



Ameren Illinois Company 2021 Residential Program Impact Evaluation Report

Final

April 29, 2022

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1. Executive Summary

This report presents impact evaluation results from Ameren Illinois Company's (AIC) 2021 Residential Program. The Residential Program is part of AIC's overall portfolio of residential and nonresidential energy efficiency programs implemented during the 2021 calendar year. The overarching objective of the 2021 Residential Program impact evaluation is to determine the gross and net electric energy, electric demand, and natural gas impacts associated with the Program.

1.1 Program Overview

The Residential Program is made up of eight initiatives (some of which are further broken down into channels) and the Efficient Choice Tool pilot, which the evaluation team assessed as part of the 2021 evaluation:

- Retail Products Initiative
- Income Qualified Initiative
 - Single Family
 - Community Action Agency (CAA)
 - Smart Savers
 - Multifamily
- Public Housing Initiative
- Multifamily Initiative¹
- Home Efficiency – Market Rate Initiative
- Midstream HVAC Initiative
- Appliance Recycling Initiative
 - Appliance Recycling Kits (AR Kits)
- Direct Distribution of Efficient Products (Direct Distribution) Initiative
 - School Kits
 - Community Kits
- Efficient Choice Tool² Pilot

The initiatives are designed to achieve energy savings from residential customers in accordance with AIC's plan filing and to provide energy efficiency services and assistance to customers through a wide range of channels. The Retail Products Initiative, which provides point-of-sale (POS) and instant discounts to customers purchasing energy-efficient products, is the largest component of the Program from an electric energy and gas savings perspective. The Income Qualified Initiative, which provides whole-home retrofit services and energy

¹ Throughout this report, "Multifamily Initiative" refers to AIC's market-rate multifamily initiative, whereas the Multifamily channel of the Income Qualified Initiative is referred to as "Income Qualified – Multifamily."

² Efficient Choice Tool is not technically an initiative but is listed here for simplicity. The Efficient Choice Tool (ECT) is an online platform for comparing and reviewing residential home appliances and consumer electronics. The ECT helps AIC customers conduct relevant product research, providing a range of information that includes product specifications, pricing, tips for use, reviews, images, and vendor locations.

efficiency measures through a range of channels, is the largest component of the Program from a spending perspective.

Additionally, AIC has continued to develop a one-stop shop approach to serving multifamily customers. Based on this model, AIC and their implementation team work to recruit and channel customers into the appropriate initiative, including the Income Qualified, Public Housing, and Multifamily Initiatives. Overall, the delivery models and measure offerings for these efforts are similar, with some variation between initiatives, so we have grouped these efforts for evaluation reporting purposes (see Section 3.3).

1.2 Policy Background

This is the fourth and final calendar year of AIC's four-year 2018 Plan, which was developed based on guidance provided through Illinois Senate Bill 2814 (the Future Energy Jobs Act [FEJA]). Based on this legislation, key concepts that affect program evaluation include:

- **Cumulative Persisting Annual Savings (CPAS):** Since 2018, electric energy savings goals for Illinois utilities have been primarily defined based on persisting savings as a percentage of sales. As such, annual evaluations of AIC's electric programs, including this one, present both annual and persisting savings over the life of delivered measures. As a result, AIC and its program implementer have also sought to deliver programs that achieve savings that persist for a longer period of time.
- **Applicable Annual Incremental Goal (AAIG):** AAIG is defined as the difference between the CPAS goal for the year being evaluated and the CPAS goal for the previous year. On a year-to-year basis, AIC must meet an AAIG. The utility must achieve sufficient savings through its programs to replace savings from measures at the end of their measure life before progress can be counted toward the AAIG.
- **Weighted Average Measure Life (WAML):** FEJA replaced the existing funding mechanism for electric energy efficiency in Illinois by allowing AIC to create a regulatory asset and amortize and recover the total expenditures of that regulatory asset "over a period that is equal to the weighted average of the measure lives implemented for that year that are reflected in the regulatory asset."³ Therefore, we present WAML for AIC's electric Residential Program in this report in accordance with the guidelines for calculation presented in the Illinois Stakeholder Advisory Group's (SAG) WAML Report.⁴
- **Savings Conversion:** FEJA allows electric utilities to "convert" non-electric energy savings achieved to electric savings for the purposes of goal attainment in certain cases. The total amount of savings allowed to be converted is capped at a maximum of 10% of the utility's AAIG. AIC met the criteria to convert savings in 2021 and chose to convert savings from two subcomponents of the Residential Program: the Smart Savers channel of the Income Qualified Initiative and the Retail Products Initiative.

1.3 Program Savings

In the following sections, the evaluation team presents annual savings (annualized 2021 energy savings) and CPAS. As discussed in greater detail in the forthcoming *2021 AIC Integrated Impact Evaluation Report*, AIC's performance compared to its AAIG is determined based on both types of savings.

³ Illinois Energy Efficiency Stakeholder Advisory Group. *Weighted Average Measure Life Report*. 2018. https://ilsag.s3.amazonaws.com/SAG_WAML_Report_Final_2-20-18.pdf.

⁴ Ibid.

1.3.1 Annual Savings

The 2021 Residential Program achieved 120,941 MWh, 17.44 MW, and 2,026,696 therms in verified net savings. These savings include a non-participant spillover (NPSO) “adder” on net savings.^{5,6} These savings are also reported after accounting for the FEJA-allowed “conversion” of natural gas savings to electric energy savings for the purpose of goal attainment. Table 1, Table 2, and Table 3 present ex ante gross, verified gross, and verified net electric energy, electric demand, and gas savings by initiative and channel for the 2021 Residential Program.

Table 1. 2021 Residential Program Electric Energy Annual Savings Summary

Initiative	Channel	Ex Ante Gross MWh	Gross Realization Rate ^a	Verified Gross MWh	Net-to-Gross (NTGR)	Verified Net MWh
Retail Products	Retail Products	65,944	101%	66,523	0.831	55,264
	Retail Products Carryover ^a	15,454	100%	15,454	0.690	10,666
Income Qualified	Single Family	7,169	115%	8,216	1.000	8,216
	CAA	652	99%	642	1.000	642
	Smart Savers	4,052	103%	4,163	1.000	4,163
	Multifamily	3,795	100%	3,777	1.000	3,777
	IQ Carryover ^a	638	100%	638	1.000	638
Public Housing		826	98%	808	1.000	808
Multifamily		1,376	100%	1,375	0.906	1,247
Home Efficiency – Market Rate		124	109%	135	0.833	112
Midstream HVAC		3,177	100%	3,171	0.807	2,561
Appliance Recycling	Appliance Recycling	5,453	95%	5,167	0.487	2,515
	AR Kits	663	104%	691	0.961	663
Direct Distribution	School Kits	2,389	100%	2,389	1.000	2,389
	School Kits Carryover ^a	188	100%	188	0.977	184
	AR Kits Carryover ^a	10	100%	10	1.000	10
	Community Kits	7,262	104%	7,558	1.000	7,558
	Community Kits Carryover ^a	540	100%	540	1.000	540
Efficient Choice Tool		N/A	N/A	630	0.683	430
<i>Residential Program Subtotal ^b</i>		<i>119,712</i>	<i>101%</i>	<i>122,075</i>	<i>0.839</i>	<i>102,384</i>
Residential NPSO Adder						1,149
Retail Products (gas conversion)						6,564
Smart Savers (gas conversion)						10,844
Residential Program Total						120,941

⁵ Opinion Dynamics. Ameren Illinois Company Energy Efficiency Portfolio 2021 Net-to-Gross Ratios. <https://ilsag.s3.amazonaws.com/AIC-2021-NTGR-Recommendations-for-SAG-FINAL-2020-09-30.xlsx>

⁶ The process of computing savings from the residential NPSO adder is complex. See Section 2.3.1 for more detail.

^a Carryover savings are those achieved through installation of measures during 2021 that were distributed or rebated in prior program years. For clarity, we break out carryover separately throughout this report.

^b Efficient Choice Tool does not report ex ante savings and therefore calculations of gross realization rate at the Residential Program level exclude it entirely.

Table 2. 2021 Residential Program Electric Demand Annual Savings Summary

Initiative	Channel	Ex Ante Gross MW	Gross Realization Rate	Verified Gross MW	NTGR	Verified Net MW
Retail Products	Retail Products	12.67	86%	10.88	0.827	9.00
	Retail Products Carryover ^a	2.05	100%	2.05	0.690	1.41
Income Qualified	Single Family	1.43	100%	1.43	1.000	1.43
	CAA	0.18	100%	0.18	1.000	0.18
	Smart Savers	1.07	110%	1.18	1.000	1.18
	Multifamily	0.57	99%	0.56	1.000	0.56
	IQ Carryover ^a	0.08	100%	0.08	1.000	0.08
Public Housing		0.09	99%	0.09	1.000	0.09
Multifamily		0.18	100%	0.18	0.886	0.16
Home Efficiency – Market Rate		0.06	111%	0.07	0.821	0.05
Midstream HVAC		1.30	101%	1.31	0.806	1.06
Appliance Recycling	Appliance Recycling	0.77	95%	0.73	0.488	0.36
	AR Kits	0.09	104%	0.09	0.963	0.09
Direct Distribution	School Kits	0.55	100%	0.55	1.000	0.55
	School Kits Carryover ^a	0.02	100%	0.02	0.979	0.02
	AR Kits Carryover ^a	<0.01	100%	<0.01	1.000	<0.01
	Community Kits	0.82	105%	0.86	1.000	0.86
	Community Kits Carryover ^a	0.08	100%	0.08	1.000	0.08
Efficient Choice Tool		N/A	N/A	0.09	0.650	0.06
<i>Residential Program Subtotal ^b</i>		<i>22.01</i>	<i>93%</i>	<i>20.44</i>	<i>0.843</i>	<i>17.23</i>
Residential NPSO Adder						0.21
Residential Program Total						17.44

^a Carryover savings are those achieved through installation of measures during 2021 that were distributed or rebated in prior program years. For clarity, we break out carryover separately throughout this report.

^b Efficient Choice Tool does not report ex ante savings and therefore calculations of gross realization rate at the Residential Program level exclude it entirely.

Table 3. 2021 Residential Program Gas Annual Savings Summary

Initiative	Channel	Ex Ante Therms	Gross Realization Rate ^a	Verified Therms	NTGR	Verified Net Therms
Retail Products	Retail Products	1,496,096	99%	1,479,070	0.930	1,374,813
	Retail Products Carryover ^a	0	N/A	0	N/A	0
Income Qualified	Single Family	524,855	99%	519,519	1.000	519,519
	CAA	56,556	100%	56,491	1.000	56,491
	Smart Savers	370,228	100%	370,114	1.000	370,114
	Multifamily	14,901	99%	14,716	1.000	14,716
	IQ Carryover ^a	0	N/A	0	N/A	0
Public Housing		4,521	83%	3,769	1.000	3,769
Multifamily		9,500	100%	9,483	0.919	8,712
Home Efficiency – Market Rate		27,029	104%	28,084	0.869	24,406
Midstream HVAC		43,670	112%	49,111	0.900	44,200
Appliance Recycling	Appliance Recycling	0	N/A	0	N/A	0
	AR Kits	27,960	100%	27,960	1.000	27,960
Direct Distribution	School Kits	67,322	100%	67,322	1.000	67,322
	School Kits Carryover ^a	0	N/A	0	N/A	0
	AR Kits Carryover ^a	0	N/A	0	N/A	0
	Community Kits	39,188	100%	39,188	1.000	39,188
	Community Kits Carryover ^a	0	N/A	0	N/A	0
Efficient Choice Tool		N/A	N/A	45,738	0.529	24,209
Residential Program Subtotal ^b		2,681,826	101%	2,710,564	0.950	2,575,417
Residential NPSO Adder						45,416
Retail Products (gas conversion)						-224,024
Smart Savers (gas conversion)						-370,114
Residential Program Total						2,026,696

^a Carryover savings are those achieved through installation of measures during 2021 that were distributed or rebated in prior program years. For clarity, we break out carryover separately throughout this report.

^b Efficient Choice Tool does not report ex ante savings and therefore calculations of gross realization rate at the Residential Program level exclude it entirely.

1.3.2 Cumulative Persisting Annual Savings

Table 4 summarizes CPAS and WAML for the 2021 Residential Program at the initiative/channel level. For additional detail related to CPAS and measure life, please see the individual initiative chapters in Section 3 and Appendix C, which presents CPAS for each year of program operation. The overall WAML for the 2021 Residential Program is 10.2 years.

Table 4. 2021 Residential Program CPAS and WAML

Initiative/Channel	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS - Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Retail Products	9.8	66,523	0.831	55,264	55,264	55,264	55,264	...	35,249	...	487,864
Retail Products Carryover	9.5	15,454	0.690	10,666	10,666	10,666	10,666	...	5,468	...	79,024
Income Qualified – Single Family	11.6	8,216	1.000	8,216	8,216	8,207	8,207	...	5,443	...	87,443
Income Qualified – CAA	15.9	642	1.000	642	642	642	642	...	591	...	9,959
Smart Savers	11.0	4,163	1.000	4,163	4,163	4,163	4,163	...	4,163	...	45,797
Income Qualified – Multifamily	11.5	3,777	1.000	3,777	3,777	3,777	3,777	...	3,348	...	42,157
Income Qualified Carryover	10.0	638	1.000	638	638	638	638	...	459	...	5,843
Public Housing	12.6	808	1.000	808	808	808	808	...	664	...	9,490
Multifamily	10.9	1,375	0.906	1,247	1,247	1,247	1,247	...	1,118	...	12,901
Home Efficiency – Market Rate	15.0	135	0.833	112	112	112	112	...	100	...	1,617
HVAC	15.9	3,171	0.807	2,561	2,561	2,561	2,561	...	2,560	...	40,704
Appliance Recycling	6.4	5,167	0.487	2,515	2,515	2,515	2,515	...	0	...	16,202
AR Kits	8.9	691	0.961	663	663	663	663	...	303	...	5,287
AR Kits Carryover	10.0	10	1.000	10	10	10	10	...	8	...	98
School Kits	8.9	2,389	1.000	2,389	2,389	2,057	2,057	...	1,425	...	20,794
School Kits Carryover	10.0	188	0.977	184	184	184	184	...	136	...	1,654
Community Kits	9.5	7,558	1.000	7,558	7,558	7,554	7,554	...	4,795	...	67,693
Community Kits Carryover	10.0	540	1.000	540	540	540	540	...	426	...	5,059
Efficient Choice	13.2	630	0.683	430	430	430	430	...	349	...	5,531
Residential NPSO	10.2	1,614	0.712	1,149	1,149	1,149	1,149	...	768	...	10,388
Retail Products (gas conversion)	11.0	7,020	0.935	6,564	6,564	6,564	6,564	...	6,564	...	72,203
Smart Savers (gas conversion)	11.0	10,844	1.000	10,844	10,844	10,844	10,844	...	10,844	...	119,288
2021 CPAS		141,554	0.854	120,941	120,941	120,596	120,596	...	84,783	...	1,146,997
Expiring 2021 CPAS				0	0	345	0	...	326	...	
Expired 2021 CPAS				0	0	345	345	...	36,158	...	
WAML	10.2										

2. Evaluation Approach

The following section of the report describes the evaluation approach taken for the 2021 Residential Program impact evaluation. As part of the evaluation process, the evaluation team applied versions of the Illinois Energy Efficiency Policy Manual and the Illinois Technical Reference Manual (IL-TRM) applicable to the 2021 program year (generally Version 1.1⁷ and Version 9.0, respectively) wherever relevant.⁸ Appendix A of this report provides more-detailed initiative-specific methodology where appropriate.

2.1 Research Objectives and Evaluation Activities

The overarching research objectives for the impact evaluation of AIC’s 2021 Residential Program are as follows:

- What were the estimated gross energy and demand impacts from the Program?
- What were the estimated net energy and demand impacts from the Program?

The evaluation team met these objectives by conducting the impact evaluation activities outlined in Table 5. As shown, for each initiative, the impact evaluation primarily consisted of applying savings algorithms from the IL-TRM V9.0 to final initiative tracking databases to estimate verified gross savings and applying SAG-approved net-to-gross ratios (NTGRs) to these verified gross savings to derive verified net savings. In addition, we reviewed initiative materials and interviewed all initiative managers.

Table 5. 2021 Residential Program Impact Evaluation Activities

Initiative	Gross Impacts			Net Impacts	
	IL-TRM Application Review	Engineering Desk Reviews	Survey-Based Analysis	Consumption Analysis	Application of SAG-Approved NTGRs
Retail Products	✓				✓
Income Qualified	✓				✓
Public Housing	✓				✓
Multifamily	✓				✓
Home Efficiency – Market Rate	✓				✓
Midstream HVAC	✓				✓
Appliance Recycling	✓				✓
Direct Distribution	✓				✓
Efficient Choice			✓		

The following sections provide further detail on the approaches to estimating verified gross and net savings.

⁷ Broadly speaking, Version 1.1 of the Policy Manual was in effect during this evaluation; however, a number of individual policies from Version 2.0 of the Policy Manual were also in effect during this evaluation. Those individual policies (e.g., Section 11.1) were applied in this evaluation as well.

⁸ In future years, the evaluation team will apply updated versions of these manuals to the evaluation of this Program as required by law, Illinois Commerce Commission orders, and changes to the manuals themselves.

2.2 Verified Gross Impact Analysis Approach

2.2.1 Application of IL-TRM V9.0

To determine verified gross impacts associated with the measures delivered through the Residential Program, we reviewed the content of the initiative tracking databases to identify database errors and duplicate records, and to ensure that the implementer correctly applied savings algorithms and assumptions stated in the IL-TRM V9.0 and the IL-TRM V9.0 errata document. In particular, we applied the algorithms and assumptions provided in the IL-TRM V9.0, while using project-specific data from the initiative tracking databases as inputs where appropriate. As part of this process, we also verified measure installations through analysis of initiative tracking databases, as well as through a review of supporting project documentation.

We resolved any discrepancies found in the databases and provide details related to any gross savings adjustments in the initiative-specific sections of this report.

In accordance with Illinois policy, the evaluation team omitted gas penalties from savings reported in the body of this report. Appendix B presents detail on gas penalties for use in cost-effectiveness analysis.

2.2.2 Carryover Savings

In addition to savings achieved by AIC's Residential Program through measures delivered during the 2021 program year, AIC also claims savings in 2021 from lighting measures distributed by the Residential Program in prior years but not installed until 2021. The relevant initiatives include:

- 2019 and 2020 Retail Products Initiatives
- 2019 and 2020 Direct Distribution Initiative – School Kits Channel
- 2020 Direct Distribution Initiative – Community Kits and Appliance Recycling Kits Channels
- 2020 Income Qualified Initiative – Single Family Channel – Safe and Virtual Energy Efficiency (SAVE) Kits
- 2020 Income Qualified Initiative – Single Family Channel – Bloomington and Normal (BN) Pilot Community Kits

Carryover savings are evaluated using the applicable NTGR from the year in which the product was sold, the applicable in-service rate (ISR) trajectory assumption based on the year in which the product was sold, and IL-TRM V9.0 and IL-TRM V9.0 errata assumptions for all other relevant impact parameters.

We reported previously on AIC's 2021 carryover savings as part of an earlier memo.⁹ Carryover savings are not reported as part of individual initiative subsections in Section 3.

⁹ Memo is awaiting finalization and this report will be updated with a reference when a final version is available.

2.2.3 Application of Custom Impact Methods

While all other Residential Program offerings in 2021 were analyzed in a fully prescriptive manner, ECT is not suitable for gross impact analysis using solely the IL-TRM. As a pilot that has not yet been characterized for prescriptive impact analysis, ECT requires a custom, survey-based analysis approach. The evaluation team applied an evaluation approach that has previously been applied in two interim impact evaluations for AIC and that has been closely coordinated with other Illinois evaluators. While many components of the approach are fully custom, gross unit savings assumptions used in the ECT evaluation are directly derived from the IL-TRM V9.0 in accordance with Illinois best practice. Further details on the custom impact methods applied for ECT are presented in Appendix A.

2.3 Verified Net Impact Analysis Approach

To determine verified net savings for the 2021 Residential Program, we applied SAG-approved NTGRs to verified gross savings.

2.3.1 Non-Participant Spillover

Net impact evaluation of AIC’s Residential Program includes a NPSO adder on net savings for non-income qualified (IQ) efforts.¹⁰ This adder is 3.1% for non-IQ electric savings (energy and demand) and 4.4% for non-IQ gas savings. Table 6 summarizes verified, non-IQ net savings for AIC’s Residential Program by initiative and computes the NPSO adder as defined above.

Table 6. 2021 Residential Program Verified Net Savings Summary for Non-Income Qualified Initiatives

Initiative/Channel	Verified Net MWh	Verified Net MW	Verified Net Therms
Retail Products (Non-IQ)	24,438	4	930,663
Retail Products Carryover (Non-IQ)	5,757	1	0
Home Efficiency - Market Rate	112	0	24,406
Midstream HVAC	2,561	1	44,200
Appliance Recycling	2,515	0	0
Multifamily	1,247	0	8,712
Efficient Choice Tool	430	0	24,209
<i>Non-IQ Residential Program Subtotal</i>	<i>37,060</i>	<i>6.68</i>	<i>1,032,190</i>
Residential NPSO Adder	1,149	0.21	45,416

¹⁰ Opinion Dynamics. Ameren Illinois Company Energy Efficiency Portfolio 2021 Net-to-Gross Ratios. 2020. <https://ilsag.s3.amazonaws.com/AIC-2021-NTGR-Recommendations-for-SAG-FINAL-2020-09-30.xlsx>.

2.4 Sources and Mitigation of Error

The evaluation team took steps to mitigate potential sources of error throughout the planning and implementation of the 2021 evaluation. In particular, we took the following action to address potential sources of non-survey-related error.¹¹

- **Analysis Error:** For prescriptive gross impact calculations, we applied IL-TRM V9.0 calculations to the participant data in the tracking database to calculate gross impacts. To minimize data analysis error, a separate team member reviewed all calculations to verify their accuracy. For net impact calculations, we applied SAG-approved NTGRs to estimated gross impacts to derive net impacts where appropriate. To minimize analytical errors, all calculations were reviewed by a separate team member to verify their accuracy.

Please also note that the calculations in some of the tables in this report cannot be exactly reproduced due to rounding.

¹¹ There is no sampling error or measurement error associated with any Residential Program evaluation activity because we did not conduct any sampling-based evaluation activities for the 2021 impact evaluation.

3. Initiative-Level Results

3.1 Retail Products Initiative

3.1.1 Initiative Description

The AIC Retail Products Initiative partners with retailers and manufacturers to offer discounts on a wide range of qualifying ENERGY STAR® products, which in 2021 included:¹²

- LED lighting, including a variety of bulb shapes and fixtures
- Consumer electronics, including advanced thermostats and Tier 1 advanced power strips (APS)
- Appliances, including dehumidifiers, air purifiers, clothes washers, clothes dryers, refrigerators, freezers, water dispensers, room air conditioners, and heat pump water heaters
- Miscellaneous other equipment, including variable-speed pool pumps and bathroom vent fans

CLEAResult implements the Initiative, facilitating several delivery channels, including POS discounts, an Online Marketplace, downstream rebates (application-based post-purchase rebates), and instant rebates. Discounts provided through the Initiative are designed to motivate customers to purchase typically more expensive energy-efficient versions of these products rather than cheaper, less-efficient alternatives, helping customers to reduce their energy usage, energy bills, and carbon footprints.

Summary of Key Implementation Changes in 2021

For the 2021 program year, the Retail Products Initiative adapted its measure offerings and incentives as follows:

- Reincorporated downstream rebates for room air conditioners and heat pump water heaters not offered since prior to 2018
- No longer operated Google-partnered “Blitz” campaign to offer additional incentives

3.1.2 Participation Summary

LED lighting remained the primary end use for the Retail Products Initiative in 2021, accounting for 93% of all units sold through the Initiative. Standard LEDs made up a slightly larger portion of sales in 2021 (29%) than in 2020 (24%) but remained much less prominent than in 2019 (63%). In an effort to focus standard LED sales primarily on lower-income customers who are less likely to adopt them on their own, the Initiative sold standard bulbs only at select retailers, while specialty bulbs continued to sell in large numbers at a wider variety of retailers. The Initiative also sold more than 50,000 Tier 1 APS products and 28,000 advanced thermostats, which together accounted for nearly 80% of non-lighting sales. The remaining measures collectively accounted for 2% of sales. Table 7 presents Retail Products participation during 2021 by measure.

