Guidehouse

# ComEd Savings for Income Eligible Seniors Pilot Impact Evaluation Report

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

**Prepared for:**

**ComEd**

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# 1. Introduction

This report presents results from the CY2020 impact evaluation of ComEd's Savings for Income Eligible Seniors Pilot. It summarizes the total energy and demand impacts broken out by relevant measure and pilot structure details. The appendices provide the impact analysis methodology and details of the total resource cost (TRC) inputs. CY2020 covers January 1, 2020 through March 31, 2020.

# 2. Pilot Description

ComEd launched the Savings for Income Eligible Seniors Pilot (Pilot) in January 2019 to test an approach to provide income eligible senior customers with greater access to energy efficiency measures. The Pilot was originally scheduled to conclude in December 2019 however due to scheduling delays, the implementers finished the installations in March 2020. At the time of this writing, ComEd does not intend to convert this Pilot into a program. CLEAResult, Green Home Experts, and AgeOptions (the Illinois Department on Aging) implemented the Pilot. The implementers worked with social services agencies to engage income eligible ComEd customers age 60 and older (income eligible seniors). Through member agency staff, marketing and communications, the implementers described the services of the Pilot to the customer and obtained permission to install energy efficiency measures in their homes. Technicians then installed a suite of measures, when possible, including weatherstripping, door sweeps, caulking, (combined as air sealing in the following sections), advanced thermostats, LED screw based omnidirectional bulbs, and LED nightlights.

The Pilot had 69 participants in CY2020, and installed the four measures as Table 2-1 and Figure 2-1 show.

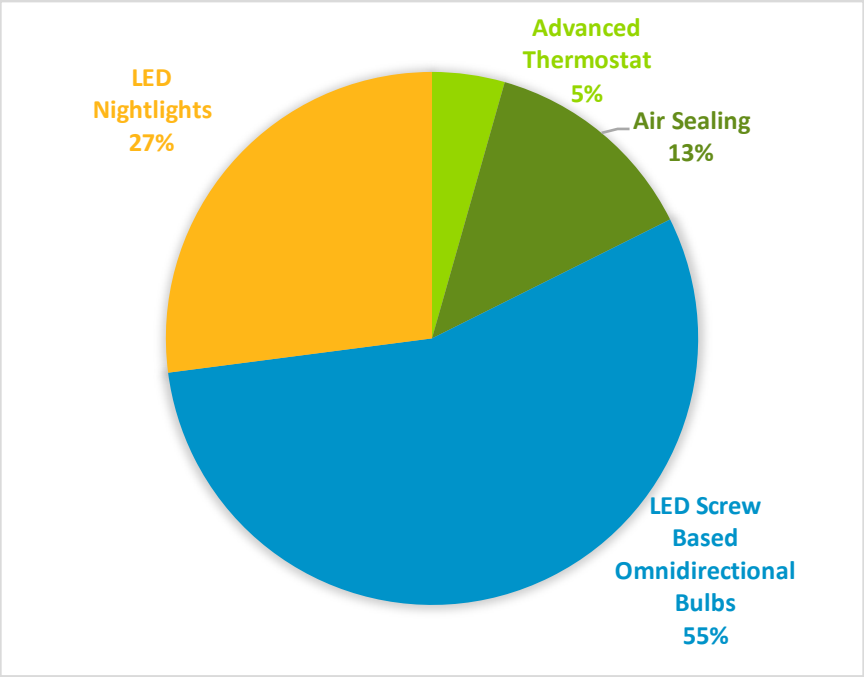
**Table 2-1. CY2020 Volumetric Findings Detail**

| Participation | Total |
|---|---|
| Participants* | 69 |
| Total Measures Installed | 499 |
| Number of Unique Measures | 4 |
| Advanced Thermostats | 22 |
| Air Sealing (Projects) | 66 |
| LED Screw Based Omnidirectional Bulbs | 276 |
| LED Nightlights | 135 |

*Participants are defined as unique project households

*Source: ComEd tracking data and evaluation team analysis*

**Figure 2-1. Share of Measures Installed by Type**




*Source: ComEd tracking data and evaluation team analysis*

# 3. Pilot Savings Detail

Table 3-1 summarizes the incremental energy and demand savings the Savings for Income Eligible Seniors Pilot achieved in CY2020. The Pilot electric savings has a realization rate of 1.01 with a Pilot gas realization rate of 0.96. Overall, the Pilot has a CY2020 gross realization rate of 0.97. Gas savings are only those that ComEd may be able to claim, which excludes savings the gas utilities claim, either via joint or non-joint pilots.

