

ComEd Income Eligible Lighting Discounts Program Impact Evaluation Report

Energy Efficiency / Demand Response Plan:
Program Year 2018 (CY2018)
(1/1/2018-12/31/2018)

Presented to
ComEd

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Prepared by:

Amy Buege
Itron, Strategic Analytics

Ethan Barquest
Itron, Strategic Analytics





ComEd Income Eligible Lighting Discounts Program Impact Evaluation Report

Submitted to:

ComEd
Three Lincoln Centre
Oakbrook Terrace, IL 60181

Submitted by:

Navigant Consulting, Inc.
150 N. Riverside Plaza, 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 CY2018 Income Eligible Lighting Discounts Program. It presents a summary of the energy and demand impacts for the total program broken out by relevant measure and program structure details. The appendix presents the impact analysis methodology. CY2018 covers January 1, 2018 through December 31, 2018.

2. PROGRAM DESCRIPTION

The primary goal of the Income Eligible Lighting Discounts Program is to increase the market penetration of energy-efficient lighting within ComEd's Income Eligible customer population by providing incentives for bulbs purchased through various retail channels. The program also seeks to increase customer awareness and acceptance of energy-efficient lighting technologies through the distribution of educational materials. In CY2018, the Income Eligible Lighting Discounts Program offered incentives for the purchase of standard, reflector and specialty LED lamps, as well as LED fixtures. The Income Eligible Lighting Discounts Program targets retail sale channels that serve, in part or in full, ComEd residential customers with incomes at or below 80% of the Area Median Income.

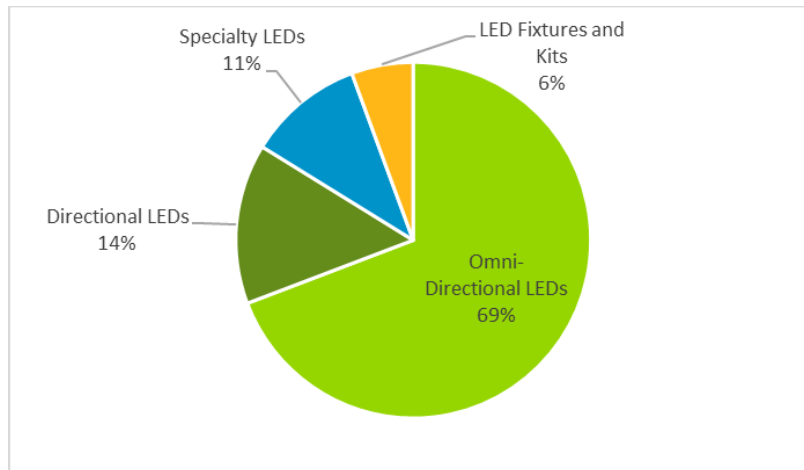
The CY2018 program incentivized over 1.14 million high efficiency LED lamps and fixtures. This included 790,289 omni-directional LEDs, 166,226 directional LEDs, 120,758 specialty LEDs, and 64,260 LED fixtures and retrofit kits. The majority of these lamps and fixtures (92%) are projected to be installed in CY2018. Table 2-1 also provides the volume of bulbs sold in CY2018 that are expected to be installed in CY2019 and CY2020 (carryover). Estimates of CY2019 and CY2020 carryover savings are provided in Section 7.3.

Table 2-1. CY2018 Volumetric Findings Detail

Participation	Total	Omni- Directional LEDs	Directional LEDs	Specialty LEDs	LED Fixtures and Kits
CY2018 Incentivized Bulbs	1,141,533	790,289	166,226	120,758	64,260
CY2018 1 st Year Installed Bulbs	1,023,573	697,794	152,336	110,668	62,775
CY2018 Carryover – CY2019 Installs	38,682	32,070	3,808	2,766	38
CY2018 Carryover – CY2020 Installs	33,415	27,621	3,336	2,424	35

Source: ComEd tracking data and Navigant team analysis.

Figure 2-1. Income Eligible Lighting Discounts Number of Measures Installed by Type



Source: ComEd tracking data and Navigant team analysis.

3. PROGRAM SAVINGS DETAIL

Table 3-1 summarizes the incremental energy and demand savings the Income Eligible Lighting Discounts Program achieved in CY2018.

