



# Nicor Gas and ComEd Residential New Construction Impact Evaluation Report

**Energy Efficiency / Demand Response Plan:  
Program Year 2019 (CY2019)  
(1/1/2019-12/31/2019)**

**Presented to  
ComEd  
Nicor Gas**

**FINAL**

April 8, 2020

***Prepared by:***

**Jake Millette  
Zach Ross  
Opinion Dynamics**





## Nicor Gas and ComEd Residential New Construction Impact Evaluation Report

### Submitted to:

ComEd  
2011 Swift Drive  
Oak Brook, IL 60523

Nicor Gas Company  
1844 Ferry Road  
Naperville, IL 60563

### Submitted by:

Guidehouse (which acquired Navigant in 2019)  
150 N. Riverside Plaza, Suite 2100  
Chicago, IL 60606

### Contact:

Randy Gunn, Partner  
312.583.5714  
randy.gunn@guidehouse.com

Jeff Erickson, Director  
608.616.4962  
jeff.erickson@guidehouse.com

Kevin Grabner, Associate Director  
608.616.5805  
kevin.grabner@guidehouse.com

Nishant Mehta, Managing Consultant  
608.616.5823  
nishant.mehta@guidehouse.com

Disclaimer: This report was prepared by Guidehouse for ComEd and Nicor Gas. The work presented in this report represents Guidehouse's professional judgment based on the information available at the time this report was prepared. Use of this report by any other party for whatever purpose should not, and does not, absolve such party from using due diligence in verifying the report's contents. Neither Guidehouse nor any of its subsidiaries or affiliates assumes any liability or duty of care to such parties, and hereby disclaims any such liability.

## TABLE OF CONTENTS

1. Introduction .....	1
2. Program Description .....	1
3. Program Savings Detail .....	2
4. Cumulative Persisting Annual Savings .....	4
5. Program Savings by Measure .....	6
6. Impact Analysis Findings and Recommendations .....	8
6.1 Impact Parameter Estimates .....	8
6.2 Other Impact Findings and Recommendations .....	9
7. Appendix 3. Total Resource Cost Detail .....	10

## LIST OF TABLES AND FIGURES

Figure 2-1. Number of Participants by Tier .....	2
Figure 4-1. Cumulative Persisting Annual Savings .....	6
Figure 5-1. Verified Net Savings by Measure – Electric .....	7
Figure 5-2. Verified Net Savings by Measure – Gas .....	8
Table 2-1. CY2019 Volumetric Findings Detail .....	1
Table 2-2. Number of Homes by Tier Level Comparison (GPY5/EPY8 – CY2019) .....	2
Table 3-1. CY2019 Total Annual Incremental Electric Savings .....	3
Table 3-2. CY2019 Total Annual Incremental Therm Savings .....	3
Table 4-1. Cumulative Persisting Annual Savings (CPAS) – Electric .....	5
Table 5-1. CY2019 Energy Savings by Measure – Electric .....	7
Table 5-2. CY2019 Summer Peak Demand Savings by Measure .....	7
Table 5-3. CY2019 Energy Savings by Measure – Nicor Gas .....	8
Table 6-1. Savings Parameters .....	9
Table 7-1. Total Resource Cost Savings Summary for ComEd .....	10
Table 7-2. Total Resource Cost Savings Summary for Nicor Gas .....	11

## 1. INTRODUCTION

This report presents the results of the impact evaluation of the joint Nicor Gas and ComEd CY2019 Residential New Construction (RNC) Program. It presents a summary of the program structure as well as program total and measure-level energy and demand impacts. CY2019 covers January 1, 2019 through December 31, 2019.

## 2. PROGRAM DESCRIPTION

Nicor Gas and ComEd jointly offer the RNC Program. Nicor Gas is the lead utility, as most of the avoided costs come from natural gas savings. Residential Science Resources (RSR) implemented the program for Nicor Gas, while Slipstream (formerly known as Seventhwave) implemented the program for ComEd.