**Table 3-1. CY2020 Total Annual Incremental Electric Savings**

| Savings Category | Energy Savings (kWh) | Summer Peak* Demand Savings (kW) |
|---|---|---|
| Electricity | | |
| Ex Ante Gross Savings | 22,034 | 4 |
| Program Gross Realization Rate | 1.01 | 0.83 |
| Verified Gross Savings | 22,330 | 3 |
| Program Net-to-Gross Ratio (NTG) | 1.00 | 1.00 |
| Verified Net Savings | 22,330 | 3 |
| Converted from Gas† | | |
| Ex Ante Gross Savings | 97,772 | NA |
| Program Gross Realization Rate | 0.96 | NA |
| Verified Gross Savings | 93,926 | NA |
| Program Net-to-Gross Ratio (NTG) | 1.00 | NA |
| Verified Net Savings | 93,926 | NA |
| Total Electric Plus Gas | | |
| Ex Ante Gross Savings | 119,807 | 4 |
| Program Gross Realization Rate | 0.97 | 0.83 |
| Verified Gross Savings | 116,256 | 3 |
| Program Net-to-Gross Ratio (NTG) | 1.00 | 1.00 |
| Verified Net Savings | 116,256 | 3 |

NA = not applicable (refers to a piece of data that 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 Savings for Income Eligible Seniors Pilot and the cumulative persisting annual savings (CPAS) for the measures installed in CY2020. The electric CPAS across all measures installed in 2020 is 22,330 kWh (Table 4-1). The CY2020 gas contribution to CPAS (converted to equivalent electricity) is 93,926 kWh (Table 4-2). Adding the gas and electric contributions produces 116,256 kWh of total CY2020 contribution to CPAS (Table 4-3). The historic rows in each table are the CPAS contribution back to CY2018. The Pilot Total Electric CPAS and Pilot Total Gas CPAS rows are the sum of the CY2020 contribution and the historic contribution.

Incremental expiring savings are cumulative annually as measures in the Pilot exceed their effective useful life (EUL). Figure 4-1 shows these expiring savings relative to the Pilot’s CY2020 total CPAS.

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

| End Use Type | Research Category | EUL | CY2020 Verified Gross Savings (kWh) | NTG* | Lifetime Net Savings (kWh)† | Verified Net kWh Savings 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shell | Air Sealing | 20.0 | 2,813 | 1.00 | 56,259 | | | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 |
| HVAC | Advanced Thermostats | 11.0 | 4,669 | 1.00 | 51,354 | | | 4,669 | 4,669 | 4,669 | 4,669 | 4,669 | 4,669 | 4,669 |
| Lighting | LED Screw Based Omnidirectional Bulb | 10.0 | 10,802 | 1.00 | 94,086 | | | 10,802 | 10,802 | 10,802 | 10,802 | 10,802 | 10,802 | 10,802 |
| Lighting | LED Nightlights | 8.0 | 4,046 | 1.00 | 32,370 | | | 4,046 | 4,046 | 4,046 | 4,046 | 4,046 | 4,046 | 4,046 |
| CY2020 Program Total Electric Contribution to CPAS | | | 22,330 | | 234,068 | | | 22,330 | 22,330 | 22,330 | 22,330 | 22,330 | 22,330 | 22,330 |
| Historic Program Total Electric Contribution to CPAS‡ | | | | | | - | 71,251 | 71,251 | 57,401 | 57,401 | 57,401 | 57,401 | 57,401 | 57,401 |
| Program Total Electric CPAS | | | | | | - | 71,251 | 93,581 | 79,731 | 79,731 | 79,731 | 79,731 | 79,731 | 79,731 |
| CY2020 Program Incremental Expiring Electric Savings§ | | | | | | | | | - | - | - | - | - | - |
| Historic Program Incremental Expiring Electric Savings‡§ | | | | | | | | - | 13,850 | - | - | - | - | - |
| Program Total Incremental Expiring Electric Savings§ | | | | | | | | - | 13,850 | - | - | - | - | - |