Table 3-1. CY2018 Total Annual Incremental Electric Savings

Savings Category	Energy Savings (kWh)	Demand Savings (kW)	Summer Peak Demand Savings (kW)	Winter Peak Demand Savings (kW)
Electricity				
Ex Ante Gross Savings	48,214,604	NA	NA	NA
Program Gross Realization Rate	0.96	NA	NA	NA
Verified Gross Savings	46,515,815	42,805	5,689	6,284
Program Net-to-Gross Ratio (NTG)	1.00	1.00	1.00	1.00
Verified Net Savings	46,515,815	42,805	5,689	6,284
Converted from Gas*				
Ex Ante Gross Savings	NA	NA	NA	NA
Program Gross Realization Rate	NA	NA	NA	NA
Verified Gross Savings	NA	NA	NA	NA
Program Net-to-Gross Ratio (NTG)	NA	NA	NA	NA
Verified Net Savings	NA	NA	NA	NA
Total Electric Plus Gas				
Ex Ante Gross Savings	48,214,604	NA	NA	NA
Program Gross Realization Rate	0.96	NA	NA	NA
Verified Gross Savings	46,515,815	42,805	5,689	6,284
Program Net-to-Gross Ratio (NTG)	1.00	1.00	1.00	1.00
Verified Net Savings	46,515,815	42,805	5,689	6,284

* There are no gas savings associated with this program

† NR = Not Reported

Note: The demand savings are equivalent to the reduction in kW of bulbs installed in 2018.

The coincident Summer Peak period is defined as 1-5 p.m. Central Prevailing Time on non-holiday weekdays, June through August. The Winter Peak Period is defined by PJM as the period from 6-8 a.m. and 5-7 p.m., Central Time Zone, between January 1 and February 28.

Source: ComEd tracking data and Navigant team analysis.

4. CUMULATIVE PERSISTING ANNUAL SAVINGS

The measure-specific and total ex ante gross savings for the Income Eligible Lighting Discounts Program and the cumulative persisting annual savings (CPAS) for the measures installed in CY2018 are shown in the following table and figure. The total CPAS across all measures installed in 2018 is 46,515,815 kWh. There are no gas savings associated with this program. As seen in the table below, standard (omni-directional) lamps have a significant reduction in net savings following the implementation of Energy Independence and Security Act (EISA) 2020. Additionally, future CPAS savings may see increased reductions in 2024 if the EISA standards are applied to specialty and reflector lamps. However, since there currently is uncertainty regarding the implementation of the EISA standards to these bulb types, a reduction in future savings has not been applied within the tables below in accordance with Version 6 of the Illinois Technical Reference Manual (TRM).

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

End Use Type	Research Category	EUL	CY2018 Verified Gross Savings	NTG*	Lifetime Net Savings†	Verified Net kWh Savings									
						2018	2019	2020	2021	2022	2023	2024	2025	2026	
Lighting	Standard LED (Residential)	10.0	22,699,929	1.00	129,738,860	22,699,929	22,699,929	22,699,929	8,805,582	8,805,582	8,805,582	8,805,582	8,805,582	8,805,582	
Lighting	Standard LED (Non-Residential)	4.6	5,577,096	1.00	20,192,012	5,577,096	5,577,096	5,577,096	2,163,424	1,297,301					
Lighting	Directional LED (Residential)	10.0	7,341,469	1.00	73,414,689	7,341,469	7,341,469	7,341,469	7,341,469	7,341,469	7,341,469	7,341,469	7,341,469	7,341,469	
Lighting	Directional LED (Non-Residential)	6.6	1,648,619	1.00	10,895,921	1,648,619	1,648,619	1,648,619	1,648,619	1,648,619	1,648,619	1,004,205			
Lighting	Specialty LED (Residential)	10.0	4,546,383	1.00	45,463,826	4,546,383	4,546,383	4,546,383	4,546,383	4,546,383	4,546,383	4,546,383	4,546,383	4,546,383	
Lighting	Specialty LED (Non-Residential)	4.5	888,940	1.00	3,986,696	888,940	888,940	888,940	888,940	430,936					
Lighting	LED Fixtures and Kits (Residential)	15.0	3,193,899	1.00	47,908,481	3,193,899	3,193,899	3,193,899	3,193,899	3,193,899	3,193,899	3,193,899	3,193,899	3,193,899	
Lighting	LED Fixtures and Kits (Non-Residential)	12.4	619,481	1.00	7,663,549	619,481	619,481	619,481	619,481	619,481	619,481	619,481	619,481	619,481	
CY2018 Program Total Electric CPAS			46,515,815		339,264,033	46,515,815	46,515,815	46,515,815	29,207,797	27,883,670	26,155,433	25,511,019	24,506,813	24,506,813	
CY2018 Program Expiring Electric Savings‡							-	-	17,308,018	18,632,145	20,360,382	21,004,796	22,009,001	22,009,001	

