



**Energy Efficiency Plan Year 2  
(6/1/2012-5/31/2013)  
Evaluation Report:  
Summary and Compendium**

**FINAL**

**Presented to  
Nicor Gas Company**



*An AGL Resources Company*

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Presented by:  
Randy Gunn  
Managing Director  
Navigant Consulting  
30 S. Wacker Drive, Suite 3100  
Chicago, IL 60606

Phone 312.583.5700  
Fax 312.583.5701



[www.navigant.com](http://www.navigant.com)



**Submitted to:**

Nicor Gas Company  
1844 Ferry Road  
Naperville, IL 60563

**Submitted by:**

Navigant Consulting, Inc.  
30 S. Wacker Drive, Suite 3100  
Chicago, IL 60606  
Phone 312.583.5700  
Fax 312.583.5701

**Contact:**

Randy Gunn, Managing Director  
312.938.4242  
[randy.gunn@navigant.com](mailto:randy.gunn@navigant.com)

Julianne Meurice, Associate Director  
312.583.5740  
[julianne.meurice@navigant.com](mailto:julianne.meurice@navigant.com)

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## 1. Portfolio Level Results and Recommendations

The goal of this report is to present a summary of the findings and results from the impact and process evaluation of the energy efficiency programs offered by Nicor Gas in Gas Program Year 2 (GPY2), which ran from June 1, 2012 to May 31, 2013.

### 1.1 Portfolio Level Impact Results

The Nicor Gas portfolio reported 13,345,226 therms of gross savings during GPY2, as shown in Table 1.1. Evaluation review of these ex-ante gross savings estimates on a program-by-program basis concluded that 111% of the reported gross savings had been realized. With the exception of the Business Custom program, Navigant applied net-to-gross (NTG) ratios as deemed by the Illinois Statewide Advisory Group (SAG)<sup>1</sup>, resulting in an overall portfolio NTG ratio of 0.78. The individual program evaluations resulted in an ex-post net savings estimate of 11,535,008 therms.

**Table 1.1. Portfolio Year 2 Results – Ex Ante and Ex Post Savings**

	Ex-Ante Gross Savings (therms)	Verified Gross Realization Rate	Verified Gross Savings (therms)	Net-to- Gross Ratio	Verified Net Savings (therms)
Home Energy Efficiency Rebates (HEER)	2,847,533	1.00	2,858,644	0.69+	1,972,464
Home Energy Savings (HES)	253,445	1.08	273,900	0.86+	235,554
Multifamily Home Energy Savings (MFHES)	628,088	1.00	628,071	0.96+	602,171
Residential New Construction (RNC)	242,112	0.91	220,300	0.80+	176,240
Elementary Energy Education (EEE)	217,254	1.51	327,689	0.79+	258,875
Behavioral Energy Savings Pilot (BES)	11,955*	1.70	20,722*	N/A	20,722
Business Energy Efficiency Rebates (BEER)	3,314,210	1.00	3,314,314	0.73+	2,419,449
Business Custom (Custom)	3,317,145	1.29	4,263,751	0.72‡	3,069,901
Economic Redevelopment (ER)	132,207	0.85	112,363	0.70+	78,654
Emerging Technologies (ETP)	8,734	0.99	8,714	1.00+	8,714
Small Business Energy Savings (SBES)	1,719,681	1.25	2,143,013	1.00+	2,143,013
Business New Construction (BNC)	255,509	1.04	265,503	0.52+	138,062
Building Performance with Energy Star (BPwES)	N/A	N/A	N/A	N/A	N/A
<b>Portfolio Total</b>	<b>13,345,226</b>	<b>1.11</b>	<b>14,840,110</b>	<b>0.78</b>	<b>11,535,008</b>

Source: Navigant Analysis and Nicor Gas Project Files

<sup>1</sup> See <http://www.ilsag.info/> for more information on the SAG and net-to-gross framework.



\*Net therms are reported in lieu of gross therms in this case.

† A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).

‡ Based on evaluation research findings

## Definitions

Key definitions are provided in the below bullets and described in more detail in Appendix 4.1.

- Ex-Ante Gross Therms are savings as recorded by the program tracking system, unadjusted by realization rates, free ridership, or spillover. This information comes from Nicor Gas’s data tracking system and those of their implementation contractors.
- The realization rate represents verified gross savings / tracking system gross savings
- Verified Gross Savings are the gross program savings after applying adjustments based on evaluation findings for only those items subject to verification review for the Verification Savings analysis.
- Net-to-Gross (NTG) is the ratio of Verified Gross Savings program savings attributed to program influence or 1 – Free Ridership + Spillover.
- Verified Net Savings are the verified gross savings times NTG ratio.

Nicor Gas fell short of their filed goals for net program savings for the second program year. The achieved net therm savings for PY2 was 11,535,008 therms, 14% below their filed goal<sup>2</sup> of 13,401,596 therms. There were four programs that met or exceeded filed goals, the other programs were unable to meet filed goals but were often closer to revised goals. Nicor Gas is closer to goal by percentage than in GPY1 (in GPY1, the overall portfolio was short by approximately 21.7%).

## 1.2 Portfolio Level Process Results

The primary objective of the process evaluation effort is to gather market intelligence to help program designers and managers structure their programs to achieve cost-effective savings while maintaining high levels of customer satisfaction. Specific process evaluation methods and objectives vary based on each individual program’s needs and stage of development, and detailed process findings are reported separately for each program in the individual evaluation reports. Navigant did not conduct satisfaction research for most programs due to high levels of customer satisfaction in GPY1. A comparison of GPY2 customer satisfaction scores across applicable programs is presented in Table 1.2.

**Table 1.2. Summary of Customer Satisfaction Scores**

Program	Sector	Customer Satisfaction	
		Score	Details
Home Energy Savings	Residential	94% for non-EI2; 100% for EI2	Scores of 7-10 on a 10-point scale
Business Energy Efficiency Rebates	C&I	83%	Scores of 4-5 on a 5-point scale
Business Custom	C&I	96%	Scores of 4-5 on a 5-point scale

Source: Navigant Analysis

<sup>2</sup> Nicor Gas program goals as filed in the EEP Plan (Rider 30 EEP Program Portfolio Operating Plan, v1.1).



### **1.3 Portfolio Level Cost Effectiveness**

Navigant will review Nicor Gas' cost effectiveness analysis for GPY1-3 at the end of GPY3.

### **1.4 High Level Conclusions and Recommendations**

#### **Program Tracking Data**

The program implementation contractor (IC) tracking systems are generally sufficiently designed and populated with the information needed for program evaluation purposes. However, improvements could be made in some program's project and customer information tracking databases. The identified improvements include collecting or updating tracking information to aid in the evaluation team's ability to calculate accurate savings. In particular, EEE should discontinue hard coding savings values, HES should track participant type, SBES should update and correct errors to improve coordination of data transfers, and BEER should consider collecting additional details to match customers to TRM business types and investigate if including customer satisfaction would be a valuable data field to track within the database.

#### **Gross Savings Estimates**

The gross savings realization rates were 1.0 or greater for most programs (MFHES, EEE, HES, HEER, BESP, SBES, BEER, Business Custom, RCx, and BNC) and were less than one for RNC, ER, and ET, resulting in an overall portfolio realization rate of 1.11. The ER program was determined not to be cost effective and was discontinued in GPY3, the RNC impact evaluation was limited by amount of billing analysis data available, and the ETP program had a realization rate of nearly one (.99).

#### **Net-to-Gross Ratios**

Program NTG ratios were deemed by the SAG, with the exception of the Business Custom program. For the Business Custom program, Navigant recommends adding an impact statement at the application phase of the project which could include questions regarding customer capital planning (e.g., whether the project was part of regularly scheduled maintenance), planned efficiencies in the absence of the program (e.g., whether the customer would have installed the same efficiency equipment without the availability of the program incentive), or project timeline (i.e. whether the customer needs to or is planning to replace the equipment within 4 years). Answers to these questions can assist Nicor Gas in assessing an application's likely level of free ridership. Identifying the level of free ridership at the project application stage may support Nicor Gas in planning and mitigating risk in the Custom program or other programs, such as BEER.

Participants with low free ridership may have financial barriers that rebates alone cannot overcome. Nicor Gas might consider facilitating targeted financial partnerships (e.g. tailored packages of financial solutions to a targeted pool of participants) in order to increase participation. Nicor Gas should also continue promotion of financial options currently available to commercial customer through external programs and organizations<sup>3</sup>.

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<sup>3</sup> <http://nicorgasrebates.com/programs/financing-resources#comm>



### **Residential Furnace Early Replacement Analysis**

Navigant research found that forty-six percent of furnaces that were installed as *secondary* units (the measure that did *not* cause the participant to contact a trade ally) by ComEd program Complete System Replacement (CSR) participants can be considered early replacement measures instead of replace-on-burnout measures. The Illinois TRM contains a different savings algorithm for HVAC units which are considered early replacement based on a set of criteria including cost of repairs and efficiency rating. Navigant recommends that the Illinois TRM also allows deemed rates of early replacement as outlined in the findings of the HEER GPY2 evaluation report.

### **Increasing Awareness of Program, Benefits, and Nicor Gas Sponsorship**

Process evaluation results of several programs identify opportunities to increase awareness among participants and trade allies. Several programs should increase and expand their marketing outreach to both trade allies and customers. Some programs could benefit from marketing to specific segments as well as emphasizing non-energy benefits from program participation. In particular, the SBES program should continue to market by sector and by geographic area due to a successful pilot with a dry cleaners association.

### **Trade Ally Partnership**

For several programs, Navigant recommends expanded outreach to target potential new trade allies as well as continuing improvements to current trade ally marketing and communications. Nicor Gas could encourage additional participation by trade allies through targeting marketing efforts towards non-participating trade allies or other specific trade ally segments through special promotions.

## 2. Evaluation Methods

The Nicor Gas EM&V team developed an evaluation work plan for each program in the portfolio. Methods employed consisted of a combination of surveys, secondary research, on-site data collection, modeling, engineering review, program database and other information reviews, and staff interviews. Table 2.1 summarizes the main impact evaluation tasks for each program, and Table 2.2 summarizes process evaluation tasks.

All programs conducted program manager interviews, reviewed the tracking database, performed QA/QC, and conducted in-depth interviews with program implementers. These contributed to both impact and process evaluations.

**Table 2.1. Impact Evaluation Methods**

	Tracking System Review/TRM Verification Review	Project File Review	On-Site M&V	Impact Survey	Other Research
HEER	✓			140	Survey non-participating trade allies, early replacement study
HES	✓			172	
MFHES	✓				Savings from steam pipe insulation, ShowerStart
RNC	✓				Billing analysis/modeling
EEE	✓				
BES	✓				Literature review
BEER	✓	10		61	Steam trap literature review
Custom	✓	20	10	10	Billing analysis, early impact reviews Parallel path
ER	✓	14	7		Billing analysis
ET	✓	2			Literature review
RCx	✓	26	10		
SBES	✓				Thermostat research
BNC	✓	30			Interactive effects study, billing analysis/modeling

Source: Navigant Analysis



**Table 2.2. Process Evaluation Methods**

	Telephone Surveys/In-Depth Interviews of Program Staff	Telephone Surveys/In-Depth Interviews of Participants	Telephone Surveys/In-Depth Interviews of Participating Trade Allies	Other Research
HEER	2			Survey non-participating trade allies
HES	3	172	5	Verification ride-alongs Audit pricing analysis
MFHES	4			
RNC	3		11	
EEE	3			
BES	3			
BEER			30	
Custom	2	16	14	Survey non-participating trade allies
ER	2			
ETP	7			
RCx	4			Survey non-participating gas retrocommissioning service providers
SBES	3	29	8	Logic model and program theory
BNC	2			Focus group

Source: Navigant Analysis

### 3. Program Level Results and Recommendations

For each of the Nicor Gas programs evaluated, this section provides a program level summary and discusses key impact findings and recommendations and key process findings and recommendations.

#### 3.1 Home Energy Efficiency Rebates

##### 3.1.1 Program Summary

The Home Energy Efficiency Rebate (HEER) program offers cash incentives and education to encourage upgrading of water- and space-heating equipment among residential customers of Nicor Gas, and central air conditioning (CAC) systems for ComEd customers through the complete system replacement (CSR) portion of the program. The HEER program was designed to conserve natural gas and electricity, and lower participants' monthly energy bills. Both rental and owner-occupied dwellings are eligible for rebates for furnaces, boilers, water heaters, and air conditioning systems. Customers must be active residential customers of Nicor Gas in order to receive rebates for gas saving measures and the premises must be used for residential purposes in existing buildings.

The HEER program promises customers a quick turn-around rebate to invest in long-term savings through better technology. Rebates are offered for the installation of high-efficiency furnaces, boilers, programmable thermostats, domestic hot water (DHW) pipe insulation, windows, water heaters, and air conditioning systems. The dollar amount of the rebate depends on the size and efficiency of the replacement measures and ranged from \$20 to \$1,000. The GPY2 HEER program is implemented by Resource Solutions Group (RSG).

##### 3.1.2 Results and Recommendations

See Table 3.1 and below for a program level savings summary and a summary of the key impact and process findings and recommendations.

**Table 3.1. HEER Program Savings**

	Therm Savings
Ex-Ante Gross Savings	2,847,533
Verified Gross Realization Rate	1.00
Verified Gross Savings	2,858,644
NTG Ratio	0.69 †
Verified Net Savings	1,972,464

Source: Navigant Analysis

† A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).

##### Program Savings Goals Attainment

**Finding 1.** Nicor Gas achieved 88% of its GPY2 goal of 2,235,590 therm savings, and 53% of its targeted program participants. Nicor Gas also fell short of the implementation contractor's



revised goals for PY2. Eighty-nine percent of the program savings were from high efficiency furnace participants.

