



ComEd Assisted Living and Senior Housing Peak Reduction Efficiency IPA Program Impact Evaluation Report

Energy Efficiency / Demand Response Plan:
Plan Year 9 (PY9)

Presented to
ComEd

FINAL

June 20, 2018

Prepared by:

Charles Ampong
Navigant Consulting, Inc.

Kevin Foley
Navigant Consulting, Inc.

www.navigant.com

Submitted to:

ComEd
Three Lincoln Centre
Oakbrook Terrace, IL 60181

Submitted by:

Navigant Consulting, Inc.
150 N. Riverside, Suite 2100
Chicago, IL 60606

Contact:

Randy Gunn, Managing Director
312.583.5714
Randy.Gunn@Navigant.com

Jeff Erickson, Director
608.497.2322
Jeff.Erickson@Navigant.Com

Patricia Plympton, Associate Director
202.253.9356
Patricia.Plympton@navigant.com

Disclaimer: This report was prepared by Navigant Consulting, Inc. ("Navigant") for ComEd based upon information provided by ComEd and from other sources. 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 Navigant 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	2
2. Program Description	2
3. Program Savings.....	3
4. Program Savings by Measure.....	3
5. Impact Analysis Findings and Recommendations	6
5.1 Impact Parameter Estimates.....	6
5.1 Other Impact Findings and Recommendations.....	7
6. Appendix 1. Impact Analysis Methodology	9
6.1 Verified Gross Program Savings Analysis Approach.....	9
6.2 Verified Net Program Savings Analysis Approach.....	9
7. Appendix 2. Impact Analysis Detail.....	10
8. Appendix 3. Total Resource Cost Detail	12

LIST OF TABLES AND FIGURES

Figure 2-1. Percentage of Measures Installed by Type	3
Table 2-1. PY9 Volumetric Findings Detail	2
Table 3-1. PY9 Total Annual Incremental Savings	3
Table 4-1. PY9 Energy Savings by Measure	4
Table 4-2. PY9 Demand Savings by Measure.....	5
Table 4-3. PY9 Peak Demand Savings by Measure	6
Table 5-1. Verified Gross Savings Parameters.....	7
Table 5-2. Tracking Baseline F40T12 Fixture and TLED Efficient Wattage Values	8
Table 7-1. PY9 Measure-Level Summary for Measures with Non-100% Gross Realization Rates	10
Table 8-1. Total Resource Cost Savings Summary.....	12

1. INTRODUCTION

This report presents the results of the impact evaluation of ComEd's PY9 Elevate Energy Assisted Living and Senior Housing Peak Reduction Efficiency IPA Program. It presents a summary of the energy and demand impacts for the total program and broken out by relevant measure and program structure details. The appendix presents the impact analysis methodology. PY9 covered June 1, 2016 through December 31, 2017.

2. PROGRAM DESCRIPTION

The Elevate Energy Assisted Living and Senior Housing Peak Reduction Efficiency Program was an IPA program that identified and implemented electric measures that supported peak load reductions in senior housing and assisted living facilities. The electric measures included common area lighting, commercial lighting, and refrigeration. The program focused on assisted living facilities and senior/elderly housing in ComEd's service territory with peak demand of 100 kW or less. The program was implemented by Elevate Energy who coordinated program activities, including leveraging existing building owner relationships, conducting direct outreach to new owners, and engaging partners who referred owner contacts to Elevate Energy.

The program had 22 participants in PY9 and distributed 2,603 measures, involving 25 work orders or projects, as shown in the following table and figure.