At the beginning of the third quarter of CY2018, the program introduced a lower level tier that required homes to achieve, at minimum, 15% better than code compared to the initial minimum 20% requirement. The program ranks homes in one of the following tiers based on performance:

- Tier 1: 15.00-19.99% above code (new in CY2018)
- Tier 2: 20.00-24.99% above code (Tier 1 in GPY6/EPY9)
- Tier 3: 25.00-29.99% above code (Tier 2 in GPY6/EPY9)
- Tier 4: 30.00% or more above code (Tier 3 in GPY6/EPY9)

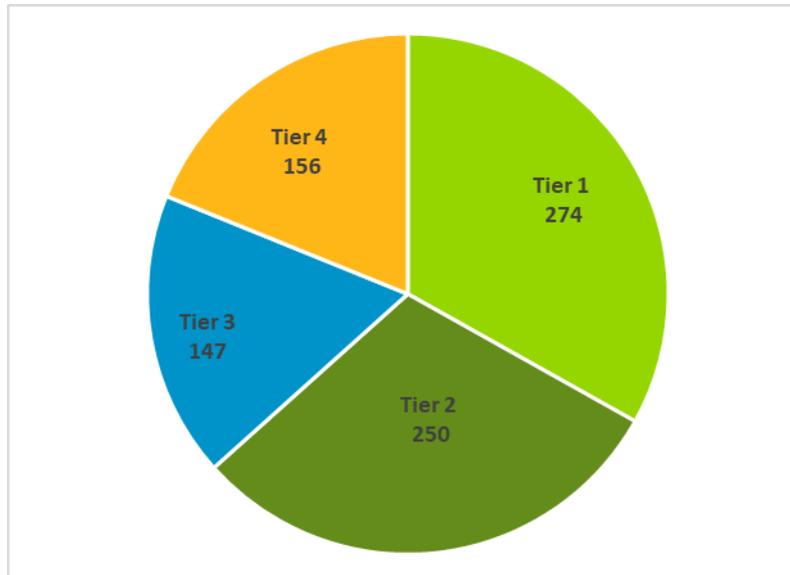
The RNC Program included a total of 827 homes in CY2019, with 95% in joint Nicor Gas and ComEd service territory. Most of the remaining 5% were in Nicor Gas territory only with only five projects (<1%) ComEd customers only. Thirty builders and eight Home Energy Rating Score (HERS) rating companies completed homes in CY2019, similar to the level of activity from CY2018. One rating company, Energy Diagnostics Inc., accounted for 85% of homes. Two builders, DR Horton and MI Homes, built 38% and 37% of homes, respectively.

The following table and figure show the number of homes in each tier.

**Table 2-1. CY2019 Volumetric Findings Detail**

Participation	Joint ComEd/ Nicor Gas Homes	Nicor Gas Only Homes	ComEd Only Homes	Total Homes
Tier 1	260	14	0	274
Tier 2	246	4	0	250
Tier 3	134	13	0	147
Tier 4	147	4	5	156
Total	787	35	5	827

Source: ComEd tracking data and evaluation team analysis

**Figure 2-1. Number of Participants by Tier**


Source: ComEd tracking data and evaluation team analysis

Table 2-2 shows the number of homes in each tier from GPY5/EPY8 through CY2019. Tier 1 homes made up the largest share of homes (33%), a sizeable increase from CY2018, while the share of Tier 3 homes decreased substantially. Note that due to the inclusion of the bridge period, GPY6/EPY9 was a 19-month period, as compared to a 12-month period for other program years, and participation was accordingly higher in that program year.

**Table 2-2. Number of Homes by Tier Level Comparison (GPY5/EPY8 – CY2019)**

Participation Category	CY2019 Total Homes	CY2019 Share of Total*	CY2018 Total Homes	CY2018 Share of Total*	CY2018 GPY6/EPY9 Total Homes	CY2018 GPY6/EPY9 Share of Total*	GPY5/EPY8 Total Homes	GPY5/EPY8 Share of Total*
Tier 1	274	33%	87	13%	0	0%	0	0%
Tier 2	250	30%	258	37%	570	40%	443	49%
Tier 3	147	18%	220	32%	594	42%	323	36%
Tier 4	156	19%	130	19%	260	18%	129	14%
<b>Total</b>	<b>827</b>	<b>100%</b>	<b>695</b>	<b>100%</b>	<b>1,424</b>	<b>100%</b>	<b>895</b>	<b>100%</b>

\* Values may not sum exactly due to rounding.