### **Gross Realization Rates**

**Finding 2.** The pipe insulation realization rate was 0.93 because the implementation contractor (IC) recorded the incorrect savings value. Additionally, the programmable thermostat realization rate was 0.99 because an incorrect in-service rate was used for self-installed thermostats. Storage water heaters received a realization rate of 1.27 because the baseline efficiency assumption used in the ex-ante gross savings estimates was for the incorrect size water heater.

**Recommendation.** The IC should thoroughly check the savings algorithms, assumptions, and deemed savings values being used in the program tracking system to ensure that they match the recommendations in the Illinois TRM.

**Recommendation.** To ensure that the program meets the requirements as defined in the Illinois TRM, the HEER program must ensure that contractors who install programmable thermostats know 1) how to program a programmable thermostat, 2) that the thermostats should be programmed using an appropriate set back schedule (such as the one suggested by ENERGY STAR), and 3) that they should instruct the homeowners on the appropriate use of a programmable thermostat. The program should also clearly indicate in the program tracking database whether a thermostat was installed by a contractor or by the customer.

### **Savings Estimates.**

**Finding 3.** The savings algorithms used to determine the ex-ante gross savings estimates for windows were not immediately apparent. It is not a measure detailed in the Illinois TRM, and the documentation provided did not provide the level of detail needed to thoroughly investigate the measure.

**Recommendation.** While the windows measure is no longer in use for the HEER program, Navigant recommends that any measure not in the Illinois TRM have an accompanying calculator and/or work paper to detail how ex ante savings estimates are calculated. The indirect water heater measure is a good example of this.

### **Trade Ally Participation: Spillover and Application Process**

**Finding 4.** Forty-seven percent of non-participating trade allies interviewed reported that they had sold program qualified measures without applying for rebates for those measures, resulting in therm savings amounting to 4% of the program's gross savings. When asked why they did not submit these measures to the program, the most commonly cited reason was the perception or experience that the program requirements were burdensome. In many cases the trade allies claimed they relied on their customers to apply for the program, however Navigant was unable to find any evidence that those customers submitted program applications without a trade ally.

**Recommendation.** Navigant recommends including the non-participating trade ally spillover savings rate, 4% of program gross savings, to future NTGR for this program.

**Recommendation.** Because Nicor Gas completely revised the application for GPY3 to simplify it, Navigant recommends an outreach effort to ensure that all "drop-out" trade allies are aware of the new, simplified application process. This effort could also include temporarily offering trade ally spiffs, which would encourage trade allies to utilize the new application.



**Finding 5.** Of the never-participated trade allies who agreed to complete the survey, fifty-six percent reported that they were unaware of the HEER program.

**Recommendation.** Navigant suggests that there are additional opportunities for Nicor Gas to increase program awareness among contractors in the service territory, and that the program would benefit from additional trade ally outreach efforts.

### Early Replacement Analysis

**Finding 6.** Forty-six percent of furnaces that were installed as *secondary* units (the measure that did *not* cause the participant to contact a trade ally) by CSR participants were reported to be early replacement measures instead of replace-on-burnout measures. Early replacement was calculated based on the condition, age, and repair history of the replaced units. Fourteen percent of furnaces installed as the *primary* CSR measures (the measure that caused the participant to contact a trade ally) were reported to be early replacement, and seven percent of furnaces replaced by furnace-only participants were reported to be early replacement.

**Recommendation.** Navigant recommends that the Illinois TRM account for early replacement rates of furnaces as described above: 46% for *secondary* units of CSR participants, 14% for *primary* units of CSR participants, and 7% of furnace-only participants, rather than consider all CSR measures as replace-on-burnout.

**Recommendation.** Navigant suggests that Nicor Gas consider the addition of an early replacement component to the stand-alone furnace program. This could include marketing materials, data collection, and additional incentives that would promote and encourage the early replacement of units that may be working, but are highly inefficient. The program qualifications may be similar to those for the furnace early replacement program currently offered in Ameren territory, where an additional rebate is offered for units that are working, and also either has an AFUE level of less than 75% or is more than thirty years old.

## 3.2 Home Energy Savings

### 3.2.1 Program Summary

The Home Energy Savings (HES) program is a joint program of Nicor Gas and ComEd, with Nicor Gas being the lead utility and CSG being the implementing contractor. The HES program provides discounted whole-home assessments (e.g., energy assessments) to customers to identify opportunities for installing energy efficiency measures and weatherizing the home. Assessments are performed by CSG Energy Advisors and weatherization type improvements such as air sealing and insulation are performed by contracted weatherization providers. During the assessment, CFLs, showerheads, kitchen and bath aerators, hot water temperature setback and education, programmable thermostat setting, and pipe insulation were directly installed or service provided at no additional charge for instant energy savings. A programmable thermostat was also offered at a reduced price for interested participants.

CSG's dedicated assessment staff generate a recommendation report for customers using proprietary software that takes into account customer home characteristic information. The customer report outlines recommended measures, potential savings, payback periods, and the amount of incentives available for recommended work. Customers choose the projects they would like to pursue. A program-eligible contractor is then assigned to perform the work and discounts are offered instantaneously. The contractor is responsible for submitting paperwork to CSG to receive rebate funds. Customers who pursued weatherization projects in GPY2 after July 2012 were eligible to receive incentives of 70% of costs for the recommended weatherization upgrades (up to \$1,750 per home) due to partnership with



EI2 and additional funding (extra \$500). If work was done before July 2012 it was the standard rebate amount of 50% up to \$1250.

In GPY2, the program partnered with Energy Impact Illinois (EI2) which hosted informational “house parties” where program contractors and EI2 staff presented information on the program as an additional outreach avenue for potential participants.

### 3.2.2 Results and Recommendations

In GPY2, the HES program sought to achieve 545,466 therms and 700 MWh of net savings<sup>4</sup> through the implementation of home energy assessments to promote discounted weatherization services and the direct installation of energy efficiency measures in residential Nicor Gas and/or ComEd in Nicor Gas territory single-family home residences or two to four unit buildings. To meet these goals, CSG planned to complete approximately 2,203 whole-home assessments to achieve approximately 749 completed jobs in GPY2.

Overall, the program performed well in GPY2 relative to GPY1. Assessment participation and weatherization participation targets were met, though therms savings goals were not. Furthermore, participants were generally satisfied with the program, though some areas for streamlining were identified. For a summary of program savings, see Table 3.2, below.

**Table 3.2. HES Program Savings**

	Therm Savings
Ex-Ante Gross Savings	253,445
Verified Gross Realization Rate	1.08
Verified Gross Savings	273,900
NTG Ratio	0.86 †
Verified Net Savings	235,554

Source: Navigant Analysis

† A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).

Key impact and process findings and recommendations are outlined below.

#### Program Savings Achievement

**Finding 1.** GPY2 verified net gas savings do not meet the original savings goals. However, gas gross savings achieved are in line with the implementation contractor’s revised goals.

**Recommendation.** Navigant recommends adjusting program savings goals for future program years based on lessons learned in GPY2 and the program participation and savings findings presented in this report.

<sup>4</sup> These savings targets were set before GPY1 as part of a three year plan and were revised with the implementation contractor in GPY2. This report uses the savings figures from the original three year plan and makes note of performance relative to the revised IC goals.



### Gross Realization Rates

**Finding 2.** Navigant reports overall gross realization rates of 100% for MWh and 108% for therms.

**Recommendation.** Navigant recommends updating ex-ante calculations for kitchen and bathroom faucet aerators based on clarifications presented in the Illinois TRM version 2.0. Additionally, Navigant recommends applying programmable thermostat savings at the household level rather than per unit installed to be in line with the TRM, and to calculate ex-ante programmable thermostat education savings based on clarifications in the TRM v2.0.

### Net-to-Gross Rate

**Finding 3.** Navigant calculates overall verified net savings using an overall program SAG-deemed NTGR value of 0.86. The evaluation team also determined an overall research NTGR for future use of 1.05 (0.94 Direct Install, 1.11 Weatherization) for gas savings utilizing full-participant, assessment-only participant, and trade ally research findings.

### Tracking System Review

**Finding 4.** The evaluation team found that though it is possible to identify full-participants from assessment-only participants in the tracking database judging by their measure installations, there is no unique field clearly designating full-participants from assessment-only participants.

**Recommendation.** Navigant recommends adding a field in the tracking database for participant type to distinguish full-participants from assessment-only participants. This will help ensure proper differentiation between the two participants groups in the tracking data for analysis.

### Program Participation

**Finding 5.** The GPY2 HES program saw participation of 2,760 total home energy assessments with weatherization jobs completed at 825 residences (these 825 weatherization jobs include 95 carry-over participants that received assessments in GPY1). This is more than double GPY1 participation, with an increase in total participants of 156% and an increase in weatherization jobs of 158%.

### Assessment Pricing

**Finding 6.** Nine months of GPY2 data suggest that promoting the HES program with a \$49 (participant) assessment cost is a cost-effective way to bring participants into the HES program.

**Recommendation.** Navigant recommends that Nicor Gas and ComEd retain the \$99 assessment pricing and selectively lower assessment pricing to \$49 to increase participation as necessary.

### Incentive Level

**Finding 7.** Navigant determined that conversion rates and average savings per household did not increase between GPY1 and GPY2 despite an increase in incentive levels from \$1,250 to \$1,750. Other program factors in GPY2, described below, may have depressed the conversion rate.

**Recommendation.** Navigant recommends Nicor Gas and ComEd continue with the increased incentive level with the expectation that these incentives, when combined with improvements described below will, increase conversions and lead to deeper savings per participant.

### **Full Participation Barriers**

**Finding 8.** Though the program generally rated high in satisfaction, the lowest satisfaction score for both full participants and assessment-only participants was “the time it took to schedule the Home Energy Savings program assessment.” Some assessment-only participants may have been deterred from full participation due to scheduling and follow-up issues. While CSG added assessors to reduce participant wait times, wait times still remained high and pressure on the assessors to complete assessments appears likely to have impacts on program conversion rates.

**Recommendation.** Navigant recommends addressing any aspects of program processes that may be causing assessment scheduling, post-assessment application processing, or weatherization contractor assignment delays. Ensuring sufficient assessor staffing levels may help alleviate assessment scheduling delays. Navigant recommends that CSG allow the number of assessors to increase or decrease as needed according to participation demand. In addition, the program may increase conversion rates by ensuring proper during-assessment weatherization support and by conducting post-assessment follow-up communications to maintain participant interest in the program and to ensure their understanding of participation procedures.

### **EI2 House Party Outreach**

**Finding 9.** EI2 house party participants accounted for 13% of participants, about 10% of program savings, and participants were generally more satisfied with the program and understood the participation process and program offerings better than Non-EI2 house party participants. On the other hand, EI2 house party participant conversion rates were considerably lower than non-participant rates.

**Recommendation.** With EI2’s withdrawal from the program, Navigant recommends CSG assess the benefits and costs of replicating key components of the house party outreach model and identifying other ways of leveraging community-based outreach approaches.

### **Future Evaluation Risk**

**Finding 10.** Given that GPY2 and GPY3 NTGR are based on GPY1 research, Navigant has reason to believe that future NTGR research may yield notably different results given interim changes in incentive levels, assessment pricing, and/or outreach methods.

**Recommendation.** The above should be taken into consideration when planning program changes.

## **3.3 *Multifamily Home Energy Savings***

### **3.3.1 Program Summary**

The Multi-Family Home Energy Savings (MFHES) is a jointly administered program with Commonwealth Edison Company (ComEd). MFHES is in its second year of implementation.

The MFHES program secures energy savings through direct installation of low-cost efficiency measures, such as water efficient showerheads, faucet aerators, programmable thermostats, water heater temperature setbacks and hot water pipe wrap insulation at eligible multi-family residences. A secondary objective of the program is to identify energy saving opportunities in the common areas of multi-family buildings through a brief visual inspection of common area lighting and/or central plant



locations to channel customers to other programs offered by the utilities. Primary target markets for the program include property management firms, trade and professional organizations, building owners and contractors who service multi-family buildings. During GPY2, the MFHES program expanded its scope to offer direct installation measures in common areas of eligible multi-family properties. Eligible buildings may have individual meters or master-metered systems.

In March 2013, the program transitioned to a new design and delivery structure, called the Multi-Family Comprehensive Energy Efficiency Program (MCEEP).<sup>5</sup> The MCEEP provides direct install measures in residential dwelling units and common areas, as before. In addition, the new program offers technical services and financial incentives to install whole-building energy efficient measures at eligible multi-family properties. Such whole-building measures may include upgrades or improvements to central plant and HVAC systems and controls, central lighting systems and building shell improvements, among others. These measures may be installed by contractors or by a participant's own maintenance staff. Honeywell Smart Grid Solutions implemented the program from the beginning of the program year until the program's transition in March 2013. In March 2013, Franklin Energy Services, LLC (Franklin Energy) became the primary implementation contractor for the ComEd/Nicor Gas program.

### **3.3.2 Results and Recommendations**

Overall, the GPY2 Multi-Family program tracking system is accurately recording measure savings and counts. The majority of program savings were from direct install measure installation in residential dwelling units, as opposed to common areas. Although the program fell short of its energy savings and participation goals in GPY2, the GPY3 program's expanded design and delivery may enable it to achieve a higher percentage of planned energy savings.

In GPY2, the Net-to-Gross Ratios used to calculate the Net Verified Savings were deemed through a consensus process by the Illinois Stakeholder Advisory Group<sup>6</sup> based on GPY1 evaluation research. The Net-to-Gross Ratio for gas measures installed in residential dwelling units was 0.96 and for measures installed in common areas was 0.93. Table 3.3 below provides a summary of program savings.

