



**Nicor Gas Company – FinalDraft
Evaluation Plans for 2018-2021**

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

Prepared for:
Nicor Gas Company

Prepared by:
Navigant

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Submitted to:

Nicor Gas Company
1844 Ferry Road
Naperville, IL 60563

Submitted by:

Navigant
150 N. Riverside, Suite 2100
Chicago, IL 60606
Phone 312.583.5700
Fax 312.583.5701

Contact:

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

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

Laura Agapay-Read, Managing Consultant
312.583.4178
laura.agapay.read@navigant.com

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1. INTRODUCTION

This document presents draft evaluation, measurement and verification (EM&V) plans for evaluating Nicor Gas's 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. Nicor Gas is now accountable for the entire budget and savings goals. Elements of the DCEO portfolio transferred to Nicor Gas include:
 - i. Income Qualified 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 5 percent of the portfolio budget in the approved Nicor Gas plan.
- b. The Nicor Gas Energy Efficiency Plan (EEP) is 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 Nicor Gas 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 Nicor Gas' 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 Nicor Gas programs.
- Collaborate with Nicor Gas 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.

Commented [KG1]: Text added in response to joint comments from CUB-EDF-AG-NRDC.

Support Nicor Gas 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 the Nicor Gas energyENGINE data system and/or survey data when appropriate.
- Leverage infrastructure investments in energyENGINE, and 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.
- Support diverse vendors.

Reporting

- Provide annual evaluation reports for Nicor Gas 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 Nicor Gas 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, Nicor Gas, 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, Peoples Gas and North Shore 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 ¹				
	Process Research Year(s)	NTG Research Year(s)	NTG Results (Q3)	Other Research	
				Year	Activity
Home Energy Efficiency Rebate (HEER)					
Equipment Rebates	2019-20	2019-20	2020		
Upstream ²	2019-20	2019-20	2020	2019-20	<u>Secondary research on Update TRM: Quality Installation impacts and upstream delivery approaches (UC)</u>
Smart Tstat	TBD	None	NA	2018-19	Update TRM: Billing analysis
Education and Outreach Track					
BES	TBD	N/A	NA	2019-21	Net impacts through billing analysis
EEE	2019	None	NA		
ES Kits	2019-20	2019-20	2020	2019-20	Update TRM: Billing analysis of water saving measures (UC)
Home Energy Savings (HES)					
Audit/DI/ Wx Rebates	2017-18	2017-18	2018	2017-18	Update TRM: Billing analysis of air sealing & insulation measures
Smart Tstat	TBD	None	NA	2018-19	Update TRM: Billing analysis
Deep Retrofit	2019-20	2019-20	2020	2020-21	Calibrated simulation (UC)
Multi-Family					
Audit/DI	2018	2018	2019		
Retrofit Projects	2018	2018	2019	2019-20	Update TRM: Steam trap billing analysis (UC)
				2020-21	Update TRM: Equivalent Full Load Heating Hour billing analysis (UC)
Residential New Construction (RNC)					
RNC	2019	2019	2020	2019-20	Calibrated simulation

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 Although the Nicor Gas approved EEP 2018-2021 does not include an upstream residential offering, Nicor Gas expects to launch a pilot upstream HVAC offering before 2021.

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

Table 2. Income Qualified 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
SF and MF Weatherization & Retrofits					
Audit/DI/ Wx Rebates	2018	NA	NA	2020- 21	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		
Affordable Housing New Construction (AHNC)					
AHNC	2018	None*	NA	2019- 20	Calibrated simulation (UC)

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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.

* 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 Affordable Housing 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.

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

Table 3. Business 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 Energy Efficiency Rebate (BEER) (includes Public Sector)					
Equipment Rebates	2018	2018	2019	2020-21 2018	<u>Pipe Insulation secondary research</u> Update TRM: Non-Residential Equivalent Full Load Heating Hours through billing analysis (UC)
Steam Traps	2018	2018	2019	2018-19-20	Update TRM: Steam trap billing analysis (UC)
Public Sector Projects	2018	2018	2019		
Assessment/DI and STEP	2018	2018	2019		
Custom Incentives (includes Public Sector)					
Custom	2020	2020	2021		
RCx	<u>2019 and 2021</u>	<u>2019 and 2021</u>	<u>2020 and 2022</u>		
CHP	Combine with NTG	Project Specific	Project Specific		
Public Sector	2020	2020	2021		
Strategic Energy Management (SEM)					
SEM Cohorts	2018-21	None	NA	2018-21	<u>Behavioral iNet impacts estimated</u> through billing analysis
Small Business					
Audit/DI	2018-19	2019	2020		
Retrofit Projects	2018-19	2019	2020	2020-21 2018	<u>Thermostats - secondary research on savings</u> Update TRM: Advanced thermostat billing analysis (UC)
Joint Business New Construction (BNC)					
BNC	Combine with NTG	<u>2019 and 2021 Every Year</u>	<u>Every Year 2020 and 2022</u>		

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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.

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

* Over the course of 2018 we will examine the program theory and evaluation approach to inform discussions in the fall SAG NTG deliberations about the need for doing free ridership surveys with SEM participants in future years. We have tentatively planned to do NTG research in 2019 and 2021 pending the outcome of those deliberations.

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 Nicor Gas 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 Nicor Gas 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 both the Company 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 Nicor Gas 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 Qualified 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 Nicor Gas 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.

Commented [MJ2]: Is this explanation included in each of the program evaluation plans? I’m not seeing it. Please add to comply with the stipulation.

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 Nicor Gas and their implementation contractors.

Commented [KG3R2]: We include explanations in each plan.

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 Nicor Gas, 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 1 of each year, submitted to the ICC, and are effective January 1, 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 the Company’s 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

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

program improvements early in the review process. To meet timely reporting requirements, Navigant will develop this evaluation schedule based on Nicor Gas 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 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 Nicor Gas and its 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 Nicor Gas’s 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 Nicor Gas staff 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 Nicor Gas and contractor 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 Nicor Gas' energy efficiency programs. Navigant will conduct research with the trade allies to understand their concerns and to help Nicor Gas 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 Nicor Gas' 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 Nicor Gas 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 the Company 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 energyENGINE

Navigant will structure its research to leverage the Nicor Gas energyENGINE data system. For example, Navigant will work with Nicor Gas to identify energyENGINE 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 Nicor Gas incorporate best practices from programs administered in other jurisdictions. Navigant will work with Nicor Gas 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 Nicor Gas plan, discussions with Nicor Gas, 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 Insulation and Air Sealing** – Navigant will interpret results of the air sealing and insulation billing analysis conducted in PY6 (with expected completion in early 2018) and apply the findings to recommend updates to the TRM residential insulation and air sealing measures. TRM work papers will be developed for affected measures.
- **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, more robust tracking data, and energyENGINE demographics. Navigant will produce a TRM work paper if the assumptions or methodology needs to be updated based on study findings.
- **Steam Traps Process and NTG** – In March 2018, Navigant will initiate a process research study on steam traps, followed by NTG research that will begin in the second quarter of 2018. Further details are described in the Business Energy Efficiency Rebate (BEER) evaluation plan study is planned for 2018.
- **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, although no study is planned at this time. 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

Commented [MJ4]: Recommend including an evaluation plan for all the evaluation research items planned for 2018, including start and end dates. Recommend also including a table listing the evaluation research items and year expected to evaluate. This table would then be updated each year based on new priorities with the current year’s activities scoped out in the evaluation plan. Within the table, you could indicate whether the evaluation activity is described within a program-specific evaluation plan or if it has a separate scope in this document.

Commented [KG5R4]: The recommended four-year table has been added.

We added a table to break out 2018 evaluation research activities in more detail.

Commented [MJ6]: Recommend adding a steam trap impact study to the plan for 2018 and coordinate with the Ameren EM&V team

Commented [KG7R6]: Recommendation discussed with ODC (for Ameren Illinois). Revised text reflects coordinated approach on the initial background research and scope development that will occur in the first half of 2018 to determine if a research study is viable.

industrial steam traps ~~also faces is not likely the challenge of to be feasible due to the difficulty in~~ isolating the impact of steam traps.

In 2018, we will work with the Ameren Illinois, Peoples Gas, and North Shore 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.

- **Residential New Construction** – Navigant will update calibrated simulation models for residential new construction in 2019. If program volume is sufficient, Navigant will also consider a calibrated simulation study for Affordable Housing New Construction in the income qualified sector.
- **Whole House “Deep Retrofits”** – Nicor Gas aims to promote whole house comprehensive retrofits in the HES Program through assessments and bonus incentives to install multiple measures. Navigant will verify projects using the TRM and custom analyses (if necessary). If program volume is sufficient (likely 2019 or later), Navigant will consider evaluation research to confirm TRM estimates of savings. Navigant will develop models and use actual consumption data to calibrate them to determine the accuracy of TRM savings estimates and capture interactive savings effects. Navigant will also consider a calibrated simulation study for comprehensive single-family retrofits in the income qualified sector.
- **Water Saving Measures** – Navigant will investigate the feasibility of a billing analysis study to estimate the impact of water saving measures distributed through kits by analyzing summer period energy usage. If a study is feasible, it will be considered for funding.
- **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.
- **Residential Furnace Quality Installation Impacts and Upstream Program Delivery Secondary Research** – A study is under consideration, but the decision to proceed and timing depend on future Nicor Gas implementation plans. Residential Furnace Quality

Commented [MJ8]: Can you conduct this research in 2018? Can any primary research be performed to verify the savings from the TRM value for pipe insulation is accurate?

Commented [KG9R8]: Yes, we intended to do the secondary research in 2018.

Primary research on non-residential heating system EFLH affects pipe insulation. As part of the secondary research, Navigant will investigate opportunities for primary research.

Commented [MJ10]: Can you conduct this research in 2018?

Commented [KG11R10]: Yes, we intended to do the secondary research in 2018. A billing analysis is under consideration for future years; it depends on program implementation plans and results.

~~Installation~~ – ~~There are no plans to conduct research on thmeasure at this time, but we will revisit that depending on Nicor Gas implementation plans.~~ Primary research to quantify quality installation savings is challenging due to the difficulty in defining a baseline or comparison group. Utilities in Iowa include this measure in programs, however recent impact evaluation work has relied upon engineering review of algorithms rather than primary research.

- **Non-Residential Heating System EFLH** – Navigant will consider conducting a study to update the non-residential equivalent full load heating hour research Navigant conducted in PY3 in the business sector.
- **Non-Energy Benefits (NEBs)** – NEBs are program impacts that are separate from energy savings. Navigant will work with Nicor Gas to identify opportunities to research NEBs and develop a strategy for conducting NEBs research efficiently. Navigant will inform Nicor Gas 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 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 Insulation and Air Sealing Billing Analysis and TRM Workpapers	Active	HES Plan	1Q-2Q			
Residential Smart Thermostat Billing Analysis	Planned	HES and HEER Plans	2Q-4Q	1Q-2Q		
Steam Traps – Process and NTG Research Study	Planned	BEER Plan	1Q-3Q			
Steam Traps –NTG Research Study	Planned	BEER Plan	2Q-4Q	1Q-2Q		
Steam Traps – Background Research on Viability of Impact Study	Planned	BEER Plan	1Q-2Q			
Steam Traps – Impact Study with Billing Data *	Under Consideration		2Q-4Q	1Q-2Q		
Non-Residential Pipe Insulation – Thermal Regain Factors and Primary Research Opportunities	Planned	BEER Plan	2Q-4Q			
Small Business Thermostats – Savings Benchmarking	Planned	Small Business Plan	2Q-4Q			
Small Business Thermostats – Billing Analysis †	Under Consideration				1Q-4Q	
Residential New Construction – Update Calibrated Simulation Models	Planned	RNC Plan		1Q-4Q		
Whole House “Deep Retrofits” Calibrated Simulations *	Under Consideration			3Q/4Q	1Q-4/2Q	
Water Saving Measures –Billing Analysis *	Under Consideration			1Q-4Q		
Residential Furnace Quality Installation Impacts and Upstream Program Delivery Secondary Research †	Under Consideration			3Q-4Q		
Non-Residential Heating System EFLH *	Under Consideration				1Q-4Q	
Non-Energy Benefits (NEBs) Participate in Primary and Secondary Research	Under Consideration				Conducted on a case-by-case 3Q/4Q basis as opportunities for coordination with ComEd arise	

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* 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 Nicor Gas implementation plans..

Table 6. 2018 Research Study Schedule

Activity	Start Research	Draft Deliverable / Report	Final Deliverable / Report
<u>Residential Insulation and Air Sealing Billing Analysis</u>	<u>August 1, 2017</u>	<u>March 15, 2018</u>	<u>May 15, 2018</u>
<u>Residential Smart Thermostat Billing Analysis</u>			
<ul style="list-style-type: none"> <u>Detailed Scope of Work</u> 		<u>May 15, 2018</u>	<u>June 30, 2018</u>
<ul style="list-style-type: none"> <u>Research Study</u> 	<u>July 9, 2018</u>	<u>2Q 2019</u>	<u>2Q 2019</u>
<u>Steam Traps – Process Research Study</u>	<u>March 1, 2018</u>	<u>July 20, 2018</u>	<u>August 31, 2018</u>
<u>Steam Traps –NTG Research Study</u>	<u>June 1, 2018</u>	<u>June 30, 2019</u>	<u>July 31, 2019</u>
<u>Steam Traps – Impact Study with Usage Billing Data *</u>			
<ul style="list-style-type: none"> <u>Background Research Memo</u> 			<u>May 31, 2018</u>
<ul style="list-style-type: none"> <u>Scope of Work</u> 			<u>June 30, 2018</u>
<u>Non-Residential Pipe Insulation – Thermal Regain Factors and Primary Research Opportunities</u>	<u>June 1, 2018</u>	<u>October 31, 2018</u>	<u>December 7, 2018</u>
<u>Small Business Thermostats – Savings Benchmarking</u>	<u>June 1, 2018</u>	<u>October 31, 2018</u>	<u>December 7, 2018</u>

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** 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 Nicor Gas to define the key dates and deliverables to ensure that our results meet the 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 Nicor Gas 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).

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.

Commented [MJ12]: Please include dates for draft and final spreadsheets.

Commented [KG13R12]: Dates added for the February 20 revision

APPENDIX A. DETAILED PROGRAM EVALUATION PLANS

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

- Residential Programs
 - energySMART Program Home Energy Efficiency Rebates (HEER)
 - energySMART Program Energy Saving Kits (Kits)
 - Home Energy Savings (HES)
 - Multi-Family Home Energy Savings (MF)
 - Residential New Construction (RNC)
 - Elementary Energy Education (EEE)
 - Behavioral Energy Savings (BES)⁴
- Income Qualified Programs
 - SF and MF Weatherization & Retrofits
 - Affordable Housing New Construction (AHNC)
 - Public Housing Authority (PHA) / Multi-Family Buildings
- Business Programs (includes Public Sector)
 - Business Energy Efficiency Rebates (BEER)
 - Business Custom Incentives (Custom)
 - Retro-Commissioning (RCx)
 - Strategic Energy Management (SEM)
 - Small Business Energy Efficiency (SB)
 - Business New Construction (BNC)
- Market Transformation Initiatives and Emerging Technologies Program (ETP)

⁴ BES offers no programs in 2018 but implementation may begin 2019.

A.1 Residential Programs

Home Energy Efficiency Rebate Program 2018 – 2021 Evaluation Plan

Introduction

The Home Energy Efficiency Rebate Program (HEER) provides incentives for the purchase and installation of high efficiency natural-gas furnaces and boilers, smart thermostats, and other high efficiency natural gas residential end use equipment. Customers are encouraged to install the most efficient gas heating equipment and appliances available when replacing older, less efficient equipment. This is accomplished by influencing the purchase and installation of high efficiency space heating and water-heating technologies through a combination of market push and pull strategies as well as education by Trade Allies.

