

**Energy Efficiency Program Year 1  
(6/1/2011-5/31/2012)  
Evaluation Report:  
Summary and Compendium**

**FINAL**

**Presented to  
Nicor Gas Company**



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## E. Executive Summary

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 1 (GPY1), which ran from June 1, 2011 to May 31, 2012.

### *E.1 Impact Evaluation*

On the whole, Nicor Gas fell short of their filed goals for net program savings for the first program year (Table E-1.). The achieved net therm savings for GPY1 was 4,585,673 therms, almost 22% below their filed goal of 5,860,783 therms. The evaluation team's preliminary finding on GPY1 portfolio cost effectiveness<sup>1</sup> based on these savings, portfolio expenditures, and the Illinois TRC, is 1.64.

**Table E-1. Portfolio Year 1 Results – Planned and Actual Net Savings**

Program	Net GPY1 Target (therms)	GPY1 Ex-Post Net Results
Multifamily Home Energy Savings	1,275,075	959,087
Elementary Energy Education	138,600	86,012
Home Energy Savings	220,729	94,597
Home Energy Efficiency Rebates	1,459,670	1,096,916
Residential New Construction	N/A	N/A
Behavioral Energy Savings Pilot	N/A	N/A
Small Business Energy Savings	169,329	104,483
Business Energy Efficiency Rebates	991,607	1,272,400
Business Custom	1,169,756	800,451
Retro-Commissioning	267,700	149,713
Business New Construction	151,200	21,300
Building Performance with Energy Star	N/A	N/A
Economic Redevelopment	17,117	714
Emerging Technologies	N/A	N/A
<b>Portfolio Total</b>	<b>5,860,783</b>	<b>4,585,673</b>

Table E-2 shows that the Nicor Gas program tracking systems reported 6,421,412 therms of gross savings at the portfolio level for GPY1. Evaluation review of these ex-ante gross savings estimates on a program-by-program basis concluded that 99% of the reported gross savings had been realized. Additional evaluation work to estimate free riders and spillover effects resulted in an overall net-to-gross ratio of 0.72.

<sup>1</sup> Final results of our review of Nicor Gas' cost effectiveness analysis of GPY will be published in a separate report.

**Table E-2. Portfolio Year 1 Results – Ex Ante and Ex Post Savings**

	Ex-Ante Gross (therms)	Realization Rate	Ex-Post Gross (therms)	Net-to- Gross Ratio	Verified Net (therms)
Multifamily Home Energy Savings	986,438	1.01	997,875	0.96	959,087
Elementary Energy Education	34,298	3.19	109,222	0.79	86,012
Home Energy Savings	104,505	1.05	109,380	0.86	94,597
Home Energy Efficiency Rebates	1,591,644	1.00	1,592,503	0.69	1,096,916
Residential New Construction	N/A	N/A	N/A	N/A	N/A
Behavioral Energy Savings Pilot	N/A	N/A	N/A	N/A	N/A
Small Business Energy Savings	104,483	1.00	104,483	1.00	104,483
Business Energy Efficiency Rebates	1,742,000	1.00	1,742,000	0.73	1,272,400
Business Custom	1,622,380	0.93	1,510,285	0.53	800,451
Retro-Commissioning	180,345	0.82	147,838	1.01	149,713
Business New Construction	54,426	1.18	64,400	0.33	21,300
Building Performance with Energy Star	N/A	N/A	N/A	N/A	N/A
Economic Redevelopment	893	1.00	893	0.80	714
Emerging Technologies	N/A	N/A	N/A	N/A	N/A
<b>Portfolio Total</b>	<b>6,421,412</b>	<b>0.99</b>	<b>6,378,879</b>	<b>0.72</b>	<b>4,585,673</b>

**Definitions**

Key definitions are provided in the below bullets and described in more detail in Appendix 5.1.

- Ex-Ante Gross Therms are the initial utility-reported total savings based on installed measures under the program. This information comes from Nicor Gas’s data tracking system and those of their implementation contractors.
- The realization rate represents the percentage of Gross Therms accepted after verification by evaluators.
- Ex-Post Gross Therms are the program savings after verification by evaluators.
- Net-to-Gross (NTG) is the ratio of ex-post gross program savings attributed to program influence.
- Ex-Post Net Therms are the accepted savings due to program influence.

## E.2. Process Evaluation

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. However, customer satisfaction is a key component of each process evaluation and a comparison of customer satisfaction scores across programs is presented in Table E-3. While there are slight differences in how each score is assessed, it can be seen that all scores indicate high levels of customer satisfaction.

**Table E-3. Summary of Customer Satisfaction Scores**

	Sector	Customer Satisfaction	
		Score	Details
Multifamily Home Energy Savings	Residential	98%	Scored higher than the planned 4.5 on a 5 point scale
Elementary Energy Education	Residential	97%	121 of 125 teachers reported they would conduct the program again
Home Energy Savings	Residential	97%	Scored 8-10 on a 10 point scale. Over 50% gave a 10 “very satisfied” rating.
Home Energy Efficiency Rebates	Residential	70%	Scored 8-10 on a 10 point scale. 35% gave a 10 “very satisfied” rating.
Residential New Construction	Residential	N/A	No completed projects
Behavioral Energy Savings Pilot	Residential	N/A	No program savings
Small Business Energy Savings	C&I	80%	Scored 8-10 on a 10 point scale.
Business Energy Efficiency Rebates	C&I	88%	Scored 8-10 on a 10 point scale.
Business Custom	C&I	100%	All 11 respondents to the participant survey indicated they were satisfied with their participation in the Custom Program
Retro-Commissioning	C&I	92%	Scored 8-10 on a 10 point scale.
Business New Construction	C&I	88%	15 of 17 participants rated the program very highly in overall satisfaction
Building Performance with Energy Star	C&I	N/A	No completed projects
Economic Redevelopment	C&I	N/A	No completed projects
Emerging Technologies	C&I	N/A	No completed projects

## E.3. High Level Conclusions and Recommendations

The program tracking systems are generally sufficiently designed and populated with the information needed for program evaluation purposes. Improvements could be made in some programs’ project and customer information tracking.

Gross savings realization rates were close to 1.0 for most programs, resulting in a portfolio realization rate of 0.99. The net-to-gross ratio for the portfolio was found to be 0.72.



Customer satisfaction rates were found to be quite high, with six of the nine programs surveyed with satisfaction rates above 90%. This suggests that the programs are being well run, that is, having no major changes needed to address program process issues.

A few secondary process improvements were identified for several programs, including streamlining application processes and improving follow-up with participants to complete projects.

To the extent feasible, Nicor Gas should consider strategic opportunities to increase customer awareness about energy efficiency programs through public events, online and social media avenues, billing inserts and other opportunities and to increase participant awareness about full program benefits through trade allies, supporting them with payback calculators and materials highlighting these benefits and the Nicor Gas branding.

## 1. Introduction to the Portfolio and Programs

Nicor Gas’s portfolio of programs includes six residential programs and eight programs targeted at business customers (Table 1-1). Details about each of these programs follow.

**Table 1-1. Portfolio Year 1 Programs and Target Savings**

	Sector	Net GPY1 Target (Therms)
Multifamily Home Energy Savings	Residential	1,275,075
Elementary Energy Education	Residential	138,600
Home Energy Savings	Residential	220,729
Home Energy Efficiency Rebates	Residential	1,459,670
Residential New Construction	Residential	N/A
Behavioral Energy Savings Pilot	Residential	N/A
Small Business Energy Savings	C&I	169,329
Business Energy Efficiency Rebates	C&I	991,607
Business Custom	C&I	1,169,756
Retro-Commissioning	C&I	267,700
Business New Construction	C&I	151,200
Building Performance with Energy Star	C&I	N/A
Economic Redevelopment	C&I	17,117
Emerging Technologies	C&I	N/A
<b>Portfolio Total</b>		<b>5,860,783</b>

### 1.1 Multifamily Home Energy Savings

The Multi-Family Home Energy Savings (MFHES) program provides natural gas energy efficiency measures to Nicor Gas, Peoples Gas, and North Shore Gas customers and electric energy efficiency measures to Commonwealth Edison Company (ComEd) customers. The lead utilities for this program are Nicor Gas and Peoples Gas and North Shore Gas. Honeywell Smart Grid Solutions (Honeywell) delivers the program to customers of served by ComEd and Nicor Gas. The Wisconsin Energy Conservation Corporation (WECC) provides program administration support to Nicor Gas. Franklin Energy Services, LLC (Franklin Energy) delivers the program to customers served by ComEd and Peoples Gas or North Shore Gas.

The program’s primary objective is to secure energy savings through direct installation of low-cost efficiency measures, such as water efficiency measures and CFLs, at eligible multifamily residences. A secondary objective of this program is to identify energy saving opportunities in the common areas of multifamily buildings through a brief visual inspection of central water heating, space heating and common area lighting equipment to channel customers to other programs offered by the utilities. This program targets building owners/property managers (collectively “decision-makers”) of buildings with five or more residential dwelling units and residential customers who live in these buildings. Multifamily buildings with individual heating systems and individual meters and buildings with central heat and central meters are both eligible to participate. ComEd has offered a multi-family program since EPY1, including offering jointly implemented pilot programs with Nicor

Gas and Peoples Gas in EPY3. Electric program year 4 (EPY4) and GPY1<sup>2</sup> was the first full year of jointly implemented program delivery.

Key performance metrics for this program include the number of participating residential dwelling units that received direct installation measures, the measures installed and corresponding gross and net energy savings, and the levels of customer satisfaction with the program reported by participating tenants and decision-makers through program customer satisfaction surveys.

## ***1.2 Elementary Energy Education***

The Elementary Energy Education (EEE) program is jointly offered by Nicor Gas and ComEd who engaged National Energy Foundation (NEF) to implement the program, branded THINK! ENERGY, and Wisconsin Energy Conservation Corporation (WECC) to serve as the Program Administrator for Nicor Gas. In GPY1/EPY4, the program targeted 5<sup>th</sup> grade students in public and large private schools that are customers of Nicor Gas or jointly Nicor Gas and ComEd. Schools received 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. After the presentation, students with signed parent permission forms took 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 (e.g., Scantron form) where they report details of their family's participation. Students and teachers are incentivized to return the 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. 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 to reduce 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.

The Nicor Gas and Nicor Gas-ComEd take home kit, branded "Take Action Kit," contained the following:

- Premium Oxygenics high-efficiency showerhead (2.0 gpm)
- Kitchen faucet aerator (1.5 gpm)
- Bathroom faucet aerator (1.0 gpm)
- Additional faucet plastic fittings
- Three (3) 14-watt CFL bulbs (Nicor Gas-ComEd kits only)
- Shower timer
- Flow rate test bag
- Digital water and ambient temperature thermometer

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<sup>2</sup> The Peoples Gas and North Shore Gas program year 1 (GPY1) and ComEd's program year 4 (EPY4) both began June 1, 2011 and concluded May 31, 2012.

- Fun Facts Slide Chart
- Scratch 'n sniff mercaptan (natural gas odorant) stickers
- "Turn it Off" light switch stickers
- Nicor Gas Energy Efficiency Program (EEP) sticker with website address
- Parent Comment Card (Business Reply Mail back to program implementer)
- Earn a wristband participation promotion card
- Product Installation Instructions
- Nicor Gas EEP/ComEd Smart Ideas®-branded Kit Box and Student Activity Guide
- Nicor Gas EEP promotional brochure
- ComEd Smart Ideas® for Your Home pamphlet (Nicor Gas-ComEd kits only)

### ***1.3 Home Energy Savings***

The Home Energy Savings (HES) program is a joint program of Nicor Gas and ComEd, with Nicor Gas leading the program implementation. In GPY1/EPY4<sup>3</sup>, the HES program was expected to achieve 220,729 therms and 438 MWh of net savings through the implementation of home energy assessments to promote discounted weatherization services and the direct installation of energy efficiency measures in residential Nicor Gas-ComEd single-family home residences. To meet these goals, the implementation contractor, Conservation Services Group (CSG), aimed to conduct approximately 2,100 whole-home assessments which would result in about 630 completed jobs in the first program year that ended May 31, 2012.

The HES program provides discounted whole-home assessments (e.g., energy assessments) to customers. During the assessment, energy and water conserving items are installed (listed below), and energy efficiency opportunities are identified. Program activities are implemented through CSG staff and contracted weatherization providers. During the assessment, free CFLs, low-flow showerheads, kitchen and bath low-flow aerators, hot water temperature setback, programmable thermostat setting and education, and hot water tank pipe insulation were directly installed for instant energy savings. A programmable thermostat was also offered at a reduced price for interested participants.

CSG's dedicated assessment staff conducted the energy assessments using proprietary whole-home assessment software. The energy advisors generated custom retrofit recommendation reports by entering home characteristic details gathered during the assessment into the implementation contractor's proprietary program. The customer report outlines recommended measures, potential savings, payback periods, and the amount of incentives available for recommended work. Once a customer agrees to do the minimum requirement of attic air sealing and insulation, they can then also chose to do additional measures from the list of recommendations. A program-eligible contractor is then assigned to perform the work and discounts are offered instantaneously.

Customers who pursue weatherization projects in GPY1 were eligible to receive incentives of 50% of retrofit cost for performing recommended weatherization upgrades to their home, which is capped at

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<sup>3</sup> Gas Program Year 1/Electric Program Year 4

a maximum of \$1,250 per home. This is in the form of an instant discount to the customer. The contractor is responsible for submitting paperwork to CSG to receive rebate funds.

The HES program utilizes an integrated marketing plan that includes website content, direct mail promotions to residents, and some community events along with direct promotion by weatherization contractors. The marketing message stresses the importance of homeowners' need to care for their home investment and energy performance. Messaging focuses on getting customers to take advantage of the program's key benefits, savings and comfort. The top three messages conveyed to participants about the benefits of participating are:

1. Savings and comfort;
2. Simplicity of participating and the potential to save money on home energy use as a result; and
3. Saving money and insuring one's home against rising energy prices

Trade allies also benefit from the program by having credibility established through participating with the utilities. Furthermore, the program provides program-related administrative and technical training, and standardizes high-quality practices in the market through a quality assurance and control (QA/QC) process.

#### ***1.4 Home Energy Efficiency Rebates***

Under the Rider 30 Home Energy Efficiency Rebate (Home EER) program, cash incentives and education were offered to encourage upgrading of water- and space-heating equipment among residential customers of Nicor Gas, and air conditioning systems for ComEd customers through the complete system replacement (CSR) portion of the program. The Home EER program was designed to conserve natural gas and electricity, and in turn to 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, or Nicor Gas and ComEd to receive rebates for high efficiency furnaces and air conditioning systems under the CSR portion of the program. In addition, the premises must be used for residential purposes in existing buildings.

The Home EER 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, water heaters, and air conditioning systems. The dollar amount of the rebate depends on the size and efficiency of the replacement measures.

#### ***1.5 Residential New Construction***

The Residential New Construction Program (RNC) is jointly offered by Nicor Gas and ComEd. Nicor Gas is the lead utility as the majority of the savings will be from natural gas. Residential Science Resources (RSR) implements the program for both utilities, and WECC administers the program for Nicor Gas. The program launched in early 2012 and did not claim any savings in the first program year. RSR uses completed REM/Rate files for each home to calculate whole-house savings. In addition, ComEd incentivizes several ENERGY STAR electric appliances and claims savings from these installations.

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. The current residential energy code in Illinois is IECC 2009, though it is expected to change to IECC 2012 within the next year.

## ***1.6 Behavioral Energy Savings Pilot***

The current Nicor Gas Energy Efficiency Program (EEP) plan proposes saving 51 million therms over three years. While well-established energy efficiency measures are central to this goal, Nicor Gas recognizes the need to explore, test, and pilot innovative ideas for the future to gain a better understanding of both emerging technologies and of customer interest in more innovative program concepts. These concepts include behavioral programs.

Behavioral science research demonstrates that effective behavior change programs focus on a specific behavior to change, and actively address the barriers to making that change through multiple means, including a direct request for a commitment, comparison to a norm, specific calls to action, feedback on progress and ongoing reinforcement. The Behavioral Energy Savings Pilot (BESP) program employs all of these concepts with Nicor Gas customers.

Nicor Gas implements the BESP program via two main efforts:

- CSG and its subcontractor, MyEnergy.com, implement the primary program component: ENERGYBUZZ. Nicor Gas soft-launched ENERGYBUZZ in August 2012 (GPY2).
- The BESP program administrator, WECC, implements a secondary program component: Take the Pledge. Nicor Gas launched the Take the Pledge in April 2012 (GPY1).<sup>4</sup>

Branded as the ENERGYBUZZ program, the BESP provides participants with access to a variety of tools and ongoing communications via an online platform. The platform, part of MyEnergy.com, intends to motivate customers to take energy-saving actions through behavior changes or participation in other Nicor Gas energy efficiency programs. Participating customers receive monthly email summaries of their energy use and have access to online tools that show them how to save energy, earn redeemable reward points, and compare their savings with those of other customers. Nicor Gas drives participation in the ENERGYBUZZ Program with various marketing and outreach efforts, such as a partnership with the Kane County Cougars.