¹² The ENERGY STAR® name and mark are registered trademarks owned by the US EPA.
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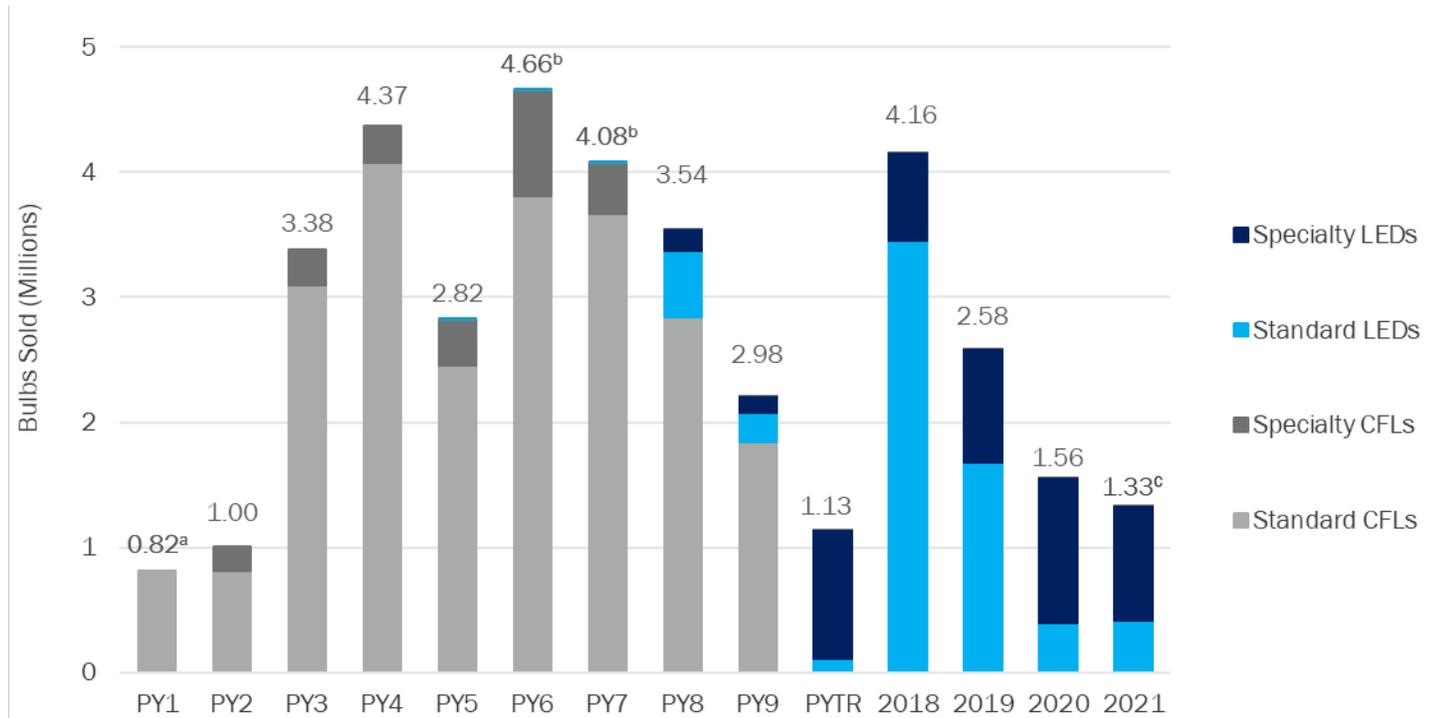
Table 7. 2021 Retail Products Participation Summary

Measure Type	Bulb Shape	Sales Quantity	Share of Sales
Standard LEDs	A-line	413,728	29%
Specialty LEDs (Reflector)	BR/R	291,859	20%
	PAR/MR	58,928	4%
Specialty LEDs (Other)	Decorative	377,930	26%
	Globe	116,568	8%
	3-way	28,368	2%
LED Fixtures	N/A	36,855	3%
LED Nightlights	Nightlight	7,300	1%
Connected LEDs	A-line	2,314	<1%
Advanced Power Strip	N/A	54,881	4%
Advanced Thermostat	N/A	28,289	2%
Dehumidifier	N/A	7,735	1%
Air Purifier	N/A	3,316	<1%
Clothes Washer	N/A	3,299	<1%
Refrigerator	N/A	2,915	<1%
Electric Clothes Dryer	N/A	1,714	<1%
Bath Vent Fans	N/A	1,315	<1%
Water Dispenser	N/A	1,110	<1%
Room Air Conditioners	N/A	422	<1%
Freezer	N/A	230	<1%
Pool Pump	N/A	124	<1%
Heat Pump Water Heater	N/A	55	<1%
Total	N/A	1,439,255	100%

Historic Product Sales

The Retail Products Initiative discounted 1,333,850 LED bulbs and fixtures during 2021, adding to more than a decade of AIC-driven efficient lighting sales. The Initiative discounted roughly 20% fewer bulbs in 2021 than in 2020, primarily reflecting a decrease in sales of specialty LEDs. Standard LED sales increased slightly from 2020 but remained much lower than in years prior to 2020. Since 2009, AIC has discounted 37.6 million energy-efficient lighting products. Figure 1 shows efficient lighting sales from PY1 through 2021.

Figure 1. Retail Products Initiative Historical Lighting Sales (PY1-2021)



^a We do not have a record of the number of CFLs sold by shape for PY1.
^b LEDs were sold, but the quantity is too small for the bar to be clearly visible.
^c Connected LEDs and LED Nightlights are included as specialty LEDs.

The Retail Products Initiative featured 13 non-lighting measures in 2021, with APS and advanced thermostats accounting for nearly 80% of those sales. The Initiative sold higher volumes of nearly all measures than in 2020 and reintroduced room air conditioners and heat pump water heaters, which had not been offered since prior to 2018. Even so, the Initiative sold roughly 10% fewer non-lighting units overall than in 2020, due to decreases in APS and advanced thermostat sales. These non-lighting measure-mix trends are outlined in Table 8.

Table 8. 2021 Retail Products Initiative Historical Non-Lighting Sales

Measure Type	2018	2019	2020	2021
Advanced Power Strip	25,803	55,275	66,438	54,881
Advanced Thermostat	14,403	16,044	33,073	28,289
Dehumidifier	0	0	5,768	7,735
Air Purifier	0	0	1,237	3,316
Clothes Washer	0	177	2,587	3,299
Refrigerator	0	82	1,388	2,915
Electric Clothes Dryer	0	79	1,357	1,714
Bath Vent Fans	0	0	1,675	1,315

Measure Type	2018	2019	2020	2021
Water Dispenser	0	0	611	1,110
Room Air Conditioners	0	0	0	422
Freezer	0	6	83	230
Pool Pump	206	8	59	124
Heat Pump Water Heater	0	0	0	55
Total	40,412	71,671	114,276	105,405

Sales by Delivery Channel

Nearly all LEDs and APS (over 99%) were discounted at the POS at participating retailers, while the remainder were sold through the Online Marketplace. Table 9 provides a breakdown of 2021 Retail Products Initiative sales of each measure by delivery channel.

Table 9. 2021 Retail Products Initiative Sales by Delivery Channel

Measure Type	POS	Downstream Rebate	Online Store
LED Lighting	1,331,895	0	1,955
Advanced Power Strip	54,231	0	650
Advanced Thermostat	0	13,305	14,984
Dehumidifier	7,698	0	37
Air Purifier	2,620	0	696
Clothes Washer	0	3,299	0
Electric Clothes Dryer	0	1,714	0
Refrigerator	0	2,915	0
Freezer	0	230	0
Pool Pump	0	124	0
Water Dispenser	1,110	0	0
Bath Vent Fans	1,295	0	20
Heat Pump Water Heater	0	55	0
Room Air Conditioners	0	422	0
Total	1,398,849	22,064	18,342

Lighting Retail Channel Coverage

Throughout 2021, AIC offered discounted LED products across 39 retailers at 373 storefronts. Thrift stores made up over a third (35%) of sales, with the vast majority of their sales being standard bulbs. Big Box, DIY,

and Club stores made up over half of sales (53%) despite selling no program-discounted standard LEDs. Table 10 provides a breakdown of lighting sales and total store locations by retail channel.

Table 10. 2021 Retail Products Initiative Lighting Sales by Retail Channel

Retail Channel	Store Locations	Sales Quantity	Share of Sales
Thrift	51	464,575	35%
Big Box	80	312,600	23%
DIY	52	225,993	17%
Club	10	166,445	12%
Dollar	85	92,080	7%
Hardware	33	38,133	3%
Grocery	51	12,671	1%
Online	1	1,955	<1%
Other	10	19,398	1%
Total	373	1,333,850	100%

Income Qualified Purchases

Table 11 summarizes sales volumes for each measure type provided in the initiative tracking data and included in this analysis, along with the distribution of IQ sales for each measure.

Table 11. 2021 Retail Products Initiative Income Qualified Allocations

Measure Category	IQ Allocation	Total Sales Quantity	IQ Sales Quantity	Non-IQ Sales Quantity
Standard LEDs	100.0%	413,728	413,728	0
Specialty LEDs (Reflector)	30.6%	350,787	107,314	243,473
Specialty LEDs (Other)	23.1%	522,866	120,563	402,303
LED Fixtures	95.6%	36,855	35,233	1,622
LED Nightlights	42.2%	7,300	3,080	4,220
Connected LEDs	11.8%	2,314	272	2,042
Advanced Power Strip	99.2%	54,881	54,419	462
Advanced Thermostat	30.0%	28,289	8,496	19,793
Dehumidifier	19.8%	7,735	1,529	6,206
Air Purifier	22.0%	3,316	728	2,588
Clothes Washer	27.8%	3,299	916	2,383
Refrigerator	29.4%	2,915	857	2,058
Electric Clothes Dryer	28.1%	1,714	482	1,232
Bath Vent Fans	20.8%	1,315	273	1,042
Water Dispenser	20.6%	1,110	228	882
Room Air Conditioners	30.6%	422	129	293
Freezer	27.7%	230	64	166
Pool Pump	21.2%	124	26	98

Measure Category	IQ Allocation	Total Sales Quantity	IQ Sales Quantity	Non-IQ Sales Quantity
Heat Pump Water Heater	25.5%	55	14	41
Total	52.0%	1,439,255	748,352	690,903

3.1.3 Initiative Annual Savings Summary

Table 12 presents the Retail Products Initiative annual savings achieved in 2021. The 2021 Retail Products Initiative achieved 55,264 MWh, 9.00 MW, and 1,374,813 therms in verified net savings.

Table 12. 2021 Retail Products Annual Savings

	Electric Energy Savings (MWh)	Electric Demand Savings (MW)	Gas Savings (Therms)
Ex Ante Gross Savings	65,944	12.67	1,496,096
Gross Realization Rate	101%	86%	99%
Verified Gross Savings	66,523	10.88	1,479,070
NTGR	0.831	0.827	0.930
Verified Net Savings	55,264	9.00	1,374,813

3.1.4 Initiative Savings Detail

Table 13 summarizes claimed ex ante savings from the Retail Products Initiative tracking data reviewed by the evaluation team. In addition, we indicate the IL-TRM V9.0 measure category used for evaluation of each measure. In total, the Initiative claimed 65,944 MWh of energy savings, 12.67 MW of peak demand savings, and 1,496,096 therms in total. LED lighting accounted for 93% of all units sold, 72% of ex ante energy savings, and 64% of ex ante demand savings. Despite making up just 2% of total program sales, advanced thermostats accounted for 18% of ex ante energy savings, 28% of ex ante demand savings, and 99.8% of ex ante gas savings.

Table 13. 2021 Retail Products Initiative Participation Summary by Measure

Evaluation Measure Category	IL-TRM Measure Name	Measure Quantity	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
Standard LEDs	LED Screw Based Omnidirectional Bulbs	413,728	10,895,866	1,431	N/A
Reflector LEDs	LED Specialty Lamps	350,787	16,381,795	3,810	N/A
Decorative LEDs	LED Specialty Lamps	522,866	17,994,796	2,507	N/A
LED Fixtures	LED Fixtures	36,855	1,636,183	244	N/A
LED Nightlights	LED Nightlights	7,300	159,899	37	N/A
Connected LEDs	LED Connected Lamps	2,314	101,384	65	N/A
Advanced Power Strips	Advanced Power Strip – Tier 1	54,881	4,011,801	450	N/A
Advanced Thermostats	Advanced Thermostats	28,289	11,986,487	3,524	1,492,941
Dehumidifiers	ENERGY STAR Dehumidifier	7,735	861,565	195	N/A
Air Purifiers	ENERGY STAR Air Purifier	3,316	321,916	38	N/A
Clothes Washers	ENERGY STAR Clothes Washers	3,299	529,984	68	3,155

Evaluation Measure Category	IL-TRM Measure Name	Measure Quantity	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
Refrigerators	ENERGY STAR and CEE Tier 2 Refrigerators	2,915	162,267	41	N/A
Electric Clothes Dryers	ENERGY STAR Clothes Dryers	1,714	275,596	37	N/A
Bathroom Vent Fans	High Efficiency Bathroom Exhaust	1,315	38,419	5	N/A
Water Dispensers	ENERGY STAR Water Coolers	1,110	138,591	16	N/A
Room Air Conditioners	ENERGY STAR Room Air Conditioners	422	38,170	34	N/A
Freezers	ENERGY STAR Freezers	230	10,504	2	N/A
Pool Pumps	High Efficiency Pool Pumps	124	254,738	164	N/A
Heat Pump Water Heaters	Heat Pump Water Heaters	55	143,675	7	N/A
Total	N/A	1,439,255	65,943,636	12,674	1,496,096

The Retail Products Initiative achieved 66,523 MWh in verified gross energy savings and 55,264 MWh in verified net energy savings, as shown in Table 14. Lighting products accounted for the vast majority of energy savings (72% of gross and 69% of net). Advanced thermostats and power strips each made up between 6% and 20% of gross and net energy savings. Total ex ante electric energy savings included as part of the Initiative's tracking data were very closely aligned with verified gross estimates, resulting in an overall gross realization rate of 101%.

Table 14. 2021 Retail Products Electric Energy Savings by Measure

Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR ^a	Verified Net Savings (MWh)
Standard LEDs	10,896	100%	10,896	1.000	10,896
Reflector LEDs	16,382	102%	16,724	0.752	12,575
Decorative LEDs	17,995	102%	18,319	0.716	13,113
LED Fixtures	1,636	99%	1,623	0.946	1,536
LED Nightlights	160	100%	160	0.821	131
Connected LEDs	101	88%	90	0.716	64
Advanced Power Strips	4,012	100%	4,013	0.999	4,009
Advanced Thermostats	11,986	99%	11,856	0.909	10,773
Dehumidifiers	862	100%	858	0.735	631
Air Purifiers	322	100%	322	0.833	268
Clothes Washers	530	119%	631	0.733	462
Refrigerators	162	100%	162	0.751	122
Electric Clothes Dryers	276	100%	275	0.763	210

Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR ^a	Verified Net Savings (MWh)
Bathroom Vent Fans	38	97%	37	0.732	27
Water Dispensers	139	100%	138	0.738	102
Room Air Conditioners	38	100%	38	0.866	33
Freezers	11	100%	11	0.733	8
Pool Pumps	255	100%	255	0.811	207
Heat Pump Water Heaters	144	80%	115	0.852	98
Total	65,944	101%	66,523	0.831	55,264

^a NTGR values shown here are savings-weighted and reflect the application of SAG-approved NTGRs, deemed at 1.0 for IQ sales.

The Retail Products Initiative achieved 10.88 MW in verified gross peak demand savings and 9.00 MW in verified net demand savings as shown in Table 15. As with energy savings, lighting products accounted for the vast majority of demand savings (58% of gross and 57% of net). As such, the difference between ex ante and verified gross demand savings for reflector bulbs is largely driving the discrepancy in the overall program demand realization rate. Advanced thermostats amounted to another 32% of gross and 33% of net demand savings. Ex ante demand savings included as part of the Initiative's tracking data nearly or exactly matched verified gross estimates for first-year lighting outside of reflector bulbs, APS, advanced thermostats, air purifiers, electric clothes dryers, dehumidifiers, water dispensers, room air conditioners, freezers, and pool pumps.

Table 15. 2021 Retail Products Electric Demand Savings by Measure

Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR ^a	Verified Net Savings (MW)
Standard LEDs	1.43	100%	1.43	1.000	1.43
Reflector LEDs	3.81	58%	2.22	0.752	1.67
Decorative LEDs	2.51	97%	2.43	0.716	1.74
LED Fixtures	0.24	103%	0.25	0.946	0.24
LED Nightlights	0.04	0%	0.00	0.821	0.00
Connected LEDs	0.07	21%	0.01	0.716	0.01
Advanced Power Strips	0.45	100%	0.45	0.999	0.45
Advanced Thermostats	3.52	99%	3.49	0.909	3.00
Dehumidifiers	0.20	100%	0.19	0.735	0.14
Air Purifiers	0.04	97%	0.04	0.833	0.03
Clothes Washers	0.07	119%	0.08	0.733	0.06
Refrigerators	0.04	60%	0.02	0.751	0.02
Electric Clothes Dryers	0.04	100%	0.04	0.763	0.03

Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR ^a	Verified Net Savings (MW)
Bathroom Vent Fans	0.00	97%	0.00	0.732	0.00
Water Dispensers	0.02	100%	0.02	0.738	0.01
Room Air Conditioners	0.03	101%	0.03	0.866	0.03
Freezers	0.00	96%	0.00	0.733	0.00
Pool Pumps	0.16	100%	0.16	0.811	0.13
Heat Pump Water Heaters	0.01	80%	0.01	0.852	0.00
Total	12.67	86%	10.88	0.827	9.00

^a NTGR values shown here are savings-weighted and reflect the application of SAG-approved NTGRs, deemed at 1.0 for IQ sales.

The Retail Products Initiative achieved 1,479,070 therms in verified gross gas savings and 1,374,813 therms in verified net gas savings, as shown in Table 16. Advanced thermostats amounted to virtually 100% of gas savings, while the remaining fraction of a percent was attributable to clothes washers. Ex ante energy savings included as part of the Initiative's tracking data slightly overestimated gas savings, resulting in an overall gross realization rate of 99%.

Table 16. 2021 Retail Products Gas Savings by Measure

Measure Category	Ex Ante Gross Savings (Therms)	Gross Realization Rate	Verified Gross Savings (Therms)	NTGR ^a	Verified Net Savings (Therms)
Advanced Thermostats	1,492,941	99%	1,476,039	0.909	1,372,597
Clothes Washers	3,155	96%	3,031	0.733	2,216
Total	1,496,096	99%	1,479,070	0.930	1,374,813

^a NTGR values shown here are savings-weighted and reflect the application of SAG-approved NTGRs, deemed at 1.0 for IQ sales.

We compared ex ante and verified savings for each measure. We describe discrepancies between ex ante and verified gross savings estimates below and provide explanation where possible. We ordered the list of discrepancies below from largest to smallest contribution to Initiative ex ante electric energy savings, focusing first on lighting and then non-lighting product categories.

- **Decorative LEDs (28% of ex ante energy and 20% of ex ante demand savings):** The gross realization rate for specialty LEDs sold during 2021 is 102% for energy savings and 97% for demand savings.
 - Verified savings match ex ante savings in 86% of cases for non-reflector specialty LEDs for both energy and demand savings.
 - Ex ante baseline wattages differed from those used to calculate verified savings in 6% of cases, all of which were decorative or globe bulbs.
 - For the remaining differences, all of the six other ex ante parameters aligned with those used to calculate verified savings, suggesting that ex ante savings used a different algorithm than the one prescribed in IL-TRM V9.0.
- **Reflector LEDs (24% of ex ante energy and 30% of ex ante demand savings):** The gross realization rate for reflector LEDs sold during 2021 is 102% for energy savings but only 58% for demand savings.

- Verified savings match ex ante savings in 76% of cases for energy savings and in 63% of cases for demand savings.
- For the remaining differences, all of the six other ex ante parameters aligned with those used to calculate verified savings, suggesting that ex ante savings used a different algorithm than the one prescribed in the IL-TRM V9.0.
- **Advanced Thermostats (18% of ex ante energy, 28% of ex ante demand, and 99%< of ex ante gas savings):** The gross realization rate for advanced thermostats is 99% for energy, demand, and gas savings.
 - Ex ante and verified gross savings match in 99% of cases. The remaining 1% of cases is explained by repeat participants being counted in ex ante savings and not in verified gross savings.
- **Standard LEDs (17% of ex ante energy and 11% of ex ante demand savings):** The gross realization rate for standard LEDs sold in 2021 is 100% for both energy and demand savings, and ex ante and per-unit verified savings matched in virtually 100% of cases.
- **Advanced Power Strips (6% of ex ante energy and 4% of ex ante demand savings):** The gross realization rate for advanced power strips is 100% for energy and demand savings, and ex ante and verified per-unit electric savings matched perfectly in all cases.
- **LED Fixtures (2% of ex ante energy and demand savings):** The gross realization rate for LED fixtures is 99% for energy savings and 103% for demand savings.
 - Verified energy savings do not match with ex ante savings in virtually all cases but do fall within 10% of ex ante savings in 99% of cases for energy savings and 67% of cases for demand savings.
 - Ex ante baseline wattages differed from those used to calculate verified savings in 43% of cases, virtually entirely for task lights/under cabinet fixtures.
 - For the remaining differences, all of the six other ex ante parameters aligned with those used to calculate verified savings, suggesting that ex ante savings used a different algorithm than the one prescribed in the IL-TRM V9.0.
- **Dehumidifiers (1% of ex ante energy and 2% of ex ante demand savings):** The gross realization rate for dehumidifiers is 100% for electric energy and demand savings and ex ante and verified per-unit savings matched perfectly in all cases.
- **Clothes Washers (1% of ex ante energy and demand savings, and <1% of ex ante gas savings):** The gross realization rate for clothes washers is 119% for electric energy, demand, and gas savings.
 - Ex ante and verified gross savings match for almost no cases, with the exception of those where zero electric or zero gas savings were claimed.
 - All nine ex ante parameters aligned with those used to calculate verified savings, suggesting that ex ante savings used a different algorithm than the one prescribed in IL-TRM V9.0.
- **LED Nightlights (<1% of ex ante energy and demand savings):** The gross realization rate for LED nightlights is 100% for energy savings and 0% for demand savings.
 - Verified energy savings match ex ante energy savings exactly in 100% of cases, but in 0% of cases for demand savings.

- The evaluation team used a coincidence factor of zero to calculate verified demand savings, resulting in no verified demand savings. Program tracking data included the exact same savings parameters, including a coincidence factor of zero, yet still included ex ante demand savings.
- **Connected LEDs (<1% of ex ante energy and 1% of ex ante demand savings):** The gross realization rate for Connected LEDs is 88% for energy savings and 21% for demand savings.
 - Ex ante and verified gross savings do not match in any cases. All connected LEDs appeared in tracking data with incandescent-equivalent baseline wattages, whereas the evaluation team assigned halogen-equivalent baseline wattages based on IL-TRM V9.0 recommendations for omnidirectional bulbs.
 - For the remaining differences, all three of the other ex ante parameters aligned with those used to calculate verified savings, suggesting that ex ante savings used a different algorithm than the one prescribed in IL-TRM V9.0.
- **Air Purifiers (<1% of ex ante energy and demand savings):** The gross realization rate for air purifiers is 100% for electric energy savings and 99% for demand savings.
 - Ex ante and verified savings match for 100% of cases for electric energy savings and 99% of cases for demand savings. Differences in the remaining 1% of cases for demand savings are likely attributable to differences in hours of use and coincidence factor assumptions, which were not specified in the tracking data. If possible, including these values in initiative tracking data would help identify the source of the differences.
- **Electric Clothes Dryers (<1% of ex ante energy and demand savings):** The gross realization rate for clothes dryers is 100% for electric energy and demand savings and ex ante and verified per-unit savings matched perfectly in all cases.
- **Pool Pumps (<1% of ex ante energy and 1% of ex ante demand savings):** The gross realization rate for variable-speed pool pumps is 100% for electric energy and demand savings and ex ante and verified per-unit savings matched perfectly in all cases.
- **Refrigerators (<1% of ex ante energy and demand savings):** The gross realization rate for refrigerators is 100% for electric energy and 60% for demand savings.
 - Ex ante and verified gross savings match in virtually 100% of cases for electric energy, but in 0% of cases for demand savings.
 - Verified gross demand savings are equivalent to ex ante demand savings multiplied by the NTGR of 0.650 in all cases.
- **Heat Pump Water Heaters (<1% of ex ante energy and demand savings):** The gross realization rate for heat pump water heaters is 80% for both electric energy and demand savings.
 - Ex ante and verified gross savings match in no cases for either electric energy or demand savings.
 - Verified gross demand savings are equivalent to ex ante demand savings multiplied by the NTGR of 0.800 in all cases.
- **Water Dispensers (<1% of ex ante energy and demand savings):** The gross realization rate for water dispensers is 100% for electric energy and demand savings and ex ante and verified per-unit savings matched perfectly in all cases.

- **Bathroom Vent Fans (<1% of ex ante energy and demand savings):** The gross realization rate for bathroom vent fans is 97% for both electric energy and demand savings and ex ante and verified per-unit savings matched perfectly in 40% of cases.
 - For the remaining 60% of cases, all four ex ante parameters aligned with those used to calculate verified savings, suggesting that ex ante savings used a different algorithm than the one prescribed in IL-TRM V9.0.
- **Room Air Conditioners (<1% of ex ante energy and demand savings):** The gross realization rate for air conditioners is 100% for electric energy and 101% for demand savings and ex ante and verified per-unit savings matched perfectly in virtually all cases after rounding.
- **Freezers (<1% of ex ante energy and demand savings):** The gross realization rate for freezers is 100% for electric energy and 96% for demand savings.
 - Verified gross electric energy and demand savings matched in all but 12 cases. All ex ante parameters included in the tracking data align with those used to calculate verified savings. Tracking data did not include freezer types (upright vs. chest) or defrosting types (manual vs. automatic), however, suggesting these assignments could be a source of differences between ex ante and verified savings.

3.1.5 Cumulative Persisting Annual Savings

Table 17 presents CPAS and WAML for the 2021 Retail Products Initiative. The measure-specific and total verified gross savings for the Initiative are summarized, and CPAS in 2021–2024 and 2030 are presented.¹³ The WAML for the Initiative is 9.8 years.

In 2021, AIC converted some natural gas savings produced by Retail Products Initiative advanced thermostats received by IQ customers to CPAS for the purposes of goal attainment; those savings are presented separately in Table 18.

Table 17. 2021 Retail Products Initiative CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Standard LEDs - Residential IQ	10.0	9,838	1.000	9,838	9,838	9,838	9,838	...	7,772	...	92,183
Standard LEDs - Commercial	5.5	1,058	1.000	1,058	1,058	1,058	1,058	...	0	...	4,834
Reflector LEDs - Residential Non-IQ	10.0	10,166	0.690	7,015	7,015	7,015	7,015	...	4,209	...	53,311
Reflector LEDs - Residential IQ	10.0	4,324	0.897	3,881	3,881	3,881	3,881	...	2,716	...	35,313
Reflector LEDs - Commercial	6.9	2,235	0.752	1,680	1,680	1,680	1,680	...	0	...	9,644
Decorative LEDs - Residential Non-IQ	10.0	12,225	0.690	8,435	8,435	8,435	8,435	...	5,145	...	64,612
Decorative LED - Residential IQ	10.0	3,646	0.802	2,926	2,926	2,926	2,926	...	1,814	...	25,922
Decorative LED - Commercial	4.7	2,448	0.716	1,752	1,752	1,752	1,752	...	0	...	7,756
LED Fixtures - Residential Non-IQ	15.0	219	0.690	151	151	151	151	...	91	...	1,604
LED Fixtures - Residential IQ	15.0	1,257	0.988	1,242	1,242	1,242	1,242	...	870	...	15,651
LED Fixtures - Commercial	14.5	146	0.975	143	143	143	143	...	143	...	2,111
LED Nightlights - Residential Non-IQ	8.0	92	0.690	64	64	64	64	...	0	...	510
LED Nightlights - Residential IQ	8.0	67	1.000	67	67	67	67	...	0	...	540
Connected LEDs - Residential Non-IQ	10.0	58	0.690	40	40	40	40	...	18	...	269
Connected LEDs - Residential IQ	10.0	8	0.911	7	7	7	7	...	6	...	66

¹³ For further detail, including achieved CPAS in years not presented in this table, please see Appendix C.