The Nicor Gas Energy Efficiency Plan 2018-2021 indicates the way customers receive their rebates will be changing. During the first six program years, customers found a trade ally, submitted a rebate application, and received their check through the mail after the work was done (for the most part). During 2018 through 2021, the participation structure will change such that customers work with one of the Nicor Gas contractor circle members to obtain the desired equipment, and receive an instant rebate at the time of installation. This new model will allow the contractor circle member to educate the customer on how to best utilize the equipment and maintain it in order to maximize efficiency. Additionally, this offering approach may be paired with other offerings such as HVAC Save, to make sure that the equipment has been installed properly and is maximizing energy efficiency in the home.

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.

Commented [MJ14]: What about the move to an upstream model? I wonder if there is any secondary research you could perform on how other programs with upstream furnace programs work and whether there are any lessons learned from those programs that could be incorporated into the Nicor program design.

Commented [KG15R14]: Yes, we can conduct secondary research on upstream furnace programs. The decision to proceed and timing depend on future Nicor Gas implementation plans.

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 [*]	23Q-4Q	1Q-2Q		
Primary Research to Update the TRM - Residential Furnace Quality Installation Impacts and Upstream Program Delivery[†]		X	X	
Research - Participant FR plus Process On-line Survey		Real-time	Real-Time	
Research - Participant SO plus Process Survey			One Time	
Research - Trade Ally SO plus Process Survey			One-Time	
Present Process and NTG Research Results			July 1	
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

^{*} ~~Study is under consideration.~~

[†] ~~Study is under consideration, but the decision to proceed and timing depends on future Nicor Gas implementation plans.~~

Residential Furnace Quality Installation Impacts and Upstream Program Delivery Secondary Research – ~~A study is under consideration, but the decision to proceed and timing depend on future Nicor Gas implementation plans. There are no plans to conduct research on this measure at this time, but we will revisit that depending on Nicor Gas implementation plans.~~ Primary research to quantify quality installation savings is challenging due to the difficulty in defining a baseline or comparison group. Utilities in Iowa include this measure in programs, however recent impact evaluation work has relied upon engineering review of algorithms rather than primary research.

Evaluation Plan for Program Year 2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for program year 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?

Commented [Apex16]: Below it states that there are no plans to conduct research on QI

Commented [KG17]: Perhaps a better way to state this is that a study is under consideration, but the decision to proceed and timing depend on future Nicor Gas implementation plans.

4. What updates are recommended for the Illinois Technical Reference Manual (TRM)?

In 2018, Navigant will develop a scope of work for a study to conduct primary billing data research on the ~~gas gross~~-impact of Smart Thermostats, to inform future updates to the TRM. If the study goes forward ~~in 2018~~ as anticipated, the initial steps ~~in 2018~~ will begin in Q3 with Navigant developing the ~~detailed scope of work~~, data request, and methodology.

Process Evaluation:

Navigant’s 2018 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.

Net Impact Evaluation

The 2018 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. Deemed NTGR for 2018

Program Path/Measure	Deemed NTGR
Home Energy Eff Rebates (including Programmable Thermostats but excluding Smart Thermostats, Duct Sealing, Air Sealing, and Insulation Measures)	0.68
Home Energy Eff Rebates (all measures, excluding Programmable Thermostats, Smart Thermostats, Duct Sealing, Air Sealing, and Insulation Measures)	0.72
Smart Thermostats	NA*

Source: Nicor Gas 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.

Use of Randomized Controlled Trial and Quasi-Experimental Design

We are not evaluating the HEER 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.

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 Program Year 2018

Table 4 below provides the schedule for evaluation of the 2018 HEER Program. Adjustments will be made as needed as program year evaluation activities begin.

Table 4. Program Year 2018 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 in 2018)	Evaluation Team	Q3-/Q4 2018
Process Findings Memo	Evaluation Team	August 15, 2018
Final Tracking Data to Navigant	Nicor Gas	January 30, 2019
Draft Impact Report to Nicor Gas and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	Nicor Gas / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 12, 2019
Comments on Redraft	Nicor Gas / SAG	April 19, 2019
Final Impact Report to Nicor Gas and SAG	Evaluation Team	April 26, 2019

Energy Saving Kits Program 2018 – 2021 Evaluation Plan

Introduction

Nicor Gas plans to continue distributing Energy Saving Kits (ESK) during 2018-2021. The kits are free and include low-flow showerheads (1 or 2 per kit), kitchen aerators, shower timers and bathroom aerators (1 or 2 per kit). These low-flow devices conserve hot water and therefore save the natural gas needed to heat the water. The option of only one bathroom aerator is new and based on Navigant’s PY5 evaluation recommendation to eliminate the waste of a percentage of bathroom aerators for those participants who do not need two. Also new to the ESK offering, beginning in 2018, is a shower timer that will further contribute to therm savings. The ESKs are free to all Nicor Gas residential customers who choose to request a kit. Further, the offering will target customers through direct email, outreach events, targeted emails, energySMART website promotions, and through financial heating assistance intake centers.

Commented [Apex18]: Based on the PY5 recommendation, we now offer a third kit option that has only one bathroom aerator. The idea was to eliminate the “waste” of a percentage of bathroom aerators for those who don’t need two.

Commented [LA19]: Noted.

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 – ESK Billing Analysis of Water-Saving Measures		X*		
Research - Participant FR plus Process On-line Survey		Real-time	Real-Time	
Research - Participant SO plus Process Survey			One Time	
Present NTG Research Results			Q3	
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

Commented [Apex20]: I would suggest that a customer be contacted no sooner than 8 weeks after receiving a kit to allow time for installation.

Commented [LA21]: Noted.

* Study to be considered. Participants contacted at least eight weeks after receiving a kit to allow time for installation.

In 2019, Navigant will investigate whether a billing analysis can be used to estimate the impact of water saving measures distributed through kits by considering summer period energy usage.

Evaluation Plan for Program Year 2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for program year 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)?

Process Evaluation:

Navigant's 2018 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.⁵ 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.

Net Impact Evaluation

The 2018 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.

⁵ Navigant understands that the program will track a total of six kit types: by 3 kit types (by showerhead and bathroom faucet aerator quantities) and by two household types (single-family and multi-family).

Commented [Apex22]: Without primary research, what recommendations are you planning to make?

Commented [KG23]: Navigant may make recommendations for updates to the TRM, based on our findings from the savings verification effort. Typically, these recommendations involve finding an error in the TRM, clarifying language to interpret and apply the TRM as intended, new secondary research on an input assumption, or adding a new measure.

Commented [Apex24]: We are tracking kits six different ways (3 kit options – each now tracked as either single-family or multi-family), so we have assigned a different gross therm value for each.

Commented [LA25]: Noted.

Table 2. Deemed NTGR for 2018

Program Path/Measure	Deemed NTGR
Energy Saving Kits – All Measures	0.84

Source: 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.

Use of Randomized Controlled Trial and Quasi-Experimental Design

We are not evaluating the ESK program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. In 2019 we will investigate whether a quasi-experimental design with consumption data can be used to estimate the impact of water saving measures distributed through kits by considering summer period energy usage.

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 Program Year 2018

Table 4 below provides the schedule for evaluation of the 2018 ESK Program. Adjustments will be made as needed as program year evaluation activities begin.

Table 4. Program Year 2018 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	Nicor Gas	January 30, 2019
Draft Impact Report to Nicor Gas and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	Nicor Gas / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 12, 2019
Comments on Redraft	Nicor Gas / SAG	April 19, 2019
Final Impact Report to Nicor Gas and SAG	Evaluation Team	April 26, 2019

Home Energy Savings Program 2018 – 2021 Evaluation Plan

Introduction

The Home Energy Savings (“HES”) program is a whole house single family weatherization program with the objective to obtain natural gas and electricity savings in existing single-family buildings. The joint program targets Nicor Gas and ComEd customers with gas space heating and electric central air conditioning in single family homes or multi-family buildings with up to 4 units. The Gas ~~o~~Only component targets select municipalities serviced by municipal electric providers.

The HES program provides weatherization and shell improvement opportunities using standard, prescriptive and ~~whole-house approaches~~. The standard offering provides home energy assessments to customers and achieves energy savings through the direct installation of energy saving products ~~during the assessment~~ including LED’s (offered jointly with ComEd), pipe insulation, shower heads and aerators, programmable thermostat reset, ~~etc. at the time of assessment~~, and co-pay smart thermostats. If the participant chooses to implement the recommended weatherization work, financial incentives are offered.

The Prescriptive offering includes attic air sealing and insulation performed by a program approved certified participating contractor. After a customer has expressed interest in the program, a participating contractor schedules a site visit to the home. No assessment is required and the participating contractor will complete the air sealing and insulation weatherization work. The customer receives an “instant discount” on the completed work.

The whole house approach ~~(which will be offered starting in 2019)~~ ~~w~~aims to generate deep savings in a customized approach. The deep savings are achieved through a comprehensive whole house model approach to energy efficiency by treating ~~a~~ single family or multi-~~unit family (up to 1-4 units)~~ ~~dwelling~~s as a system of interconnected mechanical systems. The offering includes assessment of dwelling envelop, mechanical systems, air distribution system, appliances and lighting. Customers will be provided with a customized energy report with energy efficiency improvement recommendation. The customer will also be a provided bonus incentive to undertake multiple recommendations.

Commented [Apex26]: Note that whole home component will not be offered under HES in 2018.

Commented [CZ27]: Thank you we have added this detail to the paragraph that explains the whole house approach.

Commented [Apex28]: What does this mean?

Commented [CZ29]: We revised the wording.

Commented [Apex30]: Do you mean 5+ units here?

Commented [CZ31]: Customers are eligible to participate in this program if they live in single family and multi-unit homes up to 4 units. 5+ units would be eligible to participate in the Multifamily 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 TRM – Air Sealing and Insulation Billing Analysis and TRM Work Papers	Q1-Q2			
Primary Research to Update the TRM - Smart Thermostat Billing Analysis*	2Q-Q4	1Q-Q2		
Primary Research – Whole House Comprehensive “Deep Retrofit” Calibrated Simulation Billing Analysis†			X	
Research - Participant FR plus Process On-line, Real-Time (Monthly) Survey	Q1/Q2			
Research - Participant SO plus Process Telephone Survey (One-time)	Q1/Q2			
Present NTG Research Results	July 31			
Research – Deep Retrofit Participant FR plus Process On-line, Real-Time (Monthly) Survey		3Q/4Q	Q1/Q2	
Research – Deep Retrofit Participant SO plus Process Telephone Survey (One-time)			Q1/Q2	
Present Deep Retrofit NTG Research Results			July 1	
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

* Study is under consideration.

† Study is under consideration

Nicor Gas aims to promote whole house comprehensive retrofits through assessments and bonus incentives to install multiple measures. If program volume is sufficient, Navigant will consider evaluation research to confirm TRM estimates of savings. Navigant will develop models and use actual consumption data to calibrate them in order to determine the accuracy of TRM savings estimates. This research may be used to provide revisions to the TRM, which could impact energy savings for 2021 and beyond.

Evaluation Plan for Program Year 2018

Evaluation Research Objectives

The evaluation team has identified the following objectives for evaluation research for program year 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)?
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 2018, the evaluation team will conduct NTG research with participating customers through an on-line, real-time survey approach to determine free ridership and a one-time telephone survey for spillover to inform NTG recommendations for 2019 and beyond.

In 2018, Navigant will develop a scope of work for a study to conduct primary billing data research on the ~~gas gross~~-impact of Smart Thermostats, to inform future updates to the TRM. If the study goes forward ~~in 2018~~, the initial steps ~~in 2018~~ will begin in Q3 with Navigant developing the ~~detailed scope of work~~, data request, and methodology.

Navigant will interpret results of the air sealing and insulation billing analysis conducted in 2017 and 2018 (with expected completion in early 2018) and apply the findings to recommend updates to the TRM residential insulation and air sealing measures. Navigant will submit revised TRM work papers for affected measures by May 15, 2015.

Process Evaluation:

Navigant's 2018 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 2018 NTG survey will include 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

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.

Net Impact Evaluation

The 2018 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. Deemed NTGR for 2018

Program Path/Measure	Deemed NTGR
Home Energy Savings - All measures except Smart Thermostats	1.05
Smart Thermostats	NA*

*Source: Nicor Gas 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

Navigant will conduct a combination of real time and one time NTG research. Using monthly tracking data with participants’ email addresses, we will conduct real-time research on free ridership from January to May 2018 through an on-line participant survey. No sampling would be done; the evaluation team would email a link to the survey to all participants with an email address. Satisfaction and process-related questions would also be included in the on-line survey. Spillover research will be conducted through a one-time telephone survey in Spring 2018 (Q4 GPY6 participants would not be included in the spillover sample).

The process analysis will include a synthesis of both qualitative and quantitative data collected during the NTG surveys and in-depth interviews with program management and implementers.

Use of Randomized Controlled Trial and Quasi-Experimental Design

We are not evaluating the HES program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups. In 2018 Navigant will interpret results of the air sealing and insulation billing analysis conducted in 2017 and 2018 and apply the findings to recommend updates to the TRM residential insulation and air sealing measures. Also 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.

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	Q4 2018	Interview program staff
Real-Time On-line Survey for FR Research	Q1/Q2 2018 Participants	All	Real-Time, Monthly	Data for FR and process research
Telephone Survey for SO Research	Q2 – Q4 2017 Participants	100	Spring 2018	Data for SO research
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 Program Year 2018

Table 4 below provides the schedule for evaluation of the 2018 HES Program. Adjustments will be made as needed as program year evaluation activities begin.

Table 4. Program Year 2018 Evaluation Schedule

Activity/Deliverables	Responsible Party	Completion/Delivery
Conduct Process and NTG Surveys	Evaluation Team	Q1 to Q2 2018
Air Sealing and Insulation Billing Analysis Study Report	Evaluation Team	Mid-March February 15, 2018 (draft) April 11 Mid-March, 2018 (final)
Submit Air Sealing and Insulation TRM Work Paper Updates	Evaluation Team	May 15, 2018
NTG Research Findings Memo	Evaluation Team	July 31, 2018
Process Research Findings Memo	Evaluation Team	August 31, 2018
Present NTG Recommendation for 2019	Evaluation Team	September 1, 2018
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 Q4 2018
Final Tracking Data to Navigant	Nicor Gas	January 30, 2019
Draft Impact Report to Nicor Gas and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	Nicor Gas / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 12, 2019
Comments on Redraft	Nicor Gas / SAG	April 19, 2019
Final Impact Report to Nicor Gas and SAG	Evaluation Team	April 26, 2019

Multi-Family Program 2018-2021 Evaluation Plan

Introduction

The Multi-Family Comprehensive Energy Efficiency Program (Multi-Family) will address residential (living units) and commercial (common areas, central plants) energy efficiency opportunities available in multi-family buildings. Further, the program will aim to overcome market barriers to the installation of energy efficiency measures in multi-family buildings by offering comprehensive assessments, technical assistance and incentives.

Multi-Family is designed so that customers can participate through two types of offerings. One offering consists of a free energy assessment and free installation of energy saving products. This portion of the program is offered jointly with ComEd. This direct install portion of the program offers free installation of low-flow showerheads, faucet aerators, domestic hot water pipe wrap, programmable thermostats and thermostat education, and lighting and adjustment of the temperature setting of hot water heaters to reduce the consumption of natural gas and electricity.

Customers are also eligible for rebates and incentives through the purchase and installation of qualifying energy efficient products. Typical projects consist of boiler tune-ups, boiler controls, steam trap repairs/replacement, space and water heating equipment upgrades, and building shell insulation. These upgrades are performed by installing trade allies.

This program will continue from the program offered during PY4-6, targeting property owners of residential gas heated multi-family buildings of five or more units including high-rise buildings, low-rise buildings, town homes, condominiums, assisted living, retirement communities, non- income qualified properties, public income qualified properties and public and private school dormitories.

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 based on 2018 program data, unless there is a particular interest to consider part of 2019 program year data.

Evaluation Plan for Program Year 2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for program year 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)?
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 program year 2018, 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.

Commented [Apex32]: What TRM inputs are you planning to update – you've not proposed primary research for trm measures (custom only)

Commented [CA33]: Although no specific primary research is stated here under the MF plan, some of the proposed 4-year plan research will affect the MF program. This may include pipe insulation, heating EFLH, steam traps, and water measures billing analysis. Also where any custom evaluation finding or parameter estimate is deemed reasonable to recommend to the TRM, evaluation will do so.