Separate from ENERGYBUZZ the BESP program also promotes behavior change through the “Take the Pledge” campaign, a partnership with the Chicago Fire professional soccer team. The campaign invites Fire fans to pledge to save energy by signing up for an account on a Chicago Fire branded MyEnergy.com site. When participants sign up, they pledge to do three to five simple tasks and then

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<sup>4</sup> Nicor Gas plans to discontinue Take the Pledge as a separate BESP program component halfway through GPY2. The GPY2 evaluation will assess savings from the Take the Pledge program according to the plan included in this report; however, Navigant will not evaluate Take the Pledge in GPY3.

come back to MyEnergy.com and check off what they have done. Eligible participants can win Chicago Fire-branded merchandise and other Chicago Fire prize opportunities.

### ***1.7 Small Business Energy Savings***

The Small Business Energy Savings (SBES) program is designed to achieve energy savings goals by educating ComEd/Nicor Gas and ComEd/Peoples Gas/North Shore Gas non-residential customers about electric and natural gas opportunities through on-site assessments. Energy advisors from Peoples Gas/North Shore Gas implementer Franklin Energy or Nicor Gas implementer Nexant conduct a high-level walk-through assessment of small business each site. Customers 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 the direct installation of low-flow faucet aerators and showerheads, pre-rinse spray valves, vending machine controls, and compact fluorescent lights. Nexant and Franklin Energy also tested offering free installed programmable thermostats to encourage customers to participate in the assessments in GPY1.

In addition, further savings are offered to customers through generous incentives of 30 to 70 percent for select, low-cost natural gas and electric energy efficiency measures that may be installed by a local contractor during a second on-site visit. If the premise is rented, the program implementer coordinates with the landlord/property owners. These low-cost measures installed by the contractor differ by gas utility but may include:

- Lighting measures
- Guest room energy management
- Installation of programmable thermostats
- Steam trap repair or replacement
- Boiler tune-up
- Boiler reset controls
- Furnaces of at least 92% AFUE
- Water heaters of at least 88% thermal efficiency
- Furnace tune-ups

Program staff maintains a list of approved local trade allies and assigns contractors on a rotating schedule unless the contractor recommends the program to the customer.

Participants must be both active C&I customers of ComEd with peak monthly demand of less than 100 kW and Nicor Gas or Peoples Gas/North Shore Gas customers who use less than 60,000 therms per year.

### ***1.8 Business Energy Efficiency Rebates***

The GPY1 Nicor Gas Business Energy Efficiency Rebates (BEER) Program provides incentives to increase the market share in businesses of new, highly efficient space heating, water heating, and commercial kitchen equipment as well as cost-effective improvement and additions to existing equipment. Participants must purchase and install equipment covered by the program. A rebate form must be filled out and submitted within 90 days of installation. Customers may receive a rebate without pre-approval for participation.

This evaluation builds on Navigant's 2011 evaluation of the Rider 29 BEER program. During Rider 29, program participation did not meet initial program planning goals. Program staff took steps to increase program marketing and outreach efforts for the Rider 30 program period. Therefore, a key element of Navigant's Rider 30 evaluation is to gauge whether the program was able to increase participation in the current economic environment, which is likely creating a barrier to participation for some trade allies and potential customers. The BEER program is a large part of Nicor Gas' GPY1 energy efficiency portfolio, so identifying strategies to meet targets is critical.

The BEER program works closely with the Nicor Gas Business Custom (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 BEER program may provide incentives to trade allies for specific, limited-time promotions.

### **1.9 Business Custom**

The 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 BEER program or other Nicor Gas programs. Participants span a range of industries and can receive incentives for a wide variety of natural gas savings technologies. Typical industries served by this program include light and heavy manufacturing, 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 targets for this program.

The Custom program staff work with decision-makers at larger facilities to identify and quantify efficiency opportunities at their facilities. Interested customers must first submit a letter of interest and a pre-approval application to the program. The initial application includes usage history and detailed calculations and specifications for the project. Program staff review the customer's initial savings claims and screen projects using an internal cost-benefit test. For the majority of Custom program projects, the IC conducts site visits prior to approving the project. If the project is approved by program staff, the participant and program staff will make arrangements for any necessary post-installation inspections. The Custom program requires that a project's initial application be pre-approved prior to the start of the project.

It is the intent of Nicor Gas and ComEd to cooperate in offering this program, for example, by exchanging project leads. In some cases, prospective projects may have both natural gas and electricity benefits. In such cases, joint offerings will be made to the customer to address both natural gas and electricity savings. Impact evaluation efforts for Nicor Gas and ComEd will largely be independent as gas savings and electric savings are independent of each other and not interchangeable between utilities, although there may be some observed interaction of measures that influence savings.



The initial program implementation period is three years, commencing with GPY1.<sup>5</sup> The net energy savings goals for GPY1 are 1,169,756 therms and 43 participants.

The Custom program accounts for a significant portion of the targeted ex-ante impacts of Nicor Gas' GPY1 portfolio and, thus, solid Custom Program performance is key to Nicor Gas achieving its portfolio savings goals. Navigant is working with Nicor Gas and its implementation contractor, RSG, to develop an effective means to reduce the risk of non-performance to Nicor Gas through early discussions about custom project baseline assumptions.

Navigant's 2011 evaluation of the Nicor Gas Rider 29 Custom program found that the program exceeded its therm savings goals. However, the program performed well primarily due to the impacts of several large projects. This GPY1 evaluation built on Navigant's previous evaluation work. Specifically, the evaluation included a review of the program's engineering assumptions and algorithms to review applicable baselines for some projects. The evaluation also included a review of the program's marketing and outreach efforts implemented since the Nicor Gas Rider 29 program period.

### ***1.10 Retro-Commissioning***

The ComEd Retro-Commissioning (RCx) Program has been offered each of the four electric program years. Electric Program Year 4 (EPY4) also marked the first year, GPY1, where the program was offered as a joint utility program with the gas utilities with service areas overlapping ComEd's: Nicor Gas, Peoples Gas and North Shore Gas. The RCx program offering is a natural fit due to the intensive investigation and analysis of building management 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 fewer. 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>6</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.

Supervised by ComEd for all three utilities, the program has a single IC, 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. Gas utility ICs, WECC and Franklin Energy, monitor the program for their

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<sup>5</sup> Program year designations are as follows: GPY1 begins June 1, 2011 and ends May 31, 2012; GPY2 begins June 1, 2012 and ends May 31, 2013; GPY3 begins June 1, 2013 and ends May 31, 2014.

<sup>6</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.

clients (Nicor Gas and Peoples/North Shore Gas, respectively), but do not participate in program operations.

The program is implemented in five phases: application, planning, investigation, implementation and verification. Extensive research and analysis can accompany each phase, thus the duration of engagement for a retro-commissioning project can last 12 to 18 months between contracting and verification of energy savings. Successful retro-commissioning requires experienced service providers and cooperation and buy-in of the facility staff to implement operational changes.

### ***1.11 Business New Construction***

The Business New Construction Service (BNC) 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. In EPY4/ GPY1, the program provided incentives to improve the efficiency of building systems (e.g., lighting, heating, ventilation, and air-conditioning [HVAC], and/or building envelope) in new construction (Systems Track), to improve lighting/day lighting systems beyond the systems track level of efficiency (through the Small Buildings Track) as well as through integrated whole-building design (through the Comprehensive Track). While the program Tracks being offered changed in EPY5/GPY2, projects in EPY4/GPY1 were expected to come from a mix of System, Small Buildings, and Comprehensive Tracks.

Through market preparation activities, this program has also attempted to achieve beneficial impacts that extend beyond the life and scope of the program. Market preparation entails moving the awareness and knowledge gained by designers and architects through program participation into their standard construction practice through an integrated education and training effort. There was no assessment of these activities in EPY4/GPY1.

### ***1.12 Building Performance with Energy Star***

The Building Performance with ENERGY STAR® (BPwES) Program is a two-year strategic energy management pilot program. The program offers customers in the hospitality and assisted living markets a year or more of benchmarking and consulting services to help them set and track energy performance improvement targets. The BPwES pilot has three primary objectives: 1) to penetrate and secure energy savings in the hospitality and assisted living markets; 2) to pilot the viability of an integrated program approach to target gas and electric energy savings for IC's hospitality and assisted living clients that are also customers of both Nicor Gas and ComEd; and 3) to pilot the BPwES benchmarking initiative in order to investigate the value of benchmarking for customers. A secondary objective of the BPwES pilot is to identify energy saving opportunities to channel to other Nicor Gas programs.

The BPwES pilot was initially administered by Wisconsin Energy Conservation Corporation (WECC) before Nicor Gas staff took over management. The pilot is implemented by Ecova, whose staff conduct client and market analyses, recruit participants, organize target facility opportunity assessments, and submit rebate paperwork to Resource Solutions Group (RSG) for approval and payment for completed projects.

### ***1.13 Economic Redevelopment***

The Nicor Gas Economic Redevelopment (ER) Program offers financial incentives and technical assistance for energy efficiency projects, focusing on communities in need of economic redevelopment or projects that achieve a social benefit. The program assists owners of commercial, industrial, and multi-family buildings in deciding which energy efficiency measures to implement and financing those improvements. The primary objective of the ER program is to achieve annual net energy savings of 660,000 therms through qualified projects by the end of GPY3. A secondary objective is to promote economic redevelopment by reducing energy costs for businesses and organizations that are located in economically vulnerable areas or that create jobs, offer social services, or provide affordable housing.

Through a competitive-bid RFP process, The Energy Center of Wisconsin (ECW) was chosen as the implementation contractor for the ER program. ECW provides technical resources and customer support for participants. 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. Once potential participants send in their application, program staff determines which offerings are suitable for the project. After a project is accepted into the program, ECW becomes the primary customer contact for technical support through the project lifecycle.

The ER program offers customers technical and enhanced financial resources to incent project teams to design and build projects that are more energy efficient than standard practice. The program seeks to build capacity and encourage adoption of energy efficiency measures and practices within target markets. The program offers greater incentives and resources than are typically available through other Nicor Gas programs because the program targets hard-to-reach markets. Projects accepted into the ER program may qualify for the following services:

- **Technical Assistance Services** to provide capabilities that are not yet fully adopted in the market. Services may include facilitation in the design process, reviewing plans and construction documents, assisting with research and product selections, and analyzing lifetime energy savings.
- **Design Incentives** to the design team to help offset the costs of developing designs that provide as-built performance that is more energy efficient than standard practice designs.
- **Enhanced Energy Performance Incentives** to owners and developers to help reduce cost barriers to adopting electric and gas energy saving measures that have not yet been accepted as standard practice for construction.

Two types of incentive tracks, (1) systems and (2) comprehensive, are available to qualifying projects based on project need determined by program staff.

Under the systems track, the ER program provides technical support and enhanced financial resources for specific measures, such as HVAC measures or water heating measures. In some cases, the program may provide technical or financial resources through the systems track for more complex projects that are further along in the project lifecycle. Incentives for specific technologies are based upon potential energy savings and depend upon equipment size and efficiency. The ER

program generally offers fewer technical resources to projects in the systems track due to the limited scope of influence available on these projects.

Under the comprehensive track, the ER program promotes integrated design solutions, providing projects with flexibility to meet program energy performance goals through the most cost-effective means. The comprehensive track is generally reserved for projects that are larger than 50,000 square feet and are early in the design process. Comprehensive track projects enable the ER program to influence project design and construction through technical resources (such as whole-building energy modeling) and/or financial incentives. Once the design team and ERP program staff finalize the measures that the design team intends to incorporate into a project, the project owner or developer signs a Measure Incentive Agreement, and incentive funds are reserved for the project. After the project is substantially complete, the program verifies the installed measures by conducting a site inspection.

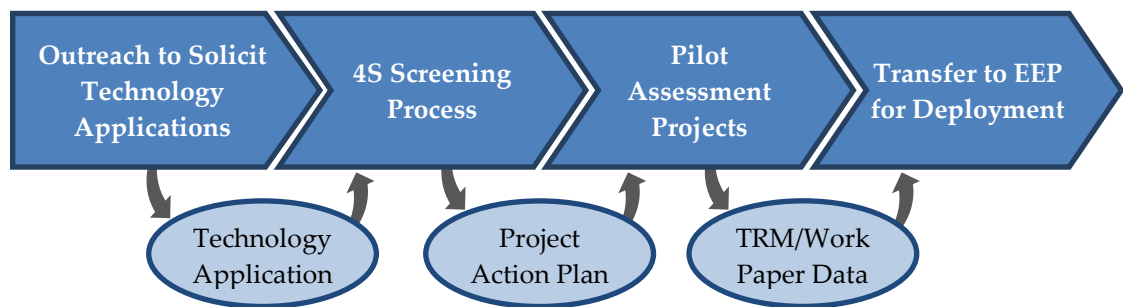
### 1.14 Emerging Technologies

The Emerging Technologies (ET) Program is designed to identify energy efficient emerging technologies or practices (i.e., measures) that Nicor Gas can incorporate into their EEP to achieve greater program savings and provide better value to their customers. The program’s stated objective is to:

“Identify emerging technologies and/or practices that are new or underutilized and have the potential for energy savings and possible future integration into the Nicor Gas energy efficiency program (EEP). ETP will achieve energy savings while being transparent, cost-effective, scalable, and developing the needed data to transition measures into the EEP.”

The ET program finds potential energy-saving technologies by soliciting applications from trade allies, manufacturers, implementation contractors, and other stakeholders. Figure 1-1 shows the overall steps of the ET program process.

**Figure 1-1: Overall ETP Process Steps**



The ET program does not have a standardized measure list or gas savings goals as found in other EEP programs. Participation in the program is tracked through the number of initial applications. The ET program measures therm savings through pilot assessment projects. 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>7</sup>

Gas Program Year 1 (GPY1) ran from June 1, 2011 to May 31, 2012, however the ET program was not operational until December 2011. Therefore, the program is still in the early stages of the implementation process. By the end of GPY1, the ET program accepted 21 applications for new emerging technologies, identified 11 applications for further evaluation after screening through the *4S: Ready, Set, Go* process, and has yet to initiate pilot assessment projects to validate energy savings. Therefore, the program evaluation is based primarily on design intent of the program, with little implementation experience to evaluate.

Unlike typical EEP rebates which encourage utility customers to purchase previously identified energy efficiency technologies, the ET program only provides incentives to encourage site-host participation in pilot assessment projects. Incentives are on an as needed basis only, and typically come in the form of program staff time, materials, labor, manufacturer discounts, or direct financial equipment buy-downs. Each pilot assessment project enables the ET program to conduct verification and due diligence of manufacturer-claimed therm savings for each technology.

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<sup>7</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.

## 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 evaluation tasks for each program.

**Table 2-1. Summary of Evaluation Tasks**

Program	Action	Impact	Process	Details
All Programs	Program manager interview	✓	✓	Program procedures, impact assumptions
	Review tracking database	✓	✓	Quality control, meet the needs of the program
	QAQC	✓	✓	Quality control, meet the needs of the program
	In-depth interviews with program implementers		✓	Process-related strengths and weaknesses
Multifamily Home Energy Savings	Measure savings review	✓		
	Engineering desk review	✓		
	Telephone surveys with participating decision-makers	✓	✓	Process issues, free rider
	Telephone surveys with participating tenants	✓	✓	Installation rate, free rider, spillover and process issues
	Documentation review	✓	✓	
Elementary Energy Education	Paper surveys of program participants	✓	✓	
	Deemed savings review	✓		
	Laboratory testing of showerhead and kitchen aerator models distributed by program	✓		
Home Energy Savings	Direct install measure savings review	✓		
	Telephone survey of participants	✓	✓	
	Telephone survey of nonparticipants	✓	✓	
Home Energy Efficiency Rebates	Deemed savings review	✓		Impact estimates
	Metering and verification of furnace participants	✓		Impact estimates

Program	Action	Impact	Process	Details
	Telephone survey of participants	✓	✓	
	Telephone survey of HVAC contractors	✓	✓	
Residential New Construction	Program literature review		✓	
Behavioral Energy Savings Pilot	Program literature review		✓	
Small Business Energy Savings	Field verification	✓		
	Engineering review of project and default savings	✓		
	Telephone surveys	✓	✓	
	In-depth interviews with participating trade allies	✓	✓	
Business Energy Efficiency Rebates	Telephone survey of participants	✓	✓	Installation rate, free rider, spillover and process issues
	Deemed savings review	✓		Impact realization rate
	In-depth interviews with participating trade allies		✓	Free rider, spillover and process issues
Business Custom	Telephone survey of participants	✓	✓	Installation rate, free rider, spillover and process issues
	In-depth interviews with participating trade allies		✓	Free rider, spillover and process issues
	Engineering desk file review	✓		
	On-site data collection	✓		
Retro-Commissioning	Engineering review of savings	✓		
	On-site verification	✓		
	In-depth interview with participants	✓	✓	Installation rate, free rider, spillover and process issues
	In-depth interview with RSPs	✓	✓	Installation rate, free rider, spillover and process issues
Business New Construction	In-depth interview with participants	✓	✓	Installation rate, free rider, spillover and process issues
	Engineering review of project files	✓		
	Focus group of active non-participants		✓	
	On-site verification	✓		
Building	Program literature review		✓	

Program	Action	Impact	Process	Details
Performance with Energy Star				
Economic Redevelopment	Telephone survey of participants	✓	✓	
	Content review of marketing materials	✓	✓	
	Engineering file review	✓	✓	
Emerging Technologies	Literature review		✓	



### 3. Portfolio Level Results and Recommendations

This section will present an overview at the portfolio level of the results and recommendations from the impact and process evaluations.

