waves
In Depth Interviews	Program Management and Implementers	4	April – Dec 2018	Augment with monthly calls
Gross Impact	Early Feedback File Review	20	June 2018 – Feb 2019	Early Feedback for Large Projects
Gross Impact	Engineering File Review	57	April 2018 – Feb 2019	Three Waves*
Gross Impact	On-site M&V	28	May 2018 – Feb 2019	
Verified Net Impact	Calculation using deemed NTG ratio	census	March 2019	
Process and Impact Research on CY2018 Operations	Literature review, secondary research	TBD	April 2017 – March 2019	Process, Impact

Note: FR = Free Ridership; SO = Spillover

* Navigant will coordinate with ComEd to determine appropriate dates to pull tracking data extracts for each wave.

† Trade ally surveys are triggered by high importance ratings by participating customers to the trade ally or vendor. Therefore, the number of trade ally or vendor surveys is dependent on the results of the participating customer surveys.

In line with changes to the RCx offerings and accelerated evaluation schedule for delivering tracking data to the evaluation team, Navigant will perform tracking system review and M&V project sampling in waves in 2018. The three waves of M&V sampling are expected to cover about half of the projects.

¹⁶ Participant counts are for global program participants – electric only and electric and gas. Breakouts of pending participation by gas utility and energy type were not provided

Proposed gross impact sampling timelines are shown below.

Gross Impact Evaluation

RCx, MBCx and RCxpress offerings enroll similar participants and use an overlapping pool of service providers. As such, these projects will be sampled by size-based strata and analyzed together. The RCxpress offering participants may form its own stratum(a) in the sampling protocol to ensure adequate representation in the sampling. All the sampled projects will be subject to engineering file review and on-site inspection and verification of installed measures. Navigant will employ IPMVP – option A or B. Gross impact estimates will mimic ex ante methods to the extent they are reasonable and accurate per data collected during verification steps. The evaluation team will modify calculations if methods are not reasonable or if verified operation differs from what was reported.

The sampling plan for these three offerings will target overall 10 percent precision at 90 percent confidence using the stratified ratio estimation technique to optimize sample size and control evaluation costs. The strata will be defined by project size and offering type.

The Tune-Up impacts will be verified by engineering file review and determined with regression analysis of trend or utility billing data and weather or other independent variables that affect energy use (for example, days of operation), as appropriate. This approach parallels IPMVP Option B or C, depending on which data are used. On-site verification will attempt to confirm that measures implemented for the program persist until evaluation verification. If implemented measures are not amenable to regression analysis, the engineering review will form the basis of evaluated savings using IPMVP Option A. This review process may point to special needs of this market segment. Navigant will sample Tune-Up projects to report an offering-specific realization rate at 90/10 confidence and precision.

SEDAC public sector projects will be analyzed as a separate stratum (strata) as the program for these participants is different than the other ComEd offerings. Though the impact evaluation methods will be similar, SEDAC public sector projects will be sampled and reviewed to report a separate realization rate at 90/10 confidence and precision.

Natural gas impacts will be sampled and evaluated in a similar fashion to ensure 90/10 confidence and precision for each gas utility. All projects with gas savings will be organized in a single sampling frame and stratified for sampling by savings magnitude. To avoid over-sampling of electric savings participants, Navigant will sample gas projects first and then sample the appropriate number of electric-only projects to complete the sample.

Navigant will perform tracking system review and M&V project sampling in three waves in CY2018. The first wave of M&V sampling is expected to cover about one-quarter of the projects. Proposed gross impact sampling timelines are shown below.

- a) First wave sample drawn in April 2018 and completed in July 2018
- b) Second wave sample drawn in August 2018 and completed November 2018
- c) Final wave starts January 2019 (or project's completion date).

Table 4 below summarizes data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions for each program offering. For planning purposes, Navigant assumes CY2018 participation based on March 2017 estimates: RCx (10), MBCx

(30), RCxpress (15), and Tune-Up¹⁷ (55)¹⁸. Participation by gas utility customers is unknown now, but we anticipate approximately 40% of participants based on recent history necessitating attempted census or near-census sampling of gas participants for process and impact research, respectively.

SEDAC forecasts about 60 completed projects for CY2018¹⁹.

Table 4. CY2018 Core Data Collection Activities and Sample*

What	Who	RCx, MBCx & RCxpress Target Completes (approx.)	RCx Tune-Up Target Completes (approx.)	SEDAC PS completes (approx.)	When
Engineering Review	Participating Customers	24	24	18	February 2018 – Feb. 2019 (concurrent)
Onsite M&V Audit†	Participating Customers (nested among engineering review sample)	8	10	6	May 2018 – February 2019
In Depth Interviews	Program Management‡	4	2		May 2018

* Final sample sizes may change based on actual participation and stratification

† Onsite M&V Audits are a subset of Engineering Reviews, not a unique sample

‡ Includes interviews with implementation contractor management as well as utility program management. Interviews across offerings may be combined if management teams are shared. Due to the length of the program year, Navigant plans to interview some managers twice.