Source: Navigant analysis of ComEd and Nicor Gas CY2019, CY2018, GPY6/EPY9, and GPY5/EPY8 program tracking data

### 3. PROGRAM SAVINGS DETAIL

Table 3-1 summarizes the incremental energy and demand savings the RNC Program achieved in CY2019. Table 3-2 shows the gas savings.

**Table 3-1. CY2019 Total Annual Incremental Electric Savings**

Savings Category	Energy Savings (kWh)	Non-Coincident Demand Savings (kW)	Summer Peak Demand Savings (kW)*
<b>Electricity</b>			
Ex Ante Gross Savings	518,095	NR	388
Program Gross Realization Rate	0.76	NA	0.77
Verified Gross Savings	395,948	NA	297
Program Net-to-Gross Ratio (NTG)	0.65	NA	0.65
Verified Net Savings	257,366	NA	193
<b>Converted from Gas</b>			
Ex Ante Gross Savings	NA	NA	NA
Program Gross Realization Rate	NA	NA	NA
Verified Gross Savings	NA	NA	NA
Program Net-to-Gross Ratio (NTG)	NA	NA	NA
Verified Net Savings	NA	NA	NA
<b>Total Electric Plus Gas</b>			
Ex Ante Gross Savings	518,095	NR	388
Program Gross Realization Rate	0.76	NA	0.77
Verified Gross Savings	395,948	NA	297
Program Net-to-Gross Ratio (NTG)	0.65	NA	0.65
Verified Net Savings	257,366	NA	193

NR = Not reported (refers a piece of data that was not reported, i.e., non-coincident demand savings)

NA = Not applicable (refers a piece of data cannot be produced or does not apply)

\* The coincident summer peak period is defined as 1:00-5:00 p.m. Central Prevailing Time on non-holiday weekdays, June through August.

Source: ComEd tracking data and evaluation team analysis

**Table 3-2. CY2019 Total Annual Incremental Therm Savings**

Savings Category	Nicor Gas (therms)
<b>Natural Gas*</b>	
Ex Ante Gross Savings	224,752
Program Gross Realization Rate	1.20
Verified Gross Savings	269,467
Program Net-to-Gross Ratio (NTG)	0.65
Verified Net Savings	175,154

\* Natural gas savings include interactive effects.

Source: ComEd and Nicor Gas tracking data and Navigant team analysis.

#### **4. CUMULATIVE PERSISTING ANNUAL SAVINGS**

Table 4-1 and Figure 4-1 show the measure-specific and total verified gross savings for the RNC Program and the cumulative persisting annual savings (CPAS) for the measures installed in CY2019. The net electric CPAS across all measures installed in 2019 is 257,366 kWh (Table 4-1). The evaluation team found no gas savings for this program attributable to ComEd and as such electric CPAS is equivalent to total CPAS.



# Nicor Gas and ComEd Residential New Construction Impact Evaluation Report

**Table 4-1. Cumulative Persisting Annual Savings (CPAS) – Electric**

End Use Type	Research Category	EUL	CY2019 Verified Gross Savings (kWh)	NTG*	Lifetime Net Savings (kWh)†	Verified Net kWh Savings									
						2018	2019	2020	2021	2022	2023	2024	2025	2026	
Whole Home	Tier 1	18.0	96,237	0.65	1,125,973		62,554	62,554	62,554	62,554	62,554	62,554	62,554	62,554	
Whole Home	Tier 2	18.0	116,294	0.65	1,360,640		75,591	75,591	75,591	75,591	75,591	75,591	75,591	75,591	
Whole Home	Tier 3	18.0	70,100	0.65	820,170		45,565	45,565	45,565	45,565	45,565	45,565	45,565	45,565	
Whole Home	Tier 4	18.0	113,317	0.65	1,325,809		73,656	73,656	73,656	73,656	73,656	73,656	73,656	73,656	
CY2019 Program Total Electric Contribution to CPAS			395,948		4,632,592		257,366	257,366	257,366	257,366	257,366	257,366	257,366	257,366	
Historic Program Total Electric Contribution to CPAS‡						232,516	232,516	232,516	232,516	232,516	232,516	232,516	232,516	232,516	
Program Total Electric CPAS						232,516	489,882	489,882	489,882	489,882	489,882	489,882	489,882	489,882	
CY2019 Program Incremental Expiring Electric Savings§															
Historic Program Incremental Expiring Electric Savings‡§															
Program Total Incremental Expiring Electric Savings§															