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	Standard LED (Residential)	8,805,582											
Lighting	Standard LED (Non-Residential)												
Lighting	Directional LED (Residential)	7,341,469											
Lighting	Directional LED (Non-Residential)												
Lighting	Specialty LED (Residential)	4,546,383											
Lighting	Specialty LED (Non-Residential)												
Lighting	LED Fixtures and Kits (Residential)	3,193,899	3,193,899	3,193,899	3,193,899	3,193,899	3,193,899						
Lighting	LED Fixtures and Kits (Non-Residential)	619,481	619,481	229,774	619,481								
CY2018 Program Total Electric CPAS		24,506,813	3,813,380	3,423,673	3,813,380	3,193,899	3,193,899	-	-	-	-	-	-
CY2018 Program Expiring Electric Savings‡		22,009,001	42,702,435	43,092,142	42,702,435	43,321,916	43,321,916	46,515,815	46,515,815	46,515,815	46,515,815	46,515,815	46,515,815

Note: The green highlighted cell shows program total first year electric savings.

* A deemed value. Source: ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, which is to be found on the Illinois Stakeholder Advisory Group (IL SAG) web site here:

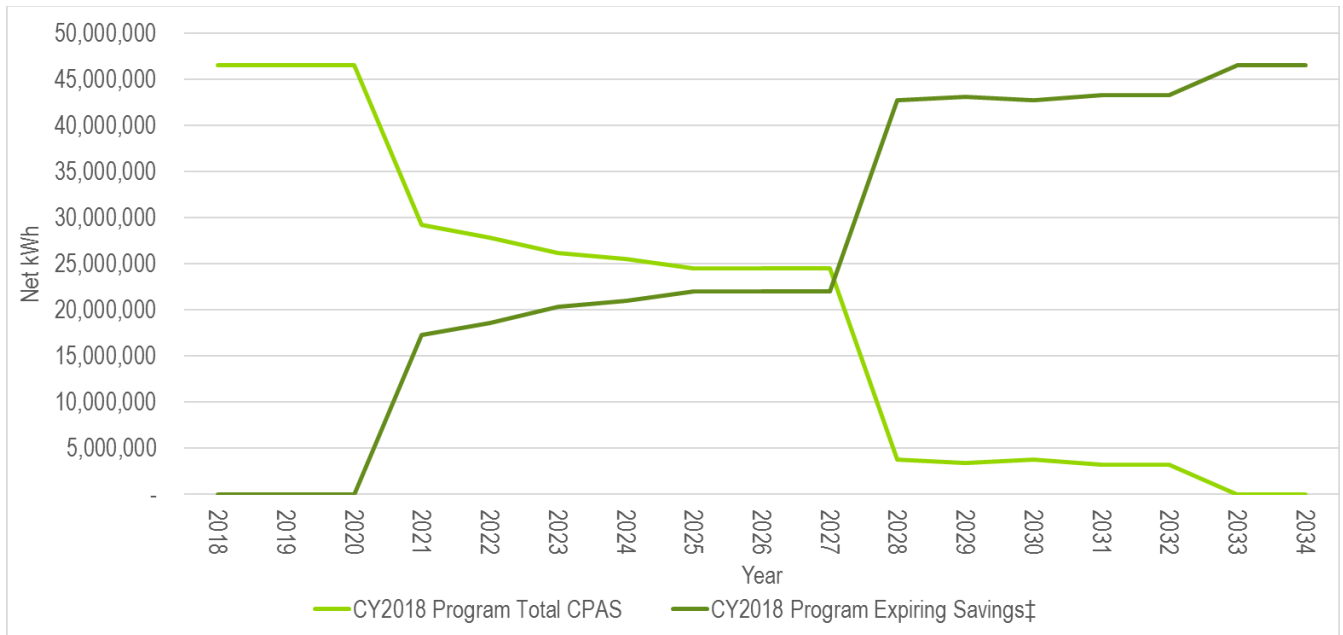
<http://ilsag.info/net-to-gross-framework.html>.