Navigant will analyze electric-only Tune-Up impacts with billing analysis utilizing appropriate meter interval data.

The gross savings impact approach will review the ex ante measure type to determine whether it is covered by the Illinois TRM or whether it is a non-deemed measure that is subject to retrospective per unit savings adjustment of custom variables. The measure type, deemed or non-deemed, will dictate the savings verification approach. We will also make a research estimate of gross savings based entirely on site-collected data and evaluation engineering analysis of savings. The two methods are described below:

1. Savings Verification

- Any measures with per unit savings values deemed by the TRM, or otherwise directed by the TRM, would have verified gross savings estimated by multiplying deemed per unit savings (therm, kWh and kW) by the verified quantity of eligible measures installed. Eligible deemed

¹⁷ Including grocery participants. ComEd electric-only participants.

¹⁸ The participation numbers are based on counts of participating sites so the total number of participating customers may be lower.

¹⁹ SEDAC 2018 RCx verification goals 2-12-18.xlsx

measures must meet all physical, operational, and baseline characteristics required to be assigned to the deemed value as defined in the TRM.²⁰

- Measures with fully custom or partially-deemed ex ante savings will be subject to retrospective evaluation adjustments to gross savings on custom variables. For fully custom measures, Navigant will subject the algorithm and parameter values to evaluation adjustment, where necessary. For partially-deemed measures, TRM algorithms and deemed parameter values will be used where specified by the TRM, and evaluation research will be used to verify custom variables.

2. Evaluation Research Savings Estimate

- The evaluation will also include an analysis of on-site collected verification data for a subset of projects. The engineering analysis methods and degree of monitoring will vary from project to project, depending on whether the measure has deemed savings or not, the complexity of the measures, the size of the associated savings, the potential to revise input assumptions, and the availability and reliability of existing data. The evaluators will contact the implementers prior to conducting site visits to ensure that the evaluation team has all correct and relevant information.

The measure-level realization rates will be extrapolated to the program population using a ratio estimation method to yield ex post evaluation-adjusted gross energy savings. Gross realization rates will be developed for energy and demand savings. The sample design will provide 90/10 statistical validity for non-lighting savings and program savings overall. The sample of 28 on-site visits drawn is also expected to achieve an approximate 90/10 confidence/relative precision level (one-tailed test) to comply with the PJM verification requirements outlined in Manual 18B.

Verified Net Impact Evaluation

The verified net impact evaluation will apply the net-to-gross (NTG) ratio accepted by Illinois Stakeholders Advisory Group (SAG) consensus to estimate the verified net savings for the program.

Table 5. Deemed NTG Values for CY2018

Coordinated Energy Efficiency Program Offering	CY2018 Deemed NTG Value
RCx	0.95
MBCx	0.95
RCxTune-Up	0.95
RCxpress	0.95
SEDAC	1.01
All Natural Gas	1.02

Source:

http://ilsagfiles.org/SAG_files/NTG/2017_NTG_Meetings/Final/ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx

Nicor Gas GPY7 NTG Values 2017-03-01 Final.xlsx

PGL_and_NS_GPY7_NTG_Values_2017-03-01_Final.xlsx

²⁰ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 5.0, available at: <http://www.ilsag.info/technical-reference-manual.html>

Navigant is applying the overall values for the other Retro-Commissioning Program offerings to each of the newer offerings (i.e., RCx Tune-Up, and RCxpress). Given that these participants tend to be smaller and have fewer resources, Navigant proposes a NTG value of 0.95 will be appropriate for these offerings until we can apply PY9 research to participants.

Research NTG Impact Evaluation

The evaluation team will conduct NTG research to inform NTG recommendations for the future for each program offering. Evaluators will collect NTG data for all program offerings in CY2019 and CY2021. By this time all public sector projects will have been enrolled through the coordinated offerings and not SEDAC. All NTG research will address free-ridership and participant spillover using survey protocols developed by the Illinois EM&V NTG Working Group and incorporated into the TRM.

Our NTG research sampling will attempt a census of service providers participating in each offering. The participant surveys will target a 90/10 sample by program offering. For natural gas NTG research, we will attempt a census of all gas projects. Each gas participant data point will also constitute an electric participant data point.

Calculation of CPAS and Annual Savings

As required by the Future Energy Jobs Act (FEJA) for electric energy efficiency, the measure-specific and total ex post gross and ex post net savings for the program and the cumulative persisting annual savings (CPAS) for the electric measures installed in CY2018 will be calculated along with the total CPAS across all electric measures. Additionally, the weighted average measure life will be estimated, if possible. When gas savings is not attributed to a gas utility, the evaluation will also add the savings converted from gas savings to the electric savings so that it's documented in the report.