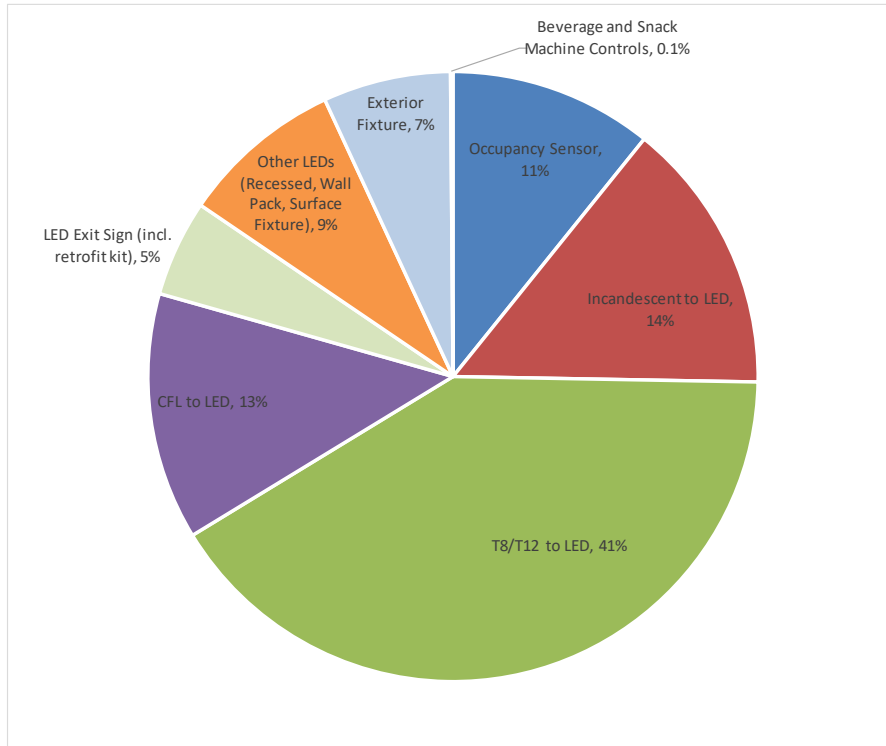
Table 2-1. PY9 Volumetric Findings Detail

Participation	PY9 Results
Participants	22
Total Measures	2,603
Installed Projects	25

Source: ComEd tracking data and Navigant team analysis.

Figure 2-1 disaggregates the distributed measures by measure mix. The T8/T12 retrofits to LED were 41 percent of the retrofits, followed by incandescent to LED (14 percent), and CFL to LED (13 percent). Other measures included exit signs, occupancy sensors, and exterior fixtures which contributed 32 percent of the retrofits.

Figure 2-1. Percentage of Measures Installed by Type



Source: Evaluation Analysis

3. PROGRAM SAVINGS

Table 3-1 summarizes the incremental energy and demand savings the Housing Peak Reduction Program achieved in PY9.

Table 3-1. PY9 Total Annual Incremental Savings

Savings Category	Energy Savings (kWh)	Demand Savings (kW)	Peak Demand Savings (kW)
Ex Ante Gross Savings	1,200,829	N/A	130
Program Gross Realization Rate	107%	N/A	103%
Verified Gross Savings	1,285,910	250	134
Program Net-to-Gross Ratio (NTGR)	0.95	0.95	0.95
Verified Net Savings	1,221,614	237	127

* The implementation contractor did not report ex ante demand savings in the tracking data.

Source: ComEd tracking data and Navigant team analysis.

4. PROGRAM SAVINGS BY MEASURE

The program included 20 measures as shown in the following table. The 2-Lamp LED and 4-Lamp LED measures contributed the most energy savings. The individual installations were separated into measures with similar equipment types. For example, the “Incandescent to LED” measure consists of many retrofits of incandescent bulbs to LEDs with varying baseline wattages. Installations of LEDs replacing 40W, 60W, 75W, 150W, 200W, and many other incandescent lamps are included in this measure.