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

‡ Expiring savings are equal to CPAS Yn-1 - CPAS Yn + Expiring Savings Yn-1.

Source: Navigant team analysis

Figure 4-1. Cumulative Persisting Annual Savings



‡ Expiring savings are equal to CPAS Yn-1 - CPAS Yn + Expiring Savings Yn-1.
 Source: Navigant analysis

5. PROGRAM SAVINGS BY MEASURE

The program includes four distinct lighting measure groups as shown in the following tables. These groups include standard LEDs, directional LEDs (BR, R, MR, and PAR reflector lamps), specialty LEDs (globe, candelabra, and 3-way lamps), and LED fixtures and retrofit kits. All four measure groups are split into residential and non-residential savings to highlight where savings are expected to be realized. Overall, standard LEDs make up the largest share of program energy and demand savings (roughly 60%).

Table 5-1. CY2018 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)	Effective Useful Life
Lighting	Standard LED (Residential)	24,331,912	0.93	22,699,929	1.00	22,699,929	10.0
Lighting	Standard LED (Non-Residential)	5,461,186	1.02	5,577,096	1.00	5,577,096	4.6
Lighting	Directional LED (Residential)	7,575,356	0.97	7,341,469	1.00	7,341,469	10.0
Lighting	Directional LED (Non-Residential)	1,616,291	1.02	1,648,619	1.00	1,648,619	6.6
Lighting	Specialty LED (Residential)	4,676,521	0.97	4,546,383	1.00	4,546,383	10.0
Lighting	Specialty LED (Non-Residential)	868,930	1.02	888,940	1.00	888,940	4.5
Lighting	LED Fixtures and Kits (Residential)	3,079,883	1.04	3,193,899	1.00	3,193,899	15.0
Lighting	LED Fixtures and Kits (Non-Residential)	604,525	1.02	619,481	1.00	619,481	12.4
Lighting	Total (Residential)	39,663,672	0.95	37,781,679	1.00	37,781,679	10.4
Lighting	Total (Non-Residential)	8,550,931	1.02	8,734,136	1.00	8,734,136	5.5
Lighting	Total (All Sectors)	48,214,604	0.96	46,515,815	1.00	46,515,815	9.5

* A deemed value. Source: ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.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.

Table 5-2. CY2018 Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Demand Reduction (kW)	NTG*	Verified Net Demand Reduction (kW)
Lighting	Standard LED (Residential)	NR†	NA	25,283	1.00	25,283
Lighting	Standard LED (Non-Residential)	NR	NA	1,417	1.00	1,417
Lighting	Directional LED (Residential)	NR	NA	7,773	1.00	7,773
Lighting	Directional LED (Non-Residential)	NR	NA	419	1.00	419
Lighting	Specialty LED (Residential)	NR	NA	4,191	1.00	4,191
Lighting	Specialty LED (Non-Residential)	NR	NA	226	1.00	226
Lighting	LED Fixtures and Kits (Residential)	NR	NA	3,328	1.00	3,328
Lighting	LED Fixtures and Kits (Non-Residential)	NR	NA	168	1.00	168
Lighting	Total (Residential)	NR	NA	40,576	1.00	40,576
Lighting	Total (Non-Residential)	NR	NA	2,229	1.00	2,229
Lighting	Total (All Sectors)	NR	NA	42,805	1.00	42,805

* A deemed value. Source: ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

†NR = Not reported

NA = Not applicable

Source: ComEd tracking data and Navigant team analysis.