Process Evaluation

While the core Retro-Commissioning Program has remained stable in design and implementation for several years, repeated issues and new challenges have come to light. Navigant will conduct process research in alternating years with NTG research. Topics of research may include: the role that facility staff and their behavior impact persistence; the impact of controls contractors on project time lines; making reports more valuable to customers; encouraging the next energy efficiency improvements and upgrades; enhancing channeling throughout the portfolio and across different implementers; reducing the number of Tune-Up drop-outs.

Navigant will perform additional process research, upon the request of the program manager, to support the program manager and implementer in transitioning into the revised regulatory requirements starting in CY2018. Possible topics may include, but will not be limited to, research on impact of public sector projects introduced into the program, and effective useful life.

SEDAC RCx program participants will be excluded from process evaluation research, due to differences in the program design. Furthermore, the CY2018 SEDAC cohort should have completed their projects prior to CY2019, the first year for planned process research.

Use of RCT and QED

We are not evaluating the RCx Program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. We are not using quasi-experimental consumption data because there are not enough participants in this program to achieve statistically significant savings estimates using this method and it would not be possible to create a valid matched control group for the customers in this program.

Evaluation Schedule

Table 6 below provides the schedule for key deliverables and data transfer activities. (See Table 3 for other schedule details.) Adjustments will be made, as needed, as evaluation activities progress.

Table 6. Schedule – Key Deadlines

Activity or Deliverable	Responsible Party	Date Delivered
Program Operations Manual and Workpapers	ComEd	January 2, 2018
CY2018 program tracking data for QA/QC	ComEd	April 6, 2018
CY2018 program tracking data for sampling Wave 1	ComEd	April 30, 2018
Wave 1 project documentation, engineering reviews, schedule, conduct on-site M&V, feedback	Evaluation	July 27, 2018
Tracking System Ex Ante Review Findings and Recommendations	Evaluation	July 27, 2018
CY2018 program tracking data for sampling Wave 2	ComEd	August 30, 2018
Wave 2 project documentation, engineering reviews, schedule, conduct on-site M&V, feedback	Evaluation	November 30, 2018
EUL Research Memo	Evaluation	December 15, 2018
CY2018 Program tracking data for sampling Wave 3	ComEd	January 18, 2019
Wave 3 project documentation, engineering reviews, schedule, conduct on-site M&V, feedback	Evaluation	January 31, 2019
Illinois TRM Update Research Findings	Evaluation	March 1, 2019
Process Analysis Findings	Evaluation	March 1, 2019
Internal Report Draft by Navigant	Evaluation	March 1, 2019
Draft Report to ComEd, Gas Utilities, and SAG	Evaluation	March 8, 2019
Comments on draft (15 Business Days)	ComEd and SAG	March 29, 2019
Revised Draft by Navigant	Evaluation	April 11, 2019
Comments on redraft (5 Business Days)	ComEd and SAG	April 18, 2019
Final Report to ComEd, Gas Utilities, and SAG	Evaluation	April 25, 2019

Small Business Program 2018-2021 Evaluation Plan

Introduction

The Small Business (SB) Program is designed to assist qualified Peoples Gas (PGL) and North Shore Gas (NSG) non-residential customers²¹ to achieve natural gas energy savings by educating them about energy efficiency opportunities through three program delivery paths:

- The Energy Assessment and Direct Install (DI) path provides installation of no-cost direct-install (DI) measures²² to small businesses or tenants through on-site assessments conducted by the implementation contractor's (Franklin Energy Services) Energy Advisors. The energy assessment identifies additional retrofit energy efficiency upgrades.
- The Prescriptive path provides small business owners/tenants with direct financial incentives for installation of retrofit measures recommended through the Energy Assessment. Customers receive rebates which cover 30 to 100 percent of the project cost based on the size and efficiency of the equipment installed or on a per unit basis.
- The Custom path provides technical services and custom rebates for non-standard building improvement upgrades.

A midstream incentive pilot program begun in 2017 encourages greater adoption of energy-efficient equipment in commercial kitchens within the city of Chicago. While the PGL Natural Gas Savings program currently offers prescriptive rebates for energy-efficient commercial kitchen equipment, the mid-stream pilot seeks to increase uptake by providing instant rebates to Chicago customers purchasing equipment through area food service equipment distributors.

Four-Year Evaluation Plan Summary

We have prepared a four-year evaluation plan summary to identify tasks by year. Final scope and timing of activities for each year will be refined as program circumstances are better known.

²¹ To qualify, participants must be Peoples Gas or North Shore commercial or industrial customers that use less than 150,000 therms per year (an increase from the 60,000 therms cap of previous years).

²² No-cost direct-install measures include low-flow showerheads and faucet aerators, pre-rinse spray valves, programmable/reprogrammed thermostats, and domestic hot water (DHW) pipe insulation.