| End Use Type | Research Category | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shell | Air Sealing | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | |
| HVAC | Advanced Thermostats | 4,669 | 4,669 | 4,669 | 4,669 | | | | | | | | | | |
| Lighting | LED Screw Based Omnidirectional Bulb | 6,157 | 6,157 | 6,157 | | | | | | | | | | | |
| Lighting | LED Nightlights | 4,046 | | | | | | | | | | | | | |
| CY2020 Program Total Electric Contribution to CPAS | | 17,685 | 13,639 | 13,639 | 7,481 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | 2,813 | - |
| Historic Program Total Electric Contribution to CPAS‡ | | 57,401 | 49,706 | 32,592 | 6,814 | 6,814 | 6,814 | 6,814 | 6,814 | 6,814 | 6,814 | 6,814 | 6,814 | - | |
| Program Total Electric CPAS | | 75,086 | 63,344 | 46,230 | 14,295 | 9,627 | 9,627 | 9,627 | 9,627 | 9,627 | 9,627 | 9,627 | 9,627 | 2,813 | - |
| CY2020 Program Incremental Expiring Electric Savings | | 4,645 | 4,046 | - | 6,157 | 4,669 | - | - | - | - | - | - | - | - | 2,813 |
| Historic Program Incremental Expiring Electric Savings | | - | 7,696 | 17,114 | 25,778 | - | - | - | - | - | - | - | - | 6,814 | - |
| Program Total Incremental Expiring Electric Savings§ | | 4,645 | 11,742 | 17,114 | 31,935 | 4,669 | - | - | - | - | - | - | - | 6,814 | 2,813 |

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

* A deemed value. Source found on the Illinois Stakeholder Advisory Group (SAG) website: https://www.ilsag.info/ntg_2020.

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

‡ Historic savings go back to CY2018.

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

*Source: Evaluation team analysis*

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

| End Use Type | Research Category | EUL | CY2020 Verified Gross Savings (Therms) | NTG* | Lifetime Net Savings (Therms)† | Verified Net Therms Savings 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shell | Air Sealing | 20.0 | 1,756 | 1.00 | 35,117 | | | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 |
| HVAC | Advanced Thermostats | 11.0 | 1,449 | 1.00 | 15,936 | | | 1,449 | 1,449 | 1,449 | 1,449 | 1,449 | 1,449 | 1,449 |
| Lighting | LED Screw Based Omnidirectional Bulbs | 10.0 | - | 1.00 | - | | | - | - | - | - | - | - | - |
| Lighting | LED Nightlights | 8.0 | - | 1.00 | - | | | - | - | - | - | - | - | - |
| CY2020 Program Total Gas Contribution to CPAS (Therms) | | | 3,205 | | 51,053 | | | 3,205 | 3,205 | 3,205 | 3,205 | 3,205 | 3,205 | 3,205 |
| CY2020 Program Total Gas Contribution to CPAS (kWh Equivalent)‡ | | | | | | - | - | 93,926 | 93,926 | 93,926 | 93,926 | 93,926 | 93,926 | 93,926 |
| Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§ | | | | | | - | 363,981 | 363,981 | 363,981 | 363,981 | 363,981 | 363,981 | 363,981 | 363,981 |
| Program Total Gas CPAS (kWh Equivalent)‡ | | | | | | - | 363,981 | 457,907 | 457,907 | 457,907 | 457,907 | 457,907 | 457,907 | 457,907 |
| 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 | 2039 | 2040 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shell | Air Sealing | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | |
| HVAC | Advanced Thermostats | 1,449 | 1,449 | 1,449 | 1,449 | | | | | | | | | | |
| Lighting | LED Screw Based Omnidirectional Bulbs | - | - | - | | | | | | | | | | | |
| Lighting | LED Nightlights | - | | | | | | | | | | | | | |
| CY2020 Program Total Gas Contribution to CPAS (Therms) | | 3,205 | 3,205 | 3,205 | 3,205 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | - |
| CY2020 Program Total Gas Contribution to CPAS (kWh Equivalent)‡ | | 93,926 | 93,926 | 93,926 | 93,926 | 51,464 | 51,464 | 51,464 | 51,464 | 51,464 | 51,464 | 51,464 | 51,464 | 51,464 | - |
| Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§ | | 363,981 | 363,981 | 363,981 | 124,926 | 124,926 | 124,926 | 124,926 | 124,926 | 124,926 | 124,926 | 124,926 | 124,926 | - | - |
| Program Total Gas CPAS (kWh Equivalent)‡ | | 457,907 | 457,907 | 457,907 | 218,852 | 176,390 | 176,390 | 176,390 | 176,390 | 176,390 | 176,390 | 176,390 | 176,390 | 51,464 | - |
| CY2020 Program Incremental Expiring Gas Savings (Therms)‖ | | - | - | - | - | 1,449 | - | - | - | - | - | - | - | - | 1,756 |
| CY2020 Program Incremental Expiring Gas Savings (kWh Equivalent)‡‖ | | - | - | - | - | 42,462 | - | - | - | - | - | - | - | - | 51,464 |
| Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§ | | - | - | - | 239,055 | - | - | - | - | - | - | - | - | 124,926 | - |
| Program Total Incremental Expiring Gas Savings (kWh Equivalent)‡‖ | | - | - | - | 239,055 | 42,462 | - | - | - | - | - | - | - | 124,926 | 51,464 |