Commented [KG34]: Navigant may make recommendations for updates to the TRM, based on our findings from the savings verification effort. Typically, these recommendations involve finding an error in the TRM, clarifying language to interpret and apply the TRM as intended, new secondary research on an input assumption, or adding a new measure.

Process Evaluation:

Navigant’s 2018 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 —options A, B, and/or C for on-site measurement and verification of custom projects. The impacts for some projects will be verified by engineering file review of site-collected data and determined with regression analysis of trend or 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 B or C, depending on which data are used. If implemented measures are not amenable to regression analysis, the evaluated savings will be determined by the engineering review with site verified data will form the basis of evaluated savings, incorporating historical data when available using IPMVP option A.

The sampling plan for these custom projects, including those for engineering review and billing analysis, 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

Commented [Apex35]: Can you clarify which get an engineering review and which get a billing analysis (below)?

Commented [Apex36]: Custom projects only?

Commented [Apex37]: Options A (key parameter measurement) and B (all parameter measurement) are actually doing metering/measurement, not only billing analysis. As written here you seem to be talking about different forms of billing analysis but not metering. Suggest you clarify you plan on potentially metering or not, and if so that would be Options A or B, if not it would be Option C (which I believe is most likely).

Commented [CA38]: The text is clarified.

Commented [Apex39]: Which projects? Engineering review or billing analysis or....

Commented [KG40]: We will draw sample projects in waves to achieve 90/10 for the program year. Sampled projects may receive engineering review or billing analysis, and may include a site visit, depending on the nature of the project.

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 2018 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. Deemed NTGR for 2018

Program Path/Measure	Deemed NTGR
Multi-family In-Unit Direct Install All Measures	0.95
Multi-family Comprehensive All Measures	0.94

Source: Nicor Gas 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 2018 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 2018 tracking data in February 2019 and complete in May 2019.

The Nicor Gas NTG research activities and timeline will be coordinated with similar research to be conducted by the ComEd and the Peoples Gas and North Shore 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 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 decision maker customer surveys. The program year 2018 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 Program Year 2018

Table 4 below provides the schedule for evaluation of the 2018 Multi-Family Program. Adjustments will be made as needed as program year evaluation activities begin.

Table 4. Program Year 2018 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	Nicor Gas	January 30, 2019
Draft Impact Report to Nicor Gas and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	Nicor Gas / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 13, 2019
Comments on Redraft	Nicor Gas / SAG	April 20, 2019
Final Impact Report to Nicor Gas 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

Nicor Gas and ComEd Residential New Construction Program CY2018 to CY2021 Evaluation Plan

Introduction

The Residential New Construction Program is jointly offered by Nicor Gas and ComEd. Nicor Gas is the lead utility as most of the avoided costs are from natural gas savings. Residential Science Resources (RSR) implements the program for Nicor Gas. Seventhwave (with RSR as their subcontractor) implements the program for ComEd. Residential Science Resources (RSR) implements the program for both utilities. Program participation requires a minimum efficiency of 20 percent above code for each home, and program homes are ranked in tiers based on performance:

- Tier 1: 20.00-24.99 percent above code
- Tier 2: 25.00-29.99 percent above code
- Tier 3: 30 percent or more above code

RSR uses completed REM/Rate files for each home to calculate whole-house savings. The program relies on networks of builders and Home Energy Rating System (HERS) raters to garner participation and continues to attract raters and builders to the program.

Nicor Gas Company (Nicor Gas) and ComEd are implementing Calendar Year 2018 (CY2018) beginning January 1, 2018 and continuing through December 31, 2018. The plan target savings goals for CY2018 are shown in Table 1.

Table 1. CY2018 Savings and Completed Homes Goals

Goal	Goal Value
Gas Savings	249,750 Gross therms
Electric Savings	878 Gross MWh
Total Homes	800 <u>joint</u> homes

Source: ComEd 2018-2021 Energy Efficiency and Demand Response Plan and Nicor Gas Energy Efficiency Plan January 2018-December 2021

This document presents the proposed evaluation activities for the CY2018 joint Nicor Gas and ComEd Residential New Construction Program. Navigant is the evaluator for both utilities' programs. The objectives of the CY2018 evaluation are to (1) identify ways in which the program can be improved; (2) determine process-related program strengths and weaknesses; and (3) verify the gross and net kilowatt-hour (kWh), kilowatt (kW), and therm impacts of the program. To evaluate program gross impacts, the evaluation team will verify the quantity of homes incented in CY2018 and apply the GPY5/EPY8 researched realization rates for both gas and electric savings to verified ex ante savings.

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. Navigant will complete a tracking system review, interview program managers and implementers, calculate gross realization rates, and complete a process analysis for each program year. Navigant will perform simulation modeling for the

Commented [CC41]: For ComEd, RSR is sub to Seventhwave under 2018 contract

Commented [LB42]: Thank you for the clarification – additional context added for both utilities

Commented [KG43R42]: ComEd requests that implementation contractors not be named in evaluation plans for programs they offer.

Commented [CC44]: Note: these are filed plan goals. If you want to update with contract goals for 2018 they are:
308,322 gross therms
915 gross MWh
850 joint homes

Commented [LB45]: Thank you. We are using filed plan goals in all the plans.

Commented [Apex46]: This methodology relies on the implementer not making any changes to the measures, methods, or models between GPY5/EP8 and 2018. To the extent these have changed, the realization rates will no longer be accurate.

Commented [LB47]: Correct – Navigant is not aware of any program changes that will affect energy savings

Commented [Apex48]: Above it states the evaluator will apply previously researched realization rates, not calculate them.

Commented [LB49]: The evaluation team will apply previously researched realization rates by home tier level, and the overall realization rate will be calculated for the program as a whole.

gross impact analysis and trade ally interviews for net-to-gross (NTG) and process research in CY2019 when the residential energy code changes from IECC 2015 to IECC 2018. The trade ally interviews will include interviews with participating raters and builders to learn about their perspectives and satisfaction with the program, incentive offerings, and how to improve the program in the future. The NTG research will include in-depth interviews with both participating and non-participating builders to assess free ridership and spillover. The findings will inform recommended NTG values for the Illinois Stakeholder Advisory Group (SAG) approval and future program application.

Table 2. Evaluation Approaches – Four Year Plan

Tasks	CY2018	CY2019	CY2020	CY2021
Tracking System Review	X	X	X	X
Data Collection – Program Manager and Implementer Interviews	X	X	X	X
Data Collection – Trade Ally Interviews		X		
Impact – Modeling		X		
Impact – Verification & Gross Realization Rate	X	X	X	X
Net-to-Gross – Trade Ally Interviews		X		
Process Analysis	X	X	X	X

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

- Gross and net impact analysis will be conducted each year
- Calibrated simulation modeling for the impact analysis in CY2019 when the residential energy code changes to IECC 2018
- Optimized timing on when to conduct NTG research
- NTG research in CY2019 when the residential energy code changes to IECC 2018
- Trade ally interviews in CY2019 as part of the NTG research
- Program manager and implementer interviews will be conducted each year
- Electric CPAS will be calculated based on the requirements of FEJA (ComEd-only)

Coordination

Navigant will coordinate with the evaluation teams for other utilities on any issues relevant to this program. Specifically, the Residential New Construction Program is jointly offered by Nicor Gas and ComEd. The evaluation activities and timing for each utility evaluation are the same as this is one evaluation effort for both utilities.

Evaluation Research Topics

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

Impact Evaluation

1. What are the gross annual energy and demand savings induced by the program?
2. Did the program meet its energy and demand savings goals? If not, why not?
3. What are the net impacts from the program?

Process Evaluation and Other Research Topics

The process evaluation effort for CY2018 will focus on program delivery. The process research will address the following questions:

1. How can the program be improved?
2. Are builders and raters satisfied with the program? What improvements, if any, would builders and raters like to see implemented?
3. How is the transition into CY2018 along with the income-eligible programs impacting the program?

Evaluation Approach

Table 3 summarizes the evaluation plan for CY2018 and CY2019 including data collection methods and sources that will be used to answer the evaluation research questions. Final activities will be determined annually as program detail and requirements become known.

Table 3. Evaluation Plan Summary

Activity	CY2018	CY2019
Gross Impact Approach	Apply GPY5/EPY8 Realization Rates	Calibrated Energy Simulation
Verified Net Impact Approach	Deemed Value	Deemed Value
Researched NTG Approach	None	Interviews with Builders
Researched NTG Timing	None	Fall/Winter 2019
Program Manager and Implementer Interviews/Review Materials	Yes	Yes

Commented [MJ50]: Why are historical realization rates being applied here?

Commented [LB51]: As the calculation method for determining ex ante savings has not changed for CY2018, the evaluation team plans to apply the GPY5/EPY8 realization rates to the ex ante savings to determine verified gross impacts for CY2018.

Table 4 summarizes the proposed data collection activities for CY2018 including the sample sizes and timing of each activity.

Table 4. Core Data Collection Activities, Sample, and Analysis

Activity	Target	Target Completes CY2018	Timeline	Notes
Tracking System Review	Tracking system	Census	Two waves: April 2018 and Jan 2019	
Program Material Review	Program manuals, marketing and educational materials	All	Jan – Feb 2019	Process analysis
In Depth Interviews	Program Management and Implementers	3	April – Dec 2018	Augment with monthly calls
Gross Impact	Use GPY5/EPY8 realization rate to adjust claimed savings for CY2018 homes	All	Feb 2019	
Verified Net Impact	Calculation using deemed NTG ratio	NA	March 2019	

In line with program changes and the accelerated evaluation schedule for delivering tracking data to the evaluation team, Navigant will perform an early tracking system review in April 2018. This includes a review of both the tracking system and the ex ante savings methodology to ensure that ex post building simulation models are representative of program homes and any program changes.

Gross Impact Evaluation

The GPY5/EPY8 evaluation used a rigorous approach of calibrated energy simulation to determine gross realization rates for gas and electric savings and to estimate gross electric demand savings. As the calculation method for determining ex ante savings has not changed for CY2018, the evaluation team plans to apply the GPY5/EPY8 realization rates to the ex ante savings to determine verified gross impacts for CY2018. Navigant will apply the GPY5/EPY8 realization rates by home tier level, as shown below.

Table 5. GPY5/EPY8 Realization Rates by Home Tier Level

Participation Category	Verified Gross Realization Rate (Gas)	Verified Gross Realization Rate (Electric)
Tier 1	103%	99%
Tier 2	89%	98%
Tier 3	88%	116%
Overall	94%	101%

Verified Net Impact Evaluation

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

Table 6. Deemed NTG Values for CY2018

Program Measure	CY2018 Deemed NTG Value
Residential New Construction	0.65

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.

Researched NTG Impact Evaluation

Navigant will complete NTG research as part of the CY2019 evaluation. Navigant will conduct in-depth interviews with both participating and non-participating builders. The evaluation team will attempt to contact a census of builders and aim to complete interviews with as many as possible up to 20 participating builders and up to 20 non-participating builders. Navigant will target the top builders to obtain results for a large share of program homes.

Navigant will use a self-report approach to estimate the program's NTGR following the statewide approach included in the TRM. The analysis will cover the following components:

- Free-ridership
- Participant Spillover
- Non-participant Spillover

~~Where participant~~Participant spillover refers to spillover from participating builders in non-program homes and non-participant spillover refers to spillover from builders who are exposed to the program but are not participating. The builder interviews will also assess the current level of energy efficiency knowledge among participating builders to provide a "baseline" for any future spillover or market effects research.

Calculation of CPAS and Annual Savings (Electric Only)

As required by the Future Energy Jobs Act (FEJA) for electric energy efficiency, the measure-specific and total ~~ex post gross savings and ex post net savings ante gross 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. ~~Evaluation will also add the savings converted from gas savings to the electric savings so that it's documented in the report.~~

Process Evaluation

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, as well as the review of program manuals and marketing and educational materials developed by the program. The

Commented [Apex52]: What is the population of participant builders? Is 20 builders enough?
Commented [LB53]: The population of participant builders ranged from 45-55 over the last two program years. 20 builders is sufficient, but the evaluation team will consider the population of builders before finalizing the target.

CY2019 NTG study will include interviews with raters and builders to learn about their perspectives and satisfaction with the program.

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, cumulative persisting annual savings and effective useful life.

Use of Randomized Controlled Trial and Quasi-Experimental Design

We are not evaluating the Residential New Construction 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.

Evaluation Schedule

Table 7 provides the schedule for key deliverables and data transfer activities. Adjustments will be made, as needed, as evaluation activities progress.

Table 7. Schedule – Key Deadlines

Activity or Deliverable	Responsible Party	Date Delivered
Program Manuals, Marketing and Educational Materials	Nicor Gas and ComEd	March 18, 2018 January 2, 2018
CY2018 Program Tracking Data for Wave 1 Review	Nicor Gas and ComEd	April 7, 2018
Tracking System Ex Ante Review Findings and Recommendations	Evaluation	July 30, 2018
CY2018 Program Tracking Data	Nicor Gas and ComEd	January 30, 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 Nicor Gas, ComEd, and SAG	Evaluation	March 5, 2019
Comments on draft (15 Business Days)	Nicor Gas, ComEd, and SAG	March 26, 2019
Revised Draft by Navigant	Evaluation	April 3, 2019
Comments on redraft (5 Business Days)	Nicor Gas, ComEd, and SAG	April 10, 2019
Final Report to Nicor Gas, ComEd, and SAG	Evaluation	April 19, 2019

Commented [AJL54]: Note to the evaluation team: per our SOW with this IC the Ops Manual is to be reviewed and accepted by ComEd within 60 days of the start of the program year so this will likely not reach the evaluation team until 3/15/18.

Commented [LB55]: Thank you for the update – date revised to 3/15/18

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, Peoples Gas (PGL), and North Shore Gas (NSG). Nicor Gas energySMART plans on targeting some kits towards Income Qualified customers. Nicor Gas can choose schools to participate that are in areas where a significant portion of Income Qualified households exist based on census data.

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

Commented [Apex56]: FYI - now that we are on a calendar year, the program is actually split into 1) a winter/spring program and 2) a fall program. This is because the nature of a school year is to run from fall to spring and we wanted to be able to have an offering throughout the school year, rather than only offer a single program in either fall or winter/spring.

Commented [CZ57]: Great, thank you for the clarification.

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Evaluation Plan for Program Year 2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for program year 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 (if any) are recommended for the Illinois Technical Reference Manual (TRM)?

Commented [Apex58]: What inputs are you researching? The plan does not propose any primary data collection.

Commented [KG59]: Navigant may make recommendations for updates to the TRM, based on our findings from the savings verification effort. Typically, these recommendations involve finding an error in the TRM, clarifying language to interpret and apply the TRM as intended, new secondary research on an input assumption, or adding a new measure.

Process Evaluation:

Navigant’s 2018 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.

Net Impact Evaluation

The 2018 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. Deemed NTGR for 2018

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

Source: 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.

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.](#)

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 Program Year 2018

Table 4 below provides the schedule for evaluation of the 2018 EEE Program. Adjustments will be made as needed as program year evaluation activities begin.

Table 4. Program Year 2018 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	Nicor Gas	January 30, 2019
Draft Impact Report to Nicor Gas and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	Nicor Gas / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 12, 2019
Comments on Redraft	Nicor Gas / SAG	April 19, 2019
Final Impact Report to Nicor Gas and SAG	Evaluation Team	April 26, 2019

Behavior Energy Savings Program 2018 – 2021 Evaluation Plan

Introduction

The intention of the behavior offering is to generate energy savings through residential customer engagement and behavioral change strategies by providing select cohort groups with analytics comparing usage to similar customers, as well as customized energy savings tips and tactics. Nicor Gas expects to explore this concept in 2018, but does not have plans to implement this program in 2018.