Table 4-1. PY9 Energy Savings by Measure

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTGR *	Verified Net Savings (kWh)	Technical Measure Life	Persistence	Effective Useful Life (EUL) †
Lighting	Incandescent to LED	145,250	124%	179,610	0.95	170,629	12	N/A	12
Lighting	Commercial LED Exit Signs	81,647	100%	81,647	0.95	77,565	16	N/A	16
Lighting	Occupancy Sensor Lighting Controls	160,862	100%	160,862	0.95	152,819	8	N/A	8
Lighting	Exterior LED Fixtures	181,246	100%	181,938	0.95	172,841	14	N/A	14
Lighting	2-Lamp T8/T12 to 2-Lamp Relamp/Reballast HPT8	3,808	100%	3,807	0.95	3,617	9	N/A	9
Lighting	3-Lamp T8/T12 to Relamp/Reballast HPT8	436	100%	436	0.95	414	9	N/A	9
Lighting	LED Recessed Lighting Fixture	24,935	100%	24,934	0.95	23,687	9	N/A	9
Lighting	1-Lamp T8/T12 to Relamp/Reballast LED or Fixture	46,051	140%	64,595	0.95	61,365	9	N/A	9
Lighting	3-Lamp T8/T12 to Relamp/Reballast TLED	12,280	113%	13,821	0.95	13,130	9	N/A	9
Lighting	4-Lamp T8/T12 to Relamp/Reballast TLED	178,708	116%	207,693	0.95	197,309	9	N/A	9
Lighting	2-Lamp T8/T12 to Relamp/Reballast LED	51,361	114%	58,636	0.95	55,704	9	N/A	9
Lighting	Exit Sign Retrofit Kit	21,428	101%	21,727	0.95	20,640	16	N/A	16
Lighting	LED Wall Pack	38,831	84%	32,762	0.95	31,124	14	N/A	14
Lighting	U Lamp T8/T12 to LED	1,488	100%	1,488	0.95	1,413	9	N/A	9
Lighting	Circuline Lamp to LED Surface Fixture	30,480	103%	31,289	0.95	29,724	9	N/A	9
Lighting	LED Linear U Lamp	189,413	100%	190,103	0.95	180,598	9	N/A	9
Lighting	LED Globe	1,899	100%	1,899	0.95	1,804	12	N/A	12
Lighting	LED Recessed Can Kit	682	88%	598	0.95	568	9	N/A	9
Lighting	LED Flood	15,963	88%	14,003	0.95	13,303	14	N/A	14
Lighting	CFL to LED	10,493	100%	10,493	0.95	9,969	12	N/A	12
Refrigeration	Beverage and Snack Machine Controls	3,569	100%	3,569	0.95	3,390	5	N/A	5
Total ‡		1,200,829	107%	1,285,910	0.95	1,221,614			

* A deemed value. Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

† EUL was calculated by dividing the lamp life in hours by the annual operating hours, both found in the TRM. If specified in the TRM, deemed lifetime was used.

‡ Totals may not sum exactly due to rounding.

Source: ComEd tracking data and Navigant team analysis.

Table 4-2. PY9 Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Demand Reduction (kW)	Verified Gross Realization Rate *	Verified Gross Demand Reduction (kW)	NTGR†	Verified Net Demand Reduction (kW)
Lighting	Incandescent to LED	N/A	N/A	25.19	0.95	23.93
Lighting	Commercial LED Exit Signs	N/A	N/A	12.48	0.95	11.85
Lighting	Occupancy Sensor Lighting Controls	N/A	N/A	75.35	0.95	71.58
Lighting	Exterior LED Fixtures	N/A	N/A	37.11	0.95	35.25
Lighting	2-Lamp T8/T12 to 2-Lamp Relamp/Reballast HPT8	N/A	N/A	0.62	0.95	0.59
Lighting	3-Lamp T8/T12 to Relamp/Reballast HPT8	N/A	N/A	0.10	0.95	0.09
Lighting	LED Recessed Lighting Fixture	N/A	N/A	3.37	0.95	3.20
Lighting	1-Lamp T8/T12 to Relamp/Reballast LED or Fixture	N/A	N/A	7.58	0.95	7.20
Lighting	3-Lamp T8/T12 to Relamp/Reballast TLED	N/A	N/A	1.92	0.95	1.83
Lighting	4-Lamp T8/T12 to Relamp/Reballast TLED	N/A	N/A	27.21	0.95	25.85
Lighting	2-Lamp T8/T12 to Relamp/Reballast LED	N/A	N/A	8.23	0.95	7.82
Lighting	Exit Sign Retrofit Kit	N/A	N/A	4.39	0.95	4.17
Lighting	LED Wall Pack	N/A	N/A	6.68	0.95	6.35
Lighting	U Lamp T8/T12 to LED	N/A	N/A	0.23	0.95	0.21
Lighting	Circuline Lamp to LED Surface Fixture	N/A	N/A	5.66	0.95	5.37
Lighting	LED Linear U Lamp	N/A	N/A	27.57	0.95	26.19
Lighting	LED Globe	N/A	N/A	0.88	0.95	0.84
Lighting	LED Recessed Can Kit	N/A	N/A	0.12	0.95	0.12
Lighting	LED Flood	N/A	N/A	2.86	0.95	2.71
Lighting	CFL to LED	N/A	N/A	2.01	0.95	1.91
Refrigeration	Beverage and Snack Machine Controls	N/A	N/A	0.41	0.95	0.39
	Total‡	N/A	N/A	250	0.95	237