Note: The green highlighted cell shows pilot 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 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 Yn-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 | NTG* | Lifetime Net Savings (kWh)† | Verified Net kWh Savings (Including Those Converted from Gas Savings) 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shell | Air Sealing | 20.0 | 54,277 | 1.00 | 1,085,533 | | | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 |
| HVAC | Advanced Thermostats | 11.0 | 47,131 | 1.00 | 518,437 | | | 47,131 | 47,131 | 47,131 | 47,131 | 47,131 | 47,131 | 47,131 |
| Lighting | LED Screw Based Omnidirectional Bulbs | 10.0 | 10,802 | 1.00 | 94,086 | | | 10,802 | 10,802 | 10,802 | 10,802 | 10,802 | 10,802 | 10,802 |
| Lighting | LED Nightlights | 8.0 | 4,046 | 1.00 | 32,370 | | | 4,046 | 4,046 | 4,046 | 4,046 | 4,046 | 4,046 | 4,046 |
| CY2020 Program Total Contribution to CPAS | | | 116,256 | | 1,730,425 | | | 116,256 | 116,256 | 116,256 | 116,256 | 116,256 | 116,256 | 116,256 |
| Historic Program Total Contribution to CPAS‡ | | | | | | - | 435,233 | 435,233 | 421,383 | 421,383 | 421,383 | 421,383 | 421,383 | 421,383 |
| Program Total CPAS | | | | | | - | 435,233 | 551,488 | 537,638 | 537,638 | 537,638 | 537,638 | 537,638 | 537,638 |
| CY2020 Program Incremental Expiring Savings§ | | | | | | | | | - | - | - | - | - | - |
| Historic Program Incremental Expiring Savings‡§ | | | | | | | | - | 13,850 | - | - | - | - | - |
| Program Total Incremental Expiring Savings§ | | | | | | | | - | 13,850 | - | - | - | - | - |

| End Use Type | Research Category | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shell | Air Sealing | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | - |
| HVAC | Advanced Thermostats | 47,131 | 47,131 | 47,131 | 47,131 | - | - | - | - | - | - | - | - | - | - |
| Lighting | LED Screw Based Omnidirectional Bulbs | 6,157 | 6,157 | 6,157 | - | - | - | - | - | - | - | - | - | - | - |
| Lighting | LED Nightlights | 4,046 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| CY2020 Program Total Contribution to CPAS | | 111,611 | 107,564 | 107,564 | 101,407 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | 54,277 | - |
| Historic Program Total Contribution to CPAS‡ | | 421,383 | 413,687 | 396,573 | 131,740 | 131,740 | 131,740 | 131,740 | 131,740 | 131,740 | 131,740 | 131,740 | 131,740 | - | - |
| Program Total CPAS | | 532,993 | 521,251 | 504,137 | 233,147 | 186,016 | 186,016 | 186,016 | 186,016 | 186,016 | 186,016 | 186,016 | 186,016 | 54,277 | - |
| CY2020 Program Incremental Expiring Savings§ | | 4,645 | 4,046 | - | 6,157 | 47,131 | - | - | - | - | - | - | - | - | 54,277 |
| Historic Program Incremental Expiring Savings‡§ | | - | 7,696 | 17,114 | 264,833 | - | - | - | - | - | - | - | - | 131,740 | - |
| Program Total Incremental Expiring Savings§ | | 4,645 | 11,742 | 17,114 | 270,991 | 47,131 | - | - | - | - | - | - | - | 131,740 | 54,277 |

Note: The green highlighted cell shows pilot 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 found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.

