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ComEd Multifamily Common Area Pilot Program Impact Evaluation Report

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

Presented to
ComEd

DRAFT

March 14, 2018

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1. INTRODUCTION

This report presents the results of the impact evaluation of ComEd's Program Year 9 (PY9) Multifamily Common Area Pilot Program (MFCAP). It presents a summary of the energy and demand savings impacts for the total program and details broken out by relevant measure and program structure. Section 6 (Appendix 1) presents the impact analysis methodology. PY9 covers June 1, 2016 through December 31, 2017.

The MFCAP is jointly implemented by: ComEd, Peoples Gas (PGL), and North Shore Gas (NSG) companies.[1] This report focuses solely on the electric savings from the program. Savings from natural gas measures are included in separate evaluation reports. The program is implemented by Franklin Energy Services, who coordinates program activities with other joint programs implemented on behalf of ComEd.

2. PROGRAM DESCRIPTION

The MFCAP serves existing multifamily properties with three or more units, including high-rise buildings, low-rise buildings, non-public housing properties, and public housing properties with Department of Commerce and Economic Opportunity's (DCEO) written approval. This joint offering targets customers who receive natural gas services from Peoples Gas or North Shore Gas and electricity from ComEd.

The program offers directly installed common area measures including water efficient aerators, water efficient showerheads, programmable thermostats, pipe wrap, and vending misers. In addition, Partner Trade Allies (PTA) offer several lighting technologies for common areas including LEDs, HPT8/LWT8 lighting, lighting controls, garage and exterior lighting fixtures, all at no cost to the participants.

The PY9 MFCAP had 583 participants and distributed 35,183 measures as shown in the following table and graph. Light Emitting Diode (LED) bulbs contributed 78 percent of the measure mix, and LED Exit Signs and High Performance T8 lighting each contributed 11 percent of the measures. Other measures contributed less than one percent of the measures, including programmable thermostats, beverage and snack machine controls, and occupancy sensor lighting controls.

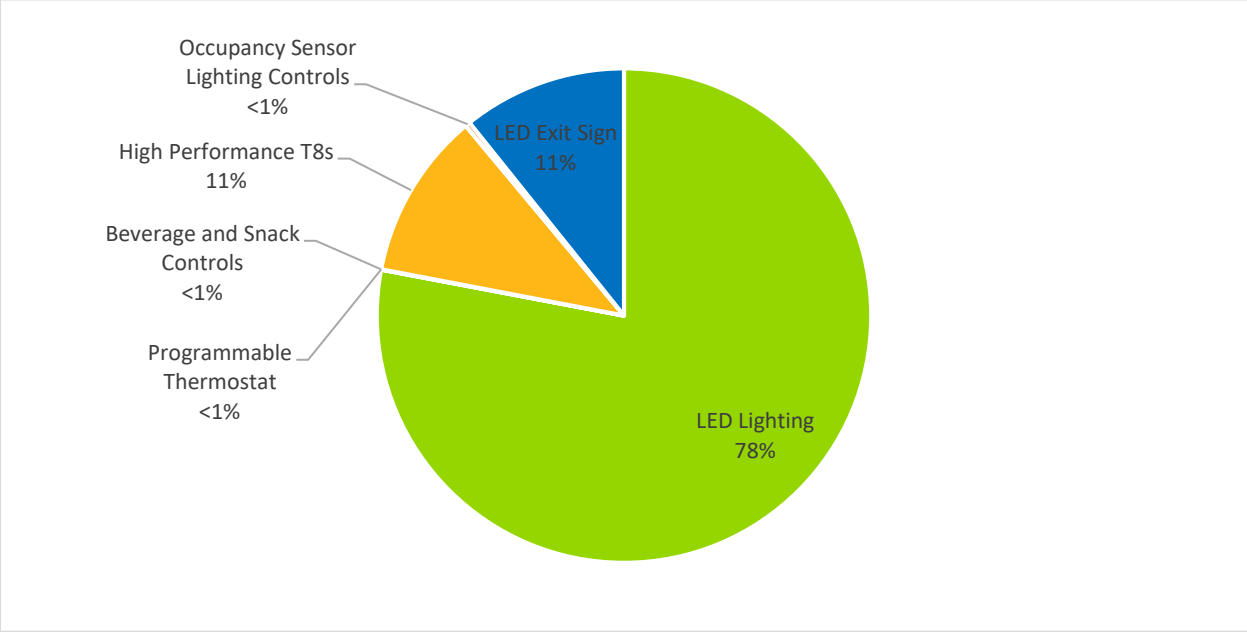
Table 2-1. PY9 Volumetric Findings Detail

Participation	Direct Install	PTA Install	Total
Participants*	536	265	583
Total Measures	26,479	8,704	35,183
Number of Projects†	643	295	780

* 583 unique participants are derived from property names and addresses. Program had 218 participants install both DI and PTA measures.
† 780 unique projects were implemented. MFCAP had 158 projects that included both DI and PTA measures.
Source: ComEd tracking data and Navigant team analysis.