Table 5-3. CY2018 Summer Peak Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Summer Peak Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Summer Peak Demand Reduction (kW)	NTG*	Verified Net Summer Peak Demand Reduction (kW)
Lighting	Standard LED (Residential)	NR†	NA	2,273	1.00	2,273
Lighting	Standard LED (Non-Residential)	NR	NA	1,117	1.00	1,117
Lighting	Directional LED (Residential)	NR	NA	811	1.00	811
Lighting	Directional LED (Non-Residential)	NR	NA	330	1.00	330
Lighting	Specialty LED (Residential)	NR	NA	494	1.00	494
Lighting	Specialty LED (Non-Residential)	NR	NA	178	1.00	178
Lighting	LED Fixtures and Kits (Residential)	NR	NA	353	1.00	353
Lighting	LED Fixtures and Kits (Non-Residential)	NR	NA	132	1.00	132
Lighting	Total (Residential)	NR	NA	3,931	1.00	3,931
Lighting	Total (Non-Residential)	NR	NA	1,758	1.00	1,758
Lighting	Total (All Sectors)	NR	NA	5,689	1.00	5,689

* A deemed value. Source: ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

†NR = Not reported

NA = Not applicable

Source: ComEd tracking data and Navigant team analysis.

Table 5-4. CY2018 Winter Peak Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Winter Peak Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Winter Peak Demand Reduction (kW)	NTG*	Verified Net Winter Peak Demand Reduction (kW)
Lighting	Standard LED (Residential)	NR†	NA	2,933	1.00	2,933
Lighting	Standard LED (Non-Residential)	NR	NA	779	1.00	779
Lighting	Directional LED (Residential)	NR	NA	1,042	1.00	1,042
Lighting	Directional LED (Non-Residential)	NR	NA	230	1.00	230
Lighting	Specialty LED (Residential)	NR	NA	638	1.00	638
Lighting	Specialty LED (Non-Residential)	NR	NA	124	1.00	124
Lighting	LED Fixtures and Kits (Residential)	NR	NA	446	1.00	446
Lighting	LED Fixtures and Kits (Non-Residential)	NR	NA	92	1.00	92
Lighting	Total (Residential)	NR	NA	5,058	1.00	5,058
Lighting	Total (Non-Residential)	NR	NA	1,226	1.00	1,226
Lighting	Total (All Sectors)	NA	NA	6,284	1.00	6,284

* A deemed value. Source: ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

†NR = Not reported

NA = Not applicable

Source: ComEd tracking data and Navigant team analysis.

Table 5-5. CY2018 Energy Savings by Measure – Total Combining Electricity and Gas

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)
Lighting	Standard LED (Residential)	24,331,912	0.93	22,699,929	1.00	22,699,929
Lighting	Standard LED (Non-Residential)	5,461,186	1.02	5,577,096	1.00	5,577,096
Lighting	Directional LED (Residential)	7,575,356	0.97	7,341,469	1.00	7,341,469
Lighting	Directional LED (Non-Residential)	1,616,291	1.02	1,648,619	1.00	1,648,619
Lighting	Specialty LED (Residential)	4,676,521	0.97	4,546,383	1.00	4,546,383
Lighting	Specialty LED (Non-Residential)	868,930	1.02	888,940	1.00	888,940
Lighting	LED Fixtures and Kits (Residential)	3,079,883	1.04	3,193,899	1.00	3,193,899
Lighting	LED Fixtures and Kits (Non-Residential)	604,525	1.02	619,481	1.00	619,481
Lighting	Total (Residential)	39,663,672	0.95	37,781,679	1.00	37,781,679
Lighting	Total (Non-Residential)	8,550,931	1.02	8,734,136	1.00	8,734,136
Lighting	Total (All Sectors)	48,214,604	0.96	46,515,815	1.00	46,515,815

Note: There are no gas savings associated with this program

* A deemed value. Source: ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.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.

6. IMPACT ANALYSIS FINDINGS AND RECOMMENDATIONS

6.1 Impact Parameter Estimates

Energy and demand savings for LED lamps and fixtures sold through the program are estimated using the following formula as specified in the IL TRM:

$$\text{Verified Gross Annual } \Delta\text{kWh} = \text{ResSplit} * \text{Res } \Delta\text{kWh} + \text{NonResSplit} * \text{NonRes } \Delta\text{kWh}$$

Where:

- **Res ΔkWh** = Bulbs * DeltaWatts/1000 * ISR_r * (1-Leakage) * HOU_r * WHF_e_r
- **NonRes ΔkWh** = Bulbs * DeltaWatts/1000 * ISR_{nr} * (1-Leakage) * HOU_{nr} * $\text{WHF}_{e_{nr}}$
- **Verified Gross Annual ΔkW** = Delta Watts/1000 * ISR * (1-Leakage)
- **Verified Gross Annual Summer Peak ΔkW** = Gross Annual ΔkW * Summer Peak CF * WHF_d
- **Verified Gross Annual Winter Peak ΔkW** = Gross Annual ΔkW * Winter Peak CF