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<sup>5</sup> In practice, the MCEEP program continued to implement existing MFHES measures through the end of the EPY5/GPY2 program year as new MCEEP program components were being developed. Therefore, this report presents results from the complete program year in one section.

<sup>6</sup> Document provided by Nicor Gas to the SAG summarizing the SAG-approved NTGR for Nicor Gas for GPY1-GPY3 as negotiated in March-August 2013. Distributed in the SAG meeting on August 5-6, 2013. [http://ilsagfiles.org/SAG\\_files/Meeting\\_Materials/2013/August 5-6, 2013 Meeting/Nicor Gas Net-to-Gross Results and Application GPY1-3.pdf](http://ilsagfiles.org/SAG_files/Meeting_Materials/2013/August 5-6, 2013 Meeting/Nicor Gas Net-to-Gross Results and Application GPY1-3.pdf).

**Table 3.3 MFHES Program Savings**

	Therm Savings
Ex-Ante Gross Savings	628,088
Verified Gross Realization Rate	1.00
Verified Gross Savings	628,071
NTG Ratio	0.96 †
Verified Net Savings	602,171

Source: Navigant Analysis

† A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).

The following provides insight into key program findings and recommendations.

### Program Savings Attainment

**Finding 1.** The GPY2 Multi-Family program achieved approximately 27 percent of the program original savings goal<sup>7</sup> and approximately 31 percent of the program revised savings goal.<sup>8</sup> Of the total program savings in GPY2, approximately 96 percent of the verified net savings were from measures installed in residential dwelling units.

**Recommendation.** None. As already planned in GPY3 to increase energy savings, the program has expanded its scope and added new offerings designed to encourage participants to implement common area measures. The implementation contractor should continue to identify common area and whole-building measure energy savings opportunities for participants.

### Verified Gross Realization Rates

**Finding 2.** The program is accurately tracking measure counts. Appropriate quality control and quality assurance procedures are in place. With minor exceptions, the program tracking system is accurately recording measure savings estimates based on deemed or partially deemed values from the Illinois TRM. The GPY2 Multi-Family program verified gross realization rate was 100 percent.<sup>9</sup>

**Recommendation.** As detailed below, Navigant recommends making minor adjustments to ex-ante measure savings for kitchen aerators and bathroom aerators installed in common areas.

### Savings Estimates

**Finding 3.** Kitchen aerators and bathroom aerators installed in common areas were the only measures with savings estimates that the evaluators changed. These measures accounted for all of the differences in the program’s ex-ante gross savings and verified gross savings.

**Recommendation.** The implementation contractor should make minor adjustments to ex-ante measure savings for kitchen aerators and bathroom aerators installed in common areas.

<sup>7</sup> The GPY2 MFHES program goals as filed in the Nicor Gas Energy Efficiency Plan 2011-2014 (Revised Plan Filed Pursuant to Order Docket No. 10-0562, Dated: May 24, 2011)”.

<sup>8</sup> Nicor Gas provided to Navigant a revised GPY2 operational goal of 1,973,894 net therms (source: Nicor Gas GPY2 Revised Goals for Evaluation, received on December 20, 2013).

<sup>9</sup> The value of 100 percent is rounded.

### Future Evaluation Risk

**Finding 4.** The GPY2 Multi-Family Program achieved a 100 percent verified gross realization rate,<sup>10</sup> but the program design is changing in GPY3.

**Recommendation.** Based on GPY2 program evaluation findings, evaluation risk associated with the direct installation portion of the program is relatively limited. The GPY3 program is expanding its scope to include additional measures that have not been evaluated under the Multi-Family program, which carries some risk associated with new design and delivery mechanisms. However, this risk is somewhat mitigated by the fact that most of the measures associated with the GPY3 program have been evaluated as part of other Nicor Gas programs, including the Business Energy Efficiency Rebate program and the Business Custom program and/or included in the Illinois Technical Reference Manual (TRM). The related measure research in the Illinois TRM, evaluation research realization rates and NTG ratios are available to calibrate ex ante savings to assure realistic projections.

## 3.4 Residential New Construction

### 3.4.1 Program Summary

The Residential New Construction (RNC) program is jointly offered by Nicor Gas and ComEd. Nicor Gas is the lead utility as the majority of the avoided cost benefits are from natural gas. Residential Science Resources (RSR) implements the program for both utilities. The program launched in early 2012 and did not claim any savings in the first plan year but met or exceeded gas savings goals for GPY2 and the planning goal of completing 600 homes.

The program relies on networks of builders and HERS raters to garner participation and has already attracted several raters and builders to the program. The current program structure relies heavily on raters to recruit builders to the program, and the current incentives are as such weighted towards raters. The RNC program pays incentives of \$500 per home to raters and \$300 per home to builders; builders receive additional incentives from ComEd for installing program-qualified ENERGY STAR electric appliances. To qualify for the program, homes must achieve savings of at least 10% over an equivalent code-compliant new home based on REM/Rate modeling. The residential energy code in Illinois changed mid-program year: homes permitted through December 2012 were under IECC 2009, and homes permitted in 2013 were under IECC 2012. Due to the length of construction, this resulted in just five of the 688 GPY2 homes being permitted under IECC 2012.

### 3.4.2 Results and Recommendations

Overall, the program performed well in its first full year, exceeding energy and participation targets and enrolling several new builders and raters with homes in the pipeline moving into GPY3. The program has moved well beyond just “getting off the ground” and is looking forward to increasing marketing and outreach to expand the program in future years. Table 3.4 below and the following findings and recommendations provide additional suggestions for how to improve the program as it grows.

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<sup>10</sup> The value of 100 percent is rounded.

**Table 3.4. RNC Program Savings**

	Therm Savings
Ex-Ante Gross Savings	242,112
Verified Gross Realization Rate	0.91
Verified Gross Savings	220,300
NTG Ratio	0.80 †
Verified Net Savings	176,240

Source: Navigant Analysis

† A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).

### Gross Impact Findings

**Finding 1.** The program exceeded RSR’s GPY2 gross therm energy savings goals by 23%, despite a gross realization rate of less than 100%.<sup>11</sup> This goal was surpassed because the program completed more homes than targeted for Nicor Gas. The program devised successful outreach strategies such as identifying and targeting areas with high construction rates to gain new participants.

**Finding 2.** A 2011 study for the Midwest Energy Efficiency Alliance (MEEA) and the Illinois Department of Commerce and Economic Opportunity (DCEO) indicated that compliance with IECC 2009 is below 100% in Illinois.<sup>12</sup> Unfortunately, the study did not provide data in a format that could support evaluation adjustments to the code baseline.

**Recommendation.** Conduct or leverage further research on regional compliance with IECC 2012 in order to determine whether the baseline should be adjusted in future evaluations.

**Finding 3.** Although program homes all exceeded code on a performance basis by at least 10%, Navigant observed that on average certain characteristics met individual code requirements more consistently than others.

**Recommendation.** Work with builders and raters to improve areas below code, such as wall and foundation insulation levels, as well as those that are at or just above code, such as window U-values, major appliances, and cooling equipment. Since IECC 2012 has stricter requirements for air sealing and duct sealing, efficiency in these areas alone may not bring homes up to program standards as reliably as in GPY2.

### Net Impact Findings

**Finding 4.** Navigant’s qualitative analysis of rater interview data indicated that free-ridership could be as high as 33% to 67% for homes built under IECC 2009 code.

**Recommendation.** Increase educational opportunities for builders and raters in order to increase the program’s influence on building practices

**Finding 5.** Code enforcement is reportedly high in this region and meeting code is a clear area of influence for many builders.

<sup>11</sup> The program also exceeded the gas savings goals for GPY2 as filed in Nicor Gas’ Energy Efficiency Plan by 286%.

<sup>12</sup> “Measuring the Baseline Compliance Rate for Residential and Non-Residential Buildings in Illinois Against the 2009 International Energy Conservation Code.” Association of Professional Energy Consultants, Inc. June 30, 2011.

## Process Findings

**Finding 6.** Raters were satisfied with the program, specifically with their interactions with program staff and the application process. Given the recent launch of the program (Spring 2012), it is operating smoothly and has been able to move on from early roadblocks.

**Finding 7.** Builders were satisfied with their interaction with HERS raters, but many did not have significant interaction with the program and did not view their HERS raters as agents of the program. This lack of connection to the program could lead to low self-reported attribution in future evaluations.

**Recommendation.** Increase direct builder outreach in order to build stronger relationships with them through the following avenues:

- One-on-one meetings with builders
- Builder training sessions for both technical skills and marketing techniques
- Having a clear “go-to” person or contact list for builders seeking technical support or looking for guidance on program requirements

**Finding 8.** Builders and raters both expressed a desire for marketing materials to help them spread program awareness and explain the benefits of program homes.

**Recommendation.** Create separate marketing materials for both builders and prospective homeowners, tailored to the needs of each group. For example:

- Builder materials should advertise the program and provide clear examples of ways to qualify for the program.
- Customer materials should help builders market to their clients by explaining the benefits of a program home in terms the average prospective homeowner can understand.

## 3.5 *Elementary Energy Education*

### 3.5.1 Program Summary

The Elementary Energy Education (EEE) program is jointly offered by Nicor Gas and ComEd who engaged National Energy Foundation (NEF) to implement the program which is branded “THINK! ENERGY.” The program targets 5<sup>th</sup> grade students in public and private schools that are customers of Nicor Gas or jointly Nicor Gas and ComEd. Schools receive an invitation to participate and register to schedule the interactive presentations; alternatively, schools could register on the program website to join a waiting list if the program was fully-enrolled when they registered. Schools that had participated in the GPY1 program were also invited to participate. After the presentation, students take home a kit that includes water conservation measures; instruments to measure water and ambient temperature, as well as water flow rates, CFLs, and a household report card where participants used the form to report details of their family’s participation. Students and teachers are incentivized to return the household report cards with a \$100 mini-grant for each class that completes and returns 80% of their cards. Students are also incentivized to receive a program wristband if they complete and return a card. New in GPY2 teachers that returned 80% of the HRCs were entered into a raffle to win an iPad. NEF based the program’s savings on the installation rate of implemented measures reported in the household report card against the number of kits that were reported taken home.



The EEE program’s primary focus is to produce natural gas and electricity savings in the residential sector by motivating students and their families to take steps through reducing energy consumption for water heating and lighting in their home, a secondary goal of the program is to reduce residential use of water. Additionally, the EEE Program aims to increase participation in other Nicor Gas and ComEd programs via cross-marketing and increased customer awareness of energy efficiency issues.

### 3.5.2 Results and Recommendations

Overall, the program performed well in GPY2, exceeding energy savings and participation targets. Schools are pleased with the program: 100 of the 120 schools that participated in GPY1 participated again in GPY2. For a summary of program savings, see Table 3.5 below.

**Table 3.5. EEE Program Savings**

	Therm Savings
Ex-Ante Gross Savings	217,254
Verified Gross Realization Rate	1.51
Verified Gross Savings	327,689
NTG Ratio	0.79 †
Verified Net Savings	258,875

*Source: Navigant Analysis  
 † A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).*

The following provides insight into key program findings and recommendations.

#### Program Savings Goals Attainment

**Finding 1.** The verified total net gas savings exceeded the Nicor Gas planning goal of 207,900 net therms.

#### Program Participation

**Finding 2.** The overall participation goal of 15,000 kits distributed (1,000 kits for Nicor Gas only participants and 14,000 kits Joint participants) was met with 1,007 kits distributed to Nicor Gas only schools and 13,997 kits distributed to Joint schools.

#### Tracking System Review

**Finding 3.** Although Navigant was able to approximate the ex ante savings claims through the NEF program reports, the actual values in the tracking data were hard-coded.

**Recommendation.** Rather than hard-coding the values in the tracking system for GPY3, NEF should document and incorporate the algorithms/assumptions for the savings so they can be verified.

**Finding 4.** NEF did not calculate savings for single family homes separately from multi-family homes for water heating measures; there is a substantial difference in household size, showerhead counts, faucet counts, and water usage in single family vs. multi-family homes.

**Recommendation.** The program should calculate savings for single family homes separately from multi-family homes in GPY3 tracking system for water heating measures.



### Gross Realization Rates

**Finding 5.** The program achieved a gross savings realization of 1.51 for gas. This is principally due to Navigant using the Illinois TRM v 1.0 ISRs, while NEF calculated ISRs from the HRC data. The ISRs in the IL TRM are higher than those calculated from the HRC data.

### Review Process.

**Finding 6.** Some program changes increased savings by simply increasing and meeting participation goals and by switching to a more efficient showerhead. Other program changes may have increased actual ISRs: 1) increasing the HRC return rate, 2) switching to a showerhead with a higher participation satisfaction rating, and 3) better educational presentations.

**Recommendation.** As these improvements may increase actual ISRs, the program should consider conducting research periodically on ISRs of the top-saving measures by, for example, surveying students in randomly selected classes in early spring to capture persistence.

### Future Evaluation Risk

**Finding 7.** A future evaluation risk for the program is the ISRs for the program measures. Currently, the Illinois TRM Version 1.0 requires this program to use ISRs that were developed for direct install programs and that are almost two times the ISRs that Navigant found in our primary research in GPY1 and in the program's HRC data for GPY2. For GPY3/EPY6, Navigant will use the Illinois TRM Version 2.0 which states that ISRs for measures distributed through efficiency kits can be determined through evaluation. These ISRs will likely be closer to the ISRs we found in our primary research in GPY1, that is, much lower than the ISRs in Illinois TRM Version 1.0.