Evaluation Measure Category	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Connected LEDs - Commercial	5.5	24	0.716	17	17	17	17	...	0	...	80
Advanced Power Strips - Non-IQ	7.0	34	0.860	29	29	29	29	...	0	...	204
Advanced Thermostats - Non-IQ	11.0	8,295	0.869	7,212	7,212	7,212	7,212	...	7,212	...	79,331
Dehumidifiers - Non-IQ	12.0	688	0.670	461	461	461	461	...	461	...	5,532
Air Purifiers - Non-IQ	9.0	251	0.786	198	198	198	198	...	0	...	1,778
Clothes Washers - Non-IQ	14.0	455	0.630	287	287	287	287	...	287	...	4,017
Refrigerators - Non-IQ	17.0	114	0.647	74	74	74	74	...	74	...	1,257
Electric Clothes Dryers - Non-IQ	16.0	198	0.670	132	132	132	132	...	132	...	2,119
Bathroom Vent Fans - Non-IQ	19.0	30	0.661	20	20	20	20	...	20	...	372
Water Dispensers - Non-IQ	10.0	110	0.670	74	74	74	74	...	74	...	737
Room Air Conditioners - Non-IQ	12.0	27	0.807	21	21	21	21	...	21	...	257
Freezers - Non-IQ	22.0	8	0.630	5	5	5	5	...	5	...	105
Pool Pumps - Non-IQ	7.0	201	0.760	153	153	153	153	...	0	...	1,068
Heat Pump Water Heaters - Non-IQ	15.0	86	0.801	69	69	69	69	...	69	...	1,029
Advanced Power Strips - IQ	7.0	3,980	1.000	3,980	3,980	3,980	3,980	...	0	...	27,857
Advanced Thermostats - IQ	11.0	3,561	1.000	3,561	3,561	3,561	3,561	...	3,561	...	39,169
Dehumidifiers - IQ	12.0	170	1.000	170	170	170	170	...	170	...	2,035
Air Purifiers - IQ	9.0	71	1.000	71	71	71	71	...	0	...	636
Clothes Washers - IQ	14.0	175	1.000	175	175	175	175	...	175	...	2,453
Refrigerators - IQ	17.0	48	1.000	48	48	48	48	...	48	...	809
Electric Clothes Dryers - IQ	16.0	77	1.000	77	77	77	77	...	77	...	1,237
Bathroom Vent Fans - IQ	19.0	8	1.000	8	8	8	8	...	8	...	147
Water Dispenser - IQ	10.0	28	1.000	28	28	28	28	...	28	...	285
Room Air Conditioners - IQ	12.0	12	1.000	12	12	12	12	...	12	...	141

Evaluation Measure Category	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Freezers - IQ	22.0	3	1.000	3	3	3	3	...	3	...	64
Pool Pumps - IQ	7.0	54	1.000	54	54	54	54	...	0	...	378
Heat Pump Water Heaters - IQ	15.0	29	1.000	29	29	29	29	...	29	...	440
2021 CPAS		66,523	0.831	55,264	55,264	55,264	55,264	...	35,249	...	487,864
Expiring 2021 CPAS				0	0	0	0	...	268	...	
Expired 2021 CPAS				0	0	0	0	...	20,016	...	
WAML	9.8										

Table 18. 2021 Retail Products Initiative Gas Conversion CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Advanced Thermostats	11.0	7,020	0.935	6,564	6,564	6,564	6,564	...	6,564	...	72,203
2021 CPAS		7,020	0.935	6,564	6,564	6,564	6,564	...	6,564	...	72,203
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	0	...	
WAML	11.0										

3.1.6 Conclusions and Recommendations

Based on the results of this evaluation, the evaluation team offers the following key findings and recommendations for the Retail Products Initiative moving forward:

- **Key Finding #1:** Initiative tracking data is clear, comprehensive, and free of any noteworthy data entry errors, gaps, or inconsistencies, contributing to overall gross realization rates close to 100% (101% for energy, 86% for demand, and 99% for gas savings).
- **Key Finding #2:** Initiative administrators incorporated the vast majority of IL-TRM-based savings assumptions into tracking data, enabling the evaluation team to identify the sources of differences between ex ante and verified savings in most cases. The addition of over two dozen inputs is a marked improvement from prior years, which not only improved our ability to identify and explain discrepancies but also brought realization rates much closer to 100% for many measures. Ex ante and verified savings matched exactly for more than half of measures and fell within 5% for all but three.
 - Recommendation: We recommend that the implementation team continue to include detailed savings parameters in future tracking data extracts.
- **Key Finding #3:** Despite the inclusion of nearly all ex ante savings assumptions, the evaluation team was unable to identify the source of differences between ex ante and verified savings estimates for a few measures and savings metrics. A discussion of measure-specific differences between ex ante and verified savings is included earlier in this chapter, and Appendix A outlines in greater detail how the evaluation team applied IL-TRM V9.0 recommendations to calculate verified savings.
 - Recommendation: We recommend the implementation team continue to work towards consistently applying and codifying all specifications and assumptions used to calculate ex ante savings and, in addition, provide the algorithms used to calculate savings for each measure. The addition of formulas showing how the implementation team applied parameters to produce ex ante savings would further minimize the need for the evaluation team to speculate on potential differences between ex ante and verified savings where they still exist. We expect that the discussion earlier in this chapter and detailed outline of verified savings assumptions provided in Appendix A can help reconcile the few remaining differences between ex ante and verified savings.
- **Key Finding #4:** Initiative administrators offered discounts on nearly 20 product categories, including over 400 unique lighting measures and 150 unique non-lighting measures over the course of 2021. To deliver incentives, the offering utilized a combination of POS discounts, downstream rebates, and an online store to effectively reach eligible customers shopping for an extensive variety of lighting, consumer electronics, home appliances, and other miscellaneous equipment.
- **Key Finding #5:** By targeting specific retailers and retail channels that disproportionately serve lower-income customers, the Initiative effectively delivered incentives to large numbers of IQ customers across all product categories. In particular, standard LEDs and APS products were almost exclusively sold at dollar and discount retailers. Over 50% of sales across all product categories are estimated to have been delivered to IQ customers, reflecting an increase from 39% in 2020.

3.2 Income Qualified Initiative

3.2.1 Initiative Description

The Single Family Income Qualified (IQ) Initiative is a home energy diagnostic and whole house retrofit offering. The target market for the Initiative is single family customers with household incomes up to 300% of federal poverty guidelines for household size.

The IQ Initiative includes three distinct channels:

- The Single Family Channel, which includes
 - Single Family “Core,”
 - SAVE Kits, and
 - Additional Offerings;
- The Community Action Agency (CAA) Channel; and
- The Smart Savers Channel.

There are a number of additional IQ-focused offerings in 2021, specifically Appliance Recycling Kits and Community Kits. We include those kits in the Direct Distribution and Appliance Recycling chapters respectively.

Single Family and CAA Core Channels

We use the term “Core” to refer to the traditional in-person and virtual activities of the Single Family and CAA Channels; distinct from the SAVE Kits or Additional Offerings, which we describe later in this section.

The Single Family Core Channel (also known as Home Efficiency Income Qualified, or HEIQ) and the CAA Core Channel provide no-cost Building Performance Institute (BPI) energy audits that identify building shell and HVAC retrofit opportunities. During the audit, implementation staff also install energy-efficient direct install (DI) measures such as LEDs, showerheads, faucet aerators, advanced power strips, pipe insulation, and programmable/advanced thermostats at no cost. Following the audit, customers may also receive additional retrofits, in some cases with a copayment,¹⁴ such as air sealing and insulation improvements, central air conditioner (CAC) replacements, and air source heat pump (ASHP) replacements. Leidos oversees the implementation of these channels in coordination with several implementation partners. For the Single Family Core Channel, Walker-Miller and BPI-certified AIC Program Allies serve moderate and low income single family customers who did not participate in the Illinois Home Weatherization Assistance Program (IHWAP). For the CAA Core Channel, CAAs with support from AIC partner, Resource Innovations, serve low income single family customers that participate in the IHWAP program at the same time. The CAAs combine AIC and IHWAP funding to provide comprehensive energy efficiency and health and safety improvements. Table 19 describes each implementation partner’s role.

Table 19. 2021 IQ Initiative Key Implementation Partners and Roles

Partner	Single Family Core Channel	CAA Channel
Leidos	Overall marketing and implementation lead, customer eligibility review, quality control (QC) field inspections, technical reviews of scopes of work, and incentive application review	

¹⁴ Moderate income participants in the Single Family Core channel may have copayments for certain measures. Low income participants in Single Family Core and CAA Channel have no copayments.

Partner	Single Family Core Channel	CAA Channel
Walker-Miller	Marketing, audits and DI, and QC field inspections of Program Ally projects	None
Resource Innovations	None	Marketing, CAA oversight and support, and incentive application review
CAAs	Marketing, audits and DI, and building envelope/HVAC retrofits ^a	Marketing, waitlist management, eligibility review, audits and DI, building envelope/HVAC retrofits, and QC field inspections
Program Allies	Marketing, audits and DI, and building envelope/HVAC retrofits	None

SAVE Kits

SAVE Kits are a distinct offering within the Single Family Channel. In June 2020, AIC developed the SAVE Kits offering to continue helping IQ customers manage their energy costs and improve the comfort of their home while avoiding in-person contact during the COVID-19 pandemic. AIC continued to offer them in 2021 to any IQ customer who completed a virtual audit through the Single Family Channel or who signed up for the “Fresh Start” bill payment assistance program.¹⁵ The SAVE Kits not only provide energy savings for customers, but also act as a “foot in the door” for hard to reach and underserved customers in energy efficiency offerings. The SAVE Kit acts as a catalyst for participation in other AIC offerings, such as the IQ Single Family Core Channel and the Online Marketplace.

The SAVE Kit includes several energy- and water-saving products (e.g., LEDs, low-flow showerheads, advanced power strips, and door sweeps), a booklet of installation instructions, and the tools customers need to install the products (e.g., a screwdriver and plumber’s tape). Once customers have received the kit, they may choose from two verification options:

- **Virtually Assisted Install (or “Virtual” Verification):** A video call with a Personal Energy Advisor (PEA) who will walk the customer through product installation and verify the customer installed the products correctly.
- **Postcard Verification:** Customers install the measures on their own and then submit a verification postcard.

Customers may also choose not to complete a verification option. AIC provides SAVE Kits at no cost to the customer and the contents do not vary by customer type (e.g., dual-fuel or single-fuel customers, single family, or multifamily).

Smart Savers Channel

The Smart Savers channel provides advanced thermostats at no-cost to IQ customers. The overarching goals of the channel are to achieve energy savings through advanced thermostat installation, reach customers who have not previously benefited from AIC’s Residential Program, and act as an entry point into other AIC energy efficiency offerings.

CLEAResult implements this channel on behalf of AIC. Customers in target IQ zip codes receive email invitations to apply online or by phone for a free Ecobee3 Lite or Google Nest E advanced thermostat to install

¹⁵ “Ameren Illinois Providing Funds in Bill Payment Assistance for Qualified Customers with ‘Fresh Start’ Program.” Peoria Citizens Committee for Economic Opportunity, Inc. (PCCEO). Accessed December 2021. <https://www.pcceo.org/ameren-illinois-providing-funds-in-bill-payment-assistance-for-qualified-customers-with-fresh-start-program/>.

in their homes. Most participating customers have the option of installing the thermostat themselves or selecting a Program Ally to install the device. Customers who live in rural areas in which there are no participating Program Allies only have the self-install option.¹⁶ If participants choose to install the advanced thermostat themselves, they receive a \$25 incentive once CLEAResult verifies the thermostat is installed and activated. After participants complete their journey through the Smart Savers Channel, CLEAResult passes their contact information to Leidos for additional marketing and recruitment for other AIC Residential Program offerings.

Additional Offerings

The Initiative continued to offer multiple ad-hoc offerings in 2021 including 1) the continuation of the Bloomington-Normal (BN) pilot; 2) Community Kits under the CAA Channel; 3) an alternate type of SAVE kit without advanced power strips and no verification component; and 4) a community event in April 2021 called Light Up Ogles Neighborhood where AIC distributed LEDs.

Summary of Key Implementation Changes in 2021

The key changes to Initiative design and implementation are below:

- AIC re-introduced copayments for some building shell and HVAC measures, specifically for moderate income (“Tier 2”) participants in the Single Family channel. Copayment percentages varied by measure, with customers paying up to \$4,000. According to AIC staff, the average copayment in 2021 was about \$2,800. In the third and fourth quarter of 2021, AIC removed all copayments from projects for the remainder of the year due to the availability of additional funding through two Market Development Initiative (MDI) partners; specifically, through the Energy Assistance Foundation’s Warm Neighbors, Cool Friends Program and a partnership with the City of Urbana.
- Compared to typical years, there was a larger-than-expected proportion of low income (“Tier 1”) Single Family Channel participants compared to moderate income (Tier 2) participants in 2021. Tier 1 projects do not include copayments and, as such, the larger proportion of Tier 1 projects led to budget challenges. To manage costs, AIC stopped providing CAC replacements to all eligible Tier 1 participants, switching to case-by-case approvals of CAC replacements (e.g., in cases of emergencies or high need).
- AIC added a new PEA support element to the SAVE Kits participation process. PEAs are a part of the Walker-Miller implementation team for the Single Family channel. The PEAs act as concierges for SAVE Kit recipients. They contact customers who receive a SAVE Kit to 1) welcome them into the IQ Initiative; 2) verify the customer has received the SAVE Kit; 3) ask if they need installation assistance (i.e., a Virtually Assisted Install); 4) communicate the steps for SAVE Kit verification; and 5) specifically introduce the Single Family Core Channel and assist with the application process. If customers would like to receive help installing their SAVE Kit, the Home Energy Specialists (HES) team (i.e., the Initiative’s customer care center) helps customers set up appointments with PEAs, who then conduct the Virtually Assisted Install calls.

¹⁶ The Smart Savers Channel actively seeks to recruit contractors in rural areas to ensure that majority of customers have the option to have a Program Ally install their advanced thermostat.

3.2.2 Participation Summary

Single Family and CAA Core Channels

The Single Family and CAA Core Channels reached over 1,200 homes in 2021 (outside of SAVE kits). Services included home audits, DI measures, and building envelope or HVAC retrofits. Walker-Miller and Program Allies (Single Family Core) served about three quarters (74%) of single family homes in 2021, while CAAs (CAA Channel) served the remaining quarter. Most participants (88%) completed HVAC and/or building envelope retrofits measures, while the remainder only received DI measures. The Initiative exceeded its goal of serving 800 homes through the Single Family Core Channel but fell short of its goal to serve 490 homes through CAA Core Channel. Table 20 presents participation over 2021 for the Single Family and CAA Core Channels. More detail on the percentage of customers who received each type of measure is available in Appendix D.

Table 20. 2021 Single Family and CAA Core Channel Participation Summary

Participation	Channel		Total
	Single Family Core	CAA Core	
Number of single family homes served	934	333	1,267
Full Participation: DI + building envelope or HVAC measures	234	314	548
DI measures only	154	0	154
Building shell or HVAC measures only	546	19	565

Source: We determined unique homes based on electric or gas account numbers. These counts exclude 46 unique account numbers with only "Other" measures (based on the "product family" field in the tracking data). "Other" measures have no ex ante savings estimates and include Administrative Cost, Program Support, Health and Safety, Authorized Measure, and Program Support.

SAVE Kits

The SAVE Kit offering of the Initiative distributed over 5,500 SAVE Kits in 2021, reaching 5,450 unique customers. A total of 387 kit recipients (8%) completed one of the two verification options. Table 21 provides the total number of SAVE Kits distributed.

Table 21. 2021 SAVE Kit Participation Summary

Verification Type	Total Recipients	Total Kits
Unverified	5,063	5,149
Verified Self-Install	387	387
Total SAVE Kits Distributed	5,450	5,536

Note: Total recipients does not match the number of kits distributed because 86 customers (defined by unique account number) received two Unverified SAVE kits.

Smart Savers Channel

The Smart Savers Channel provided thermostats to over 7,600 customers in 2021. About two-thirds of customers (66%) installed the thermostat themselves, while the remaining one-third of customers had their new thermostat installed by a Program Ally. The vast majority of participants (95%) were single family homes, but there were 356 multifamily participants (direct install only). Table 22 presents participation in the Smart Savers Channel during 2021.

Table 22. 2021 Smart Savers Channel Participation Summary

Install Type	Total
Self-Install	5,061
Direct Install	2,620
Total	7,681

Additional Offerings

The Initiative distributed over 3,500 additional kits through various ad-hoc offerings; completed over 100 additional retrofits or direct install projects through the BN pilot; and distributed 1,000 LEDs at the Light Up Ogles Neighborhood event. Table 23 and Table 24 summarize participation in these additional offerings.

Table 23. 2021 Additional Kit and LED Offerings Participation Summary

Kit Type	Total Recipients	Number of Measures Distributed	Measure Unit
BN Community Kit	501	514	Kits
CAA Community Kit	9	9	Kits
SAVE Kit – No APS	3,000	3,000	Kits
Light Up Ogles Neighborhood	N/A	1,000	LEDs

Note: Total BN Community Kit recipients does not match the number of BN Community Kits distributed because 13 customers (defined by unique account number) received two kits.

Table 24. 2021 BN Pilot Project Participation Summary

Project Type	Number of Projects
DI Only	14
Building envelope or HVAC measures	4
DI + Building envelope or HVAC measures	88
Total	106

3.2.3 Initiative Annual Savings Summary

Table 25 presents IQ Initiative annual savings achieved in 2021. The Initiative achieved 13,021 MWh, 2.80 MW, and 946,124 therms in verified net savings. Overall, the Initiative achieved strong gross realization rates of 110%, 104%, and 99% for electric energy, electric demand, and gas savings, respectively. We multiplied the verified gross savings by the SAG-approved NTGR of 1.0 to derive verified net savings.

Table 25. 2021 Income Qualified Initiative Annual Savings

	Electric Energy Savings (MWh)	Electric Demand Savings (MW)	Gas Savings (Therms)
Ex Ante Gross Savings	11,872	2.68	951,638
Gross Realization Rate	110%	104%	99%
Verified Gross Savings	13,021	2.80	946,124
NTGR	1.000	1.000	1.000
Verified Net Savings	13,021	2.80	946,124

Note: Ex ante savings presented in this chapter may differ slightly from ex ante claims in initiative tracking data due to rounding issues related to kits.

3.2.4 Initiative Savings Detail

As shown in Table 26, the IQ Initiative distributed 24 categories of measures across the three channels. The Smart Savers Channel and SAVE Kits were the largest contributors to Initiative savings overall, followed by Single Family Core and the CAA Channels.

Table 26. 2021 Income Qualified Participation Summary by Measure

Evaluation Measure Category	IL-TRM Measure Name	Measure Quantity	Units	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
Single Family Channel						
Single Family Core ^a						
Air Sealing	Air Sealing	779,954	Cubic Feet per Minute	267,728	158.22	41,334
CAC (ER)	Central Air Conditioning	127	Systems	251,709	193.15	0
BPM Motor	Furnace Blower Motor	410	Motors	211,507	32.63	0
Attic Insulation	Ceiling/Attic Insulation	668,948	Square Feet	169,590	79.24	40,966
ASHP (ER) - Replaces Elec. Resist.	Air Source Heat Pump	17	Systems	187,025	30.83	0
Standard LED ^b	LED Screw Based Omnidirectional Bulbs	4,087	Bulbs	139,113	17.36	0
Bathroom Exhaust Fan	High Efficiency Bathroom Exhaust Fan	597	Fans	129,489	14.75	0
Advanced Thermostat	Advanced Thermostats	422	Thermostats	114,298	28.00	28,583
Crawlspace Insulation	Basement Sidewall Insulation	31,186	Square Feet	54,790	13.02	15,651
Advanced Power Strip - Tier 1	Advanced Power Strip - Tier 1	447	Power Strips	41,823	4.69	0
Specialty LED	LED Specialty Lamps	1,368	Bulbs	36,459	5.61	0
Heat Pump Water Heater	Heat Pump Water Heaters	17	Systems	32,953	1.56	0
Wall Insulation	Wall Insulation	139,858	Square Feet	32,708	16.67	12,663
ASHP (ER) - Replaces ASHP	Air Source Heat Pump	5	Systems	26,651	6.94	0
Duct Sealing	Duct Insulation and Sealing	21	Participants	19,088	6.59	7,374
Exterior Standard LED	LED Screw Based Omnidirectional Bulbs	165	Bulbs	14,293	1.58	0
Reflector LED	LED Specialty Lamps	235	Bulbs	10,097	1.53	0
Rim Joist Insulation	Rim/Band Joist Insulation	59,332	Square Feet	9,501	2.92	3,032
Exterior Reflector LED	LED Specialty Lamps	33	Bulbs	4,399	0.49	0

Evaluation Measure Category	IL-TRM Measure Name	Measure Quantity	Units	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
Room Air Conditioner (ER)	ENERGY STAR Room Air Conditioner	31	Systems	2,804	3.80	0
ASHP (TOS)	Air Source Heat Pump	3	Systems	2,311	0.17	0
Showerhead	Low Flow Showerheads	93	Showerheads	2,041	0.13	765
Faucet Aerator	Low Flow Faucet Aerators	152	Aerators	1,401	0.32	667
Pipe Insulation	Domestic Hot Water Pipe Insulation	1,734	Linear Feet	1,375	0.16	955
Exterior Specialty LED	LED Specialty Lamps	15	Bulbs	1,261	0.14	0
Floor Insulation	Floor Insulation Above Crawlspace	3,132	Square Feet	780	0.43	348
CAC (TOS)	Central Air Conditioning	2	Systems	578	0.65	0
Gas Furnace (TOS)	Gas High Efficiency Furnace	105	Systems	0	0	10,460
Gas Furnace (ER)	Gas High Efficiency Furnace	416	Systems	0	0	91,723
Gas Boiler (TOS)	Gas High Efficiency Boiler	8	Systems	0	0	961
Gas Boiler (ER)	Gas High Efficiency Boiler	2	Systems	0	0	745
<i>Single Family Core Subtotal</i>		1,692,922		1,765,770	621.56	256,226
SAVE Kits ^a						
Unverified SAVE Kit - APS Tier 1	Advanced Power Strip - Tier 1	10,298	Power Strips	959,045	107.62	0
Unverified SAVE Kit - 9W LED	LED Screw Based Omnidirectional Bulbs	30,894	Bulbs	769,467	135.52	0
Unverified SAVE Kit - 6W LED	LED Specialty Lamps	20,596	Bulbs	448,333	77.58	0
Unverified SAVE Kit - 8W LED	LED Specialty Lamps	10,298	Bulbs	375,809	65.03	0
Unverified SAVE Kit - Door Sweep	Air Sealing	10,298	Door Sweeps	172,061	0	44,871
Unverified SAVE Kit - Showerhead	Low Flow Showerheads	5,149	Showerheads	161,379	13.78	29,429
Unverified SAVE Kit - Kitchen Aerator, 1.5 gpm	Low Flow Faucet Aerators	5,149	Aerators	125,296	28.07	21,890
Unverified SAVE Kit - 3/4" Pipe Insulation	Domestic Hot Water Pipe Insulation	30,894	Linear Feet	118,923	13.57	26,618
Unverified SAVE Kit - Outlet Gasket	Air Sealing	123,576	Gaskets	107,387	0	27,904

Evaluation Measure Category	IL-TRM Measure Name	Measure Quantity	Units	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
Unverified SAVE Kit - Shower TSV	Thermostatic Restrictor Shower Valve	5,149	Valves	32,495	1.70	5,926
Unverified SAVE Kit - 1/2" Pipe Insulation	Domestic Hot Water Pipe Insulation	15,447	Linear Feet	25,483	2.91	5,704
Unverified SAVE Kit - Bath Aerator	Low Flow Faucet Aerators	5,149	Aerators	16,295	22.83	2,710
Unverified SAVE Kit (No APS) - 9W LED	LED Screw Based Omnidirectional Bulbs	18,000	Bulbs	447,151	78.75	0
Unverified SAVE Kit (No APS) - 6W LED	LED Specialty Lamps	12,000	Bulbs	260,534	45.08	0
Unverified SAVE Kit (No APS) - 8W LED	LED Specialty Lamps	6,000	Bulbs	218,389	37.79	0
Unverified SAVE Kit (No APS) - Door Sweep	Air Sealing	6,000	Door Sweeps	99,988	0	26,448
Unverified SAVE Kit (No APS) - Showerhead	Low Flow Showerheads	3,000	Showerheads	93,780	8.01	17,346
Unverified SAVE Kit (No APS) - Kitchen Aerator	Low Flow Faucet Aerators	3,000	Aerators	72,812	16.31	12,902
Unverified SAVE Kit (No APS) - 3/4" Pipe Insulation	Domestic Hot Water Pipe Insulation	18,000	Linear Feet	69,108	7.88	15,690
Unverified SAVE Kit (No APS) - Outlet Gasket	Air Sealing	36,000	Gaskets	31,202	0	8,224
Unverified SAVE Kit (No APS) - Shower TSV	Thermostatic Restrictor Shower Valve	3,000	Valves	18,883	0.99	3,493
Unverified SAVE Kit (No APS) - 1/2" Pipe Insulation	Domestic Hot Water Pipe Insulation	9,000	Linear Feet	14,809	1.69	3,362
Unverified SAVE Kit (No APS) - Bath Aerator	Low Flow Faucet Aerators	3,000	Aerators	9,469	13.27	1,597
Verified SAVE Kit - Standard LED	LED Screw Based Omnidirectional Bulbs	2,250	Bulbs	85,091	10.49	0
Verified SAVE Kit - Advanced Power Strip - Tier 1	Advanced Power Strip - Tier 1	750	Power Strips	76,360	8.57	0
Verified SAVE Kit - Specialty LED	LED Specialty Lamps	1,498	Bulbs	49,228	5.95	0
Verified SAVE Kit - Reflector LED	LED Specialty Lamps	752	Bulbs	41,032	4.96	0