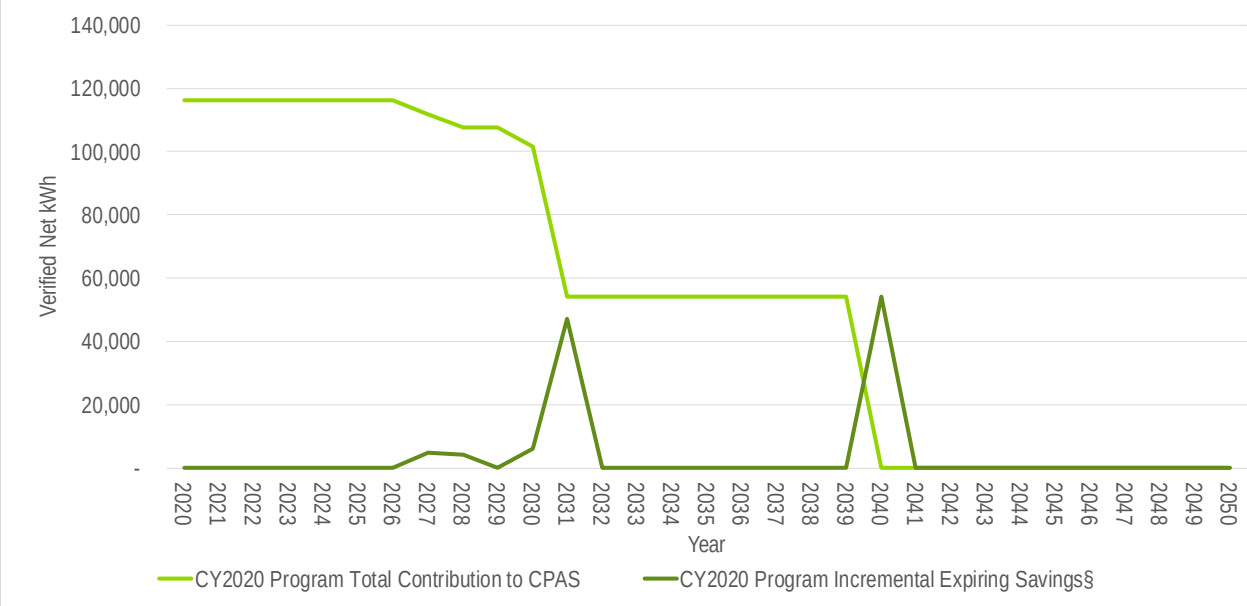
† Lifetime savings are the sum of CPAS savings through the EUL.

‡ 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. CY2020 Cumulative Persisting Annual Savings**



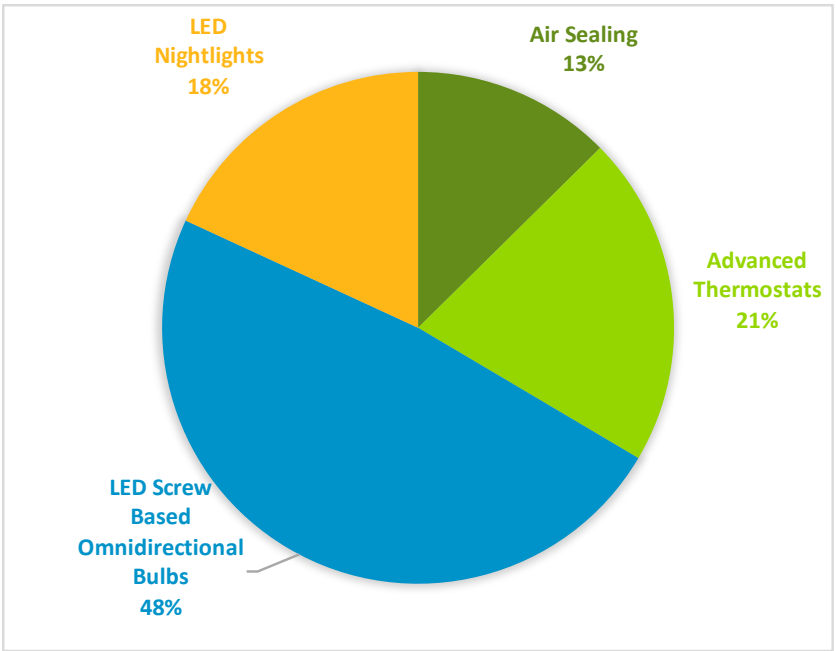

§ Expiring savings are equal to CPAS $Y_{n-1}$ - CPAS $Y_n$ + Expiring Savings $Y_{n-1}$.

*Source: Evaluation team analysis*

# 5. Pilot Savings by Measure

The Pilot includes advanced thermostats, air sealing, and lighting measures, as the following tables show. LED screw based omnidirectional bulbs contributed the majority (48%) of the savings (see Figure 5-1).