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Whole Home	Tier 1	62,554	62,554	62,554	62,554	62,554	62,554	62,554	62,554	62,554	62,554				
Whole Home	Tier 2	75,591	75,591	75,591	75,591	75,591	75,591	75,591	75,591	75,591	75,591				
Whole Home	Tier 3	45,565	45,565	45,565	45,565	45,565	45,565	45,565	45,565	45,565	45,565				
Whole Home	Tier 4	73,656	73,656	73,656	73,656	73,656	73,656	73,656	73,656	73,656	73,656				
CY2019 Program Total Electric Contribution to CPAS		257,366	257,366	257,366	257,366	257,366	257,366	257,366	257,366	257,366	257,366				
Historic Program Total Electric Contribution to CPAS‡		232,516	232,516	232,516	232,516	232,516	232,516	232,516	232,516	232,516					
Program Total Electric CPAS		489,882	489,882	489,882	489,882	489,882	489,882	489,882	489,882	489,882	257,366				
CY2019 Program Incremental Expiring Electric Savings§		-	-	-	-	-	-	-	-	-	-	257,366			
Historic Program Incremental Expiring Electric Savings‡§		-	-	-	-	-	-	-	-	-	232,516				
Program Total Incremental Expiring Electric Savings§		-	-	-	-	-	-	-	-	-	232,516	257,366			

Note: The green highlighted cell shows program total first year electric savings. The gray cells are blank, indicating values irrelevant to the CY2019 contribution to CPAS.

\* A deemed value. Source: is to be found on the IL SAG web site here: [https://www.ilsag.info/ntg\\_2019](https://www.ilsag.info/ntg_2019).

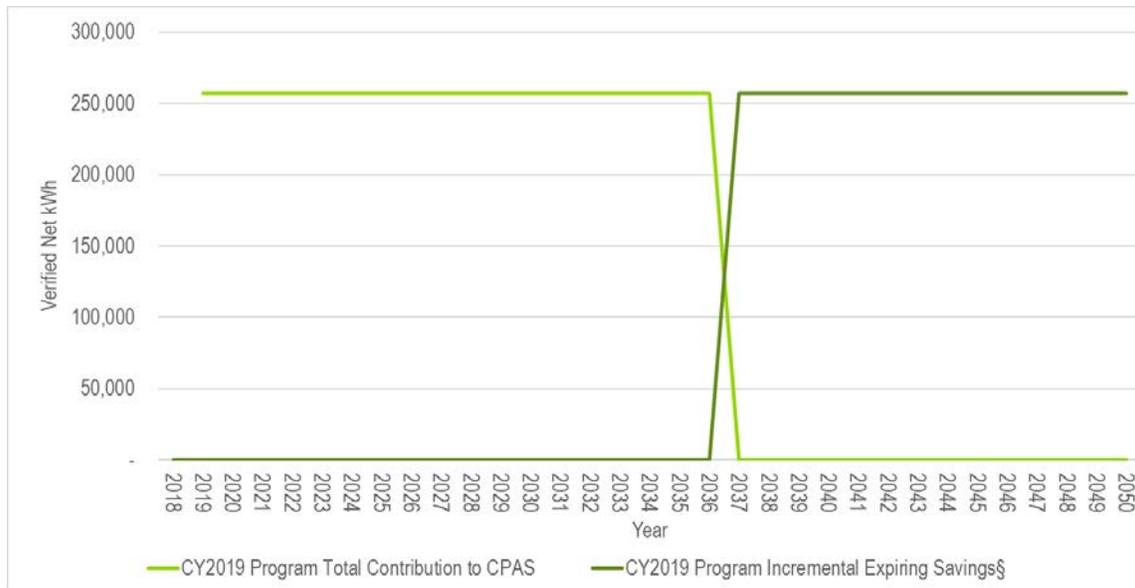
† Lifetime savings are the sum of CPAS savings through the EUL.