## 3.6 Behavioral Energy Savings Pilot

### 3.6.1 Program Summary

In GPY2, Nicor Gas implemented the Behavioral Energy Savings Pilot (BES) program via two efforts:

1. Conservation Services Group (CSG) and its subcontractor, MyEnergy.com, implemented the primary program component: ENERGYBUZZ. Nicor Gas soft-launched ENERGYBUZZ in August 2012 (GPY2).
2. The former BES program administrator, Wisconsin Energy Conservation Corporation (WECC), implemented a secondary program component: Take the Pledge. Nicor Gas launched Take the Pledge in April 2012 (GPY1), and ended it in December 2012 (GPY2) due to low participation. Upon closure of the Take the Pledge program, Nicor Gas moved all current Take the Pledge participants over to the ENERGYBUZZ program. WECC passed oversight of the ENERGYBUZZ program to Nicor Gas at the end of GPY2 (May 2013).

The BES program is open to all Nicor Gas residential customers with an online Nicor Gas account. The program also has two secondary target audiences: community partners for outreach collaboration and businesses for rewards donations. For the purposes of this evaluation, a program participant is defined as a customer who has both 1) created an account on the MyEnergy.com website and 2) linked that account with their Nicor Gas online billing account.



Nicor Gas conducts BES program efforts based on two overall strategies:

1. Drive people to visit the ENERGYBUZZ website and create an account through marketing and outreach efforts.
2. Engage account holders to save energy by distributing monthly email summaries of their energy use, providing access to online tools that show them how to save energy, and offering participants the opportunity to earn points and redeem them for rewards.

The pilot period for BES is three years, commencing with the GPY1 implementation year.

### 3.6.2 Results and Recommendations

BES results are summarized in Table 3.6 below and findings and recommendations resulting from the GPY2 program evaluation follow.

**Table 3.6. BES Program Savings**

	Therm Savings
Ex-Ante Net Savings	11,955
Realization Rate	1.70
Verified Net Savings	20,722
NTG Ratio	N/A

*Source: Navigant Analysis*

**Finding 1.** The literature provided three relevant annual savings values of 2.4%, 2.6% and 2.1% per household, resulting in a combined average annual savings value of 2.3% per household.

**Recommendation.** Nicor Gas uses an ex ante net savings value of 15 therms per household, equaling 1.3% of the annual average residential usage in 2009.<sup>13</sup> This value seems conservative based on the limited available research; Navigant calculated a Research Findings Net Savings value by applying the 2.3% average to Nicor Gas customers' 2009 annual usage of 1,136.5 therms per household; the Research Findings Net Savings value is 26 therms per household. Navigant and Nicor Gas will discuss whether it is reasonable to refine the Research Findings Net Savings value based on analysis of participant usage data via the PY3 evaluation, given the program size and participation rate.

**Finding 2.** According to program data, only 28% of customers who created a MyEnergy.com account completed the sign-up process by linking their Nicor Gas online account to the MyEnergy.com platform.<sup>14</sup>

**Recommendation.** Nicor Gas should continue to look for solutions to this issue, such as a single sign on option. Nicor Gas should also consider conducting a survey of participants who have not linked their accounts to understand the barriers and look to other MyEnergy.com programs for lessons learned.

<sup>13</sup> The 2010 Nicor Gas Market Potential Study established 1,136.5 therms as the average overall usage of all premise and heat types. Bass & Company. (2010). *Nicor Gas Market Potential Study Report*.

<sup>14</sup> Total overall percentage as of August 2012 through April 2013.



**Finding 3.** The program is not tracking KPIs related to participant participation in other Nicor Gas programs. Channeling participants into other Nicor Gas programs is one of the key expected outcomes of the BES program.

**Recommendation.** Navigant recommends that program management begin tracking program-channeling KPIs at the latest when the tracking system is operational and activity by the same account can be easily aggregated.

**Finding 4.** Current participation and savings goals do not reflect the program's actual launch date and have not been adjusted to reflect implementation realities.

**Recommendation** Nicor Gas should review the implementation contractor's expected scenarios and corresponding program needs to assess appropriate adjustments to participation and savings goals. This will allow the pilot's success to be measured against realistic goals. Nicor Gas should also explore automatically enrolling customers with Nicor Gas web accounts in the BES program, while still allowing customers who do not currently have an account to create one as desired. Adding an opt-out component to the program model would allow the program to reach more customers, and may alleviate some of the program's participation challenges.

**Finding 5.** While some mass promotion of the program has taken place, program marketing had not been fully implemented at the time of this evaluation and some questioned whether the mass promotion efforts were optimal.

**Recommendation.** Nicor Gas should continue to track and optimize marketing efforts to ensure the best use of program resources while achieving new participant accounts.

### **3.7 Business Energy Efficiency Rebates**

#### **3.7.1 Program Summary**

The Business Energy Efficiency Rebate (BEER) program provides incentives to increase the market share of new, highly efficient space heating, water heating, and commercial kitchen equipment as well as cost-effective improvements and additions to existing equipment.

The BEER program works closely with the Nicor Gas Business Custom program and the other business programs within the portfolio to target both end-use customers and trade allies. The BEER program relies on wholesale and retail trade allies to assist in the marketing of this program. Trade ally support and engagement is considered to be key to this program's success. To increase measure uptake in any period, the program may provide incentives to trade allies for specific, limited-time promotions. The implementation contractor conducts PEEZZA training sessions which educate contractors and trade allies regarding program offerings and energy efficient measures.

#### **3.7.2 Results and Recommendations**

Overall, the GPY2 BEER program built on a solid foundation from GPY1 to substantially expand its impacts. The BEER program increased participation year over year and exceeded planned energy savings targets in GPY2 compared to GPY1. The programs' tracking system is accurately recording measure counts and measure savings, contributing to GPY2 gross realization rates of 1.00. In GPY2, the program net-to-gross ratio used to estimate program verified net savings was deemed from the previous year as 0.73. Additional NTG research by incorporating trade ally free ridership did not produce the



results to support refinement of the program NTG. Table 3.7 shows program level savings and a discussion of findings and recommendations follows.

**Table 3.7. BEER Program Savings**

	Therm Savings
Ex-Ante Gross Savings	3,314,210
Verified Gross Realization Rate	1.00
Verified Gross Savings	3,314,314
NTG Ratio	0.73 †
Verified Net Savings	2,419,449

Source: Navigant Analysis

† A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).

### Program Savings Goals Attainment

**Finding 1.** The GPY2 BEER program exceeded the program’s filed net savings goal of 2,026,900 therms<sup>15</sup> by 19 percent. Compared to GPY1, the BEER program increased net energy savings by 90 percent in GPY2. Steam traps continue to be a very significant factor in the savings increase.

**Recommendation.** In an effort to maintain a high level of customer and trade ally engagement and satisfaction the program should continue to provide program marketing and outreach. The program should also continue to actively look outside of the organizations that are currently active within the program to find potential unconventional program allies, such as trade organizations, local banks, and environmental advocates.

**Recommendation.** In order to further incentivize customers to participate in the program to their greatest potential, the program could provide an additional bonus incentive to the customer if they install measures in multiple end-use categories. For instance, a bonus incentive of 10% could be achieved by combining installations of cohesive measures such as water heating equipment and commercial kitchen equipment. By combining more measure end-uses, the potential for the bonus level could also increase.

**Recommendation.** In the effort to improve attractiveness of program measures when natural gas prices are relatively low, the IC should continue to compile and promote specific examples of the non-energy benefits of gas measures (reduced maintenance, improved performance, reliability, waste reduction, pollution control, etc.) from past participants – if possible supported by quantified impacts or actual quotations.

### Net-to-Gross Ratio

**Finding 2.** The GPY2 program verified net savings is based on a NTG ratio of 0.73 deemed by the SAG, from GPY1 evaluation research findings.

**Recommendation.** The IC should consider the process of the adding an impact statement at the application phase of the project, which could include questions regarding customer capital planning (i.e. was the project part of regularly scheduled maintenance?), planned efficiencies in the absence of the program (i.e. would the customer have installed the same efficiency

<sup>15</sup> The GPY2 BEER program goals as filed in the EEP Plan (*Rider 30 EEP Program Portfolio Operating Plan, v1.1*). Revised GPY2 operational goals were exceeded by a similar amount.

equipment without the availability of the program incentive?), and based on the preponderance of evidence, does the customer need to or are they planning to replace the equipment within the near future (e.g. within 4 years)? By identifying the above issues at the beginning of the project application cycle, project free ridership can be identified and appropriate project planning can be done to mitigate the effects.

**Recommendation.** Potential participants with low free-ridership may have financial barriers that rebates alone cannot overcome, and may show little interest in pursuing initial projects. Nicor Gas promotes loan, grant, and financing resources to address financial barriers, and might consider facilitating targeted partnerships. For example, Nicor Gas could consider assembling tailored packages of financial solutions to targeted groups of participants who share common issues of limited capital, investment criteria, or financing. Possible packages may include interest rate buy-downs or on-bill financing, using revolving loan funds of rate-payer money or on-bill repayment using third-party funds, similar to that being pioneered by investor owned utilities (IOUs) in California<sup>16</sup>. The financial solutions packages, such as revolving loan funds, could target specific market segments such as hospitals or mid-sized industry, leveraging industry association networks in delivery or administration. Additional options may include investment grade energy studies, and quantifying non-energy benefits to improve the calculated rate of return. Productivity and environmental experts could be included in the partnership.

#### Verified Gross Realization Rates

**Finding 3.** The program realization rate has been stable at 1.0 in GPY1 and GPY2. The program tracking system is accurately recording measure savings estimates based on deemed or partially deemed values from the Illinois TRM. Navigant did not adjust the program claimed savings in the tracking system, except for a minor rounding adjustment to steam trap savings. The difference between program ex ante and verified savings was 104 Therms with overall program verified gross realization rate of 1.00.

**Finding 4.** The Illinois TRM has different equivalent full load hours for low, mid and high rise offices for space heating equipment, but the tracking system appears to assume a single value for all office types. Similarly, the TRM has different hours of use assumptions for strip mall versus department store retail business categories. The single values may not accurately represent the actual breakdown of program participants.

**Recommendation.** The IC should assess the feasibility of collecting additional details from participants and modifying the program application forms and the tracking system to match the TRM business categories.

**Finding 5.** The tracking system does not provide the customer documentation showing that installed steam traps replaced 100 percent failed open or blow through steam traps. This information is required to evaluate TRM compliance and verify eligible installed quantities and savings.

**Recommendation.** The IC should consider whether additional fields should be provided in the tracking system to provide the documentation that the steam trap replaced quantities were inspected and found in failed open/leaking/blow-through condition. If not accessible

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<sup>16</sup> Discussed in the “Energy Efficiency Investment Report” released by the American Council for an Energy-Efficient Economy (ACEEE) on February 2014. Report Number F1401.



through the tracking system, evaluation will make a separate request to the IC for verification documentation to support savings claimed.

### Savings Estimates

**Finding 6.** Steam trap replacements continue to be the major contributor to the BEER program savings, and accounted for 77.5 percent of the program savings in GPY2; close to 96 percent of the steam trap savings in GPY2 came from high pressure industrial steam trap replacements. Steam trap savings in GPY2 were 7.5 percent less as a percentage of total savings when compared to GPY1 savings, while savings from other measures improved in GPY2 (e.g. pipe insulation from 2.0 percent to 5.5 percent, boiler tune-up from 2.0 percent to 6.1 percent).

**Recommendation.** The program should continue to seek opportunities and adopt strategies that increase the savings from other program qualified measures, where the results will bring about achieving or exceeding program targets.

**Finding 7.** The evaluation team found that while the Illinois TRM steam trap savings algorithm and assumptions are comparable to findings from other industry TRMs, savings estimates vary significantly depending on measure-specific conditions and steam trap characteristics. The lack of Illinois data and details in the Illinois TRM on the prevailing steam trap types, population percentages of trap types and orifice sizes, and percent of those that fail open suggest the TRM savings estimates may not adequately reflect Illinois market conditions.

**Recommendation.** Since steam trap savings contribute most of the BEER program savings, Navigant recommends additional studies that will assess the various types of steam traps in the Illinois market to determine the population percentages of each trap type and orifice sizes and percentages of those that fail open. Savings estimates can follow the approach used in Wisconsin (further discussed in program evaluation), based on weighted averages of prevailing trap types, orifice sizes and operating pressure ranges. This study may include billing analysis and/or on-site data collection to establish a more accurate estimate of savings.

### Program Participation

**Finding 8.** Overall verified program savings (+90%), measure count (+90%) and projects per participant (+12%) increased in GPY2, with multifamily business types having the highest number of projects per participant in GPY2. In contrast, overall average savings per project were down (-26%) as more measures with smaller per unit savings replaced steam trap measures or projects. Heavy and light industry business types continue to have the largest therms savings per project, and these customers implemented mainly steam trap measures.

**Recommendation.** Although the program has met the targeted net goal for GPY2, the IC should continue to pursue new and innovative ways of targeting high potential measures and trade ally segments through specific targeted marketing efforts, including:

- Undertake regular market research including penetration analysis for the program to aid in identifying potential new markets.
- Recruit program staff, trade allies, or auditors with connections to potential target communities or markets that have a high energy savings potential.

### Trade Ally Satisfaction and Other Participation.

**Finding 9.** Overall, participating trade allies and contractors are very familiar and satisfied with the BEER program. On the question of satisfaction, twenty-five out of thirty participating

trade allies (83%) gave a score of four or five (highest), indicating their strong satisfaction with the program. On the question of program marketing and outreach, about half of the survey respondents said the program marketing is working well, but the other half called for continuous improvement to the outreach.

**Recommendation.** The program should consider whether outreach activities can be improved and expanded, because about half of the participating trade allies interviewed recommended continuing improvements.