* The implementation contractors did not report ex ante demand savings in the tracking data.

† A deemed value. Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

‡ Totals may not sum exactly due to rounding.

Source: ComEd tracking data and Navigant team analysis.

Table 4-3. PY9 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)	NTGR*	Verified Net Peak Demand Reduction (kW)
Lighting	Incandescent to LED	14.7	113%	16.6	0.95	15.8
Lighting	Commercial LED Exit Signs	8.2	100%	8.2	0.95	7.8
Lighting	Occupancy Sensor Lighting Controls	49.7	100%	49.7	0.95	47.2
Lighting	Exterior LED Fixtures	0.0	NA	0.0	0.95	0.0
Lighting	2-Lamp T8/T12 to 2-Lamp Relamp/Reballast HPT8	0.5	87%	0.4	0.95	0.4
Lighting	3-Lamp T8/T12 to Relamp/Reballast HPT8	0.1	100%	0.1	0.95	0.1
Lighting	LED Recessed Lighting Fixture	2.3	102%	2.4	0.95	2.3
Lighting	1-Lamp T8/T12 to Relamp/Reballast LED or Fixture	4.9	101%	5.0	0.95	4.8
Lighting	3-Lamp T8/T12 to Relamp/Reballast TLED	1.1	115%	1.3	0.95	1.2
Lighting	4-Lamp T8/T12 to Relamp/Reballast TLED	16.7	108%	18.0	0.95	17.1
Lighting	2-Lamp T8/T12 to Relamp/Reballast LED	4.9	112%	5.4	0.95	5.2
Lighting	Exit Sign Retrofit Kit	3.0	95%	2.9	0.95	2.7
Lighting	LED Wall Pack	0.0	NA	0.0	0.95	0.0
Lighting	U Lamp T8/T12 to LED	0.1	100%	0.1	0.95	0.1
Lighting	Circuline Lamp to LED Surface Fixture	3.8	98%	3.7	0.95	3.5
Lighting	LED Linear U Lamp	18.1	100%	18.2	0.95	17.3
Lighting	LED Globe	0.6	100%	0.6	0.95	0.6
Lighting	LED Recessed Can Kit	0.0	NA	0.0	0.95	0.0
Lighting	LED Flood	0.0	NA	0.0	0.95	0.0
Lighting	CFL to LED	1.3	100%	1.3	0.95	1.3
Refrigeration	Beverage and Snack Machine Controls	0.0	NA	0.0	0.95	0.0
	Total†	130	103%	134	0.95	127

* A deemed value. Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

† Totals may not sum exactly due to rounding.

Source: ComEd tracking data and Navigant team analysis.

5. IMPACT ANALYSIS FINDINGS AND RECOMMENDATIONS

5.1 Impact Parameter Estimates

Energy savings for lighting measures were estimated using the following formula as specified in the TRM:

$$\Delta kWh = ((Watts_{base} - Watts_{EE}) / 1000) * Hours * WHF_e * ISR$$

Where:

Watts_{base} = Input wattage of the existing or baseline system.

Watts_{EE} = Actual wattage of fixture installed.

Hours = Average hours of use per year from the Reference Table in Section 4.5 of the TRM.