Where:

- **Res/NonRes Split** = Percentage of program bulbs installed in residential and non-residential locations. Deemed within Illinois TRM v6.
- **Bulbs** = Quantity of bulbs sold through the CY2018 program, based on program tracking data.
- **Delta Watts** = Difference in wattage between the baseline bulb (WattsBase) and the efficient program bulb (WattsEE):
 - WattsBase = Baseline bulb wattage, mapping deemed in Illinois TRM v6.
 - WattsEE = Wattage of efficient program bulb, based on program tracking data.
- **$\text{ISR}_{r(nr)}$** = First-year installation rate (residential or non-residential), deemed in Illinois TRM v6.
- **Leakage** = Percentage of program bulbs installed outside of ComEd service territory, deemed in Illinois TRM v6.
- **$\text{HOU}_{r(nr)}$** = Annual hours-of-use (residential/non-residential), deemed in Illinois TRM v6.
- **$\text{WHF}_{e_{r(nr)}}$** = Water heat factor – Energy (residential/non-residential), deemed in Illinois TRM v6.
- **$\text{WHF}_{d_{r(nr)}}$** = Water heat factor – Demand (residential/non-residential), deemed in Illinois TRM v6.
- **Summer Peak CF** = Peak load coincidence factor, the percentage of program bulbs turned on during summer peak hours (weekdays from 1 to 5 p.m.).
- **Winter Peak CF** = Peak load coincidence factor, the percentage of program bulbs turned on during the PJM Winter Peak hours.¹

The source of the verified first-year gross and net savings parameters are shown in the table below. The sources of the parameters used to calculate the second and third year carryover are presented in the carryover section (Section 7.3). The lifetime energy and demand savings are estimated by multiplying the verified savings by the effective useful life for each measure.²

¹ The Winter Peak Period is defined by PJM as the period from 6-8 a.m. and 5-7 p.m., Central Time Zone, between January 1 and February 28.

² Standard LED Lamps receive baseline adjustments in lifetime savings starting 2021 to account for the implementation of the EISA efficiency standards for these measures.

Table 6-1. Savings Parameters

Gross Savings Input Parameters	Deemed * or Evaluated?	Source
Program Bulbs	Evaluated	CY2018 Program Tracking Data
Delta Watts	Deemed	Illinois TRM v6
Installation Rate	Deemed	Illinois TRM v6
Leakage	Evaluated	Illinois TRM v6‡
Res / Non-Res Split	Deemed	Illinois TRM v6
Hours of Use (HOU)	Deemed	Illinois TRM v6
Summer Peak Coincidence Factor (CF)	Deemed	Illinois TRM v6
Winter Peak Coincidence Factor (CF)	Evaluated	Memo to ComEd
Waste Heat Factor (Energy)	Deemed	Illinois TRM v6
Waste Heat Factor (Demand)	Deemed	Illinois TRM v6
NTG†	Deemed	Illinois TRM v6

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

† A deemed value. Source: ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

‡ This parameter is reflective of the revision found in the Illinois TRM v6 Errata.

6.2 Other Impact Findings and Recommendations

The evaluation team developed a recommendation based on findings from the CY2018 evaluation.

Finding 1. The gross realization rate for the Income Eligible Lighting Discounts Program is 97%. The main source of the discrepancy between the ex ante and verified savings estimates results from differences in the gross savings calculations. The evaluation team includes interactive effects (WHFe and WHFd), in service rates (ISR) and program leakage into the final savings calculations per the TRM v6. However, the ex ante gross savings did not include the application of these parameters.

Recommendation 1. The evaluation team recommends that the implementer calculate ex ante savings values using all parameters included in the IL TRM estimated savings equations.

7. APPENDIX 1. IMPACT ANALYSIS METHODOLOGY

7.1 Verified Gross Program Savings Analysis Approach Estimates

The evaluation team calculated verified savings for all measures with available data. For CY2018, the evaluation team calculated verified savings for omni-directional LEDs, directional LEDs, specialty LEDs, and LED fixtures and retrofit kits. The data used to estimate the verified gross program savings came from the CY2018 program tracking data,³ and the Illinois Statewide Technical Reference Manual Versions 6.0 and 7.0 (Illinois TRM v6 and v7).