#### 3.1 Portfolio Level Impact Results

The Nicor Gas program tracking systems reported 6,421,412 therms of savings at the portfolio level for GPY1 (Table 3-1). Evaluation review of these ex-ante gross savings estimates on a program-by-program basis concluded that 99% of those estimated gross savings had been realized. Additional evaluation work to estimate free riders and spillover effects resulted in an overall net-to-gross ratio of 0.72. The results of all the individual program reviews were an ex-post estimate of 4,585,673 therms of verified net savings at the portfolio level.

**Table 3-1. Portfolio Level Program Year 1 Results**

	Ex-Ante Gross (therms)	Realization Rate	Ex-Post Gross (therms)	Net-to-Gross Ratio	Verified Net (therms)
Multifamily Home Energy Savings	986,438	1.01	997,875	0.96	959,087
Elementary Energy Education	34,298	3.19	109,222	0.79	86,012
Home Energy Savings	104,505	1.05	109,380	0.86	94,597
Home Energy Efficiency Rebates	1,591,644	1.00	1,592,503	0.69	1,096,916
Residential New Construction	N/A	N/A	N/A	N/A	N/A
Behavioral Energy Savings Pilot	N/A	N/A	N/A	N/A	N/A
Small Business Energy Savings	104,483	1.00	104,483	1.00	104,483
Business Energy Efficiency Rebates	1,742,000	1.00	1,742,000	0.73	1,272,400
Business Custom	1,622,380	0.93	1,510,285	0.53	800,451
Retro-Commissioning	180,345	0.82	147,838	1.01	149,713
Business New Construction	54,426	1.18	64,400	0.33	21,300
Building Performance with Energy Star	N/A	N/A	N/A	N/A	N/A
Economic Redevelopment	893	1.00	893	0.80	714.4
Emerging Technologies	N/A	N/A	N/A	N/A	N/A
<b>Portfolio Total</b>	<b>6,421,412</b>	<b>0.99</b>	<b>6,378,879</b>	<b>0.72</b>	<b>4,585,673</b>

#### Definitions

Key definitions are provided in the below bullets and described in more detail in Appendix 5.1.

- Ex-Ante Gross Therms are the initial utility-reported total savings based on installed measures under the program. This information comes from Nicor Gas’s data tracking system and those of their implementation contractors.
- The realization rate represents the percentage of Gross Therms accepted after verification by evaluators.
- Ex-Post Gross Therms are the program savings after verification by evaluators.
- Net-to-Gross (NTG) is the ratio of ex-post gross program savings attributed to program influence.
- Ex-Post Net Therms are the accepted savings due to program influence.

### 3.2 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. However, customer satisfaction is a key component of each process evaluation and a comparison of customer satisfaction scores across programs is presented in Table 3-2. While there are slight differences in how each score is assessed, it can be seen that all scores indicate high levels of customer satisfaction.

**Table 3-2. Summary of Customer Satisfaction Scores**

	Sector	Customer Satisfaction	
		Score	Details
Multifamily Home Energy Savings	Residential	98%	Scored higher than the planned 4.5 on a 5 point scale
Elementary Energy Education	Residential	97%	121 of 125 teachers reported they would conduct the program again
Home Energy Savings	Residential	97%	Scored 8-10 on a 10 point scale. Over 50% gave a 10 “very satisfied” rating.
Home Energy Efficiency Rebates	Residential	70%	Scored 8-10 on a 10 point scale. 35% gave a 10 “very satisfied” rating.
Residential New Construction	Residential	N/A	
Behavioral Energy Savings Pilot	Residential	N/A	
Small Business Energy Savings	C&I	80%	Scored 8-10 on a 10 point scale.
Business Energy Efficiency Rebates	C&I	88%	Scored 8-10 on a 10 point scale.
Business Custom	C&I	100%	All 11 respondents to the participant survey indicated they were satisfied with their participation in the Custom Program
Retro-Commissioning	C&I	92%	Scored 8-10 on a 10 point scale.
Business New Construction	C&I	88%	15 of 17 participants rated the program very highly in overall satisfaction
Building Performance with Energy Star	C&I	N/A	
Economic Redevelopment	C&I	N/A	
Emerging Technologies	C&I	N/A	

### **3.3 Portfolio Level Cost Effectiveness**

As part of Navigant's evaluation of Nicor Gas' energy efficiency programs for GPY1, Navigant reviewed the assumptions underpinning Nicor Gas' various energy efficiency program benefit-cost analyses. The focus of this review was on the basis for and reasonableness of the assumptions used in the Illinois TRC test calculation. A summary of preliminary findings is presented below. A full discussion of methodology and final results will be presented in a separate report.

#### **All Programs**

Across the entire portfolio, the incentive amounts are included in the utility costs for the total resource cost (TRC) calculation. The standard method for performing a TRC calculation is to exclude the total incentives, but include the entire incremental participant cost of the measure, rather than just the net cost to the participant. Since the incentive cost is netted out of the aggregate participant cost making the net impact on the TRC ratio zero.

#### **Single Family / Home Energy Savings**

Navigant's review found that most of the measure life assumptions used in this program's cost-benefit analysis were reasonable, with the exception of the 25 year measure life for retrofit measures. Navigant recommends using a weighted average life of the various retrofit measures included in the program. Additionally, Navigant found a couple minor discrepancies in the inputs, including the measure life used for thermostat education in the program versus the portfolio cost-effectiveness analysis, and the net therm savings achieved through the program versus Navigant's verified results reported in the final evaluation report.

#### **Multi-Family / Home Energy Savings**

Navigant's review found that all of the assumptions used in this program's cost-benefit analysis were reasonable. There was a minor discrepancy in the net therm savings achieved through the program as utilized in the cost-effectiveness analysis versus the final evaluation report.

#### **Home Energy Efficiency Rebate/CSR (HEER)**

Navigant found the assumptions used for the HEER program to be appropriate, and the incremental costs to be somewhat conservative. For gas storage water heaters, Nicor Gas assumed a measure life of 15 years, which is appropriate, but different from that assumed by Integrys, who jointly implemented the program. Additionally, there were small discrepancies in the total amount of reported therm savings from the HEER Program.

#### **Elementary Energy Education**

Navigant's review found that all of the assumptions used in this program's cost-benefit analysis were reasonable. However, there was a minor discrepancy in the net therm savings achieved through the program as utilized in the cost-effectiveness analysis versus the final evaluation report.

#### **Business Energy Efficiency Rebate (BEER)**

The inputs for the cost effectiveness calculation for the BEER program were almost all reasonable with the only input possibly warranting further review being the incremental cost used for convection ovens, which does not match the value in the Technical Resources Manual.

#### **C&I Custom**

The evaluation report lists a verified net savings amount of 800,451 therms, which is 59,410 therms, or roughly 7%, less than the savings amount included in the cost-effectiveness analysis. This difference appears to be due to a realization rate of 0.93 that was applied to the ex-ante gross savings based on program tracking data and on-site verification to determine the research finding gross savings in the evaluation report. This was not done for the energy savings included in the cost-effectiveness calculation. Additionally, best practice would be to use a weighted average measure life based on the distribution of measures installed through the program in each year. The 10 year estimated useful life (EUL) used in this year's analysis is a conservative value.

**C&I New Construction**

The 25 year measure life utilized in the cost-effectiveness calculation represents an upper bound of measure lives incented through the program, and is likely an aggressive assumption. The Nicor Gas Plan included a EUL of 15 years, which is likely closer to a proper weighted average. Navigant recommends utilizing the 15 year measure life from the Plan, or a weighted average measure life based on the individual measures incented through the program.

**C&I Retro-Commissioning**

Navigant's review found that all of the assumptions used in this program's cost-benefit analysis were reasonable.

**Small Business Energy Services**

Several of the measure life inputs used for this program agree with the Nicor Gas Plan, but should be updated in accordance with values in the Illinois Technical Resources Manual (IL TRM) and utilized by Integrys, who also jointly implemented the Small Business Program with Commonwealth Edison. The incremental cost values utilized for water saving measures are also quite high in comparison to values typically used, which may be resulting in conservative results for the cost-effectiveness calculations.

**Economic Redevelopment**

Only one project completed during GPY1 to be included in the cost-effectiveness calculations. All inputs to the calculations for the program are appropriate.

Preliminary portfolio level results, separated by benefit and cost components, are presented in Table 3-3.

**Table 3-3 Summary of Preliminary Portfolio Level Costs and Benefits (000's)**

	Illinois TRC Test	
	IL TRC Benefits	IL TRC Costs
Avoided Natural Gas Supply Costs	\$31,049	-
Avoided Water Use Costs	\$7,016	-
Administration & Implementation Costs	-	\$9,755
Incentives	-	\$4,156
Participant Costs	-	\$9,289
Present Value Totals	\$38,065	\$23,201
Ratio	1.64	

A summary of the preliminary program level benefits and costs is in Table 3-4 below.

**Table 3-4 - Summary of Preliminary Program Level Benefits and Costs (000's)**

Program	Benefits	Costs			IL TRC		
	Avoided Utility Costs	Admin Costs	Incentives <sup>8</sup>	Participant Costs	IL TRC Benefits	IL TRC Costs	IL TRC Test
Single Family / Home Energy Savings	\$1,095	\$664	\$534	\$314	\$1,095	\$1,414	0.77
Multi-Family / Home Energy Savings	\$12,501	\$87	\$894	-	\$12,501	\$904	13.84
Home Energy Efficiency Rebate (CSR)	\$13,426	\$2,302	\$2,523	\$7,432	\$13,426	\$11,390	1.18
Elementary Education	\$1,456	\$96	\$380	-	\$1,456	\$382	3.81
Business Energy Efficiency Rebate	\$7,285	\$513	\$375	\$338	\$7,285	\$1,111	6.56
C&I Custom	\$6,484	\$1,102	\$1,015	\$1,194	\$6,484	\$2,809	2.31
C&I New Construction	\$285	\$83	\$32	\$37	\$285	\$131	2.18
C&I Retro-Commissioning	\$656	\$152	\$177	\$115	\$656	\$439	1.50
Small Business Energy Services	\$792	\$499	\$80	\$15	\$792	\$591	1.34
Economic Redevelopment	\$7	\$52	\$1	\$0	\$7	\$52	0.14

### 3.4 Portfolio Level Conclusions and Recommendations

#### Program Tracking Data

The quality and completeness of program tracking information affect the evaluation team's ability to calculate accurate impact savings. The evaluation team found the level of quality of the program tracking systems to be generally good, however some systems need to track additional information. In particular, the Custom tracking system should track key baseline statistics (replace-on-burnout/retrofit, equipment remaining useful life, operating conditions, etc.), the Home EER system should track all items on the application, and the MFHES system should track installation rates of water efficiency measures. The quality of all program tracking systems can be improved with minor changes: requiring current primary contact information for participants and trade allies, distinguishing default values from field values, adding a Quality Control status field, and providing

<sup>8</sup> Incentives are shown in this table but are not included as costs when calculating TRC costs.

sufficient documentation of the tracking system. Sharing participation data among certain programs, especially MFHES, Custom, and BEER, will enable the proper tracking and attribution of referral project savings.

### **Gross Savings Estimates**

The gross savings realization rates were 1.0 or greater for most programs (MFHES, EEE, HES, Home EER, SBES, BEER, BNC and ER) and were less than one for Custom and RCx. To improve these realization rates, Nicor Gas should consider requiring the Custom program implementation contractor to provide sufficient documentation of baseline conditions and the retro-commissioning service providers to use program savings calculators and to account for interactive and concurrent savings.

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

Evaluation work to estimate free riders and spillover effects resulted in a net-to-gross ratio of 0.72 for the portfolio. While the estimated net-to-gross (NTG) ratios for three large programs were below 0.70 (BEER, Home EER and Custom) the values are not atypical of new programs. Custom may include questions regarding free ridership in their application process to help assess the risk of free riders entering the program.

### **Customer Satisfaction**

Customer satisfaction rates were found to be quite high, with several programs with satisfaction rates above 90%. This suggests that the programs are being well run, thus no major changes are needed to address program process issues.

### **Secondary Process Improvements**

While the evaluation team found no major process changes are needed, the team identified a few secondary process improvements that apply to several programs: 1) streamline application processes (Home EER, Custom, BEER and BNC); 2) improve follow up (by implementation contractor or trade ally) with participants to complete projects (MFHES, Custom and RCx); and 3) clearly communicate to participants and trade allies that their cooperation with evaluation surveys and verification is a program requirement. These process improvements should increase participation, savings, and precision of evaluation results.

### **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, in particular, basic awareness of the program (RNC and SBES); awareness of the full benefits of the program, especially the value of utility-qualified trade allies (HES, BEER, SBES and BNC); and awareness of Nicor Gas as a program sponsor (Residential and Business New Construction programs). To the extent feasible, Nicor Gas should consider strategic opportunities to increase customer awareness about energy efficiency programs through public events, online and social media avenues, billing inserts and other opportunities and to increase participant awareness about full program benefits through trade allies, supporting them with payback calculators and materials highlighting these benefits and the Nicor Gas branding.

## 4. Program Level Results and Recommendations

For each of the Nicor gas programs evaluated this section discusses separately key impact findings and recommendations and key process findings and recommendations.

### 4.1 Multifamily Home Energy Savings

#### 4.1.1 Key Impact Findings and Recommendations

As shown in Table 4-1, the GPY1 Nicor Gas GPY1 MFHES reported ex-ante gross energy savings of 986,438 therms. Evaluation adjustments resulted in verified gross energy savings<sup>5</sup> of 997,875 therms reflecting the program's gross realization rate of 1.012.<sup>9</sup> The program level NTGR for gas measures was 0.96 based on evaluation research findings, yielding net energy savings of 959,087 therms.

**Table 4-1. Nicor Gas GPY1 Energy Savings**

Savings Estimates	Nicor Gas Energy Savings (therms)
Ex-Ante Gross	986,438
Ex-Ante Net	887,795
Verified Gross	997,875
Research Findings Net	959,087
GPY1 Program NTGR	0.96

*Source: Navigant analysis*

Additional key impact evaluation findings and recommendations follow:

**Finding:** The MFHES program recruited eligible properties and applications were backed with supporting documentation.

**Finding:** For Nicor Gas, Navigant found some discrepancies between the program administrator's measure savings values using TRM inputs and assumptions and those calculated by Navigant using the same inputs and assumptions. The TRM measure value for water temperature setbacks was correctly applied.

**Recommendation:**

- Navigant recommends updating the Nicor Gas program tracking system to match TRM savings values by making minor adjustments to measure savings for water efficient showerheads (from 26.00 therms/unit to 26.21 therms/unit), kitchen faucet aerators and bathroom faucet aerators (from 2.70 therms/unit each to 2.52 therms/unit and 3.02 therms/unit, respectively) and programmable thermostats (from 34.07 therms/unit to 34.21 therms/unit) based on algorithms and inputs found in the Illinois TRM.

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<sup>9</sup> Realization rate = verified gross / ex-ante gross from the tracking system.

#### 4.1.2 Key Process Findings and Recommendations

The GPY1 MFHES program impacted 24,744 residential dwelling units, achieving 71 percent of its Nicor Gas planning estimate (Table 4-2).