As described in the Nicor Gas Energy Efficiency Plan for 2018-2021, this offering may utilize one or more vendors to provide individualized energy use information through Home Energy Reports (HERs) tailored to customer usage and habits and drive changes in energy usage behavior. HERs typically use utility energy use data, customer demographics, and other information to provide personalized, actionable tips to customers. HERs information may be delivered to customers in multiple formats on a regular basis to provide education about natural gas consumption and energy efficiency opportunities. This combination of multi-channel communications, targeted messaging, energy usage analytics and behavioral science has been shown to result in positive behavior changes related to energy usage and an increase in participation in other energySMART offerings.

An important feature of typical utility HER programs is that they are designed as randomized controlled trials (RCTs). Customers in the target group of residential customers from the utility are randomly assigned to either the recipient group or the control (non-recipient) group for the purpose of estimating changes in energy 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.⁶

Four-Year Evaluation Plan Summary

Navigant will prepare an evaluation plan when final scope and timing of program activities for each year are better known. The table below assumes program implementation will begin in 2019.

Table 1. Four-Year Evaluation Plan Summary

Activity	2018	2019	2020	2021
Tracking System Review		X	X	X
Data Collection – Program Manager and Implementer Interviews		X	X	X
Impact – End-of-Year Savings Verification		X	X	X

⁶ 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.

A.2 Income Qualified Programs

Nicor Gas Income Qualified Single Family and Multi-Family Weatherization and Retrofit Program 2018 to 2021 Evaluation Plan

Introduction

The Income Qualified Single Family and Multi-Family Weatherization and Retrofit Program provides retrofits to single- and multi-family households in Nicor Gas 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 ("HWAP").

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~~
- ~~The program is jointly implemented by Nicor Gas and ComEd.~~

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			
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

As this is a joint program with ComEd, evaluation will coordinate closely with the electric utility on issues common to this program. Ameren Illinois has a suite of energy efficiency programs for income qualified 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.

Commented [KG60]: Text added in response to joint comments from CUB-EDF-AG-NRDC.

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
<u>Gross Impact</u>	<u>TRM Measure Review</u>	<u>All</u>	<u>June 2018 – March 2019</u>	<u>Two Waves*</u>
Gross Impact	Engineering Impact Review <u>and Field Work</u>	<u>SampleNA</u>	July 2018	Two Waves*
Participant Survey	Participants	Census		

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

Gross Impact Evaluation

Since the Income Qualified Single Family and Multi-Family Program savings are derived from values contained in the TRM⁷, 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 where possible (1) with (1) a review of project documentation for a sample of projects in each program year to verify participation, installed measure quantities, and

Commented [Apex61]: Evaluation approaches table mentions an engineering review – where does that fit in?

Commented [Apex62]: May want to caveat these items as “where possible” in the evaluation approaches table above. Right now it looks like these are actions you plan to take (verification, field work, etc).

⁷ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 6.0, <http://www.ilsag.info/technical-reference-manual.html>

associated savings and (2) verification of installation of energy efficient measures through participant surveys or field work.

Verified Net Impact Evaluation

The TRM deems NTG at 1.0 for Income Qualified programs.

Research NTG Impact Evaluation

No NTG research is planned for this income-qualified 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-qualified census tracts and overlay income-qualified 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 ~~pain points with the program~~ and ways to improve. The results will inform future process research ~~focused on developing a sector-level customer journey map to visualize customer satisfaction.~~

Commented [Apex63]: What are pain points?

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.

Commented [KG64]: Text added in response to joint comments from CUB-EDF-AG-NRDC.

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

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	Nicor Gas	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	Nicor Gas	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 Nicor Gas and SAG	Evaluation	March 11, 2019
Comments on draft (15 Business Days)	Nicor Gas and SAG	April 16, 2019
Revised Draft by Navigant	Evaluation	April 17, 2019
Comments on redraft (5 Business Days)	Nicor Gas and SAG	April 25, 2019
Final Report to Nicor Gas and SAG	Evaluation	April 30, 2019

Nicor Gas Affordable Housing New Construction Program 2018 to 2021 Evaluation Plan

Introduction

The Nicor Gas Affordable Housing 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 qualified customers in Nicor Gas’ service territory 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. The program has three participation levels: major renovation, new multi-family, and new single-family. The program is coordinated offered jointly by ComEd, Peoples Gas (PGL) and North Shore Gas (NSG), and Nicor Gas.

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
Impact <u>Research</u> – Calibrated Simulation Modeling*		X		
Process Analysis	X	X	X	X

* Study to be considered.

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

- Gross and net impact analysis will be conducted each year
- Calibrated simulation modeling research in CY2019 to inform potential updates to the TRM
- Program manager and implementer interviews will be conducted each year

Coordination

As this ~~is a joint~~ program is coordinated with ComEd, evaluation will coordinate closely with the electric utility on issues common to this program. The evaluation activities and timing for each utility

evaluation are the same as this is one evaluation effort for both utilities. Ameren Illinois has a suite of energy efficiency programs for income qualified 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.

Commented [KG65]: Text added in response to joint comments from CUB-EDF-AG-NRDC.

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 participants’ 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
<u>Gross Impact</u>	<u>TRM Measure Review</u>	<u>All</u>	<u>June 2018 – March 2019</u>	<u>Two Waves*</u>
Gross Impact	<u>Parallel Path Early Feedback</u> Review	As Needed	June 2018 – Feb 2019	Early Feedback for Large Projects
Gross Impact	Engineering Review	<u>SampleAll</u>	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 Nicor Gas to determine appropriate dates to pull tracking data extracts for each wave.

Gross Impact Evaluation

Since the Affordable Housing New Construction Program savings are derived from values contained in the TRM⁸, 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 ~~where possible~~ with a review of project documentation for a sample of projects in each program year to verify participation, installed measure quantities, and associated savings.

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 Nicor Gas by January 30, 2019, with reporting finalized by April 26, 2019

Gross Impact Evaluation Research

In program year 2019 if program volume is sufficient, Navigant will conduct evaluation research to confirm TRM estimates of savings. Navigant will develop models and use actual consumption data to

⁸ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 6.0 for 2018, available at: <http://www.ilsag.info/technical-reference-manual.html>

Commented [Apex66]: Table above mentions an engineering review AND TRM verification. Where does the engineering review come in?

Commented [LB67]: Engineering review refers to an in-depth review of project files including large projects or custom calculations.

calibrate them in order to determine accuracy of TRM savings estimates. This research may be used to provide revisions to the TRM, which could impact energy savings for 2021 and beyond.

Verified Net Impact Evaluation

The TRM deems NTG at 1.0 for Income Qualified 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 Affordable Housing 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 Nicor Gas intends 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.

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.

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	Nicor Gas	March 15, 2018 January 15, 2018
2018 program tracking data for QA/QC	Nicor Gas	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
<u>2018 program tracking data request</u>	<u>Evaluation</u>	<u>January 9, 2019</u>
2018 program tracking data	Nicor Gas	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 Nicor Gas and SAG	Evaluation	March 6, 2019
Comments on draft (15 Business Days)	Nicor Gas and SAG	March 27, 2019
Revised Draft by Navigant	Evaluation	April 5, 2019
Comments on redraft (5 Business Days)	Nicor Gas and SAG	April 12, 2019
Final Report to Nicor Gas and SAG	Evaluation	April 26, 2019

Commented [CC68]: Ops Manual for AH-NC is being drafted; will not be ready to share with evaluation team by 1/15/18.

Commented [JA69]: Note to the Evaluation Team: per our SOW with this IC the Ops Manual is to be reviewed and accepted by ComEd within 60 days of the start of the program year so this will likely not reach the evaluation team until 3/15/18.

Commented [LB70]: Thank you for the update – date revised in table

Nicor Gas Income Qualified 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 (PHA 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)⁹; 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 Nicor Gas service territory. The program is jointly implemented by Nicor Gas and ComEd.

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			
Data Collection – Property Manager Interviews	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 (2018, future years as needed)	X	X	X	X
Net-to-Gross – Customer Self-Report Surveys (if needed)		X		
Process Analysis	X	X	X	X

Commented [Apex71]: Looks like verification and field work are supplemental – “where possible”

Commented [KG72]: We will do this in 2018, and then decide whether field work is needed in future years.

⁹ Illinois Public Act 099-0906 (<http://www.ilga.gov/legislation/publicacts/99/099-0906.htm>).

Coordination

As this is a joint program with ComEd, evaluation will coordinate closely with the electric utility on issues common to this program. Ameren Illinois has a suite of energy efficiency programs for income qualified 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.

Commented [KG73]: Text added in response to joint comments from CUB-EDF-AG-NRDC.

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 Engineering File Review	All	June 2018 – March 2019	Two Waves*
Gross Impact	Engineering File Review & 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 Nicor Gas to determine appropriate dates to pull tracking data extracts for each wave.
 † Sample size will depend on population of completed projects in 2018.

Commented [Apex74]: Where's the sample size on field work and verification?

Commented [Apex75]: TRM review?

Commented [Apex76]: TRM review?

Commented [Apex77]: TRM review?

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 where possible with a review of project documentation in on a sample of 2018 projects 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. Engineering file review and field work will be repeated in future years, depending on the findings from 2018, and future project size and complexity. Verified gross savings will be estimated by multiplying TRM-derived per unit therm savings by the verified quantity of eligible measures.

Commented [Apex78]: This looks like a TRM review - table says an engineering review -

Commented [CA79]: This includes both TRM and engineering review projects in the tracking database

Verified Net Impact Evaluation

The TRM deems NTG at 1.0 for Income Qualified programs.

Research NTG Impact Evaluation

No NTG research will be done for the income-qualified 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.

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.

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	Nicor Gas	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	Nicor Gas	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	Nicor Gas	November 15, 2018
Participating customer process survey fielding	Evaluation	November 30, 2018
Final 2018 Tracking Data to Navigant	Nicor Gas	January 30, 2019
Illinois TRM Update Research Findings	Evaluation	March 1, 2019
Process Analysis Findings	Evaluation	March 1, 2019
Draft Report to Nicor Gas and SAG	Evaluation	March 7, 2019
Comments on draft (15 Business Days)	Nicor Gas and SAG	March 28, 2019
Revised Draft by Navigant	Evaluation	April 7, 2019
Comments on redraft (5 Business Days)	Nicor Gas and SAG	April 26, 2019
Final Report to Nicor Gas and SAG	Evaluation	April 30, 2019

A.3 Business Programs (includes Public Sector)

Business Energy Efficiency Rebate Program 2018 – 2021 Evaluation Plan

Introduction

The Business Energy Efficiency Rebates (BEER) program’s goal is to produce natural gas energy savings in the Business Sector and Public Sector by promoting the purchase and installation of prescriptive energy efficiency measures. The energy efficiency rebate component influences the purchase and installation of high-efficiency space heating, water heating, and process heating technologies. Boiler measures are divided into hydronic, condensing, and steam boilers of varying size categories. Also included as prescriptive measures are boiler tune-ups, boiler reset controls, steam traps, thermostats, low-flow spray valves, infrared heaters, water heaters, unit heaters, pipe insulation and an assortment of food service equipment.

The BEER program offers technical assistance in the form of assessments, the direct installation of low-flow salon sprayers, faucet aerators, shower heads, and additional indoor pipe insulation for customer facilities. The assessments culminate in a customer-facing report which summarizes the findings from the assessment and makes recommendations for energy-saving projects for the customer. Prescriptive measures are marketed through a combination of market push and pull strategies as well as trade ally activities. These efforts stimulate demand, while simultaneously increasing market provider investment in stocking and promoting high efficiency products.

In addition, Nicor Gas has committed to work with other utilities in the State to deliver a pilot upstream incentive offering for commercial kitchen rebates for eligible business customers, with a focus on taking advantage of statewide distributor networks and the associated efficiencies, with a goal of implementing the program beginning in 2019.

~~Additionally, Nicor Gas also offers, through the Midwest Energy Efficiency Alliance (MEEA), a self-install program through the Savings Through Efficient Products (“STEP”) program. Qualified Illinois public 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.~~

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

Commented [Apex80]: The STEP program will not be a component of the Nicor Gas offerings in 2018. DI for the public sector will be offered as part of CLEAResult’s scope within the BEER and SB assessment offerings.

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
<u>Secondary Research and Updated TRM Work Papers for Pipe Insulation Thermal Regain Factors</u>	<u>X</u>	<u>X</u>		
<u>Steam Traps – Background Research on Viability of Impact Study</u>	<u>X</u>			
Primary Research to Update the TRM – Steam Trap Impact Billing Analysis (Study under consideration)	<u>X</u>	<u>X</u>		
Primary Research to Update the TRM - Update the Equivalent Full Load Heating Hour Billing Analysis Research Navigant Conducted in PY3 (Study under consideration).			X	
<u>Research – Steam Trap Process Survey Research</u>	<u>X*</u>			
Research – Business Sector and Public Sector Participant FR+SO plus Process Survey	X*	<u>X*</u>		
Research – Trade Ally SO plus Process Survey	<u>X*</u>	<u>X*</u>		
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.

Commented [MJ81]: Recommend adding a steam trap impact study to the plan for 2018 and coordinate with the Ameren EM&V team

Commented [KG82R81]: Recommendation under discussion with ODC (for Ameren). Revisions reflect coordinated approach on the initial background research and scope development that will occur in the first half of 2018 to determine if a research study is viable.

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Evaluation Plan for Program Year 2018

Evaluation Research Objectives

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

Impact Evaluation:

1. What are the Business Sector verified gross savings?
2. What are the Business Sector verified net savings?
3. What are the Public Sector verified gross savings?
4. What are the Public Sector verified net savings?
- ~~5. What are the STEP program verified gross savings?~~
- ~~6. What are the STEP program verified net savings?~~

- 7-5. What caused gross realization rate (RR) adjustments and what corrective actions are recommended?
- 8-6. What updates are recommended for the Illinois Technical Reference Manual (TRM)?
- 9-7. What is the level of free ridership and spillover for the Business Sector, based on evaluation research?
- 10-8. What is the level of free ridership and spillover for the Public Sector, based on evaluation research?
- 11. What is the level of free ridership and spillover for the STEP program, based on evaluation research?
- 12-9. What is the level of free ridership and spillover for steam traps, based on evaluation research?

For 2018, the evaluation team will conduct Net-to-Gross (NTG) research through interviews with participating Business Sector, ~~and~~ Public Sector, ~~and STEP program~~ customers to determine free ridership and spillover and include spillover questions in our trade ally interviews, to inform future NTG recommendations. We will stratify our sample to make separate NTG estimates for steam traps, the Business Sector, and the Public Sector. ~~A separate stratum for the STEP program will be developed if savings permit, otherwise Navigant will include the STEP program participants within the Public Sector BEER stratum.~~ Navigant will coordinate with the ~~Ameren Illinois evaluation team and with the Peoples Gas and North Shore Gas team~~ when planning and conducting the process and NTG research study on steam traps.

Commented [Apex83]: What about the Peoples/NS Gas teams?

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.

Process Evaluation:

Navigant's 2018 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.

Navigant will conduct a survey with a unique set of process questions for steam trap participants from prior years. Questions will cover maintenance practices in depth, observed measure lifetime, corporate policies and barriers, planning and purchasing practices, interactions with vendors, firmographics, and systems and equipment description and operating details.

The NTG survey will include additional process questions to elicit feedback on trade ally and participant satisfaction and suggestions for program improvement. ~~Final process research questions will be refined determined as program circumstances are better known with and~~ input is received from the program implementer. ~~We will note differences between Business Sector and Public Sector issues and develop a unique set of process questions targeting steam trap participants.~~

Commented [Apex84]: Didn't you already perform PM interviews to determine high level process topics?

Gross Impact Evaluation

Navigant anticipates all measures offered through the BEER 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.

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

Use of Randomized Controlled Trial and Quasi-Experimental Design

Navigant is not evaluating the BEER 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 2018 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. Deemed NTGR for 2018

Program Path/Measure	Deemed NTGR
BEER – Business Sector	0.68
BEER – Public Sector	0.68
STEP Program	0.68

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

NTG Research

Navigant will conduct NTG research to inform NTG values for potential deeming in future program years through surveys with 2018 Business Sector ~~and~~ Public Sector ~~and STEP program~~ participating customers and trade allies. 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, and tentatively plan to include spillover questions in trade ally interviews, pending further guidance from the NTG Working Group. We will stratify our sample to make separate NTG estimates for steam traps, the Business Sector, and the Public Sector ~~(and possibly the STEP program)~~, and the sample design will attempt to achieve a 90/10 confidence/precision level in each stratum.