Table 1. Four-Year Evaluation Plan Summary

Activity	2018	2019	2020	2021
Gross Impact - Mid-Year Review of TRM Compliance	X	X	X	X
Gross Impact - End-of-Year TRM Savings Verification	X	X	X	X
Gross Impact – Custom Project Savings Verification Waves	X	X	X	X
Gross Impact – End-of-Year Custom Project Savings Verification	X	X	X	X
Research – Small Business Thermostat Savings Benchmarking	X			
Primary Research – Small Business Advanced Thermostat Billing Analysis*			X	
Research - Participant FR plus SO plus Process Survey			X†	
Research – Trade Ally FR plus SO plus Process Survey			X†	
Present NTG Research Results				Q3
Additional Process Research‡	X	X		
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

* Study is under consideration.

† The FR and SO data collection and survey completion will extend into Q2 of 2021, but will be based on 2020 program data, unless there is a particular interest to consider part of 2021 program year data.

‡ Additional primary and/or secondary process research will be considered.

Small Business Advanced Thermostats – In 2018, Navigant will examine secondary research from a larger population study (e.g., Michigan) to benchmark Illinois savings and assess whether their impact analysis approach to small commercial thermostats is transferrable to Illinois. For the 2018-2021 period, advanced thermostats may be a higher priority for further research than standard programmable thermostats. Navigant will work with ComEd, Ameren Illinois, and Nicor Gas to explore a billing analysis study.

Evaluation Plan for CY2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for CY2018:

Impact Evaluation:

1. What are the program’s verified gross savings?
2. What are the program’s verified net savings?
3. What caused gross realization rate (RR) adjustments and what corrective actions are recommended?
4. What updates are recommended for the Illinois Technical Reference Manual (TRM)?

Process Evaluation:

Navigant’s CY2018 process research activities will include review of program materials and in-depth qualitative interviews with program management and implementers. These interviews will be used to develop a complete understanding of the final design, procedures, and implementation strategies for the program, including specific marketing tactics and perceived results, to understand the current program performance and inform our evaluation efforts.

In consultation with program management, Navigant will consider additional process research to support the program manager and implementer. Possible topics include development of best practices in preparation for a CY2018 pilot of small business behavioral programs, specifically to drive energy efficiency efforts by restaurant staff, and broadly transform staff behavior across those industry sectors that are most impactful.

Gross Impact Evaluation

For measures covered by the TRM, the evaluation team will review the TRM measure characterizations and customer-specific data collected in the tracking system that substantiates the measures installed, and make adjustments as needed to calculate verified savings. The gross impact evaluation for TRM measures will include a mid-year review and end-of-year final verification. Midway through the program year, Navigant will review the program tracking data to determine the level of input completeness, flag outliers, and identify incorrect algorithms or input assumptions. If necessary, the Navigant team will make recommendations for modifications to the tracking data for use in the impact evaluation effort. After the program year ends, verified measure savings are estimated and summed across participants to calculate the total verified savings for the program.

The gross impact evaluation approach for custom projects will be based on engineering analysis of all or a sample of projects to verify claimed savings or make retrospective adjustment to claimed gross savings. Custom projects will be sampled by size-based strata and analyzed together. All the sampled projects will be subject to engineering file review and a subset may receive on-site inspection and verification of installed measures. Gross impact estimates will mimic *ex ante* methods to the extent they are reasonable and accurate per data collected during verification steps. The evaluation team will modify calculations if methods are not reasonable or if verified operation differs from that which was reported.

Navigant will employ IPMVP protocols for on-site measurement and verification of custom projects. The impacts for some projects will be verified by engineering review of site-collected data and determined with regression analysis of utility billing data and weather and/or other independent variables that affect energy use (for example, days of operation), as appropriate. This approach parallels IPMVP option C. If implemented measures are not amenable to regression analysis, the

evaluated savings will be determined by engineering review with site verified data, incorporating historical data when available.

The sampling plan for custom projects will target overall 10 percent precision at 90 percent confidence using the stratified ratio estimation technique to optimize sample size and control evaluation costs. Due to tight end-of-year impact reporting timelines, Navigant will sample for impacts in two to three waves – approximately July and/or December, and after the final program year projects are closed. Each sample will be based on lower precision targets for the wave, but when combined at the end of the year, the overall sample will meet targets.

Use of Randomized Controlled Trial and Quasi-Experimental Design

Navigant is not evaluating the Small Business Program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. Navigant is not using quasi-experimental consumption data for the following reasons.

- It would not be possible to create a valid matched control group for the customers in this program.
- This method would estimate average savings across all program participants which is not the desired savings estimate for this program.
- This program contains many unique measures with significant cross-participation. In this case, quasi-experimental consumption data analysis would produce savings estimates for bundles of commonly-installed measures, rather than for each measure individually, which is not the desired output for all analysis.

