



ComEd Grocery Program Impact Evaluation Report

Energy Efficiency / Demand Response Plan:
Program Year 2020 (CY2020)
(1/1/2020-12/31/2020)

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ComEd
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1. Introduction

This report presents results from the CY2020 impact evaluation of ComEd's Grocery Program. It summarizes the total energy and demand impacts for the program broken out by relevant measure and program structure details. The appendices provide the impact analysis methodology and details of the total resource cost inputs. CY2020 covers January 1, 2020 through December 31, 2020.

2. Program Description

The ComEd Grocery Program aims to achieve cost-effective electricity savings for grocery and retail customers with refrigeration systems. For account managers working with customers on an initial energy assessment, the program provides equipment and measure selection and installation, incentive application and approval, and re-engagement to identify additional energy savings opportunities. The program engages with manufacturers, distributors, and installers of refrigeration and lighting equipment to offer the measures listed in Table 2-1. This program is referred to as the “EnergySmart Grocer” program in the deemed NTG spreadsheet.

To participate in the program, the ComEd customer has the option to first undergo a no-cost energy assessment or pre-installation check and an interview completed by the offering implementer, CLEARResult. CLEARResult prepares a savings report based on findings from the assessment and a CLEARResult account manager discusses the report with the customer. The savings report is generated using an energy savings model and a measure analysis tool developed by CLEARResult called EnergySmart Grocer. Each customer report presents possible efficiency measures for the customer to consider. Once the customer selects the measures to install, the account manager helps the customer select installers, complete incentive processing paperwork, and manage projects to completion. Account managers re-engage with customers after project completion to identify additional opportunities, providing the same level of management and assistance for subsequent projects the customer decides to undertake.

In CY2020, the Grocery Program had 60 participants and distributed 158 measures as the following table and graph show. Figure 2-1 illustrates the program ex ante savings distribution according to the 15 primary measure types; Figure 2-2 illustrates the program distribution according to the four end use types. In its first year, the ComEd Grocery Program's measure distribution was 63% lighting or lighting controls, 36% refrigeration, and 1% HVAC.

Table 2-1. CY2020 Volumetric Findings Detail

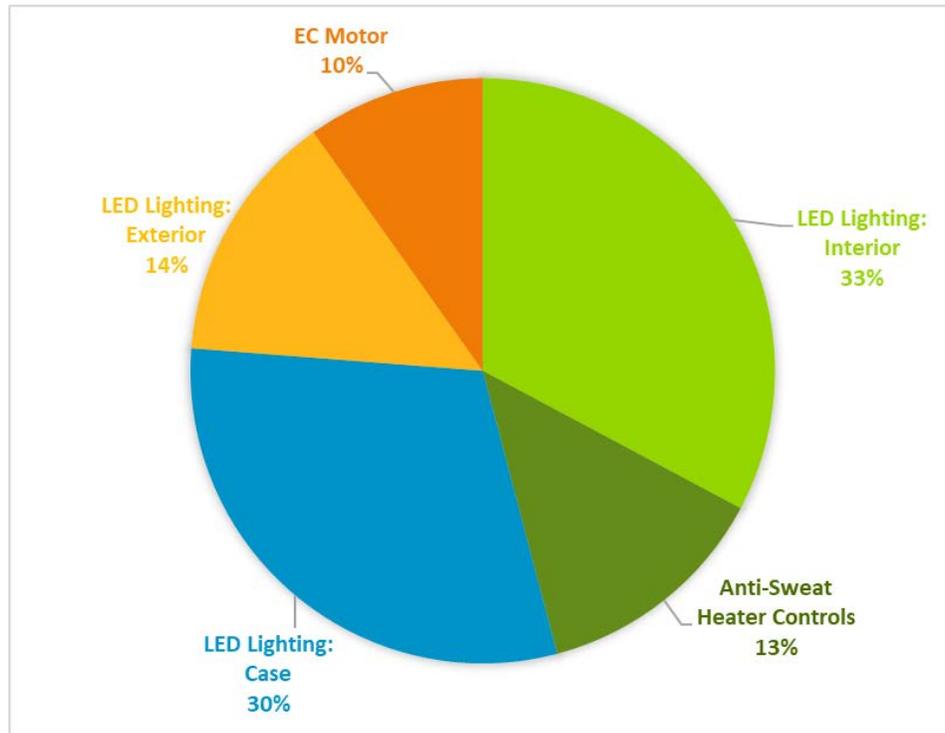
Participation	End Usage	Number
Participants		60
Measure Installations		15
Installed Anti-Sweat Heater Controls	Refrigeration	16
Installed Automatic Door Closer	Refrigeration	2
Installed EC Motor	Refrigeration	12
Installed Evaporator Fan Control	Refrigeration	8
Installed HVAC Control	HVAC	1
Installed HVAC Early Replacement	HVAC	1
Installed LED Lighting: Case	Lighting	37
LED Lighting: Exterior	Lighting	17
Installed LED Lighting: Interior	Lighting	40
Installed New Cases	Refrigeration	2
Installed Night Covers	Refrigeration	3
Installed Lighting Photocells	Lighting Controls	2
Installed Occupancy Sensor	Lighting Controls	1
Installed Strip Curtains	Refrigeration	5
Installed VFD for Condenser Fans	Refrigeration	11

* Participants are defined as unique ComEd account numbers

† Measure installations reflect unique line items in tracking data.