Proposed program year 2018 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 2018 tracking data in February 2019 and complete in May 2019.

Process Research

The 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 customer decision maker and trade ally surveys in 2018. The program year 2018 study will include in-depth interviews with participating Business Sector ~~and~~ Public Sector ~~and STEP program~~ decision makers and trade allies to learn about their perspectives and satisfaction with the program. We will note differences between Business Sector and Public Sector issues and participants.

Navigant will ~~conduct a survey with include~~ a unique set of process questions for steam trap participants ~~from prior years~~. Questions will cover maintenance practices in depth, observed measure lifetime, corporate policies and barriers, planning and purchasing practices, interactions with vendors, firmographics, and systems and equipment description and operating details.

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.

Commented [SD85]: Per our call on 1/18 it would be helpful to note why you selected the legacy BEER NTG for the public sector (e.g., per discussions at SAG, and as filed in the Nicor Gas EE plan...)

Commented [KG86R85]: This issue was addressed in a Navigant memo January 26, 2018. The values for pre-existing Nicor Gas are the only NTGs deemed for use in 2018. They consistent with Nicor Gas planning estimates.

Commented [MJ87]: I oppose attempting to estimate spillover from trade allies. The IL-TRM provides that spillover is estimated from end users.

Commented [KG88R87]: We recommend the following: 1) tentatively plan to collect non-participant spillover estimates from trade allies using the methodology outlined in the residential TRM NTG section, recognizing that we need to follow the protocol for a deviation as described in TRM version 6.0; 2) Delay the data gathering until after the TRM NTG Working Group meets during Q2 and Q3 2018, and we can present this issue to the NTG WG; 3) the NTG WG will produce final TRM v7 NTG protocols by October 1, 2018; 4) If the v7 TRM protocols explicitly prohibit non-residential trade ally NPSO estimates, we will drop our plans to ask those questions, but if it is allowed, we will proceed as planned.

Commented [MJ89]: If there are any other places in the evaluation plan that do not comply with the IL-TRM NTG methodologies please let me know. I oppose all of those instances and recommend the evaluation plans be revised to comply with the IL-TRM NTG methodologies.

Commented [KG90R89]: There are deviations in the Small Business plan in 2019 and RCx.

Commented [MJ91]: Can you please provide more information about the process research that will be performed on steam traps?

Commented [KG92R91]: We have not scoped this out yet, but expect we would cover maintenance practices in depth, observed measure lifetime, corporate policies and barriers, planning and purchasing practices, interactions with vendors, firmographics, and systems and equipment description and operating details.

Table 3. Core Data Collection Activities

What	Target	Completed Interviews	When	Comments
In Depth Interviews	Program Management	1-2	Q1 & Q3 2018	Interview program staff
<u>Steam Trap Process Survey Research</u>	<u>GPY6 Participants</u>	<u>TBD</u>	<u>Q1 2018 to Q2 2018</u>	<u>Process questions on steam traps</u>
Process and NTG Survey Research – Online Surveys	Participating Customer Decision Makers	TBD	Q2 2018 to Q2 2019	Process and free ridership, real time, <u>all measures including steam traps</u>
Process and NTG Survey Research – CATI Surveys	Participating Customer Decision Makers	TBD	<u>Q1-Q2 2019</u>	Process and spillover
Process and NTG Survey Research – <u>Online Surveys</u>	Participating Trade Allies	TBD	<u>Q1-Q2 2019</u>	Process <u>and spillover</u>
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

Commented [MJ94]: I oppose attempting to estimate spillover from trade allies. The IL-TRM provides that spillover is estimated from end users.

Commented [KG95R94]: Addressed above.

Commented [Apex93]: These may need to be done via telephone, difficult to get TAs to do this online. Maybe note online or CATI

Evaluation Schedule for Program Year 2018

Table 4 below provides the schedule for evaluation of the 2018 BEER 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 steam traps, the Business Sector and Public Sector and STEP program.

Table 4. Program Year 2018 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
Final Tracking Data to Navigant	Nicor Gas	January 30, 2019
Draft Impact Report to Nicor Gas and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	Nicor Gas / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 12, 2019
Comments on Redraft	Nicor Gas / SAG	April 19, 2019
Final Impact Report to Nicor Gas and SAG	Evaluation Team	April 26, 2019
Conduct <u>Steam Trap</u> Process and NTG Survey	Evaluation Team	Q1 2018 to Q3 2018
<u>Steam Trap Process Findings Memo</u>	<u>Evaluation Team</u>	<u>August 31, 2018</u>
<u>Conduct Steam Trap and Other Measure NTG Survey</u>	<u>Evaluation Team</u>	<u>Q2 2018 to Q2 2019</u>
Updated TRM Work Papers for Pipe Insulation Thermal Regain Factors	Evaluation Team	May 15, 2019
NTG Research Findings Memo	Evaluation Team	July 31, 2019
<u>Program-level</u> Process Research Findings Memo	Evaluation Team	August 31, 2019

Commented [MJ96]: The date for this process research findings seems really late. I thought the plan was for the process research on the steam traps to be conducted early and then the results would then inform the NTG research for the steam traps. Can this process research for steam traps be moved up to August 31, 2018?

Commented [KG97R96]: Yes, we will move the steam trap process research to the first half of 2018. That would require we contact GPY6 participants.

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

Introduction

The purpose of the Custom Incentives (Custom) program is to assist medium to large commercial, multi-family non-prescriptive public sector and industrial customers in identifying and implementing cost-effective gas energy efficiency measures that are not otherwise addressed in Nicor Gas' BEEER or Small Business Programs. Additionally, the Custom program will offer a Retro-Commissioning offering, assisting participants with low-cost and no cost tune-ups and adjustments to the operating systems, building controls, energy management systems and HVAC of existing buildings. The program will also consider rebates for Combined Heat and Power (CHP) projects.

Commented [SD98]: What about CHP? It falls under Custom. Can be a separate report (like RCx) but should be addressed somewhere. There are some feasibility studies with ComEd/Peoples, and there are some Nicor Gas prospects now.

Custom projects involve unique or process-related equipment or multiple measures with interactive effects that are not well-suited for prescriptive programs. In this program, performance-based incentives are provided to customers working on larger-scale projects. Incentives are typically higher than prescriptive incentives and are based on an energy savings or engineering analysis. Technical assistance is provided to customers or their contractors to help quantify the energy savings opportunity and customize incentives for specific projects. The program also provides custom audits and engineering studies to assist customers in understanding their efficiency opportunities by quantifying the estimated project costs, energy savings, and forecasted incentives.

Navigant will produce separate reporting of impacts, research findings, and recommendations for the Business Sector and Public Sector. Retro-Commissioning evaluation is addressed in a separate plan.

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 – Business Sector and Public Sector Participant FR+SO plus Process Survey			X*	
Present NTG Research Results				Q3
<u>CHP Project-Specific Process and NTG Research – Case-by-Case</u>	X	X	X	X
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 2021, but will be based on 2020 program data, unless there is a particular interest to consider part of 2021 program year data.

Evaluation Plan for Program Year 2018

Evaluation Research Objectives

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

Impact Evaluation:

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

Process Evaluation:

Navigant's 2018 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 Sector 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 – options A, B, and/or C for custom projects. The impacts for some projects will be verified by engineering file review and determined with regression analysis of trend or 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 B or C, depending on which data are used. If implemented measures are not amenable to regression analysis, the engineering review will form the basis of evaluated savings using IPMVP option A. 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.

Commented [SD99]: Not to be nitpicky, but Options A (key parameter measurement) and B (all parameter measurement) are actually doing metering/measurement, not only billing analysis. As written here you seem to be talking about different forms of billing analysis but not metering. Suggest you clarify you plan on potentially metering or not, and if so that would be Options A or B, if not it would be Option C (which I believe is most likely).

The sampling plan for these 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 2018 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 below. ~~There will be no primary NTG research in 2018.~~

Table 2. Deemed NTGR for 2018

Program Path/Measure	Deemed NTGR
Business Sector Custom	0.79
Public Sector Custom	0.79
<u>CHP</u>	<u>Project-Specific</u>

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

Commented [SD100]: As with BEER, please note why you are using legacy custom program for public sector (e.g., SAG discussions, Nicor Gas EE Plan...)

Commented [KG101R100]: Our response is in the BEER evaluation plan.

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 Sector and Public Sector issues. ~~There will be no primary NTC 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
Project Savings Verification	Completed Business Sector and Public Sector Custom Projects		Q2 3 and/or Q4 2018	One or two sampling waves, separate samples for Business and Public Sectors. Business and Public Sector waves may occur on separate timelines.
Large Project <u>Parallel Path</u> (Pre-Installation) Review	Business and Public Sector 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 Business and Public Sector Custom Projects		Feb – March 2019	Projects not previously sampled

Commented [SD102]: Can we start by Q2, since we'll have some rollover projects from PY6 (Nicor Gas is rolling over a phased part of some projects).

Commented [SD103]: Please also note this as the parallel path review (to use consistent terminology as to how we typically refer to it).

Evaluation Schedule for Program Year 2018

Table 4 below provides the schedule for evaluation of the 2018 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 Sector and Public Sector.

Table 4. Program Year 2018 Evaluation Schedule

Activity/Deliverables	Responsible Party	Completion/Delivery
Program Manager & Implementer Interview	Evaluation Team	Q3 2018
Custom Project Savings Verification Waves	Evaluation Team	Q3 2018 to Q1 2019
Large Project Pre-Installation Review	Evaluation Team	Ten business days
Process Research Findings Memo	Evaluation Team	September 14, 2018
Final Tracking Data to Navigant	Nicor Gas	January 30, 2019
Draft Impact Report to Nicor Gas and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	Nicor Gas / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 13, 2019
Comments on Redraft	Nicor Gas / SAG	April 20, 2019
Final Impact Report to Nicor Gas 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

Commented [KG104]: This plan is the new version.

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

<u>Retro-Commissioning Program Offering</u>	<u>Estimated Participants¹⁰ CY2018</u>	<u>Gross GWh Savings Goals – CY2018</u>	<u>Nicor Gas¹¹ Gross Therm Savings Goals – CY2018</u>	<u>Peoples Gas Gross Therm Savings Goals – CY2018</u>	<u>North Shore Gas Gross Therm Savings Goals – CY2018</u>
<u>RCx</u>	<u>10</u>	<u>3</u>			
<u>MBCx</u>	<u>30</u>	<u>8</u>	<u>NA</u>	<u>361,080</u>	<u>40,188</u>
<u>RCxpress</u>	<u>15</u>	<u>8</u>			
<u>Tune-Up¹²</u>	<u>55</u>	<u>15</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<u>SEDAC public sector</u>	<u>50</u>	<u>7</u>	<u>281,000</u>	<u>7,000</u>	<u>7,000</u>
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

¹⁰ Participant counts are for ComEd. Counts by gas utility are indeterminant at the time of this Plan.

¹¹ Nicor Gas RCx goals are not available as they are combined with other Nicor Gas Custom Incentive offerings.

¹² RCx Tune-Up includes Grocery participants in the evaluation plan.

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.

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
<u>Tracking System Review</u>	X	X	X	X
<u>Data Collection – Participant Surveys</u>		X		X
<u>Data Collection – Program Manager and Implementer Interviews</u>	X	X	X	X
<u>Data Collection – Trade Ally Interviews</u>		X		X
<u>Impact – Project-specific Billing Analysis</u>	X	X	X	X
<u>Impact – Engineering Review</u>	X	X	X	X
<u>Impact – Verification & Gross Realization Rate</u>	X	X	X	X
<u>Net-to-Gross – Customer Self-Report Surveys</u>		X		X
<u>Net-to-Gross – Trade Ally Interviews</u>		X		X
<u>Process Analysis</u>	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 research¹³ 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.

¹³ ComEd has contracted with a research firm to conduct RCx persistence research under the ComEd R&D budget

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.

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

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

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.

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.

¹⁴ 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

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-Up¹⁵ (55)¹⁶. 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 CY2018¹⁷.

¹⁵ Including grocery participants. ComEd electric-only participants.

¹⁶ The participation numbers are based on counts of participating sites so the total number of participating customers may be lower.

¹⁷ SEDAC 2018 RCx verification goals 2-12-18.xlsx

Table 4. CY2018 Core Data Collection Activities and Sample*

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

* 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 measures must meet all physical, operational, and baseline characteristics required to be assigned to the deemed value as defined in the TRM.¹⁸
- 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.

¹⁸ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 5.0, available at: <http://www.ilsaq.info/technical-reference-manual.html>

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

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

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 NSG GPY7 NTG Values 2017-03-01 Final.xlsx](#)

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

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

PREVIOUS VERSION WITH COMMENTS

The Retro-Commissioning (RCx) Program seeks to realize energy savings through the retro-commissioning 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. Retro-commissioning 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.

Commented [KG105]: Following is the commented version.

The Retro-Commissioning Program is managed by ComEd. ~~and ComEd coordinates with Nicor Gas, and Peoples Gas (PGL) and North Shore Gas (NSG) companies 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 ~~retro-commissioning (RCx) represents the original retro-commissioning program offering for large commercial buildings and completes a four-phase retro-commissioning 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.~~

Commented [RH106]: From Scott Dimetrosky This seems to be copied and pasted from ComEd, and some of these offerings do not apply to gas (e.g., the Grocery RCx), plus you only show the ComEd GWh goals (can you show the Nicor Gas participant and them goals?).

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.

Commented [RH107R106]: It was copied, as was this revision in order to maintain planning coordination in a coordinated program. I will note when there are differences. Regarding goals I cannot parse the Nicor Gas RCx goals from the Custom Incentives goals

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, ~~without a planning phase,~~ to retro-commissioning RCx with a targeted list of measures and use of ~~program~~ calculators in addition to custom calculations for savings estimates.

RCx Building Tune-Up (Tune-Up) is an electric-only offering for commercial and retail customers less than about 150,000 ft² but with more than 100 kW of peak demand. 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 ~~in the progress of being~~ incorporated into the Tune-Up offering.

Commented [RH108]: From Apex Nicor Gas does not currently participate in Tune-Up and Grocery

SEDAC (in-flight) RCx includes public sector participants who initially enrolled in the RCx program when it was under separate administration by SEDAC. These projects will form their own cohort until they are completed. 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.

Commented [RH109R108]: So noted in the coordinated text

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

Table 1. Anticipated Participation and Savings Goals by Program Offering

ComEd Energy Efficiency Retro-Commissioning Program Offering	Estimated Participants ¹⁹ CY2018	Gross GWh Savings Goals – CY2018	Nicor Gas ²⁰ Gross Therm Savings Goals – CY2018	Peoples Gas Gross Therm Savings Goals – CY2018	North Shore Gas Gross Therm Savings Goals – CY2018
RCx	1410	143			
MBCx	3013	58	NA	361,080	40,188
RCxpress	1542	8			
Tune-Up ²¹	5590	159	NA	NA	NA
SEDAC public sector	50	7	281,000	7,000	7,000
All Offerings	149160	4133	NA	368,080	47,188

Source: Implementation Contractor estimates and utility goals

Notable program changes made from GPY6/EPY9 to CY2018 include:

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

The program 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.

The primary objectives of the Retro-Commissioning RCx Program 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 retro-commissioning service providers (RSPs) and participants.

¹⁹ Participant counts are for ComEd. Counts by gas utility are indeterminant at the time of this Plan.

²⁰ Nicor Gas RCx goals are not available as they are combined with other Nicor Gas Custom Incentive offerings.

²¹ RCx Tune-Up includes Grocery participants in the evaluation plan.

Commented [RH110]: From Jennifer Morris
This table is missing gas savings goals for the gas utilities

Commented [RH111R110]: Added Nicor Gas, PGL and NSG to the extent data are available

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Commented [SC112]: Please add DCEO. There are 55 active ComEd projects and 60 gas projects.