Evaluation Measure Category	IL-TRM Measure Name	Measure Quantity	Units	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
Verified SAVE Kit - Outlet Gasket	Air Sealing	9,288	Gaskets	11,293	7.91	2,568
Verified SAVE Kit - Faucet Aerator	Low Flow Faucet Aerators	772	Aerators	8,945	1.92	2,712
Verified SAVE Kit - Showerhead	Low Flow Showerheads	386	Showerheads	8,599	0.62	2,741
Verified SAVE Kit - Door Sweep	Air Sealing	774	Door Sweeps	3,378	0	4,322
Verified SAVE Kit - Restrictor Shower Valve	Thermostatic Restrictor Shower Valve	386	Valves	2,693	0.11	859
Verified SAVE Kit - Pipe Insulation	Domestic Hot Water Pipe Insulation	1,158	Linear Feet	2,607	0.30	1,311
<i>SAVE Kits Subtotal</i>		<i>407,911</i>		<i>4,937,325</i>	<i>719.22</i>	<i>268,628</i>
BN Pilot ^a						
CAC (ER)	Central Air Conditioning	16	Systems	39,548	31.66	0
Standard LED	LED Screw Based Omnidirectional Bulbs	680	Bulbs	26,324	3.24	0
Advanced Thermostat	Advanced Thermostats	80	Thermostats	16,376	5.75	0
Specialty LED	LED Specialty Lamps	606	Bulbs	16,025	2.40	0
Advanced Power Strip - Tier 1	Advanced Power Strip - Tier 1	99	Power Strips	10,197	1.14	0
Bathroom Exhaust Fan	High Efficiency Bathroom Exhaust Fan	38	Fans	8,242	0.94	0
Attic Insulation	Ceiling/Attic Insulation	37,463	Square Feet	5,678	3.74	0
Air Sealing	Air Sealing	16,504	Cubic Feet per Minute	5,200	3.83	0
Reflector LED	LED Specialty Lamps	81	Bulbs	3,974	0.55	0
Duct Sealing	Duct Insulation and Sealing	4	Participants	3,071	1.25	0
Exterior Specialty LED	LED Specialty Lamps	31	Bulbs	2,482	0.27	0
CAC (TOS)	Central Air Conditioning	6	Systems	2,251	2.50	0
Exterior Standard LED	LED Screw Based Omnidirectional Bulbs	16	Bulbs	1,541	0.17	0
Showerhead	Low Flow Showerheads	5	Showerheads	1,071	0.11	0
Exterior Reflector LED	LED Specialty Lamps	4	Bulbs	533	0.06	0
Pipe Insulation	Domestic Hot Water Pipe Insulation	32	Linear Feet	264	0.03	0
Rim Joist Insulation	Rim/Band Joist Insulation	2,455	Square Feet	233	0.12	0
Wall Insulation	Wall Insulation	653	Square Feet	95	0.06	0

Evaluation Measure Category	IL-TRM Measure Name	Measure Quantity	Units	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
Faucet Aerator	Low Flow Faucet Aerators	4	Aerators	90	0.13	0
BN Community Kit - LED - 9W A-Lamp	LED Screw Based Omnidirectional Bulbs	3,006	Bulbs	81,608	10.52	0
BN Community Kit - Caulk	Air Sealing	501	Kits	33,854	0	0
BN Community Kit - Door Sweep	Air Sealing	1,002	Door Sweeps	33,732	0	0
BN Community Kit - LED - 8W BR30	LED Specialty Lamps	1,002	Bulbs	31,800	5.05	0
BN Community Kit - APS Tier 1	Advanced Power Strip - Tier 1	501	Power Strips	29,118	3.27	0
BN Community Kit - LED - 5W Globe	LED Specialty Lamps	1,002	Bulbs	26,104	3.58	0
BN Community Kit - V-Seal Tape	Air Sealing	501	Kits	19,086	0	0
BN Community Kit - Foam Tape	Air Sealing	501	Kits	16,444	0	0
BN Community Kit - Showerhead	Low Flow Showerheads	501	Showerheads	15,714	1.29	0
BN Community Kit - Shower Timer	Shower Timer	501	Shower Timers	9,026	0.91	0
BN Community Kit - Shower Valve	Thermostatic Restrictor Shower Valve	501	Valves	7,836	0.45	0
BN Community Kit - Outlet Gaskets	Air Sealing	4,008	Gaskets	7,047	0	0
BN Community Kit - Kitchen Aerator	Low Flow Faucet Aerators	501	Aerators	3,956	1.73	0
BN Community Kit - Switch Gaskets	Air Sealing	2,004	Gaskets	3,524	0	0
BN Community Kit - DHW Pipe Insulation 3/4"	Domestic Hot Water Pipe Insulation	501	Kits	1,593	0.18	0
BN Community Kit - Bath Aerator	Low Flow Faucet Aerators	501	Aerators	1,534	1.73	0
BN Community Kit - DHW Pipe Insulation 1/2"	Domestic Hot Water Pipe Insulation	501	Kits	757	0.09	0
<i>BN Pilot Subtotal</i>		<i>76,312</i>		<i>465,927</i>	<i>86.73</i>	<i>0</i>
<i>Single Family Channel Subtotal</i>		<i>2,177,145</i>		<i>7,169,023</i>	<i>1,427.52</i>	<i>524,855</i>
CAA Channel						
Standard LED	LED Screw Based Omnidirectional Bulbs	6,214	Bulbs	218,555	27.38	0

Initiative-Level Results

Evaluation Measure Category	IL-TRM Measure Name	Measure Quantity	Units	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
Air Sealing	Air Sealing	681,733	Cubic Feet per Minute	187,980	88.68	21,499
Attic Insulation	Ceiling/Attic Insulation	277,984	Square Feet	70,306	32.31	19,303
Bathroom Exhaust Fan	High Efficiency Bathroom Exhaust Fan	299	Fans	64,853	7.39	0
Crawlspace Insulation	Basement Sidewall Insulation	22,683	Square Feet	28,999	6.28	6,542
Floor Insulation	Floor Insulation Above Crawlspace	49,316	Square Feet	26,377	3.39	1,714
Showerhead	Low Flow Showerheads	129	Showerheads	17,556	1.78	541
Wall Insulation	Wall Insulation	88,686	Square Feet	15,268	6.69	5,864
Specialty LED	LED Specialty Lamps	513	Bulbs	10,723	1.32	0
Faucet Aerator	Low Flow Faucet Aerators	304	Aerators	4,973	6.76	153
Rim Joist Insulation	Rim/Band Joist Insulation	28,000	Square Feet	3,694	0.98	854
Full Community Kit - 9W LED	LED Screw Based Omnidirectional Bulbs	36	Bulbs	984	0.12	0
Full Community Kit - APS Tier 1	Advanced Power Strip - Tier 1	9	Power Strips	844	0.09	0
Full Community Kit - Showerhead	Low Flow Showerheads	9	Showerheads	284	0.02	52
Full Community Kit - Kitchen Aerator	Low Flow Faucet Aerators	9	Aerators	171	0.03	30
Full Community Kit - Bath Aerator	Low Flow Faucet Aerators	9	Aerators	21	0.02	4
<i>CAA Channel Subtotal</i>		<i>1,155,932</i>		<i>651,587</i>	<i>183.25</i>	<i>56,556</i>
Smart Savers Channel						
Advanced Thermostats – Single Family Self-Install	Advanced Thermostats	5,061	Thermostats	2,555,573	689.58	268,138
Advanced Thermostats – Single Family Direct Install	Advanced Thermostats	2,264	Thermostats	1,439,105	330.32	102,090
Advanced Thermostats – Multifamily Direct Install	Advanced Thermostats	356	Thermostats	56,912	47.64	0
<i>Smart Savers Channel Subtotal</i>		<i>7,681</i>		<i>4,051,590</i>	<i>1,067.54</i>	<i>370,228</i>
Total				11,872,200	2,678.31	951,638

^a All Single Family offerings are included in Single Family CPAS line items in Table 30 and Table 31.

^b Single Family Core Standard LED Measure includes LEDs distributed at the Light Up Ogles event.

Table 27 through Table 29 present electric, demand, and gas impacts by measure.

Table 27. 2021 Income Qualified Electric Energy Savings by Measure

Evaluation Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
Single Family Channel					
Single Family Core ^a					
Air Sealing	268	100%	267	1.000	267
CAC (ER)	252	92%	232	1.000	232
BPM Motor	212	100%	212	1.000	212
ASHP (ER) - Replaces Elec. Resist.	187	97%	181	1.000	181
Attic Insulation	170	100%	169	1.000	169
Standard LED ^b	139	100%	139	1.000	139
Bathroom Exhaust Fan	129	100%	130	1.000	130
Advanced Thermostat	114	101%	115	1.000	115
Crawlspace Insulation	55	99%	54	1.000	54
Advanced Power Strip - Tier 1	42	100%	42	1.000	42
Specialty LED	36	100%	36	1.000	36
Heat Pump Water Heater	33	120%	40	1.000	40
Wall Insulation	33	101%	33	1.000	33
ASHP (ER) - Replaces ASHP	27	97%	26	1.000	26
Duct Sealing	19	109%	21	1.000	21
Exterior Standard LED	14	100%	14	1.000	14
Reflector LED	10	99%	10	1.000	10
Rim Joist Insulation	10	99%	9	1.000	9
Exterior Reflector LED	4	100%	4	1.000	4
Room Air Conditioner (ER)	3	100%	3	1.000	3
ASHP (TOS)	2	100%	2	1.000	2
Showerhead	2	100%	2	1.000	2
Faucet Aerator	1	100%	1	1.000	1
Pipe Insulation	1	100%	1	1.000	1
Exterior Specialty LED	1	100%	1	1.000	1
Floor Insulation	1	100%	1	1.000	1
CAC Air Conditioner (TOS)	1	100%	1	1.000	1
<i>Single Family Core Subtotal</i>	1,766	99%	1,748	1.000	1,748
SAVE Kits ^c					
Unverified SAVE Kit - APS Tier 1	959	98%	943	1.000	943
Unverified SAVE Kit - 9W LED	769	143%	1,100	1.000	1,100
Unverified SAVE Kit - 6W LED	448	143%	642	1.000	642
Unverified SAVE Kit - 8W LED	376	143%	538	1.000	538

Evaluation Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
Unverified SAVE Kit - Door Sweep	172	98%	169	1.000	169
Unverified SAVE Kit - Showerhead	161	98%	159	1.000	159
Unverified SAVE Kit - Kitchen Aerator	125	98%	123	1.000	123
Unverified SAVE Kit - 3/4" Pipe Insulation	119	98%	117	1.000	117
Unverified SAVE Kit - Outlet Gasket	107	98%	106	1.000	106
Unverified SAVE Kit - Shower TSV	32	98%	32	1.000	32
Unverified SAVE Kit - 1/2" Pipe Insulation	25	98%	25	1.000	25
Unverified SAVE Kit - Bath Aerator	16	98%	16	1.000	16
Unverified SAVE Kit (No APS) - 9W LED	447	145%	650	1.000	650
Unverified SAVE Kit (No APS) - 6W LED	261	146%	379	1.000	379
Unverified SAVE Kit (No APS) - 8W LED	218	146%	318	1.000	318
Unverified SAVE Kit (No APS) - Door Sweep	100	100%	100	1.000	100
Unverified SAVE Kit (No APS) - Showerhead	94	100%	94	1.000	94
Unverified SAVE Kit (No APS) - Kitchen Aerator	73	100%	73	1.000	73
Unverified SAVE Kit (No APS) - 3/4" Pipe Insulation	69	100%	69	1.000	69
Unverified SAVE Kit (No APS) - Outlet Gasket	31	100%	31	1.000	31
Unverified SAVE Kit (No APS) - Shower TSV	19	100%	19	1.000	19
Unverified SAVE Kit (No APS) - 1/2" Pipe Insulation	15	100%	15	1.000	15
Unverified SAVE Kit (No APS) - Bath Aerator	9	100%	9	1.000	9
Verified SAVE Kit - Standard LED	85	100%	85	1.000	85
Verified SAVE Kit - Advanced Power Strip - Tier 1	76	100%	76	1.000	76
Verified SAVE Kit - Specialty LED	49	100%	49	1.000	49
Verified SAVE Kit - Reflector LED	41	100%	41	1.000	41
Verified SAVE Kit - Outlet Gasket	11	98%	11	1.000	11
Verified SAVE Kit - Faucet Aerator	9	101%	9	1.000	9
Verified SAVE Kit - Showerhead	9	101%	9	1.000	9
Verified SAVE Kit - Door Sweep	3	100%	3	1.000	3
Verified SAVE Kit - Restrictor Shower Valve	3	88%	2	1.000	2
Verified SAVE Kit - Pipe Insulation	3	100%	3	1.000	3
<i>SAVE Kits Subtotal</i>	<i>4,937</i>	<i>122%</i>	<i>6,017</i>	<i>1.000</i>	<i>6,017</i>
BN Pilot					
BN Community Kit - LED - 9W A-Lamp	82	97%	80	1.000	80
BN Community Kit - Caulk	34	97%	33	1.000	33
BN Community Kit - Door Sweep	34	97%	33	1.000	33
BN Community Kit - LED - 8W BR30	32	97%	31	1.000	31
BN Community Kit - APS Tier 1	29	97%	28	1.000	28
BN Community Kit - LED - 5W Globe	26	98%	26	1.000	26
BN Community Kit - V-Seal Tape	19	97%	19	1.000	19

Evaluation Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
BN Community Kit - Foam Tape	16	97%	16	1.000	16
BN Community Kit - Showerhead, 1.5 gpm	16	97%	15	1.000	15
BN Community Kit - Shower Timer	9	97%	9	1.000	9
BN Community Kit - Shower Valve	8	97%	8	1.000	8
BN Community Kit - Outlet Gaskets	7	97%	7	1.000	7
BN Community Kit - Kitchen Aerator, 1.5 gpm	4	97%	4	1.000	4
BN Community Kit - Switch Gaskets	4	97%	3	1.000	3
BN Community Kit - DHW Pipe Insulation 3/4"	2	97%	2	1.000	2
BN Community Kit - Bath Aerator, 1.0 gpm	2	97%	1	1.000	1
BN Community Kit - DHW Pipe Insulation 1/2"	1	97%	1	1.000	1
CAC (ER)	40	90%	36	1.000	36
Standard LED	26	100%	26	1.000	26
Advanced Thermostat	16	100%	16	1.000	16
Specialty LED	16	100%	16	1.000	16
Advanced Power Strip - Tier 1	10	100%	10	1.000	10
Bathroom Exhaust Fan	8	85%	7	1.000	7
Attic Insulation	6	99%	6	1.000	6
Air Sealing	5	99%	5	1.000	5
Reflector LED	4	87%	3	1.000	3
Duct Sealing	3	78%	2	1.000	2
Exterior Specialty LED	2	100%	2	1.000	2
CAC (TOS)	2	100%	2	1.000	2
Exterior Standard LED	2	100%	2	1.000	2
Showerhead	1	100%	1	1.000	1
Exterior Reflector LED	1	100%	1	1.000	1
Pipe Insulation	0.3	100%	0.3	1.000	0.3
Rim Joist Insulation	0.2	102%	0.2	1.000	0.2
Wall Insulation	0.1	100%	0.1	1.000	0.1
Faucet Aerator	0.1	100%	0.1	1.000	0.1
<i>BN Pilot Subtotal</i>	<i>466</i>	<i>97%</i>	<i>451</i>	<i>1.000</i>	<i>451</i>
<i>Single Family Channel Subtotal</i>	<i>7,169</i>	<i>115%</i>	<i>8,216</i>	<i>1.000</i>	<i>8,216</i>
CAA Channel					
Standard LED	219	100%	219	1.000	219
Air Sealing	188	100%	187	1.000	187
Attic Insulation	70	99%	70	1.000	70
Bathroom Exhaust Fan	65	100%	65	1.000	65
Crawlspace Insulation	29	96%	28	1.000	28
Floor Insulation	26	72%	19	1.000	19

Evaluation Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
Showerhead	18	102%	18	1.000	18
Wall Insulation	15	100%	15	1.000	15
Specialty LED	11	100%	11	1.000	11
Faucet Aerator	5	103%	5	1.000	5
Rim Joist Insulation	4	99%	4	1.000	4
Full Community Kit - 9W LED	1	133%	1	1.000	1
Full Community Kit - APS Tier 1	1	100%	1	1.000	1
Full Community Kit - Showerhead, 1.5 gpm	0.3	100%	0.3	1.000	0.3
Full Community Kit - Kitchen Aerator, 1.5 gpm	0.2	100%	0.2	1.000	0.2
Full Community Kit - Bath Aerator, 1.0 gpm	0.02	100%	0.02	1.000	0.02
<i>CAA Channel Subtotal</i>	652	99%	642	1.000	642
Smart Savers Channel					
Advanced Thermostats – Single Family Self-Install	2,556	102%	2,610	1.000	2,610
Advanced Thermostats – Single Family Direct Install	1,439	104%	1,492	1.000	1,492
Advanced Thermostats – Multifamily Direct Install	57	108%	61	1.000	61
<i>Smart Savers Channel Subtotal</i>	4,052	103%	4,163	1.000	4,163
Total	11,872	110%	13,021	1.000	13,021

^a All Single Family offerings are included in Single Family CPAS line items in Table 30 and Table 31.

^b Single Family Core Standard LED Measure includes LEDs distributed at the Light Up Ogles event.

^c Verified SAVE kits had measure-specific information available in the initiative tracking data. This allowed the evaluation team to estimate savings separately for each measure type.

Table 28. 2021 Income Qualified Electric Demand Savings by Measure

Evaluation Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
Single Family Channel					
Single Family Core					
CAC (ER)	0.193	91%	0.177	1.000	0.177
Air Sealing	0.158	100%	0.158	1.000	0.158
Attic Insulation	0.079	101%	0.080	1.000	0.080
BPM Motor	0.033	216%	0.070	1.000	0.070
ASHP (ER) - Replaces Elec. Resist.	0.031	86%	0.026	1.000	0.026
Advanced Thermostat	0.028	103%	0.029	1.000	0.029
Standard LED ^a	0.017	99%	0.017	1.000	0.017
Wall Insulation	0.017	100%	0.017	1.000	0.017
Bathroom Exhaust Fan	0.015	101%	0.015	1.000	0.015
Crawlspace Insulation	0.013	101%	0.013	1.000	0.013

Evaluation Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
ASHP (ER) - Replaces ASHP	0.007	92%	0.006	1.000	0.006
Duct Sealing	0.007	100%	0.007	1.000	0.007
Specialty LED	0.006	100%	0.006	1.000	0.006
Advanced Power Strip - Tier 1	0.005	100%	0.005	1.000	0.005
Room Air Conditioner (ER)	0.004	100%	0.004	1.000	0.004
Rim Joist Insulation	0.003	100%	0.003	1.000	0.003
Exterior Standard LED	0.002	100%	0.002	1.000	0.002
Heat Pump Water Heater	0.002	116%	0.002	1.000	0.002
Reflector LED	0.002	100%	0.002	1.000	0.002
CAC (TOS)	0.001	100%	0.001	1.000	0.001
Exterior Reflector LED	0.0005	100%	0.0005	1.000	0.0005
Floor Insulation	0.0004	100%	0.0004	1.000	0.0004
Faucet Aerator	0.0003	100%	0.0003	1.000	0.0003
ASHP (TOS)	0.0002	100%	0.0002	1.000	0.0002
Pipe Insulation	0.0002	100%	0.0002	1.000	0.0002
Exterior Specialty LED	0.0001	100%	0.0001	1.000	0.0001
Showerhead	0.0001	100%	0.0001	1.000	0.0001
<i>Single Family Core Subtotal</i>	0.622	103%	0.640	1.000	0.640
SAVE Kits					
Unverified SAVE Kit - 9W LED	0.136	98%	0.133	1.000	0.133
Unverified SAVE Kit - APS Tier 1	0.108	98%	0.106	1.000	0.106
Unverified SAVE Kit - 6W LED	0.078	98%	0.076	1.000	0.076
Unverified SAVE Kit - 8W LED	0.065	98%	0.064	1.000	0.064
Unverified SAVE Kit - Kitchen Aerator	0.028	98%	0.028	1.000	0.028
Unverified SAVE Kit - Bath Aerator	0.023	98%	0.022	1.000	0.022
Unverified SAVE Kit - Showerhead	0.014	98%	0.014	1.000	0.014
Unverified SAVE Kit - 3/4" Pipe Insulation	0.014	98%	0.013	1.000	0.013
Unverified SAVE Kit - 1/2" Pipe Insulation	0.003	98%	0.003	1.000	0.003
Unverified SAVE Kit - Shower TSV	0.002	98%	0.002	1.000	0.002
Unverified SAVE Kit (No APS) - 9W LED	0.079	100%	0.079	1.000	0.079
Unverified SAVE Kit (No APS) - 6W LED	0.045	100%	0.045	1.000	0.045
Unverified SAVE Kit (No APS) - 8W LED	0.038	100%	0.038	1.000	0.038
Unverified SAVE Kit (No APS) - Kitchen Aerator	0.016	100%	0.016	1.000	0.016
Unverified SAVE Kit (No APS) - Bath Aerator	0.013	100%	0.013	1.000	0.013
Unverified SAVE Kit (No APS) - Showerhead	0.008	100%	0.008	1.000	0.008
Unverified SAVE Kit (No APS) - 3/4" Pipe Insulation	0.008	100%	0.008	1.000	0.008
Unverified SAVE Kit (No APS) - 1/2" Pipe Insulation	0.002	100%	0.002	1.000	0.002
Unverified SAVE Kit (No APS) - Shower TSV	0.001	100%	0.001	1.000	0.001

Evaluation Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
Verified SAVE Kit - Standard LED	0.010	100%	0.010	1.000	0.010
Verified SAVE Kit - Advanced Power Strip - Tier 1	0.009	100%	0.009	1.000	0.009
Verified SAVE Kit - Outlet Gasket	0.008	98%	0.008	1.000	0.008
Verified SAVE Kit - Specialty LED	0.006	100%	0.006	1.000	0.006
Verified SAVE Kit - Reflector LED	0.005	100%	0.005	1.000	0.005
Verified SAVE Kit - Faucet Aerator	0.002	100%	0.002	1.000	0.002
Verified SAVE Kit - Showerhead	0.001	100%	0.001	1.000	0.001
Verified SAVE Kit - Pipe Insulation	0.0003	100%	0.0003	1.000	0.0003
Verified SAVE Kit - Restrictor Shower Valve	0.0001	96%	0.0001	1.000	0.0001
<i>SAVE Kits Subtotal</i>	<i>0.719</i>	<i>99%</i>	<i>0.711</i>	<i>1.000</i>	<i>0.711</i>
BN Pilot					
BN Community Kit - LED - 9W A-Lamp	0.011	97%	0.010	1.000	0.010
BN Community Kit - LED - 8W BR30	0.005	97%	0.005	1.000	0.005
BN Community Kit - LED - 5W Globe	0.004	97%	0.003	1.000	0.003
BN Community Kit - APS Tier 1	0.003	97%	0.003	1.000	0.003
BN Community Kit - Bath Aerator	0.002	97%	0.002	1.000	0.002
BN Community Kit - Kitchen Aerator	0.002	36%	0.001	1.000	0.001
BN Community Kit - Showerhead	0.001	97%	0.001	1.000	0.001
BN Community Kit - Shower Timer	0.001	97%	0.001	1.000	0.001
BN Community Kit - Shower Valve	0.0004	97%	0.0004	1.000	0.0004
BN Community Kit - DHW Pipe Insulation 3/4"	0.0002	97%	0.0002	1.000	0.0002
BN Community Kit - DHW Pipe Insulation 1/2"	0.0001	97%	0.0001	1.000	0.0001
CAC (ER)	0.032	90%	0.028	1.000	0.028
Advanced Thermostat	0.006	100%	0.006	1.000	0.006
Air Sealing	0.004	100%	0.004	1.000	0.004
Attic Insulation	0.004	100%	0.004	1.000	0.004
Standard LED	0.003	100%	0.003	1.000	0.003
CAC (TOS)	0.002	100%	0.002	1.000	0.002
Specialty LED	0.002	100%	0.002	1.000	0.002
Duct Sealing	0.001	100%	0.001	1.000	0.001
Advanced Power Strip - Tier 1	0.001	100%	0.001	1.000	0.001
Bathroom Exhaust Fan	0.001	85%	0.001	1.000	0.001
Reflector LED	0.001	94%	0.001	1.000	0.001
Exterior Specialty LED	0.0003	100%	0.0003	1.000	0.0003
Exterior Standard LED	0.0002	100%	0.0002	1.000	0.0002
Faucet Aerator	0.0001	100%	0.0001	1.000	0.0001
Rim Joist Insulation	0.0001	103%	0.0001	1.000	0.0001
Showerhead	0.0001	100%	0.0001	1.000	0.0001

Evaluation Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
Exterior Reflector LED	0.0001	100%	0.0001	1.000	0.0001
Wall Insulation	0.0001	100%	0.0001	1.000	0.0001
Pipe Insulation	0.00003	100%	0.00003	1.000	0.00003
<i>BN Pilot Subtotal</i>	<i>0.087</i>	<i>94%</i>	<i>0.082</i>	<i>1.000</i>	<i>0.082</i>
<i>Single Family Channel Subtotal</i>	<i>1.428</i>	<i>100%</i>	<i>1.432</i>	<i>1.000</i>	<i>1.432</i>
CAA Channel					
Air Sealing	0.089	100%	0.089	1.000	0.089
Attic Insulation	0.032	100%	0.032	1.000	0.032
Standard LED	0.027	100%	0.027	1.000	0.027
Bathroom Exhaust Fan	0.007	100%	0.007	1.000	0.007
Faucet Aerator	0.007	103%	0.007	1.000	0.007
Wall Insulation	0.007	99%	0.007	1.000	0.007
Crawlspace Insulation	0.006	98%	0.006	1.000	0.006
Floor Insulation	0.003	100%	0.003	1.000	0.003
Showerhead	0.002	101%	0.002	1.000	0.002
Specialty LED	0.001	100%	0.001	1.000	0.001
Rim Joist Insulation	0.001	99%	0.001	1.000	0.001
Full Community Kit - 9W LED	0.0001	133%	0.0002	1.000	0.0002
Full Community Kit - APS Tier 1	0.0001	100%	0.0001	1.000	0.0001
Full Community Kit - Kitchen Aerator	0.00003	100%	0.00003	1.000	0.00003
Full Community Kit - Showerhead	0.00002	100%	0.00002	1.000	0.00002
Full Community Kit - Bath Aerator	0.00002	100%	0.00002	1.000	0.00002
<i>CAA Channel Subtotal</i>	<i>0.183</i>	<i>100%</i>	<i>0.183</i>	<i>1.000</i>	<i>0.183</i>
Smart Savers Channel					
Advanced Thermostats – Single Family Self-Install	0.690	108%	0.747	1.000	0.747
Advanced Thermostats – Single Family Direct Install	0.330	115%	0.380	1.000	0.380
Advanced Thermostats – Multifamily Direct Install	0.048	111%	0.053	1.000	0.053
<i>Smart Savers Channel Subtotal</i>	<i>1.068</i>	<i>110%</i>	<i>1.180</i>	<i>1.000</i>	<i>1.180</i>
Total	2.678	104%	2.795	1.000	2.795

^a Single Family Core Standard LED Measure includes LEDs distributed at the Light Up Ogles event.