Net Impact Evaluation

The CY2018 net impact evaluation will apply the net-to-gross ratio (NTGR) deemed through the Illinois Stakeholders Advisory Group (SAG) consensus process. The deemed NTGRs are provided in Table 2.

Table 2. PGL/NSG Deemed NTGR for CY2018

Program Path/Measure	Deemed NTGR
Assessment and Direct Install	0.92
Prescriptive, Partner Trade Ally, and Custom Rebates	0.92

Source: PGL_and_NSJ_GPY7_NTG_Values_2017-03-01_Final.xlsx.

Process and NTG Evaluation

The process analysis will include a synthesis of both qualitative and quantitative data collected during the review of program materials and in-depth qualitative interviews with program management and implementers. In consultation with program management, Navigant will consider additional process research to support the program manager and implementer. Possible topics include development of best practices in preparation for a CY2018 pilot of small business behavioral programs, specifically to

drive energy efficiency efforts by restaurant staff, and broadly transform staff behavior across those industry sectors that are most impactful. There will be no primary NTG research in 2018.

Data Collection, Methods, and Sample Sizes

Table 3 below summarizes data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions.

Table 3. Core Data Collection Activities

What	Target	Completed Interviews	When	Comments
In Depth Interviews	Program Management	1-2	Q3 2018	Interview program staff
Mid-Year TRM Compliance Review	All Program TRM Measures		May - July 2018	Review program tracking data using the TRM measure characterizations
Custom Project Savings Verification	Completed Custom Projects		Q3 and/or Q4 2018	One or two sampling waves
End-of-Year TRM Savings Verification	All Participating Customers with TRM Measures		Feb – March 2019	Gross savings verification using the TRM and customer-specific data collected in the tracking system
End-of Year Custom Project Savings Verification	Completed Custom Projects		Feb – March 2019	Custom projects not previously sampled

Evaluation Schedule for CY2018

Table 4 below provides the schedule for evaluation of the CY2018 Small Business Program. Adjustments will be made as needed as program year evaluation activities begin.

Table 4. CY2018 Evaluation Schedule

Activity/Deliverables	Responsible Party	Completion/Delivery
Mid-Year TRM Compliance Review and Findings Memo	Evaluation Team	July 20, 2018
Process Research Findings Memo	Evaluation Team	August 15, 2018
Small Business Thermostat Savings Secondary Benchmarking Research	Evaluation Team	December 7, 2018
Custom Project Savings Verification Waves	Evaluation Team	Q3 2018 to Q1 2019
Final Tracking Data to Navigant	Franklin Energy	January 30, 2019
Draft Impact Report to PGL & NSG and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	PGL & NSG / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 13, 2019
Comments on Redraft	PGL & NSG / SAG	April 20, 2019
Final Impact Report to PGL & NSG and SAG	Evaluation Team	April 27, 2019

Peoples Gas and North Shore Gas and ComEd Business New Construction Program CY2018 to CY2021 Evaluation Plan

Introduction

This plan covers the ninth program year for the Business New Construction Program. Calendar Year 2018 (CY2018) is the tenth program year of ComEd’s energy efficiency savings portfolio and the seventh program year for energy efficiency gas savings (January 1, 2018 to December 31, 2018).

This evaluation plan reflects evaluation approaches designed for the unique characteristics of this program and which originated in discussions between the implementation and evaluation teams over the course of the past several years. The primary objectives of this evaluation are as follows:

- Provide adjusted gross impacts for all completed projects using a researched realization rate.
- Provide verified net savings for all electric and gas projects completed in CY2018.
- Use a “real time” approach for the eventual derivation of NTGR, interviewing project representatives as they enter the reservation stage.

The CY2018 program did not change significantly from PY9. The program has continued to develop and offer different program tracks to cater to different types of participants. These include the legacy Comprehensive Track, the Expedited Assistance Track, the Design Replication Track, and the Accelerate Performance Track. The tracks vary in the incentives and technical assistance offered by the program based on the type of project and the point at which the project enters the program. In addition to these tracks, the program began serving public sector projects in Program Year 9 (PY9) and the first public sector projects are slated to complete in CY2018.

The Business New Construction Program is coordinated between ComEd, Nicor Gas, Peoples Gas and North Shore Gas Companies. The evaluation activities and timing for each utility evaluation are the same, as this is one evaluation effort for all four utilities. Desk reviews and participant interviews are done without respect to which gas utility it is associated. In PY8, there were no gas projects completed in Peoples Gas or North Shore Gas territories. Net-to-gross (NTG) ratios are deemed prospectively with separate NTG values for electric and for gas. Beyond these points, the ComEd evaluation team will coordinate on any relevant evaluation issue on an as needed basis.