Nexant is estimating that 40%-50% of these will be completed in 2018.

Commented [RH113R112]: OK. Added participant count. Assumed 25 based on your numbers. Missing GWh goals, but these have been subject to change in the past.

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Commented [RH114]: From Apex
NA for Nicor Gas currently

Commented [RH115R114]: So noted

Commented [SC116]: Please be aware that the SEDAC projects have a different model and implementation contractor than the ComEd RCx/Xpress/MBCx and Tune-up offerings.

Commented [RH117R116]: Noted. We will try to make the distinction throughout this Plan

Commented [DE118]: SEDAC will be finishing up RCx projects in the public sector that it started prior to 10/31/17. Since they are a different IC with a different model, it may be better to break out the 2018 public sector RCx evaluation.

Commented [RH119R118]: OK. I think it does not make sense to interview these participants for process or NTG. We will make the distinction throughout the plan.

Commented [RH120]: From Scott Dimetrosky

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.

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 2. Evaluation Approaches – Four Year Plan

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

NTG research in alternate years follows the pattern of past research, including NTG research for natural gas and electricity in GPY6/EPY9. 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 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 program-RCx offerings. The

Commented [JE121]: From Jennifer Morris:
Please ensure these NTG Trade Ally Interviews comply with the statewide NTG methodologies contained in the IL-TRM.

Commented [RH122R121]: Added sentences immediately following Table 2.

Commented [RH123]: From Jennifer Morris
How did you decide to do NTG research in 2021? Seems like it may be better to have updated NTG before the next plan filing. When was the NTG last updated for this program on the gas side? Does the current NTG utilize the statewide NTG method? Or is this program too small on the gas side to warrant spending the effort on updating the NTG?

Commented [RH124R123]: Added sentences immediately following Table 2. If it is preferable to do NTG research only in CY2020 prior to the next plan filing, there is time to make that adjustment. CY2020 research would supplant both CY2019 and CY 2021 research.

Commented [TRJ125]: Note: SEDAC is administering all public sector projects accepted prior to October 15, 2017 (“in-flight” projects per earlier addition).

Commented [RH126R125]: Added SEDAC clause

ComEd ~~Retro-commissioning~~ RCx Program evaluation plan parallels the planned work for the Ameren Illinois (AIC) ~~Retro-commissioning~~ 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

- 4. What are the program's first year verified gross savings?
- 5. What are the program's first year verified net savings?

Process Evaluation and Other Research Topics

The process evaluation effort for CY2018 may focus on persistence, channeling, and program delivery, and may address the following questions:

- 6. How do participants impact persistence? Review and integrate in-progress persistence research²² and effective useful life into program results and reporting.
- 7. Why do Tune-Up customers drop out of the program – electric only?
- 8. How can controls contractor bottlenecks be alleviated?
- 9. How can channeling be increased across the portfolio?
- 10. 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 program 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.

²² ComEd has contracted with Seventh Wave to conduct RCx persistence research under the ComEd R&D budget

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Commented [RH127]: Add reference to 7th wave study

Commented [TRJ128]: Research into measure persistence over time as well as methods for protecting savings is taking place outside of the usual program structure. Does this point refer to separate inquiries into persistence as part of the 2018 evaluation?

Commented [RH129R128]: Clarified. I think.

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Commented [DE130]: Agree. Persistence research will take place under our R&D umbrella. It won't be part of the regular RCx program evaluation.

Commented [RH131R130]: Footnoted clarification.

Commented [RH132]: From Apex Na for nicor Gas

Commented [RH133R132]: So noted

Commented [DE134]: RSP?

Commented [RH135R134]: "Contractor" is correct. The concern is that the RCx process is hampered by the controls vendors (contractors) that the participants employ to run their BAS. They can be unavailable.

Commented [RH136]: From Scott Dimetrosky Somewhere in this RCx write up we should note that the PY6 NTG and process research has not been completed, and thus will be completed in CY2018 for application in the 2019 TRM. And, if applicable, you may want to note that some of the process q's above will be covered under the forthcoming PY6 report.

Commented [RH137R136]: Reference to current GPY6/EPY9 research noted

MVP 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 comprehensive RCx, MBCx, and 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.

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 primary or secondary research into effective useful life of key retro-commissioning 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.

Commented [SA138]: Change to “RCx”? or “Traditional”?

Commented [RH139R138]: done

Commented [SC140]: SEDAC projects should be evaluated as a separate population, because the offering is different.

Commented [RH141R140]: OK.
We don’t talk about sampling strata yet, but we do below.

Commented [RH142]: From Apex
Please adjust to remove Tune-UP offering

Commented [RH143R142]: Clarified to show what is electric only and what is coordinated.

Commented [JE144]: From Jennifer Morris:
I think Seventhwave has already performed secondary research and is currently performing a persistence study for RCx. It is not a good use of resources to duplicate efforts already underway.

Commented [TRJ145]: Per earlier comment, does this refer to work being performed outside of the scope of this year’s evaluation plan? That work will yield data that will inform future program designs and evaluation plans.

Commented [RH146R145]: Navigant sees the need for EUL research to complement persistence. EUL relates to widgets; persistence relates to behavior. RCx is a blend. This sentence clarifies our EUL approach.

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

Activity	Target	Target Completes ²³ CY2018	Timeline	Notes
<u>Tracking System Review</u>	<u>Tracking system</u>	<u>Census</u>	<u>Preliminary of planned and ongoing</u>	<u>Three waves</u>
<u>In Depth Interviews</u>	<u>Program Management and Implementers</u>	<u>4</u>	<u>April – Dec 2018</u>	<u>Augment with monthly calls</u>
<u>Gross Impact</u>	<u>Early Feedback File Review</u>	<u>20</u>	<u>June 2018 – Feb 2019</u>	<u>Early Feedback for Large Projects</u>
<u>Gross Impact</u>	<u>Engineering File Review</u>	<u>57</u>	<u>April 2018 – Feb 2019</u>	<u>Three Waves*</u>
<u>Gross Impact</u>	<u>On-site M&V</u>	<u>28</u>	<u>May 2018 – Feb 2019</u>	
<u>Verified Net Impact</u>	<u>Calculation using deemed NTG ratio</u>	<u>57census</u>	<u>March 2019</u>	
<u>Process and Impact Research on CY2018 Operations</u>	<u>Literature review, secondary research</u>	<u>TBD</u>	<u>April 2017 – March 2019</u>	<u>Process, Impact</u>

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.

Commented [RH147]: From Scott Dimetrosky
Are these the correct sample sizes for Nicor Gas projects (or are these for ComEd?)

And wouldn't the n for the deemed NTG be the census of participants? (shows 57 in table).

Commented [RH148R147]: The counts reflect global participation. Added footnote. Our sampling as it applies to gas projects is described elsewhere.

Good point about the application of the NTG. Thank you

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In line with program 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 two-three waves of M&V sampling are expected to cover about half of the projects. Proposed gross impact sampling timelines are shown below.

Commented [SA149]: Change to "three"?

Commented [RH150R149]: Yes. Thank you.

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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

Commented [SC151]: Please add text describing the evaluation of SEDAC projects.

This comment applies through the document.

Commented [TRJ152R151]: Agree- there are basically two separate RCx programs in place during 2018; projects managed by SEDAC following the DCEO public sector RCx model, and projects managed by Nexant.

Commented [RH153R151]: See text below. Though two ICs we are proposing an overall RR at 90/10 and Non-SEDAC specific results.

²³ 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

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 electric-only 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 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.

CY2018 Gross Impact Sampling Waves

- d) First wave sample drawn in April 2018 and completed in July 2018
- e) Second wave sample drawn in August 2018 and completed November 2018
- f) 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 (104).

Commented [RH154]: From apex
NA for Nicor Gas

Commented [RH155R154]: Electric-only application noted.

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Commented [SA156]: Will we want to coordinate our batches to align closely with these waves? We should also plan on submitted a batch in November like we did this year.

Commented [RH157R156]: I think we will need to adjust as we see the volume though the first 8 months of the year. I am leaving the text unchanged as I am not sure a change would be any more accurate.

MBCx (430), RCxpress (4215), and Tune-Up²⁴ (5590)²⁵, SEDAC public sector (25)²⁶. Participation by gas utility customers is unknown now, but we anticipate relatively low counts approximately 40% of participants based on recent history necessitating attempted census or near-census sampling of gas participants for process and impact research, respectively.

Commented [RH158]: From apex NA for Nicor Gas

Commented [RH159R158]: Noted in footnote

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	247	3024	18	February 2018 – Feb. 2019 (concurrent)
Onsite M&V Audit†	Participating Customers (nested among engineering review sample)	138	1510	6	May 2018 – February 2019
In Depth Interviews	Program Management‡	4	2		May 2018

Commented [TRJ160]: Do target complete numbers need to be refreshed due to updated project volumes by program offering provided above?

Commented [RH161R160]: Yes. Added SEDAC as well

* 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.

3. 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

²⁴ Including grocery participants. ComEd electric-only participants.

²⁵ The participation numbers are based on counts of participating sites so the total number of participating customers may be lower.

²⁶ January 2018 estimates from Nexant

(therm, kWh and kW) by the verified quantity of eligible measures installed. Eligible deemed measures must meet all physical, operational, and baseline characteristics required to be assigned to the deemed value as defined in the TRM.²⁷

- 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.

4. 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.

Commented [RH162]: From Scott Dimetrosky
Again looks like some of this was not converted for gas application.

Commented [RH163R162]: I prefer “coordinated” to converted or copied. We will edit for more inclusivity

Commented [RH164]: From Scott Dimetrosky
Most of this is not applicable to gas.

Commented [RH165R164]: But it does apply in a coordinated plan

²⁷ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 5.0, available at: <http://www.ilsag.info/technical-reference-manual.html>

Table 5. Deemed NTG Values for CY2018

ComEd Coordinated Energy Efficiency Program Offering	CY2018 Deemed NTG Value
Comprehensive RCx	0.95
Monitoring-Based MBCx	0.95
RCx-Tune-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 NSG GPY7 NTG Values 2017-03-01 Final.xlsx](#)

- Commented [RH166]:** From Scott Dimetrosky Can drop the electric values, reference the Nicor Gas NTG document.
- Commented [TRJ167]:** Should this be 'traditional'? or 'RCx'?
- Commented [RH168R167]:** I am going with RCx.
- Commented [RH169]:** Based on PY7 DCEO report
- Commented [SC170]:** Please add SEDAC
- Commented [RH171R170]:** Got it
- Formatted:** Indent: Left: 1.81", Right: 1.56", Space After: 0 pt

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. 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 ante-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.

- Commented [RH172]:** From Scott Dimetrosky But if one of the gas utilities claims these savings I assume ComEd cannot also claim these, correct?
- Commented [RH173R172]:** I clarified. I think this is most likely to apply for the "electric-only" Tune-up projects that may have gas savings

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 into these issues during the years that they are not researching NTG in alternating years with NTG research. These issues Topics of research may include: the role that facility staff and their behavior have in impacting persistence; the impact of controls contractors on project time lines; making reports more valuable to customers; and encouraging the next steps 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, relatively

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 **Error! Reference source not found.** for other schedule details.) Adjustments will be made, as needed, as evaluation activities progress.

Commented [RH174]: From Scott Dimetrosky
Wouldn't some of these process issues actually be researched in the years you are doing NTG since you can leverage the survey research? That's how it shows up in the Nicor Gas 2018-2021 SOW.

Commented [RH175R174]: Thank you.
Revised to reflect combined interviews

Table 6. Schedule – Key Deadlines

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

Nicor Gas and ComEd Strategic Energy Management Program CY2018 to CY2021 Evaluation Plan

Introduction

The Strategic Energy Management (SEM) Program is designed to provide training and guidance to participating commercial and industrial customers at once, gathered in cohorts. Each cohort is a group of SEM participants that receive training together and work with each other to provide practical insight on how to implement energy efficiency measures at their sites. The program is a standard part of Nicor Gas offerings. It is managed independently by Nicor Gas as well as jointly with ComEd.

The goal of the SEM Program is to implement a process of continuous energy management improvements which result in energy savings and reductions in energy intensity. Energy savings are expected to be achieved through operational and maintenance (O&M) improvements, incremental increases in capital energy efficiency projects, additional capital projects that would not otherwise have been considered (e.g., process changes, consideration of energy efficiency in all capital efforts), and improved persistence for O&M and capital projects. The program seeks to educate participants in the identification of low cost or no cost measures, improve process efficiency, and reduce energy usage through behavioral changes.

Currently the program has two types of participants: (1) New Cohort made up of new participants, (2) The Practitioners Cohort for customers that continue to participate after this first year. Due to the timing of available data Navigant will focus on the practitioner cohort in CY2018 and will review cohort 3 in CY2019.

As a part of the evaluation, Navigant will review the documentation and savings for the practitioner cohort with a focus on persistence of savings and SEM activities. As needed, site interview will be completed to support Navigant research into site persistence. Navigant will evaluate the SEM program for both the independent program and joint programs with ComEd. For joint programs, Navigant will produce a single report for both utilities.

The impact evaluation of the SEM Program will characterize and quantify:

- Energy savings achieved through SEM improvements and behavior change beyond capital projects (prescriptive and custom)
- The persistence of achieved behavioral savings
- Persistence of SEM activities and practices

Notable program changes made from GPY6/EPY9 to Calendar Year 2018 (CY2018) include:

- Persistence of savings will be a focus of this year's evaluation for the practitioner cohort. We will be focusing on persistence of both savings and SEM activities and processes.
- As sites transition into the practitioner cohort, the evaluation activities will change to meet the needs of the client and implementer without overburdening the site. Navigant will not complete onsite surveys with sites that have already been surveyed in the past or complete

simpler surveys to not overburden participants. Impact evaluation may be reduced as well for site that have already received impact evaluations in the past.

The CY2018 gross impact evaluation will not vary from the previous years. Over the course of 2018 we will examine the program theory and evaluation approach to inform discussions in the fall SAG NTG deliberations about the need for doing free ridership surveys with SEM participants in future years. We have tentatively planned to do NTG research in CY2019 and CY2021 pending the outcome of those deliberations. The CY2018 process study will include program manager and implementer interviews 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 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. As noted above, a limited process evaluation will be completed with the practitioner cohort with a focus on persistence but not normal detailed evaluation. The sites in this cohort have received several years of process evaluation and we do not expect that much has changed within the last year.

Table 1. Evaluation Approaches – Four Year Plan

Tasks	CY2018	CY2019	CY2020	CY2021
<u>Tracking System Review</u>	X	X	X	X
<u>Data Collection – Participant Surveys</u>		X		X
<u>Data Collection – Program Manager and Implementer Interviews</u>	X	X	X	X
<u>Data Collection – Stakeholder Interviews</u>	X	X	X	X
<u>Impact – Billing Analysis</u>	X	X	X	X
<u>Impact – Engineering Review</u>	X	X	X	X
<u>Impact – Measure-Level Deemed Savings Review</u>	X	X	X	X
<u>Impact – Modeling</u>	X	X	X	X
<u>Impact – Verification & Gross Realization Rate</u>	X	X	X	X
<u>Impact – NTG Analysis (tentative)</u>		X		X
<u>Process Analysis</u>	X	X	X	X

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 four-year evaluation approach for this program is based on the following:

- Gross and net impact analysis will be conducted each year
- Site specific process surveys will occur every other year. If the program participation changes greatly from one year to the next and/or the utility has interest in specific site surveys could be completed as needed.

Coordination

SEM is independently managed and jointly managed with ComEd. ComEd will coordinate with Nicor Gas on issues relevant to the program. The SEM evaluation report is developed as an independent Nicor Gas report and a combined ComEd and Nicor Gas evaluation report. Navigant leads the evaluation and will work with Nicor Gas to finalize the report. There are special data collection issues with the SEM program and Navigant will manage those data issues with ComEd and Nicor Gas.

Evaluation Research Topics

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

Impact Evaluation

1. What are the actual achieved energy behavior savings in this program?
2. What were the realization rates of the projects? [Defined as evaluation-verified (ex post) savings divided by program-reported (ex ante) savings].
3. Are there any major changes occurring during or after program implementation (production, size, hours etc.) which may have affected the results?