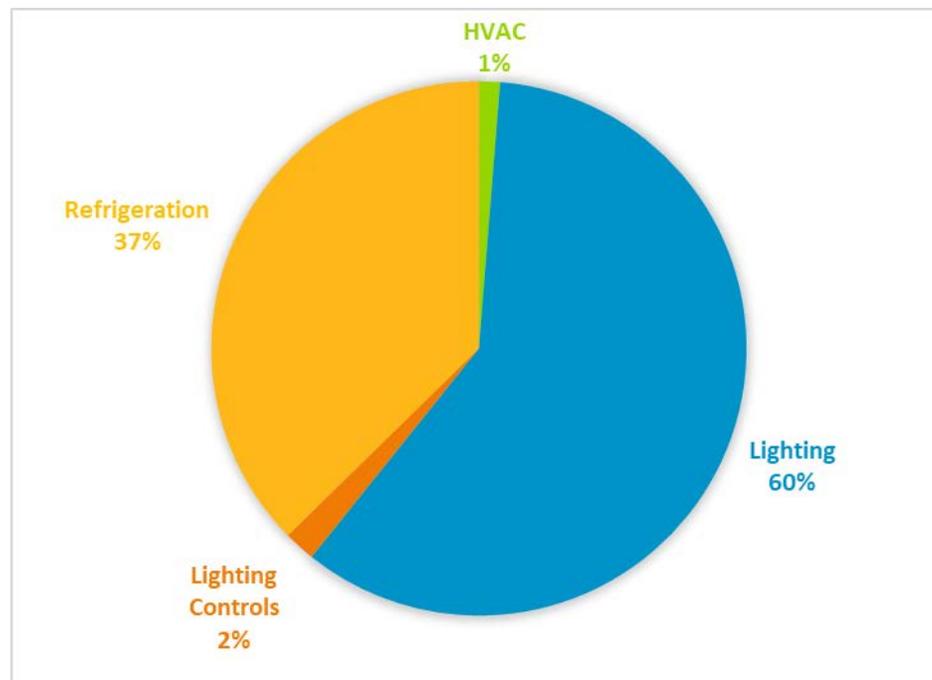
Source: ComEd tracking data and evaluation team analysis

Figure 2-1. Share of Top 5 Measures (Number of installed measures)



Source: ComEd tracking data and evaluation team analysis

Figure 2-2. Share of Measures Installed by End Use (Number of installed measures)



Source: ComEd tracking data and evaluation team analysis

3. Program Savings Detail

Table 3-1 summarizes the incremental energy and demand savings the Grocery Program achieved in CY2020. The gas savings shown are only those that ComEd may be able to claim, which excludes savings the gas utilities claim, via either joint or non-joint programs.

Table 3-1. CY2020 Total Annual Incremental Electric Savings

Savings Category	Energy Savings (kWh)	Summer Peak* Demand Savings (kW)
Electricity		
Ex Ante Gross Savings	9,368,231	1,185
Program Gross Realization Rate	1.02	1.02
Verified Gross Savings	9,536,289	1,204
Program Net-to-Gross Ratio (NTG)	0.97	0.97
Verified Net Savings	9,250,200	1,168
Converted from Gas†		
Ex Ante Gross Savings	2,704	NA
Program Gross Realization Rate	1.00	NA
Verified Gross Savings	2,704	NA
Program Net-to-Gross Ratio (NTG)	0.97	NA
Verified Net Savings	2,623	NA
Total Electric Plus Gas		
Ex Ante Gross Savings	9,370,934	1,185
Program Gross Realization Rate	1.02	1.02
Verified Gross Savings	9,538,993	1,204
Program Net-to-Gross Ratio (NTG)	0.97	0.97
Verified Net Savings	9,252,823	1,168

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

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

† Gas savings converted to kilowatt-hours (kWh) by multiplying therms by 29.31 (which is based on 100,000 Btu/therm and 3,412 Btu/kWh). The evaluation determines which gas savings are converted to kWh and counted toward ComEd's electric savings goal while producing the portfolio-wide summary report. According to Section 8-103B(b-25) of the Illinois Public Utilities Act, "In no event shall more than 10% of each year's applicable annual incremental goal as defined in paragraph (7) of subsection (g) of this Section be met through savings of fuels other than electricity."

Source: ComEd tracking data and evaluation team analysis

4. Cumulative Persisting Annual Savings

Table 4-1 to Table 4-3 and Figure 4-1 show the measure-specific and total verified gross savings for the ComEd Grocery Program and the cumulative persisting annual savings (CPAS) for the measures installed in CY2020. The electric CPAS across all measures installed in 2020 is 9,250,200 kWh (Table 4-1). The CY2020 gas contribution to CPAS (converted to equivalent electricity) is 2,623 kWh (Table 4-2). Adding the gas and electric contributions produces 9,252,823 kWh of total CY2020 contribution to CPAS (Table 4-3). The historic rows in each table are the CPAS contribution back to CY2019. The Program Total Electric CPAS and the Program Total Gas CPAS are the sum of the CY2020 contribution and the historic contribution.