³ The Evaluation Team received the final CY2018 tracking data on January 17, 2019: LDIS_2018_EOY_Data_Rev1_01172019.xlsx.

7.2 Verified Net Program Savings Analysis Approach

Verified net energy and demand (coincident peak and overall) savings were calculated by multiplying the verified gross savings estimates by a net-to-gross ratio (NTG). For income eligible programs, NTG values are all assumed to be 1.0.

7.3 Carryover Savings Estimation

7.3.1 CY2019 Preliminary Carryover Savings

The evaluation team calculated a preliminary CY2019 carryover estimate using the Illinois TRM (v6, and v7) and the CY2018 Impact Evaluation Reports. The energy and demand savings from the CY2018 second year installations are calculated based on the following parameters:

- Delta Watts – Verified savings estimate from the year of installation (source: Illinois TRM v7)
- Residential/Non-Residential Split – Verified savings from the year of purchase (source: Illinois TRM v6)
- HOU and Peak CF – Verified savings estimate from the year of installation (source: Illinois TRM v7)
- Energy and Demand IE – Verified savings estimate from the year of installation (source: Illinois TRM v7)
- Installation Rate – Verified savings estimate from the year of purchase (source: Illinois TRM v6)
- NTG – The deemed net-to-gross values from the year of purchase – this value is not subject to change

Table 7-1 shows that in CY2019 a total of 38,682 bulbs that were purchased in CY2018 are expected to be installed within ComEd’s service territory. The table below provides both the gross and net energy and demand savings from these bulbs. Total **preliminary** energy and demand savings estimates are expected to be 1,753,803 net kWh, 1,544 kW, 232 summer peak kW, and 199 winter peak kW.

Table 7-1. CY2019 Preliminary Carryover Savings Estimates from CY2018 Bulb Sales

Preliminary CY2019 Carryover Savings	CY2018 Bulbs
Carryover Bulbs Installed During CY2018	38,682
Average Delta Watts	39.9
Average Daily Hours of Use	2.95
Summer Peak Load Coincidence Factor	0.133
Winter Peak Load Coincidence Factor	0.128
Energy Interactive Effects	1.06
Demand Interactive Effects	1.11
Gross kWh Impact Per Unit	39,828
Gross kW Impact Per Unit	37.6
Carryover Gross Energy Savings (kWh)	1,753,803
Carryover Gross Demand Savings (kW)	1,544
Carryover Gross Summer Peak Demand Savings (kW)	232
Carryover Gross Winter Peak Demand Savings (kW)	199
Net-to-Gross Ratio	1.00
Carryover Net Energy Savings (kWh)	1,753,803
Carryover Net Demand Savings (kW)	1,544
Carryover Net Summer Peak Demand Savings (kW)	232
Carryover Net Winter Peak Demand Savings (kW)	199
EUL Res	10.0
EUL NonRes	5.5

Source: Navigant team analysis

7.3.2 CY2020 Preliminary Partial Carryover Savings from CY2018

The evaluation team calculated a preliminary partial CY2020 carryover savings estimate based on the bulbs sold during CY2018 (CY2019 sales are not known at this time) that are estimated to be installed in CY2020. We are calling these preliminary as several of the parameters used to estimate CY2020 carryover savings are based on deemed parameters from the year of install (Delta Watts, HOU and Peak CF, and Waste Heat Factors of Energy and Demand) which for CY2020 would be IL TRM v8. Since IL TRM v8 is not yet finalized, the evaluation team used v7 of the IL TRM to estimate these parameters. Hence the **preliminary** parameters for the partial CY2020 carryover savings are taken from:

- Delta Watts – Verified savings estimate from the year of installation (source: Illinois TRM v7⁴) – this value is subject to change and will ultimately use the values from Illinois TRM v8.
- Residential and Non-Residential Split – Verified savings from the year of purchase (source: Illinois TRM v6) – this value is not subject to change.
- HOU and Peak CF – Verified savings estimate from the year of installation (source: Illinois TRM v7) – this value is subject to change and will ultimately use the values from Illinois TRM v8.