**Table 4-2. Nicor Gas GPY1 Program Participation Achievements**

Program	Participation Goal (Dwelling units)	Actual Participation (Dwelling units)	Percent of Planning Estimate
Nicor Gas Individually-Metered	8,750	4,700	54%
Nicor Gas Master-Metered	26,250	20,044	76%
<b>Nicor Gas Total</b>	<b>35,000</b>	<b>24,744</b>	<b>71%</b>

*Source: Navigant analysis of program tracking data*

The GPY1 program year was efficiently delivered by Honeywell. On the gas side, the program met 75 percent of its energy planning estimate through direct installation activities at 71 percent of planned dwelling units. The program built on the previous year’s implementation efforts by the IC and ComEd and through the Rider 29 pilot program with Nicor Gas. The program’s continued success can be attributed to solid program design, program activities that were well aligned with anticipated outcomes and cooperation between the program’s utility sponsors and implementation contractor. This section addresses the following process evaluation questions, in italics, with findings and recommendations indicated as such.

#### **Research Topic:**

*What areas could the program improve to create a more effective program for customers and help increase the energy impacts?*

**Finding:** One of the upcoming challenges for this program is increasing program uptake by overcoming participation barriers in the multi-family marketplace, including the split-incentive barrier. While the implementation contractor has undertaken a number of activities to address these challenges, Navigant recommends exploring additional ideas.

#### **Recommendations:**

- The program may be able to share information or increase communication with other ComEd or Nicor Gas programs, to provide a single point of contact for multi-family decision-makers to implement common area improvements and direct install activity in residential dwelling units; and
- The program may consider designing a pilot program to target customers using a comprehensive whole-building approach, as is implemented in some other utility service areas, such as Con Edison (New York) and DTE (Detroit). The program is currently planning a program designed to provide energy and cost savings benefits to multi-family decision-makers as well as tenants scheduled for rollout during GPY2.



**Finding:** About nine percent (2,376 dwelling units) of units at sites where field teams were performing direct installation activity did not receive any measures because the dwelling units were not available to the field teams.

**Recommendations:**

- The program should track and review reasons why a dwelling unit is not available for direct installation activity at a given multi-family site. If there are recurring reasons why dwelling units are unavailable to the program, the program may be able to develop communications or other mechanisms to reduce the number of unavailable units.

**Finding:** While the program currently tracks CFL installation rates, the program does not track installation rates for water efficiency measures.

**Recommendations:**

- The program should track water efficiency measure installation rates and review reasons why field technicians are unable to install energy efficiency measures in a given unit. In so doing, the program may find that it can achieve higher installations per dwelling unit by adding different types or styles of measures (e.g. faucet aerators or globe CFLs), such as it has in the past; and
- Emphasize to field teams the importance of installing the maximum number of eligible direct install measures in dwelling units.

**Research Topic:**

*Has the program effectively channeled customers to other programs sponsored by Nicor Gas or ComEd to implement common area efficiency measures as identified in common area assessments?*

**Findings:** The program reported that it conducted 285 central plant surveys to inspect central water heating or space heating equipment for Nicor Gas. The program reported that it conducted 31 common area lighting surveys for ComEd.

**Recommendations:**

- The program should place a greater emphasis on completing common area assessments;
- The IC should track common area referrals to other programs and participation rates from referrals and include a data point in the tracking system;
- Target common area energy efficiency opportunities through increased communication and/or co-marketing with other energy efficiency programs;
- Develop a script for follow up calls that could include ongoing customer satisfaction with direct installation measures, any action items from the property manager customer survey and to ask for referrals; and
- Follow up with property managers that have received common area recommendations using the script.

**Research Topic:**

*Is the program effectively coordinating with ComEd for electric measures and reporting?*

**Findings:** Overall, it appears that the parties responsible for jointly implementing the program continue to implement an effective process for coordination and reporting, primarily through regular coordination conference calls and frequent communication. However, at the end of the program year, the program tracking system had missing and/or misnamed data, with the IC working closely with the utilities and evaluators to identify the missing data and reconcile the program tracking systems once these issues were discovered.

**Recommendation:**

- As feasible, the program should consider adding fields, programming or other data points to streamline data transfer from the tracking system and facilitate program data review.

**Research Topic:**

*Are customers satisfied with participation in the program and customer service experiences?*

**Finding:** Overall, participants –both tenants and property managers - appear to be very satisfied with the direct install portion of the program. Navigant’s analysis indicated that 84 percent of tenants responded that they were satisfied or very satisfied with the program. Decision-makers were also satisfied with the program, with 90 percent of respondents indicating that they were satisfied or very satisfied with the program’s direct install measures and 95 percent indicating that they were satisfied or very satisfied with the program’s field team. When asked about common area recommendations and reporting, decision-makers indicated less satisfaction with the overall program (70 percent) or the summary report provided by the program. Almost half (45 percent) of those participants surveyed did not know if they received recommendations for energy efficiency improvements in common areas or central plants.

**Recommendations:**

- Participant responses to the decision-maker survey would indicate potential opportunities for the program to increase customer satisfaction through placing a greater emphasis on common area or central plant assessments and follow up recommendations to decision-makers.

## 4.2 Elementary Energy Education

### 4.2.1 Key Impact Findings and Recommendations

Table 4-3 shows deemed and verified gas savings for the Nicor Gas-only and Nicor Gas-ComEd programs. Verified gross savings were calculated using IL TRM algorithms and parameters. The overall participation goal of 10,000 kits distributed (5,000 kits each for Nicor Gas-only and Nicor Gas-ComEd) was nearly met with 4,997 kits distributed to Nicor Gas-only schools, and 4,975 kits distributed to Nicor Gas-ComEd schools. While the verified total net savings of 86,012 therms exceed the total Nicor Gas-only and Nicor Gas-ComEd total ex ante net savings estimate of 33,955 therms, the savings did not meet the overall planned net therm savings goal of 138,600 in Nicor Gas' compliance filing therms<sup>10 11</sup>.

**Table 4-3. GPY1 Deemed Gas Savings Estimates (Therms)**

	Nicor Gas-only	Nicor Gas-ComEd	Total
Ex Ante Gross	17,187	17,111	34,298
Ex Ante Net	17,015	16,940	33,955
Verified Gross <sup>12</sup>	50,119	59,104	109,222
Research Findings Net <sup>13</sup>	32,790	53,222	86,012
Research Findings NTGR	0.65	0.90	0.79

Source: Navigant Analysis

Navigant offers the following additional impact findings and recommendations for the program.

- **Finding.** Navigant's survey included students who returned their Home Report Cards (HRCs) and students who did not. Among Navigant's results, installation rates did not differ across these two groups of students. This suggests an undocumented assumption of NEF:

<sup>10</sup> Nicor Gas EEP Final – Revision for Compliance Filing 05-37-2011 FINAL.docx, pg. 56.

<sup>11</sup> Nicor Gas submitted planning values for the program in its May 2011 compliance filing, before the release of the Illinois TRM. The planning values assumed higher savings estimates than were achieved when using the TRM input assumptions. See *Appendix, Evaluation Report: Elementary Energy Education Evaluation GPY1*

<sup>12</sup> The September 14, 2012 final version of the first State of Illinois Energy Efficiency Technical Reference Manual (TRM) (effective as of June 1, 2012) has been agreed to by Illinois Stakeholder Advisory Group (SAG) participants and is currently pending approval before the Illinois Commerce Commission in Docket No. 12-0528 as of the date of this report. The verified gross savings shown in Table 4.4 assumes that measures covered by the TRM are deemed for evaluation purposes in GPY1 Gross savings based on evaluation research findings in GPY1/EPY4 are provided in *Appendix, Evaluation Report: Elementary Energy Education Evaluation GPY1* (in particular, research findings gross savings were calculated with the in-service rate and household size based on Navigant survey results).

<sup>13</sup> The evaluation team determined the verified net savings by applying, per measure, survey-determined research findings NTG ratios to the verified gross savings which are based on TRM values and certain custom input (e.g., number of household members). Research findings NTG ratios were used rather than planning NTG ratios because the program underwent significant changes since the previous evaluation. Further discussion of net impact parameter estimates can be found in section 3.1.5.

installation rates reported in the HRCs are representative of all participants, independent of whether a participant returned an HRC.

**Recommendation:** Use HRC response rates across all participants.

- **Finding.** The evaluation team found some errors in the tracking system, including discrepancies between HRCs and entries in the tracking system, missing data, and data inconsistencies. This is most likely due to a lack of documented procedures for tracking kits, HRCs, and incentives; tracking of key performance indicators in multiple files; and a lack of method for tracking key performance indicators in the tracking system.

**Recommendation.** In order to address the tracking system inadequacies, Navigant recommends that the National Energy Foundation (NEF) consolidate their tracking system into a single master multi-user tracking database and establish clear documented procedures for tracking kits, HRCs, and incentives. Furthermore, a key element that must be incorporated into the tracking database is the ability to track the changes made by the program staff at NEF. Since multiple people have access to the tracking system, it is important that updates to key performance indicators be logged (recording when a change is made, by whom, and why).

- **Finding.** Navigant recognizes NEF's approach in estimating installation rates to be superior to simply assuming every measure in every kit distributed is installed. However, documentation of this assumption is absent and is evident only in the savings formula in the Savings Sheets.

**Recommendation.** Navigant recommends that NEF explicitly document their assumption that the installation rate of HRC non-respondents is the same as respondents. NEF can now reference this evaluation which confirms their previously untested assumption.

#### 4.2.2 Key Process Findings and Recommendations

Navigant offers the following process findings and recommendations for the program.

- **Finding.** The EEE program's research findings show in-service rates for the showerhead and aerators range from 35-45% for the Nicor Gas-only program and 19-27% for Nicor Gas-ComEd.<sup>14</sup> Survey respondents indicated that fit problems were the most common reason for not installing showerheads and aerators while water pressure concerns, leakage, and a dislike of the measures were the main reported reasons for uninstalling them.

**Recommendation.** To address the installation and persistence barriers in order to increase effective installation rates for the measures in the kit, Navigant recommends the following:

- Further research the installation and fitting problems of the showerheads and aerators (amounts to about one-third of aerators not installed, and a fifth of showerheads).

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<sup>14</sup> The large difference in rates between these two groups is unexpected, and survey results offer no clear explanation. Future evaluations may explore this with additional research.

- Evaluate features of other kitchen aerators and showerheads<sup>15</sup> for:
    - Consumer satisfaction
    - Functional performance
    - Base household water pressure requirements
- **Finding.** Teachers reported that there were difficulties coordinating program processes in cases where teacher aides or substitutes were present rather than the main classroom teacher. The evaluation team also experienced difficulties administering surveys in classrooms with substitutes present rather than teachers that originally signed up for the program.

**Recommendation.** The evaluation team recommends establishing clear protocols and explanatory materials to address situations where original or lead teachers are not present to administer the program, distribute program kits, or deliver program surveys.

- **Finding.** In some cases, teacher and student survey results indicate instructional material in the kits is insufficient for or inaccessible to everyone. Some students indicated they did not know how to install items despite the kit instructions and many students live in Spanish-speaking households.

**Recommendation.** Enhance installation instructions in the kit by:

- Providing Spanish language documentation.
  - Adding instructional photographs and/or illustrations.
  - Adding video tutorial content to the NEF website to further complement the paper-based installation instructions (in English and Spanish) and include URLs to “see more installation instructions” in paper-based installation instructions.
- **Finding.** The EEE program provides an exceptional marketing opportunity for Nicor Gas and ComEd’s other residential efficiency programs and marketing can be further improved.

**Recommendation.** While the program cross-markets other DSM programs with consistent branding collateral, Navigant recommends that the EEE program expand its efforts to channel participants to other residential programs. Such efforts could be as simple as including brief descriptions of Nicor Gas and ComEd’s other residential programs in the student and teacher guides or a refrigerator magnet with website and program names and pictures. Furthermore, creating a parent-specific “packet for parents” in the kit would better ensure that parents see the Nicor Gas and ComEd program brochures and other program referral material already included in the kit. Channeling efforts could also be as complex as adding an interactive component to the Nicor Gas and ComEd websites that maps educational content from the EEE program to other programs.

- **Finding.** Teachers reported that some parents were leery of signing the program participation permission letter.

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<sup>15</sup> For GPY2/EPY5, NEF has replaced the GPY1/EPY4 showerheads with a different brand.

**Recommendation.** The evaluation team recommends making participation in the program OPT-OUT rather than OPT-IN. Every parent would receive an OPT-OUT permission letter well before the presentation and, thus, would have the option to OPT-OUT before the child participates. However, now a non-response to the permission letter would signify OPT-IN.

### 4.3 *Home Energy Savings*

#### 4.3.1 **Key Impact Findings and Recommendations**

The evaluation effort succeeded in addressing the key research question posited by the program evaluation plan. Weatherization measure savings are calculated using Conservation Services Group's (CSG) proprietary EnergyMeasure® HOME (EM HOME) software. Navigant performed a desk review of the EM HOME software during GPY1. Key findings and recommendations associated with the research questions and evaluation plan are as follows:

- **Finding.** Program verification, due diligence, and tracking system procedures all meet or exceed aspects of national best practices, as documented.
- **Finding.** CSG tracks installation rates during subsequent weatherization or QC activities, but it does not track persistence.

**Recommendation.** Improvements in savings estimates may be achieved by tracking direct installation measure persistence as a potential program effectiveness indicator by way of follow-up checks during subsequent weatherization or QC activities.

- **Finding.** The data entry process involves taking field notes on paper and then re-entering the information into EM HOME on a computer in the work van, which is an instance of duplicate data entry.

**Recommendation.** Explore switching from paper-to-computer based data entry during the energy assessments to using tablet computers equipped with EM HOME software. This will not only remove duplicative data entry and the potential for errors associated with it, but it could also potentially speed up the assessment process, which currently takes an average of 2.5 hours. By speeding up the assessment process, CSG could use the additional time for customer education helpful to the program. Such a software change would also provide the benefit of automatic, real-time accounting for the inter-connectivity of interdependent variables.

- **Finding.** The tracking database extract did not specify whether values were field-specified or default values.

**Recommendation.** State whether building characteristics in the tracking system are field-specified or default values (e.g., heating and cooling system efficiencies), to clarify the basis for subsequent savings estimates. CSG stated that this information is visible in the EM HOME software suite, but that it would take considerable resources to be made available in the Microsoft Excel format that was used for the data extract submitted to Navigant. This

information would be helpful to the evaluation team in determining the accuracy of inputs into the tracking system. This could also be useful as part of energy assessment review and training.

- **Finding.** The EM HOME simulation engine does not integrate customer billing data.

**Recommendation.** Continue refining the EM HOME simulation engine to further improve savings estimates and reduce associated uncertainties. Explore options for improving modeling calibration using customer billing data, to provide an added dimension in estimating savings.

Table 4-4 outlines the program’s therm savings for GPY1.<sup>16</sup> The NTG Framework<sup>17</sup> calls for retroactively applying the NTG ratio for “previously evaluated programs undergoing significant changes — either in the program design or delivery, or changes in the market itself.” The evaluation team believes the HES program meets this criterion because the program changed assessment pricing and implementation contractors in GPY1. As a result this evaluation uses the NTGR calculated from our GPY1 research.

**Table 4-4. GPY1 Savings\***

	Energy Savings (Therms)
Ex-Ante Gross Savings	104,505
Ex-Ante Net Savings	96,105
Verified Gross Savings	109,380
Verified Net Savings	94,597
Overall NTG Ratio**	0.86

Source: Navigant Analysis; Nicor EEP Final – Revision for Compliance Filing 05-27-2011 FINAL

\*Temperature turndown and thermostats are deemed; showerheads, aerators, pipe insulation are partially deemed; all weatherization measures are not deemed.

\*\*Overall NTG is the ratio between verified net and verified gross savings.

In GPY1 the gas component of the program achieved 43% of planning net savings goals.

Table 4-5 presents the measure-specific therm savings for GPY1.

<sup>16</sup> The September 14, 2012 final version of the first State of Illinois Energy Efficiency Technical Reference Manual (TRM) (effective as of June 1, 2012) has been agreed to by Illinois Stakeholder Advisory Group (SAG) and the Illinois Commerce Commission in Docket No. 12-0528 as of the date of this report. The verified gross savings shown in Table 4.6 are deemed by the TRM for measures outlined in the document. Evaluation research findings for gross savings in GPY1 are provided for reference in the *Appendix, Evaluation Report: Home Energy Savings Evaluation GPY 1*.

<sup>17</sup> “Proposed Framework for Counting Net Savings in Illinois.” Memorandum March 12, 2010 from Philip Mosenthal, OEI, and Susan Hedman, OAG.