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

End Use Type	Research Category	EUL	CY2020		2018	2019	2020	2021	2022	2023	2024	2025	2026
			Verified Gross Savings (kWh)	NTG*									
Lighting	LED Lighting: Interior	8.6	4,324,767	0.97	33,323,491		4,195,024	4,195,024	4,195,024	4,195,024	3,775,064	3,775,064	3,775,064
Refrigeration	Anti-Sweat Heater Controls	10.0	1,621,318	0.97	15,726,789		1,572,679	1,572,679	1,572,679	1,572,679	1,572,679	1,572,679	1,572,679
Lighting	LED Lighting: Case	8.6	941,204	0.97	7,578,343		912,968	912,968	912,968	912,968	895,988	895,988	895,988
Lighting	LED Lighting: Exterior	11.6	901,504	0.97	9,951,512		874,458	874,458	874,458	874,458	874,458	874,458	874,458
Refrigeration	EC Motor	15.0	714,200	0.97	10,391,615		692,774	692,774	692,774	692,774	692,774	692,774	692,774
Refrigeration	VFD for Condenser Fans	15.0	433,526	0.97	6,307,796		420,520	420,520	420,520	420,520	420,520	420,520	420,520
Refrigeration	Night Covers	5.0	229,981	0.97	1,115,408		223,082	223,082	223,082	223,082	223,082		
Refrigeration	New Cases	12.0	175,590	0.97	2,043,873		170,323	170,323	170,323	170,323	170,323	170,323	170,323
Refrigeration	Evaporator Fan Control	13.0	126,614	0.97	1,596,607		122,816	122,816	122,816	122,816	122,816	122,816	122,816
Refrigeration	Strip Curtains	4.0	46,165	0.97	179,118		44,780	44,780	44,780	44,780			
Refrigeration	Automatic Door Closer	8.0	10,456	0.97	81,141		10,143	10,143	10,143	10,143	10,143	10,143	10,143
HVAC	HVAC Control	10.0	7,589	0.97	73,618		7,362	7,362	7,362	7,362	7,362	7,362	7,362
HVAC	HVAC Early Retirement	5.0	2,562	0.97	12,428		2,486	2,486	2,486	2,486	2,486		
Lighting Controls	Occupancy Sensors	8.0	722	0.97	5,604		700	700	700	700	700	700	700
Lighting Controls	Lighting: Photocells	8.0	89	0.97	690		86	86	86	86	86	86	86
CY2020 Program Total Electric Contribution to CPAS			9,536,289		88,388,032		9,250,200	9,250,200	9,250,200	9,250,200	8,768,480	8,542,913	8,542,913
Historic Program Total Electric Contribution to CPAS‡						5,560,834	5,560,834	5,543,895	5,543,895	5,512,091	4,998,479	4,998,479	4,998,479
Program Total Electric CPAS						-	5,560,834	14,811,034	14,794,096	14,794,096	14,762,291	13,766,959	13,541,392
CY2020 Program Incremental Expiring Electric Savings§								-	-	-	481,720	225,567	-
Historic Program Incremental Expiring Electric Savings‡§								-	16,939	-	31,804	513,612	-
Program Total Incremental Expiring Electric Savings§								-	16,939	-	31,804	995,332	225,567

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	LED Lighting: Interior	3,775,064	1,443,139										
Refrigeration	Anti-Sweat Heater Controls	1,572,679	1,572,679	1,572,679									
Lighting	LED Lighting: Case	895,988	342,520										
Lighting	LED Lighting: Exterior	874,458	874,458	874,458	874,458	332,469							
Refrigeration	EC Motor	692,774	692,774	692,774	692,774	692,774	692,774	692,774	692,774				
Refrigeration	VFD for Condenser Fans	420,520	420,520	420,520	420,520	420,520	420,520	420,520	420,520				
Refrigeration	Night Covers												
Refrigeration	New Cases	170,323	170,323	170,323	170,323	170,323							
Refrigeration	Evaporator Fan Control	122,816	122,816	122,816	122,816	122,816	122,816						
Refrigeration	Strip Curtains												
Refrigeration	Automatic Door Closer	10,143											
HVAC	HVAC Control	7,362	7,362	7,362									
HVAC	HVAC Early Retirement												
Lighting Controls	Occupancy Sensors	700											
Lighting Controls	Lighting: Photocells	86											
CY2020 Program Total Electric Contribution to CPAS		8,542,913	5,646,591	3,860,932	2,280,891	1,738,902	1,236,110	1,113,294	1,113,294	-	-	-	-
Historic Program Total Electric Contribution to CPAS†		4,994,402	4,994,402	4,950,167	4,950,167	4,950,167	4,915,101	4,915,101					
Program Total Electric CPAS		13,537,315	10,640,993	8,811,099	7,231,058	6,689,069	6,151,211	6,028,395	1,113,294	-	-	-	-
CY2020 Program Incremental Expiring Electric Savings§		-	2,896,322	1,785,659	1,580,041	541,989	502,792	122,816	-	1,113,294	-	-	-
Historic Program Incremental Expiring Electric Savings‡§		4,077	-	44,235	-	-	35,066	-	4,915,101	-	-	-	-
Program Total Incremental Expiring Electric Savings§		4,077	2,896,322	1,829,894	1,580,041	541,989	537,857	122,816	4,915,101	1,113,294	-	-	-

Note: The green highlighted cell shows program total first year electric savings. The gray cells are blank, indicating values irrelevant to the CY2020 contribution to CPAS.

* A deemed value. Source: is found on the Illinois SAG website: https://www.ilsag.info/ntg_2020..

† Lifetime savings are the sum of CPAS savings through the effective useful life (EUL).

‡ Historical savings go back to CY2018.

§ Incremental expiring savings are equal to CPAS Y_{n-1} - CPAS Y_n .

Source: Evaluation team analysis

Table 4-2. Cumulative Persisting Annual Savings (CPAS) – Gas

End Use Type	Research Category	EUL	CY2020 Verified Gross Savings (Therms)	NTG*	Lifetime Net Savings (Therms)†	2018	2019	2020	2021	2022	2023	2024	2025	2026
Lighting	LED Lighting: Interior	8.6		0.97	-									
Refrigeration	Anti-Sweat Heater Controls	10.0		0.97	-									
Lighting	LED Lighting: Case	8.6		0.97	-									
Lighting	LED Lighting: Exterior	11.6		0.97	-									
Refrigeration	EC Motor	15.0		0.97	-									
Refrigeration	VFD for Condenser Fans	15.0		0.97	-									
Refrigeration	Night Covers	5.0		0.97	-									
Refrigeration	New Cases	12.0		0.97	-									
Refrigeration	Evaporator Fan Control	13.0		0.97	-									
Refrigeration	Strip Curtains	4.0		0.97	-									
Refrigeration	Automatic Door Closer	8.0		0.97	-									
HVAC	HVAC Control	10.0	92	0.97	895			89	89	89	89	89	89	89
HVAC	HVAC Early Retirement	5.0		0.97	-									
Lighting Controls	Occupancy Sensors	8.0		0.97	-									
Lighting Controls	Lighting: Photocells	8.0		0.97	-									
CY2020 Program Total Gas Contribution to CPAS (Therms)			92		895			89	89	89	89	89	89	89
CY2020 Program Total Gas Contribution to CPAS (kWh Equivalent)‡						-	-	2,623	2,623	2,623	2,623	2,623	2,623	2,623
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§														
Program Total Gas CPAS (kWh Equivalent)‡						-	-	2,623	2,623	2,623	2,623	2,623	2,623	2,623
CY2020 Program Incremental Expiring Gas Savings (Therms)									-	-	-	-	-	-
CY2020 Program Incremental Expiring Gas Savings (kWh Equivalent)‡									-	-	-	-	-	-
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§									-	-	-	-	-	-
Program Total Incremental Expiring Gas Savings (kWh Equivalent)‡									-	-	-	-	-	-

