



ComEd Low Income Kit Energy Impact Evaluation Report

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

Presented to
Commonwealth Edison Company

FINAL

May 7, 2018

Prepared by:

Emma van Beuningen
Navigant

Christine Zook
Navigant

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

Chelsea Lamar, Managing Consultant
312.583.2673
Chelsea.Lamar@Navigant.com

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1. INTRODUCTION

This report presents the results of the impact evaluation of ComEd's PY9 Low Income Kit Energy (LIKE) Program. The report presents a summary of the energy and demand impacts for the total program and broken out by relevant measure detail. The appendices present the impact analysis methodology. PY9 covers June 1, 2016 through December 31, 2017.

2. PROGRAM DESCRIPTION

The University of Illinois at Chicago Energy Resources Center (UIC-ERC) implements the LIKE Program and jointly delivers the program with the Illinois Association of Community Action Agencies (IACAA). The program provides qualified customers with a kit containing energy-saving devices such as seven-plug advanced power strips, CFL light bulbs, and LED light bulbs. The kits also include educational information on additional energy-saving actions customers can take to reduce their energy bills. The target population is low income customers living in single family and small multi-family housing (two – four units) that are currently underserved by existing energy efficiency programs. Eligibility is limited to customers whose incomes are at or below 150% of the federal poverty line for their household size.

The IACAA is responsible for customer recruitment that takes place in the Community Action Agencies (CAA) facilities. Customers go to these facilities to receive assistance from several programs available to them and among those programs is the Low-Income Home Energy Assistance Program (LIHEAP). The LIHEAP has the same income-qualification requirements as the LIKE Program (need to be at or below 150% of the federal poverty line). After a customer provides proof they are eligible to participate in the LIHEAP (proof of income eligibility and receives electricity from ComEd), a CAA staff member will ask them if they would like to participate in the LIKE Program and receive a free energy efficiency kit. The customer will then fill out a form to receive the kit, receive a brochure explaining the kit contents, and have the kit hand-delivered to them on-site.

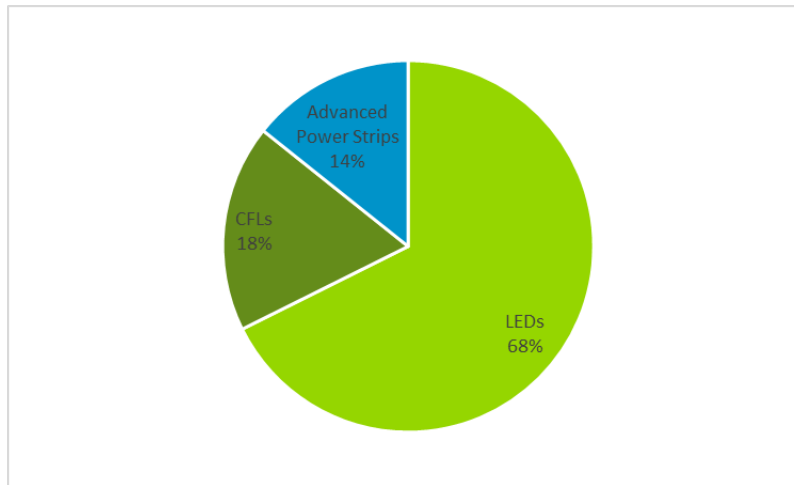
The program had 26,177 participants in PY9 and distributed 183,239 measures as shown in the following table and graph.

Table 2-1. PY9 Volumetric Findings Detail

Participation	Measures Distributed
Number of Total Kits Distributed	26,177
Number of Measures/Kit	7
Number of LEDs Distributed	123,990
Number of CFLs Distributed	33,072
Number of Advanced Power Strips Distributed	26,177
Number of Total Measure Distributed	183,239

Source: ComEd tracking data and Navigant team analysis.

Figure 2-1. Distribution of Measures Installed by Type



Source: Evaluation Analysis

3. PROGRAM SAVINGS

Table 3-1 summarizes the incremental energy and demand savings the LIKE 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	6,417,322	NR†	634
Program Gross Realization Rate	87%	NA	92%
Verified Gross Savings	5,581,491	4,861	581
Program Net-to-Gross Ratio (NTGR)	1.00	1.00	1.00
Verified Net Savings	5,581,491	4,861	581

†NR = not reported

Source: ComEd tracking data and Navigant team analysis.