**Finding 10.** Non-participating trade allies surveyed provided several reasons why they had not submitted an application, although several reasons were fixable. In general, non-participating trade allies indicated less familiarity with the program (48 percent gave scores of four to five indicating the highest familiarity with the program) than participating trade allies (77 percent indicated highest familiarity).

**Recommendation.** The IC should review the recommendations raised by non-participant trade allies to improve on the dissemination of information to both program trade allies and those potential trade allies working with other utilities.

**Recommendation.** The IC should continue to encourage non-participating trade allies to pursue and submit projects to the program. The IC should continue to maintain a commercial and industrial specific list of non-participating trade allies. By identifying potential trade allies, the IC will be better able to target new contractors to further increase program participation and savings.

**Recommendation.** Nicor Gas and the IC should continue to provide additional non-financial incentives to trade allies to promote their interest in the program, such as sporting event tickets or a trade ally recognition program, in which trade allies that have championed the program are recognized by Nicor Gas as leaders in their field, either through the existing BEER website, or through industry newsletters. This recognition may encourage non-participating trade allies or trade allies that have participated in the program in previous years to become more active.

#### **Process Review.**

**Finding 11.** Navigant reviewed the BEER program status of implementing recommendations made for the key performance indicators (KPI) in the program logic model review and the processes in our review of verification, due diligence, and tracking systems (VDDTSR) of the program in GPY1. Navigant concludes that the BEER program staff including the IC has implemented all of the recommended KPIs identified in the Logic Model and Program Theory (LMPT) memo (dated July, 2012). The program has implemented or is in the process of implementing most of the recommendations for VDDTSR.

**Recommendation.** Navigant recommends that the program should continue to track the identified KPIs throughout GPY3. The IC should revisit the recommendation related to incorporating customer satisfaction into the current program tracking database once the implementation of the TrakSmart® tracking database has occurred to determine if there would be an added value of combining the customer satisfaction results with the program tracking database.



### 3.8 Business Custom

#### 3.8.1 Program Summary

The Nicor Gas Business Custom Incentive Program (Business Custom) program provides business customers with financial incentives for the installation of natural gas-related energy improvements that are not specified for a prescriptive rebate under the Nicor Gas Business Energy Efficiency Rebate program or other Nicor Gas programs. Participants span a range of market segments and can receive incentives for a wide variety of natural gas saving technologies. Typical market segments for this program may include light and heavy industry, steel and metal working, plastics compounding and processing, hospitals, food processing, hotels, commercial laundry and other process heating intensive businesses. Large centrally-heated multifamily buildings and office buildings are also target segments for this program.

No major changes were introduced to the program during the GPY2 period. The majority of the savings from the measures installed in GPY2 are derived from energy management system controls and boiler upgrades in the heavy and light industry business category. The GPY2 evaluation involved applying the necessary research to verify the reported savings and any necessary adjustments for measures not deemed in the Illinois TRM. The evaluation conducted net-to-gross (NTG) research to assess and quantify participant free ridership and spillover to determine program verified net savings. The evaluation efforts included interviews with participating and non-participating trade allies to examine their influence, challenges and satisfaction with the program. The Business Custom program was implemented in GPY2 by CLEARResult.

#### 3.8.2 Results and Recommendations

Overall, the GPY2 Business Custom program built on a solid foundation from GPY1 to substantially expand its impacts. The Business Custom program did not meet its GPY2 participation and savings targets, but still increased both participation and savings in GPY2 compared to GPY1. Table 3.8 outlines program savings and a discussion of program findings and recommendations follows.

**Table 3.8. Custom Program Savings**

	Therm Savings
Ex-Ante Gross Savings	3,317,145
Verified Gross Realization Rate	1.29
Verified Gross Savings	4,263,751
NTG Ratio	0.72 ‡
Verified Net Savings	3,069,901

Source: Navigant Analysis

‡ Based on evaluation research findings

#### Program Savings Goals Attainment

**Finding 1.** The GPY2 Business Custom program achieved verified net savings were 10 percent less than the program's filed net savings goal of 3,417,000 therms. However, compared to GPY1, the Business Custom Program increased net energy savings by 288 percent in GPY2.

**Recommendation.** To further increase program savings, the program should continue to encourage program trade allies and contractors to market the program and inform

customers of the program incentives. The program implementers should also continue to actively look outside of the organizations that are currently active within the program to find potential unconventional program allies, such as trade organizations, local banks, and environmental advocates.

**Recommendation.** In order to improve attractiveness of measures when natural gas prices are relatively low, consider compiling and promoting specific examples of the non-energy benefits of gas measures (reduced maintenance, improved performance, reliability, etc.) from past participants – if possible supported by quantified impacts or actual quotes.

**Recommendation.** Nicor Gas could consider using segmenting strategies to tailor their marketing messages to specific customers, and use sales analytics to provide feedback to program implementation staff. Improvements in technology have made it possible to implement customer relationship management techniques, use data analytics to target marketing, and track performance based sales incentives among staff.

**Recommendation.** The technical successes and customer satisfaction that Nicor Gas has generated in the first two program years are good leverage points that Nicor Gas could consider using to an advantage. This could involve replicating technical successes at other facilities (supported by case studies and outreach), and building an energy partnership with customers to encourage repeat participation and multi-year project planning.

## Net-to-Gross Ratio

**Finding 2.** Navigant calculated a NTG ratio of 0.72 based on evaluation research conducted on GPY2 participants. This value is an increase of 36 percent compared to the NTG ratio calculated in GPY1.

**Recommendation.** The IC should consider adding an impact statement at the application phase of the project, which could include questions regarding customer capital planning (i.e., Was the project part of regularly scheduled maintenance?), planned efficiencies in the absence of the program (i.e., Would the customer have installed the same efficiency equipment without the availability of the program incentive?), and based on the preponderance of evidence, does the customer need to or are they planning to replace the equipment within the near future (e.g., within four years)? By identifying the above issues at the beginning of the project application cycle, project free ridership can be identified and appropriate project planning can be done to mitigate the effects.

**Recommendation.** Potential participants with low free-ridership may have financial barriers that rebates alone cannot overcome, and may show little interest in pursuing initial projects. If that is the IC's experience, Nicor Gas should tailor financial solutions with participants who raise the issue of limited capital, investment criteria, or financing to help overcome specific barriers that are common within customer segments. Possible solutions may include interest rate buy-downs, investment grade energy studies, on-bill financing, quantifying non-energy benefits to improve the calculated rate of return, and facilitating partnerships for grants, loans, and financing arrangements. In addition, Nicor Gas should continue to promote the financing options currently available to commercial customers through external programs and organizations<sup>17</sup>.

## Verified Gross Realization Rates

**Finding 3.** The research finding realization rate on ex ante gross savings is 1.29. This value is an increase of 40 percent compared to the realization rate achieved in GPY1. The key factor in

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<sup>17</sup> <http://nicorgasrebates.com/programs/financing-resources#comm>



the increased realization rate was the use of updated weather and metering data in the project evaluations. The use of these updated data resulted in evaluated savings that were greater than the reported savings.

### Savings Estimates

**Finding 4.** The GPY2 ex ante gross savings are 3,317,145 therms and the verified gross savings are 4,263,751 therms. The ex ante net savings are 2,388,344 therms and the verified net savings are 3,069,901. Heavy and light industry business types represent 65 percent of the GPY2 gross savings and continue to have the largest therm savings per project. These customers implemented mainly control systems and boiler upgrades.

**Recommendation.** The program should continue to seek opportunities and adopt strategies that increase the savings beyond current successes with control systems and boiler upgrades for industrial business types. Strategies might include targeted marketing or targeted incentive increases. For example, the Business Custom program currently offers bonus incentives for projects that are above 25,000 therms. The Bonus Incentive Opportunity removes the standard 50 percent project cost cap and doubles the available incentive to \$2/therm<sup>18</sup>. Nicor Gas should consider lowering the estimated therms requirement from 25,000 therms to allow for more projects to be submitted through this opportunity. In GPY3, 53 of the total 73 projects were below the 25,000 therm threshold. These 53 projects accounted for 12 percent (410,108 therms) of the overall program ex ante savings. By lowering the therm requirement, the program may encourage customers to participate in the program that otherwise would have not (due to capital financial constraints) while increasing program awareness and reducing overall free ridership. Nicor Gas might also consider targeting bonus incentives for repeat participants, to expand the comprehensiveness of past participant treatments and exert higher influence on projects (potentially helping to lower free-ridership).

### Program Participation

**Finding 5.** Overall program verified gross savings (+186 percent), measure count (+119 percent) and projects per participant (+18 percent) increased in GPY2. Heavy and light industry business types continue to have the largest therms savings per project, and these customers implemented mainly energy management controls and boiler upgrades. The number of participants in GPY2 was 62, 44 percent less than the goal of 110.

**Recommendation.** The program did not meet the targeted participation goal for GPY2, so the IC should continue to pursue new and innovative ways of targeting high potential measures and trade ally segments through specific targeted marketing efforts, including:

- Undertake regular market research including penetration analysis for the program to aid in identifying potential markets.
- Recruit program staff, trade allies, or auditors with connections to potential target communities or markets that have a high energy savings potential.

**Recommendation.** The program should consider having special incentive promotions for targeted measures. For example, the program could offer a limited time offer of increasing the incentive by 50 percent for trade allies that perform a burner replacement. Ideal measure for this type of offering would be measures that are not currently predominant in the program.

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<sup>18</sup> [http://www.nicorgasrebates.com/images/pdfs/CUSTOM\\_BonusIncentive\\_Final.pdf](http://www.nicorgasrebates.com/images/pdfs/CUSTOM_BonusIncentive_Final.pdf)

**Recommendation.** The program should include any relevant special offerings on the program pre-approval application. This brings visibility to the offerings of potential applicants when reviewing the process and may act as a catalyst for encouraging participation.

### **Trade Ally Satisfaction and Other Participation**

**Finding 6.** Overall, approximately half of the interviewed trade allies and contractors are very familiar with the Business Custom program. Eight out of 14 participating trade allies interviewed (57 percent) gave a score of 5 or 4 (highest on a scale of 0 to 5) of their familiarity with the program. On the question of satisfaction, nine respondents (64 percent) indicated very high satisfaction with responses of 5 or 4. Three respondents with a lower satisfaction score indicated they received a lower rebate than expected due to final estimates of their project savings. Two additional respondents indicated the processes involved with the program were confusing and discouraging

**Recommendation.** Nicor Gas should consider offering an option to “lock-in” an incentive at the pre-approval stage. The incentive could be paid at a lower rate (e. g., 80 percent of regular incentives) to cover the risk of under-performing projects. Over-performing projects would still be paid at the lower incentive level.

**Recommendation.** Nicor Gas and the IC should consider providing additional non-financial incentives to trade allies to promote their interest in the program, such as a trade ally recognition program in which trade allies that have championed the program are recognized by Nicor Gas as leaders in their field, either through the existing Business Custom program website, or through industry news letters. This recognition may encourage other trade allies to become more active.

**Recommendation.** The program should encourage trade allies to participate in future evaluation surveys. The program may consider adding a note to the terms and conditions for trade ally participation that trade allies should be aware they may be contacted by an independent evaluator to complete a survey of their experience with the program.

**Recommendation.** In order to further incentivize contractors to participate in the Business Custom program, Nicor Gas could offer a special onetime offering of a cash bonus for trade allies that submit a Final Application within a certain month. For each Final Application submitted by a trade ally between the first and last day of the chosen month, they could be entered into a drawing to win the predetermined cash prize (e. g., \$1,000 gift card). These incentives encourage trade allies to submit projects in a timely manner, allowing for better program planning, while also having the added benefit of attracting trade allies that may not have otherwise participated in the program. Additionally, this would reward particularly active trade allies, encouraging them to remain active and possibly become champions for the program.

## **3.9 Economic Redevelopment**

### **3.9.1 Program Summary**

The Economic Redevelopment Program (ER) program targets existing commercial, industrial, and commercial-sized multifamily facilities and properties undergoing major renovation in established “redevelopment areas” and encourages that they incorporate energy efficiency measures into the renovation process. The program provides technical assistance and enhanced incentives to render energy efficiency projects more affordable within these economically challenged communities. The Energy Center of Wisconsin (ECW) is the implementation contractor (IC) for this program. CNT Energy



(a non-profit organization founded by the Center for Neighborhood Technology), located in Chicago, conducts marketing and outreach for the program, including recruiting qualified potential participants. The target audiences for outreach include chambers of commerce, economic development departments, building owners, architecture firms and contractors.

The ER experienced slow participation uptake rates in GPY1 but, due to a successful marketing and outreach campaign, significantly increased program participation from one project in GPY1 to 15 projects in GPY2. However, the ER program will be discontinued as a separate program after GPY3, and only the remaining projects in the pipeline will be completed; additional project will be directed to another Nicor Gas program.

### 3.9.2 Results and Recommendations

Overall, the ER made significant progress in program participation and savings in GPY2. However, Nicor Gas determined that the ER program was not cost-effective and discontinued the program, deciding to complete only the remaining projects in the pipeline and to redirect any additional incoming projects to another Nicor Gas program. Table 3.9 below outlines ER program savings and a discussion of findings and recommendations follows.

**Table 3.9. ER Program Savings**

	Therm Savings
Ex-Ante Gross Savings	132,207
Verified Gross Realization Rate	0.85
Verified Gross Savings	112,363
NTG Ratio	0.70 †
Verified Net Savings	78,654

Source: Navigant Analysis

† A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).

#### Gross Realization Rates

**Finding 1.** Navigant’s GPY2 ER program evaluation resulted in a realization rate of 0.85.

**Finding 2.** Three out of the five projects with the lowest realization rates were evaluated using billing data to directly compare the pre- and post-implementation periods (ER-01, ER-04, and ER-07).