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	LED Lighting: Interior												
Refrigeration	Anti-Sweat Heater Controls												
Lighting	LED Lighting: Case												
Lighting	LED Lighting: Exterior												
Refrigeration	EC Motor												
Refrigeration	VFD for Condenser Fans												
Refrigeration	Night Covers												
Refrigeration	New Cases												
Refrigeration	Evaporator Fan Control												
Refrigeration	Strip Curtains												
Refrigeration	Automatic Door Closer												
HVAC	HVAC Control	89	89	89									
HVAC	HVAC Early Retirement												
Lighting Controls	Occupancy Sensors												
Lighting	Lighting: Photocells												
CY2020 Program Total Gas Contribution to CPAS (Therms)		89	89	89	-	-	-	-	-	-	-	-	-
CY2020 Program Total Gas Contribution to CPAS (kWh Equivalent)†		2,623	2,623	2,623	-	-	-	-	-	-	-	-	-
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§													
Program Total Gas CPAS (kWh Equivalent)†		2,623	2,623	2,623	-	-	-	-	-	-	-	-	-
CY2020 Program Incremental Expiring Gas Savings (Therms)		-	-	-	89	-	-	-	-	-	-	-	-
CY2020 Program Incremental Expiring Gas Savings (kWh Equivalent)†		-	-	-	2,623	-	-	-	-	-	-	-	-
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§		-	-	-	-	-	-	-	-	-	-	-	-
Program Total Incremental Expiring Gas Savings (kWh Equivalent)†		-	-	-	2,623	-	-	-	-	-	-	-	-

Note: The green highlighted cell shows program total first year gas savings in kWh equivalents. The gray cells are blank, indicating no values or no contribution to calculating CPAS in CY2020.

* A deemed value. Source: is found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.

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

‡ kWh equivalent savings are calculated by multiplying therm savings by 29.31.

§ Historic savings go back to CY2018.

|| Incremental expiring savings are equal to CPAS Y_{n-1} - CPAS Y_n.

Source: Evaluation team analysis

Table 4-3. Cumulative Persisting Annual Savings (CPAS) – Total

End Use Type	Research Category	EUL	CY2020 Verified Gross Savings (kWh)	NTG*	Lifetime Net Savings (kWh)†	2018	2019	2020	2021	2022	2023	2024	2025	2026
Lighting	LED Lighting: Interior	8.6	4,324,767	0.97	33,323,491			4,195,024	4,195,024	4,195,024	4,195,024	3,775,064	3,775,064	3,775,064
Refrigeration	Anti-Sweat Heater Controls	10.0	1,621,318	0.97	15,726,789			1,572,679	1,572,679	1,572,679	1,572,679	1,572,679	1,572,679	1,572,679
Lighting	LED Lighting: Case	8.6	941,204	0.97	7,578,343			912,968	912,968	912,968	912,968	895,988	895,988	895,988
Lighting	LED Lighting: Exterior	11.6	901,504	0.97	9,951,512			874,458	874,458	874,458	874,458	874,458	874,458	874,458
Refrigeration	EC Motor	15.0	714,200	0.97	10,391,615			692,774	692,774	692,774	692,774	692,774	692,774	692,774
Refrigeration	VFD for Condenser Fans	15.0	433,526	0.97	6,307,796			420,520	420,520	420,520	420,520	420,520	420,520	420,520
Refrigeration	Night Covers	5.0	229,981	0.97	1,115,408			223,082	223,082	223,082	223,082	223,082	223,082	223,082
Refrigeration	New Cases	12.0	175,590	0.97	2,043,873			170,323	170,323	170,323	170,323	170,323	170,323	170,323
Refrigeration	Evaporator Fan Control	13.0	126,614	0.97	1,599,229			122,816	122,816	122,816	122,816	122,816	122,816	122,816
Refrigeration	Strip Curtains	4.0	46,165	0.97	179,118			44,780	44,780	44,780	44,780	44,780	44,780	44,780
Refrigeration	Automatic Door Closer	8.0	10,456	0.97	81,141			10,143	10,143	10,143	10,143	10,143	10,143	10,143
HVAC	HVAC Control	10.0	10,293	0.97	78,864			9,985	9,985	7,362	7,362	7,362	7,362	7,362
HVAC	HVAC Early Retirement	5.0	2,562	0.97	12,428			2,486	2,486	2,486	2,486	2,486	-	-
Lighting Controls	Occupancy Sensors	8.0	722	0.97	5,604			700	700	700	700	700	700	700
Lighting Controls	Lighting: Photocells	8.0	89	0.97	690			86	86	86	86	86	86	86
CY2020 Program Total Contribution to CPAS			9,538,993		88,395,900			9,252,823	9,252,823	9,250,200	9,250,200	8,768,480	8,542,913	8,542,913
Historic Program Total Contribution to CPAS‡								-	5,560,834	5,560,834	5,543,895	5,543,895	5,512,091	4,998,479
Program Total CPAS								-	5,560,834	14,813,657	14,796,718	14,794,096	14,762,291	13,541,392
CY2020 Program Incremental Expiring Savings§										2,623	-	481,720	225,567	-
Historic Program Incremental Expiring Savings‡§										-	16,939	-	31,804	513,612
Program Total Incremental Expiring Savings§										-	16,939	2,623	31,804	995,332