Table 29. 2021 Income Qualified Gas Savings by Measure

Evaluation Measure Category	Ex Ante Gross Savings (Therms)	Gross Realization Rate	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Single Family Channel					
Single Family Core					
Gas Furnace (ER)	91,723	100%	92,140	1.000	92,140
Air Sealing	41,334	100%	41,396	1.000	41,396
Attic Insulation	40,966	100%	41,055	1.000	41,055
Advanced Thermostat	28,583	100%	28,621	1.000	28,621
Crawlspace Insulation	15,651	100%	15,654	1.000	15,654
Wall Insulation	12,663	100%	12,696	1.000	12,696
Gas Furnace (TOS)	10,460	100%	10,460	1.000	10,460
Duct Sealing	7,374	59%	4,349	1.000	4,349
Rim Joist Insulation	3,032	100%	3,036	1.000	3,036
Gas Boiler (TOS)	961	100%	961	1.000	961
Pipe Insulation	955	100%	956	1.000	956
Showerhead	765	100%	765	1.000	765
Gas Boiler (ER)	745	100%	745	1.000	745
Faucet Aerator	667	100%	667	1.000	667
Floor Insulation	348	100%	348	1.000	348
<i>Single Family Core Subtotal</i>	<i>256,226</i>	<i>99%</i>	<i>253,848</i>	<i>1.000</i>	<i>253,858</i>
SAVE Kits					
Unverified SAVE Kit - Door Sweep	44,871	98%	44,122	1.000	44,122
Unverified SAVE Kit - Showerhead	29,429	98%	28,937	1.000	28,937
Unverified SAVE Kit - Outlet Gasket	27,904	98%	27,438	1.000	27,438
Unverified SAVE Kit - 3/4" Pipe Insulation	26,618	98%	26,174	1.000	26,174
Unverified SAVE Kit - Kitchen Aerator	21,890	98%	21,524	1.000	21,524
Unverified SAVE Kit - Shower TSV	5,926	98%	5,827	1.000	5,827
Unverified SAVE Kit - 1/2" Pipe Insulation	5,704	98%	5,609	1.000	5,609
Unverified SAVE Kit - Bath Aerator	2,710	98%	2,665	1.000	2,665
Unverified SAVE Kit (No APS) - Door Sweep	26,448	100%	26,431	1.000	26,431
Unverified SAVE Kit (No APS) - Showerhead	17,346	100%	17,335	1.000	17,335
Unverified SAVE Kit (No APS) - 3/4" Pipe Insulation	15,690	100%	15,679	1.000	15,679
Unverified SAVE Kit (No APS) - Kitchen Aerator	12,902	100%	12,894	1.000	12,894
Unverified SAVE Kit (No APS) - Outlet Gasket	8,224	100%	8,218	1.000	8,218
Unverified SAVE Kit (No APS) - Shower TSV	3,493	100%	3,490	1.000	3,490
Unverified SAVE Kit (No APS) - 1/2" Pipe Insulation	3,362	100%	3,360	1.000	3,360
Unverified SAVE Kit (No APS) - Bath Aerator	1,597	100%	1,596	1.000	1,596
Verified SAVE Kit - Door Sweep	4,322	100%	4,322	1.000	4,322
Verified SAVE Kit - Showerhead	2,741	100%	2,741	1.000	2,741

Evaluation Measure Category	Ex Ante Gross Savings (Therms)	Gross Realization Rate	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Verified SAVE Kit - Faucet Aerator	2,712	100%	2,712	1.000	2,712
Verified SAVE Kit - Outlet Gasket	2,568	100%	2,568	1.000	2,568
Verified SAVE Kit - Pipe Insulation	1,311	100%	1,308	1.000	1,308
Verified SAVE Kit - Restrictor Shower Valve	859	84%	722	1.000	722
<i>SAVE Kits Subtotal</i>	<i>268,628</i>	<i>99%</i>	<i>265,671</i>	<i>1.000</i>	<i>265,671</i>
<i>Single Family Channel Subtotal</i>	<i>524,855</i>	<i>99%</i>	<i>519,519</i>	<i>1.000</i>	<i>519,519</i>
CAA Channel					
Air Sealing	21,499	100%	21,514	1.000	21,514
Attic Insulation	19,303	100%	19,303	1.000	19,303
Crawlspace Insulation	6,542	99%	6,453	1.000	6,453
Wall Insulation	5,864	100%	5,867	1.000	5,867
Floor Insulation	1,714	100%	1,714	1.000	1,714
Rim Joist Insulation	854	100%	851	1.000	851
Showerhead	541	101%	547	1.000	547
Faucet Aerator	153	102%	155	1.000	155
Full Community Kit - Showerhead	52	100%	52	1.000	52
Full Community Kit - Kitchen Aerator	30	100%	30	1.000	30
Full Community Kit - Bath Aerator	4	100%	4	1.000	4
<i>CAA Channel Subtotal</i>	<i>56,556</i>	<i>100%</i>	<i>56,491</i>	<i>1.000</i>	<i>56,491</i>
Smart Savers Channel					
Advanced Thermostats – Single Family Self-Install	268,138	100%	268,138	1.000	268,138
Advanced Thermostats – Single Family Direct Install	102,090	100%	101,976	1.000	101,976
Advanced Thermostats – Multifamily Direct Install	0	N/A	0	1.000	0
<i>Smart Savers Channel Subtotal</i>	<i>370,228</i>	<i>100%</i>	<i>370,114</i>	<i>1.000</i>	<i>370,114</i>
Total	951,638	99%	946,124	1.000	946,124

We describe the key drivers of discrepancies between ex ante and verified gross savings estimates below. We discovered more than 100 individual discrepancies in our final impact analysis. In part, this reflects the size of the Initiative, which includes three implementation channels, several additional offerings, and a wide variety of available measures. Many of these discrepancies affect measure categories that provide a relatively small proportion of Initiative savings (less than 5%), while others affected only a few measures within a category. As such, the list below includes the most significant, but not all, realization rate drivers. The evaluation team is prepared to share and discuss the full list of discrepancies with AIC, if desired.

We ordered the list of discrepancies below from largest to smallest contribution to Initiative ex ante electric energy savings.

- **Advanced Thermostats (Smart Savers) (Single Family Self-Install: 63%, 65%, and 72% of ex ante energy, demand, and gas savings, respectively. Single Family Direct Install: 36%, 31%, and 28% of ex ante energy, demand, and gas savings, respectively. Multifamily Direct Install: 1%, and 4% of ex ante energy and demand savings, respectively):** The gross realization rate for advanced thermostats

provided through the Smart Savers Channel varied across housing type (Single Family and Multifamily) and installation type (Self-Install and Direct Install). The realization rates ranged from 95% to 108% for electric energy; 108% to 115% for electric demand; and 90% to 100% for gas.

- For 9% of Single Family Self-Install projects (n=453) and 4% of Single Family Direct Install projects (n=93), ex ante estimates used tracking data that indicated a SEER value of 1.0, which we determined to be a data entry error. Verified analysis used a SEER value of 12 in these cases, as recommended in the IL-TRM V9.0 when the actual SEER value is unavailable, resulting in lower kWh savings.
- For the same Single Family projects as above, ex ante estimates used tracking data that indicated an EER value of 1.0 and zero demand savings, which we determined to be a data entry error. Verified analysis used an EER value of 10.5, as recommended in the IL-TRM V9.0 when the actual EER is unavailable, leading to higher kW savings.
- For 100% of Single Family Direct Install (n=2,264) and Multifamily Direct Install (n=356) projects, ex ante estimates used an in-service rate (ISR) of 90% for direct install thermostats to calculate energy and demand savings, while the verified analysis used an ISR of 100%, as recommended in the IL-TRM V9.0, leading to higher verified kWh and kW savings.
- All other ex ante parameters aligned with those used to calculate verified savings, suggesting that any remaining differences between ex ante and verified energy savings are attributable to applying a slightly different savings algorithms in the ex ante calculations. We are unable to determine the exact source of these discrepancies based on the available data.
- **Unverified SAVE Kits (46% of ex ante energy, 33% of ex ante demand, and 31% of ex ante gas savings for Single Family Channel):** The gross realization rate for unverified SAVE Kits was 98% for most measures across each savings type, but the MWh realization rate was 143% for lighting measures.
 - For all unverified SAVE Kits (n=5,149), all lighting measures assumed 100% electric heating and as a result included electric heating penalties for the purposes of goal attainment. Provided the heating fuel is unknown for unverified SAVE Kits, the verified savings analysis applied IL-TRM V9.0 assumptions for “unknown” heating fuel (i.e., gas heating), thus removing all electric heating penalties, resulting in notably higher verified MWh savings.
 - For 2% of unverified SAVE Kits (n=86), ex ante estimates included savings for additional kits for the 86 customers who received more than one kit. The verified analysis did not include savings for the duplicate kits, resulting in lower verified electric energy, demand, and gas savings.
- **Unverified SAVE Kits (No APS) (19% of ex ante energy, 15% of ex ante demand, and 17% of ex ante gas savings for Single Family Channel):** The gross realization rate for unverified SAVE Kits (No APS) was 100% for most measures across each savings type but the MWh realization rate for lighting measures ranged from 145% to 146%.
 - For all unverified SAVE Kits (No APS) (n=3,000), all lighting measures assumed 100% electric heating and as a result included electric heating penalties for the purposes of goal attainment. Provided the heating fuel is unknown for unverified kits, the verified savings analysis applied IL-TRM V9.0 assumptions for “unknown” heating fuel (i.e., gas heating), thus removing all electric heating penalties, resulting in notably higher verified electric energy savings.
- **BN Community Kits (5% of ex ante energy and 2% of ex ante demand savings for Single Family Channel):** The gross realization rate for BN Community Kits was 98% for MWh and 97% for MW savings for most measures. However, the BN Community Kit’s kitchen aerator had a lower MW savings gross

realization rate of 36%. AIC does not claim gas savings for BN Community Kits, as this is a partnership with Nicor Gas.

- For all BN Community Kits (n=514), ex ante estimates applied the deemed bathroom aerators demand savings when deriving demand savings for kitchen aerators. The verified savings used the deemed kitchen aerator savings, resulting in considerably lower verified electric demand savings.
- For 3% of BN Community Kits (n=13), ex ante estimates included savings for additional kits for the 13 customers who received more than one kit. The verified analysis did not include savings for the duplicate kits, resulting in lower verified electric energy and demand savings.
- **Floor Insulation (CAA Channel) (4% of ex ante energy, 2% of ex ante demand, and 3% of ex ante gas savings):** The gross realization rate for floor insulation was 72% for electric energy, 100% for demand, and 100% for gas savings for the CAA Channel.
 - For 14% of projects (n=8), ex ante estimates used a different heating efficiency (η_{Heat}) than what the tracking database provided. The verified analysis applied η_{Heat} based on what the tracking database provided, resulting in lower verified electric energy savings.
 - For 5% of projects (n=9), ex ante estimates included furnace fan runtime savings even though the database indicated propane heating was present. The verified analysis removed furnace fan runtime savings in these cases, resulting in lower verified electric energy savings.
- **CAC (Single Family Core and BN Pilot) (4% of ex ante energy and 14% of ex ante demand savings for Single Family Core; and 1% of ex ante energy and 2% of ex ante demand savings for BN Pilot):** The gross realization rate for CACs ranged from 90% to 100% for MWh and 91% to 100% for MW savings.
 - For 93% of CAC projects (n=141), ex ante estimates incorrectly derated existing SEER values for early replacement (ER) CACs. The verified analysis derated existing SEER values by 1% annually compounded over the reported age of existing equipment, resulting in lower verified electric energy and demand savings. The IL-TRM V9.0 references a metering study that relies on research from NREL¹⁷ outlining best practices for SEER, EER, HSPF, and AFUE degradation. The publication identifies the following formula:

$$\text{Efficiency} = \text{Base Efficiency} * (1-M)^{\text{Age}}$$

Where:

Base Efficiency = Nameplate efficiency of existing equipment

M = Maintenance factor (1%)

Age = Age (in years) of existing equipment

- **ASHP (Single Family Core) (3% of ex ante energy and 2% of ex ante demand savings):** The gross realization rate for ASHPs ranged from 97% to 100% for electric energy and 86% to 100% for demand, depending on the type of replaced equipment.
 - For 84% of ASHP projects (n=21), ex ante estimates incorrectly derated existing SEER values for early replacement ASHP. The verified analysis derated existing SEER values by 1% annually compounded over the reported age of existing equipment, resulting in lower verified electric energy and demand savings. The IL-TRM V9.0 references a metering study that relies on research from a

¹⁷ <https://www.nrel.gov/docs/fy06osti/38238.pdf>

NREL publication¹⁸ outlining best practices for SEER, EER, HSPF, and AFUE degradation. The publication identifies the following formula:

$$\text{Efficiency} = \text{Base Efficiency} * (1-M)^{\text{Age}}$$

Where:

Base Efficiency = Nameplate efficiency of existing equipment

M = Maintenance factor (1%)

Age = Age (in years) of existing equipment

- **BPM Motor (Single Family Core) (3% of ex ante energy and 2% of ex ante demand savings):** The gross realization rate for BPM motors was 100% for electric energy and 216% for demand savings.
 - For 83% of BPM motors (n=342), the reported ex ante demand savings was 0.09 per project regardless of the cooling capacities provided in the database, but the source of the 0.09 value is unknown. The verified analysis relied on the cooling capacities provided in the initiative tracking database, resulting in roughly double the demand savings in the verified analysis.
- **Standard LEDs (Single Family Core) (2% of ex ante energy and 1% of ex ante demand savings for Single Family Channel):** The gross realization rate for standard LEDs was 100% for electric energy and ranged from 99% for electric demand savings for the Single Family Core Channel.
 - For 14% of cases in the Single Family Core channel (n=1,000), specifically those associated with the Light Up Ogles event, ex ante estimates applied waste heat factors (WHF) and coincidence factors (CF) for an unknown installation location even though the database identifies the location as interior single family. The verified analysis applied the appropriate WHF and CF for single family interior installations, resulting in higher verified electric energy and lower demand savings.
 - For 0.5% of projects in the Single Family Core channel (n=34), ex ante estimates applied the heating efficiency (η_{Heat}) for unknown heating type when calculating heating penalties even though the tracking database identifies heating type as ASHP. The verified analysis applied η_{Heat} for ASHP heating type, resulting in higher verified electric energy savings.
- **Attic Insulation (Single Family Core and CAA Channel) (2% of ex ante energy, 6% of ex ante demand, and 8% of ex ante gas savings for Single Family Core; and 11% of ex ante energy, 18% of ex ante demand, and 34% of ex ante gas savings for CAA Channel):** The gross realization rate for attic insulation ranged from 99% to 100% for electric energy and 100% to 101% for demand savings between the Single Family Core and CAA channels. The realization rate for gas savings was 100% for both channels.
 - For 3% of Single Family Core channel projects (n=18) and 5% of CAA Channel projects (n=16), ex ante estimates included furnace fan runtime savings even though the database indicated a natural gas boiler or propane heating was present. The verified analysis removed furnace fan runtime savings in these cases, resulting in lower verified electric energy savings.
 - For 1% of Single Family Core channel projects (n=6), ex ante estimates applied different cooling and heating efficiencies (η_{Cool} and η_{Heat}) than what is presented in the tracking database. The verified analysis used the cooling and heating efficiencies present in the tracking database, resulting in lower or higher verified electric energy and demand savings depending on the case, but slightly increasing verified savings overall.

¹⁸ <https://www.nrel.gov/docs/fy06osti/38238.pdf>

- **Advanced Thermostats (Single Family Core and BN Pilot) (2% of ex ante energy, 2% of ex ante demand, and 5% of ex ante gas savings for Single Family Core; and <1% of ex ante energy and <1% of ex ante demand savings for BN Pilot):** The gross realization rate for advanced thermostats ranged from 100% to 101% for electric energy and 100% to 103% for demand across Single Family Core and BN Pilot and 100% for gas in Single Family Core.
 - For 2% of advanced thermostat projects (n=10), ex ante estimates included furnace fan runtime savings for those with natural gas boilers. The verified analysis excluded these savings as the IL-TRM V9.0 suggests including furnace fan runtime savings for natural gas furnaces only, resulting in lower verified electric energy savings.
 - For less than 1% of advanced thermostat projects (n=3), ex ante applied heating reduction assumptions from the IL-TRM V9.0 assuming the existing thermostat was programmable. The verified analysis applied heating reduction assumptions from the IL-TRM V9.0 for “unknown” control type as the initiative tracking database does not provide this information for these three cases. This resulted in slightly higher verified electric energy and gas savings.
- **Crawlspace Insulation (Single Family Core and CAA Channel) (1% of ex ante energy, 1% of ex ante demand, and 3% of ex ante gas savings for Single Family Core; and 4% of ex ante energy, 3% of ex ante demand, and 12% of ex ante gas savings for CAA Channel):** The gross realization rate for crawlspace insulation ranged from 96% to 99% for electric energy and 98% to 101% for demand savings between the Single Family Core and CAA channels. The realization rate for gas savings was 100% for both channels.
 - For 3% of Single Family Core Channel projects (n=9) and 7% of CAA Channel projects (n=11), ex ante estimates included furnace fan runtime savings even though the tracking database indicates natural gas boiler or propane heating is present. The verified analysis removed furnace fan runtime savings in these cases, resulting in lower verified electric energy savings.
 - For 3% of Single Family Core Channel projects (n=8), ex ante estimates applied a different heating efficiency (η_{Heat}) than what is presented in the tracking database. The verified analysis used the heating efficiency present in the tracking database, resulting in lower or higher verified electric energy depending on the case, but slightly increasing verified savings overall.
- **Full Community Kits (CAA Channel) (<1% of ex ante energy, <1% of ex ante demand, and <1% of ex ante gas savings):** The gross realization rate for Full Community Kits was 100% for MWh, MW and therm savings for all measures except standard LEDs. The Full Community Kit’s standard LEDs had a higher electric energy and demand savings gross realization rate of 133%.
 - For all Full Community Kits (n=9), ex ante estimates applied an ISR of 66% to all standard LEDs, the IL-TRM V9.0 Direct Mail Kits ISR. The verified analysis applied an 88% ISR for Distributed Community Kits, resulting in higher verified electric energy and demand savings.
- **Heat Pump Water Heater (Single Family Core) (<1% of ex ante energy and <1% of ex ante demand savings):** The gross realization rate for heat pump water heaters was 129% for electric energy and demand.
 - For 82% of projects (n=14), ex ante estimates applied factors for “unknown” heating fuel, even though it is included in the initiative tracking database. The verified analysis relied on the actual heating type specified in the tracking database and applied IL-TRM V9.0 assumptions dependent on this variable, resulting in higher verified electric energy and demand savings.

- For 82% of projects (n=14), ex ante estimates for heating savings deviated from the algorithm provided in the IL-TRM V9.0. The verified analysis relied on the algorithm provided in the IL-TRM V9.0, resulting in higher verified electric energy savings.
- For 18% of projects (n=3), ex ante estimates applied zero savings for three measures because the tracking database did not include efficiency factor (UEF) parameters. The verified analysis relied on the average efficiency factor from projects with known values from the tracking database, resulting in higher electric energy and demand verified savings.
- **Duct Sealing (Single Family Core and BN Pilot) (<1% of ex ante energy and <1% of ex ante demand savings for Single Family Core; and <1% of ex ante energy and <1% of ex ante demand savings for BN Pilot):** The gross realization rate for duct sealing ranged from 78% to 109% for electric energy savings across Single Family Core and the BN Pilot; it was 100% for electric demand for both Single Family Core and the BN Pilot; and 59% for gas within Single Family Core.
 - For 56% of duct sealing projects (n=14), ex ante estimates deviated from the therms algorithm provided in the IL-TRM V9.0. The verified analysis relied on the algorithm provided in the IL-TRM V9.0, resulting in lower gas verified savings.
 - For 20% of duct sealing projects (n=5), ex ante estimates applied heating capacities for existing heating equipment even though new heating equipment was installed. The verified analysis relied on the heating capacities of the newly installed heating equipment, resulting in lower verified electric energy and gas verified savings.
 - For 20% of duct sealing projects (n=5), ex ante estimates calculated output heating capacity using the electric heating consumption from the Advanced Thermostat section in the IL-TRM V9.0. (Section 5.3.16), multiplied it by 3,412, and divided its product by the full load heating hours. The verified analysis relied on the output heating capacities provided in the tracking database, resulting in higher verified electric energy, demand, and gas savings.

3.2.5 Cumulative Persisting Annual Savings

Table 30 presents CPAS and WAML for the 2021 Income Qualified Initiative. The measure-specific and total verified gross savings for the Initiative are summarized by channel, and CPAS in 2021–2024 and 2030 are presented.¹⁹ The WAML for the Initiative is 11.6 years. CPAS and WAML for each channel at a measure level are summarized in Table 31 through Table 33.

In 2021, AIC converted some natural gas savings produced by Smart Savers channel measures to CPAS for the purposes of goal attainment; those savings are presented separately in Table 34.

Table 30. 2021 Income Qualified Initiative CPAS and WAML by Channel

Channel	WAML	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Single Family	11.6	8,216	1.000	8,216	8,216	8,207	8,207	...	5,443	...	87,443
CAA	15.9	642	1.000	642	642	642	642	...	591	...	9,959
Smart Savers	11.0	4,163	1.000	4,163	4,163	4,163	4,163	...	4,163	...	45,797
2021 CPAS		13,021	1.000	13,021	13,021	13,013	13,013	...	10,198	...	143,199
Expiring 2021 CPAS				0	0	9	0	...	0	...	
Expired 2021 CPAS				0	0	9	9	...	2,823	...	
WAML	11.6										

Table 31. 2021 Income Qualified Initiative – Single Family Channel CPAS and WAML

Measure	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Advanced Power Strip - Tier 1	7.0	52	1.000	52	52	52	52	...	0	...	364
Advanced Thermostats	11.0	131	1.000	131	131	131	131	...	131	...	1,444
Air Sealing	20.0	272	1.000	272	272	272	272	...	272	...	4,969
ASHP (ER) - Replaces ASHP	16.0	26	1.000	26	26	26	26	...	4	...	196
ASHP (ER) - Replaces Elec. Resist.	16.0	181	1.000	181	181	181	181	...	143	...	2,515
ASHP (TOS)	16.0	2	1.000	2	2	2	2	...	2	...	37
Attic Insulation	20.0	175	1.000	175	175	175	175	...	175	...	3,213
Bathroom Exhaust Fan	19.0	137	1.000	137	137	137	137	...	137	...	2,602
BPM Motor	6.0	212	1.000	212	212	212	212	...	0	...	1,273

¹⁹ For further detail, including achieved CPAS in years not presented in this table, please see Appendix C.