**Finding 3.** Navigant determined a low realization rate for ER-15. This project’s ex-ante savings were a high percentage of the facility’s billed gas consumption. The ex-ante savings methodology utilized customized algorithms and inputs rather than guidelines specified in the Illinois TRM.

**Recommendation.** Prior to approving incentive payment for a project, Navigant recommends that Nicor Gas compare the claimed savings to the site’s billed energy usage to assess the reasonableness of the claimed savings.

**Recommendation.** Navigant recommends that the IC use the Illinois TRM to calculate savings where applicable.

## Review Process

**Finding 4.** Despite thorough review of the project files and follow-up with the IC, the Navigant team could not identify baseline conditions upon which the ex-ante savings calculations are dependent for some projects (i.e. ER-06, ER-08, and ER-11).

**Recommendation.** Verification of claimed savings is greatly aided when thorough documentation of baseline conditions are provided, including:

- Pre-existing equipment and operation description,
- Energy savings assumptions and methodologies,
- Standard maintenance practices and history, and
- Inspection results.

While the IC is collecting this information, Navigant stresses the importance of sufficient project documentation to accurately portray the program's selection of baseline conditions for all projects.

## Process Evaluation Findings

**Finding 5.** The two main factors that likely led to the discontinuation of the ER program were:

1. Customers lacked the upfront capital to fund energy efficiency projects; and
2. Customers needed longer implementation periods to complete energy efficiency projects.

**Recommendation.** Navigant recommends that future programs aimed at community-based organizations increase the incentive amounts and/or restructure the program so that customers receive incentives earlier in the project timeline.

**Recommendation.** Navigant recommends that future programs aimed at community-based organizations allow for extended multi-year project timelines, granting these organizations more time to collect funding to install energy efficiency measures.

**Finding 6.** Lack of upfront capital was more of a barrier for community-based organizations, such as churches, YMCAs, homeless shelters, community assistance centers, and other community-based organizations, than for multifamily facilities located in Tax Increment Financing (TIF) districts or enterprise zones. This was because community-based organizations prioritized their funds for community service and day-to-day operations rather than management staff of multifamily facilities who prioritize budget for facility improvement projects in order to retain tenancy.

**Recommendation.** Navigant recommends that Nicor Gas consider implementing a shared savings program for these types of customers, providing upfront financial assistance and allowing the customer to pay back the investment with the savings associated with the project.

**Finding 7.** The most successful outreach strategy to customers was likely through utilization of CNT Energy's personal relationships with non-profit organizations to directly contact the people most involved in the energy efficiency investment decisions of these projects.

**Recommendation.** Navigant encourages Nicor Gas to continue this method of outreach to these customer types as future potential ER program projects are absorbed into other Nicor Gas programs.

**Finding 8.** Economic development agencies did not provide a significant number of leads to potential customers because they typically focused on assisting large commercial customers



to relocate their business rather than on commercial entities planning to renovate their existing facilities.

### 3.10 Emerging Technologies

#### 3.10.1 Program Summary

The Nicor Gas Energy Efficiency Program’s Emerging Technology (ET) program is designed to identify energy efficient emerging technologies or practices (i.e., measures) that Nicor Gas can incorporate into their Energy Efficiency Program (EEP) to achieve greater program savings and provide better value to their customers. The ET program finds potential energy-saving technologies by soliciting applications from trade allies, manufacturers, implementation contractors, and other stakeholders.

The Gas Technology Institute (GTI) manages the ET program as the implementation contractor with sub-contractor support from Livingston Energy Innovations (LEI). As detailed in the ET Program Operations Manual, LEI provides program support for a variety of ET program activities, including: program design, development, and launch; transfer of technologies into programs; and business development with stakeholders.<sup>19</sup>

During GPY2, ET program implemented many new processes that they had designed in GPY1. This program evaluation is focused on the newly implemented processes as well as changes made to processes implemented in GPY1 during the program’s infancy.

#### 3.10.2 Results and Recommendations

Table 3.10 documents the verified net therm savings for the ET program in GPY2, which includes energy savings from the two individual pilot assessment projects: the condensing RTU and on-demand controls.

**Table 3.10. ET Program Savings**

	Therm Savings
Ex-Ante Gross Savings	8,734
Verified Gross Realization Rate	0.99
Verified Gross Savings	8,714
NTG Ratio	1.00 †
Verified Net Savings	8,714

Source: Navigant Analysis

† A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).

The evaluation team also identified the following findings and recommendations.

#### Spreadsheet quality control and documentation

**Finding 1.** During the engineering desk review for the on-demand controls pilot assessment, the evaluation team identified three spreadsheet errors which impacted the pilot assessment

<sup>19</sup> From “Nicor Gas ETP Program Operations Manual Final to WECC 03-29-12.” The complete list of activities that the ETP identifies as areas in which LEI will contribute can be found on page 8.

results. The evaluation team notified ET program so that they could promptly correct the errors.

**Recommendation.** The evaluation team recommends that the ET program implement a simple process for detailed quality-control review of pilot assessment spreadsheets. Such a review process need not be onerous and by its very nature should encourage proliferation of best practices, thereby reducing the quality-control burden over time and improving work quality.

**Finding 2.** During the engineering desk review, the evaluation team identified five questions regarding analysis inputs/calculations, the sources for which were not always clearly documented or explained.

**Recommendation.** The evaluation team recommends that the ET program ensure that spreadsheets are easily interpreted by others and that the analysis could be recreated by others by requiring basic documentation for each input value. Constants should be clearly labeled, including the source, and calculations should be simple and clear to enable easy interpretation. Should an anomaly arises in the data, ET program should include a simple explanation to indicate if and how they address it.

#### HDD temperature basis

**Finding 3.** The ET program projection for annual energy consumption for the condensing RTU was based on the annual heating degree days (HDD) using a 65°F basis. Review of a plot of gas consumption versus HDD shows that using a basis at a lower temperature may be more appropriate for this projection.

**Recommendation.** The evaluation team recommends that the ET program consider revising the condensing RTU calculations using an HDD60 basis for RTU1 and HDD63 basis for RTU2. While the impact is small in this case, adjustment of the HDD basis is an important component of any heating-measure analysis that should not be overlooked. For measures that rely on regression analysis of the HDD data, this is particularly important.

#### Process Findings and Recommendations

**Finding 4.** The evaluation team found valuable improvements in the ET program's technology evaluation processes. In GPY2, the ET program learned valuable lessons during implementation of their pilot assessment and technology transitioning processes. These lessons have led to process refinements that will promote continued program success in GPY3.

**Finding 5.** With the integration of a market evaluation, the ET program created a more comprehensive approach to technology evaluations that captures both the technical and market components and helps promote technology success. ET program has improved their focus on the non-technical aspects of successful program design that are required for the EEP to successfully deploy a technology and realize targeted therm savings.

**Finding 6.** ET program first began transitioning technologies in GPY2 and has recognized the value in a formalized process to promote success. They plan to integrate into the process a webinar to help launch the technology deployment by gathering key stakeholders and providing valuable education in a coordinated effort. Further, they expect greater interfacing with EEP ICs in the future, which will help promote success of ET program technologies in the EEP.

**Finding 7.** The ET program has faced hurdles due to the submission deadline for work papers. The deadline is in January each year and falls in the middle of heating season, when gas technologies are often being field tested.

**Recommendation.** The evaluation team recommends that ET program identify an optimal timeline for work paper submission and work with Nicor Gas to determine a potential pathway for changing the submission deadline. Moving this deadline will eliminate conflict with heating technology testing and coincide better with natural pilot assessment cycles.

### **3.11 Retro-Commissioning**

#### **3.11.1 Program Summary**

The ComEd Retro-Commissioning (RCx) program has been offered each of the five electric program years and GPY2 marked the second year where the program was offered as a joint utility program with Nicor Gas. The RCx program offering is a natural fit for joint delivery due to the intensive investigation and analysis of heating, ventilation and air-conditioning (HVAC) systems. Individual measures frequently save both electricity and gas, and analyzing one while neglecting the other would be a lost opportunity.

The program helps commercial and industrial customers improve the performance and reduce energy consumption of their facilities through the systematic evaluation of existing building systems. In general, the program pays for 100% of a detailed retro-commissioning study contingent upon a participant's commitment to spend a certain amount of their own money implementing recommendations in the study that have a payback of 18 months or less. Retro-commissioning recommendations typically include low-cost or no-cost HVAC measures like (1) scheduling equipment with occupancy, (2) optimizing temperature set points and controls to operate equipment efficiently and (3) repairing worn-out or failed components<sup>20</sup> that manifest themselves as energy waste rather than affecting the ability of the whole system to maintain comfort. The measures can usually be implemented in the course of normal maintenance or through improvements to sensors or control programs with existing building automation systems (BAS).

The program is co-managed by ComEd/Nicor Gas and a single implementer, Nexant Inc. Nexant manages the day-to-day operation of the program including marketing, interacting with customers, working with program-approved retro-commissioning service providers (RSPs), and reporting progress and savings to the utilities.

#### **3.11.2 Results and Recommendations**

In general, the program continues to perform as it did in prior years. A steady flow of projects are generating savings. The program has evolved to capture the diverse customer base in the commercial building market sector. Facilities receiving district energy can participate and smaller buildings that are part of a campus are eligible to participate as well. The implemented savings is between five and seven percent of participant annual gas consumption, on average. The program savings are outlined in Table 3.11 below and a discussion of findings and recommendations follows.

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<sup>20</sup> For example, broken damper linkages that permit introducing too much ventilation air in extreme weather conditions. Servicing or replacing the linkages so they perform as intended would be a retro-commissioning measure.

**Table 3.11. RCx Program Savings**

	Therm Savings
Ex-Ante Gross Savings	397,353
Verified Gross Realization Rate	1.02
Verified Gross Savings	403,126
NTG Ratio	1.02 †
Verified Net Savings	411,189

Source: Navigant Analysis

† A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).

### Program Savings Goals Attainment

**Finding 1.** Nicor Gas energy savings fell well-short of goals (1,024,308 therms), though program managers expect GPY3 savings will make up for some of this shortfall due to long implementation lead times for some retro-commissioning measures.<sup>21</sup>

**Recommendation.** The GPY3 pipeline of projects appears to be a continuation of past performance for all utilities except North Shore Gas<sup>22</sup>. Goals attainment is very dependent on the number of projects processed by the program. GPY2 projects involved two more RSPs than GPY1 (11 versus 9) but that still leaves more than 50% of participating RSPs without a completed project. Working with the new RSPs to complete projects and enroll future participants should be a priority for meeting future goals.

### Gross Realization Rates

**Finding 2.** A few RSPs are recommending retrofit measures among their retro-commissioning measures that are covered in the Illinois TRM or might be included in future versions of the Manual. These measures include faucet aerators (TRM) and V-Bank filters for ventilation systems.

**Recommendation.** When measures are covered in the TRM consider using the algorithms there for *ex ante* estimates rather than custom methods for consistency. Consider proposing V-bank filters for deemed savings through the prescriptive program. Base deemed savings on research from pre- and post-installation measurements through retro-commissioning verification processes.

### Service Provider Participation

**Finding 3.** Eleven RSPs participated in GPY2. This is an increase from nine last year, but one RSP submitted almost 40% of projects and the top 4 active RSPs submitted 70% of projects while all others submit three or less. Tracking data show that 15 RSPs have pipeline projects including six that have not completed projects in the past.

**Recommendation.** Consider focusing marketing and follow-up efforts with new or less active RSPs to help them understand the value proposition for themselves and their customers for participating in the program.

<sup>21</sup> ICC Quarterly Report 4<sup>th</sup> Quarter PY2 Final.xls, Nicor Gas, July 16 email.

<sup>22</sup> North Shore Gas has one pipeline participant for GPY3 in a recent tracking review

### Participant Building Operator Certification Training

**Finding 4.** One requirement of the program is successful completion of Level I Building Operator Certification training by at least one participant representative within one year of completing the retro-commissioning project. The training is well received, anecdotally, and serves to support savings persistence. Successful tracking of this requirement, however, has only recently been implemented. Data show that thirteen individuals representing eight GPY1 participants (of 50) have completed the training. For GPY2 fifteen individuals, representing eleven participants, have completed the training. The one year window for compliance almost ensures this will be a recurring evaluation concern. Program leverage is weak on this requirement as the RSP is paid for the study long before the *participant* must comply.

**Recommendation.** Consider stronger tools for enforcing this program requirement – such as requiring participants to pay for training tuition prior to program completion. The program might collect the tuition in escrow and pay for the training when the participant enrolls. Compile a list of testimonials from operators who have recently completed the training describing the benefits of training.

### Processes.

**Finding 5.** Program Managers identified coordination with the controls contractors as a barrier to program success. These contractors are brought in to do much of the project work and in some cases, have not implemented projects correctly. Also, program managers identified that customer implementation funding and customer staff availability to participate in the retro-commissioning process continue to be barriers for the program.

**Recommendation.** Consider closer coordination with controls contractors, either by Nexant or also by utility staff. Closer coordination and more frequent monitoring will ensure that contractors are on track to implement projects successfully. Also, since funding and staff availability continue to be obstacles, the program could consider increasing funding and staffing to meet program goals.

Overall the program is addressing the barriers to retro-commissioning and operational savings in commercial buildings. There are a large number of registered service providers with varying degrees of activity in the service territory. Anecdotal comments suggest that participants are more aware of the program and the benefits of retro-commissioning, in general.