[1] The program years are electric program year 9 (EPY9) and gas program year 6 (GPY6).

Figure 2-1. Number of Measures Installed by Type



Source: Evaluation Analysis

3. Program Savings

Table 3-1 summarizes the incremental energy and demand savings the Multifamily Common Area Pilot 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	4,556,087	NR*	497
Program Gross Realization Rate	101%	NR	104%
Verified Gross Savings	4,621,834	823	517
Program Net-to-Gross Ratio (NTGR)†	0.95	0.95	0.95
Verified Net Savings	4,390,742	782	491

**NR = not reported*
†A deemed value. Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html.
Source: ComEd tracking data and Navigant team analysis.

4. Program Savings by Measure

The program includes eight measures as shown in the following tables. LED Lighting and high performance T8 measures produced the most savings. The LED retrofit bulbs contributed 58 percent of the verified gross and net savings, followed by the High Performance T8s with 24 percent. LED Exit Signs contributed 17 percent, with one percent from occupancy control measures.

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	LED Lighting	2,621,689	103%	2,687,392	0.95	2,553,022	NA	NA	15
Lighting	High Performance T8s	1,091,879	100%	1,091,877	0.95	1,037,283	NA	NA	15
Lighting	Occupancy Sensor Lighting Controls	41,353	100%	41,383	0.95	39,313	NA	NA	8
Lighting	LED Exit Sign	792,914	100%	792,930	0.95	753,284	NA	NA	16
HVAC	Programmable Thermostat	188	100%	188	0.95	178	NA	NA	4
Kitchen Equipment	Beverage and Snack Controls	8,065	100%	8,065	0.95	7,661	NA	NA	5
Total‡		4,556,087	101%	4,621,834	0.95	4,390,742			

* A deemed value. Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, 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.
‡ Numbers do 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	LED Lighting	NR†	NA	513	0.95	488
Lighting	High Performance T8s	NR	NA	178	0.95	169
Lighting	Occupancy Sensor Lighting Controls	NR	NA	26	0.95	25
Lighting	LED Exit Sign	NR	NA	105	0.95	100
HVAC	Programmable Thermostat	NR	NA	0	0.95	0
Kitchen Equipment	Beverage and Snack Controls	NR	NA	1	0.95	1
Total‡		NR	NA	823	0.95	782

* A deemed value. Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html.
†NR = not reported
‡Numbers do 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 Peak Net Demand Reduction (kW)
Lighting	LED Lighting	249	103%	256	0.95	243
Lighting	High Performance T8s	138	100%	138	0.95	131
Lighting	Occupancy Sensor Lighting Controls	5	347%	18	0.95	17
Lighting	LED Exit Sign	105	100%	105	0.95	100
HVAC	Programmable Thermostat	0	-	0	0.95	0
Kitchen Equipment	Beverage and Snack Controls	0	-	0	0.95	0
Total†		497	104%	517	0.95	491

* A deemed value. Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html.
† Numbers do 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

Navigant estimated verified unit savings for each program measure using impact algorithm sources found in the TRM v5.0 or through secondary research. Table 5-1 presents the key parameters and the references used in the verified gross and net savings calculations.

Table 5-1. Verified Gross Savings Parameters

Gross Savings Input Parameters	Value	Deemed* or Evaluated?
Measure Quantities	Varies	Evaluated
Measure Type and Eligibility	Varies	Deemed
Savings Input Assumptions	Varies	Deemed
Gross Savings per Unit	Varies	Deemed
Verified Realization Rate on Ex Ante Gross Savings	Varies	Evaluated
NTGR†	Varies	Deemed

* Illinois Statewide Technical Reference Manual for Energy Efficiency Version 5.0, available at: http://www.ilsag.info/technical-reference-manual.html.
† Deemed values. Source: ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html.