**Table 4-5. GPY1/EPY4 Measure-Level Therms Savings\***

	Measure	Ex-Ante Gross Therms	RR	Verified Gross Therms	NTG	Verified Net Therms
	Shower Head	19,463	0.98	19,157	0.93	17,847
	Kitchen Aerator	426	0.97	412	0.99	409
	Bathroom Aerator	3,574	0.98	3,512	0.99	3,481
	Hot Water Temperature Setback	1,331	0.96	1,274	0.88	1,116
	Pipe Insulation	3,943	0.98	3,855	0.93	3,581
	Programmable Thermostat	3,261	0.90	2,946	0.90	2,651
	Programmable Thermostat Education	0	-	5,718	0.90	5,146
	<i>Subtotal</i>	31,998	1.15	36,873	0.93	34,231
Retrofit Measures	Attic Insulation	34,604	1.00	34,604	0.81	28,181
	Wall Insulation	4,316	1.00	4,316	0.78	3,367
	Floor Insulation (Other)	6,496	1.00	6,496	0.84	5,460
	Duct Insulation & Sealing	111	1.00	111	0.80	89
	Air Sealing	26,979	1.00	26,979	0.86	23,270
	<i>Subtotal</i>	72,507	1.00	72,507	0.83	60,366
	<b>Total Savings</b>	104,505	1.05	109,380	0.86	94,597

Source: Navigant analysis

\*Temperature turndown and thermostats are deemed; showerheads, aerators, pipe insulation are partially deemed; all weatherization measures are not deemed.

#### 4.3.2 Key Process Findings and Recommendations

At this stage in the program’s development, Navigant finds that program processes are generally well-planned and executed, and that the program is serving participants very well. However, since the program did not reach its participation goals in GPY1, the evaluation team conducted research amongst participants, non-participants, and trade allies to determine marketing outreach effectiveness and potential barriers to participation. Navigant found that the program is using the most effective means of outreach to customers with its program mailers. The program is also targeting the right customers, evidenced by the fact that even the non-participants reported valuing energy efficiency, being interested in weatherization work, and being tentatively interested in participating (however they are not convinced by the marketing message to take action). Participants, contractors, and non-participants alike agree that marketing material content could be improved. Many program-aware non-participants that received a spring mailer about the program were unaware of the free direct install measures available through the program and thought that getting



an assessment would obligate them to purchase weatherization measures. In addition, a noteworthy portion of participants and non-participants aware of the program showed some uncertainty about the program and the utility intentions of discounting and giving out free measures.

Navigant presents the following key process findings and recommendations:

- **Finding.** Program participants and program partners were very satisfied with the program, incentive levels, and processes. About 97% of participants rated their satisfaction as 8 to 10 on a 0-10 point scale and over half of participants stated they were “very satisfied” (the highest rating).
- **Finding.** The program is using an effective means of outreach to customers. Participants and non-participants agreed that program mailers were the best way to reach them. Participants also noted that word-of-mouth and contractor referrals were other important sources of initial information about the program.
- **Finding.** The program targeted the right market of customers in its marketing mailer. Most mailed non-participants both valued energy efficiency and showed potential for participation in the program. On a four-point scale (“not at all valuable,” “somewhat valuable,” “very valuable,” “extremely valuable”), only 3% of respondents indicated energy efficiency was “not at all valuable” to them, and 60% indicated it was either “very valuable” or “extremely valuable.” Furthermore, 25% of non-participants reported that they have plans to make energy efficiency improvements to their home in the near future. When asked to indicate what they would do, the most common response was insulation work (39%). This is a strong indication of potential participants among mailed non-participants.
- **Finding.** A promising proportion of program-knowledgeable non-participants are willing to spend the money necessary to participate in the program’s weatherization component. Almost a fifth of program-knowledgeable non-participants (about 5% of all mailed customers) noted that they were willing to spend \$750-1,250 on the program if it were to save them money on their energy bills. Another 39% of program-knowledgeable non-participants (about 10% of mailed customers) reported they don’t know or are not sure how much they would spend.

**Recommendation.** The program could benefit from conducting additional focus groups to explore how best to remove barriers to participation for these program-knowledgeable non-participants.

- **Finding.** Participants, contractors, and non-participants alike agree that marketing material content could be improved. The most common participant recommendation for program improvement was for more informative, persistent, and thorough marketing about the program and its benefits.

**Recommendation.** The evaluation team suggests a workshop meeting of energy advisors, trade allies, and other program stakeholders to gather feedback on the previous year’s program efforts and associated marketing efforts, with the goal of improving the marketing material for future program years. For example, the program may benefit from posting video clips on the program website to clarify program details through a new, information-rich

medium. Implementing these recommendations may help identify some sources of participant misunderstandings of program offerings and further strengthen information available to potential participants about the program.

- **Finding.** Many program-aware non-participants were unaware of the free direct install measures available through the program. Furthermore, many non-participants thought that getting an assessment would obligate them to purchase weatherization measures.

**Recommendation.** Consider modifying the program marketing collateral to more clearly emphasize that, while strongly encouraged and that there is considerable program support to do so, customers are not obligated to purchase the weatherization measures suggested by the assessment, along with pointing out that direct install measures provide immediate savings benefits that outweigh the cost of getting an assessment. This emphasis may drive more initial participation. Furthermore, the program may attract more participants by more strongly emphasizing that the nature of the assessment is to inform customers about opportunities to save money on energy bills and to make the home more comfortable. Highlighting the low-risk nature of scheduling an assessment may help hesitant participants feel more comfortable about participating since there are no obligations to install recommended measures.

- **Finding.** A noteworthy portion of participants and non-participants aware of the program showed some uncertainty about the program and the utility intentions of discounting and giving out free measures. According to non-participant survey results, if program-aware non-participant skepticism about the program is addressed, it could increase the amount of customers that ultimately consider participation from the current 28% that reported thinking about participating upon receiving a program mailer to up to as much as 50%.

**Recommendation.** The program may benefit from addressing these concerns in its marketing and outreach materials in order to tip hesitant but interested potential participants into scheduling an assessment. Given the very high levels of participant satisfaction with the program, the program may consider providing customers summary information from real-world case studies and testimonials that address common misconceptions about the program. These could be presented on the program website, in mailers, and other marketing and outreach material. Issues to address should include why the utilities are willing to incentivize energy efficiency improvements, and the mutually-beneficial nature of the programs for customers and the utilities. Implementing this recommendation may increase the conversion rate for the program mailer.

- **Finding.** Nearly a third of mailed non-participants did not know what “weatherization” means.

**Recommendation.** Marketing material should meet the needs of the layman and use simplified terminology to describe the program offerings.

- **Finding.** Though marketing material could benefit from clarification, the overall program marketing message resonates with participant perceptions of the program’s primary benefits. The vast majority of participating customers surveyed saw the primary program benefit to be reduced energy bills (69%) and receiving a rebate on the cost of installing measures (20%).

Nearly half (46%) of participants also cited a variety of other benefits the program provided, including improved comfort, assurance that equipment is running smoothly and safely, environmental benefits, and an improved general awareness and knowledge of what’s needed to improve a home’s efficiency.<sup>18</sup>

- **Finding.** About 26% of non-participants were aware of the program (mostly through program mailers, word- of-mouth, and contractor referrals), while the remainder were not despite having received mailers. Furthermore, program administrators noted that community outreach was not strong in GPY1.

**Recommendation.** Though the program mailers are the most important source of program outreach, the program may consider seeking to capitalize on developing additional communication channels such as various social media as an extension of the word-of mouth awareness building that is already starting to be an important source of program awareness. Furthermore, the program may benefit from community outreach at events that attract the target participant demographic. Implementing these recommendations may increase participation levels and provides additional opportunities to address issues related to customer awareness and understanding about the program.

## 4.4 Home Energy Efficiency Rebates

### 4.4.1 Key Impact Findings and Recommendations

Table 4-6 shows the key results of the gross and net impact evaluation using deemed savings estimates.

**Table 4-6. GPY1 Deemed Savings Estimates**

	Therm Savings
Ex-Ante Gross	1,591,644
Ex-Ante Net	1,115,441
Verified Gross	1,592,503
Verified Net	1,096,916
NTG Ratio	0.69

Navigant’s review of the deemed savings calculations showed that Wisconsin Energy Conservation Corporation (WECC) used the Illinois Technical Resource Manual (IL TRM) algorithms correctly. There were some areas where Navigant made changes to the inputs, and we have made recommendations addressing these areas below. The remaining impact recommendations relate to the tracking system and verification and due diligence review.

- **Location tracking.** The program currently uses a zip code map to allocate addresses to each county. A customer’s county location is used to determine heat loads and thus, savings. Because some zip codes cross county lines, some customers have heating loads based on multiple counties. Navigant used GIS software to code each address to a single county, resulting in slightly different savings estimates for some customers. The program should

<sup>18</sup> Respondents were allowed multiple responses to the question on program benefits.

consider mapping participants with the GIS software or proposing that the TRM use a standard list of zip codes by county to avoid confusion.

- **Domestic hot water heater energy factor.** Navigant found that there were some domestic hot water heaters which, due to their classification as commercial units, had ratings of thermal efficiency. In most cases, WECC correctly converted these values to energy factors, but Navigant found cases where the thermal efficiency was used and also some cases where the conversion was incorrect. The tracking of these efficiencies should be improved to avoid such oversights.
- **Tracking System Review.** Though the program is functioning well from the perspective of due diligence and tracking system set up, the evaluation team found room for improvement in the tracking system database extract. Navigant recommends that steps be taken to ensure that all information present on the application be included in the tracking database, and that steps be taken to coordinate tracking efforts between Nicor Gas and ComEd to ensure consistency in utility databases.

#### 4.4.2 Key Process Findings and Recommendations

The primary process findings and recommendations are as follows:

**Finding:** Both trade allies and program participants report high levels of satisfaction with the program. However, there is still some perception that the application requirements are burdensome and complicated. One area of the program with lower levels of satisfaction was the length of time before receipt of the rebate, despite Nicor Gas meeting its goal that rebates are received within 14 days or fewer.

- **Recommendation:** Nicor Gas has taken steps to simplify and clarify the application, so Navigant will assess the success of the updated application process in GPY2. Navigant suggests expanding the use of the “instant discount” feature, which will allow the program to continue its success in meeting its goal of distributing rebates within 14 days.

**Finding:** Trade allies are instrumental in program promotion. The majority of participants were first made aware of the program through their contractors, and the trade allies are the party most responsible for explaining the program to participants.

- **Recommendation.** Navigant suggests that additional promotional material be provided to the trade allies, especially payback calculators, and that co-operative advertising be explored. Navigant also suggests that to ensure the continued successful partnership between Nicor Gas and trade allies, Nicor Gas consider creating a form of recognition for contributing trade allies.

**Finding:** Throughout the evaluation process, Navigant experienced some challenges with regards to trade ally evaluation survey responses.

- **Recommendation:** For GPY2 evaluations, Navigant plans to contact trade allies during a time of year where they are more likely to be available to speak, and also suggests that the

participating trade allies be encouraged by the implementation staff - or potentially required as a condition of program participation - to participate in the program evaluation.

## **4.5 Residential New Construction**

### **4.5.1 Key Impact Findings and Recommendations**

This year's impact evaluation was limited to the verification, due diligence and tracking system review (presented in *Appendix, Evaluation Report: Residential New Construction Evaluation GPY1*) and a preliminary review of the program's approach to calculating savings. Navigant's key findings and recommendations from these tasks are presented here:

- **Finding.** The program's planned verification and due diligence practices will meet most aspects of national best practices if implemented as documented.

**Recommendation.** Navigant recommends formalizing protocols for "problem" builders and raters in addition to following the excellent procedures already documented.

- **Finding.** The program's tracking system, RSR's proprietary HouseRater system, also meets or exceeds most national best practices.

**Recommendation.** Navigant recommends improving the documentation for this system, which will track extensive data at the home level, as well as linking it to the utility customer information systems.

### **4.5.2 Key Process Findings and Recommendations**

Navigant's key process findings and recommendations are presented here:

- **Finding.** Navigant's review showed that the program has begun to successfully recruit builders and raters to the program using a variety of outreach activities. It is clear that this outreach and the development of training materials are in line with program theory.
- **Finding.** The fact that the program has been designed to operate with IECC 2012 as the baseline energy code shows that program staff is well aware of the challenges that the adoption of this code in Illinois will present.

- **Finding.** The program currently does not have any "branding" for program homes beyond their program qualification.

**Recommendation.** Navigant recommends developing program branding as soon as possible to raise program awareness among homeowners. This branding may align with existing Nicor Gas and ComEd branding.

- **Finding.** The initial program documentation does not have any formal market transformation goals; although interviews with program staff showed that market transformation is an "unwritten" goal. For example, Nicor Gas is working with the State of Illinois and the other Illinois utilities to develop building code compliance and advocacy programs for the next energy efficiency plan cycle.

**Recommendation.** Navigant recommends establishing formal market transformation goals as soon as possible. The program should also track key performance indicators related to market transformation, namely market share and program homes' time to purchase.

## 4.6 Behavioral Energy Savings Pilot

### 4.6.1 Key Findings and Recommendations

Because the program implementers were in the process of designing the BESP program during GPY1, Navigant did not conduct a full evaluation this year. Instead, Navigant worked with BESP program administrative and implementation staff to develop a model of the program theory and logic and an evaluation approach for GPY2 and GPY3. Navigant's key findings and recommendations from these tasks are presented here and primarily focus on ensuring that the program will appropriately track data necessary for successful GPY2 and GPY3 evaluation.

- **Data Necessary for Future Evaluation**
  - **Finding:** Navigant can test for program impacts in GPY2 and GPY3 *only if* the necessary data described in this report are available.
  - **Recommendation:** Nicor Gas and the BESP program implementers, WECC and CSG, should be sure to track the necessary data as it is described in this report. Doing so will allow Navigant to evaluate whether gas savings can be attributed to the BESP program in GPY2 and GPY3.
  - **Finding:** Navigant can investigate whether BESP participants signed up for other Nicor Gas programs after visiting the BESP web portals by reviewing data from other Nicor Gas programs. Information about customer motivation for enrolling in the other Nicor Gas programs will enhance this review.
  - **Recommendation:** Nicor Gas should ensure that customer motivation for enrolling in other Nicor Gas programs is captured during the enrollment process. In addition to GPY2 and GPY3 survey data, information captured during program enrollment will allow Navigant to identify whether the BESP program effectively channeled customers into other Nicor Gas programs.
- **Target Audience is Unclear**
  - **Finding:** The BESP program is open to all Nicor Gas residential customers with an online Nicor Gas account. The program marketing plan does not seem to incorporate insight from marketing segmentation or customer demographic data. It is unclear what type of customer the program intends to attract.
  - **Recommendation:** Nicor Gas and the BESP program implementers should consider studying participant demographics on an ongoing basis. Participant demographics could include housing characteristics and socio-economic data as well as participant levels of awareness, satisfaction, and energy use behaviors. Capturing and understanding this information will inform program design decisions, allow

implementers to optimize marketing to customers that have not yet signed up for the program, and enhance ongoing evaluation efforts.

## 4.7 *Small Business Energy Savings*

### 4.7.1 **Key Impact Findings and Recommendations**

The impact evaluation of the SBES program resulted in adjustments to the ex-ante gross savings for gas measures under conditions that will be described later in this report. The verified gross savings shown in Table 4-7 assumes that gas measures covered by the State of Illinois Technical Reference Manual (TRM) are deemed for evaluation purposes in GPY1.<sup>19</sup> An alternative estimate for the program as a whole is provided in the *Appendix, Evaluation Report: Small Business Energy Savings Evaluation GPY1*. The savings in the *Appendix, Evaluation Report: Small Business Energy Savings Evaluation GPY1* does not assume any deeming, but consists of research estimates for all measures, whether a measure is in the TRM or not.

As shown in Table 4-7, verified gross energy savings were nearly equal to the ex-ante gross savings reported in the Nicor Gas tracking system, resulting in a realization rate of 1.00 for gas savings (realization rate = verified gross / ex-ante gross from the tracking system).

Table 4-7 also provides the verified findings for net energy savings based on research conducted with first-year program participants and trade allies to estimate the NTGRs. The NTGR for Nicor Gas savings was 1.00. The NTGR for Nicor Gas reflects free-ridership at 2 percent offset by participant self-reported spillover of 2 percent. Trade allies reported no non-participant spillover for gas measures.

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<sup>19</sup> The September 14, 2012 final version of the first State of Illinois Energy Efficiency Technical Reference Manual (TRM) (effective as of June 1, 2012) was approved on January 9, 2013 by the Illinois Commerce Commission in Docket No. 12-0528. The verified gross savings shown in Table 4.10 recognizes that gas measures covered by the TRM are deemed for evaluation purposes in GPY1. Since the TRM was not final until after the end of GPY1, the TRM is applicable for evaluation purposes, but not GPY1 implementation. Evaluation research findings for gross savings in GPY1 are provided in *Appendix, Evaluation Report: Small Business Energy Savings Evaluation GPY1*.