4. PROGRAM SAVINGS BY MEASURE

The program offered three measures as shown in Table 4-1, Table 4-2, and Table 4-3. LEDs (49 percent of total energy savings) and advanced power strips (33 percent of total energy savings) contributed the most savings.

From June 2016 to May 2017, the kit contained one advanced power strip, four 9W LEDs, and two 23W CFLs. In May 2017, the program replaced the two 23W CFLs with two 15W LEDs.

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)†
Kits	CFL Lighting	960,262	100%	960,262	1.00	960,262	NA	NA	4
Kits	LED Lighting	2,760,829	100%	2,760,829	1.00	2,760,829	NA	NA	10
Kits	Advanced Power Strip	2,696,231	69%	1,860,399	1.00	1,860,399	NA	NA	4
Total		6,417,322	87%	5,581,491	1.00	5,581,491			

* 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 is a combination of technical measure life and persistence.

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)
Kits	CFL Lighting	NR†	NA	1,187	1.00	1,187
Kits	LED Lighting	NR	NA	3,413	1.00	3,413
Kits	Advanced Power Strip	NR	NA	261	1.00	261
Total		NR	NA	4,861	1.00	4,861

* 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>.

†NR = not reported

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 Peak Net Demand Reduction (kW)
Kits	CFL Lighting	96	100%	96	1.00	96
Kits	LED Lighting	276	100%	276	1.00	276
Kits	Advanced Power Strip	262	80%	209	1.00	209
Total		634	92%	581	1.00	581

* 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>.

Source: ComEd tracking data and Navigant team analysis.

5. IMPACT ANALYSIS FINDINGS AND RECOMMENDATIONS

5.1 Impact Parameter Estimates

Navigant estimated verified unit savings for each program measure using impact algorithm sources found in the version 5 of the Illinois Technical Reference Manual¹ (TRM v5.0). Table 5-1 presents the key parameters and the references used in the verified gross and net savings calculations. Detailed breakdown of the measure quantities and per unit savings values are provided in Appendix 2.

Table 5-1. Verified Gross Savings Parameters

Research Category	Ex Ante and Verified Gross Savings (kWh/unit)	Deemed or Evaluated?	Source
Quantity	Varies	Evaluated	Program Tracking Data
NTGR	1.00	Deemed	IL SAG Consensus*
CFL Installations	29.04		IL TRM v5.0 - Section 5.5†
LED Installations	Varies		IL TRM v5.0 - Section 5.5†
Advanced Power Strip	103.00		IL TRM v5.0 - Section 6.2‡

* 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>

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

‡ State of Illinois Technical Reference Manual version 6.0 from <http://www.ilsag.info/technical-reference-manual.html>

5.2 Other Impact Findings and Recommendations

Navigant reviewed the tracking data for quality and completeness and verified the savings for the program. Additionally, Navigant checked the quantities on the tracking data with the invoices and monthly reports.

Finding 1: When calculating the savings, the implementer did not use an in-service rate (ISR) for advanced power strips. Section 5.2.1 of the IL TRM v5.0 (Advanced Power Strip – Tier 1) states that the measure was developed to be applicable to time of sale, new construction, and direct install programs. When applied to other types of programs, the TRM states the measure savings should be verified. Because a kit program is not one of the applicable program types, Navigant verified the savings using version 6.0² of the Illinois Technical Reference Manual (TRM v6.0). TRM v6.0 is applicable to kit programs and includes an ISR of 69 percent. This resulted in a realization rate for this measure of 69%; see Appendix 2 for more detail.

Recommendation 1: The implementer should include an ISR of 69% when calculating energy and demand savings for advanced power strips for calendar year 2018.