**Figure 5-1. Verified Net Savings by Measure Type – 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) |
|---|---|---|---|---|---|---|---|
| Shell | Air Sealing | 648 | 4.34 | 2,813 | 1.00 | 2,813 | 20.0 |
| HVAC | Advanced Thermostats | 3,922 | 1.19 | 4,669 | 1.00 | 4,669 | 11.0 |
| Lighting | LED Screw Based Omnidirectional Bulbs | 9,358 | 1.15 | 10,802 | 1.00 | 10,802 | 10.0 |
| Lighting | LED Nightlights | 8,107 | 0.50 | 4,046 | 1.00 | 4,046 | 8.0 |
| | Total | 22,034 | 1.01 | 22,330 | NA | 22,330 | NA |

Note: The savings in this table include 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 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

| End Use Type | 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) |
|---|---|---|---|---|---|---|
| Shell | Air Sealing | 0.00 | NA | 0.00 | 1.00 | 0.00 |
| HVAC | Advanced Thermostats | 2.52 | 0.72 | 1.81 | 1.00 | 1.81 |
| Lighting | LED Screw Based Omnidirectional Bulbs | 1.21 | 1.07 | 1.30 | 1.00 | 1.30 |
| Lighting | LED Nightlights | 0.00 | NA | 0.00 | 1.00 | 0.00 |
| | Total | 3.73 | 0.83 | 3.10 | NA | 3.10 |

* A deemed value. Source 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) |
|---|---|---|---|---|---|---|---|
| Shell | Air Sealing | 1,953 | 0.90 | 1,756 | 1.00 | 1,756 | 20.0 |
| HVAC | Advanced Thermostats | 1,383 | 1.05 | 1,449 | 1.00 | 1,449 | 11.0 |
| Lighting | LED Screw Based Omnidirectional Bulbs | 0 | NA | 0 | 1.00 | 0 | 10.0 |
| Lighting | LED Nightlights | 0 | NA | 0 | 1.00 | 0 | 8.0 |
| | Total Therms | 3,336 | 0.96 | 3,205 | NA | 3,205 | NA |
| | Total kWh Converted From Therms† | 97,772 | 0.96 | 93,926 | NA | 93,926 | NA |

* A deemed value. Source 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) |
|---|---|---|---|---|---|---|
| Shell | Air Sealing | 57,888 | 0.94 | 54,277 | 1.00 | 54,277 |
| HVAC | Advanced Thermostats | 44,454 | 1.06 | 47,131 | 1.00 | 47,131 |
| Lighting | LED Screw Based Omnidirectional Bulbs | 9,358 | 1.15 | 10,802 | 1.00 | 10,802 |
| Lighting | LED Nightlights | 8,107 | 0.50 | 4,046 | 1.00 | 4,046 |
| | Total† | 119,807 | 0.97 | 116,256 | NA | 116,256 |

* A deemed value. Source 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 estimated the lifetime energy and demand savings by multiplying the verified savings by the EUL for each measure. The team conducted research to validate the parameters not specified in the Illinois Statewide Technical Reference Manual v8.0 (TRM v8.0). Table 6-1 presents the key parameters and references used in the verified gross and net savings calculations; the table indicates which were examined through CY2020 evaluation research and which were deemed.

**Table 6-1. Savings Parameters**

| Measure | Custom Input Parameters | Deemed Input Parameters | Source* |
|---|---|---|---|
| LED Screw Based Omnidirectional Bulbs | Watts_ee, Watts_base, Quantity | In-Service Rate (ISR), Leakage, Hours, Waste Heat Factor (WHF_e), WHF_d, Coincidence Factor (CF), Net to Gross (NTG) | TRM v8.0 Errata – Section 5.4.08 |
| Advanced Thermostats | Capacity, Seasonal Energy Efficiency Ratio (SEER), Energy Efficiency Ratio (EER), Quantity | %ElectricHeat, Elec_Heating_Consumption, Heating_Reduction, Household Factor (HF), EFF_ISR, Fe, %AC, FLH, Cooling_Reduction, ISR, Hours, CF, %FossilHeat, NTG | TRM v8.0 – Section 5.3.16 |
| Air Sealing | CFM50_existing, CFM50_new, Quantity | N_heat, Heating Degree Days (HDD), Eff_heat, NTG | TRM v8.0 – Section 5.6.01 |
| LED Nightlights | Watts_ee, Watts_base, Quantity | ISR, Leakage, Hours, WHF_e, WHF_d, CF, NTG | TRM v8.0 – Section 5.5.11 |

*TRM is the Illinois Statewide 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: https://www.ilsag.info/ntg_2020.
*Source: Evaluation team analysis*

## 6.2 Other Impact Findings and Recommendations

Although this Pilot has sunsetted, the evaluation team developed several recommendations based on findings from the CY2020 evaluation that can be applied to similar Pilots or Programs.