Measure	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Central Air Conditioner (ER)	18.0	267	1.000	267	267	267	267	...	53	...	2,233
Central Air Conditioner (TOS)	18.0	3	1.000	3	3	3	3	...	3	...	51
Crawlspace Insulation	20.0	54	1.000	54	54	54	54	...	54	...	1,003
Duct Sealing	20.0	23	1.000	23	23	23	23	...	23	...	439
Exterior Reflector LED	10.0	5	1.000	5	5	5	5	...	3	...	45
Exterior Specialty LED	6.9	4	1.000	4	4	4	4	...	0	...	26
Exterior Standard LED	8.0	16	1.000	16	16	16	16	...	0	...	123
Faucet Aerator	10.0	1	1.000	1	1	1	1	...	1	...	15
Floor Insulation	20.0	1	1.000	1	1	1	1	...	1	...	14
Heat Pump Water Heater	15.0	40	1.000	40	40	40	40	...	40	...	591
Pipe Insulation	15.0	2	1.000	2	2	2	2	...	2	...	25
Reflector LED	10.0	14	1.000	14	14	14	14	...	9	...	123
Rim Joist Insulation	20.0	10	1.000	10	10	10	10	...	10	...	181
Room Air Conditioner (ER)	12.0	3	1.000	3	3	3	3	...	3	...	34
Showerhead	10.0	3	1.000	3	3	3	3	...	3	...	31
Specialty LED	10.0	52	1.000	52	52	52	52	...	33	...	465
Standard LED	10.0	166	1.000	166	166	166	166	...	131	...	1,553
Wall Insulation	20.0	33	1.000	33	33	33	33	...	33	...	606
BN Community Kit - LED - 9 W A-Lamp	10.0	80	1.000	80	80	80	80	...	63	...	745
BN Community Kit - Caulk	20.0	33	1.000	33	33	33	33	...	33	...	660
BN Community Kit - Door Sweep	20.0	33	1.000	33	33	33	33	...	33	...	658
BN Community Kit - LED - 8W BR30	10.0	31	1.000	31	31	31	31	...	22	...	282
BN Community Kit - APS Tier 1	7.0	28	1.000	28	28	28	28	...	0	...	199
BN Community Kit - LED - 5 W Globe	10.0	26	1.000	26	26	26	26	...	16	...	227
BN Community Kit - V-Seal Tape	20.0	19	1.000	19	19	19	19	...	19	...	372
BN Community Kit - Foam Tape	20.0	16	1.000	16	16	16	16	...	16	...	321
BN Community Kit - Showerhead	10.0	15	1.000	15	15	15	15	...	15	...	153
BN Community Kit - Shower Timer	2.0	9	1.000	9	9	0	0	...	0	...	18
BN Community Kit - Shower Valve	10.0	8	1.000	8	8	8	8	...	8	...	76
BN Community Kit - Outlet Gaskets	20.0	7	1.000	7	7	7	7	...	7	...	137

Measure	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
BN Community Kit - Kitchen Aerator	10.0	4	1.000	4	4	4	4	...	4	...	39
BN Community Kit - Switch Gaskets	20.0	3	1.000	3	3	3	3	...	3	...	69
BN Community Kit - DHW Pipe Insulation 3/4"	15.0	2	1.000	2	2	2	2	...	2	...	23
BN Community Kit - Bath Aerator	10.0	1	1.000	1	1	1	1	...	1	...	15
BN Community Kit - DHW Pipe Insulation 1/2"	15.0	1	1.000	1	1	1	1	...	1	...	11
Verified SAVE Kit - Standard LED	10.0	85	1.000	85	85	85	85	...	67	...	798
Verified SAVE Kit - Advanced Power Strip - Tier 1	7.0	76	1.000	76	76	76	76	...	0	...	535
Verified SAVE Kit - Specialty LED	10.0	49	1.000	49	49	49	49	...	31	...	437
Verified SAVE Kit - Reflector LED	10.0	41	1.000	41	41	41	41	...	29	...	374
Verified SAVE Kit - Wall Plate Gasket	20.0	11	1.000	11	11	11	11	...	11	...	221
Verified SAVE Kit - Faucet Aerator	10.0	9	1.000	9	9	9	9	...	9	...	90
Verified SAVE Kit - Showerhead	10.0	9	1.000	9	9	9	9	...	9	...	87
Verified SAVE Kit - Door Sweep	20.0	3	1.000	3	3	3	3	...	3	...	68
Verified SAVE Kit - Restrictor Shower Valve	10.0	2	1.000	2	2	2	2	...	2	...	24
Verified SAVE Kit - Pipe Insulation	15.0	3	1.000	3	3	3	3	...	3	...	39
Unverified SAVE Kit - APS Tier 1	7.0	943	1.000	943	943	943	943	...	0	...	6,600
Unverified SAVE Kit - 9W LED	10.0	1,100	1.000	1,100	1,100	1,100	1,100	...	869	...	10,306
Unverified SAVE Kit - 6W LED	10.0	642	1.000	642	642	642	642	...	398	...	5,691
Unverified SAVE Kit - 8W LED	10.0	538	1.000	538	538	538	538	...	377	...	4,899
Unverified SAVE Kit - Door Sweep	20.0	169	1.000	169	169	169	169	...	169	...	3,383
Unverified SAVE Kit - Showerhead	10.0	159	1.000	159	159	159	159	...	159	...	1,587
Unverified SAVE Kit - Kitchen Aerator	10.0	123	1.000	123	123	123	123	...	123	...	1,232
Unverified SAVE Kit - 3/4" Pipe Insulation	15.0	117	1.000	117	117	117	117	...	117	...	1,754
Unverified SAVE Kit - Outlet Gasket	20.0	106	1.000	106	106	106	106	...	106	...	2,112
Unverified SAVE Kit - Shower TSV	10.0	32	1.000	32	32	32	32	...	32	...	319
Unverified SAVE Kit - 1/2" Pipe Insulation	15.0	25	1.000	25	25	25	25	...	25	...	376
Unverified SAVE Kit - Bath Aerator	10.0	16	1.000	16	16	16	16	...	16	...	160
Unverified SAVE Kit (No APS) - 9W LED	10.0	650	1.000	650	650	650	650	...	513	...	6,090
Unverified SAVE Kit (No APS) - 6W LED	10.0	379	1.000	379	379	379	379	...	235	...	3,362
Unverified SAVE Kit (No APS) - 8W LED	10.0	318	1.000	318	318	318	318	...	223	...	2,895

Initiative-Level Results

Measure	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Unverified SAVE Kit (No APS) - Door Sweep	20.0	100	1.000	100	100	100	100	...	100	...	1,999
Unverified SAVE Kit (No APS) - Showerhead	10.0	94	1.000	94	94	94	94	...	94	...	937
Unverified SAVE Kit (No APS) - Kitchen Aerator	10.0	73	1.000	73	73	73	73	...	73	...	728
Unverified SAVE Kit (No APS) - 3/4" Pipe Insulation	15.0	69	1.000	69	69	69	69	...	69	...	1,036
Unverified SAVE Kit (No APS) - Outlet Gasket	20.0	31	1.000	31	31	31	31	...	31	...	624
Unverified SAVE Kit (No APS) - Shower TSV	10.0	19	1.000	19	19	19	19	...	19	...	189
Unverified SAVE Kit (No APS) - 1/2" Pipe Insulation	15.0	15	1.000	15	15	15	15	...	15	...	222
Unverified SAVE Kit (No APS) - Bath Aerator	10.0	9	1.000	9	9	9	9	...	9	...	95
2021 CPAS		8,216	1.000	8,216	8,216	8,207	8,207	...	5,443	...	87,443
Expiring 2021 CPAS				0	0	9	0	...	0	...	
Expired 2021 CPAS				0	0	9	9	...	2,772	...	
WAML	11.6										

Table 32. 2021 Income Qualified Initiative – CAA Channel CPAS and WAML

Measure	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Standard LED	10.0	219	1.000	219	219	219	219	...	173	...	2,048
Air Sealing	20.0	187	1.000	187	187	187	187	...	187	...	3,682
Attic Insulation	20.0	70	1.000	70	70	70	70	...	70	...	1,359
Bathroom Exhaust Fan	19.0	65	1.000	65	65	65	65	...	65	...	1,235
Crawlspace Insulation	20.0	28	1.000	28	28	28	28	...	28	...	538
Floor Insulation	20.0	19	1.000	19	19	19	19	...	19	...	378
Showerhead	10.0	18	1.000	18	18	18	18	...	18	...	178
Wall Insulation	20.0	15	1.000	15	15	15	15	...	15	...	300
Specialty LED	10.0	11	1.000	11	11	11	11	...	7	...	95
Faucet Aerator	10.0	5	1.000	5	5	5	5	...	5	...	51
Rim Joist Insulation	20.0	4	1.000	4	4	4	4	...	4	...	72
Community Kit - 9W LED	10.0	1	1.000	1	1	1	1	...	1	...	12
Community Kit - APS Tier 1	7.0	1	1.000	1	1	1	1	...	0	...	6
Community Kit - Showerhead	10.0	0	1.000	0.3	0.3	0.3	0.3	...	0.3	...	2.8
Community Kit - Kitchen Aerator	10.0	0	1.000	0.2	0.2	0.2	0.2	...	0.2	...	1.7
Community Kit - Bath Aerator	10.0	0	1.000	0.02	0.02	0.02	0.02	...	0.02	...	0.21
2021 CPAS		642	1.000	642	642	642	642	...	591	...	9,959
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	51	...	
WAML	15.9										

Table 33. 2021 Income Qualified Initiative – Smart Savers Channel CPAS and WAML

Measure	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Advanced Thermostats	11.0	4,163	1.000	4,163	4,163	4,163	4,163	...	4,163	...	45,797
2021 CPAS		4,163	1.000	4,163	4,163	4,163	4,163	...	4,163	...	45,797
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	0	...	
WAML	11.0										

Table 34. 2021 Income Qualified Initiative – Smart Savers Channel (Gas Conversion) CPAS and WAML

Measure	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Advanced Thermostats	11.0	10,844	1.000	10,844	10,844	10,844	10,844	...	10,844	...	119,288
2021 CPAS		10,844	1.000	10,844	10,844	10,844	10,844	...	10,844	...	119,288
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	0	...	
WAML	11.0										

3.2.6 Conclusions and Recommendations

Based on the results of this evaluation, the evaluation team offers the following key findings and recommendations for the IQ Initiative moving forward:

- **Key Finding #1:** Lighting measures included in unverified SAVE Kits included electric heating penalties for the purposes of goal attainment.
 - Recommendation: Since heating fuel is unknown, remove electric heating penalties and assume gas heating per the IL-TRM V9.0.
- **Key Finding #2:** Ex ante estimates claimed savings for participants who received more than one Unverified SAVE Kit or BN Community Kit. These kits had different project identifiers but the same customer account numbers.
 - Recommendation: Review kit recipients' account numbers to ensure that savings are only claimed for one kit per participant.
- **Key Finding #3:** Across multiple insulation and advanced thermostat measures, ex ante estimates included furnace fan runtime savings for those with either natural gas boilers or propane heating fuel.
 - Recommendation: When calculating insulation and advanced thermostat measure savings, remove furnace fan runtime savings for all projects with heating types other than natural gas furnace, per the IL-TRM V9.0.
 - Recommendation: The evaluation team will clarify with the IL-TRM Administrator whether furnace fan savings should apply to propane furnaces.
- **Key Finding #4:** Across multiple insulation measures, ex ante estimates apply different cooling and heating efficiencies (η_{Cool} and η_{Heat}) and capacities than those provided in the program tracking database.
 - Recommendation: Apply the actual cooling and heating efficiencies and capacities rather than assuming the default from the IL-TRM V9.0 when the TRM recommends the use of actual values.
- **Key Finding #5:** AIC provided 1,000 9W LEDs to customers during the Light Up Ogles community event and included all LEDs in one line item with a quantity of 1,000. No backup data was available to verify the number of recipients, creating uncertainty around measure counts or the number of unique customers served.
 - Recommendation: Going forward, AIC should track individual recipients in some form (e.g., via sign-up sheets that collect customer information) for such events for evaluation purposes.
- **Key Finding #6:** We could not identify the exact source of some discrepancies for Smart Savers because CLEAResult did not provide the algorithm used to calculate savings.
 - Recommendation: Provide the algorithms used for Smart Savers savings calculations within or alongside tracking datasets.
- **Key Finding #7:** Ex ante estimates applied a rounded per-kit deemed savings value for all kits (e.g., Unverified SAVE kit, Full Community Kit, BN Community Kit, Unverified SAVE Kit (No APS)) instead of calculating the actual savings values for each measure in the kit. The evaluation team calculated the verified savings for each individual measure. As a result, the verified analysis produced slightly different savings than the rounded ex ante savings, thus creating slight inconsistencies in reported ex ante savings to the total verified kit savings.

- Recommendation: Use unrounded savings values by kit measure to derive total kit savings.

3.3 Multifamily Initiatives

AIC continued to use a one-stop shop approach to serving multifamily customers in 2021. Based on this model, CMC Energy Services (CMC) serves multifamily properties through the Income Qualified Initiative's Multifamily channel (IQ Multifamily), the Public Housing Initiative, and the Multifamily Initiative. CMC recruits multifamily property managers to participate and channels them into the appropriate initiative based on tenant income guidelines and the property's Public Housing Authority status.²⁰ Overall, since the delivery models and measure offerings for these efforts are similar, with some variation between initiatives, we have grouped these efforts for evaluation reporting purposes.

3.3.1 Description of the Initiatives

AIC's Multifamily Initiatives are designed to provide a range of measures that result in lower energy use, lower costs of living and increased comfort for tenants and lower operating costs for building owners of subsidized or low-income housing, publicly owned housing serving low-income customers, and non-subsidized or market-rate multifamily and mixed-use buildings with three or more units. AIC serves these multifamily residents through IQ Multifamily, the Public Housing Initiative, and the Multifamily Initiative, respectively. Overall, the delivery models and measure offerings for these initiatives are similar, with some variation.

Leidos and CMC work together to implement the Multifamily Initiatives. Leidos' role is to provide oversight for the Multifamily Initiatives, including support for marketing efforts and initiative implementation, while CMC is responsible for conducting outreach, measure installations,²¹ QA/QC inspections on direct install measures, and managing project submissions, inventory, and initiative tracking data.

AIC transitioned the delivery of the Multifamily Initiatives to a one-stop shop model beginning in 2020. The goal of the one-stop shop model is to make access to Multifamily Initiative offerings as streamlined and seamless as possible for property managers and Housing Authorities. AIC provides property managers with a single point of contact, which guides them through the process of accessing offerings from multiple distinct AIC Initiatives. This delivery model provides the property manager with an opportunity to develop a trusted relationship with their Energy Advisor (EA), through whom they can obtain technical assistance on any aspect of their project.

The CMC outreach coordinator generates the bulk of leads for the Multifamily Initiatives by conducting outreach to multifamily properties, Public Housing Associations, and other housing organizations in AIC service territory via phone, email, and postcard. The Leidos team also refers customers to the Initiatives.

The one-stop shop approach begins when the property manager completes an online application and an interview with an Energy Advisor (EA) from CMC to support a full property assessment and identification of the available energy-saving opportunities for which the property may qualify. CMC staff act as a central point of contact for initial identification and coordination of direct install and program ally installed measures. This process involves an extensive interview with the property manager, during which implementation staff obtain a detailed understanding of the history of building envelope and interior upgrades at the property. Upon assessment completion, the EA recommends appropriate upgrades to the property manager and the no-contact options available to receive measures at their property. Implementation staff are heavily involved in providing installation instructions and support for property staff and tenants receiving in-unit direct install

²⁰ We use the term "property manager" to refer to both property managers and property owners.

²¹ CMC did not conduct in-unit direct installations in 2021 due to the COVID-19 pandemic social distancing protocols.

measures. As customers engage with the Multifamily Initiatives, the EA introduces them to the AIC Multifamily resources webpage which is set up as a resource for customers to access information regarding incentive offerings, energy efficiency grants, loans, and rebates.²² Property managers and tenants may also access educational and support resources, including ENERGY STAR information and the Efficient Choice Tool for selecting energy efficient appliances.²³

In response to statewide restrictions and social distancing guidelines due to the COVID-19 pandemic, AIC suspended most in-person installation activities for the majority of the 2020 calendar year, and this continued throughout the entirety of 2021. As such, implementation included several virtual delivery offerings:

- **Material Drop Ship and Green Bag Options:** For the Material Drop Ship and Green Bag delivery models, CMC compiles an order based on the qualifying measures recommended in each property’s assessment and CMC drop ships the order contact-free to the property. The primary distinction between the Material Drop Ship and Green Bag options is that property management staff install the measures provided through Material Drop Ship, while the tenant installs the measures in the Green Bag left at their door. The Green Bag option primarily includes in-unit measures tenants can install, such as LEDs and power strips. The Drop Ship option can include any measure type that qualified in the assessment at the discretion of the property. The property manager has the option to choose which measures they would like to receive through their bag drop.
- **Virtual Property Assessments:** As a result of COVID-19, AIC shifted their onsite property assessments to an online assessment, which consists of an online intake application and phone interview to determine property characteristics and eligibility. Measure offerings remain the same under the modification to the assessment process. AIC staff noted the virtual option allowed them to expand the reach of the assessments to rural areas.

The Initiatives provide energy-efficient upgrades for all aspects of multifamily properties, including in-unit, common area and exterior spaces, but the measures offered and delivery method differ based on the location of the installation. Table 35 includes an overview of these nuances.

Table 35. 2021 Multifamily Initiatives Measure Offerings and Delivery Methods

Location	Measures Offered	Installation Process
In-unit ^a	<ul style="list-style-type: none"> ▪ Thermostatic restrictor shower valves, door sweeps, outlet and switch wall plate gaskets on exterior walls, standard and specialty LED light bulbs, low-flow showerheads, low-flow kitchen faucet aerators, low-flow bathroom faucet aerators, water heater pipe insulation, Tier 1 advanced power strips, advanced thermostats ▪ Room air conditioner rebate offering available to Public Housing and IQ-eligible participants only 	<ul style="list-style-type: none"> ▪ CMC staff complete the virtual assessment ▪ In-unit measures are property- or tenant-installed via the Material Drop Ship or Green Bag Options, respectively ▪ CMC performs a 10% administrative review on 100% of the properties through pictures and video ▪ Room air conditioner: Property uses AIC rebate to purchase a new unit. Property may also receive an additional rebate upon recycling pick-up of old unit
Common Area	<ul style="list-style-type: none"> ▪ ENERGY STAR bathroom lights, ductless heat pumps, retrofit 4’ light fixtures, LED lighting fixture retrofits 	<ul style="list-style-type: none"> ▪ CMC staff complete the virtual assessment ▪ Program Allies install common area measures

²² Ameren Illinois. “Multifamily Property Managers.” Last modified March 9, 2022.

<https://www.amerenillinoisavings.com/multifamily-properties>.

²³ Ameren Illinois. “Efficient Choice Tool.” Last modified March 9, 2022.

<https://amerenillinoisavings.com/residential/efficientchoice/>.

Location	Measures Offered	Installation Process
	<ul style="list-style-type: none"> ▪ Ductless heat pump incentive level varies between multifamily initiatives 	<ul style="list-style-type: none"> ▪ Vending machine controls offering available to Public Housing and Market Rate participants only
Exterior	<ul style="list-style-type: none"> ▪ Security lighting, walkway lighting, parking lot lighting 	<ul style="list-style-type: none"> ▪ CMC staff complete the virtual assessment ▪ Program Allies install exterior measures
Building Envelope	<ul style="list-style-type: none"> ▪ Air sealing, attic insulation ▪ Measure offerings available to Public Housing and IQ-eligible participants only 	<ul style="list-style-type: none"> ▪ CMC staff complete the virtual assessment ▪ Program Allies install building envelope measures ▪ 100% of multifamily building envelope projects receive both pre- and post-installation inspections

^a While all of the listed in-unit measures were available in 2021, due to CMC’s inability to conduct direct installations in-unit, property managers were limited to selecting only measures for which they felt comfortable with their tenants installing on their own.

In cases where participating customers choose to pursue additional upgrades beyond the offerings available through the Multifamily Initiatives, the EA continues to serve as the single point of contact, helping the customer navigate an expanded project scope. This hallmark of the one-stop shop model ensures that these customers can seamlessly tap into all opportunities available to their properties. Program Allies conduct their own in-depth audit to develop work scopes and incentive quotes. The EA communicates with the property manager throughout the process, providing support and expertise to create a smooth participation experience. If the property manager chooses not to take full advantage of the available incentives at the time of the assessment, CMC staff will also follow up about completing additional work in the future.

Summary of Key Implementation Changes in 2021

In addition to continuing the COVID-19 related offerings (which began in 2020), AIC made one additional key adjustment to the Multifamily Initiatives’ offerings in 2021. Specifically, AIC transitioned the Room Air Conditioner Replacement Pilot into a permanent rebate offering. Properties may receive a rebate for replacing and recycling a non-ENERGY STAR room air conditioner. The pilot was previously available to Public Housing and IQ-eligible participants, and in 2021 AIC expanded the permanent offering to be available to all Multifamily Initiatives customers. Incentive amounts are higher for Public Housing and IQ Multifamily than those for Multifamily (market rate).

3.3.2 Participation Summary

Table 36 presents participation in the Multifamily channel in 2021 across the Public Housing, IQ Multifamily, and Multifamily Initiatives. The Multifamily Initiatives did not add any new offerings to the measure mix in 2021, though the room air conditioner and ductless heat pump offerings became permanent measures upon running successful pilots in 2021.

Table 36. 2021 Multifamily Initiatives Participation Summary

Unique Projects	Public Housing	IQ Multifamily	Multifamily (Market Rate)	Total
Unique Projects	51	119	30	200
Unique Tenant Units	1,477	3,504	962	5,943
Measure Count ^a	13,984	50,844	13,675	78,503

^a The units for attic insulation, pipe insulation, and air sealing are the number of discrete installations.

Table 37 provides the quantity of each measure type delivered to property managers through the Multifamily Initiatives. LEDs, wall plate gaskets, faucet aerators, and advanced power strips comprised the greatest quantity of measures delivered to property managers. Implementation staff reported the Public Housing Initiative was most affected by the COVID-19 pandemic restrictions. Properties within this delivery channel were especially sensitive to the COVID-19 pandemic because AIC serves more vulnerable populations through the Public Housing Initiative, such as senior living facilities. In particular, implementation staff reported the delivery of advanced thermostats to Public Housing residents was lower than expected and generating interest from this sector has been a challenge. In 2021, the Initiative distributed 52 advanced thermostats, compared to 1,134 and 913 advanced thermostats through the IQ Multifamily and Multifamily (Market Rate) Initiatives, respectively.

Table 37. 2021 Multifamily Initiatives Quantity of Measures Delivered

Measure Type	Public Housing	IQ Multifamily	Multifamily (Market Rate)
LEDs	7,687	33,764	9,149
Advanced Power Strips	551	2,394	693
Faucet Aerators	194	3,013	1,092
Shower Valves	1,291	577	41
Room Air Conditioners	240	29	0
Showerheads	118	2,216	555
Advanced Thermostats	52	1,134	913
Air Sealing	0	9	0
Attic Insulation	0	9	0
Ductless Heat Pumps	60	139	8
Pipe Insulation	1	28	6
Door Sweeps	665	534	163
Wall Plate Gaskets	3,125	6,998	1,055
Total	13,984	50,844	13,675

Note: The units for attic insulation, pipe insulation, and air sealing are the number of discrete installations, and all other quantities are measured in units of equipment.

3.3.3 Annual Savings Summary

Table 38 through Table 40 present the annual savings achieved from the Multifamily Initiatives (Public Housing, IQ Multifamily, and Multifamily [Market Rate], respectively) in 2021. Initiative staff reported serving more all-electric properties and fewer dual-fuel properties in 2021 in comparison to previous years, which reduced opportunities to reach gas goals. COVID-19 modestly impacted the savings performance for the Multifamily and IQ Multifamily Initiatives and significantly impacted performance for the Public Housing Initiative.

The 2021 Public Housing Initiative achieved 808 MWh, 0.09 MW, and 3,769 therms in verified net savings (Table 38).

Table 38. 2021 Public Housing Initiative Annual Savings

	Electric Energy Savings (MWh)	Electric Demand Savings (MW)	Gas Savings (Therms)
Ex Ante Gross Savings	826	0.09	4,521
Gross Realization Rate	98%	99%	83%
Verified Gross Savings	808	0.09	3,769
NTGR	1.000	1.000	1.000
Verified Net Savings	808	0.09	3,769

The 2021 IQ Multifamily Initiative achieved 3,777 MWh, 0.56 MW, and 14,716 therms in verified net savings (Table 39).

Table 39. 2021 IQ Multifamily Initiative Annual Savings

	Electric Energy Savings (MWh)	Electric Demand Savings (MW)	Gas Savings (Therms)
Ex Ante Gross Savings	3,795	0.57	14,901
Gross Realization Rate	100%	99%	99%
Verified Gross Savings	3,777	0.56	14,716
NTGR	1.000	1.000	1.000
Verified Net Savings	3,777	0.56	14,716

The 2021 Multifamily (Market Rate) Initiative achieved 1,247 MWh, 0.16 MW, and 8,712 therms in verified net savings (Table 40).

Table 40. 2021 Multifamily (Market Rate) Initiative Annual Savings

	Electric Energy Savings (MWh)	Electric Demand Savings (MW)	Gas Savings (Therms)
Ex Ante Gross Savings	1,376	0.18	9,500
Gross Realization Rate	100%	100%	100%
Verified Gross Savings	1,375	0.18	9,483
NTGR	0.906	0.886	0.919
Verified Net Savings	1,247	0.16	8,712

3.3.4 Savings Detail

The measures distributed through the Multifamily Initiatives in 2021 are shown in Table 41 through Table 43. The Public Housing, IQ Multifamily, and Multifamily (Market Rate) Initiatives delivered 16, 22, and 16 measure types, respectively. The measure types that comprised the largest share of overall savings varied by initiative.