5.2 Other Impact Findings and Recommendations

The following describes the key program findings and recommendations.

Finding 1: The ex ante calculations for LED lighting used an ISR of 96.6 percent for fixtures installed in the common areas. Since common areas of a multifamily building are considered commercial type spaces, an ISR of 100 percent could be used. Applying an ISR of 100 percent for the calculations for these fixtures resulted in the increased energy savings and a program energy savings realization rate of 101 percent and peak demand savings of 104 percent.

Recommendation 1: Consider using an ISR of 100 percent for the direct install LEDs installed in common areas.

Finding 2: In the tracking data, some of the LEDs installed replaced energy efficient CFL bulbs. These measures were not included in the original scope of work or in the calculations file. Since CFLs are already energy efficient, little savings were claimed from these measures. Navigant does not believe that it is cost effective to remove CFLs and replace them with LEDs. In the future, this will most likely be the standard replacement, but for now, the program should reconsider the energy savings benefit of replacing CFLs with LED bulbs.

Recommendation 2: Whenever program scope changes, we recommend that the evaluation team reviews the assumptions to provide technical guidance, which reduces the risk of evaluation adjustments to savings at the end of program year.

Finding 3: For LED lighting, there were two measures that had realization rates of 52 percent (CA Interior and Exterior 5W LED Candelabra (7W-CFL)) and two that had realization rates of 120 percent (CA Interior and Exterior 8W LED Flood (15W-CFL)). These measures were not included in the implementer's calculations, so Navigant is unable to determine the exact source of error. It appears the source of error is from the baseline and energy efficient fixture wattages.

Recommendation 3: Review the tracking data savings input assumptions for these measures, and clarify in the measure workbooks the source of any assumptions other than those provided in the TRM v5.0.

Finding 4: In reviewing the implementers calculations, Navigant found that the implementer is using the incorrect algorithms to calculate savings for the occupancy sensor controls. Navigant believes the implementer used the algorithms for lighting measures and not those deemed in section 4.5.10 of the TRM (v5.0).

Recommendation 4: Update the equations used to calculate savings for the occupancy sensor controls so they match those defined in the TRM (v5.0).

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.[2]

7. Appendix 2. Impact Analysis Detail

Navigant downloaded the final tracking data and measure workbook for the MFCA 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 tracking database file: "MFCA_PY9_EOY_Data_Rev0.xlsx"
- Measure workbook of default savings: "PY9 DI TA Implementer Savings Calc.xlsx"
- Illinois Technical Reference Manual (TRM v5.0) for deemed input parameters

[2] Source ComEd_NTG_History_and_PY9_Recommendations_2016-02-26_Final.xlsx, found on the IL SAG web site here: http://ilsag.info/net-to-gross-framework.html

The following sections provide tracking system review findings, associated recommendations and 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[3], and realization rates.

7.1 LED Lighting

LED lighting has an overall realization rate of 103 percent and contributed to 58 percent of the total energy savings.

Table 7-1. LED Lighting Measures Impact Detail

Measure	Unit Basis	Units Installed	kWh Gross Realization Rate	Verified kWh per Unit	Peak kW Gross Realization Rate	Verified Peak kW per Unit	TRM Section
CA Exterior 5W LED Candelabra (7W-CFL)	Lamp	38	52%	9.8		0.0	4.5.4
CA Exterior 8W LED Flood (15W-CFL)	Lamp	49	120%	34.3		0.0	4.5.4
CA Interior 5W LED Candelabra (7W-CFL)	Lamp	124	52%	13.6	56%	0.0	4.5.4
CA Interior 8W LED Flood (15W-CFL)	Lamp	891	120%	47.5	122%	0.0	4.5.4
CA Exterior 11W LED (18W-CFL)	Lamp	57	103%	34.3		0.0	4.5.4
CA Exterior 13W LED Flood (90W-Incandescent)	Lamp	3	103%	377.5		0.0	4.5.4
CA Exterior 15W LED (100W-Incandescent)	Lamp	185	103%	279.5		0.0	4.5.4
CA Exterior 15W LED (23W-CFL)	Lamp	97	103%	39.2		0.0	4.5.4
CA Exterior 15W LED Flood (100W-Incandescent)	Lamp	389	103%	416.8		0.0	4.5.4
CA Exterior 15W LED Flood (23W-CFL)	Lamp	257	103%	39.2		0.0	4.5.4
CA Exterior 5W LED Candelabra (40W-Incandescent)	Lamp	137	103%	171.6		0.0	4.5.4
CA Exterior 6W LED (40W-Incandescent)	Lamp	5	103%	112.8		0.0	4.5.4
CA Exterior 6W LED (9W-CFL)	Lamp	26	103%	14.7		0.0	4.5.4
CA Exterior 8W LED Flood (65W-Incandescent)	Lamp	80	103%	279.5		0.0	4.5.4
CA Exterior 9W LED (13W-CFL)	Lamp	2,153	103%	19.6		0.0	4.5.4