W_{HFe} = Waste heat factor for energy to account for cooling energy savings from efficient lighting from the Reference Table in Section 4.5 of the TRM.

ISR = In Service Rate - the percentage of units rebated that actually get installed.

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

The evaluation team conducted research to validate the parameters that were not specified in the TRM. For measures not included in the TRM, the team used specification sheets and audit reports to confirm baseline and efficient wattages. The results are shown in the following table.

Table 5-1. Verified Gross Savings Parameters

Gross Savings Input Parameters	Value	Deemed* or Evaluated?
Quantity	Varies	Evaluated
Measure Type and Eligibility	Varies	Deemed
Gross Savings per Unit, Sampled Deemed Measures	Varies	Deemed
Gross Savings per Unit, Sampled Non-Deemed Measures	Varies	Evaluated
Verified Realization Rate on Ex-Ante Gross Savings	Varies	Evaluated

* State of Illinois Technical Reference Manual version 5.0 from <http://www.ilsag.info/technical-reference-manual.html>.

5.1 Other Impact Findings and Recommendations

The following describes the key program findings and recommendations.

Finding 1: For the various F40T12 baseline fixtures, Navigant used wattages from the IL TRM to calculate the savings when relamped/reballasted to TLED measures. Navigant found that the baseline values in the tracking data were inconsistent with values found in the TRM. Navigant received specification sheets and audit details (“Audit Detail – Pines of Edgewater (TLEDs Type C)”) for the TLED efficient wattages, but the information received did not match the tracking data. Table 5-2 shows the tracking data wattage for the baseline T12 and efficient TLED measures, and comments outlining discrepancies between the TRM, specification sheets, audit details, and the tracking data.

Table 5-2. Tracking Baseline F40T12 Fixture and TLED Efficient Wattage Values

Measure	Tracking Baseline Wattage	Tracking Efficient Wattage	Baseline Evaluation Comments	Efficient Evaluation Comments
1-Lamp F40T12 (Mag) to 1-Lamp Relamp/Reballast TLED	30	15	TRM description of base measure has 51W.	Specs of efficient measure provided in "Audit Detail - Pines of Edgewater (TLEDs Type C)" has 12.5W.
2-Lamp F40T12 (Mag) to 1-Lamp Relamp/Reballast TLED	82	18	TRM description of base measure has 97W.	Specs of efficient measure provided in "Audit Detail - Pines of Edgewater (TLEDs Type C)" has 12.5W.
2-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	82	14	TRM description of base measure has 97W.	Specs of efficient measure provided in "Audit Detail - Pines of Edgewater (TLEDs Type C)" has 25W.
2-Lamp F96T12 (Mag) to 4-Lamp Relamp/Reballast TLED	165	64	TRM description of base measure has 165W.	Specs of efficient measure provided in "Audit Detail - Pines of Edgewater (TLEDs Type C)" has 50W.
3-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	110	41	TRM description of base measure has 135W.	Specs of efficient measure provided in "Audit Detail - Pines of Edgewater (TLEDs Type C)" has 25W.
4-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	164	36	TRM description of base measure has 175W.	Specs of efficient measure provided in "Audit Detail - Pines of Edgewater (TLEDs Type C)" has 25W.

Base and efficient wattage values found in the file ComEd PY9 Assist Sr Liv IPA Program Tracking Data Request_final (version 1)
 Source: Navigant analysis of tracking data.

Recommendation 1: Document the rationale to use different baseline and efficient wattages than what are in the TRM, specification sheets, and audit details for the F40T12 (Magnetic ballast) fixtures for the TLED retrofits.

Finding 2: The wattages used in the tracking database for approximately five Incandescent to LED retrofits were incorrect. For example, there was one instance for the Incandescent 60W Exit Sign to LED Exit Sign measure where an incorrect baseline wattage was used. In other instances where the savings equations were not provided in the tracking data, Navigant used the baseline and efficient wattages provided in TRM, specification sheets, and the audit details and arrived at different energy savings using all sources.