Table 41. 2021 Multifamily Initiatives Electric Energy Savings by Measure

Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
Public Housing					
Ductless Heat Pumps (ER)	277	100%	277	1.000	277
LED - In-Unit (A-Type)	173	100%	173	1.000	173
LED - Common Area (A-Type)	110	100%	110	1.000	110
Door Sweep	60	100%	60	1.000	60
Restrictor Shower Valve	59	68%	40	1.000	40
Advanced Thermostat	42	100%	42	1.000	42
Room Air Conditioner (ER)	33	100%	33	1.000	33
Showerhead	25	100%	25	1.000	25
Advanced Power Strip - Tier 1	23	100%	23	1.000	23
Kitchen Faucet Aerator	14	100%	14	1.000	14
Wall Plate Gasket	5	102%	5	1.000	5
Bathroom Faucet Aerator	4	100%	4	1.000	4
Pipe Insulation	1	100%	1	1.000	1
Total	826	98%	808	1.000	808
IQ Multifamily					
Advanced Thermostat	1,107	100%	1,107	1.000	1,107
Ductless Heat Pump (ER)	765	99%	761	1.000	761
Showerhead	490	100%	490	1.000	490
LED - In-Unit (A-Type)	474	101%	479	1.000	479
Kitchen Faucet Aerator	234	100%	234	1.000	234
LED - In-Unit (Globe)	114	95%	109	1.000	109
LED - Common Area (A-Type)	102	100%	102	1.000	102
Advanced Power Strip - Tier 1	99	100%	99	1.000	99
LED - In-Unit (Candelabra)	90	101%	91	1.000	91
Bathroom Faucet Aerator	51	100%	51	1.000	51
Door Sweep	50	98%	48	1.000	48
Exterior LED - In-Unit (A-Type)	48	100%	48	1.000	48
Wall Plate Gasket	44	102%	45	1.000	45
Restrictor Shower Valve	43	67%	29	1.000	29
Pipe Insulation	31	100%	31	1.000	31
LED - In-Unit (Reflector)	23	101%	23	1.000	23
Attic Insulation	9	99%	9	1.000	9

Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
Room Air Conditioner (ER)	9	97%	8	1.000	8
LED - Common Area (Candelabra)	7	100%	7	1.000	7
Air Sealing	3	98%	3	1.000	3
Exterior LED - In-Unit (Candelabra)	2	100%	2	1.000	2
Exterior LED - In-Unit (Reflector)	2	100%	2	1.000	2
Total	3,795	100%	3,777	1.000	3,777
Multifamily (Market Rate)					
Advanced Thermostat	914	100%	914	0.883	807
LED - In-Unit (A-Type)	127	100%	127	0.960	122
Showerhead	97	100%	97	1.004	97
Ductless Heat Pump (ER)	63	100%	63	0.800	51
Kitchen Faucet Aerator	62	100%	62	1.004	63
Advanced Power Strip - Tier 1	29	100%	29	0.980	28
LED - In-Unit (Reflector)	28	100%	28	0.960	27
LED - In-Unit (Globe)	26	100%	26	0.960	25
Bathroom Faucet Aerator	15	100%	15	1.004	15
Wall Plate Gasket	7	102%	7	0.861	6
LED - In-Unit (Candelabra)	5	100%	5	0.960	5
Restrictor Shower Valve	2	67%	2	0.800	1
Pipe Insulation	1	100%	1	0.794	1
Door Sweep	0.4	100%	0.4	0.861	0.3
Total	1,376	100%	1,375	0.906	1,247

Table 42. 2021 Multifamily Initiatives Electric Demand Savings by Measure

Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
Public Housing					
LED - In-Unit (A-Type)	0.03	100%	0.03	1.000	0.03
Room Air Conditioner (ER)	0.03	100%	0.03	1.000	0.03
LED - Common Area (A-Type)	0.02	100%	0.02	1.000	0.02
Advanced Thermostat	0.01	100%	0.006	1.000	0.006
Restrictor Shower Valve	0.004	67%	0.003	1.000	0.003
Kitchen Faucet Aerator	0.004	100%	0.004	1.000	0.004
Bathroom Faucet Aerator	0.004	100%	0.004	1.000	0.004
Showerhead	0.003	100%	0.003	1.000	0.003
Advanced Power Strip - Tier 1	0.003	100%	0.003	1.000	0.003
Wall Plate Gasket	0.002	110%	0.002	1.000	0.002
Pipe Insulation	0.0001	100%	0.0001	1.000	0.0001
Ductless Heat Pumps (ER)	(0.01)	100%	(0.01)	1.000	(0.01)
Total	0.09	99%	0.09	1.000	0.09
IQ Multifamily					
Advanced Thermostat	0.11	104%	0.12	1.000	0.12
Ductless Heat Pumps (ER)	0.09	89%	0.08	1.000	0.08
LED - In-Unit (A-Type)	0.09	99%	0.09	1.000	0.09
Showerhead	0.06	100%	0.06	1.000	0.06
Kitchen Faucet Aerator	0.06	100%	0.06	1.000	0.06
Bathroom Faucet Aerator	0.05	100%	0.05	1.000	0.05
LED - In-Unit (Globe)	0.03	94%	0.03	1.000	0.03
LED - In-Unit (Candelabra)	0.02	100%	0.02	1.000	0.02
LED - Common Area (A-Type)	0.01	100%	0.01	1.000	0.01
Advanced Power Strip - Tier 1	0.01	100%	0.01	1.000	0.01
Wall Plate Gasket	0.01	107%	0.01	1.000	0.01
Room Air Conditioner (ER)	0.01	97%	0.01	1.000	0.01
LED - In-Unit (Reflector)	0.01	100%	0.01	1.000	0.01
Pipe Insulation	0.004	100%	0.004	1.000	0.004
Restrictor Shower Valve	0.003	67%	0.002	1.000	0.002
LED - Common Area (Candelabra)	0.001	100%	0.001	1.000	0.001
Attic Insulation	0.001	100%	0.001	1.000	0.001
Air Sealing	0.001	100%	0.001	1.000	0.001
Total	0.57	99%	0.56	1.000	0.56
Multifamily (Market Rate)					
Advanced Thermostat	0.09	100%	0.09	0.800	0.07
LED - In-Unit (A-Type)	0.03	100%	0.03	0.960	0.03
Kitchen Faucet Aerator	0.02	100%	0.02	1.004	0.02

Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
Bathroom Faucet Aerator	0.01	100%	0.01	1.004	0.01
Showerhead	0.01	100%	0.01	1.004	0.01
LED - In-Unit (Reflector)	0.01	100%	0.01	0.960	0.01
LED - In-Unit (Globe)	0.01	100%	0.01	0.960	0.01
Ductless Heat Pump (ER)	0.005	100%	0.005	0.800	0.004
Advanced Power Strip - Tier 1	0.003	100%	0.003	0.980	0.003
Wall Plate Gasket	0.001	110%	0.001	0.861	0.001
LED - In-Unit (Candelabra)	0.001	100%	0.001	0.960	0.001
Restrictor Shower Valve	0.0002	67%	0.0001	0.800	0.0001
Pipe Insulation	0.0001	100%	0.0001	0.794	0.0001
Total	0.18	100%	0.18	0.886	0.16

Table 43. 2021 Multifamily Initiatives Gas Savings by Measure

Measure Category	Ex Ante Gross Savings (Therms)	Gross Realization Rate	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Public Housing					
Restrictor Shower Valve	2,279	67%	1,526	1.000	1,526
Wall Plate Gasket	981	100%	981	1.000	981
Advanced Thermostat	571	100%	571	1.000	571
Door Sweep	555	100%	555	1.000	555
Showerhead	136	100%	136	1.000	136
Total	4,521	83%	3,769	1.000	3,769
IQ Multifamily					
Advanced Thermostat	8,980	100%	8,980	1.000	8,980
Showerhead	1,743	100%	1,743	1.000	1,743
Pipe Insulation	1,537	100%	1,538	1.000	1,538
Door Sweep	749	100%	749	1.000	749
Kitchen Faucet Aerator	606	100%	606	1.000	606
Wall Plate Gasket	389	100%	389	1.000	389
Attic Insulation	346	83%	287	1.000	287
Restrictor Shower Valve	223	67%	149	1.000	149
Air Sealing	191	72%	137	1.000	137
Bathroom Faucet Aerator	138	100%	138	1.000	138
Total	14,901	99%	14,716	1.000	14,716

Measure Category	Ex Ante Gross Savings (Therms)	Gross Realization Rate	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Multifamily (Market Rate)					
Advanced Thermostats	5,913	100%	5,913	0.900	5,322
Showerhead	1,732	100%	1,732	1.000	1,732
Door Sweep	817	100%	817	0.800	653
Kitchen Faucet Aerator	503	100%	503	1.000	503
Bathroom Faucet Aerator	406	100%	406	1.000	406
Restrictor Shower Valve	51	67%	34	0.800	27
Wall Plate Gasket	50	100%	50	0.800	40
Pipe Insulation	28	100%	28	1.000	28
Total	9,500	100%	9,483	0.919	8,712

The 2021 Public Housing, IQ Multifamily, and Multifamily (Market Rate) Initiatives achieved the following gross realization rates:

- **Public Housing:** 98% electric energy savings, 99% electric demand savings, 83% gas savings.
- **IQ Multifamily:** 100% electric energy savings, 99% electric demand savings, 99% gas savings.
- **Multifamily (Market Rate):** 100% electric energy savings, 100% electric demand savings, 100% gas savings.

We describe differences in savings that are most impactful to the overall program realization rates below. The evaluation team is prepared to share and discuss the full list of discrepancies with AIC, if desired.

Across the Public Housing Initiative, realization rates are primarily driven by differences in thermostatic restrictor shower valve and wall gasket measures.

- **Restrictor Shower Valve (7% of ex ante energy, 4% of ex ante demand, and 50% of ex ante gas savings):** The gross realization rate for restrictor shower valves was 68% for electric energy savings, 67% for electric demand savings, and 67% for gas savings.
 - For all restrictor shower valves (n=1,291), ex ante estimates applied a flow rate (gpm) from the IL-TRM V9.0 for a non-low-flow showerhead (2.24 gpm) when all participants received a low-flow showerhead through the Initiative. The verified analysis applied the IL-TRM V9.0. value of 1.50 gpm for a direct install restrictor shower valve with the install of a low-flow showerhead, resulting in lower electric energy, electric demand, and gas verified savings.
 - For 20% of restrictor shower valves (n=253), ex ante estimates did not claim secondary electric savings for wastewater treatment for participants who are not AIC electric customers. The verified analysis savings included secondary wastewater treatment savings for all customers provided savings still occur at the wastewater site, resulting in slightly higher electric energy verified savings.
- **Wall Gasket (1% of ex ante energy, 2% of ex ante demand, and 22% of ex ante gas savings):** The gross realization rate for wall gaskets was 102% for electric energy savings, 110% for electric demand savings, and 100% for gas savings.
 - For 49% of wall gasket measures (n=1,541), ex ante estimates applied a value for the N_cool variable that is not included in the IL-TRM V9.0 (N_cool = 37.5). The verified analysis applied

values for N_cool from the IL-TRM V9.0 for the cooling city specified in the tracking database, resulting in higher electric energy and demand verified savings.

Across the IQ Multifamily Initiative, the electric energy realization rate is 100%; however, the electric demand realization rate is driven by slight differences in ductless heat pumps, while the gas realization rate is mainly impacted by decreased verified savings in thermostatic restrictor valves, air sealing, and attic insulation.

- **Ductless Heat Pump (20% of ex ante energy and 16% of ex ante demand savings):** The gross realization rate for ductless heat pumps was 100% for electric energy savings and 88% for electric demand savings.
 - For 27% of ductless heat pump projects (n=38), ex ante estimates applied default cooling efficiencies from the IL-TRM V9.0 instead of using the actual efficiencies provided in the Initiative tracking database. The verified analysis relied on the actual efficiencies in the database, resulting in lower electric energy and demand verified savings.
- **Restrictor Shower Valve (1% of ex ante energy, demand, and gas savings, respectively):** The gross realization rate for restrictor shower valves was 67% for electric energy savings, electric demand savings, and gas savings.
 - For all restrictor shower valves (n=577), ex ante estimates applied a flow rate (gpm) from the IL-TRM V9.0 for a non-low-flow showerhead (2.24 gpm) when all participants received a low-flow showerhead through the Initiative. The verified analysis applied the IL-TRM V9.0 value of 1.50 gpm for a direct install restrictor shower valve with the install of a low-flow showerhead, resulting in lower electric energy, electric demand, and gas verified savings.
- **Attic Insulation (<1% of ex ante energy, <1% of ex ante demand, and 2% of ex ante gas savings):** The gross realization rate for attic insulation was 100% for electric energy savings, 100% for electric demand savings, and 83% for gas savings.
 - For one attic insulation project, ex ante estimates included furnace fan runtime savings even though the database indicates a natural gas boiler is present. The verified analysis removed furnace fan runtime savings in these cases, resulting in lower verified electric energy savings.
 - For one attic insulation project, ex ante estimates include gas savings even though AIC is not a gas provider to the customer. The verified analysis removes all gas savings for those who are not AIC gas customers, resulting in lower verified gas savings.
- **Air Sealing (<1% of ex ante energy, <1% of ex ante demand, and 1% of ex ante gas savings):** The gross realization rate for attic insulation was 98% for electric energy savings, 100% for electric demand savings, and 72% for gas savings.
 - For one air sealing project, ex ante estimates included furnace fan runtime savings even though the database indicates a natural gas boiler is present. The verified analysis removed furnace fan runtime savings in these cases, resulting in lower verified electric energy savings.
 - For one air sealing project, ex ante estimates include gas savings even though AIC is not a gas provider to the customer. The verified analysis removes all gas savings for those who are not AIC gas customers, resulting in lower verified gas savings.

Across the Multifamily (Market Rate) Initiative, electric energy, electric demand, and gas realization rates are 100%. Differences in savings have an insignificant impact to overall savings and are therefore not detailed below, but available upon request.

3.3.5 Cumulative Persisting Annual Savings

Table 44 presents CPAS and WAML for the 2021 Multifamily Initiatives (Public Housing, IQ Multifamily, and Multifamily [Market Rate]). The measure-specific and total verified gross savings for each initiative or channel are summarized, and CPAS in 2021–2024 and 2030 are presented. The combined WAML for the Initiative is 11.5 years. CPAS and WAML for each initiative or channel at a measure level are summarized in Table 45 through Table 47.

Table 44. 2021 Multifamily Initiatives CPAS and WAML

Initiative/Channel	WAML	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Public Housing	12.6	808	1.000	808	808	808	808	...	664	...	9,490
Income Qualified - Multifamily	11.5	3,777	1.000	3,777	3,777	3,777	3,777	...	3,348	...	42,157
Multifamily	10.9	1,375	0.906	1,247	1,247	1,247	1,247	...	1,118	...	12,901
2021 CPAS		5,960	0.978	5,831	5,831	5,831	5,831	...	5,130	...	64,549
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	701	...	
WAML	11.5										

Table 45. 2021 Public Housing Initiative CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Ductless Heat Pumps	15	277	1.000	277	277	277	277	...	260	...	4,005
Standard LED (In-Unit)	10	173	1.000	173	173	173	173	...	137	...	1,623
Standard LED (Common Area)	10	110	1.000	110	110	110	110	...	42	...	691
Door Sweep	20	60	1.000	60	60	60	60	...	60	...	1,198
Advanced Thermostat	11	42	1.000	42	42	42	42	...	42	...	466
Restrictor Shower Valve	10	40	1.000	40	40	40	40	...	40	...	401
Room Air Conditioner ER	12	33	1.000	33	33	33	33	...	33	...	396
Showerhead	10	25	1.000	25	25	25	25	...	25	...	252
Advanced Power Strip - Tier 1	7	23	1.000	23	23	23	23	...	0	...	159
Faucet Aerator	10	18	1.000	18	18	18	18	...	18	...	180
Wall Plate Gasket	20	5	1.000	5	5	5	5	...	5	...	103
Pipe Insulation	15	1	1.000	1	1	1	1	...	1	...	16
2021 CPAS		808	1.000	808	808	808	808	...	664	...	9,490
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	144	...	
WAML	12.6										

Table 46. 2021 IQ Multifamily Initiative CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS - Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Advanced Thermostats	11	1,107	1.000	1,107	1,107	1,107	1,107	...	1,107	...	12,176
Ductless Heat Pumps	15	761	1.000	761	761	761	761	...	730	...	11,139
Showerhead	10	490	1.000	490	490	490	490	...	490	...	4,899
Standard LED (In-Unit)	10	479	1.000	479	479	479	479	...	379	...	4,491
Faucet Aerator	10	285	1.000	285	285	285	285	...	285	...	2,845
Specialty LED (In-Unit)	10	200	1.000	200	200	200	200	...	124	...	1,768
Standard LED (Common Area)	10	102	1.000	102	102	102	102	...	39	...	643
Advanced Power Strip - Tier 1	7	99	1.000	99	99	99	99	...	0	...	690
Exterior Standard LED	8	48	1.000	48	48	48	48	...	0	...	264
Door Sweep	20	48	1.000	48	48	48	48	...	48	...	968
Wall Plate Gasket	20	45	1.000	45	45	45	45	...	45	...	893
Pipe Insulation	15	31	1.000	31	31	31	31	...	31	...	472
Restrictor Shower Valve	10	29	1.000	29	29	29	29	...	29	...	286
Reflector LED (In-Unit)	10	23	1.000	23	23	23	23	...	16	...	212
Attic Insulation	20	9	1.000	9	9	9	9	...	9	...	179
Room Air Conditioner ER	12	8	1.000	8	8	8	8	...	8	...	100
Specialty LED (Common Area)	10	7	1.000	7	7	7	7	...	4	...	55
Air Sealing	20	3	1.000	3	3	3	3	...	3	...	52
Exterior Reflector LED	10	2	1.000	2	2	2	2	...	1	...	15
Exterior Specialty LED	6.9	2	1.000	2	2	2	2	...	0	...	11
2021 CPAS		3,777	1.000	3,777	3,777	3,777	3,777	...	3,348	...	42,157
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	429	...	
WAML	11.5										

Table 47. 2021 Multifamily (Market Rate) Initiative CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS - Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Advanced Thermostat	11	914	0.883	807	807	807	807	...	807	...	8,876
Standard LED (In-Unit)	10	127	0.960	122	122	122	122	...	46	...	764
Showerhead	10	97	1.004	97	97	97	97	...	97	...	971
Faucet Aerator	10	77	1.004	77	77	77	77	...	77	...	773
Ductless Heat Pumps	15	63	0.800	51	51	51	51	...	48	...	739
Specialty LED (In-Unit)	10	30	0.960	29	29	29	29	...	18	...	224
Advanced Power Strip - Tier 1	7	29	0.980	28	28	28	28	...	0	...	196
Reflector LED (In-Unit)	10	28	0.960	27	27	27	27	...	16	...	207
Wall Plate Gasket	20	7	0.861	6	6	6	6	...	6	...	121
Restrictor Shower Valve	10	2	0.800	1	1	1	1	...	1	...	13
Pipe Insulation	15	1	0.794	1	1	1	1	...	1	...	11
Door Sweep	20	0	0.861	0	0	0	0	...	0	...	7
2021 CPAS		1,375	0.906	1,247	1,247	1,247	1,247	...	1,118	...	12,901
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	128	...	
WAML	10.9										

3.3.6 Conclusions and Recommendations

Based on the results of this evaluation, the evaluation team offers the following key findings and recommendations for the Multifamily Initiatives moving forward:

- **Key Finding #1:** Ex ante savings for faucet aerators, showerheads, and thermostatic restrictor shower valves exclude secondary wastewater treatment savings for customers who do not receive electricity from AIC.
 - Recommendation: Claim secondary wastewater treatment savings in all cases, regardless of customer type as savings are realized at the water treatment plant and not at the customer site.
- **Key Finding #2:** Ex ante savings calculations for thermostatic restrictor shower valves assume a flow rate (gpm) for a non-low-flow showerhead when all participants received a low-flow showerhead through the Initiative.
 - Recommendation: Apply the flow rate of the low-flow showerhead installed at the site where the thermostatic restrictor shower valve operates.
- **Key Finding #3:** Across attic insulation and air sealing measures, ex ante estimates included furnace fan runtime savings for those with natural gas boilers.
 - Recommendation: When calculating attic insulation and air sealing measure savings, remove furnace fan runtime savings for all projects with heating types other than natural gas furnace, per IL-TRM V9.0.
 - Recommendation: The evaluation team will clarify with the IL-TRM Administrator whether furnace fan savings should apply to propane furnaces.

3.4 Home Efficiency – Market Rate Initiative

The Home Efficiency – Market Rate Initiative is a new initiative offered by AIC as part of the 2021 portfolio. The Initiative focuses on providing home weatherization and envelope efficiency measures and operates in conjunction with the existing Income Qualified (IQ) Initiative’s Single Family channel. The Home Efficiency – Market Rate Initiative and the IQ Initiative’s Single Family channel both offer the same weatherization measures coupled with a tiered incentive system that provides higher incentives for low- and moderate-income customers treated through the IQ Initiative and somewhat lower incentives for market-rate customers served through the Home Efficiency – Market Rate Initiative. Table 48 outlines the incentive tiers offered through the IQ and Home Efficiency Initiatives for weatherization measures. Home Efficiency – Market Rate participants fall into Tier 3.

Table 48. 2021 IQ and Home Efficiency Incentive Tiers

Measure	Tier 1 (Low Income)	Tier 2 (Moderate Income)	Tier 3 (Market Rate)
Air Sealing	\$0.70/CFM	\$0.53/CFM	\$0.35/CFM
Attic Insulation	\$1.50/sq. ft.	\$1.13/sq. ft.	\$0.75/sq. ft.
Wall Insulation	\$1.80/sq. ft.	\$1.35/sq. ft.	\$0.90/sq. ft.
Rim Joist Insulation	\$2.00/lin. ft.	\$1.50/lin. ft.	\$1.00/lin. ft.
Crawlspace Wall Insulation	\$4.00/lin. ft.	\$3.00/lin. ft.	\$2.00/lin. ft.

In addition to the weatherization measures listed in Table 48, the 2021 Home Efficiency – Market Rate Initiative also conducted duct sealing and installed high efficiency bathroom exhaust fans and advanced thermostats in participating homes.

Finally, in 2021, the Home Efficiency – Market Rate Initiative also included savings claims from measures delivered through the AIC Market Development Initiative (MDI). AIC MDI Partner, Senior Services Plus (SSP), delivered and installed advanced thermostats and exterior dawn-to-dusk photosensitive LED lamps to senior AIC customers located in the River Bend area.²⁴

3.4.1 Participation Summary

Table 49 presents a summary of Home Efficiency – Market Rate participation during 2021.

Table 49. 2021 Home Efficiency – Market Rate Initiative Participation Summary

Participation	Total Participants
Air Sealing	61
Attic Insulation	56
Bathroom Exhaust Fan	42
Duct Sealing	5
Crawlspace Insulation	29
Advanced Thermostat	12
Wall Insulation	26
Rim Joist Insulation	44
SSP Advanced Thermostat	197 ^a
SSP LEDs (Dusk to Dawn)	197 ^a
Total	258^b

^a While initiative tracking data identifies 201 SSP installations, our review of backup data provided indicates that four installations were duplicate records.

^b Total does not sum the column as it counts the total number of unique customers who received services through the Initiative in 2021.

²⁴ While program tracking data refers to these installations as “Blitz Kits,” AIC confirmed that all measures were direct installed for customers.

3.4.2 Initiative Annual Savings Summary

Table 50 presents the Home Efficiency - Market Rate Initiative annual savings achieved in 2021. The 2021 Home Efficiency - Market Rate Initiative achieved 112 MWh, 0.05 MW, and 24,406 therms in verified net savings.

Table 50. 2021 Home Efficiency – Market Rate Initiative Annual Savings

	Electric Energy Savings (MWh)	Electric Demand Savings (MW)	Gas Savings (Therms)
Ex Ante Gross Savings	124	0.06	27,029
Gross Realization Rate	109%	111%	104%
Verified Gross Savings	135	0.07	28,084
NTGR	0.833	0.821	0.869
Verified Net Savings	112	0.05	24,406

3.4.3 Initiative Savings Detail

The Home Efficiency - Market Rate Initiative distributed 172,818 measures as shown in Table 51. Note that air sealing and insulation measures report measure quantities in units of CFM reduction and treated square footage, respectively, instead of number of customers or measures.

Table 51. 2021 Home Efficiency – Market Rate Participation Summary by Measure

Measure Category	IL-TRM Measure Name	Quantity ^a	Units	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
Air Sealing	Air Sealing	80,104	CFM Reduction	22,278	14.12	3,794
Attic Insulation	Ceiling/Attic Insulation	70,438	Square Footage	16,385	7.90	3,909
Bathroom Exhaust Fan	High Efficiency Bathroom Exhaust Fan	42	Fans	9,110	1.04	0
Duct Sealing	Duct Insulation and Sealing	5	Homes	7,512	2.89	1,887
Crawlspace Insulation	Basement Sidewall Insulation	3,067	Square Footage	6,027	1.28	1,358
Advanced Thermostat	Advanced Thermostats	12	Thermostats	4,130	1.04	854
Wall Insulation	Wall Insulation	13,259	Square Footage	2,966	1.47	1,057
Rim Joist Insulation	Rim/Band Joist Insulation	5,497	Linear Feet	900	0.27	248
SSP Advanced Thermostat	Advanced Thermostats	197	Thermostats	42,796	27.93	13,922
SSP LEDs (Dusk to Dawn)	LED Screw Based Omnidirectional Bulbs	197	Bulbs	11,908	1.31	0
Total		172,818		124,011	59.23	27,029

^aAs reported in ex ante tracking data.

Table 52 through Table 54 present ex ante gross, verified gross, and verified net electric energy, electric demand, and natural gas savings for the Initiative in 2021.

Table 52. 2021 Home Efficiency – Market Rate Electric Energy Savings by Measure

Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
Air Sealing	22	100%	22	0.897	20
Attic Insulation	16	99%	16	0.800	13
Bathroom Exhaust Fan	9	101%	9	0.800	7
Duct Sealing	8	107%	8	0.800	6
Crawlspace Insulation	6	100%	6	0.800	5
Advanced Thermostat	4	100%	4	0.856	4
Wall Insulation	3	100%	3	0.800	2
Rim Joist Insulation	1	100%	1	0.800	1
SSP Advanced Thermostat	43	116%	49	0.843	42
SSP LEDs (Dusk to Dawn)	12	132%	16	0.800	13
Total	124	109%	135	0.833	112

Table 53. 2021 Home Efficiency – Market Rate Electric Demand Savings by Measure

Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
Air Sealing	0.014	100%	0.014	0.897	0.013
Attic Insulation	0.008	100%	0.008	0.800	0.006
Duct Sealing	0.003	101%	0.003	0.800	0.002
Wall Insulation	0.001	99%	0.001	0.800	0.001
Crawlspace Insulation	0.001	100%	0.001	0.800	0.001
Bathroom Exhaust Fan	0.001	101%	0.001	0.800	0.001
Advanced Thermostat	0.001	100%	0.001	0.800	0.001
Rim Joist Insulation	<0.001	100%	<0.001	0.800	<0.001
SSP Advanced Thermostat	0.028	123%	0.034	0.800	0.027
SSP LEDs (Dusk to Dawn)	0.001	132%	0.002	0.800	0.001
Total	0.059	111%	0.066	0.821	0.054

Table 54. 2021 Home Efficiency – Market Rate Gas Savings by Measure

Measure Category	Ex Ante Gross Savings (Therms)	Gross Realization Rate	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Attic Insulation	3,909	100%	3,909	0.800	3,127
Air Sealing	3,794	100%	3,802	0.894	3,398
Duct Sealing	1,887	100%	1,887	0.800	1,510
Crawlspace Insulation	1,358	100%	1,358	0.800	1,086

Measure Category	Ex Ante Gross Savings (Therms)	Gross Realization Rate	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Wall Insulation	1,057	100%	1,057	0.800	845
Advanced Thermostat	854	100%	854	0.900	769
Rim Joist Insulation	248	100%	248	0.800	198
SSP Advanced Thermostat	13,922	108%	14,969	0.900	13,472
Total	27,029	104%	28,084	0.869	24,406

We describe the key discrepancies between ex ante and verified gross savings estimates below.