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Process Evaluation and Other Research Topics

The process evaluation effort for CY2018 will focus on program persistence. The process research will address the following questions:

1. What SEM activities have the sites continued to implement after the first year of training?
2. What new activities have the sites incorporated into their operation?
3. What SEM activities have they stopped implementing since the training?
4. If their savings have increased over time, why?
5. If their savings have stopped or reversed over time, why?

Evaluation Approach

The CY2018 evaluation plan summary identifies tasks on a preliminary basis (Table 2). Final activities will be determined as program circumstances are better understood. CY2018 refers to the year of participation that will be researched, not the research timeframe.

Table 2. CY2018 Evaluation Plan Summary for SEM Program

Activity	CY2018
<u>Gross Impact Approach</u>	<u>Billing meter data/regression and Survey (as needed)</u>
<u>Gross Sampling Frequency</u>	<u>One Time</u>
<u>Verified Net Impact Approach</u>	<u>Deemed Value</u> <u>Electric (0.95)</u> <u>Gas (1.00)</u>
<u>Researched NTG Approach</u>	<u>None</u>
<u>Program Manager and Implementer Interviews/ Review Materials</u>	<u>Yes</u>
<u>Participant Interview</u>	<u>Process and Impact</u>
<u>Effective Useful Life Determination</u>	<u>3 years (further research is needed to increase up to 5 years)</u>

Data Collection, Methods, and Sample Sizes

Table 3 summarizes data collection methods, data sources, timing, and targeted sample sizes that will be used to answer the evaluation research questions. Evaluation of the SEM Program is based upon availability of SEM cohorts, thus, evaluation for CY2018 will be completed by the end of 2018.

Table 3. Core Data Collection Activities and Sample

What	Who	Target Completes CY2018	When	Comment
<u>Engineering Review- Practitioner Cohort</u>	<u>Participating Customers</u>	<u>*</u> <u>-</u>	<u>June - July 2018</u>	
<u>Telephone Survey- Practitioner Cohort</u>	<u>Participating Customers</u> <u>Implementer</u> <u>Program Staff</u>	<u>*</u> <u>-</u>	<u>July – August 2018</u>	<u>Engineering review to provide guidance to surveys</u>
<u>Second Engineering Review- Practitioner Cohort</u>	<u>Participating Customers</u>	<u>*</u> <u>-</u>	<u>August – September 2018</u>	<u>A second review based on survey results</u>

*Sample size will be determined to achieve 90/10

The main impact review will be completed before conducting the surveys to identify any site-specific issues that could be addressed in the interviews. Prior to the interviews, both Nicor Gas and ComEd will review the surveys to ensure they meet the needs of the program. Once the surveys are complete, Navigant will complete the engineering review by making any additional changes identified by the surveys.

Navigant will sample projects from these sites and apply the sample realization rates to the entire population to calculate overall savings. Navigant will consider several ways to stratify the SEM projects to design a sample once initial program data is received. Navigant will use a stratified ratio estimation sampling design to develop an efficient sample achieving 90/10 confidence/precision on the program-level realization rate. Once all sampled sites are evaluated, the realization rate of each stratum will be calculated. This realization rate will be applied to the total claimed savings within each stratum to calculate the final program savings.

Table 4 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 4. Core Data Collection Activities, Sample, and Analysis

Activity	Target	Target Completes CY2018	Timeline	Notes
<u>Tracking System Review</u>	<u>Tracking system</u>	<u>Census</u>	<u>Based on data availability</u>	
<u>In Depth Interviews</u>	<u>Program Management and Implementers</u>	<u>-2</u>	<u>April – Dec 2018</u>	<u>Augment with monthly calls</u>
<u>Gross Impact</u>	<u>Engineering File Review *</u>	<u>Census</u>	<u>April 2018 – Feb 2019</u>	<u>Timing is based on data availability</u>

* This is a multi-regression model based upon whole-building data, production data and other key variables.

As participating sites complete their one year of activities within the SEM Program, Navigant will collect the information regarding these sites and begin the evaluation. Navigant expects that the timing of this information will be dependent on the timing of the cohort training.

Gross Impact Evaluation

The impact evaluation will be grounded in site-specific data using engineering models and analysis.

1. A site-specific analysis approach will be implemented. Because this program contains primarily behavioral-based changes, the International Performance Measurement and Verification Protocol (IPMVP) option C – billing/metered data regression, will be the main method of impact evaluation.
2. The data collection will focus on verifying or updating the assumptions that feed into the implementer’s energy model for each site. This data may include: program tracking data and supporting documentation (project specifications, invoices, etc.), utility billing and interval data, Navigant-calibrated building automation system (BAS) trend logs, production data and telephone conversations with onsite staff.

Energy models have been provided for all the sites within the SEM Program. This data will be used with other collected information from the site to identify operating characteristics of the site both pre- and post these activities. If major changes have occurred at the site during or after the SEM activities,

it is expected the model will need to be adjusted to account for these changes. The changes that could affect the model savings include:

- Changes in hours of operation
- Changes in employees
- Changes in production
- Other measures installed at the site that were implemented through other Utility EE/DR programs or outside of the ComEd and Nicor Gas programs²⁸

Due to the small number of participating sites, Navigant will be performing the impact analysis on all participating customers. Sampling will be considered as number of participants grow.

Verified Net Impact Evaluation

The 2018 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 Table 5.

Table 5. Deemed NTG Values for CY2018

<u>Program Channel</u>	<u>CY2018 Deemed NTG Value</u>
<u>Comprehensive</u>	<u>0.95</u>
<u>Monitoring-Based</u>	<u>0.95</u>
<u>All-Natural Gas</u>	<u>1.00</u>

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.

Calculation of CPAS and Annual Savings

As required by the Future Energy Jobs Act (FEJA) for electric energy efficiency, 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 for each electric measure along with the total CPAS for all electric measures. Additionally, the weighted average measure life will be estimated, if possible. Evaluation will also add the savings converted from gas savings to the electric savings so that it's documented in the report.

²⁸ These measures are rebated separately from SEM program and savings for these measures are not counted in the SEM savings

~~energy efficiency measures at their sites. ComEd and Nicor Gas contracted with CLEAR to implement the SEM Program joint and individually managed SEM Programs.~~

Commented [KG177]: Following is the commented version for reference

The goal of the SEM Program is to implement a process of continuous energy management improvements which result in energy savings and reductions in energy intensity. Energy savings are expected to be achieved through operational and maintenance (O&M) improvements, incremental increases in capital energy efficiency projects, additional capital projects that would not otherwise have been considered (e.g., process changes, consideration of energy efficiency in all capital efforts), and improved persistence for O&M and capital projects. The program seeks to educate participants in the identification of low cost or no cost measures, improve process efficiency, and reduce energy usage through behavioral changes.

~~Currently the program has two types of participants: (1) New Cohort made up of new participants, and (2) The Practitioners Cohort for customers that continue to participate after this first year. Due to the timing of available data, Navigant will focus on the Practitioners Cohort in CY-2018 and will review Cohort 3 in CY-2019.~~

~~As a part of the evaluation, Navigant will review the documentation and savings for the Practitioner Cohort with a focus on persistence of savings and SEM activities. As needed, site interview will be completed to support Navigant research into site persistence.~~

~~This program has two types of groups, cohort groups and practitioner groups. Cohort groups are comprised of participants new to the program; Practitioner groups consist of participants after their first year with the program.~~

Navigant will evaluate the SEM program for both ~~both independent and joint programs with ComEd. For joint programs, Navigant grant utilities and~~ will produce a single report for both utilities. As a part of the evaluation, Navigant will review the documentation and savings for the Practitioner Cohort with a focus on persistence of savings and SEM activities. As needed, site interview will be completed to support Navigant research into site persistence.

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The impact evaluation of the SEM Program will characterize and quantify:

- Energy savings achieved through SEM improvements and behavior change beyond capital projects (prescriptive and custom).
- ~~Electric Demand savings achieved through SEM improvements and behavior change~~
- The persistence of achieved behavioral savings
- Persistence of SEM activities and practices

Commented [Apex178]: Demand savings is currently NOT in scope for Nicor Gas. May be in future contracts with ComEd.

Notable program changes made from GPY6/EPY9 to CY2018 include:

- ~~Electric Demand demand savings model may be part of this year's evaluation and the impact evaluation of these models may need to be considered based on the need of the program.~~
- Persistence of savings will be a focus of this year's evaluation for the practitioner cohort. We will be focusing on persistence of both savings and SEM activities and processes.

Commented [SD179]: I assume for electric only? If so note.

- As sites transition into the practitioner cohort, the evaluation activities will change to meet the needs of the client and implementer without overburdening the site. Navigant will not complete onsite surveys with sites that have already been surveyed in the past or complete simpler surveys to not overburden participants. Impact evaluation may be reduced as well for site that have already received impact evaluations in the past.

Commented [Apex180]: How will the activities change?

The CY2018 gross impact evaluation will not vary from the previous years. Over the course of 2018 we will examine the program theory and evaluation approach to inform discussions in the fall SAG NTG deliberations about the need for doing free ridership surveys with SEM participants in future years. We have tentatively planned to do NTG research in CY2019 and CY2021 pending the outcome of those deliberations. The evaluation of participating customer free ridership and spillover study will not occur in CY2018. Evaluation will continue to monitor net-to-gross (NTG) and will most likely perform NTG analysis in CY2019 and CY2021. The findings from the study will inform recommended NTG values for the Illinois Stakeholder Advisory Group (SAG) approval and future program application. The CY2018 process study will include program manager and implementer interviews 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.

Commented [JR181R180]: »On the process side, the participant interview is a little shorter with more of an emphasis on persistence and additional energy saving measures/actions.

Commented [DB182R180]: »Added details that match ComEd plan

Commented [SD183]: This differs from Table 3-3 of the Nicor Gas SOW, which notes NTG will be part of the billing analysis (“net impacts through billing analysis”).

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. As noted above, a limited process evaluation will be completed with the practitioner cohort with a focus on persistence but not normal detailed evaluation. The sites in this cohort have received several years of process evaluation and we do not expect that much has changed within the last year.

Table 1. 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 – Stakeholder Interviews	X	X	X	X
Impact – Billing Analysis	X	X	X	X
Impact – Engineering Review	X	X	X	X
Impact – Measure-Level Deemed Savings Review	X	X	X	X
Impact – Modeling	X	X	X	X
Impact – Verification & Gross Realization Rate	X	X	X	X
Impact – NTG Analysis (if needed)		X		X
Process Analysis	X	X	X	X

Commented [SD184]: See note above on this.

Coordination

The SEM program is independently and jointly managed by Nicor Gas and ComEd. The SEM evaluation report is developed as an independent and a combined ComEd and Nicor Gas evaluation report. Navigant leads the evaluation and will work with both utilities to finalize the report. There are special data collection issues with the SEM program and Navigant will manage those data issues with ComEd and Nicor Gas.

Evaluation Research Topics

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

Impact Evaluation

1. What are the actual achieved energy behavior savings in this program?
2. What were the realization rates of the projects? [Defined as evaluation-verified (ex post) savings divided by program-reported (ex ante) savings].
3. Are there any major changes occurring during or after program implementation (production, size, hours etc.) which may have affected the results?

Process Evaluation and Other Research Topics

The process evaluation effort for CY2018 will focus on program persistence. The process research will address the following questions:

- ~~4.6.~~ What SEM activities have the sites continued to implement after the first year of training?
- ~~2.7.~~ What new activities have the sites incorporated into their operation?

Commented [SD185]: You seem to include persistence under other research topics, seems like it would fit better under impact (and be called out as persistence).

Commented [DB186R185]: We will likely not have the data to formally calculate persistence due to the high amount of energy use variation year after year. Persistence of activities will be discussed as a part of our process evaluation which is why it is here.

3-8. What SEM activities have they stopped implementing since the training?

4-9. If their savings have increased over time, why?

5-10. If their savings have stopped or reversed over time, why?

Evaluation Approach

The following multiyear evaluation plan summary identifies tasks by year on a preliminary basis (Table 2). Final activities will be determined annually as program circumstances are better understood.

Table 2. CY2018 Evaluation Plan Summary for SEM Program

Activity	CY2018
Gross Impact Approach	Billing meter data/regression and Survey (as needed)
Gross Sampling Frequency	One Time
Verified Net Impact Approach	Deemed Value Electric (0.95) Gas (1.00)
Researched NTG Approach	None
Program Manager and Implementer Interviews/ Review Materials	Yes
Participant Interview	Process and Impact
Effective Useful Life Determination	3 years (further research is needed to increase up to 5 years). Secondary or Primary Research

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. Evaluation of the SEM Program is based upon availability of SEM cohorts, thus, evaluation for CY2018 will be completed by the end of 2018.

Commented [SD187]: Isn't this part of the persistence work? (i.e., an output would feed into the EUL?)

Commented [DB188R187]: We will be looking at activity persistence but will likely not have the savings data that could be used to estimate persistence at this point.

Commented [Apex189]: Previous report critiqued and suggested using using 5 years as other utilities have 5 years, e.g. AEP Ohio. Needs further investigation to make this improvement.

Commented [DB190R189]: Aligned with ComEd. We will likely not have the data to make this change with this program data but we could use secondary research.

Table 3. Core Data Collection Activities and Sample

What	Who	Target Completes CY2018	When	Comment
Engineering Review-Practitioner Cohort	Participating Customers	*	June - July 2018 May - June 2018	
Telephone Survey-Practitioner Cohort	Participating Customers Implementer Program Staff	*	July - August 2018 June - July 2018	Engineering review to provide guidance to surveys
Second Engineering Review- Practitioner Cohort	Participating Customers	*	August - September 2018 July - August 2018	A second review based on survey results

*Sample size will be determined to achieve 90/10

The main impact review will be completed before conducting the surveys to identify any site-specific issues that could be addressed in the interviews. Prior to the interviews, both Nicor Gas and ComEd will review the surveys to ensure they meet the needs of the program. Once the surveys are complete, Navigant will complete the engineering review by making any additional changes identified by the surveys.

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 4. Core Data Collection Activities, Sample, and Analysis

Activity	Target	Target Completes CY2018	Timeline	Notes
Tracking System Review	Tracking system	Census	Based on data availability Three waves	
In Depth Interviews	Program Management and Implementers	-2	April - Dec 2018	Augment with monthly calls
Gross Impact	Engineering File Review *	Census	April 2018 - Feb 2019	Three Waves Timing is based on data availability

* This is a multi-regression model based upon whole-building data, production data and other key variables.

As participating sites complete their one year of activities within the SEM Program, Navigant will collect the information regarding these sites and begin the evaluation. Navigant expects that the timing of this information will be dependent on the timing of the cohort training.

Gross Impact Evaluation

The impact evaluation will be grounded in site-specific data using engineering models and analysis.

Commented [AA191]: 2 SEM programs will be completed in 2018 ; Cohort-3 in October 31st and Practitioner-1 in June 30th. Do we need to evaluate both?

Commented [DB192R191]: This evaluation will focus on just the practitioner cohorts due to timing issues.

Commented [Apex193]: 2 SEM programs will be completed in 2018 ; Cohort-3 in October 31st and Practitioner-1 in June 30th. Do we need to evaluate both?

Commented [JR194R193]: For persistence, we need to talk with the Practitioner Group. This cohort has a rolling enrollment, so only those customers who have completed their SEM cohort by May 2017 would be interviewed.

Commented [DB195R193]: This evaluation will focus on just the practitioner cohorts due to timing issues.

1-3. A site-specific analysis approach will be implemented. Because this program contains primarily behavioral-based changes, the International Performance Measurement and Verification Protocol (IPMVP) option C – billing/metered data regression, will be the main method of impact evaluation.

2-4. The data collection will focus on verifying or updating the assumptions that feed into the implementer’s energy model for each site. This data may include: program tracking data and supporting documentation (project specifications, invoices, etc.), utility billing and interval data, Navigant-calibrated building automation system (BAS) trend logs and telephone conversations with onsite staff.