‡ Historical savings go back to CY2018

§ Incremental expiring savings are equal to CPAS Y<sub>n-1</sub> - CPAS Y<sub>n</sub>

Source: Evaluation team analysis

**Figure 4-1. Cumulative Persisting Annual Savings**



\* Expiring savings are equal to CPAS  $Y_{n-1}$  - CPAS  $Y_n$   
 Source: Evaluation team analysis

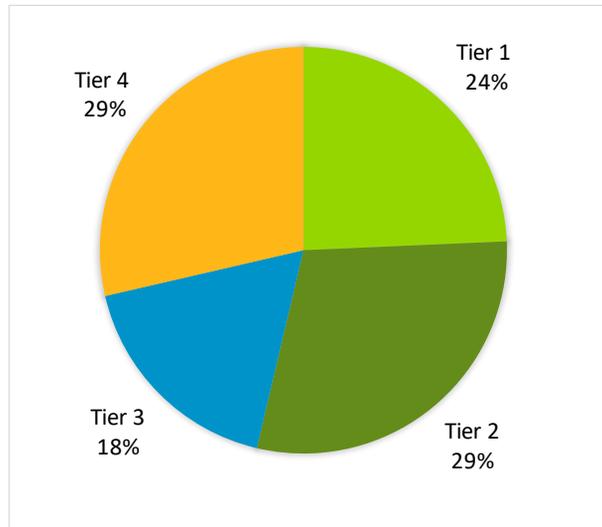
## 5. PROGRAM SAVINGS BY MEASURE

The RNC Program includes four home performance tiers that vary by performance above code. The evaluation team calculated verified savings using realization rates for each tier derived from calibrated simulations conducted for the CY2018 evaluation. The CY2018 evaluation report provides additional detail on the development of the calibrated simulations that led to the realization rates reported here.<sup>1</sup> All savings values include interactive effects. In GPY5/EPY8, the evaluation team conducted the analysis with and without interactive effects and found that the impact on savings was insignificant – the weighted average per home savings was reduced by 0.6% for gas savings and increased by 0.6% for electric savings.

Figure 5-1 and Table 5-1 summarize the electric energy savings from the RNC Program by tier, while Table 5-2 and Table 5-3 show summer peak demand savings and gas savings, respectively. Figure 5-1 illustrates that Tier 2 and Tier 4 homes contributed the greatest electric savings (29% each of total verified net kWh savings). Figure 5-2 shows that Tier 2 homes accounted for the largest share of gas savings (31% of total verified net therms savings).

<sup>1</sup> CY2018 Nicor Gas and ComEd Residential New Construction Impact Evaluation Report, pages 9-16. April 25, 2019. Accessed at: [https://s3.amazonaws.com/lsag/Nicor\\_Gas\\_and\\_ComEd\\_RNC\\_CY2018\\_Impact\\_Evaluation\\_Report\\_2019-04-25\\_Final.pdf](https://s3.amazonaws.com/lsag/Nicor_Gas_and_ComEd_RNC_CY2018_Impact_Evaluation_Report_2019-04-25_Final.pdf)

**Figure 5-1. Verified Net Savings by Measure – Electric**



Source: ComEd tracking data and evaluation team analysis

**Table 5-1. CY2019 Energy Savings by Measure – Electric**

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)	EUL (years)
Whole Home	Tier 1	127,316	0.76	96,237	0.65	62,554	18.0
Whole Home	Tier 2	154,111	0.75	116,293	0.65	75,591	18.0
Whole Home	Tier 3	94,927	0.74	70,100	0.65	45,565	18.0
Whole Home	Tier 4	141,741	0.80	113,317	0.65	73,656	18.0
<b>Total</b>		<b>518,095</b>	<b>0.76</b>	<b>395,948</b>	<b>0.65</b>	<b>257,366</b>	<b>18.0</b>

\* A deemed value. Source is to be found on the Illinois SAG web site here: [https://www.ilsag.info/htg\\_2019](https://www.ilsag.info/htg_2019).