Recommendation 2: Use wattages provided in the TRM and specification sheets, and provide documentation showing the source of the baseline and efficient wattages used. When looking up wattages, first use the TRM. If values are not in the TRM, next check specification sheets and any audit details provided.

Finding 3: Navigant found that some measures in the tracking data used incorrect hours of operation. For example, the Circuline Lamp to LED Surface Fixture measure used the "screw bulb" hours of operation instead of the "fixture" hours of operation.

Recommendation 3: Double-check that lighting measures use the correct hours of operation as specified in the IL TRM. Per the IL TRM, the following annual hours of operation apply to lighting measures:

- Fixture: 7,862 hours
- Screw Bulb: 5,950 hours
- Exterior (dusk to dawn): 4,903 hours

Finding 4: In reviewing the calculations, Navigant found that for some measures there was a discrepancy between the HVAC interactive effects and the annual hours of operation in the savings equation. The LED Flood, LED Recessed Can Kit, and LED Wall Pack measures used exterior lighting annual hours of operation in the savings equation (4,903 hours), indicating these measures were installed outdoors. However, they are also used HVAC interactive effects for interior spaces equal to 1.14 in the same equation.

Recommendation 4: Double-check that lighting measures use the correct HVAC interactive effect values as specified in the IL TRM. The HVAC interactive effect values should coincide with the proper annual hours of operation (as shown in Recommendation 3). Per the IL TRM, the following HVAC interactive effect values apply to lighting measures:

- Energy HVAC interactive effect (interior): 1.14
- Demand HVAC interactive effect (interior): 1.30
- Energy HVAC interactive effect (exterior): 1.00
- Demand HVAC interactive effect (exterior): 1.00

6. APPENDIX 1. IMPACT ANALYSIS METHODOLOGY

6.1 Verified Gross Program Savings Analysis Approach

Navigant determined verified gross savings for each program measure by:

1. Reviewing the savings algorithm inputs in the measure workbook for agreement with the TRM or secondary research.
2. Validating that the savings algorithm was applied correctly.
3. Cross-checking per-unit savings values in the tracking data with the verified values in the measure workbook or in Navigant's calculations if the workbook did not agree with the TRM.
4. Multiplying the verified per-unit savings value by the quantity reported in the tracking data.

6.2 Verified Net Program Savings Analysis Approach

Navigant calculated verified net energy and demand (coincident peak and overall) savings by multiplying the verified gross savings estimates by a net-to-gross ratio (NTGR). In PY9, the NTGR estimates used to calculate the net verified savings were based on past evaluation research and defined by a consensus process through SAG, as documented in a spreadsheet.¹

¹ Source ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

7. APPENDIX 2. IMPACT ANALYSIS DETAIL

The following table shows energy savings and peak demand savings for measures that have greater than or less than 100% realization rates.

Table 7-1. PY9 Measure-Level Summary for Measures with Non-100% Gross Realization Rates

Measure	Quantity Installed	Ex Ante kWh Unit Savings	Ex Ante kW Unit Peak Savings	Verified kWh Unit Savings	Verified kW Unit Peak Savings	Gross kWh Realization Rate	Gross kW Peak Realization Rate
LED 2x4 Recessed Light Fixture, 4501-6000 lumens (54.3W)	8	439	0.040	439	0.042	100%	105%
LED 2x4 Recessed Light Fixture, 4501-6000 lumens (54.3W)	13	439	0.040	439	0.042	100%	105%
2-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast HPT8	7	317	0.039	317	0.030	100%	78%
1-Lamp F40T12 (Mag) to 1-Lamp Relamp/Reballast TLED	14	134	0.013	345	0.033	257%	257%
3-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	2	618	0.059	986	0.094	159%	159%
4-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	47	1,147	0.110	1344	0.129	117%	117%
2-Lamp F40T12 (Mag) to 1-Lamp Relamp/Reballast TLED	19	574	0.055	757	0.073	132%	132%
3-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	4	618	0.059	820	0.079	133%	133%
4-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	4	1,147	0.110	1344	0.129	117%	117%
2-Lamp F96T12 (Mag) to 4-Lamp Relamp/Reballast TLED	27	905	0.087	1031	0.099	114%	114%
2-Lamp F40T12 (Mag) to 1-Lamp Relamp/Reballast TLED	1	609	0.035	757	0.073	124%	206%
1-Lamp F40T12 (Mag) to 1-Lamp Relamp/Reballast TLED	21	134	0.013	345	0.033	257%	257%
2-Lamp F40T12 (Mag) to 1-Lamp Relamp/Reballast TLED	41	574	0.055	757	0.073	132%	132%
4-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	85	1,147	0.110	1344	0.129	117%	117%
24/7 9W A19 LED	117	323	0.028	510	0.044	158%	156%
9W A19 LED	42	219	0.028	346	0.044	158%	156%
24/7 4.6W B11 LED	40	337	0.029	354	0.030	105%	105%
4.6W B11 LED	4	229	0.029	240	0.030	105%	105%
4.5W G25 LED	8	229	0.029	241	0.031	106%	105%
2-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	17	545	0.052	645	0.062	118%	119%
LED A 7W Screw-in	4	360	0.031	530	0.045	147%	147%
LED A 7W Screw-in	8	244	0.031	530	0.045	217%	147%