Energy models have been provided for all the sites within the SEM Program. This data will be used with other collected information from the site to identify operating characteristics of the site both pre- and post these activities. If major changes have occurred at the site during or after the SEM activities, it is expected the model will need to be adjusted to account for these changes. The changes that could affect the model savings include:

- Changes in hours of operation
- Changes in employees
- Changes in production
- Other measures installed at the site that were implemented through other Utility EE/DR programs or outside of the ComEd and Nicor Gas programs²⁹

Due to the small number of participating sites, Navigant will be performing the impact analysis on all participating customers.

Verified Net Impact Evaluation

The 2018 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 the following table.

²⁹ These measures are rebated separately from SEM program and savings for these measures are not counted in the SEM savings

Table 5. Deemed NTG Values for CY2018

Program Channel	CY2018 Deemed NTG Value
Comprehensive	0.95
Monitoring-Based	0.95
All Natural Gas	1.00

Source:
http://lsagfiles.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.

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 ante gross savings for the program and the cumulative persisting annual savings (CPAS) in CY2018 will be calculated for each electric measure along with the total CPAS for all electric measures. Additionally, the weighted average measure life will be estimated, if possible. Evaluation will also add the savings converted from gas savings to the electric savings so that it's documented in the report.

Process Evaluation

The CY2018 process evaluation research will include a synthesis of both qualitative and quantitative data collected during the program staff and implementer interviews, and during the participant surveys in CY2018. The CY2018 NTG study will include in-depth interviews with participating customers to learn about their perspectives and satisfaction with the program.

Use of RCT and QED

[The evaluation team will not evaluate this program via a randomized controlled trial because the program was not designed with randomly assigned treatment and control groups.](#)

[The evaluation will not use quasi-experimental design because there are not enough participants for individual measures in this program to achieve statistically significant savings estimates using this method.](#)

Evaluation Schedule

Table 6 below provides the schedule for key deliverables and data transfer activities. Adjustments will be made, as needed, as evaluation activities progress.

Table 6. Schedule – Key Deadlines

Activity or Deliverable	Responsible Party	Date Delivered
CY2018 site reports and models are available to Navigant	ComEd/Nicor Gas	*
Engineering review early findings	Evaluation	*
Detailed Surveys	Evaluation	*
Final engineering review completed	Evaluation	*
Draft Report to ComEd, Nicor Gas and SAG	Evaluation *	October 13, 2018
Comments on draft (15 Business Days)	ComEd/Nicor Gas	November 3, 2018
Redraft of Report	Evaluation	November 10, 2018
Comments on Redraft	ComEd/Nicor Gas	December 1, 2018
Final Report to ComEd, Nicor Gas and SAG	Evaluation	December 22, 2018

* Timing of tasks depends on timing of data availability are to be determined later.

Commented [SD196]: Table 4 above shows engineering file review into early 2019 (which I would expect), so how will results be ready by late 2019?

Commented [DB197R196]: This program has unique timing of data availability as discussed in table 3. For this reason the report will be drafted before the majority of the other reports.

Commented [Apex198]: Does it include practitioner and CH3? Measurement period ends : Practitioner-1 ends in June 30th and CH3 Oct 31st.

Commented [DB199R198]: This will only include the practitioner cohort. Given the timing of available data, we will not be able to complete the evaluation of cohort 3 this program year.

Small Business Program 2018-2021 Evaluation Plan

Introduction

The Small Business Program's (SB) objective is to obtain long-term natural gas energy savings from small business gas customers with energy efficiency retrofit and financial incentives to influence the installation of high efficient natural gas equipment. This program will provide small commercial gas customers with turn-key installation services and incentives to replace older, inefficient equipment and increase the overall efficiency of buildings.

The program offers a free energy assessment to introduce customers to energy efficiency, and creates an Energy Assessment Report to help customers identify and prioritize energy efficient improvements for their business. During the assessment, Energy Advisors offer customers free energy efficient products and services including low-flow bathroom and kitchen aerators, low-flow pre-rinse spray valves, salon sprayers, low-flow showerheads, and pipe insulation. Customers are given recommendations to improve the efficiency of their business. Recommendations align with the rebates available for small business customers for energy efficiency improvements and additions (i.e. pipe insulation, ozone laundry, and boiler reset controls), space and water heating, commercial food service equipment, steam traps, and boiler tune-ups. Small business customers may also qualify for higher custom incentives for energy-saving projects. Small business customers may directly apply for a rebate for energy efficiency projects in their facility.

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	X	X	X	X
Gross Impact – End-of-Year Custom Project Savings Verification	X	X	X	X
<u>Research – Small Business Thermostat Savings Benchmarking</u>	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†		
Additional Process Research‡	X	X		
Present NTG Research Results			Q3	
Process - Program Manager and Implementer Interviews/ Review Materials	X	X	X	X

Commented [KG200]: This is a deviation in the TRM ver6 NTG protocols. We will get clarification from the TRM NTG Working Group prior to the start of this research.

* Study is under consideration.

† 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.

‡ Additional ~~primary and/or~~ secondary process research will be considered to address the direct install/assessment offering, leasee responsibility for facility infrastructure systems, and website content development and navigation.

Small Business Savings Benchmarking and 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 Peoples Gas and North Shore Gas to explore a billing analysis study.

Evaluation Plan for Program Year 2018

Evaluation Research Objectives

The evaluation team has identified the following key objectives for evaluation research for program year 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)?

Process Evaluation:

Navigant's 2018 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 and following up on PY5 and PY6 research, Navigant will consider additional process research to address questions including:

1. What are best practices for utility program website content to enhance the customer online experience and support TAs?
2. How do lease agreements address infrastructure systems such as HVAC?
3. How to make direct install/assessment offerings more satisfying to customers?

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 – options A, B, and/or C for small business custom projects. The impacts for some projects will be verified by engineering file review and determined with regression analysis of trend or 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 B or C, depending on which data are used. If implemented measures are not amenable to regression analysis, the engineering review will form the basis of evaluated savings using IPMVP option A.~~

Commented [Apex201]: For SB custom sites, only?

Navigant will employ IPMVP protocols for on-site measurement and verification of small business 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.

Commented [Apex202]: As noted for Custom (above), options A (key parameter measurement) and B (all parameter measurement) are actually doing metering/measurement, not only billing analysis. As written here you seem to be talking about different forms of billing analysis but not metering. Suggest you clarify you plan on potentially metering or not, and if so that would be Options A or B, if not it would be Option C (which I believe is most likely).

The sampling plan for ~~custom these~~ 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.

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 2018 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. Deemed NTGR for 2018

Program Path/Measure	Deemed NTGR
Direct Install (DI)	0.87
Prescriptive Rebates	0.81
Custom Rebates	0.88
Roll-up to program-level (DI, Prescriptive, Custom)	0.81

Source: Nicor Gas 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. Additional ~~primary, and/or~~ secondary process research will be considered to address the direct install/assessment offering, leasee responsibility for facility infrastructure systems, and website content development and navigation. There will be no primary NTG research in 2018.

Commented [Apex203]: No additional primary research is proposed, however, so would this really be secondary research? (and may be of limited value for some q's, like how to improve the Website).

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 Program Year 2018

Table 4 below provides the schedule for evaluation of the 2018 Small Business Program. Adjustments will be made as needed as program year evaluation activities begin.

Table 4. Program Year 2018 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
<u>Small Business Thermostat Savings Secondary Benchmarking Research</u>	<u>Evaluation Team</u>	<u>December 7, 2018</u>
Custom Project Savings Verification Waves	Evaluation Team	Q3 2018 to Q1 2019
Final Tracking Data to Navigant	Nicor Gas	January 30, 2019
Draft Impact Report to Nicor Gas and SAG	Evaluation Team	March 12, 2019
Draft Comments Received	Nicor Gas / SAG	April 2, 2019
Send Revised Draft	Evaluation Team	April 13, 2019
Comments on Redraft	Nicor Gas / SAG	April 20, 2019
Final Impact Report to Nicor Gas and SAG	Evaluation Team	April 27, 2019

ComEd ~~BusinessNon-Residential~~ 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
<u>Tracking System Review</u>	X	X	X	X
<u>Data Collection – Participant Interviews</u>	X	X	X	X
<u>Data Collection – Program Manager and Implementer Interviews</u>	X	X	X	X
<u>Impact – Engineering Review</u>	X	X	X	X
<u>Impact – Modeling</u>	X	X	X	X
<u>Impact – Verification & Gross Realization Rate</u>	X	X	X	X
<u>Net-to-Gross – Free Ridership Self-Report Surveys</u>	X	X	X	X
<u>Net-to-Gross – Spillover Research</u>			X	
<u>Process Analysis</u>	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
<u>In Depth Interviews</u>	<u>Program Management and Implementers</u>	2	<u>April – Dec 2018</u>	<u>Augment with monthly calls</u>
<u>Gross Impact</u>	<u>Early Feedback File Review</u>	5	<u>June 2018 – Feb 2019</u>	<u>Early Feedback for Large Projects, As Needed</u>
<u>Gross Impact</u>	<u>Engineering Desk Review</u>	30†	<u>June 2018 – Feb 2019</u>	<u>Two Waves*†</u>
<u>Verified Net Impact</u>	<u>Calculation using deemed NTG ratio</u>	n/a	<u>March 2019</u>	
<u>Researched NTG and Process</u>	<u>Telephone Interview with Participating Customers</u>	-50	<u>April 2018 – March 2019</u>	<u>FR, Process, Targeting Projects Currently in Reservation Phase</u>
<u>Process and Impact Research on CY2018 Operations</u>	<u>Literature review, secondary research</u>	n/a	<u>April 2017 – March 2019</u>	<u>Process, Impact</u>

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
<u>Program Tracking Database</u>	<u>Program Administrator</u>	X	X	X
<u>Email Correspondence</u>	<u>Program Administrator</u>		X	
<u>Building Plans</u>	<u>Program Administrator</u>	X	X	
<u>Program Marketing and Outreach Materials</u>	<u>Program Administrator</u>			X
<u>International Energy Conservation Code (IECC) 2015</u>	<u>International Code Council</u>	X		
<u>ASHRAE Building Standards and Guidelines</u>	<u>ASHRAE</u>	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.

- a) First wave sample drawn in July 2018 and completed September 2018

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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.³⁰ 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

³⁰ 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.

two tailed for MWh and therms, respectively. The overall sample will include 30 projects, approximately 12 of which will have received gas incentives.³¹

Table 4. Estimated Number of Projects in Sample

<u>Fuel-Type</u>	<u>Estimate of Projects in Sample (Approximate)</u>
<u>Electric</u>	<u>18</u>
<u>Gas</u>	<u>12</u>
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

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

Source:
http://ilsagfiles.org/SAG_files/NTG/2017_NTG_Meetings/Final/ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, [PGL and NSG 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.

³¹ The number of projects in the sample may change based on the final list of projects and their savings.

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 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

<u>Activity or Deliverable</u>	<u>Responsible Party</u>	<u>Date Delivered</u>
<u>Monthly calls with program/implementation staff</u>	<u>Evaluation Team, ComEd</u>	<u>Ongoing</u>
<u>CY2018 program tracking data for participant interviews</u>	<u>ComEd</u>	<u>April 1, 2018</u>
<u>Post-reservation phase participant interviews</u>	<u>Evaluation</u>	<u>April 1, 2018 through November 30, 2018</u>
<u>CY2018 program tracking data for sampling Wave 1</u>	<u>ComEd</u>	<u>June 1, 2018</u>
<u>Wave 1 engineering desk reviews</u>	<u>Evaluation</u>	<u>September 30, 2018</u>
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<u>Final Report to ComEd, Gas Utilities, and SAG</u>	<u>Evaluation</u>	<u>April 24, 2019</u>

PREVIOUS VERSION WITH COMMENTS

covers the ninth program year for the Non-Residential New Construction (C&I New Construction) Program. Specifically, this is the tenth program year of ComEd's energy efficiency savings portfolio (CY2018) and the seventh program year for energy efficiency gas savings (January 1, 2018 to December 31, 2018). Seventhwave implements the program for ComEd, Nicor Gas, Peoples Gas, and North Shore Gas.

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.

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The CY2018 program did not change significantly from PY9GPY6/EPY9. 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.

The C&I New Construction Program is coordinated between ComEd, Nicor Gas, People 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 PY8EPY8, there were no gas projects completed in Peoples Gas or North Shore Gas territories. NTG 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).

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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 net-to-gross (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 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	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
Net-to-Gross – Spillover Research			X	
Process Analysis	X	X	X	X

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 NTGRs?
- 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?

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- 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

The table below 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.

Other secondary data sources that will be referenced to answer the research questions include:

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

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Commented [SD206]: Per note above process/NTG research are not shown for CY2018 on the 2018-2021 Nicor Gas SOW.

Commented [KG207R206]: This will be clarified in the next version of this plan, which is still being edited.

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International Energy Conservation Code (IECC) 2012	International Code Council	X
ASHRAE Building Standards and Guidelines	ASHRAE	X

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In line with program changes and 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

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- e) — First wave sample drawn in July 2018 and completed September 2018
- d) — Final wave starts January 2018 (or projects completion date)

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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.

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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.

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.

Commented [SD208]: Are there monthly calls set up with BNC like there are with CR for the Custom program? If not maybe this needs to be set up.

Commented [KG209R208]: ComEd and the evaluation team hold monthly call on BNC.

Gross Impact Evaluation Sampling Approach

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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.³² 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.³³

Table 4. Estimated Number of Projects in Sample

Fuel-Type	Estimate of Projects in Sample (Approximate)
Electric	48
Gas	12
Total	30

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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-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

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Source:

http://ilsagfiles.org/SAG_files/NTG/2017_NTG_Meetings/Final/ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, [PGL_and_NSQ_GPY7_NTG_Values_2017-03-01_Final.xlsx](#), and [Nicor Gas GPY7 NTG Values 2017-03-01_Final.xlsx](#)

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 - a. Reviewing project narratives for indications of program influence.
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³² Similarly, when estimating verified savings, the evaluation will include all therm savings in the gas utilities' service territories with the interactive effects removed whether the project received a gas incentive.

³³ The number of projects in the sample may change based on the final list of projects and their savings.

e. ——— If needed, discussing the project with Seventhwave to confirm areas where Seventhwave believes the program was influential.

2. ——— **Post-Reservation Interview.** Once a sampled project reaches the reservation stage, Seventhwave 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 electric measure-specific and total ex ante gross savings for the program and the cumulative persisting annual savings (CPAS) in CY2018 will be calculated along with the total CPAS. Additionally, the weighted average measure life will be estimated, if possible. Evaluation will also add the savings converted from gas savings to the electric savings so that it's 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. 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.

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 and affordable housing 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.

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
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A.4 Market Transformation Initiatives and Emerging Technologies Program (ETP)

Market Transformation Initiatives and Emerging Technology Program 2018 – 2021 Evaluation Plan

Introduction

Energy legislation Section 8-104 affords program administrators up to 3 percent of the portfolio budget to be dedicated to breakthrough equipment and devices and up to 5 percent of the portfolio budget to be dedicated towards market transformation initiatives. The Nicor Gas energySMART program will employ Emerging Technologies and Market Transformation tools and techniques to integrate innovation in energy efficiency programs. Nicor Gas expects these tools and techniques will play a critical role in identification and demonstration of innovative energy efficiency technologies and identification and alleviation of market barriers towards adoption and implementation of energy efficiency strategies and offerings.

Four-Year Evaluation Plan Summary

Nicor Gas will operate several market transformation and research efforts during EEP 2018-2021, as well as the Emerging Technology Program, for which it presently does not plan to claim savings. Therefore, no impact evaluation activities are planned for 2018 through 2021. If Nicor Gas claims savings during this period, Navigant will develop a plan and approach to verify the savings. Navigant will conduct annual program manager interviews to understand the status of these efforts, and will work with Nicor Gas to identify opportunities to provide supplemental research activities for these efforts, being mindful of overall budget availability.

Table 1. Four-Year Evaluation Plan Summary

Activity	2018	2019	2020	2021
Market Transformation and Emerging Technology Program Manager and Implementer Interviews	X	X	X	X