Joint Evaluation Approach

This plan outlines the evaluation objectives and activities for the program and how results pertain to each utility. To recognize the singular nature of the program, the evaluation team will synthesize process findings from each fuel type into a single set of findings. The impact evaluation work will be slightly more fuel-specific: the electric impact evaluation will focus on a sample of projects with electric savings (75 projects expected in CY2018), while the gas impact evaluation will focus on a sample of projects claiming gas savings (30 projects expected in CY2018).

The CY2018 gross impact evaluation will not vary from the previous years, and will rely on engineering desk reviews. As in past years, the CY2018 evaluation will include rolling customer free ridership research. The findings from the study will inform recommended NTG values for the Illinois Stakeholder Advisory Group (SAG) approval and future program application. The CY2018 free ridership research will include in-depth interviews with participating customers to learn about their

perspectives and satisfaction with the program, the energy assessment services and incentive offerings, and how to improve the program in the future.

The evaluation team will use the same general evaluation approach for all tracks of the program, including the public-sector projects, but will account for the variations in the tracks (e.g., qualified measures) as needed. To the extent there are enough projects to be meaningful, we will present results for each track as well as overall results for the program.

Table 1. Evaluation Approaches – Four Year Plan

Tasks	CY2018	CY2019	CY2020	CY2021
Tracking System Review	X	X	X	X
Data Collection – Participant Interviews	X	X	X	X
Data Collection – Program Manager and Implementer Interviews	X	X	X	X
Impact – Engineering Review	X	X	X	X
Impact – Modeling	X	X	X	X
Impact – Verification & Gross Realization Rate	X	X	X	X
Net-to-Gross – Free Ridership Self-Report Surveys	X	X	X	X
Net-to-Gross – Spillover Research			X	
Process Analysis	X	X	X	X

The evaluation of this program over the coming four years (2018-2021) will include a variety of data collection and analysis activities, including those indicated in Table 1. The evaluation team determined the approach for the four-year period based on the program’s needs and history. Given that the program includes very large custom projects and that the program is rolling out several new initiatives to better serve specific customer groups, we plan to conduct most research activities, including impact, process, and free-ridership analyses, annually. This approach will ensure that any year-to-year variations due to individual projects will not affect future years as well as provide the program with timely information to continue to improve the program’s design.

Coordination

Navigant will coordinate with the evaluation teams for other utilities on any issues relevant to this program.

Evaluation Research Topics

The objectives of the CY2018 evaluation are as follows:

1. Provide adjusted gross impacts for all completed projects using a researched realization rate.
2. Provide verified net savings for all projects completed in CY2018.
3. Update the verification, due diligence, and tracking system review from CY2018, if needed.
4. Continue the existing approach for NTG derivation. This includes:
 - a. Review of program documentation for projects that have recently reached the reservation stage, including:

- i. Project narratives and technical assistance summaries
 - ii. Design documents collected throughout the customer's participation process and final design and engineering plans, and building models to help guide in-depth interview questioning. If needed, coordinate with the implementation team to discuss their understanding of the project's participation prior to the evaluation team interviewing the project contacts.
- b. Collection of NTGR data from an interview conducted within 30 days of, or as soon as possible after the reservation date to minimize possible measurement issues associated with respondent recollection.

The CY2018 evaluation will seek to answer the following key researchable questions:

Impact Evaluation

- What are the researched gross energy and demand impacts?
- What are the verified net impacts from the program using SAG-approved NTG ratios?
- Did the program meet its energy and demand savings goals? If not, why not?
- What are the free ridership values to be used prospectively in future program years?

Process Evaluation

- What design or implementation changes, including changes to the gas portion of the program, occurred in CY2018, and how has this, if at all, changed the way the program is offered?
- What is the level of participation for the different program tracks?
- How do participants' experience with the program differ for the different program tracks?
- What challenges did the program face over the course of the program year and how did the program respond to them?

Evaluation Approach

Table 2 summarizes the surveys, interviews, and other primary data sources that will be used to answer these research questions in CY2018. We anticipate employing similar sources and data collection activities in the evaluation of future program years, though quantities of projects reviewed will differ.

Table 2. Core Data Collection Activities, Sample, and Analysis

Activity	Target	Target Completes CY2018	Timeline	Notes
In Depth Interviews	Program Management and Implementers	2	April – Dec 2018	Augment with monthly calls
Gross Impact	Early Feedback File Review	5	June 2018 – Feb 2019	Early Feedback for Large Projects, As Needed
Gross Impact	Engineering Desk Review	30†	June 2018 – Feb 2019	Two Waves*†
Verified Net Impact	Calculation using deemed NTG ratio	n/a	March 2019	
Researched NTG and Process	Telephone Interview with Participating Customers	~50	April 2018 – March 2019	FR, Process, Targeting Projects Currently in Reservation Phase
Process and Impact Research on CY2018 Operations	Literature review, secondary research	n/a	April 2017 – March 2019	Process, Impact

Note: FR = Free Ridership

* The total number of projects receiving engineering desk reviews for each year may change based on the final list of projects and their savings. Navigant will coordinate with ComEd to determine appropriate dates to pull tracking data extracts for each wave.