## 3.12 Small Business Energy Savings

### 3.12.1 Program Summary

The Small Business Energy Savings (SBES) program is designed to achieve energy savings goals by educating ComEd, Nicor Gas, and Peoples Gas/North Shore Gas small business customers about electric and natural gas savings opportunities through on-site assessments and added incentives. The implementers, Nexant for ComEd/Nicor Gas and Franklin Energy for ComEd/Peoples Gas/North Shore Gas, provide energy advisors who conduct high-level walk-through assessments of customer sites. Customers are able to achieve immediate savings with the direct installation of specific products during the assessment at no cost to them. The no-cost measures promoted by the program include low-flow faucets and showerheads, pre-rinse spray valves, vending machine controls, and compact fluorescent lights.



Further savings opportunities are offered to customers through incentives of 30 to 70 percent for selected low-cost electric and natural gas energy efficiency measures that may be installed by a local contractor at a second on-site visit. If the premises are rented, the program implementer coordinates participation in the program with the landlord or property owner. Trade allies are assigned on a rotating schedule based on geography unless the contractor recommended the program to the customer.

Rather than a geographic focus, Nicor Gas concentrated on a particular market segment with untapped savings potential: steam traps at dry cleaners, venues which in the greater Chicago area are mostly owned and operated by Korean-Americans. Working closely with the Chicago-based Korean-American Dry Cleaners Association (KADCA), Nexant recruited bilingual trade allies with experience installing steam traps at dry cleaners. After verifying that the participating trade allies understood the Program, could explain it properly, and were recommending and installing measures correctly per the standard SBES process, these trade allies were allowed to perform the assessments on their own. At the same time, Nicor Gas raised the steam trap incentive offered to dry cleaners to 100 percent starting in February 2013 and extending through the end of GPY2.

### 3.12.2 Results and Recommendations

The SBES program succeeded not only in meeting its goals for gas savings in GPY2, but in fact strongly exceeded them, which dramatically increased the program’s energy savings compared to the previous program year. This resulted in part from overall good execution on the part of the utilities and the program implementers, as well as increased familiarity with the program goals and processes on the part of participating trade allies. However, two other important factors should not be overlooked, namely the creative thinking and risk-taking on the part of program managers at both utilities. Their willingness to experiment with nontraditional approaches and take on the risks inherent in such efforts in order to overcome existing barriers to adoption of energy efficiency measures, were key elements in the Program’s success this year. Table 3.12 below summarizes SBES energy savings and a discussion of findings and recommendations follows.

**Table 3.12. SBES Program Savings**

	Therm Savings
Ex-Ante Gross Savings	253,445
Verified Gross Realization Rate	1.08
Verified Gross Savings	273,900
NTG Ratio	0.86 †
Verified Net Savings	235,554

Source: Navigant Analysis

† A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).

#### Program Savings Goals Attainment

**Finding 1.** The SBES program success was driven partly by the accomplishments of the geo-marketing pilot program, which comprised 15 percent of total program net savings, though the core program also performed well.

**Recommendation.** The program should expand the geo-marketing pilot program to other communities in its service territory.

**Finding 2.** The SBES program exceeded its GPY2 net therms savings goal by 247 percent. The program achieved 20 times the verified net savings it did in GPY1. This outstanding success is largely attributable to Nicor Gas’s innovative focus on dry cleaner steam trap replacements, which accounted for 74 percent of total Program therms savings.

**Recommendation.** The program should continue the steam trap special and expand it to other parts of Nicor Gas’s service territory.

### Program Tracking System Review

**Finding 3.** Navigant found several examples where the tracking system needed updating or correction, including building-type lookups, unit savings values for some measure types, notably lighting, and inconsistencies between the data provided by the implementation contractors and what was reported in the Frontier tracking system. We detailed these findings in Section 3.1.

**Recommendation.** Update and correct the tracking systems, and improve coordination of data transfer from the implementers’ data systems to Frontier.

### Pilot Program Findings.

**Finding 4.** The geo-marketing pilot program succeeded in raising uptake rates in the six small communities it targeted in GPY2. ComEd’s decision to commit extra resources to these communities, allow cooperating trade allies flexibility in tailoring their marketing approaches to local conditions, work closely with local businesses and community organizations, and set an aggressive, time-limited incentive, were all key factors driving the pilot’s success. The main features of this marketing model could be extended to other venues besides small communities.

**Recommendation.** The program should extend the pilot program to other small and mid-sized communities, and think creatively about adapting the geo-marketing delivery model to other settings where feasible (e.g., to “vertical communities” in apartment buildings and high-rise office buildings, as well as to urban neighborhoods that have had sub-par uptakes with the Program).

**Finding 5.** The experiences of the individual trade allies who delivered the geo-marketing pilot program in GPY2 suggest that there is no single marketing strategy that guarantees success in all circumstances. Approaches that worked in some communities failed to pay off in others, and not all trade allies were equally adept at making mid-course corrections to improve performance.

**Recommendation.** The program should allow maximum flexibility to the trade allies participating in future geo-marketing pilots, to allow them to experiment with alternative approaches and make adjustments as they gain experience working in each location. The Program should bring participating trade allies together (e.g., sponsor a conference or awards dinner) to share their experiences of what worked and generate ideas for overcoming barriers in the future.

**Finding 6.** The program’s success in increasing therms savings in GPY2 rests mainly on the success of the steam trap special offer, which Nicor Gas and Nexant implemented in collaboration with the Korean-American Dry Cleaner Association. This group provided the program with access to trusted, experienced, bilingual trade allies, along with valuable publicity and credibility with this hard-to-reach customer segment. Nicor Gas’s decision to

engage creatively with an ethnic/language-based group, and set an aggressive, time-limited incentive, were also key factors in assuring the Program’s success in GPY2.

**Recommendation.** The program should seek out other opportunities to work with non-traditional trade and community groups to promote steam trap replacements in non-dry cleaning venues, such as high-rise buildings, apartments and condo complexes. The Program should also consider expanding the focus to include other gas-saving measures, such as boiler tune-ups/replacements.

### **Trade Ally and Other Participation.**

**Finding 7.** Some trade allies participating in the GPY2 geo-marketing pilot indicated that the time they had been given to prepare to enter and market the pilot in each test community had been too short.

**Recommendation.** The program should give pilot program trade allies more notice before starting the pilot program in each targeted community, to allow them sufficient to develop marketing strategies, and contact local subcontractors and community leaders.

**Finding 8.** Trade allies participating in the GPY2 steam trap special reported encountering steam traps in service well beyond the recommended replacement age. Some dry cleaner proprietors appeared to be unaware of the large impact that leaking traps could have on their energy bills – indeed, some were reportedly unaware that they *had* steam traps or what their function is.

**Recommendation.** This lack of awareness represents a program barrier, but also represents an opportunity for Nicor Gas to strengthen and extend its cooperative relationship with KADCA. Nicor Gas should produce and distribute educational materials aimed at educating dry cleaner owners and others about steam traps, including proper maintenance and replacement schedules (federal guidelines recommend replacement every five to eight years). These could be translated into Korean and distributed cooperatively with the Association.

**Finding 9.** Some trade allies involved in the GPY2 steam trap special found that some customer boilers at participating dry cleaner were old and in deteriorated condition; they recommended extending the special offer to include boiler replacements.

**Recommendation.** Nicor Gas should consider developing an initiative to promote replacement of older, inefficient boilers. However, current Illinois rules provide a perverse incentive that serves to discourage replacement of older, inefficient boilers by crediting utilities with relatively low savings in such cases (so-called “replace-on-burnout”) that do not reflect the full social value of these measures. For this reason, Nicor Gas should propose alterations to these rules to the ICC that would alleviate this problem.

## **3.13 Business New Construction**

### **3.13.1 Program Summary**

The Business New Construction (BNC) Service program aims to capture immediate and long-term energy efficiency opportunities that are available during the design and construction of new buildings, additions, and renovations in the non-residential market. The program is jointly offered by ComEd and Nicor Gas. The ComEd program has been operating since June 1, 2009. Nicor Gas joined the program to offer natural gas rebates in June 2011.

The Energy Center of Wisconsin (ECW) implements the program for both ComEd and Nicor Gas. ECW reaches out to design professionals and customers at the beginning of the design process to engage them in the program as early as possible. Prior to GPY2, the program offered incentives through three tracks: Systems, Comprehensive, and Small Buildings. In GPY2, the program transitioned toward a single performance-based, Comprehensive track model which eliminates the remaining tracks previously offered. The Comprehensive track offers customers with building facilities greater than 20,000 square feet incentives for whole-building electric and therm savings. The change to a single track only affects new projects initiated in GPY2 or later. Future program years for electric and gas are likely to see more Comprehensive Track projects and fewer projects from the Systems and Small Buildings Tracks. Since New Construction projects typically take longer than one program year to complete, more than half of all projects completed in GPY2 were Systems Track projects initiated in past years. Additionally, one project was completed in GPY2 through the Small Buildings track which contained lighting and day-lighting requirements for buildings under 20,000 square feet.

### 3.13.2 Results and Recommendations

The BNC program achieved evaluation-adjusted gross savings of 265,503 therms, but fell short of its goal of 168,000 net therms (the revised savings targets established in the GPY2 contract), achieving savings of 138,062 net therms. Table 3.13 below provides detail on program savings.

**Table 3.13. BNC Program Savings**

	Therm Savings
Ex-Ante Gross Savings	255,509
Verified Gross Realization Rate	1.04
Verified Gross Savings	265,503
NTG Ratio	0.52 †
Verified Net Savings	138,062

Source: Navigant Analysis

† A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).

The program had 111 projects in EPY5/GPY2, consisting of 41 ComEd-only projects and 70 projects completed as ComEd and Nicor Gas joint projects. Of these 70 joint projects, 28 had therm savings eligible for incentives paid by Nicor Gas. In GPY2, the program transitioned from three incentive tracks (Systems, Comprehensive, and Small Building) toward a single performance-based, Comprehensive Track model which eliminates the remaining tracks previously offered. The change to a single track only affects new projects initiated in GPY2 or later. Thus, in GPY3 and beyond, the program is likely have an increasing number of Comprehensive Track projects and decreasing projects in the other tracks. Since New Construction projects often take longer than one program year to complete, more than half of the projects initiated in past years and completed in GPY2 were Systems Track, as shown below. Additionally, one project was completed in GPY2 through the Small Buildings track.

Given program maturity and historically high participant satisfaction, the GPY2 process evaluation was limited to activities that provided information on participant characteristics, program implementation changes, and program challenges, particularly for the newer Nicor Gas program offerings.



This section summarizes the key impact and process findings and recommendations.

### **Program Savings Goals Attainment**

**Finding 1.** Nicor Gas achieved evaluation-adjusted gross savings of 265,503 therms, but fell short of its goal of 168,000 net therms, achieving savings of 138,062 net therms.<sup>23</sup> This was primarily because the agreed upon NTG was lower than the planning value.

**Recommendation.** The program should continue to target projects with both gas and electric savings and target sectors with high levels of gas use and potential savings.

### **Gross Realization Rates**

**Finding 2.** The gross realization rate for therms savings is 104%. Engineering review of a sample of projects revealed that most energy savings modeling and calculations are reasonable and meet program guidelines. However, a few issues repeat across multiple projects as a result of not following program guidelines.

**Recommendation.** Calculating savings according to the program guidelines will result in gas realization rates closer to 100% for future projects.

**Finding 3.** The calculations for demand controlled ventilation (DCV) and energy recovery ventilation (ERV) include a minimum economizer operation temperature indicating that the units are not in heating mode until below that temperature. Although economizers may operate to this temperature, many buildings can still see DCV and ERV savings at higher temperatures. For all five applicable projects, this temperature is set to a relatively low value (35°F) for buildings with moderate internal gains common to the program.

**Recommendation.** The program should consider using a more reasonable assumption for the maximum outdoor temperature below which DCV and ERV savings may occur. For many buildings this will be between 55-60°F, though this is dependent on internal gains and should be determined on a project-specific basis. If a building has an abnormal balance temperature that requires a lower set-point, this should be clearly documented.

**Finding 4.** Two major renovation projects used existing parameters (e.g., the existing exterior wall construction) as the baseline for savings calculations. Renovations that expose the interior of the wall are required by law to bring the wall construction to code. In one case, the evaluation team's review of the project documentation indicated that keeping the existing wall was appropriate. For the second project, we determined that the level of interior demolition necessitated using code as the baseline.

**Recommendation.** Major retrofit projects that use existing parameters as baseline (such as shell) that are less than current code minimum should be reviewed to ensure reasonableness and documented accordingly. Specifically, we encourage using code minimums in all cases where the renovations are significant and the exterior walls are likely to be exposed.

**Finding 5.** Two projects used baseline equipment inconsistent with ASHRAE 90.1 Appendix G. The evaluation team changed the equipment specifications in the evaluation-adjusted model to use the appropriate baseline.

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<sup>23</sup> Including interactive therm penalties from joint projects. When these penalties are removed, the verified Nicor Gas savings are 137,441 net therms.



**Recommendation.** We recommend that the implementation team describe any deviations from ASHRAE 90.1 Appendix G in the project's supporting documentation.

### Process Evaluation

**Finding 6.** Attaining gas goals continues to be a challenge, as the gas side of the program has not had as long to mature and grow. However, program staff are actively working to increase gas savings in several ways such as researching new construction trends in the Nicor Gas service territory and mining past participation data to target sectors with high savings potential, as well as investigating new gas measures.

**Recommendation.** In addition to focusing on past participant data mining, also target previously untapped sectors with large gas loads. For example, the large hot water loads in the hospitality and food service sectors may be a potential source of savings.

**Finding 7.** The program has worked to improve its screening of projects for potential free-riders in several ways, including limiting participation to projects earlier in the design process and discussing large projects with the evaluation team in advance.