**Table 4-7. Savings of the Small Business Energy Savings Program**

Savings Estimate	GPY1 Nicor Gas Natural Gas Energy Savings (Therms) <sup>20, 21</sup>	
	ICC-Approved TRM Algorithm	Corrected TRM Algorithm
Ex-Ante Gross*	104,483	109,353
Ex-Ante Net**	83,586	87,482
Verified Gross	104,483	109,353
Verified Net	104,483	109,353
GPY1 Program NTGR	1.00	1.00

\* Source: Nicor Gas ex-ante savings from an extract dated October 6, 2012.

\*\* Nicor Gas ex-ante net savings includes a NTGR of 0.80.

The primary impact findings and recommendations are as follows:

**Finding:** Evaluation research findings for customer participant self-reported free-ridership was 20 percent for Nicor Gas, very close to the ex-ante value of 20 percent assumed in program planning for both utilities. In contrast, trade ally feedback supported free-ridership estimates of 2% for gas.

While nearly all participants reported a high level of influence by the program, several indicated some level of intention to pursue efficiency projects had the program not been available, captured as a partial score of non-zero free-ridership, while still recognizing the influence of the program.

Given the program’s logic model and market structure, Navigant recognizes that a traditional participant self-report may overstate free-ridership. The program’s basic premise is that small businesses are hard to reach through other energy efficiency programs. In this circumstance, participant responses to the counter-factual (*What would you do in the absence of the program?*) are not a very reliable indicator because market barriers have limited to date, and would continue to limit, small business purchases and installations of qualifying equipment.

<sup>20</sup> The ex-ante gross savings for Nicor Gas shown in the column labeled “ICC-Approved TRM Algorithm” have not been adjusted for errata found in the approved September 14, 2012 TRM that are corrected by removing the GPM factor from the algorithm for aerators and showerheads. The ex-ante and verified gross and net savings that reflect the corrected algorithm are found in the column labeled “Corrected TRM Algorithm.” The TRM measure codes for aerators and showerheads in the ICC-approved TRM are CI-HW\_-LFFA-V01-120601 and CI-HW\_-LFSH-V01-120601, respectively. The TRM measure codes reflecting the corrected algorithms for aerators and showerheads are CI-HW\_-LFFA-V02-120601 and CI-HW\_-LFSH-V02-120601, respectively. See Illinois Statewide Technical Reference Manual for Energy Efficiency Version 2.0, June 7<sup>th</sup>, 2013, Effective June 1<sup>st</sup>, 2013, and p. 9 et seq.

<sup>21</sup> Verified gross and net savings match ex ante gross savings for Nicor Gas due to a verified gross realization rate of exactly 1.00, and a NTGR of 1.00 when rounded to two decimal places of precision.



Thus, trade allies comprise the best source of information about the market's structure (both before and after the introduction of the program). For this reason, Navigant conducted telephone interviews with participating contractors to determine how the sales to small businesses changed (both in content and quantity) as the program began to serve utility customers in the Chicago area.

Individual trade ally responses to free-ridership questions were weighted by their respective fuel-specific program savings contributions and combined for a fuel-specific overall free-ridership rate. This approach resulted in an evaluation estimate of 2 percent free-ridership for gas measures, and 5 percent free-ridership for electric measures. We used the trade ally estimate as a cap or maximum value for free-ridership, concluding that the trade allies used the program to overcome market barriers to serve a hard-to-reach audience. This is supported by self-reported customer participant free-ridership responses that recognized the program influenced them to act on their indefinite intentions and the program theory that the program was designed to serve an under-served market.

**Finding:** The per-unit savings values provided by Nicor Gas were reasonable first-year ex-ante savings estimates, given that participant equipment sizes and operating hours were assumed.

There are two areas of higher uncertainty that require attention in the second program year: heating equipment capacities, and programmable thermostat per-unit savings.

Nicor Gas based their boiler measure savings on fixed, assumed equipment sizes in the first year, whereas the Illinois TRM<sup>22</sup> estimates savings using heating equipment gas input size as a measure-level custom input to the algorithms. We did not observe project-specific heating equipment sizes in the tracking system or listed in the project documentation we sampled. Programmable thermostats are a high volume measure in the SBES program not covered by the Illinois TRM, and should be reviewed for addition.

- Recommendations for potential updates and revisions to the Illinois TRM are provided in *Appendix, Evaluation Report: Small Business Energy Savings Evaluation GPY1*.
- **Recommendation:** The program should collect boiler and furnace heating system capacities to enable the program to claim actual rather than default savings.<sup>23</sup>

We observed in the database that some instances of identical measures and building types used different per-unit savings (e.g., claimed savings matched different building types). We did not adjust for this finding, because it appeared that the claimed savings were reasonable selections for the businesses, even if the recorded building type was not consistent with the deemed savings. We suspect this is due to the ambiguity in assigning building types for some small businesses, and projects that may encompass a portion of the space in a business that may be different than the business as a whole. Possibly the business type is not updated to reflect the final project.

- **Recommendation:** Review database tracking and updating procedures to improve consistency between ex ante per-unit savings and recorded building type.

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<sup>22</sup> State of Illinois Energy Efficiency Technical Reference Manual, Final version, September 14, 2012, effective June 1, 2012.

<sup>23</sup> The implementation contractor indicated in draft comments that they are collecting heating system capacities in GPY2.

#### 4.7.2 Key Process Findings and Recommendations

The key process finding and recommendations are as follows:

**Finding:** With respect to savings goals, Nicor Gas did not reach their goal of 169,329 net therm savings in the first year, achieving 104,483 net therms, which is 62 percent of goal.

Nicor Gas program planners assumed that first-year participation would be much higher than achieved. For instance, the Nicor Gas efficiency plan for GPY1 assumed 169,329 net therms saved from 1,140 projects, about 149 therms per project. The actual number of participants was far lower, 272 participants for GPY1, saving 104,483 net therms or 384 therms per project. Although GPY1 projects were larger than planned, planners overestimated the number of projects that would be completed in the first year. The goals for Nicor Gas were too high for the number of active gas measure trade allies and their level of engagement.

- **Recommendation:** Lighting-only firms participated at twice the rate of HVAC-only firms in GPY1. Nexant has been actively recruiting more HVAC contractors and mechanical engineering firms for GPY2. The Evaluation Team advises Nexant to concentrate on HVAC firms that are willing to enter partnership relationships with lighting companies and that are in less-covered geographic areas.

**Finding:** The SBES Program may need more time than other programs to ‘ramp up’ to full speed. Small business customers are not educated about the savings potential of energy efficient equipment and are somewhat skeptical that the utilities are offering the program. They tend to be unaware of the surcharge and the other programs offered by the utilities.

**Finding:** The program appears to be changing the structure of the market. Trade allies are forming partnerships by purchasing other companies, and adding more staff to sell the program and install both lighting and HVAC equipment. Two trade allies, one lighting company and one mechanical engineering firm, purchased a company to be in a position to deliver the full set of program measures. Other firms hired more staff and one opened an additional office in the Chicago area. Structural changes such as these, purchasing companies and forming long-term partnerships, take time to fully impact the market.

- **Recommendation:** Nicor Gas should revisit the expected participation levels for the SBES Program. Small business customers are ‘low information’ customers and it will take time and resources for their knowledge base to catch up with that of larger customers. In addition, some of the trade allies have made significant investments to participate in this program; the utilities should respect their efforts to embrace the program.

**Finding:** Nexant staff and utility staff judged the success of the marketing of the SBES Program more favorably than trade allies. Trade allies thought more marketing was the way to raise awareness with customers. Radio was the most preferred channel among trade allies, along with direct mail.

- **Recommendation:** Nicor Gas needs to continue general advertising of the SBES Program to increase customer awareness and receptivity and promote the program.

**Finding:** During the Due Diligence review, Navigant understood that customers currently do not sign any documents if they change the scope of the project when the trade ally arrives at the

customers' facility. Alternatively, the customer signs but the customer approval and the scope of the approved project was not entered into the tracking system. In this situation, the invoice from the trade ally was used as the final determination of the number and type of measures installed.

- **Recommendation:** Customers should be required to sign a change-order (tracking) form if they change the scope of the project substantially to ensure that the changes to measure quantities are recorded in the tracking system for evaluation purposes.<sup>24</sup>

## 4.8 Business Energy Efficiency Rebates

### 4.8.1 Key Impact Findings and Recommendations

As shown in Table 4-8, savings verification of the GPY1 BEER program found that verified gross energy savings were consistent with the ex ante gross savings reported in the implementation contractor's (IC's) tracking system, resulting in a realization rate of 1.00 (realization rate = evaluation verified gross / ex-ante gross from the tracking system). Table 4-8 provides the evaluation research findings net energy savings based on a NTG ratio of 0.73 calculated from GPY1 evaluation research.

**Table 4-8. GPY1 Natural Gas Savings Estimates**

	Nicor Gas Energy Savings (Therms)
Ex Ante Gross Savings	1,742,478
Ex Ante Net Savings	1,400,675
Verified Gross Savings <sup>25</sup>	1,742,478
Verified Net Savings	1,272,009
Verified Net-to-Gross Ratio	0.73

*Navigant Analysis of Nicor Gas tracking database (10/06/2012 data extract)*

Comparing initial program planning net therm savings with evaluation estimated net therm savings, Navigant found that Nicor Gas BEER program achieved 128% (1,272,009 therms) of the initial planned net savings for the BEER program. The planned net energy savings goals for GPY1 were 991,607 net therms with a NTGR of 0.80.

The Navigant team also assessed the progress of the Nicor Gas BEER program by comparing impact results from the Rider 29 program to the Rider 30 GPY1 impact results. Although program

<sup>24</sup> In GPY2/EPY5 Nexant is requiring customers to sign/initial a revised Installation Agreement with the scope changes noted.

<sup>25</sup> The September 14, 2012 final version of the first State of Illinois Energy Efficiency Technical Reference Manual (TRM) (effective as of June 1, 2012) has been agreed to by Illinois Stakeholder Advisory Group (SAG) participants and has been approved by the Illinois Commerce Commission in Docket No. 12-0528 as of the date of this report. The verified gross savings shown in Table 4.11 assumes that gas measures covered by the TRM are deemed for implementation and evaluation purposes in GPY1, after the ICC approval of the TRM and TRM Policy Document for use in GPY1. For the BEER program, evaluation research findings for gross savings that do not assume deemed status of TRM measures in GPY1 were identical to verified gross savings with deeming.

participation in Rider 30 GPY1 was not significantly different from that of the Rider 29 pilot program, the Rider 30 GPY1 program achieved over 318% (1,742,478 therms) of Rider 29 gross savings (547,787 therms). Net savings increased by approximately 299% from 426,071 therms to 1,272,009 therms. Further, these gains were achieved by expending incentives equivalent to only 88% of Rider 29 incentives. The difference in savings and incentives was due to higher than projected installations of relatively low-incentive industrial high pressure steam traps.

The primary impact findings and recommendations are as follows:

**Finding:** Navigant found that steam trap measures represent approximately 85% of the total reported gross therm savings. Much of the program's ability to achieve its goal can be attributed solely to steam trap measures. Navigant acknowledges that new programs sometimes rely on just a few measures to achieve savings and then diversify over time.

**Recommendations:**

- The program should work to diversify the registered trade ally pool to include additional types of equipment/measures.
- Future evaluations should include secondary research on commercial and industrial steam trap measures to ensure prescribed savings are accurate.

**Finding:** Upon reviewing the program tracking database, Navigant found that certain key variables that aid in the evaluation process were not included in the tracking data provided for review, although it is the understanding of the evaluator that this data is tracked.. The Implementation Contractor (IC) provided unit measure savings estimates for program qualifying measures. Navigant performed a review and verification of the algorithms and assumptions. Our estimates from the TRM were in agreement with those provided in the IC's documentation. The IC's estimates were considered accurate for GPY1 application.

**Recommendations:**

- The IC should ensure that unique project identifiers are provided in the tracking system for review by the evaluator.
- The IC should ensure information provided in hardcopy or handwritten applications are accurately transferred into the tracking system. The IC should ensure the type of business or facility type indicated in the project application is provided in the tracking system.
- The IC should also ensure all relevant contact information for both program participants and trade allies is provided in the tracking database. At a minimum, contact name, telephone number, and participant address should be provided for all program participants. A primary contact name and telephone number should be provided for trade allies.

#### **4.8.2 Key Process Findings and Recommendations**

The primary process findings and recommendations are as follows:

**Finding**

Overall, customers appear to be very satisfied with the BEER program; 94% of the customers surveyed reported being satisfied with the program overall. Most customers (88%) reported being

satisfied with the incentive amount; while 84% reported being satisfied with the incentivized measures/equipment offered by the program.

**Finding**

Evidence from the program tracking system shows incomplete applications and denials are a challenge to the program implementation.

**Recommendation:**

- The program implementation team should work with the participating trade allies to streamline and simplify the application process; including providing additional information about qualifying units before the energy efficient projects are undertaken, in order to reduce the number of rejected applications.

**Finding**

Navigant found that during the Rider 29 evaluation, program participation and savings did not meet initial program planning goals. In GPY1 of Rider 30, program staff took steps to increase program marketing and outreach efforts and added new program measures (steam traps and commercial kitchen measures) to achieve program goals. Navigant found that the program made successful modifications to achieve the savings goals and at a lower than projected incentive cost.

**Finding:** Navigant found that significant efforts have been made to improve on the program marketing and outreach activities to trade allies since the beginning of Rider 30. The IC increased the total registered trade allies from 1,000 to 4,169. Only 41% of the survey respondents reported that they used a program-qualified trade ally.

This suggests that both the program and the trade allies may not be promoting the program-qualified trade ally status feature to the fullest extent possible.

**Recommendation:**

- Navigant recommends that the IC continue to train and recruit new trade allies to aid in the promotion of the BEER program. Because the participation of trade allies is vital to both program promotion and to facilitating the program application process, Navigant also suggests that the IC implement additional incentives for trade allies, such as rewarding higher trade ally volume through such means as listing on Nicor Gas website based on cumulative savings brought in.
- Although contractors are encouraged to participate in co-branding of their company's website and marketing material, it may also be effective to encourage trade allies to promote their program-qualified status to participating and potential customers. By informing customers of their status (either vocally or through marketing material) as a registered Trade Ally with Nicor Gas, customers may be more comfortable participating in future program offerings.

In January 2013, Nicor Gas implemented a web-based tool that allows customers to find Contractor Circle/registered trade allies that provide service to their county, customer segment (i.e. residential, large commercial, small commercial), and the type of service required (e.g. commercial boiler installation, central air conditioning installation, etc.). This tool should facilitate customers' ability to find program affiliated contractors.

**Finding:** Participation in the participant survey did not meet the designed sample size of 75 completes. Although Navigant contacted 146 participants, only 34 agreed to participate in the survey. Although there were few outright refusals to participate in the survey, many participants indicated that they did not have time and calling back at a later time would be better. Many of the later callbacks did not result in the customer's participation, but rather another refusal to participate. It should be noted that while the sample of 34 participants represented 13% of the population, it accounted for approximately 80% (or 1,392,269 therms) of the ex-ante gross savings claimed.

**Recommendations:**

- Improve the quality of the customer contact name and telephone number data in the tracking system so the correct survey contact can be targeted from the outset.
- Discuss the verification obligation with customer contacts at the time of project implementation activity – note that there is a requirement to participate in a brief survey, if contacted.
- Include a note of obligation to participate in verification, if contacted, with the rebate check payment letter.
- Send out a reminder note of the verification obligation in post-project follow-up communication with the customer
- On the application form Terms and Conditions, state that, if contacted, responding to verification interviews is a requirement of program participation. Navigant recommends changing the current wording from:

“Current C&I PY2 Application Forms Terms & Conditions: Verification: Any customer receiving a rebate check may be contacted by an evaluator to verify service/equipment installation or be asked to complete a customer survey.”

To

“Verification: Any customer receiving a rebate check may be contacted by an evaluator to verify service/equipment installation or be asked to complete a customer survey. If contacted, your participation is required.”

## **4.9 Business Custom**

### **4.9.1 Key Impact Findings and Recommendations**

As shown in Table 4-9, savings verification of the GPY1 Custom program found that research findings gross energy savings were approximately 7% lower than ex-ante gross savings reported in the implementation contractor's (IC's) tracking system, resulting in a realization rate of 0.93 (realization rate = evaluation research findings gross / ex-ante gross from the tracking system). Table 4-9 provides the evaluation research findings net energy savings based on a calculated net-to-gross ratio (NTGR) of 0.53.