[3] This quantity represents the values provided in the tracking data and are not grouped by unit as shown in Table 2-1.

Measure	Unit Basis	Units Installed	kWh Gross Realization Rate	Verified kWh per Unit	Peak kW Gross Realization Rate	Verified Peak kW per Unit	TRM Section
CA Exterior 9W LED (60W-Incandescent)	Lamp	428	103%	166.7		0.0	4.5.4
CA Garage 11W LED (75W-Incandescent)	Lamp	2	103%	148.7	104%	0.0	4.5.4
CA Garage 15W LED (100W-Incandescent)	Lamp	9	103%	201.8	105%	0.1	4.5.4
CA Garage 15W LED (23W-CFL)	Lamp	16	103%	28.3	104%	0.0	4.5.4
CA Garage 6W LED (9W-CFL)	Lamp	4	103%	10.6	110%	0.0	4.5.4
CA Garage 9W LED (13W-CFL)	Lamp	56	103%	14.2	105%	0.0	4.5.4
CA Garage 9W LED (60W-Incandescent)	Lamp	72	103%	120.4	103%	0.0	4.5.4
CA Interior 11W LED (18W-CFL)	Lamp	534	103%	47.5	104%	0.0	4.5.4
CA Interior 11W LED (75W-Incandescent)	Lamp	88	103%	284.9	104%	0.0	4.5.4
CA Interior 15W LED (100W-Incandescent)	Lamp	194	103%	386.6	104%	0.0	4.5.4
CA Interior 15W LED (23W-CFL)	Lamp	690	103%	54.3	113%	0.0	4.5.4
CA Interior 5W LED Candelabra (40W-Incandescent)	Lamp	482	103%	237.4	103%	0.0	4.5.4
CA Interior 6W LED (40W-Incandescent)	Lamp	58	103%	156.0	103%	0.0	4.5.4
CA Interior 6W LED (9W-CFL)	Lamp	365	103%	20.3	101%	0.0	4.5.4
CA Interior 6W LED Globe (40/60W-Incandescent)	Lamp	46	103%	298.5	103%	0.0	4.5.4
CA Interior 6W LED Globe (9W-CFL)	Lamp	35	103%	20.3	101%	0.0	4.5.4
CA Interior 7W LED Tracklight (50W-Incandescent)	Lamp	60	103%	291.7	103%	0.0	4.5.4
CA Interior 8W LED Flood (65W-Incandescent)	Lamp	347	103%	386.6	103%	0.0	4.5.4
CA Interior 9W LED (13W-CFL)	Lamp	15,707	103%	27.1	103%	0.0	4.5.4
CA Interior 9W LED (60W-Incandescent)	Lamp	2,787	103%	230.6	103%	0.0	4.5.4

Measure	Unit Basis	Units Installed	kWh Gross Realization Rate	Verified kWh per Unit	Peak kW Gross Realization Rate	Verified Peak kW per Unit	TRM Section
Ext - DD Outdoor <=175W HID to LED	Lamp	322	100%	494.5		0.0	4.5.4
Ext - DD Outdoor 176-250W HID to LED	Lamp	61	100%	792.3		0.0	4.5.4
Ext - DD Outdoor 251-400W HID to LED	Lamp	93	100%	1174.3		0.0	4.5.4
Gar - DD Outdoor <=175W HID to LED	Lamp	107	100%	343.0	101%	0.1	4.5.4
Gar - DD Outdoor 176-250W T12 HO to LED	Lamp	3	103%	549.6	103%	0.1	4.5.4
Gar - 24/7 Outdoor <=175W HID to LED	Lamp	284	100%	884.1	100%	0.1	4.5.4
Gar - 24/7 Outdoor 176-250W HID to LED	Lamp	42	100%	1416.6	100%	0.2	4.5.4
Gar - 24/7 Outdoor 251-400W HID to LED	Lamp	1	100%	2099.5	100%	0.2	4.5.4
Gar - DD Outdoor 251-400W HID to LED	Lamp	51	100%	814.5	100%	0.2	4.5.4

Source: ComEd tracking data and Navigant team analysis.