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	LED Lighting: Interior	3,775,064	1,443,139	-	-	-	-	-	-	-	-	-	-
Refrigeration	Anti-Sweat Heater Controls	1,572,679	1,572,679	1,572,679	-	-	-	-	-	-	-	-	-
Lighting	LED Lighting: Case	895,988	342,520	-	-	-	-	-	-	-	-	-	-
Lighting	LED Lighting: Exterior	874,458	874,458	874,458	874,458	332,469	-	-	-	-	-	-	-
Refrigeration	EC Motor	692,774	692,774	692,774	692,774	692,774	692,774	692,774	692,774	-	-	-	-
Refrigeration	VFD for Condenser Fans	420,520	420,520	420,520	420,520	420,520	420,520	420,520	420,520	-	-	-	-
Refrigeration	Night Covers	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	New Cases	170,323	170,323	170,323	170,323	170,323	-	-	-	-	-	-	-
Refrigeration	Evaporator Fan Control	122,816	122,816	122,816	125,439	122,816	122,816	-	-	-	-	-	-
Refrigeration	Strip Curtains	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	Automatic Door Closer	10,143	-	-	-	-	-	-	-	-	-	-	-
HVAC	HVAC Control	7,362	7,362	7,362	-	-	-	-	-	-	-	-	-
HVAC	HVAC Early Retirement	-	-	-	-	-	-	-	-	-	-	-	-
Lighting Controls	Occupancy Sensors	700	-	-	-	-	-	-	-	-	-	-	-
Lighting Controls	Lighting: Photocells	86	-	-	-	-	-	-	-	-	-	-	-
CY2020 Program Total Contribution to CPAS		8,542,913	5,646,591	3,860,932	2,283,514	1,738,902	1,236,110	1,113,294	1,113,294	-	-	-	-
Historic Program Total Contribution to CPAS†		4,994,402	4,994,402	4,950,167	4,950,167	4,950,167	4,915,101	4,915,101	-	-	-	-	-
Program Total CPAS		13,537,315	10,640,993	8,811,099	7,233,681	6,689,069	6,151,211	6,028,395	1,113,294	-	-	-	-
CY2020 Program Incremental Expiring Savings§		-	2,896,322	1,785,659	1,577,418	544,612	502,792	122,816	-	1,113,294	-	-	-
Historic Program Incremental Expiring Savings‡§		4,077	-	44,235	-	-	35,066	-	4,915,101	-	-	-	-
Program Total Incremental Expiring Savings§		4,077	2,896,322	1,829,894	1,577,418	544,612	537,857	122,816	4,915,101	1,113,294	-	-	-

Note: The green highlighted cell shows program total first year electric savings (including direct electric savings and those converted from gas). The gray cells are blank, indicating no values or no contribution to calculating CPAS in CY2020.

* A deemed value. Source: is found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.

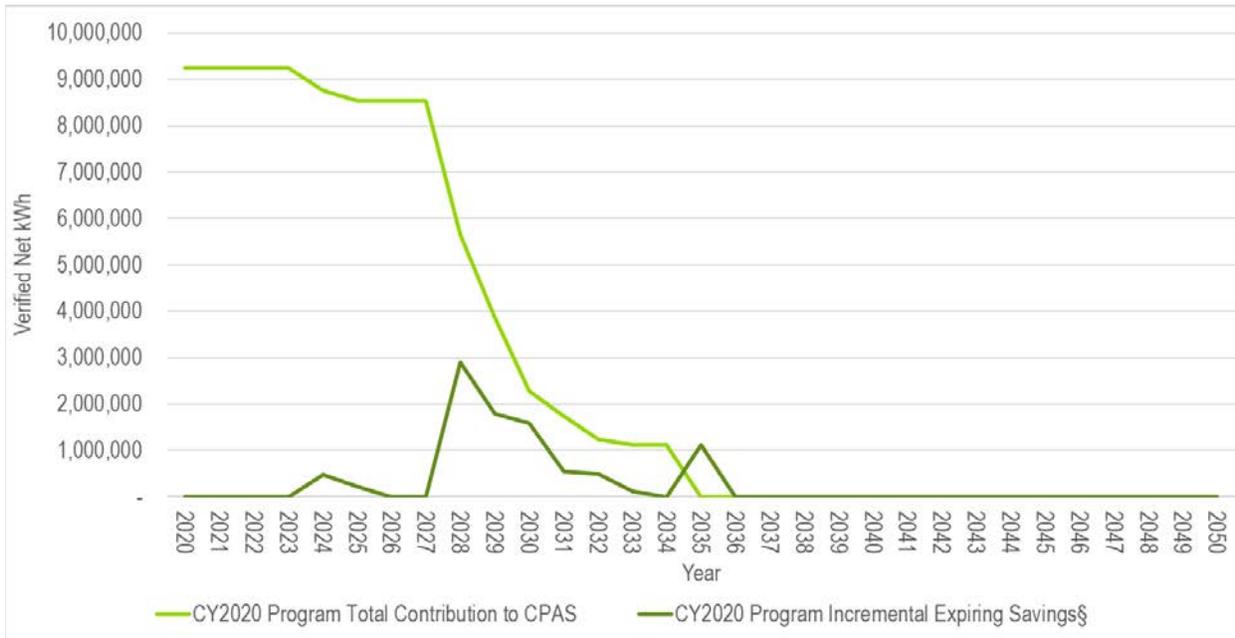
† Lifetime savings are the sum of CPAS savings through the EUL.

‡ Historic savings go back to CY2018.

§ Incremental expiring savings are equal to CPAS Y_{n-1} - CPAS Y_n .