**Table 4-9. GPY1 Natural Gas Savings Estimates**

Category	Nicor Gas Energy Savings (Therms)
Ex Ante Gross Savings	1,622,380
Ex Ante Net Savings	1,297,904
Research Findings Gross Savings	1,510,285
Research Findings Net Savings	800,451
Verified Net-to-Gross Ratio	0.53

*Navigant Analysis of Nicor Gas tracking database (10/06/2012 data extract)*

The primary impact findings and recommendations are as follows:

**Finding:** Navigant’s program tracking system review indicates that additional information is needed to support future program evaluations and possibly allow program managers to monitor key aspects of program performance at regular intervals.

**Recommendations:**

- The IC should consider updating the tracking system for the GPY2 evaluation to include participant business or facility type.
- The IC should consider including additional fields in the tracking system for information on baseline selection to indicate whether the implemented measure is a replace on burn-out (ROB) or early replacement/retrofit (RET) scenario.
- The tracking system should include measure information such as equipment cost, installation and incremental cost, equipment age or estimated equipment end of useful life. This information is useful for evaluating measure and program cost effectiveness.
- The IC tracks program forecast or pipeline projects separately and updates the main tracking system when projects are approved for incentives. The program tracking system should provide pipeline projects, including timelines.

**Finding:** Customers or their trade allies do not submit adequate information on the operating condition and input parameters for savings estimates, and measure specifications. During the on-site M&V and subsequent follow-up review, the evaluation team spent a significant amount of time reviewing and obtaining sufficient project information from the customer or IC to enable us to sufficiently establish the condition of installed equipment to develop savings estimations. Significant adjustments were applied to the operating conditions for some projects including; NG01-001, NG01-004, NG01-005, NG01-006, and NG01-015. The projects with the lowest relative realization rates were; NG01-061, NG01-012, and NG01-002, with realization rates of 0.64, 0.42, and 0.62 respectively.

**Recommendation:**

- Verification of net claimed savings is greatly aided when thorough documentation of baseline and baseline conditions are provided, including:

- a. Pre-existing equipment and operation description,
  - b. energy savings assumptions and methodologies,
  - c. estimated equipment remaining useful life from pre-approval application form, when applicable,
  - d. standard maintenance practices and history, and
  - e. Inspection results.
- While the IC is collecting this information to some extent, Navigant stresses the importance of sufficient project documentation to accurately portray the program's selection of baseline conditions for custom projects.
  - Nicor Gas should continue to encourage all customers receiving incentives through the Custom Program to participate in the CATI survey. Navigant will work with the IC in reaching out to program participants prior to initiating either participant or trade ally surveys.

**Finding:** A relatively lower overall weighted NTGR of 0.53 was achieved compared to initial program planning NTGR of 0.80. This is due to a lower rating by the majority of survey respondents when asked to assign a percentage to the Custom program's influence relative to all other factors regarding their decision to implement the measures/project.

**Recommendation:**

- The program should continue to assess the opportunities to reduce free ridership among the Custom program participants. Although high free ridership among custom project participants is not unusual, increasing awareness and the application screening process can help reduce free ridership.

#### 4.9.2 Key Process Findings and Recommendations

The primary process findings and recommendations summarized below:

**Finding:** The Custom program in the Rider 30 GPY1 period achieved significant progress in recruiting additional participants, with 28 projects participating in GPY1 compared to nine projects during the Rider 29. Although the Custom program did not meet its GPY1 participation target of 43 projects, the program in GPY1 exceeded its planning gross savings goal by 11%, and an increase of 415% of gross savings compared to the Rider 29 program.

**Finding:** Navigant found that significant effort has been made to improve on the program marketing and outreach activities to both trade allies and participants since the beginning of Rider 30. Notable among them is the continuous recruitment of contractors and organizing trade ally meetings and training.

During Rider 29, there were 1,000 registered trade allies. The IC did a commendable job in recruiting trade allies to the program, increasing the total registered trade allies to 4,169.

- **Finding:** Participating customers surveyed are highly satisfied with the program, with the majority planning to participate again in the future and the balance possibly participating in



the program again in the future. It should be noted that since a high level of free ridership was found in GPY1, these participants may or may not pose a risk of increasing free ridership in future program years if they decide to participate again.

**Recommendation**

- In an effort to reduce free ridership, the program could;
  - Promote the installation of technologies that are more emergent, and;
  - Continue to recruit trade allies to the program. Increasing trade ally participation may bring customers to the program that may otherwise have not known about the program and promote measures that the customer would be less likely to have installed in the absence of the program.
- The program should continue to work on simplifying the application process, including using more common terminology and the ability to submit program applications online.
- The IC should continue to follow up with those customers (pending participant authorization for Navigant to release their contact information) that indicated that they are interested in future participation to explore whether those customers have particular projects in mind.

**Finding:** All trade allies contacted were satisfied with the program and its role in their businesses. The majority would be interested in sharing with Nicor Gas their thoughts on equipment and energy saving methods that could be incorporated into the program as well as potential improvements to the equipment qualification process and the metering documentation required to achieve program approval.

**Recommendation:**

- Nicor Gas should continue conducting focused research to explore trade allies' thoughts on beneficial program changes.

**Finding:** Customer referral is happening between the Custom program and the SBES and BEER programs. Referrals are reported to Nicor Gas on a weekly, monthly and quarterly basis.

**Recommendation**

- The Custom program in coordination with other Business programs should create a central database system where referral projects are stored and the status of which can tracked.

## **4.10 Retro-Commissioning**

### **4.10.1 Key Impact Findings and Recommendations**

Table 4-10 summarizes the savings from the Joint RCx program.

Among the 50 total participants, 7 in the program database were Nicor Gas participants. The gas utilities did not have a deemed NTG ratio; however, they all used 0.8 as a planning assumption, and Navigant applies this ratio to ex ante net savings. Since no NTG estimates were deemed for gas savings, Navigant applied the NTG ratio estimated by GPY1 research below to GPY1 gas savings.

**Table 4-10. GPY1 Evaluation Natural Gas Savings Estimates**

Research Category	Nicor Gas Savings (therms)
Ex Ante Gross	180,345
Ex Ante Net <sup>26</sup>	144,276
Research Findings Gross	147,838
Verified Net <sup>27</sup>	150,057
Research Findings NTGR	1.02

*Source: Utility tracking data and Navigant analysis.*

- **Program Savings Goals Attainment.**

**Finding.** Gas savings goals fell short for Nicor Gas (267,700 therms).

**Recommendation.** Savings is driven largely by participation and by effective trade allies. Increasing the number of active trade allies performing more projects will help gas goal achievement.

- **Gross Realization Rates**

**Finding.** The gas savings realization rate is 82.0% Nicor Gas. Divergent gas realization rates are a result of the small populations and savings. The overall gas realization rate is 103%. Energy savings estimates from the RSPs are generally well-supported and calculated with a high degree of rigor. Most RSPs continue to use their own estimation spreadsheets, rather than program-provided templates for common measures. This factor complicates program implementation and evaluation efforts as the variety of methods is time-consuming and open to more errors.

**Recommendation.** Explore ways to encourage use of existing program-standard savings calculators, when the common measures qualify for their use, e.g. less than 2,500 therms savings. Perhaps use incentives or fast-track program processes when standard savings calculators are used.

- **Net-to-Gross estimates:**

**Finding.** The gas NTG ratio estimate is 1.015. Program incentives to fund the studies and the expertise of RSPs rank very high in importance among participants. (9.6/10) According to participants, program influence to identify and implement measures is lower (7.4/10), a result similar to EPY3. There is only small indication of spillover among participants. Service providers credit the program with sustaining and creating a retro-commissioning market in Illinois, as a result spillover from the RSPs contributes to overall NTG estimates.

**Recommendation.** Update gas-specific NTG ratio for planning purposes, based on research

<sup>26</sup> The program-assumed net-to-gross ratio is 0.8 for Nicor Gas savings, Peoples Gas and North Shore Gas for planning purposes.

<sup>27</sup> Natural gas verified net savings is based on EPY4/GPY1 research that found a net-to-gross ratio of 1.015 for gas and 1.038 for electric savings.

presented in this report. Apply the gas NTG retrospectively to GPY1 savings since this is the first time NTG has been researched for the gas program.

- **Incomplete Savings Estimates.**

**Finding.** Some measures are low-risk and high-reward in terms of savings, and there is a temptation to apply less rigorous calculations to quantify savings, since the RSP is certain the customer will implement the measure. While this scenario expedites the retro-commissioning process and still benefits the customer, it short-changes the program's savings estimates.

**Recommendation.** During savings-calculation quality control steps, look specifically for interactive and concurrent savings with a checklist by measure type. For example, equipment scheduling saves gas for ventilation as well as fan energy; fan static pressure reduction decreases fan heating, and discharge air temperature resets can change mass-flow rates and fan power. Encouraging the use of program template calculators, which do include the concurrent and secondary effects, will improve the overall accuracy of estimates.

- **Incomplete Training Tracking.**

**Finding.** A condition of program participation is having at least one staff member complete Level 1 Building Operator Certification training. The program data base currently is not set up to track training participation for program compliance.

**Recommendation.** Add table(s) to the data base to track training for one or more individuals for each participating site. The table should link to project number for verification purposes.

#### 4.10.2 Key Process Findings and Recommendations

- **RSP Participation.**

**Finding.** The program has 23 registered RSPs. While only nine completed projects in GPY1 many of the others are working on projects for GPY2 completion. While the effort to increase the number of participating RSPs between GPY1 and GPY2 was a success, there is lost opportunity in having RSPs listed as part of the program but not completing projects in a program year.

**Recommendation.** Because RSPs are the primary conduit for program participation, The IC should stress the importance of completing a project during training and be sure all RSPs clearly understand inactivity and no projects will result in rebid or removal from the program. Conduct evaluation research with inactive RSPs in GPY2 to determine the conditions of inactivity.

- **Implementation Phase Support**

**Finding.** The Implementation Phase continues to be the primary source of challenges for the program. This phase is generally participant-led and the timely completion of projects is entirely dependent on the customer keeping the project moving. RSPs expressed a concern that while they are not involved in this phase, they are still held responsible, via the RSP review process for the timely completion of projects.

**Recommendation.** More effort is needed from Program Managers and the IC to engage the participants and keep the implementation phase moving along on a timely basis. Include

implementation milestone dates in the implementation phase that will status each recommendation periodically. The milestones could be simple written status updates via email to the RSP, if projects are progressing, or the status updates could be part of a conference call or on-site meeting with the customer, RSP and utility / program representatives if the recommendations seem stalled.

- **RSP review process.**

**Finding.** RSPs indicated that while they think the review process is important, the process could be more transparent. Essentially, RSPs believe there should be consideration in the scoring for those parts of the project that the RSPs feel they have little to no control over. For example, the timely completion of the implementation phase may negatively affect the score; yet, they have little to no control over this part of the project.

**Recommendation.** The RSP role in implementation should be emphasized and clarified. RSPs should be reminded to conduct more implementation follow-up to encourage timely project completion. If this fails to spur implementation, the RSP scoring system should be reviewed to ensure it is not penalizing RSPs for aspects of the program that they have less control over (e.g., implementation timing) or program approaches should be put in place that allow RSPs to guide the participants more actively through the customer-directed phases.

- **Project timing**

**Finding.** Timing improved in GPY1, but remains a challenge. In the current program year, many projects were unable to meet their originally planned completion timelines. Timing challenges include:

- The program year, which ends in May, limits the RSP's testing season for cooling measures, creating problems in finishing projects on time.
- Lack of customer urgency to complete the various stages of the project process.
- The amount of back and forth between the RSPs and IC during the review process.

Customer timing perception varied by customer type with:

- Large corporate participants indicating that the projects could have been completed more quickly; and,
- Smaller, non-profit, or more budget constrained participants indicating that being able to spread the implementation phase out of the course of more than one fiscal year would allow them to complete more projects through the program.

**Recommendation.** The utilities and Nexant should stay more engaged with participants and RSPs to clear obstacles to implementation and analysis review. Set up periodic meetings with each project team to learn of obstacles before they slow down the program processes.

## **4.11 Business New Construction**

### **4.11.1 Key Impact Findings and Recommendations**

The program garnered savings of only 11% of the therms savings goal. Customers are satisfied and find value from the program. Our research finds that the implementation team is running the

program well, although we do provide recommendations to improve their processes (detailed more below and in the report).

**Table 4-11. Program Gross and Net Savings**

Research Category	Nicor Gas Savings (therms)	Verified MBtu (ComEd and Nicor Gas)*	Research MBtu (ComEd and Nicor Gas)*
Ex Ante Gross	54,426	76,235	76,235
Ex Ante Net	32,656	45,742	45,742
Research Findings Gross	64,400	68,700	68,300
Verified Net	21,300	37,600	39,700
Research Findings NTGR	0.33	0.55	0.58

Source: ComEd PY4 Ex Ante Table, Program Tracking Data from Implementer, Nicor Gas Rider 30 Filing, evaluation team analysis.

\* MBtu values are calculated by applying conversion factors to the ex ante MWh and therm values. Verified MBtu were calculated using verified electric Systems Track parameters, Research MBtu were calculated using research results only.

The gas side of the program had a gross savings realization rate greater than 100% but a low net-to-gross ratio (Table 4-11). The NTGR was 0.33 for the program with a range of 0 to 0.80. In GPY1, there were only seven projects that received Nicor Gas incentives. Five projects comprised the evaluation sample, but one project personnel did not participate in the NTGR interview. When there are so few projects, the values shown in Table 4-11 often do not provide indications of what could occur in the future. The evaluation team also observed that since the gas incentives were new, many participants did not learn about them as early in the design process. This contributed to low NTGR values.

In Table 4-12, we break out the values presented in this section by program track, i.e., Systems or Comprehensive.

**Table 4-12. Program Gross and Net Savings – by Track**

	Metric	Systems Track	Comprehensive Track	Total*
Ex ante gross savings	therms	22,867	31,559	54,426
Ex ante net savings	therms	13,720	18,935	32,656
Evaluation adjusted gross savings	therms	27,000	37,300	64,400
Evaluation net savings	therms	8,900	12,400	21,300
Verified Gross Savings	MBtu	45,700	23,000	68,700
Verified Net Savings	MBtu	26,200	11,400	37,600
Researched Gross Savings	MBtu	47,300	21,000	68,300
Researched Net Savings**	MBtu	27,500	12,200	39,700

Source: Evaluation team analyses

\* Track sub totals do not always sum exactly to the total value due to rounding.

\*\* Due to the sample design, only the total researched net savings value meets the 90% confidence and 10% precision level. We show this value decomposed across Systems and Comprehensive Track projects for illustrative purposes only.

### Impact Recommendations

**Finding:** The evaluation team found that the gas savings from HVAC measures calculated using the Commercial Building Energy Consumption Survey (CBECS) data was somewhat inconsistent. Heat loads and the resulting savings were based on CBECS data averaged over the entire United States. This underestimated the heating for buildings in the Illinois climate zones. Additionally, an assumed peak load was used to cancel out the building area in the analysis. While this approach in itself is not incorrect, it is important to note that the savings are dramatically different than if simply using the actual building area to determine the savings.

- **Recommendation:** Use regionally appropriate data sources whenever possible. The Illinois technical reference manual (TRM) was not available for this program year, but should be used for prescriptive heating measures in future years.

**Finding:** While the team’s impact analysis did not reduce the gross ex ante energy savings much overall, the information in *Appendix, Evaluation Report: Business New Construction Evaluation GPY1* shows that NTGRs continue to significantly reduce the program’s net savings estimates. Based on the project sample, relatively few large projects with high free ridership had a significant impact on the overall NTGR. This was especially true for the gas analysis: interviews showed that low gas incentives and low awareness of gas incentives contributed to high free ridership.

- **Recommendation:** The implementation team should review, possibly further develop, and document its free-rider screening process for potential projects. The program’s operation

manual indicates that the program screens for free riders, but the evaluation results indicate that there are a few participating in the program. For projects that the program touches early, implementation staff should consider the customer's preexisting level of commitment to efficiency. If projects are undertaken after the original design is completed, implementation staff should consider asking how the program can leverage further efficiency out of the customer. Improving awareness of available gas measures earlier in the design process could help raise the gas NTGR.

### **Building Efficiency Baselines**

**Finding:** With the addition of process-related efficiency measures, the types of measures that receive incentives through the New Construction program are moving beyond building envelope, HVAC, and lighting systems. Expanding the measures that can be included in the program may be beneficial for the program and its participants. For identifying building efficiency baselines in GPY1, the program primarily used the International Energy Conservation Code (IECC) Illinois Energy Conservation Code for Commercial Buildings, which referenced IECC 2009 and allowed for American Society of Heating, Refrigerating, and Air-Conditioning Engineers 90.1 – 2007 as an alternate compliance method. Yet, in GPY1 the program had to reach outside of this framework to establish and document the baseline for some industrial process measures.

- **Recommendation:** The evaluation team recommends a careful consideration of the program's use of appropriate baselines, and the documentation of all related decisions as the program implements measures not covered by existing building codes. The implementation team should document changes to the rationale for alternative baselines selected to compensate new project types.