These findings suggest ways to improve measure-level realization rates. LED screw based omnidirectional bulbs represent 48% of Pilot savings and have a realization rate of 1.15 (see Table 6-2), while LED nightlights represent 18% of Pilot savings and have a realization rate of 0.50; these results suggest improvements to the lighting ex ante calculations could have a material impact on the Pilot-level realization rate. The air sealing measure, which represents 13% of Pilot savings, had a realization rate of 4.34, indicating significant room for improvement.

**Table 6-2. Measure-Level Savings and Realization Rates**

| End Use | Realization Rate | Percentage of Verified Net Savings |
|---|---|---|
| Lighting – Omnidirectional | 1.15 | 48% |
| HVAC (Advanced Thermostats) | 1.19 | 21% |
| Lighting – Nightlights | 0.50 | 18% |
| Air Sealing | 4.34 | 13% |

*Source: Evaluation team analysis*

### 6.2.1 Air Sealing Measures

Air sealing measures accounted for 13% of the Pilot verified net savings and had a verified gross realization rate of 4.34.

**Finding 1.** For air sealing measures, the ex ante energy and demand savings assumed that 3% of spaces are heated using electric heat and 97% using gas heat. The evaluation team requested the heating type information as a part of the end of year data request, but the implementer confirmed that this information was not tracked during the Pilot's implementation. Therefore, the team calculated the verified energy and demand savings using the assumption that 13% of homes were electrically heated and the remaining 87% were gas heated. This spilt is deemed in the TRM v8.0 and is based on information from the 2010 Residential Energy Consumption Survey (RECS) for Illinois.

**Recommendation 1.** Guidehouse recommends the implementer track the heating and cooling data for air sealing measures. If this data is not tracked, Guidehouse recommends ex ante savings are calculated assuming 13% of spaces have electric heating and 87% have gas heating, as specified in the TRM v8.0.

### 6.2.2 Advanced Thermostats

Advanced thermostats accounted for 21% of the Pilot verified net savings and had a verified gross realization rate of 1.19.

**Finding 2.** Ex ante energy and demand savings calculations for advanced thermostat measures used an installed measure quantity of 21. Guidehouse used the CY2020 reported installation data quantity of 22 measures to calculate verified measure-level savings.[1] This resulted in an underestimation of the total measure savings by one unit (approximately 212 kWh and 65 therms).

[1] "SIES Client Install Data 2020.xlsx" provided to Guidehouse on April 28, 2020.

**Recommendation 2.** Guidehouse recommends the implementer check the reported installed quantities of the measure when evaluating measure-level savings.

**Finding 3.** Reported tracking data did not include specifications for household types. Ex ante reported savings for advanced thermostats were calculated using a full load hour (FLH) value associated with single-family house types, as deemed by the TRM v8.0. As household type was not reported in the tracking data, the use of the single-family FLH variable represents an overestimation of savings.

**Recommendation 3.** Guidehouse recommends the implementer track the household type for this measure going forward. If the data is not tracked, Guidehouse recommends calculating energy and demand savings using the average FLH value of the single-family, general multifamily, and weatherized multifamily household types for the respective climate zone of each project.

**Finding 4.** Ex ante calculations assumed the Chicago climate electric heat pump value for the electric heating consumption variable. Because heating and cooling type was not provided in the tracking data, Guidehouse was unable to verify this assumption.

**Recommendation 4.** Guidehouse recommends the implementer track household heating and cooling type data for this measure. If the data is not tracked, Guidehouse recommends calculating savings based on the deemed value for unknown location and heating type, as deemed in the TRM v8.0.

**Finding 5.** Peak demand savings for ComEd are calculated using the PJM summer peak coincidence factor of 0.233, deemed in the TRM v8.0. Ex ante demand savings for this measure were calculated using the summer system peak coincidence factor of 0.34. This overestimates demand savings.

**Recommendation 5.** Guidehouse recommends calculating the peak demand savings for ComEd using the PJM summer peak coincidence factor deemed in the TRM v8.0.

### 6.2.3 LED Screw Based Omnidirectional Bulbs

LED omnidirectional bulbs accounted for 48% of the Pilot verified net savings and had a verified gross realization rate of 1.15.