Source: Evaluation team analysis

Figure 4-1. Cumulative Persisting Annual Savings



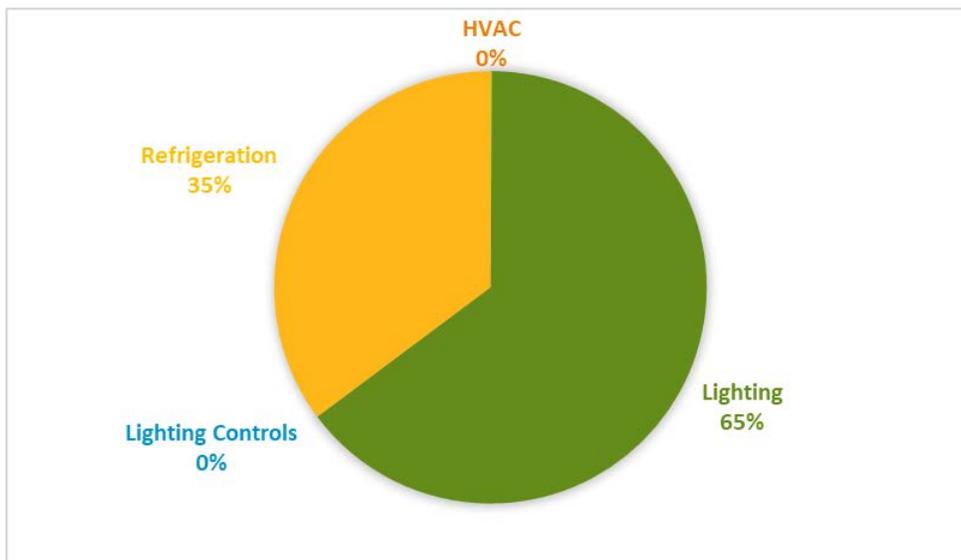
* Expiring savings are equal to CPAS Y_{n-1} - CPAS Y_n

Source: Evaluation team analysis

5. Program Savings by Measure

The program includes 15 primary measure types as shown in the following tables. The lighting measures contributed the greatest savings at 65% (see Figure 5-1). Table 5-1, Table 5-2, and Table 5-3 summarize energy, peak demand, and gas savings, respectively. The realization rate in the tables was calculated at the program level and applied at the measure level. The implementer did not claim any water savings for this program.

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



Source: Evaluation team analysis

Table 5-1. CY2020 Energy Savings by Measure – Electric

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)	EUL (years)
Lighting	LED Lighting: Interior	4,248,552	1.02	4,324,767	0.97	4,195,024	8.6
Refrigeration	Anti-Sweat Heater Controls	1,592,746	1.02	1,621,318	0.97	1,572,679	10.0
Lighting	LED Lighting: Case	924,617	1.02	941,204	0.97	912,968	8.6
Lighting	LED Lighting: Exterior	885,616	1.02	901,504	0.97	874,458	11.6
Refrigeration	EC Motor	701,614	1.02	714,200	0.97	692,774	15.0
Refrigeration	VFD for Condenser Fans	425,886	1.02	433,526	0.97	420,520	15.0
Refrigeration	Night Covers	225,928	1.02	229,981	0.97	223,082	5.0
Refrigeration	New Cases	172,496	1.02	175,590	0.97	170,323	12.0
Refrigeration	Evaporator Fan Control	124,383	1.02	126,614	0.97	122,816	13.0
Refrigeration	Strip Curtains	45,351	1.02	46,165	0.97	44,780	4.0
Refrigeration	Automatic Door Closer	10,272	1.02	10,456	0.97	10,143	8.0
HVAC	HVAC Control	7,456	1.02	7,589	0.97	7,362	10.0
HVAC	HVAC Early Retirement	2,517	1.02	2,562	0.97	2,486	5.0
Lighting Controls	Occupancy Sensors	709	1.02	722	0.97	700	8.0
Lighting Controls	Lighting: Photocells	87	1.02	89	0.97	86	8.0
Total		9,368,231	1.02	9,536,289	0.97	9,250,200	9.9

Note: The savings in this table includes secondary electric energy (kWh) savings from water supply and wastewater treatment plants for measures claimed by ComEd. The savings account for electric heating penalties, where applicable.

* A deemed value. Source: is found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.

Source: ComEd tracking data and evaluation team analysis

Table 5-2. CY2020 Summer Peak Demand Savings by Measure

Research Category	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Peak Demand Reduction (kW)	NTG*	Verified Net Peak Demand Reduction (kW)
LED Lighting: Interior	905.49	1.02	919.86	0.97	892.26
Anti-Sweat Heater Controls	0.00	1.02	0.00	0.97	0.00
LED Lighting: Case	159.36	1.02	161.89	0.97	157.04
LED Lighting: Exterior	0.00	1.02	0.00	0.97	0.00
EC Motor	80.09	1.02	81.36	0.97	78.92
VFD for Condenser Fans	0.00	1.02	0.00	0.97	0.00
Night Covers	0.00	1.02	0.00	0.97	0.00
New Cases	17.24	1.02	17.51	0.97	16.99
Evaporator Fan Control	14.19	1.02	14.41	0.97	13.98
Strip Curtains	5.17	1.02	5.26	0.97	5.10
Automatic Door Closer	1.44	1.02	1.46	0.97	1.42
HVAC Control	1.20	1.02	1.22	0.97	1.18
HVAC Early Retirement	0.80	1.02	0.81	0.97	0.79
Occupancy Sensors	0.50	1.02	0.50	0.97	0.49
Lighting: Photocells	0.00	1.02	0.00	0.97	0.00
Total	1,185.48	1.02	1,204.29	0.97	1,168.16

* A deemed value. Source: is found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.

Source: ComEd tracking data and evaluation team analysis

Table 5-3. CY2020 Energy Savings by Measure – Gas

End Use Type	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate	Verified Gross Savings (Therms)	NTG*	Verified Net Savings (Therms)	EUL (years)
Lighting	LED Lighting: Interior						8.6
Refrigeration	Anti-Sweat Heater Controls						10.0
Lighting	LED Lighting: Case						8.6
Lighting	LED Lighting: Exterior						11.6
Refrigeration	EC Motor						15.0
Refrigeration	VFD for Condenser Fans						15.0
Refrigeration	Night Covers						5.0
Refrigeration	New Cases						12.0
Refrigeration	Evaporator Fan Control						13.0
Refrigeration	Strip Curtains						4.0
Refrigeration	Automatic Door Closer						8.0
HVAC	HVAC Control	92	1.00	92	0.97	89	10.0
HVAC	HVAC Early Retirement						5.0
Lighting Controls	Occupancy Sensors						8.0
Lighting Controls	Lighting: Photocells						8.0
	Total Therms	92	1.00	92	0.97	89	NA
	Total kWh Converted From Therms†	2,704	1.00	2,704	0.97	2,623	NA

* A deemed value. Source: is found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.

