



Memorandum

**To:** Jim Jerozal, Steve Grzenia, Nicor Gas; David Nichols, Dan Snyder, Mike Butkus, ComEd; Jennifer Hinman, David Brightwell, ICC Staff

**From:** Laura Tabor, Navigant Consulting, Inc.

**CC:** Scott Dimetrosky, Ted Weaver; Mike Topitzhofer, Aaron Riendeau, Residential Science Resources

**Date:** January 28, 2015

**Re:** GPY3/EPY6 Joint Residential New Construction Program Impact Findings

This memorandum presents impact findings from the Nicor Gas/ComEd GPY3/EPY6 Joint Residential New Construction (RNC) program evaluation.

**SUMMARY OF FINDINGS**

Navigant applied verified gross realization rates of 91 percent for therm savings and 92 percent for kWh savings, yielding total verified gross savings of 232,557 therms and 507,943 kWh. For GPY3/EPY6, the planning NTGR value of 0.80 was approved through a consensus process by the Illinois Stakeholder Advisory Group. Navigant estimated GPY3/EPY6 results by applying the realization rates for each type of home from the GPY2/EPY5 impact evaluation.

**Table 1. GPY3/EPY6 Impact Results for the Residential New Construction Program**

Category	Nicor Gas Energy Savings (therms)	ComEd Energy Savings (kWh)	ComEd Demand Savings (kW)
Ex Ante Gross Savings	256,445	554,001	NA
Ex Ante Net Savings	205,156	443,201	NA
Verified Gross Savings	232,557	507,943	133.24
Net to Gross Ratio (NTGR)		0.80	
Verified Net Savings	186,046	406,355	106.6

*Source: Navigant analysis of ComEd program tracking data*

Navigant found low penetration for the five prescriptive electric measures offered by ComEd. ENERGY STAR® refrigerators were the most common measure: builders installed them in over 30 percent of homes. The tracking data also showed that the percent of homes with prescriptive electric measures installed did not vary greatly between ComEd joint homes and Nicor Gas only homes.

**Table 2. GPY3/EPY6 RNC Program Volumetric Findings**

Measure		Joint Homes	Nicor	All
			Gas Only Homes	Homes
ECM Furnace Motor	Count	16	5	21
	%	2.01%	3.79%	2.26%
Air Conditioner >=14.5 SEER	Count	11	0	11
	%	1.38%	0.00%	1.18%
ENERGY STAR® Refrigerator	Count	269	69	338
	%	33.71%	52.27%	36.34%
ENERGY STAR® Exhaust Fan	Count	0	0	0
	%	0.00%	0.00%	0.00%
100% CFL/ENERGY STAR® Lighting	Count	0	0	0
	%	0.00%	0.00%	0.00%
Total Homes	Count	798	132	930

Source: Navigant analysis of ComEd program tracking data

## INRODUCTION

### Program Description

The Residential New Construction Program is jointly offered by Nicor Gas and Commonwealth Edison (ComEd). Nicor Gas is the lead utility as the majority of the avoided costs are from natural gas savings. Residential Science Resources (RSR) implements the program for both utilities. The program launched in early 2012 and did not claim savings in the first program year, but ex ante gross savings estimates exceeded both gas and electric savings targets for GPY2/EPY5 and again in GPY3/EPY6. 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 as well as whole-home electricity savings.

The program relies on networks of builders and HERS raters to improve 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 weighted towards the raters. The Residential New Construction 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 percent over an equivalent code-compliant new home based on REM/Rate modeling. The residential energy code in effect in Illinois was IECC 2009 through December 2012. The residential energy code IECC 2012 was in effect beginning in January 2013.

### Evaluation Questions

The GPY3/EPY6 impact evaluation sought to answer the following key researchable questions.

1. What are the gross annual natural gas and electric energy and demand savings induced by the program? Did the program meet its energy and demand savings goals? If not, why not?

2. Does or will the upcoming report by the Midwest Energy Efficiency Alliance (MEEA) provide sufficient data for the program to claim savings below the IECC 2012 code?

### **Evaluation Methods**

The GPY2/EPY5 evaluation used a rigorous approach of calibrated energy simulation to determine verified gross realization rates for therm and kWh savings and to estimate gross kW savings.<sup>1</sup> Since the Illinois residential energy code changed for buildings permitted after January 2013, the GPY3/EPY6 program year saw a mix of homes that qualified under IECC 2009 and IECC 2012 codes. Although the majority of homes were built under IECC 2012 code, there was not yet sufficient billing data to perform a rigorous evaluation with the calibrated simulation method.<sup>2</sup> As the calculation method for determining ex ante savings did not change for GPY3 and EPY6, the evaluation team applied the GPY2/EPY5 realization rates to the ex ante savings to determine verified gross impacts for GPY3/EPY6. The evaluation team plans to conduct calibrated simulation analysis again in GPY4/EPY7, when we expect that there will be a large enough number of homes completed under the IECC 2012 code with sufficient billing data for a robust analysis.

Before applying the verified gross realization rates, Navigant reviewed the tracking database to confirm the number of homes incented through each code and within the following groups which Navigant built aggregate models for in GPY2/EPY5:

- Single Story Detached
- Single Story Attached
- Two or More Story Detached
- Two or More Story Attached

### **EVALUATION RESULTS**

This section includes the verified gross kWh savings realization rate.