Measure	Quantity Installed	Ex Ante kWh Unit Savings	Ex Ante kW Unit Peak Savings	Verified kWh Unit Savings	Verified kW Unit Peak Savings	Gross kWh Realization Rate	Gross kW Peak Realization Rate
Exit Sign Retro Kit LED 4.5W (Chicago Approv)	2	337	0.026	487	0.056	144%	213%
LED Wall Pack 40W	5	1,986	0.000	1201	0.000	60%	N/A
2-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	7	580	0.050	645	0.062	111%	124%
2-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	15	520	0.050	645	0.062	124%	124%
Based on actual specs LED Exterior Fixtures 128W existing to 18W LED	12	512	0.000	539	0.000	105%	N/A
Based on actual specs LED Exterior Fixtures 188W existing to 26W LED	13	755	0.000	794	0.000	105%	N/A
4-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	6	1,147	0.110	1344	0.129	117%	117%
2-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	10	430	0.041	645	0.062	150%	150%
2-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	5	430	0.041	645	0.062	150%	150%
LED Surface Fixt 2x9-Watt (18 Watt)	20	237	0.031	278	0.027	117%	86%
Based on actual specs LED Exterior Fixture 295W existing to 80W LED	1	1,202	0.000	1054	0.000	88%	N/A
LED Wallpack 26-Watt	3	1,056	0.000	927	0.000	88%	N/A
LED Rec Can Kit 14W (exterior)	2	341	0.000	299	0.000	88%	N/A
LED Wallpack 26-Watt	1	576	0.000	505	0.000	88%	N/A
LED Wallpack 26-Watt	1	1,056	0.000	927	0.000	88%	N/A
LED Flood 18W	1	374	0.000	329	0.000	88%	N/A
LED Flood 26W	1	1,056	0.000	927	0.000	88%	N/A
LED Wallpack 26W	12	1,056	0.000	927	0.000	88%	N/A
LED Flood 150W	8	1,817	0.000	1593	0.000	88%	N/A
LED Linear Tube 4' Bi-Pin (2-Lamp) New Driver (Type C)	2	1,147	0.110	1246	0.119	109%	109%
LED Linear Tube 4' Bi-Pin (2-Lamp) New Driver (Type C)	5	1,147	0.110	1246	0.119	109%	109%
4-Lamp F40T12 (Mag) to 2-Lamp Relamp/Reballast TLED	5	1,147	0.110	1344	0.129	117%	117%
Exit Sign Retro Kit LED 4.5W (Chicago Approv)	3	311	0.026	311	0.036	100%	137%
Exit Sign Retro Kit LED 4.5W (Chicago Approv)	22	83	0.026	83	0.010	100%	37%
4-Lamp F40T12 (139W) to 2-Lamp Relamp/Reballast TLED (30W) (24/7)	4	1,089	0.050	1089	0.094	100%	188%
1-Lamp 4'T8 (32W) to 1-Lamp LED Cooler Fixture (18W) (24/7)	9	140	0.050	140	0.012	100%	24%
1-Lamp 4'T12 (48W) to 1-Lamp LED Cooler Fixture (18W) (24/7)	2	300	0.050	300	0.026	100%	52%