† Navigant will coordinate with ComEd to determine appropriate dates to pull tracking data extracts for each wave.

Table 3 lists other secondary data sources that will be referenced to answer the research questions.

Table 3. Secondary Data Sources

Reference Source	Author	Gross Impacts	Net Impacts	Process
Program Tracking Database	Program Administrator	X	X	X
Email Correspondence	Program Administrator		X	
Building Plans	Program Administrator	X	X	
Program Marketing and Outreach Materials	Program Administrator			X
International Energy Conservation Code (IECC) 2015	International Code Council	X		
ASHRAE Building Standards and Guidelines	ASHRAE	X		

Note: The program will use IECC 2018 beginning in CY2019

In line with program changes and an accelerated evaluation schedule for delivering tracking data to the valuation team, Navigant will perform tracking system review and M&V project sampling in waves in 2018. The first wave of M&V sampling is expected to cover about two-thirds of the projects.

Proposed gross impact sampling timelines are shown below.

CY2018 Gross Impact Sampling Waves

- a) First wave sample drawn in July 2018 and completed September 2018
- b) Final wave starts January 2019 (or projects completion date)

Gross Impact Evaluation

The evaluation team will conduct gross savings research on a sample of approximately 30 projects to determine CY2018 savings and calculate realization rates. This research will include an engineering desk review of each project in our sample. The evaluation team will also develop a summary sheet for each project reviewed that outlines the evaluation activities completed, the resulting changes to the model (as applicable), and the effect on the electric and therm savings claimed.

Per the program design, the baseline for all projects (when not using deemed values) will typically be based on the appropriate Illinois Energy Conservation Code for Commercial Buildings. As in prior evaluations, the evaluation team will use the project’s application date to determine which version of the Illinois Energy Conservation Code, which references the International Energy Conservation Code (IECC), is the most appropriate to use as baseline. Notably, this reference specifically allows for use of ASHRAE Standard 90.1 as an alternate compliance method.

The evaluation team will also calculate interactive savings associated with projects for each utility to be used within the cost-effectiveness analysis by each fuel type. We include all interactive effects for projects the program database indicates are within participating gas companies’ service territories (e.g., the project receives natural gas service from Nicor Gas and electric service from ComEd, but may or may not have received a gas incentive). We will also present researched savings without interactive effects for comparison to utility goals.

Some new construction projects have high uncertainty surrounding the baseline selection (e.g., major renovations with HVAC reconfiguration), resulting in higher risk for downward evaluation savings adjustment. In such cases, a review of the baseline by the evaluation team prior to incentive commitment may reduce savings uncertainty. As a part of monthly evaluation update calls, there will be an opportunity for the program staff to identify projects where they perceive higher uncertainty. After discussion, the program staff and evaluation team may agree to have the evaluation team follow-up with a brief but deeper review of project details, and provide feedback on baseline selection within 10 days. The evaluation follow-up review will be optional, advisory and non-binding, but may serve to reduce downward savings adjustments.

Gross Impact Evaluation Sampling Approach

The evaluation team plans to create two sample frames, one focused on electric projects and the other focused on gas projects. The electric sample frame will be composed only of projects with electric savings. These projects may or may not have gas savings and may or may not be in any of the participating gas utilities’ service territories. The gas sample frame will consist of all gas projects with positive therm savings before interactive effects from electric measures, regardless of whether the project received a gas incentive.²³ Within each of the sample frames, we plan to use a stratified random sample design. Each sample will be designed to reach 90% confidence and 10% precision two tailed for MWh and therms, respectively. The overall sample will include 30 projects, approximately 12 of which will have received gas incentives.²⁴

²³ Similarly, when estimating verified savings, the evaluation will include all therm savings in the gas utilities’ service territories with the interactive effects removed whether or not the project received a gas incentive.

²⁴ The number of projects in the sample may change based on the final list of projects and their savings.

Table 4. Estimated Number of Projects in Sample

Fuel-Type	Estimate of Projects in Sample (Approximate)
Electric	18
Gas	12
Total	30

Navigant will perform tracking system review and M&V project sampling in two waves in CY2018. The first wave of M&V sampling is expected to cover about one-third of projects completed in CY2018. Proposed gross impact sampling timelines are shown below.

Verified Net Impact Evaluation

The verified net impact evaluation will apply the net-to-gross (NTG) ratio accepted by Illinois Stakeholders Advisory Group (SAG) consensus to estimate the verified net savings for the program.