#### **4.11.2 Key Process Findings and Recommendations**

This section lists the main findings and recommendations resulting from the GPY1 evaluation. The evaluation team believes that these recommendations will prove the most useful to the implementation team in their efforts to continue to develop the program in GPY2.

### **Marketing and Outreach**

**Finding:** The program appears to be performing outreach effectively, but there may be some opportunities for improvement by increasing awareness of the joint program and targeting additional professional associations. Among program participants, many heard about the program through word of mouth within the industry or directly from program staff. Focus group participants knew about Nicor Gas efficiency programs in general, but they were less aware of the New Construction Service program in particular and could only list a few details. Among the focus group participants, only four of the ten knew that ComEd and Nicor Gas offered a joint program.

- **Recommendation:** Ensure that all marketing and program materials are prominently co-branded.
- **Recommendation:** The implementation team likely has a good understanding of its marketing effectiveness across the many professional organizations it already targets. Per its discretion, it should consider expanding outreach efforts to additional organizations such as the following:

- CoreNet—this is an association of corporate real estate professionals, workplace professionals, service providers and economic developers.
- Alliance for Environmental Sustainability (AES)—The program participant who suggested AES acknowledged that AES formerly had much more of a residential focus but in recent years has expanded its focus and, therefore, may be an appropriate outreach target for the program.

### **Barriers and Drivers to Participation**

**Finding:** The program implementation team has been focused on finding the best ways to work with project staff (i.e., participants and partners) given standard business and design practices and project time lines in the new construction industry. For program participants, it appears that the program is generally engaging project teams at the right time and in ways consistent with its design. Non-participants in the focus group, however, did express concerns about how participation in the program might adversely affect their projects. Concerns included impacts on tight project timelines, creating onerous application requirements similar to Leadership in Energy and Environmental Design (LEED), and receiving incentives for lighting power density reductions as opposed to kilowatt-hours saved through measures. The perception that the program competes with market actors who provide modeling does not appear to be a significant barrier.

- **Recommendation:** Better describe the program to potential participants by developing the program website. Overall, focus group participants indicated they need more clarity on program processes and one participant noted that the program website was not helpful in answering his immediate questions. Create a list of frequently asked questions to post on the website based on the questions, concerns, and misperceptions uncovered in the focus group with active non-participants (see *Appendix, Evaluation Report: Business New Construction Evaluation GPY1*).
- **Recommendation:** Clarify the program’s structure and benefits for potential participants by offering training on becoming a program ally. Focus group participants want more information about the program and want to understand how they can use the program to benefit their projects, create and use a webinar to train designers, increase their understanding of the program, and provide them a marketing tool.
- **Recommendation:** Better describe the program for potential participants by creating one-page, program-specific marketing sheets. Designers requested that they have a one-page marketing piece to pass out during early design meetings to introduce the possibility of participating in the program. Create one-page descriptions of the program aimed at specific target audiences. One marketing piece should be targeted to the owner/developer group but also be available to those in the design group. Another could be targeted to projects that are already intending to incorporate some high-efficiency design such as LEED.
- **Recommendation:** Better characterize the program for potential participants by continuing to develop case studies. Focus group participants suggested that case studies are a good way to describe the potential program benefits for projects similar to those they are working on. Given that point, continued development of case studies and disseminating them to the design community should occur.



## Gas Incentive Levels

**Finding:** There is some evidence that suggests the gas incentives may be low compared to other programs in the market. Program participants and focus group participants gave a strong, positive response to the inclusion of gas incentives.

- **Recommendation:** Promote the gas incentives and consider increasing them. The program should review the gas incentive rates and investigate whether they are high enough to increase participation.

## Program Impact on the Market

**Finding:** The program is likely helping to build energy efficiency knowledge in the market, especially among the market actors who participate in the program and among the market actors who attend trainings. However, it is not clear if the program is creating a sustained effect on energy-efficient new construction practices beyond the projects that are recruited into the program. Instead, participants and active non-participants have indicated that LEED and utility incentive programs in general are driving energy-efficient new construction practices more than the New Construction Service in particular. Given these other influences, it is difficult to parse out the effects of the New Construction Service.

- **Recommendation:** The program should take advantage of the prevalence of LEED projects by recruiting these projects into the program; however, the program needs to convince design teams that working with the program on these projects will be a smooth, non-onerous, valuable process. The main concern focus group participants had about program alignment with LEED is that participating in LEED requires many administrative hours for paperwork and they worry that working with the New Construction Service may require similar amounts of paperwork. Create LEED-specific, one-page fact sheets outlining the ways the program can enhance the efficiency of these projects. Create a message that highlights: 1) the design team can submit existing LEED design plans; 2) program incentives help decrease first costs to ensure that high-efficiency design and equipment are implemented; and 3) past design participants find the program's review of LEED design valuable for helping to find ways to realize LEED goals and for the "extra set of eyes" the service provides.

## *4.12 Building Performance with Energy Star*

### **4.12.1 Key Process Findings and Recommendations**

After reviewing the program materials and conducting interviews with program and implementation contractor staff, Navigant has the following key process findings and recommendations:

- **Finding.** The program currently does not have any key performance indicators (KPIs) outlined in program operations documents.
  - **Recommendation.** Establish clear key performance indicators and tracking plans to help track and determine program effectiveness and to identify potential avenues for enhancing program performance. This will also help provide future evaluation efforts with key data for evaluating program effectiveness.

- **Finding.** Though Nicor and ComEd share potential participants in their respective versions of the program, there is no official coordination of program efforts or co-branding between the two utilities.
  - **Recommendation.** The evaluation team recommends Nicor Gas assess the potential benefits and challenges of running this program jointly with ComEd since both utilities target many of the same clients with their respective versions of this program effort.<sup>28</sup> A joint utility effort could result in implementation cost savings and it could increase useful data sharing.
- **Finding.** Though the current implementation contractor is running the same program for ComEd for some of the same potential participants as Nicor, it does not share data between the two utilities in cases where they have mutual participants.
  - **Recommendation.** Whether utilizing a shared implementation contractor, running the program jointly, or through alternative agreed upon means, the evaluation team encourages data sharing between the utilities in cases where they share participants in their respective versions of this program. Both utilities may benefit from better understanding shared participants' proposals and projects on both the electric and gas sides. For instance, Nicor Gas may benefit from understanding whether potential participants considering both utility programs are more inclined to pursue electric measure projects rather than gas ones due to differences in electric and gas energy costs.
- **Finding.** Program marketing and outreach materials are currently limited to an informational leaflet. The evaluation team sees opportunity to develop additional materials to help promote the program and drive participation.
  - **Recommendation.** The evaluation team recommends looking into expanding program informational materials. This could include developing more informational materials and case studies, both online and print. Since the Nicor Gas program does not yet have customer experiences to profile, profiles of peer businesses in the hospitality and assisted living sectors that participated in other utilities' comparable programs could stand in until such are available. Concrete examples of these programs in action and details of related energy and non-energy benefits have proven to be very powerful in motivating participation.
- **Finding.** While ComEd's BPwES program is open to customers for whom the implementation contractor does not provide billing support, the Nicor Gas program is not, which potentially limits its outreach and growth potential.
  - **Recommendation.** The evaluation team recommends that Nicor Gas assess the potential of opening the program to clients to which the implementation contractor does not provide billing services. If Nicor Gas were to establish lead-generating processes to refer potential participants to the implementation contractor, program

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<sup>28</sup> ComEd treats its version of this pilot as a feeder program for its Prescriptive Program.

participation could potentially be increased. Furthermore, opening the program up to customers that the implementation contractor does not handle billing for could allow for trade ally involvement in promoting the program.

## 4.13 Economic Redevelopment

### 4.13.1 Key Impact Findings and Recommendations

**Finding:** The ER program began implementation in January 2012. In GPY1, the ER program recruited 27 projects, including 20 comprehensive projects. Many of the projects initially recruited by the ER program were still in progress at the end of GPY1, including 26 projects with estimated gross annual energy savings of 250,836 therms, amounting to 66 percent of the program’s GPY2 gross energy savings goals of 379,070 therms.

**Finding:** The program induced ex-ante gross savings of 893 therms from one systems project that qualified for completion incentives in GPY1, achieving 5 percent of its GPY1 gross energy savings goal of 17,117 therms. Navigant applied the program planned Net-to-Gross (NTG) ratio of 0.80 per the NTG Framework<sup>29</sup>, resulting in an Evaluation Research Findings Net Savings of 714 therms. Table 4-13 presents GPY1 program impacts.

**Table 4-13. Nicor Gas GPY1 Economic Redevelopment Program Impacts**

Savings Estimates	Energy Savings (Therms)
Ex-Ante Gross Savings	893
Ex-Ante Net Savings	893
Research Findings Gross Savings	893
Research Findings Net Savings	714
GPY1 Program NTGR	0.80

Source: Navigant analysis of program tracking system and file review

- **Recommendation:** No improvements needed.

**Finding:** The program Operations Manual doesn’t include guidance or definitions for when a site inspection should occur, other than when a project is “substantially complete.”

- **Recommendation:** Navigant recommends that program staff consider establishing criteria for conducting site inspections for projects during the construction process and incorporate the criteria into the Operations Manual. Examples of projects that might require multiple site visits to mark project milestones and document project compliance could include: 1) projects with a large amount of energy savings, 2) projects with a high level of uncertainty for construction-related measure implementation or 3) projects with a first-time participant.

**Finding:** The project file selected for engineering review was missing documentation for some factors that may influence energy savings estimates, including baseline efficiency, equipment load

<sup>29</sup> Nicor Monthly Report – PY1\_2012 May.xlsm

profile and schedule, equivalent full load hours of the operating climate zone, replacement specifications and proof of purchase of the equipment.

- **Recommendation:** Navigant recommends that the ER program develop a project file checklist with important documentation for each project file and add a data field to the program tracking database that indicates whether or not a project file checklist has been completed. The purpose of the project file checklist would be to include consistent documentation for participating projects, including important information relating to engineering assumptions and other factors that may influence energy savings estimates, as indicated in the finding above.

**Finding:** The ER program's Systems Project template uses a different algorithm for a water heating system replacement than a similar measure found in the Illinois TRM<sup>30</sup>.

- **Recommendation:** Navigant recommends that the ER program review TRM algorithms and assumptions for consistency in estimating annual energy savings. The ER program should conduct a periodic review of applicable Illinois TRM values and algorithms for compliance with standard engineering best practices.

#### 4.13.2 Key Process Findings and Recommendations

**Finding:** The ER program's implementation contractors appear to have a clear understanding of their roles and responsibilities and comprise a well-qualified team that understands their roles and responsibilities in order to successfully implement this program.

- **Recommendation:** No improvements needed.

**Finding:** The ER program reported marketing and outreach to 69 unique contacts within the program's target markets. Additionally, the program appeared in 12 unique marketing efforts with program partners.

- **Recommendation:** Consider including specific goals and metrics for ER program marketing and outreach efforts, such as number of attendees at workshops, number of unique contacts or other metrics.

**Finding:** The participating customer interviewed by Navigant for this evaluation report displayed a high level of customer satisfaction about the technical assistance services and customer service provided by the program. The customer reported that, in their opinion, the associated rebate with this measure did not justify the expenses incurred by the customer associated with implementing the measure and would like to see higher rebates for similar measures from the program in the future.

- **Recommendation:** Navigant recommends investigating customer satisfaction with systems project rebates in future evaluations and reviewing system projects rebate amounts accordingly.

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<sup>30</sup> State of Illinois Energy Efficiency Technical Reference Manual, Final version, September 14, 2012, effective June 1, 2012. Section 7.4.2: Gas Water Heaters.

## **4.14 Emerging Technologies**

### **4.14.1 Key Impact Findings and Recommendations**

This evaluation for GPY1 does not include an impact evaluation. The program is too early in its implementation to have measurable impacts.

### **4.15 Key Process Findings and Recommendations**

Although GPY1 ran from June 1, 2011 to May 31, 2012, the ET program however was not operational until December 2011. Therefore, the program was still in the early stages of the implementation process at the end of GPY1. Nonetheless, Nicor Gas and the ET program team together have effectively designed and implemented many of the important processes to build a successful program in this short period. The evaluation team recognizes that since the end of GPY1, the ET program has likely evolved further, and may have made progress to address some of the issues discussed in this evaluation. However, based on the research conducted at the time for this evaluation, the evaluation team has concerns about a few program areas, starting with insufficiently defined program objectives. With some focused effort to improve the objective, and to address the recommendations below, in particular those focused on technology transition to EEP, the evaluation team expects the ET program to perform well.

Navigant's key process findings and recommendations are as follows:

- **Program Objective is Limited** – The ET program's stated program objective is too limited to assure an effective program. GTI has taken steps beyond the stated objectives that will address this issue and help assure success; however, to be effective, the program objectives and goals should be expanded and more clearly defined. In particular, the objective does not address the actual transition to EEP, which is fundamental to a successful program. Navigant recommends that Nicor Gas and the ET program expand the objective to incorporate a successful technology transition to the EEP. Nicor Gas and the ET program may benefit from additionally defining the ET program's intentions with regards to either long-term or near-term technical and economic savings potential and overall portfolio energy efficiency or end-use therm savings.
- **Risk Mitigation in Technology Transfer/Deployment to EEP** – The current deployment process may be insufficiently well defined, potentially putting the success of each technology deployment in jeopardy; a more clearly defined, robust deployment process can help ensure that the technology deploys successfully and contributes expected levels of energy savings to the EEP portfolio. Navigant recommends clearly defining a set of deliverables, including a new market/business assessment and any relevant findings from the pilot, that will enable effective information transfer for the technology, and by assigning responsibility to specific personnel (both in ET program and EEP) to oversee the transition of each technology.
- **Comprehensive Central Tracking** - The ET program's technology tracking process does not currently extend beyond the program's 4S selection process to include information on pilot assessment testing or the transition to EEP. This process is an interim solution as they intend to transition to Nexant's TrakSmart software platform, which all EEP-programs plan to adopt. Navigant recommends that the ET program employ a central tracking system that extends from application submission to technology transfer to EEP (or rejection from further

analysis) that will enable comprehensive performance assessment. The monthly Project Scorecard and other deliverables should ideally be linked to such a system automatically. It is currently unclear whether TrakSmart will contain the necessary functionality to successfully track the ET program through each process.

- **Documentation and Re-Evaluation of Promising Technologies** – The ET program has not defined a process by which they can revisit promising technology applications which do not currently meet all the necessary criteria, but may be viable options in the future. Navigant recommends that the ET program consider recording the summary of reason(s) for not going further (with a date). For some ideas, the ET program may want to set a target date to revisit the status (e.g., in 6 months or two years), including a threshold for improvements which would trigger a re-evaluation.

## 5. Appendices

The program-specific reports will be attached as separate appendices.

### 5.1 Glossary

#### ComEd and Nicor 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 5-1 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 5-1. 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  $X^{DV}$  (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  $X^{AV}$

## Glossary Incorporated From the TRM

Below is the full Glossary section from the TRM Policy Document as of October 31, 2012<sup>31</sup>.

**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 this process will primarily be driven by measures with high savings within Program

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

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.

## **5.2 *Multifamily Home Energy Savings***



ComEd-Nicor Gas  
MFHES EPY4-GPY1 Ev

## **5.3 *Elementary Energy Education***



Nicor ComEd EPY4  
GPY1 EEE Report 201

## **5.4 *Home Energy Savings***



Nicor ComEd  
EPY4-GPY1 HES Evalu

## **5.5 *Home Energy Efficiency Rebates***



Nicor ComEd Rpt  
HEER Draft Final 2011

## **5.6 *Residential New Construction***



Nicor-ComEd  
GPY1-EPY4 Residenti

## **5.7 *Behavioral Energy Savings Pilot***



Nicor GPY1  
Behavioral Energy Sa

## **5.8 *Small Business Energy Savings***



ComEd-Nicor Gas  
EPY4-GPY1 SBES EMV

## **5.9 *Business Energy Efficiency Rebates***



Nicor Gas BEER  
Program GPY1 Evalua

## **5.10 *Business Custom***



Nicor Gas Business  
Custom Incentive Pro

## **5.11 *Retro-Commissioning***



JointUtil PY4 rCx Eval  
Report 2013-01-14 Fi

## **5.12 *Business New Construction***



CI New Construction  
EPY4-GPY1 EMV Repe

## **5.13 *Building Performance with Energy Star***



Nicor - R30 - BPwES -  
Evaluation Report - F

## **5.14 *Economic Redevelopment***



Nicor Gas Economic  
Redevelopment Progr

## **5.15 *Emerging Technologies***



Nicor GPY1 Emerging  
Technologies Program