Measure	Quantity Installed	Ex Ante kWh Unit Savings	Ex Ante kW Unit Peak Savings	Verified kWh Unit Savings	Verified kW Unit Peak Savings	Gross kWh Realization Rate	Gross kW Peak Realization Rate
3-Lamp 4'T8 (100W) to 3-Lamp Relamp/Reballast TLED (40W) (24/7)	9	600	0.050	600	0.051	100%	103%
2' T12 (28W) to 2' Relamp/Reballast TLED (20W) (24/7)	4	80	0.050	80	0.007	100%	14%

Source: ComEd tracking data and Navigant team analysis.

8. APPENDIX 3. TOTAL RESOURCE COST DETAIL

Table 8-1 includes variables for the Total Resource Cost (TRC) test. It only includes analysis inputs available at the time of finalizing the PY9 Elevate Energy Assisted Living and Senior Housing Peak Reduction Efficiency Program impact evaluation report. Additional required data (e.g., measure costs, program level incentive and non-incentive costs) are not included in this table and will be provided to the evaluation team at a later date. EULs are not final and are subject to change.

Table 8-1. Total Resource Cost Savings Summary

End Use Type	Research Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (kWh)	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Savings (kWh)	Verified Gross Peak Demand Reduction (kW)
Lighting	Incandescent to LED	Lamp	320	12	145,250	14.67	179,610	16.63
Lighting	Commercial LED Exit Signs	Sign	257	16	81,647	8.23	81,647	8.23
Lighting	Occupancy Sensor Lighting Controls	Sensor	247	8	160,862	49.73	160,862	49.73
Lighting	Exterior LED Fixtures	Lamp	169	14	181,246	-	181,938	-
Lighting	2-Lamp T8/T12 to 2-Lamp Relamp/Reballast Lamp	Lamp	12	9	3,808	0.47	3,807	0.41
Lighting	3-Lamp T8/T12 to Relamp/Reballast HPT8	Lamp	1	9	436	0.06	436	0.06
Lighting	LED Recessed Lighting Fixture	Fixture	53	9	24,935	2.34	24,934	2.38
Lighting	1-Lamp T8/T12 to Relamp/Reballast LED c Fixture	Lamp	128	9	46,051	4.95	64,595	5.00
Lighting	3-Lamp T8/T12 to Relamp/Reballast TLED Lamp	Lamp	22	9	12,280	1.11	13,821	1.27
Lighting	4-Lamp T8/T12 to Relamp/Reballast TLED Fixture	Fixture	158	9	178,708	16.69	207,693	17.96
Lighting	2-Lamp T8/T12 to Relamp/Reballast LED	Lamp	216	9	51,361	4.86	58,636	5.43
Lighting	Exit Sign Retrofit Kit	Sign	117	16	21,428	3.04	21,727	2.89
Lighting	LED Wall Pack	Fixture	29	14	38,831	-	32,762	-
Lighting	U Lamp T8/T12 to LED	Lamp	3	9	1,488	0.15	1,488	0.15
Lighting	Circuline Lamp to LED Surface Fixture	Fixture	91	9	30,480	3.82	31,289	3.73
Lighting	LED Linear U Lamp	Lamp	342	9	189,413	18.13	190,103	18.20
Lighting	LED Globe	Lamp	8	12	1,899	0.58	1,899	0.58
Lighting	LED Recessed Can Kit	Fixture	2	9	682	-	598	-
Lighting	LED Flood	Lamp	10	14	15,963	-	14,003	-
Lighting	CFL to LED	Lamp	415	12	10,493	1.33	10,493	1.33
Refrigeration	Beverage and Snack Machine Controls	Control Unit	3	5	3,569	130.15	3,569	133.99

Source: ComEd tracking data and Navigant team analysis.