Table 5. Deemed NTG Values for CY2018

Utility	CY2018 Deemed NTG Value
ComEd (MW and MWh)	0.60
Gas Utilities (therms)	0.77

Source:

http://ilsagfiles.org/SAG_files/NTG/2017_NTG_Meetings/Final/ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, [PGL_and_NSJ_GPY7_NTG_Values_2017-03-01_Final.xlsx](#), and [Nicor Gas GPY7 NTG Values 2017-03-01 Final.xlsx](#)

Research NTG Impact Evaluation

The team will implement a real-time approach for deriving the NTGRs, which captures data as projects progress through the stages of participation. This methodology will include the following:

1. **Documentation Review.** The evaluation team will begin by reviewing the documentation on each sampled project provided by the implementation contractor to identify potential points of influence. This component will include:
 - a. Reviewing project narratives for indications of program influence.
 - b. Reviewing building plans from throughout the project’s participation to identify changes in efficiency throughout the construction process.
 - c. If needed, discussing the project with the implementation contractor to confirm areas where they believe the program was influential.

2. **Post-Reservation Interview.** Once a sampled project reaches the reservation stage, the implementation contractor will provide the evaluation team contact information for key decision makers and the team will conduct a post-reservation interview within 30 days or as soon as possible. We will also incorporate customized questions for each project linked to the points of influence identified in the documentation review. During these interviews, the team will also collect process data.

To fully implement the real time NTGR approach, we will conduct interviews with all projects currently in the reservation stage, regardless of program year, to best capture the program’s early influence. Because we will attempt to interview a census of projects, no sampling of projects or differentiation between electric and gas savings is needed. While we will attempt a census of all such projects, based on past evaluations, we expect to complete about 50 interviews.

Calculation of CPAS and Annual Savings

As required by the Future Energy Jobs Act (FEJA) for electric energy efficiency, the Navigant will report ex post gross and ex post net savings for the program and the cumulative persisting annual savings (CPAS) in CY2018 will be calculated along with the total CPAS. Additionally, we will develop a weighted average measure life based on recent program years, if possible. The evaluation team will also add the savings converted from gas savings not claimed by the gas utilities (if any) to the electric savings so that it is documented in the report.

Process Evaluation

The program instituted several new participation tracks to the program in EPY9/GPY6 and these are fully rolling out in CY2018. Additionally, the program will begin to serve public sector customers in CY2018. The process evaluation explores participants’ characteristics, satisfaction, and experiences, as well as other program implementation changes—such as changes to the program’s marketing and outreach strategy, and program challenges. We will collect this information through program manager interviews program participant interviews, and a review of program materials. In program participant interviews, we will ask about their experience with elements of the specific program tracks, as applicable, to provide the program with actionable information about the different tracks. Because of the nature of the questions and the fact that we will be asking these process-related questions to a census of participants in the reservation phase as part of the net-to-gross interviews, a randomized controlled trial or quasi-experimental design is not applicable for this research.

Navigant will perform additional process research, upon the request of the program manager, to support the program manager and implementer in transitioning into the revised regulatory requirements starting in CY2018. Possible topics may include, but will not be limited to, research on impact of public sector projects introduced into the program and investigation of the effects of codes and standards on the baseline of new construction in the ComEd service territory.

Use of RCT and QED

The evaluation team will not use the Randomized Control Trials (RCT) or Quasi-Experimental Design for process evaluation because:

- There are not enough participants in this program to achieve statistically significant savings estimates using this method.
- It would not be possible to create a valid matched control group for the customers in this program.
- This method would estimate average savings across all program participants which is not the desired savings estimate for this program

Evaluation Schedule

Table 6 below provides the schedule for key deliverables and data transfer activities. (See Table 2 for other schedule details.) Adjustments will be made, as needed, as evaluation activities progress.

Table 6. Schedule – Key Deadlines

Activity or Deliverable	Responsible Party	Date Delivered
Monthly calls with program/implementation staff	Evaluation Team, ComEd	Ongoing
CY2018 program tracking data for participant interviews	ComEd	April 1, 2018
Post-reservation phase participant interviews	Evaluation	April 1, 2018 through November 30, 2018
CY2018 program tracking data for sampling Wave 1	ComEd	June 1, 2018
Wave 1 engineering desk reviews	Evaluation	September 30, 2018
Process Analysis Findings	Evaluation	December 15, 2018
EUL Research Memo	Evaluation	December 15, 2018
CY2018 program tracking data for sampling Wave 2	ComEd	January 30, 2019
Wave 2 engineering desk reviews	Evaluation	February 28, 2019
NTG Analysis Findings	Evaluation	March 1, 2019
Internal Report Draft by Navigant	Evaluation	March 1, 2019
Draft Report to ComEd, Gas Utilities, and SAG	Evaluation	March 8, 2019
Comments on draft (15 Business Days)	ComEd, Gas Utilities and SAG	March 29, 2019
Revised Draft by Navigant	Evaluation	April 9, 2019
Comments on redraft (5 Business Days)	ComEd, Gas Utilities and SAG	April 16, 2019
Final Report to ComEd, Gas Utilities, and SAG	Evaluation	April 24, 2019