⁴ Since the IL TRM v8 is not yet finalized v7 was used as a proxy. It is for this reason these CY2020 savings are label as “preliminary”.

- Energy and Demand IE – Verified savings estimate from the year of installation (source: Illinois TRM v7) – this value is subject to change and will ultimately use the values from Illinois TRM v8.
- Installation Rate – Verified savings estimate from the year of purchase (source: Illinois TRM v6) – this value is not subject to change.
- NTG – The deemed net-to-gross values from the year of purchase– this value is not subject to change.

Table 7-2 shows that in CY2020 a total of 33,471 bulbs that were purchased in CY2018 are expected to be installed within ComEd’s service territory in CY2020. The table below provides both the gross and net energy and demand savings from these bulbs. The total preliminary net energy savings is estimated to be 1,527,974 kWh, 1,337 kW, 203 Summer Peak kW, and 174 Winter Peak kW which will be counted in CY2020.

Table 7-2. CY2020 Preliminary Carryover Savings Estimates from CY2018 Bulb Sales

Preliminary Partial CY2020 Carryover Savings	CY2018 Bulbs
Carryover Bulbs Installed During CY2019	33,471
Average Delta Watts	40.0
Average Daily Hours of Use	1.52
Summer Peak Load Coincidence Factor	0.135
Winter Peak Load Coincidence Factor	0.129
Energy Interactive Effects	1.06
Demand Interactive Effects	1.11
Gross kWh Impact Per Unit	34,989
Gross kW Impact Per Unit	32.7
Carryover Gross Energy Savings (kWh)	1,527,974
Carryover Gross Demand Savings (kW)	1,337
Carryover Gross Summer Peak Demand Savings (kW)	203
Carryover Gross Winter Peak Demand Savings (kW)	174
Net-to-Gross Ratio	1.00
Carryover Net Energy Savings (kWh)	1,527,974
Carryover Net Demand Savings (kW)	1,337
Carryover Net Summer Peak Demand Savings (kW)	203
Carryover Net Winter Peak Demand Savings (kW)	174
EUL Res	10.0
EUL NonRes	5.5

Source: Navigant team analysis

8. APPENDIX 2. TOTAL RESOURCE COST DETAIL

Table 8-1, below, shows the Total Resource Cost (TRC) table. It includes only the 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 this table and will be provided to evaluation later.

Table 8-1. Total Resource Cost Savings Summary

End Use Type	Research Category	Measure	Quantity	Effective Useful Life	Verified Gross Savings (kWh)	Verified Gross Peak Demand Reduction (kW)	Gross Heating Penalty (Therms)	NTG	Verified Net Savings (kWh)	Verified Net Peak Demand Reduction (kW)	Net Heating Penalty (Therms)
Lighting	LED Lighting	Standard LED (Residential)	750,775	10.0	22,699,929	2,273	(511,476.50)	1.00	22,699,929	2,273	(511,476.50)
Lighting	LED Lighting	Standard LED (Non-Residential)	39,514	4.6	5,577,096	1,117	(112,565.24)	1.00	5,577,096	1,117	(112,565.24)
Lighting	LED Lighting	Directional LED (Residential)	157,915	10.0	7,341,469	811	(165,413.35)	1.00	7,341,469	811	(165,413.35)
Lighting	LED Lighting	Directional LED (Non-Residential)	8,311	6.6	1,648,619	330	(33,273.84)	1.00	1,648,619	330	(33,273.84)
Lighting	LED Lighting	Specialty LED (Residential)	114,720	10.0	4,546,383	494	(102,379.67)	1.00	4,546,383	494	(102,379.67)
Lighting	LED Lighting	Specialty LED (Non-Residential)	6,038	4.5	888,940	178	(17,931.25)	1.00	888,940	178	(17,931.25)
Lighting	LED Lighting	LED Fixtures and Kits (Residential)	61,047	15.0	3,193,899	353	(70,130.32)	1.00	3,193,899	353	(70,130.32)
Lighting	LED Lighting	LED Fixtures and Kits (Non-Residential)	3,213	12.4	619,481	132	(13,190.15)	1.00	619,481	132	(13,190.15)

Note: Standard LEDs have a baseline shift and savings are not constant over time. See the CPAS tables for additional detail.

Source: ComEd tracking data and Navigant team analysis.