#### **Gross Savings**

Navigant analyzed homes by grouping them into four “model bins.” There were a total of 930 homes in the GPY3/EPY6 program. Table 3 below shows the total number of homes completed in each of the four bins. Nineteen percent of GPY3/EPY6 homes were built under IECC 2009 code and 81 percent were built under IECC 2012 code.

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<sup>1</sup> There were no ex ante kW savings estimates in EPY5, so a realization rate cannot be applied. For EPY6, Navigant adjusted ex post kW estimates for IECC 2012 homes based on the difference between IECC 2009 and IECC 2012 home average kWh savings.

<sup>2</sup> For best results, this approach requires at least one year of billing data per home, thus the evaluation team elected to wait for GPY4/EPY7 for the next simulation analysis.

**Table 3. Total GPY3/EPY6 Residential New Construction Homes Completed**

Model Bin	Joint Homes Completed	Nicor Gas Only Homes Completed	Total Homes Completed
Detached 1 Story	107	50	157
Detached 2+ Story	355	23	378
Attached 1 Story	49	33	82
Attached 2+ Story	287	26	313
<b>Total</b>	<b>798</b>	<b>132</b>	<b>930</b>

Source: Navigant analysis of ComEd program tracking data

For Nicor Gas, the GPY3/EPY6 Residential New Construction program achieved verified gross savings of 232,557 therms and a verified gross realization rate of 91 percent for therm savings. Table 4 below shows natural gas results as well as the applied realization rates for each model bin.

**Table 4. Nicor Gas Ex Ante and Verified Gross Therm Savings by Model Bin**

Model Bin	Ex Ante Gross Therm Savings per Home	Verified Gross Therm Savings per Home	Ex Ante Total Gross Therm Savings	Gross Realization Rate*	Verified Gross Therm Savings
Detached 1 Story	311	323	48,848	104%	50,769
Detached 2+ Story	393	340	148,412	86%	128,339
Attached 1 Story	143	142	11,698	100%	11,671
Attached 2+ Story	152	133	47,487	88%	41,778
<b>Total</b>	<b>276</b>	<b>276</b>	<b>256,445</b>	<b>91%</b>	<b>232,557</b>

\*From GPY2/EPY5 analysis.

Source: Navigant analysis of ComEd program tracking data

For ComEd, the GPY3/EPY6 Residential New Construction program achieved verified gross savings of 507,943 kWh and a verified gross realization rate of 92 percent for kWh savings. Table 5 below shows electric results as well as the applied realization rates for each model bin.

**Table 5. ComEd Ex Ante and Verified Gross kWh Savings by Model Bin**

Model Bin	Ex Ante Gross kWh Savings per Home	Verified Gross kWh Savings per Home	Ex Ante Total Gross kWh Savings	Gross Realization Rate*	Verified Gross kWh Savings
Detached 1 Story	655	758	70,032	116%	81,053
Detached 2+ Story	859	733	304,983	85%	260,109
Attached 1 Story	447	397	21,914	89%	19,449
Attached 2+ Story	547	513	157,072	94%	147,332
<b>Total</b>	<b>694</b>	<b>637</b>	<b>554,001</b>	<b>92%</b>	<b>507,943</b>

\*From GPY2/EPY5 analysis.

Source: Navigant analysis of ComEd program tracking data

The GPY3/EPY6 Residential New Construction program achieved evaluation research gross demand reduction of 133.24 kW. Table 6 shows evaluation research demand reduction estimates by model bin, both per home and overall. Navigant’s evaluation research estimates include all end uses.

**Table 6: ComEd Researched Gross Demand Reduction by Model Bin**

Model Bin	Gross kW Savings per Home	Gross kW Savings
Detached 1 Story	0.23	24.40
Detached 2+ Story	0.18	62.93
Attached 1 Story	0.12	5.75
Attached 2+ Story	0.14	40.16
<b>Total</b>	<b>0.17</b>	<b>133.24</b>

Source: Navigant analysis of ComEd program tracking data

### Net Savings

For GPY3/EPY6, the jointly implemented RNC program achieved verified net savings of 186,046 therms for Nicor Gas and verified net savings of 406,355 kWh for ComEd. Evaluation research net demand reduction was 106.6 kW. The planning NTGR value of 0.80 used for this evaluation was approved through a consensus process by the Illinois Stakeholder Advisory Group.

### **Code Compliance**

To date, MEEA’s code compliance report for Illinois and IECC 2012 is not available for review. The team will review and follow-up with any additional findings in a separate memo once it is available. This report is expected to provide a code compliance rate for the residential IECC 2012 code, and may also include supporting data which could inform baseline adjustments for the new construction program.

## **FINDINGS AND CONCLUSIONS**

The evaluation team conducted a limited evaluation in GPY3/EPY6 with no process research beyond program staff interviews. The team has the following findings for this program year:

**Finding 1.** The program exceeded participation and gas and electric savings targets again in GPY3/EPY6 despite operating with a more stringent residential energy code.

**Finding 2.** As in GPY2/EPY5, the program experienced low participation levels of prescriptive electric measures.

**Recommendation.** Provide additional marketing material or sales pitch ideas to help builders and raters to increase the prevalence of these measures.

**Recommendation.** Estimate savings for all electric measures through whole-home models in order to more accurately capture whole-home savings and interactive effects.