**Finding 6.** The ex ante energy savings calculation used the hours of use (HOU) value of 1,089 hours, deemed for residential and in-unit multifamily locations. Because the installation location and household type were not provided, the “unknown” installation location deemed HOU of 1,159 should be used. The use of residential and in-unit HOU underestimates savings.

**Recommendation 6.** Guidehouse recommends the implementer track the household type and installation location for this measure. If this data is not tracked, Guidehouse recommends calculating the reported energy and demand savings using the HOU of 1,159 as deemed by the TRM v8.0 for unknown install locations.

**Finding 7.** Ex ante savings calculations used a Watts efficient (WattsEE) value of 11.4 W instead of 9 W as indicated in the specification sheet provided in CY2019. The implementer verified that the same bulb types were installed in CY2019 and CY2020.

**Recommendation 7.** Guidehouse recommends the implementer calculate savings using the WattsEE value of 9 W, as specified in provided measure details.

### 6.2.4 LED Nightlights

LED nightlights account for 18% of the Pilot verified net savings and had a verified gross realization rate of 0.50.

**Finding 8.** Ex ante savings for LED nightlights used a leakage value deemed for upstream (TOS) lighting programs rather than a value aligned with direct installation. This underestimates savings.

**Recommendation 8.** Guidehouse recommends calculating reported savings with a leakage value of 0 aligned with a direct install Pilot, as deemed in the TRM v8.0.

**Finding 9.** Ex ante energy and demand savings calculations for LED nightlights used an installed measure quantity of 276, which is the total number of LED screw based omnidirectional bulbs installed as a part of the Pilot. Using this value resulted in an overestimation of the total measure savings by approximately 48%.

**Recommendation 9.** Guidehouse recommends the implementer check the reported installed quantities of the measure when evaluating measure-level savings.

# Appendix A. Impact Analysis Methodology

Guidehouse determined verified gross savings for each pilot measure by:

- Reviewing the savings algorithm inputs in the measure workbook for agreement with the TRM v8.0.
- Validating the savings algorithms were applied correctly.
- Cross-checking per-unit savings values in the tracking data with the verified values in the measure workbook or in the team's calculations if the workbook did not agree with the TRM v8.0.
- Multiplying the verified per-unit savings value by the quantity reported in the tracking data.

The evaluation team calculated verified net energy and demand (coincident peak and overall) savings by multiplying the verified gross savings estimates by a NTG ratio. In CY2020, the NTG estimates used to calculate the net verified savings were deemed as 1 based on a consensus process through the Illinois SAG.

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

- Final CY2020 tracking data: "SIES Client Install Data 2020.xlsx"
- Final CY2020 measure descriptions: "SIES Measure Descriptions 2020.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: "SIES Overall Pilot Savings Calculations_200414.xlsx"

# Appendix B. Total Resource Cost Detail

Table B-1 shows the TRC cost-effectiveness analysis inputs available at the time of finalizing this impact evaluation report. Additional required cost data (e.g., measure costs, pilot-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 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shell | Air Sealing | Projects | 66 | 20.0 | No | 2,813 | 0.00 | 1,756 | 0 | 0 | 0 | 1.00 | 1.00 | 1.00 | 2,813 | 0.00 | 1,756 | 0 | 0 | 0 |
| HVAC | Advanced Thermostats | Each | 22 | 11.0 | No | 4,669 | 1.81 | 1,449 | 0 | 0 | 0 | 1.00 | 1.00 | 1.00 | 4,669 | 1.81 | 1,449 | 0 | 0 | 0 |
| Lighting | LED Screw Based Omnidirectional Bulbs‡ | Each | 276 | 10.0 | No | 10,802 | 1.30 | 0 | 0 | 0 | -210 | 1.00 | 1.00 | 1.00 | 10,802 | 1.30 | 0 | 0 | 0 | -210 |
| Lighting | LED Nightlights | Each | 135 | 8.0 | No | 4,046 | 0.00 | 0 | 0 | 0 | -92 | 1.00 | 1.00 | 1.00 | 4,046 | 0.00 | 0 | 0 | 0 | -92 |
| | Total | | | 11.1 | | 22,330 | 3 | 3,205 | 0 | 0 | -302 | NA | NA | NA | 22,330 | 3 | 3,205 | 0 | 0 | -302 |

* 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 pilot savings.

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

‡ The EUL for this measure varies over time. See the CPAS tables (Table 4-1 to Table 4-3).

*Source: ComEd tracking data and evaluation team analysis*