† Gas savings converted to kWh by multiplying therms by 29.31 (which is based on 100,000 Btu/therm and 3,412 Btu/kWh).

Source: ComEd tracking data and evaluation team analysis

Table 5-4. CY2020 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	LED Lighting: Interior	4,248,552	1.02	4,324,767	0.97	4,195,024
Refrigeration	Anti-Sweat Heater Controls	1,592,746	1.02	1,621,318	0.97	1,572,679
Lighting	LED Lighting: Case	924,617	1.02	941,204	0.97	912,968
Lighting	LED Lighting: Exterior	885,616	1.02	901,504	0.97	874,458
Refrigeration	EC Motor	701,614	1.02	714,200	0.97	692,774
Refrigeration	VFD for Condenser Fans	425,886	1.02	433,526	0.97	420,520
Refrigeration	Night Covers	225,928	1.02	229,981	0.97	223,082
Refrigeration	New Cases	172,496	1.02	175,590	0.97	170,323
Refrigeration	Evaporator Fan Control	124,383	1.02	126,614	0.97	122,816
Refrigeration	Strip Curtains	45,351	1.02	46,165	0.97	44,780
Refrigeration	Automatic Door Closer	10,272	1.02	10,456	0.97	10,143
HVAC	HVAC Control	10,160	1.02	10,293	0.97	9,985
HVAC	HVAC Early Retirement	2,517	1.02	2,562	0.97	2,486
Lighting Controls	Occupancy Sensors	709	1.02	722	0.97	700
Lighting Controls	Lighting: Photocells	87	1.02	89	0.97	86
	Total†	9,370,934	1.02	9,538,993	0.97	9,252,823

* A deemed value. Source: is found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.

† The total includes the electric equivalent of the total therms.

Source: ComEd tracking data and evaluation team analysis

6. Impact Analysis Findings and Recommendations

6.1 Impact Parameter Estimates

The evaluation team used parameters deemed by the Illinois Statewide Technical Reference Manual (TRM v8.0) and validated the parameters that were not specified in TRM v8.0. Table 6-1 shows the results.

Table 6-1. Savings Parameters

Gross Savings Input Parameters	Value	Units	Deemed or Evaluated?	Source *
Quantity of Installation	Field-collected	# Measures	Evaluated	Detailed review of provided project workbooks and measure invoices
NTG	97	%	Deemed	SAG Consensus
Hours of Use (LED Lighting)	Varies by building type	Hours/Year	Deemed	Project workbooks including fixture location information and inputs where drawn from TRM v8.0 – Section 4.5.4
Lighting Pre and Post Wattage	Varies by fixture type	Watts	Evaluated	TRM v8.0 – for baseline wattage and measure invoice for post wattage
Lighting Waste Heat Factors	0	Btu/Watts	Deemed	TRM v8.0 includes WHF but zero claimed WHF is consistent with the standard lighting program requirements
Refrigeration	Varies by Climate Zone	kWh Savings/HP	Deemed	Climate zones where confirmed for each project and TRM v8.0 – Section 4.6.12 provided deemed inputs

* TRM is the State of Illinois Technical Reference Manual version 8.0 from <http://www.ilsag.info/technical-reference-manual.html>. The NTG values can be found on the Illinois SAG website here: https://www.ilsag.info/ntg_2020.

Source: Evaluation team analysis

6.2 Other Impact Findings and Recommendations

The evaluation team developed several recommendations based on findings from the CY2020 evaluation.

6.2.1 Lighting

Finding 1. Guidehouse could not initially verify lighting calculations for select sample projects based on the databooks provided because calculation fields and input data were hidden and locked by the implementation contractor (IC). Although a password was provided, Guidehouse staff had difficulty identifying all the inputs in these calculators as they were often within hidden tabs or columns. Guidehouse verified lighting calculations by recreating the databooks using invoice quantities and specification documentation.

Recommendation 1. Guidehouse recommends the IC submit workbooks that are not password protected to enable accurate and substantiated verification of savings. If certain columns are

kept hidden for simplicity when presenting to the customer, Guidehouse would like guidance on where the major inputs are in each calculation.

Finding 2. Guidehouse noted that zero heating penalty (therms) was included in the program level tracker. Including this penalty is consistent with how heating penalty is handled in the other programs.

Recommendation 2. If the program plans to claim gas savings, Guidehouse recommends the IC add the heating penalty data field to the tracker to enable an accurate and substantiated verification of savings if this information is necessary in the future. To do this, the IC should include building type (grocery or convenience store) and heating fuel type for each project.

Finding 3. Guidehouse observed that the value for annual lighting operating hours for project ESG 57 was incorrectly applied by the project workbook, as a result of inappropriate building type selection. This misapplication resulted in a realization rate (RR) of 1.05 for the sampled strata energy savings, and a program level RR of 1.02 for energy savings. Similarly, this selection resulted in a RR of 1.03 for the sampled strata demand savings, and corresponding program level RR of 1.02 for demand savings.

Guidehouse and ComEd had a follow-up meeting with the IC to explain this situation. The IC explained that the site, normally a grocery store, was being used exclusively for food prep and baking during the pandemic. For this reason, the other building type was chosen instead of grocery. Since grocery represents the normal operation for this site, the evaluation team decided that it was more appropriate to use the grocery building type resulting in a slightly higher RR.

Recommendation 3. Guidehouse recommends the IC consider conducting additional QA/QC steps on final analyses workbooks to ensure energy and demand savings are claimed correctly.

6.2.2 Program

Finding 4. There is no field in the tracking data that allows for T12 baselines to be identified. This information is necessary to accurately account for the T12 midlife adjustment specified in the TRM.