Source: ComEd tracking data and evaluation team analysis

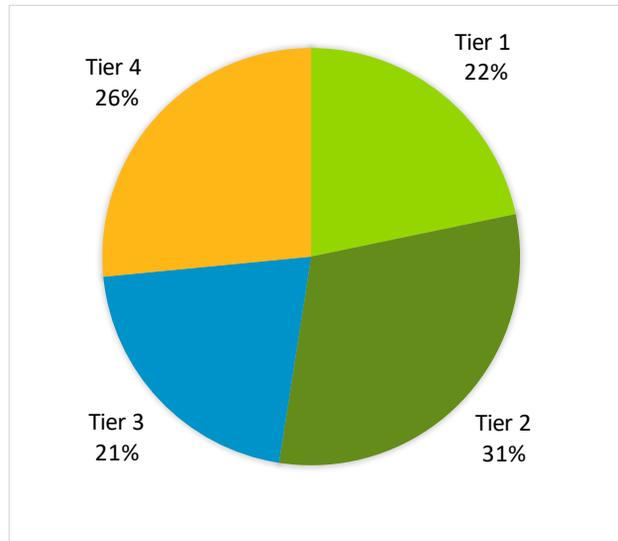
**Table 5-2. CY2019 Summer Peak Demand Savings by Measure**

End Use Type	Research Category	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Peak Demand Reduction (kW)	NTG*	Verified Net Peak Demand Reduction (kW)
Whole Home	Tier 1	79.96	0.76	60.44	0.65	39.29
Whole Home	Tier 2	105.07	0.75	79.29	0.65	51.54
Whole Home	Tier 3	71.06	0.74	52.48	0.65	34.11
Whole Home	Tier 4	131.45	0.80	105.09	0.65	68.31
<b>Total</b>		<b>387.54</b>	<b>0.77</b>	<b>297.29</b>	<b>0.65</b>	<b>193.24</b>

\* A deemed value. Source is to be found on the Illinois SAG web site here: [https://www.ilsag.info/htg\\_2019](https://www.ilsag.info/htg_2019).

Note: Values may not sum exactly due to rounding

Source: ComEd tracking data and evaluation team analysis

**Figure 5-2. Verified Net Savings by Measure – Gas**


Source: ComEd tracking data and evaluation team analysis

**Table 5-3. CY2019 Energy Savings by Measure – Nicor Gas**

End Use Type	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate	Verified Gross Savings (Therms)	NTG*	Verified Net Savings (Therms)	EUL (years)
Whole Home	Tier 1	44,015	1.33	58,666	0.65	38,133	18.0
Whole Home	Tier 2	61,956	1.34	82,830	0.65	53,839	18.0
Whole Home	Tier 3	50,249	1.13	56,553	0.65	36,759	18.0
Whole Home	Tier 4	68,532	1.04	71,418	0.65	46,422	18.0
<b>Total</b>		<b>224,752</b>	<b>1.20</b>	<b>269,467</b>	<b>0.65</b>	<b>175,154</b>	<b>18.0</b>

\* A deemed value. Source is to be found on the Illinois SAG web site here: [https://www.ilsag.info/htg\\_2019](https://www.ilsag.info/htg_2019).

Source: Nicor Gas and ComEd tracking data and evaluation team analysis

## 6. IMPACT ANALYSIS FINDINGS AND RECOMMENDATIONS

### 6.1 Impact Parameter Estimates

The lifetime energy and demand savings are estimated by multiplying the verified savings by the effective useful life for each measure.

The EM&V team conducted research to validate the parameters that were not specified in the Illinois TRM (TRM). The results are shown in the following table.

**Table 6-1. Savings Parameters**

Gross Savings Input Parameters	Value	Units	Deemed or Evaluated?	Source *
Home Quantity, Tier	Varies	# measures	Evaluated	Tracking database
NTG	Varies	0.65	Deemed	SAG Consensus
Verified Realization Rates	Varies	NA	Evaluated	Tracking database, calibrated energy simulation from CY2018
Effective Useful Life (EUL)	18.0	Years	Deemed	TRM v7.0

NA = Not applicable

\* TRM is the State of Illinois Technical Reference Manual version 7.0 from <http://www.ilsag.info/technical-reference-manual.html>. The NTG values can be found on the Illinois SAG web site here: [https://www.ilsag.info/ntg\\_2019](https://www.ilsag.info/ntg_2019).