Table 7-2 shows the inputs used to calculate savings for the lighting measures with realization rates below 100 percent or above 100 percent. The majority of the lighting measures had realization rates above 100 percent due to the in-service rate adjustment from 96.9 percent to 100 percent, using commercial TRM assumptions included in this table.

Table 7-2. LED Lighting Inputs for 100% Measures

Measure Name	Watts Base	Watts EE	Hours	WHFe	WHFd	ISR	CF
CA Exterior 5W LED Candelabra (7W-CFL)	7	5	4903	1.00	1.00	1.00	0.00
CA Exterior 8W LED Flood (15W-CFL)	15	8	4903	1.00	1.00	1.00	0.00
CA Interior 5W LED Candelabra (7W-CFL)	7	5	5950	1.14	1.32	1.00	0.64
CA Interior 8W LED Flood (15W-CFL)	15	8	5950	1.14	1.32	1.00	0.64

Source: ComEd tracking data and Navigant team analysis.

7.2 Programmable Thermostats

Programmable thermostats have a realization rate of 100 percent and contribute to less than one percent of the overall savings.

Table 7-3. Thermostat Measures Impact Detail

Measure	Unit Basis	Units Installed	kWh Gross Realization Rate	Verified kWh per Unit	Peak kW Gross Realization Rate	Verified Peak kW per Unit	TRM Section
CA Programmable Thermostat	Each	3	100%	62.6		0.0	5.3.11

Source: ComEd tracking data and Navigant team analysis.

7.3 Beverage and Snack Controls

Beverage and Snack controls had an overall realization rate of 100 percent and contributed to less than one percent of the overall savings.

Table 7-4. Beverage and Snack Measures Impact Detail

Measure	Unit Basis	Units Installed	kWh Gross Realization Rate	Verified kWh per Unit	Peak kW Gross Realization Rate	Verified Peak kW per Unit	TRM Section
CA Vending Miser MV170	Each	5	100%	1612.9		0.0	4.6.2

Source: ComEd tracking data and Navigant team analysis.

7.4 Occupancy Sensor Lighting Controls

Occupancy sensor lighting controls had an overall energy realization rate of 100 percent and contributed to less than one percent of the overall savings. The verified gross peak demand realization rate for occupancy sensors was very high (over 300 percent) due to the kW controlled and other assumptions from the TRM, as described below.

Table 7-5. Occupancy Sensor Measures Impact Detail

Measure	Unit Basis	Units Installed	kWh Gross Realization Rate	Verified kWh per Unit	Peak kW Gross Realization Rate	Verified Peak kW per Unit	TRM Section
Int - CA Occupancy Sensor (>=100W)	Each	47	98%	293.0	323%	0.1	4.5.10
Int - 24/7 Occupancy Sensor (>=100W)	Each	64	101%	431.4	359%	0.2	4.5.10

Source: ComEd tracking data and Navigant team analysis.

When reviewing the implementer savings calculations, Navigant found that the ex ante calculations are using the following equations to calculate savings:

$$\Delta kWh = \frac{Watts_{Base} - Watts_{EE}}{1000} * WHF_E * ISR * HOU$$

$$\Delta kW = \frac{Watts_{Base} - Watts_{EE}}{1000} * WFH_d * ISR * CF$$

These equations are the equations used for lighting and do not match the equations listed in section 4.5.10 of the IL TRM. For this measure, Navigant used the following equations and variables for the ex ante calculations:

$$\Delta kWh = kW_{Controlled} * Hours * ESF * WHF_e$$

$$\Delta kW_{non-peak} = kW_{Controlled} * WHF_d$$

$$\Delta kW_{peak} = kW_{Controlled} * WHF_d * (CF_{baseline} - CF_{OS})$$

Where:

$kW_{Controlled}$ = Total lighting load connected to the control in kW
Hours = Total operating hours of the controlled lighting circuit before the lighting controls are installed
ESF = Energy Savings factor (represents the percentage reduction to the operating hours from the non-controlled baseline lighting system
WHF_e = Waste heat factor for energy
WHF_d = Waste heat factor for demand
$CF_{baseline}$ = Baseline Summer Peak Coincidence Factor for the lighting system without Occupancy Sensors installed
CF_{OS} = Retrofit Summer Peak Coincidence Factor for the lighting system with Occupancy Sensors