Recommendation 4. Guidehouse recommends the program track the baseline fixture type using a field with prescribed fixture identities.

Appendix A. Impact Analysis Methodology

The evaluation team initiated the impact evaluation process by designing a sample of the CY2020 ComEd Grocery Program participants. The team categorized measures by annual energy savings strata, defined as follows:

- **Small:** Less than 75,000 kWh
- **Mid:** 75,000 to 150,000 kWh
- **Large:** Greater than 150,000 kWh

To achieve the 85% confidence interval and 15% maximum relative precision, Guidehouse selected 22 measures for nine participants according to the following distribution numbers:

- **Small:** Eight
- **Mid:** Six
- **Large:** Eight

The team requested the documentation associated with the sampled measures for review. Final ex post values were determined through a detailed review of the sampled measures. The evaluation team developed realization rates (RRs) for each strata from the ex post savings and weighted this strata RR against the total savings in each strata to determine a final program RR. The final ex post savings resulted in 90% confidence interval and 2.6% relative precision which was much better than original sample target.

The evaluation team determined verified gross savings for each program measure by:

1. Reviewing the savings algorithm inputs in the measure databook for agreement with the TRM v8.0 and the TRM v8.0 Errata, where applicable.
2. Validating 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 Guidehouse'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 IC workbook data.

The evaluation team calculated verified net energy and coincident peak demand savings by multiplying the verified gross savings estimates by a net-to-gross (NTG). For the ComEd Grocery Program, the NTG is deemed as 0.97 through the SAG consensus process.

The team used the following documents to verify the per-unit savings for each program measure:

- Final ComEd CY2020 tracking data: ESG_CY2020_EOY_Data_01172021.xlsx.

- TRM v8.0 for deemed input parameters or secondary evaluation research to verify any custom inputs used in the ex-ante calculations.
- Implementer Savings Calculations: 08- [site name] -Final Grocery Lighting Workbook ComEd.xlsx.
- IC's W-9s, program applications, measure specifications, and measure invoices for each sample project.
- ComEd Grocery Program Workpapers, CLEAResult, February 10, 2020; and April 10, 2019.

Appendix B. Total Resource Cost Detail

Table B-1 shows the total resource cost (TRC) cost-effectiveness analysis inputs available at the time of finalizing this impact evaluation report. Additional required cost data (e.g., measure costs, program level incentive and non-incentive costs) is not included in this table and will be provided to the evaluation team later.

Table B-1. Total Resource Cost Savings Summary

End Use Type	Research Category	Units	Quantity of Measures	EUL (years)*	ER Flag†	Gross Electric Energy Savings (kWh)	Gross Peak Demand Reduction (kW)	Gross Gas Savings (Therms)	Gross Secondary Savings due to Water Reduction (kWh)	Gross Heating Penalty (kWh)	Gross Heating Penalty (Therms)	NTG (kWh)	NTG (kW)	NTG (Therms)	Net Electric Energy Savings (kWh)	Net Peak Demand Reduction (kW)	Net Gas Savings (Therms)	Net Secondary Savings due to Water Reduction (kWh)	Net Heating Penalty (kWh)	Net Heating Penalty (Therms)	
Lighting	LED Lighting: Interior	Each	40	8.6		4,324,767	919.86	0	0	0	-90,614	0.97	0.97	0.97	4,195,024	892.26	0	0	0	-87,896	
Refrigeration	Anti-Sweat Heater Controls	Each	16	10.0		1,621,318	0.00	0	0	0	0	0.97	0.97	0.97	1,572,679	0	0	0	0	0	
Lighting	LED Lighting: Case	Each	37	8.6		941,204	161.89	0	0	0	0	0.97	0.97	0.97	912,968	157	0	0	0	0	
Lighting	LED Lighting: Exterior	Each	17	11.6		901,504	0.00	0	0	0	0	0.97	0.97	0.97	874,458	0	0	0	0	0	
Refrigeration	EC Motor	Each	12	15.0		714,200	81.36	0	0	0	0	0.97	0.97	0.97	692,774	79	0	0	0	0	
Refrigeration	VFD for Condenser Fans	Each	11	15.0		433,526	0.00	0	0	0	0	0.97	0.97	0.97	420,520	0	0	0	0	0	
Refrigeration	Night Covers	Each	3	5.0		229,981	0.00	0	0	0	0	0.97	0.97	0.97	223,082	0	0	0	0	0	
Refrigeration	New Cases	Each	2	15.0		175,590	17.51	0	0	0	0	0.97	0.97	0.97	170,323	17	0	0	0	0	
Refrigeration	Evaporator Fan Control	Each	8	13.0		126,614	14.41	0	0	0	0	0.97	0.97	0.97	122,816	14	0	0	0	0	
Refrigeration	Strip Curtains	Each	5	4.0		46,165	5.26	0	0	0	0	0.97	0.97	0.97	44,780	5	0	0	0	0	
Refrigeration	Automatic Door Closer	Each	2	8.0		10,456	1.46	0	0	0	0	0.97	0.97	0.97	10,143	1	0	0	0	0	
HVAC	HVAC Control	Each	1	10.0		7,589	1.22	92	0	0	0	0.97	0.97	0.97	7,362	1	89	0	0	0	
HVAC	HVAC Early Retirement	Each	1	5.0	YES	2,562	0.81	0	0	0	0	0.97	0.97	0.97	2,486	1	0	0	0	0	
Lighting Controls	Occupancy Sensors	Each	1	8.0		722	0.50	0	0	0	0	0.97	0.97	0.97	700	0	0	0	0	0	
Lighting	Lighting: Photocells	Each	2	8.0		89	0.00	0	0	0	0	0.97	0.97	0.97	86	0	0	0	0	0	
	Total			10.0		9,536,289	1,204	92	0	0	0	-90,614	NA	NA	NA	9,250,200	1,168	89	0	0	-87,896

NA = Not applicable

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

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

Source: ComEd tracking data and evaluation team analysis