¹ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 5.0, available at: <http://www.ilsag.info/technical-reference-manual.html>

² Illinois Statewide Technical Reference Manual for Energy Efficiency Version 6.0, available at: <http://www.ilsag.info/technical-reference-manual.html>

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 v5.0
2. Validating that savings algorithms were 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) of 1.0. In PY9, the LIKE Program's NTGR estimate was based on past evaluation research and defined by a consensus process through SAG, as documented in a spreadsheet.³

7. APPENDIX 2. IMPACT ANALYSIS DETAIL

Navigant downloaded the final tracking data and measure workbook for the LIKE PY9 impact evaluation from the ComEd Evaluation Share file site. We relied on the following documents to verify the per-unit savings for each program measure:

- Final PY9 monthly report file: "ComEd PY9 TPEP Monthly Report-UIC-ERC-LIKE-December 2017.xlsx"
- Illinois Technical Reference Manual (TRM v5.0) for deemed input parameters or secondary evaluation research to verify any custom inputs used in the ex ante calculations.
- Measure Data: "LIKE PY9-Final Measure Data.xlsx"; ComEd provided an updated dataset on 4/23/2018
- Implementer Savings Calculations: "LIKE_kWh Savings Calculation.xlsx"

The following sections provide an outline of the differences between the ex ante and verified savings estimates for each measure by end use. Each section contains a table that provides the quantity installed, ex ante and ex post values, and realization rates.

7.1 Lighting

The LED and CFL lighting included in the PY9 kits were 9W and 15W LEDs, as well as 23W CFLs. From June 2016 to May of 2017 the bulbs included in the kits were two 23W CFLs and four 9W LEDs. From June 2017 through the end of the year, the CFLs were replaced with two 15W LEDs so the kits included two 15W and four 9W LEDs. Overall, lighting has a realization rate of 100 percent and contributed to about 67 percent of the overall savings. Table 7-1 below shows the ex ante and verified gross per unit savings values.

³ 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>

Table 7-1. Per Unit Lighting Measures Impact Detail

Lighting Measure Detail	Unit Basis	Quantity Distributed	Ex Ante Gross Savings (kWh)	Verified Gross kWh Realization Rate	Verified Gross Savings (kWh)
9W LED	Each	104,708	20	100%	20
15W LED	Each	19,282	34	100%	34
23WCFL	Each	33,072	29	100%	29

Source: ComEd tracking data and Navigant team analysis.

7.2 Advanced Power Strips

The implementer did not use an ISR when calculating savings for the Advanced Power Strip. Section 5.2.1 of the IL TRM v5.0 (Advanced Power Strip – Tier 1) states that the measure was developed to be applicable to time of sale, new construction, and direct install programs. When applied to other types of programs, the TRM states the measure savings should be verified. Because a kit program is not one of the applicable program types, Navigant verified the savings using version 6.0⁴ of the Illinois Technical Reference Manual (TRM v6.0). TRM v6.0 is applicable to kit programs and includes an ISR of 69 percent. Table 7-2 below shows the ex ante and verified gross per unit savings values.

Table 7-2. Per Unit Advanced Power Strip Measures Impact Detail

Lighting Measure Detail	Unit Basis	Quantity Distributed	Ex Ante Gross Savings (kWh)	Verified Gross kWh Realization Rate	Verified Gross Savings (kWh)
Advanced Power Strip	Each	26,117	103	69%	71

Source: ComEd tracking data and Navigant team analysis.

8. APPENDIX 3. TOTAL RESOURCE COST DETAIL

Table 8-1, the Total Resource Cost (TRC) variable table, only includes cost-effectiveness analysis inputs available at the time of finalizing the PY9 LIKE impact evaluation report. Additional required cost 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 later. EUL information in this table is subject to change and is not final.

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)
Kits	CFL Lighting	Lamp	33,072	4	960,262	96	960,262	96
Kits	LED Lighting	Lamp	123,990	10	2,760,829	276	2,760,829	276
Kits	Advanced Power Strip	Each	26,117	4	2,696,231	262	1,860,399	209

*Illinois Statewide Technical Reference Manual for Energy Efficiency Version 5.0, available at: <http://www.ilsag.info/technical-reference-manual.html>.

⁴ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 6.0, available at: <http://www.ilsag.info/technical-reference-manual.html>.