Table 7-6. Occupancy Sensor Algorithm Inputs

Gross Savings Input Parameters	Value	Deemed* or Evaluated?
$kW_{Controlled}$	0.18	Deemed
Hours	Varies	Deemed
ESF	0.24	Deemed
WHF_e	Varies	Deemed
WHF_d	Varies	Deemed
$CF_{baseline}$	Varies	Deemed
CF_{OS}	0.15	Deemed

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

7.5 High Performance T8s

High performance T8s had an overall realization rate of 100 percent and contributed 24 percent of the overall savings.

Table 7-7. T8 Lighting Measures Impact Detail

Measure	Unit Basis	Units Installed	kWh Gross Realization Rate	Verified kWh per Unit	Peak kW Gross Realization Rate	Verified Peak kW per Unit	TRM Section
Int - 24/7 Delamp w/Ref 2L Utube T12 to 2L 2ft T8	Lamp	56	100%	327.6	101%	0.0	4.5.3

Measure	Unit Basis	Units Installed	kWh Gross Realization Rate	Verified kWh per Unit	Peak kW Gross Realization Rate	Verified Peak kW per Unit	TRM Section
Int - CA Delamp 4L 4ft T12 to 2L 4ft HPT8	Lamp	5	100%	690.8	100%	0.1	4.5.3
Int - CA Delamp w/Ref 2L Utube T12 to 2L 2ft T8	Lamp	357	100%	229.5	100%	0.0	4.5.3
Int - CA Delamp w/Ref 4L 4ft T12 to 2L 4ft HPT8	Lamp	15	100%	690.8	100%	0.1	4.5.3
Int - 24/7 1L 4ft HPT8/LWT8 L&B Retro	Lamp	179	100%	179.9	100%	0.0	4.5.3
Int - CA 1L 4ft HPT8/LWT8 L&B Retro	Lamp	351	100%	126.1	100%	0.0	4.5.3
Int - 24/7 1L 8ft T12 Slim/HO/VHO - 2L 4ft HPT8	Lamp	22	100%	550.4	100%	0.1	4.5.3
Int - CA 1L 8ft T12 Slim/HO/VHO - 2L 4ft HPT8	Lamp	22	100%	385.6	100%	0.0	4.5.3
Int - CA 2L 4ft HPT8/LWT8 L&B Retro	Lamp	1,472	100%	215.5	100%	0.0	4.5.3
Int- 24/7 2L 4ft HPT8/LWT8 L&B Retro	Lamp	856	100%	307.6	100%	0.0	4.5.3
Int - 24/7 3L 4ft HPT8/LWT8 L&B Retro	Lamp	3	100%	420.3	100%	0.1	4.5.3
Int - CA 3L 4ft HPT8/LWT8 L&B Retro	Lamp	13	100%	294.5	101%	0.0	4.5.3
Int - 24/7 2L 8ft T12 Slim/HO/VHO - 4L 4ft HPT8	Lamp	148	100%	817.5	100%	0.1	4.5.3
Int - CA 2L 8ft T12 Slim/HO/VHO - 4L 4ft HPT8	Lamp	95	100%	572.8	100%	0.1	4.5.3
Int - 24/7 4L 4ft HPT8/LWT8 L&B Retro	Lamp	97	100%	578.3	100%	0.1	4.5.3
Int - CA 4L 4ft HPT8/LWT8 L&B Retro	Lamp	157	100%	405.2	100%	0.0	4.5.3

Source: ComEd tracking data and Navigant team analysis.

7.6 LED Exit Signs

LED exit signs had an overall realization rate of 100 percent and contributed to 17 percent of the overall savings.

Table 7-8. LED Exit Signs Measures Impact Detail

Measure	Unit Basis	Units Installed	kWh Gross Realization Rate	Verified kWh per Unit	Peak kW Gross Realization Rate	Verified Peak kW per Unit	TRM Section
LED Exit Sign Retrofit	Each	3,552	100%	209.7	101%	0.0	4.5.5
LED Exit Sign Retrofit with Battery Backup	Each	229	100%	209.7	101%	0.0	4.5.5

Source: ComEd tracking data and Navigant team analysis.

8. APPENDIX 3. TRC DETAIL

[We will add this section in the second draft.]