## 6.2 Other Impact Findings and Recommendations

The evaluation team developed findings from the CY2019 evaluation, as follows:

**Finding 1.** The CY2019 RNC Program achieved 257,366 kWh of verified net energy savings and 175,154 therms of verified net gas savings. The overall verified program realization rate was 76% for electric energy savings and 120% for gas savings.



## Nicor Gas and ComEd Residential New Construction Impact Evaluation Report

### 7. APPENDIX 3. TOTAL RESOURCE COST DETAIL

Table 7-1 and Table 7-2 show the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of finalizing this impact evaluation report. Additional required cost data (e.g., measure costs, program level incentive and non-incentive costs) are not included in these tables and will be provided to the evaluation team later.

**Table 7-1. Total Resource Cost Savings Summary for ComEd**

End Use Type	Research Category	Units	Quantity	EUL (years)*	ER Flag†	Verified Gross Electric Energy Savings (kWh)	Verified Gross Peak Demand Reduction (kW)	Verified Gross Gas Savings (Therms)	Gross Heating Penalty (kWh)	Gross Heating Penalty (Therms)	NTG (kWh)	NTG (kW)	NTG (Therms)	Verified Net Electric Energy Savings (kWh)	Verified Net Peak Demand Reduction (kW)	Verified Net Gas Savings (Therms)	Net Heating Penalty (kWh)	Net Heating Penalty (Therms)
Whole Home	Tier 1	Home	274	18.0	No	96,237	60.44	0	NA	NA	0.65	0.65	0.65	62,554	39.29	0	NA	NA
Whole Home	Tier 2	Home	250	18.0	No	116,293	79.29	0	NA	NA	0.65	0.65	0.65	75,591	51.54	0	NA	NA
Whole Home	Tier 3	Home	147	18.0	No	70,100	52.48	0	NA	NA	0.65	0.65	0.65	45,565	34.11	0	NA	NA
Whole Home	Tier 4	Home	156	18.0	No	113,317	105.09	0	NA	NA	0.65	0.65	0.65	73,656	68.31	0	NA	NA
<b>Total</b>			<b>827</b>	<b>18.0</b>		<b>395,948</b>	<b>297.29</b>	<b>0</b>	<b>NA</b>	<b>NA</b>	<b>0.65</b>	<b>0.65</b>	<b>0.65</b>	<b>257,366</b>	<b>193.24</b>	<b>0</b>	<b>NA</b>	<b>NA</b>

NA = Not applicable

\* The total of the EUL column is the weighted average measure life (WAML), and is calculated as the sum product of EUL and measure savings divided by total program savings.

† Early Replacement (ER) measures are flagged as YES, otherwise a NO is indicated in the column.

Source: Nicor Gas and ComEd tracking data and evaluation team analysis



## Nicor Gas and ComEd Residential New Construction Impact Evaluation Report

**Table 7-2. Total Resource Cost Savings Summary for Nicor Gas**

End Use Type	Research Category	Units	Quantity	EUL (years)*	ER Flag†	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	NTG (Therms)	Verified Net Savings (Therms)
Whole Home	Tier 1	Home	274	18.0	No	44,015	58,666	0.65	38,133
Whole Home	Tier 2	Home	250	18.0	No	61,956	82,829.70	0.65	53,839
Whole Home	Tier 3	Home	147	18.0	No	50,249	56,553.04	0.65	36,759
Whole Home	Tier 4	Home	156	18.0	No	68,532	71,418.39	0.65	46,422
<b>Total</b>			<b>827</b>	<b>18.0</b>		<b>224,752</b>	<b>269,467</b>	<b>0.65</b>	<b>175,154</b>

NA = Not applicable

\* The total of the EUL column is the weighted average measure life (WAML), and is calculated as the sum product of EUL and measure savings divided by total program savings.

† Early Replacement (ER) measures are flagged as YES, otherwise a NO is indicated in the column.

Source: Nicor Gas and ComEd tracking data and evaluation team analysis