**Recommendation.** In addition to continuing these efforts and moving forward with the "real-time" self-report net-to-gross pilot for GPY3, plan to use market research to capture outside spillover now that the program is maturing.

**Finding 8.** The evaluation team observed that while ECW required large projects to be inspected if they were not randomly selected, the same protocol of randomly selecting 50% of projects for inspection remained in place for EPY5/GPY2. The implementation team indicated that a new system could be developed if the program grows to the point where the current system is too inefficient.

**Recommendation.** Consider developing a new and more efficient verification sampling system now so that it is already in place by the time the program is too large for the current approach.

## 3.14 *Building Performance with Energy Star*

### 3.14.1 Program Summary

The Building Performance with ENERGY STAR® (BPwES) pilot offers select customers in the hospitality and assisted living market segments one year or more of no-cost benchmarking and consulting services aimed at helping participants set and continuously track progress towards energy performance improvement targets at their regional facilities within the Nicor Gas service territory. Initial baseline and ongoing monthly benchmarking will be performed in ENERGY STAR's Portfolio Manager, as well as through a third-party benchmarking tool that provides a weather-normalized view of the participants' energy performance across their entire portfolio.

### 3.14.2 Results and Recommendations

The pilot did not generate anticipated participation levels over the two year pilot period and will not be continuing in GPY3. The primary areas of inquiry were to identify the barriers that prevented the pilot from succeeding and the lessons learned that should be applied to future similar efforts.



The program implementer, Ecova, reports that there would be benefits in combining Nicor Gas and ComEd's versions of this pilot. The implementation contractor found that it was sometimes difficult to speak with site level engineers and have them go through two different utilities if they were interested in both electric and gas measures. Having completely separate programs doubles the paperwork and can cause confusion. Furthermore, Ecova reports that it might be helpful to be able to come to a facility with a complete solution, and not just look at natural gas or electric measures separately. Customers want to see electric and gas opportunities together rather than one or the other.

The relative success of the ozone laundry systems gas measure allowed it to be integrated into other commercial and industrial programs as an offering. The measure's lower capital investment and two- to four-year payback criteria made it successful in relation to other higher-cost gas measures. Savings generated by the measure were credited to the Custom Program in GPY2 and Nicor Gas reports that in GPY3 the measure is being offered through the BEER program.

## 4. Appendices

### 4.1 Glossary

#### ComEd, Nicor Gas, Peoples Gas, and North Shore Gas EM&V Reporting Program Year

- EPY1, EPY2, etc. Electric Program Year where EPY1 is June 1, 2008 to May 31, 2009, EPY2 is June 1, 2009 to May 31, 2010, etc.
- GPY1, GPY2, etc. Gas Program Year where GPY1 is June 1, 2011 to May 31, 2012, GPY2 is June 1, 2012 to May 31, 2013.

There are two main tracks for reporting impact evaluation results, called Verified Savings and Impact Evaluation Research Findings, summarized in Table 4.1 below.

#### Verified Savings composed of

- Verified Gross Energy Savings
- Verified Gross Demand Savings
- Verified Net Energy Savings
- Verified Net Demand Savings

These are savings using deemed savings parameters when available and after evaluation adjustments to those parameters that are subject to retrospective adjustment for the purposes of measuring savings that will be compared to the utility's goals. Parameters that are subject to retrospective adjustment will vary by program but typically will include the quantity of measures installed. In EPY4/GPY1 ComEd's deemed parameters were defined in its filing with the ICC. The Gas utilities agreed to use the parameters defined in the TRM, which comes into official force for EPY5/GPY2.

**Application:** When a program has deemed parameters then the Verified Savings are to be placed in the body of the report. When it does not (e.g., Business Custom, Retrocommissioning), the evaluated impact results will be the Impact Evaluation Research Findings.

#### Impact Evaluation Research Findings composed of

- Research Findings Gross Energy Savings
- Research Findings Gross Demand Savings
- Research Findings Net Energy Savings
- Research Findings Net Demand Savings

These are savings reflecting evaluation adjustments to any of the savings parameters (when supported by research) regardless of whether the parameter is deemed for the verified savings analysis. Parameters that are adjusted will vary by program and depend on the specifics of the research that was performed during the evaluation effort.

**Application:** When a program has deemed parameters then the Impact Evaluation Research Findings are to be placed in an appendix. That Appendix (or group of appendices) should be labeled Impact Evaluation Research Findings and designated as "ER" for short. When a program does not have deemed parameters (e.g., Business Custom, Retrocommissioning), the Research Findings are to be in

the body of the report as the only impact findings. (However, impact findings may be summarized in the body of the report and more detailed findings put in an appendix to make the body of the report more concise.)

**Table 4.1. Program-Level Savings Estimates Terms**

N	Term Category	Term to Be Used in Reports‡	Application†	Definition	Otherwise Known As (terms formerly used for this concept)§
1	Gross Savings	Ex-ante gross savings	Verification and Research	Savings as recorded by the program tracking system, unadjusted by realization rates, free ridership, or spillover.	Tracking system gross
2	Gross Savings	Verified gross savings	Verification	Gross program savings after applying adjustments based on evaluation findings for only those items subject to verification review for the Verification Savings analysis	Ex post gross, Evaluation adjusted gross
3	Gross Savings	Verified gross realization rate	Verification	Verified gross / tracking system gross	Realization rate
4	Gross Savings	Research Findings gross savings	Research	Gross program savings after applying adjustments based on all evaluation findings	Evaluation-adjusted ex post gross savings
5	Gross Savings	Research Findings gross realization rate	Research	Research findings gross / ex-ante gross	Realization rate
6	Gross Savings	Evaluation-Adjusted gross savings	Non-Deemed	Gross program savings after applying adjustments based on all evaluation findings	Evaluation-adjusted ex post gross savings
7	Gross Savings	Gross realization rate	Non-Deemed	Evaluation-Adjusted gross / ex-ante gross	Realization rate
1	Net Savings	Net-to-Gross Ratio (NTGR)	Verification and Research	1 – Free Ridership + Spillover	NTG, Attribution
2	Net Savings	Verified net savings	Verification	Verified gross savings times NTGR	Ex post net
3	Net Savings	Research Findings net savings	Research	Research findings gross savings times NTGR	Ex post net
4	Net Savings	Evaluation Net Savings	Non-Deemed	Evaluation-Adjusted gross savings times NTGR	Ex post net
5	Net Savings	Ex-ante net savings	Verification and Research	Savings as recorded by the program tracking system, after adjusting for realization rates, free ridership, or spillover and any other factors the program may choose to use.	Program-reported net savings

‡ “Energy” and “Demand” may be inserted in the phrase to differentiate between energy (kWh, Therms) and demand (kW) savings.

† **Verification** = Verified Savings; **Research** = Impact Evaluation Research Findings; **Non-Deemed** = impact findings for programs without deemed parameters. We anticipate that any one report will either have the first two terms or the third term, but never all three.



§ Terms in this column are not mutually exclusive and thus can cause confusion. As a result, they should not be used in the reports (unless they appear in the “Terms to be Used in Reports” column).

## Individual Values and Subscript Nomenclature

The calculations that compose the larger categories defined above are typically composed of individual parameter values and savings calculation results. Definitions for use in those components, particularly within tables, are as follows:

**Deemed Value** – a value that has been assumed to be representative of the average condition of an input parameter and documented in the Illinois TRM or ComEd’s approved deemed values. Values that are based upon a deemed measure shall use the superscript “D” (e.g., delta watts<sup>D</sup>, HOU-Residential<sup>D</sup>).

**Non-Deemed Value** – a value that has not been assumed to be representative of the average condition of an input parameter and has not been documented in the Illinois TRM or ComEd’s approved deemed values. Values that are based upon a non-deemed, researched measure or value shall use the superscript “E” for “evaluated” (e.g., delta watts<sup>E</sup>, HOU-Residential<sup>E</sup>).

**Default Value** – when an input to a prescriptive saving algorithm may take on a range of values, an average value may be provided as well. This value is considered the default input to the algorithm, and should be used when the other alternatives listed for the measure are not applicable. This is designated with the superscript “DV” as in X<sup>DV</sup> (meaning “Default Value”).

**Adjusted Value** – when a deemed value is available and the utility uses some other value and the evaluation subsequently adjusts this value. This is designated with the superscript “AV” as in X<sup>AV</sup>

## Glossary Incorporated From the TRM

Below is the full Glossary section from the TRM Policy Document as of October 31, 201224.

**Evaluation:** Evaluation is an applied inquiry process for collecting and synthesizing evidence that culminates in conclusions about the state of affairs, accomplishments, value, merit, worth, significance, or quality of a program, product, person, policy, proposal, or plan. Impact evaluation in the energy efficiency arena is an investigation process to determine energy or demand impacts achieved through the program activities, encompassing, but not limited to: *savings verification, measure level research, and program level research*. Additionally, evaluation may occur outside of the bounds of this TRM structure to assess the design and implementation of the program.

*Synonym:* Evaluation, Measurement and Verification (EM&V)

**Measure Level Research:** An evaluation process that takes a deeper look into measure level savings achieved through program activities driven by the goal of providing Illinois-specific research to facilitate updating measure specific TRM input values or algorithms. The focus of

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<sup>24</sup> IL-TRM\_Policy\_Document\_10-31-12\_Final.docx



this process will primarily be driven by measures with high savings within Program Administrator portfolios, measures with high uncertainty in TRM input values or algorithms (typically informed by previous savings verification activities or program level research), or measures where the TRM is lacking Illinois-specific, current or relevant data.

**Program Level Research:** An evaluation process that takes an alternate look into achieved program level savings across multiple measures. This type of research may or may not be specific enough to inform future TRM updates because it is done at the program level rather than measure level. An example of such research would be a program billing analysis.

**Savings Verification:** An evaluation process that independently verifies program savings achieved through prescriptive measures. This process verifies that the TRM was applied correctly and consistently by the program being investigated, that the measure level inputs to the algorithm were correct, and that the quantity of measures claimed through the program are correct and in place and operating. The results of savings verification may be expressed as a program savings realization rate (verified ex post savings / ex ante savings). Savings verification may also result in recommendations for further evaluation research and/or field (metering) studies to increase the accuracy of the TRM savings estimate going forward.

**Measure Type: Measures are categorized into two subcategories: custom and prescriptive.**

**Custom:** Custom measures are not covered by the TRM and a Program Administrator's savings estimates are subject to retrospective evaluation risk (retroactive adjustments to savings based on evaluation findings). Custom measures refer to undefined measures that are site specific and not offered through energy efficiency programs in a prescriptive way with standardized rebates. Custom measures are often processed through a Program Administrator's business custom energy efficiency program. Because any efficiency technology can apply, savings calculations are generally dependent on site-specific conditions.

**Prescriptive:** The TRM is intended to define all prescriptive measures. Prescriptive measures refer to measures offered through a standard offering within programs. The TRM establishes energy savings algorithm and inputs that are defined within the TRM and may not be changed by the Program Administrator, except as indicated within the TRM. Two main subcategories of prescriptive measures included in the TRM:

**Fully Deemed:** Measures whose savings are expressed on a per unit basis in the TRM and are not subject to change or choice by the Program Administrator.

**Partially Deemed:** Measures whose energy savings algorithms are deemed in the TRM, with input values that may be selected to some degree by the Program Administrator, typically based on a customer-specific input.

In addition, a third category is allowed as a deviation from the prescriptive TRM in certain circumstances, as indicated in Section 3.2:



**Customized basis:** Measures where a prescriptive algorithm exists in the TRM but a Program Administrator chooses to use a customized basis in lieu of the partially or fully deemed inputs. These measures reflect more customized, site-specific calculations (e.g., through a simulation model) to estimate savings, consistent with Section 3.2



## 4.2 Final EM&V Program Reports

The final GPY2 report for each Nicor Gas program is available on the Illinois Energy Efficiency Stakeholder Advisory Group website, [http://www.ilsag.info/nicor\\_gas\\_eval\\_reports.html](http://www.ilsag.info/nicor_gas_eval_reports.html).

**Table 4.2 Program Evaluation Report File Names**

Program	File Name
Home Energy Efficiency Rebate	Nicor Gas HEER GPY2 Report 2014-02-27 Final.pdf
Home Energy Savings	Joint HES ComEd-Nicor Gas GPY2-EPY5 Eval Report 2014-03-25 Final.pdf
Multifamily Home Energy Savings	Nicor Gas MFHES GPY2 Report 2014-02-28 Final.pdf
Residential New Construction	Joint Res New Construction GPY2 EPY5 Report 2014-02-21 Final.pdf
Elementary Energy Education	Joint ComEd-Nicor Gas Elem Energy Ed GPY2 EPY5 Report 2014-01-28 Final.pdf
Behavioral Energy Savings Pilot	Nicor BESP Fast Track Memo 2013-10-01 Final.pdf
Business Energy Efficiency Rebate	Nicor Gas GPY2 Business Program Eval 2014-05-08 Final.pdf
Business Custom	Nicor Gas GPY2 Custom Eval Report 2014-04-02 Final.pdf
Economic Redevelopment	Nicor Gas Econ Redevelopment GPY2 Report 2014-01-27 Final.pdf
Emerging Technologies	Nicor Gas GPY2 ETP EMV Report 2013-10-22 Final.pdf
Retro-Commissioning	Joint Utilities RCx EPY5-GPY2 Eval Report 2014-03-27 Final.pdf
Small Business Energy Savings	ComEd-Nicor Gas SBES Program EPY5-GPY2 Evaluation Report 2014-03-06 Final.pdf
Business New Construction	Joint Bus New Construction EPY5-GPY2 Eval Report 2014-03-26.pdf
Business Performance with Energy Star	Nicor Gas PY2 BPwES EMV Report Memo 2013-10-4 Final.pdf