- **SSP Advanced Thermostats (35% of ex ante energy, 47% of ex ante demand, and 52% of ex ante gas savings):** The gross realization rate for advanced thermostats was 113% for cooling electric energy, 110% for heating electric energy, 113% for cooling electric demand, and 110% for gas savings. Advanced thermostats delivered by SSP represent 35% of electric energy, 47% of electric demand, and 52% of gas ex ante savings in the final data.
 - Ex ante savings estimates did not apply IL-TRM V9.0 errata for three parameters: Heating_Reduction, Eff_ISR_Heat, and Eff_ISR_Cool. The verified analysis applied the errata, which resulted in decreased verified cooling savings and increased verified heating savings.
 - Ex ante savings estimates also included an erroneous additive term in therm savings estimates. Removing this term slightly decreased verified heating savings.
 - Ex ante savings applied the cooling in-service rate (ISR) for all other programs (90%) rather than the direct install ISR of 100%. Initiative staff verified that these measures were direct installed by SSP staff; therefore, the verified analysis applied the direct install ISR, resulting in higher verified electric energy and demand savings.
 - Ex ante savings included 201 thermostat installations. Upon review of backup data, however, we identified four installations as duplicate records; verified savings therefore represent only 197 installations, decreasing savings for all fuels.
 - Finally, based on direct communication from the implementation team, we understand that they embed applicable NTGRs in gross savings estimates.
 - In cooling gross savings estimates, the NTGR was mistakenly included. Therefore, the verified analysis removed the NTGR from gross savings estimates and applied it only when calculating verified net savings, which increased the verified gross savings accordingly (but did not affect verified net savings for the measure overall).
 - In heating gross savings estimates, the NTGR was not included at all, nor was it applied at a later point when calculating net savings estimates. Therefore, the verified analysis applied the NTGR when calculating verified net savings, which decreased verified net savings accordingly.
- **Air Sealing (18% of ex ante energy, 24% of ex ante demand, and 14% of ex ante gas savings):** The gross realization rate for air sealing is 100% for electric energy, electric demand, and gas savings. Air sealing projects represent 18% of electric energy, 24% of electric demand, and 14% of gas ex ante savings in the final data.
 - For one projects, ex ante savings estimates applied IL-TRM assumptions for the Springfield climate zone when the database indicates Chicago for variables N_cool and CDD. The verified analysis

applied Chicago climate zone variables, resulting in lower verified electric energy and demand savings and no changes to gas savings.

- For one project, ex ante savings estimates claimed electric energy savings for furnace fan runtime savings even though the tracking database identifies the heating type as a gas boiler. The verified analysis excludes furnace fan runtime savings for gas boilers as the IL-TRM V9.0 specifies that furnace fan runtime savings are appropriate for projects with gas furnaces only, resulting in lower verified electric energy savings and no changes to electric demand and gas savings.
- For one project, ex ante savings estimates applied assumptions from the IL-TRM V9.0 for air sealing with attic insulation, even though attic insulation was not installed, impacting variables ADJcool, ADJfan, ADJgas. Ex ante savings applied 121%, 107%, and 100%, respectively for those variables, while ex post applied 100%, 100%, 77%, respectively, resulting in lower verified electric energy and demand savings and higher gas savings.
- For one project, ex ante savings applied a cooling efficiency (8.37 SEER) that is inconsistent with the cooling efficiency reported in the tracking database (9.3 SEER), resulting in lower verified electric energy and demand savings.
- **Attic Insulation (13% of ex ante energy, 13% of ex ante demand, and 14% of ex ante gas savings):** The gross realization rate for attic insulation is 99% for electric energy, 100% for electric demand, and 100% for gas savings. Attic insulation projects represent 13% of electric energy, 13% of electric demand, and 15% of gas ex ante savings in the final data.
 - For one project, ex ante savings applied a cooling efficiency (8.37 SEER) that is inconsistent with the cooling efficiency reported in the tracking database (9.3 SEER), resulting in lower verified electric energy and demand savings.
 - For one project, ex ante savings estimates claimed electric energy savings for furnace fan runtime savings even though the tracking database identifies the heating type as a gas boiler. The verified analysis excludes furnace fan runtime savings for gas boilers as the IL-TRM V9.0 specifies that furnace fan runtime savings are appropriate for projects with gas furnaces only, resulting in lower verified electric energy savings and no changes to electric demand and gas savings.
- **SSP LEDs (Dusk to Dawn) (10% of ex ante energy and 2% of ex ante demand savings):** The gross realization rate for omnidirectional exterior LEDs was 132% for electric energy and 132% for electric demand savings.
 - Ex ante savings estimates applied the Community Kits ISR of 88%. Initiative staff verified that these measures were direct installed by SSP staff; therefore, the verified analysis applied the direct install ISR of 94.5%, resulting in higher verified electric energy and demand savings.
 - Ex ante savings included 201 LED installations. Upon review of backup data, however, we identified four installations as duplicate records; verified savings therefore represent only 197 installations, decreasing savings.
 - Ex ante savings also improperly embedded a NTGR of 80% in the gross savings estimates. The verified analysis removed the NTGR from gross savings estimates and applied it only when calculating verified net savings, which increased the gross realization rate (but did not affect verified savings overall)
- **Bathroom Exhaust Fan (7% of ex ante energy and 2% of ex ante demand savings):** The gross realization rate for bathroom exhaust fan is 101% for electric energy and 101% for electric demand savings.

Bathroom exhaust fan projects represent 7% of electric energy and 2% of electric demand ex ante savings in the final data.

- For all projects, (n=42), ex ante savings applied the deemed savings from the IL-TRM V9.0 for continuous operation. The verified analysis calculated savings by applying the algorithm and variable assumptions for continuous operation from the IL-TRM V9.0, resulting in higher verified electric energy and demand savings.
- **Duct Sealing (6% of ex ante energy, 5% of ex ante demand, and 7% of ex ante gas savings):** The gross realization rate for duct sealing is 107% for electric energy, 101% for electric demand, and 100% for gas savings. Duct sealing projects represent 6% of electric energy, 5% of electric demand, and 7% of gas ex ante savings in the final data.
 - For one project, ex ante savings applied the default heating efficiency for heat pump (2.40 COP) from the IL-TRM V9.0 while the verified analysis relied on the actual heating efficiency reported in the tracking database (2.04 COP), resulting in a higher verified electric energy and demand savings.
 - For one project, ex ante savings applied the coincidence factor (CF) for central air conditioner (68%) from the IL-TRM V9.0. The verified analysis applied the CF from the IL-TRM V9.0 for heat pump (72%) because the tracking database indicated the cooling equipment was a heat pump, resulting in higher verified electric demand savings.
- **Crawlspace Insulation (5% of ex ante energy, 2% of ex ante demand, and 5% of ex ante gas savings):** The gross realization rate for crawlspace insulation is 100% for electric energy, electric demand, and gas savings. Crawlspace insulation projects represent 5% of electric energy, 2% of electric demand, and 5% of gas ex ante savings in the final data.
 - For one project, ex ante savings applied a cooling efficiency (8.37 SEER) that is inconsistent with the cooling efficiency reported in the tracking database (9.3 SEER), resulting in lower verified electric energy and demand savings.
- **Wall Insulation (2% of ex ante energy, 2% of ex ante demand, and 4% of ex ante gas savings):** The gross realization rate for wall insulation is 100% for electric energy, 99% for electric demand, and 100% for gas savings. Wall insulation projects represent 2% of electric energy, 3% of electric demand, and 4% of gas ex ante savings in the final data.
 - For one project, ex ante savings applied a cooling efficiency (8.37 SEER) that is inconsistent with the cooling efficiency reported in the tracking database (9.3 SEER), resulting in lower verified electric energy and demand savings.
- **Rim Joist Insulation (1% of ex ante energy, <1% of ex ante demand, and 1% of ex ante gas savings):** The gross realization rate for rim joist insulation is 100% for electric energy, electric demand, and gas savings. Rim joist insulation projects represent <1% of electric energy, electric demand, and gas ex ante savings in the final data.
 - For one project, ex ante savings applied a cooling efficiency (8.37 SEER) that is inconsistent with the cooling efficiency reported in the tracking database (9.3 SEER), resulting in lower verified electric energy and demand savings.

3.4.4 Cumulative Persisting Annual Savings

Table 55 presents CPAS and WAML for the 2021 Home Efficiency – Market Rate Initiative. The measure-specific and total verified gross savings for the Initiative are summarized, and CPAS in 2021–2024 and 2030 are presented.²⁵ The WAML for the Initiative is 15.0 years.

Table 55. 2021 Home Efficiency – Market Rate CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Air Sealing	20.0	22	0.897	20	20	20	20	...	20	...	384
Attic Insulation	20.0	16	0.800	13	13	13	13	...	13	...	251
Duct Sealing	20.0	8	0.800	6	6	6	6	...	6	...	122
Bathroom Exhaust Fan	19.0	9	0.800	7	7	7	7	...	7	...	140
Wall Insulation	20.0	3	0.800	2	2	2	2	...	2	...	46
Crawlspace Insulation	20.0	6	0.800	5	5	5	5	...	5	...	94
Advanced Thermostat	11.0	4	0.856	4	4	4	4	...	4	...	39
Rim Joist Insulation	20.0	1	0.800	1	1	1	1	...	1	...	14
SSP Advanced Thermostat	11.0	49	0.843	42	42	42	42	...	42	...	459
SSP LEDs (Dusk to Dawn)	8.0	16	0.800	13	13	13	13	...	0	...	69
2021 CPAS		135	0.833	112	112	112	112	...	100	...	1,617
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	13	...	
WAML	15.0										

²⁵ For further detail, including achieved CPAS in years not presented in this table, please see Appendix C.

3.4.5 Conclusions and Recommendations

Based on the results of this evaluation, the evaluation team offers the following key findings for the Home Efficiency – Market Rate Initiative moving forward:

- **Key Finding #1:** Initiative tracking data is clear, comprehensive, and free of any noteworthy data entry errors, gaps, or inconsistencies for all measures excluding the SSP-delivered measures.
- **Key Finding #2:** The implementation team is applying assumptions that are inconsistent with the IL-TRM V9.0 for SSP-delivered advanced thermostats and lighting.
 - **Recommendation:** We recommend that the implementation team verifies the parameters listed in the relevant version of the IL-TRM for the current program year are applied to ex ante savings when actual data and equipment specifications are not available. In addition, we recommend verifying that the algorithm used for ex ante savings matches the relevant version of the IL-TRM for the current program year.
- **Key Finding #3:** The implementation team is applying NTGRs in a manner that is inconsistent with Illinois-standard application of NTGRs for SSP-delivered advanced thermostats and LEDs.
 - **Recommendation:** We recommend verifying that NTGRs are applied separately to gross savings as is required in the Illinois-standard application.

3.5 Midstream Heating and Cooling Initiative

3.5.1 Initiative Description

In 2021, AIC launched the Midstream Heating and Cooling Initiative (Midstream HVAC Initiative), which encourages market actors such as distributors and contractors in AIC territory to promote and install high-efficiency ASHPs, ductless heat pumps, CACs, ENERGY STAR certified advanced thermostats, and heat pump water heaters (HPWHs).

Participating distributors promote and sell units that qualify for the Initiative and provide contractors with an instant incentive for qualifying equipment. Using information that the contractor provides about the end user, the distributor will submit an application to the Initiative for approval. Once the application is approved, the Initiative will pay the distributor a base incentive plus a pay-for-performance incentive for the unit sold. The incentive provided to distributors in turn lowers the cost of efficient equipment for contractors, thus encouraging them to pass those savings onto their customers. The incentive also encourages contractors to install more efficient heating and cooling equipment and water heaters than they might normally install.

Although the main point of contact for the Initiative has transitioned from the contractor (previously known as the Program Ally) to the distributor, contractors still play a large role in the implementation of the Initiative. Contractors are required to provide data about the end user to the distributor in order to verify that the existing unit falls within the parameters of the Initiative and that the end user lives in AIC's service territory. Additionally, most marketing materials provided to distributors are directed at contractors, such as point of sale flyers, postcards, and other marketing materials.

Summary of Key Implementation Changes in 2021

In 2021, the Midstream HVAC Initiative transitioned from a downstream model to a midstream model by providing incentives to distributors rather than the end user. The Midstream HVAC Initiative was officially launched on April 1, 2021; however, the legacy HVAC Initiative still ran through April and was phased out on May 1, 2021.

Aside from this major implementation change, other notable changes occurred from 2020 to 2021 including:

■ Incentives & Measures

- Early retirement incentives were removed around September 2020 before the Initiative transitioned to the Midstream model.
- Added ductless heat pumps to the measure mix for a \$600 incentive in June 2021.
- The HPWH incentive was decreased from a \$700 pay-for-performance incentive at the end of PY2020 to a \$600 pay-for-performance incentive in the beginning of PY2021. Then the incentive decreased again to a \$500 pay-for-performance but then was increased again to \$700 towards the end of the program year according to the implementation team. The \$300 base incentive did not change through the end of PY2020 or throughout PY2021.
- AIC removed the restriction that only HPWHs that are 55 gallons or less could be incentivized. Incentives are now available for units larger than 55 gallons.

■ Marketing

- The Initiative began to conduct distributor round tables to stay up to date on distributor's experience in the Initiative such as participation barriers and program support that could help

contractors to participate. These roundtables also gathered market intelligence on changes to the supply chain.

- The Initiative began to cross-promote other offerings including the Retail Products, Home Efficiency – Market Rate, and Appliance Recycling Initiatives.
- **Contractor List**
 - The Initiative implemented a contractor list on the AIC website that allows contractors to self-identify whether they offer incentives through the Midstream HVAC Initiative.

3.5.2 Participation Summary

Table 56 presents the Midstream HVAC Initiative participation during 2021.

Table 56. 2021 Midstream HVAC Initiative Participation Summary by Measure Type

Measure Type	Unique Participants ^a	Project Count	Measure Count
CAC	2,280	2,280	2,291
CAC ER ^b	1	1	1
ASHP	310	310	312
Ductless Heat Pumps	160	160	160
HPWH	137	137	160
Advanced Thermostats	843	843	843
Total	3,064	3,207	3,767

^a The totals do not add up due to some participants installing multiple measures through the program.
^b Although the Initiative nominally discontinued ER measures in 2020, there was one CAC ER measure in the 2021 program.

3.5.3 Initiative Annual Savings Summary

Table 57 presents Midstream HVAC Initiative annual savings achieved in 2021. The 2021 Midstream HVAC Initiative achieved 2,561 MWh, 1.06 MW, and 44,200 therms in verified net savings.

Table 57. 2021 Midstream HVAC Initiative Annual Savings

	Electric Energy Savings (MWh)	Electric Demand Savings (MW)	Gas Savings (Therms)
Ex Ante Gross Savings	3,177	1.30	43,670
Gross Realization Rate	100%	101%	112%
Verified Gross Savings	3,171	1.31	49,111
NTGR	0.807	0.806	0.900
Verified Net Savings	2,561	1.06	44,200

3.5.4 Initiative Savings Detail

Table 58 shows the quantities and reported ex ante gross energy and demand savings by measure category. The Midstream HVAC Initiative distributed 3,767 measures, with the majority of installations from central air conditioners.

Table 58. 2021 Midstream HVAC Initiative Participation Summary by Measure

Measure Category	IL-TRM Measure Name	Measure Quantity	Units	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
CAC (Midstream)	Central Air Conditioning	1,604	CACs	720,190	727	0
ASHP (Midstream)	Air Source Heat Pump	187	ASHPs	680,787	68	0
Ductless Heat Pumps (Midstream)	Ductless Heat Pumps	133	DMSHPs	609,017	8	0
Heat Pump Water Heater (Midstream)	Heat Pump Water Heater	160	HPWHs	384,240	18	0
CAC (Downstream)	Central Air Conditioning	687	CACs	322,883	320	0
ASHP (Downstream)	Air Source Heat Pump	125	ASHPs	142,111	41	0
Advanced Thermostat (Midstream)	Advanced Thermostats	565	Thermostats	141,604	88	29,153
Advanced Thermostat (Downstream)	Advanced Thermostats	278	Thermostats	118,668	5	14,517
Ductless Heat Pumps (Downstream)	Ductless Heat Pumps	27	DMSHPs	55,086	2	0
CAC (ER) (Downstream)	Central Air Conditioning	1	CACs	2,331	2	0
Total		3,767		3,176,937	1,296	43,670

Table 59 shows the ex ante gross, verified gross, and verified net energy savings by measure category. For most measures the gross realization rate was 100%. The overall gross realization rate for the Initiative was also 100%. The overall NTGR is 0.807, resulting in verified net savings of 2,561 MWh.

Table 59. 2021 Midstream HVAC Initiative Electric Energy Savings by Measure

Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
CAC (Midstream)	720	100%	720	0.800	576
ASHP (Midstream)	681	100%	679	0.800	544
Ductless Heat Pumps (Midstream)	609	100%	608	0.800	486
Heat Pump Water Heater (Midstream)	384	100%	384	0.800	307
CAC (Downstream)	323	100%	323	0.822	265
ASHP (Downstream)	142	100%	142	0.822	117
Advanced Thermostat (Midstream)	142	99%	140	0.835	117
Advanced Thermostat (Downstream)	119	99%	117	0.863	101

Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
Ductless Heat Pumps (Downstream)	55	100%	55	0.822	45
CAC (ER) (Downstream)	2	95%	2	0.742	2
Total	3,177	100%	3,171	0.807	2,561

Table 60 shows the ex ante gross, verified gross, and verified net demand savings by measure category. The overall gross realization rate for demand savings was 101% and the overall NTGR is 0.806, resulting in verified net peak demand savings of 1.06 MW.

Table 60. 2021 Midstream HVAC Initiative Electric Demand Savings by Measure

Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
CAC (Midstream)	0.73	100%	0.73	0.800	0.58
ASHP (Midstream)	0.07	100%	0.07	0.800	0.05
Ductless Heat Pumps (Midstream)	0.01	85%	0.01	0.800	0.01
Heat Pump Water Heater (Midstream)	0.02	100%	0.02	0.800	0.01
CAC (Downstream)	0.32	100%	0.32	0.822	0.26
ASHP (Downstream)	0.04	100%	0.04	0.822	0.03
Advanced Thermostat (Midstream)	0.09	99%	0.09	0.800	0.07
Advanced Thermostat (Downstream)	0.02	188%	0.04	0.800	0.03
Ductless Heat Pumps (Downstream)	0.00	100%	0.00	0.822	0.00
CAC (ER) (Downstream)	0.00	95%	0.00	0.742	0.00
Total	1.30	101%	1.31	0.806	1.06

Table 61 shows the ex ante gross, verified gross, and verified net natural gas (therms) savings by measure category. The overall gross realization rate for therms savings was 112% and the overall NTGR was 0.900, resulting in verified net savings of 44,200 therms natural gas. All gas savings achieved by the Initiative are from advanced thermostats.

Table 61. 2021 Midstream HVAC Initiative Gas Savings by Measure

Measure Category	Ex Ante Gross Savings (Therms)	Gross Realization Rate	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Advanced Thermostat (Midstream)	29,153	119%	34,734	0.900	31,260
Advanced Thermostat (Downstream)	14,518	99%	14,378	0.900	12,940
Total	43,670	112%	49,111	0.900	44,200

Although the overall gross realization rates for electric energy, electric demand, and gas savings were close to 100%, the gross realization rates varied at the measure level. The list below describes the primary reasons for discrepancies between ex ante and verified ex post savings, organized by measure category.

- **ASHP (Midstream and Standard) (21% of ex ante energy and 5% of ex ante demand savings for Midstream; and 4% of ex ante energy and 3% of ex ante demand savings for Downstream):** The gross realization rate for Midstream and Standard ASHPs was 100% for electric energy and demand savings.
 - There was a minor discrepancy between ex ante and verified gross energy savings for ASHP Midstream. For one record (<1% of records), the implementation team applied a baseline heating seasonal performance factor (HSPF) of 5.14. The evaluation team could not verify the source of this assumption and instead applied a weighted average baseline HSPF of 6.14 based on existing heating equipment from 779 contractor-based Midstream time-of-sale applications and values listed in the IL-TRM V9.0 for existing ASHP (8.20) or electric resistance (3.41) heating equipment. This led to a small decrease in electric energy savings achieved by the ASHP Midstream measure.
- **Ductless Heat Pumps (Midstream) (19% of ex ante energy and 1% of ex ante demand savings):** The gross realization rate for Midstream Ductless Heat Pumps was 100% for electric energy and 85% for electric demand savings.
 - For one Midstream Ductless Heat Pump record (<1% of records), the implementation team applied a cooling capacity that was an order of magnitude too high. Correcting this error decreased verified electric energy and demand savings.
- **Advanced Thermostat (Downstream) (4% of ex ante energy, <1% of ex ante demand, and 100% of ex ante gas savings):** The gross realization rate for advanced thermostats was 99% for electric energy, 188% for electric demand, and 99% for gas savings.
 - The implementation team used the IL-TRM V8.0 savings factor of 8.4% for cooling demand reduction for all records. The evaluation team used the IL-TRM V9.0 savings factor of 16.4% for cooling demand reduction. This increased verified gross electric demand savings.
 - The implementation team referenced the IL-TRM V8.0 for twelve records (4.3% of records) without existing cooling equipment information in the tracking data, applying a SEER of 9.3 and EER of 7.5. The evaluation team applied the IL-TRM V9.0 values (SEER of 12 and EER of 10.5) for unknown existing cooling equipment. This decreased electric energy and demand savings.
 - The implementation team assumed natural gas heating for seven records (2.5% of records) in their calculation of heating kWh but did not claim any gas savings. The verified analysis assumed electric heating based on the measure name, measure code, and measure description in the tracking data for these measures. This increased electric energy savings.
 - Three thermostats were secondary thermostats that were associated with secondary HVAC units in the tracking data. The IL-TRM V9.0 algorithm for heating kWh includes an electric heating consumption parameter at the aggregate household value, whereas the algorithm for cooling kWh includes a capacity parameter specific to each HVAC system. The implementation team claimed heating and cooling savings for these secondary thermostats. The verified analysis awarded secondary cooling-only savings. This decreased electric energy and gas savings.
- **Advanced Thermostat (Midstream) (4% of ex ante energy, 7% of ex ante demand, and 67% of ex ante gas savings):** The gross realization rate for midstream advanced thermostats was 99% for electric energy and demand savings and 119% for gas savings.
 - The implementation team applied electric heating consumption values from an unknown source for all records with unknown heating equipment. The evaluation team applied electric heating consumption values from the IL-TRM V9.0 based on city for records with unknown heating equipment. This increased verified electric energy savings.

- The implementation team applied cooling capacity, SEER, and EER values that are inconsistent with the tracking data for 152 records (26.9% of records). The evaluation team applied the cooling capacity and SEER values associated with new equipment in the tracking data for participants who also installed new HVAC equipment, or else defaulted to the values in the tracking data associated with existing equipment. This decreased electric energy and demand savings.
- The implementation team claimed savings for multiple thermostats per household for two participants, and there was no indication that the participants had multiple HVAC systems. The evaluation team only awards savings for one thermostat per household, in accordance with the IL-TRM V9.0. This led to a small decrease in electric energy, electric demand, and gas savings.
- For three records (<1% of records), the implementation team applied IL-TRM V9.0 values of 97% gas heating, 3% electric heating, and 99% thermostat control of air conditioning for unknown heating and cooling equipment. The evaluation team found existing equipment information in the tracking data and applied 100% gas heating and 100% air conditioning based on the existing equipment being listed as a natural gas furnace and central air conditioner. This led to a small increase in electric energy, electric demand, and gas savings.
- **CAC (ER) (<1% of ex ante energy and <1% of ex ante demand savings):** Although the Initiative discontinued ER measures in 2020, there was one CAC ER record in the 2021 tracking data. The gross realization rate for this ER CAC was 95% for electric energy and demand savings.
 - Ex ante estimates incorrectly derated existing SEER values for early replacement (ER) CACs. The verified analysis derated existing SEER values by 1% annually compounded over the reported age of existing equipment, resulting in lower verified electric energy and demand savings. The IL-TRM V9.0 references a metering study that relies on research from a NREL publication²⁶ outlining best practices for SEER, EER, HSPF, and AFUE degradation. The publication identifies the following formula:

$$\text{Efficiency} = \text{Base Efficiency} * (1-M)^{\text{Age}}$$

Where:

Base Efficiency = Nameplate efficiency of existing equipment

M = Maintenance factor (1%)

Age = Age (in years) of existing equipment

²⁶ <https://www.nrel.gov/docs/fy06osti/38238.pdf>

3.5.5 Cumulative Persisting Annual Savings

Table 62 presents CPAS and WAML for the 2021 Midstream HVAC Initiative. The measure-specific and total verified gross savings for the Initiative are summarized, and CPAS in 2021–2024 and 2030 are presented.²⁷ The WAML for the Initiative is 15.9 years.

Table 62. 2021 Midstream HVAC Initiative CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
CAC Midstream	18.0	720	0.800	576	576	576	576	...	576	...	10,371
ASHP Midstream	16.0	679	0.800	544	544	544	544	...	544	...	8,697
Ductless Heat Pumps Midstream	15.0	608	0.800	486	486	486	486	...	486	...	7,296
Heat Pump Water Heater Midstream	15.0	384	0.800	307	307	307	307	...	307	...	4,600
CAC Downstream	18.0	323	0.822	265	265	265	265	...	265	...	4,777
ASHP Downstream	16.0	142	0.822	117	117	117	117	...	117	...	1,869
Advanced Thermostat Midstream	11.0	140	0.835	117	117	117	117	...	117	...	1,286
Advanced Thermostat Downstream	11.0	117	0.863	101	101	101	101	...	101	...	1,113
Ductless Heat Pump Downstream	15.0	55	0.822	45	45	45	45	...	45	...	679
CAC ER Downstream	18.0	2	0.742	2	2	2	2	...	0	...	15
2021 CPAS		3,171	0.807	2,561	2,561	2,561	2,561	...	2,560	...	40,704
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	1	...	
WAML	15.9										

²⁷ For further detail, including achieved CPAS in years not presented in this table, please see Appendix C.

3.5.6 Conclusions and Recommendations

Based on the results of this evaluation, the evaluation team offers the following key findings and recommendations for the Midstream HVAC Initiative moving forward:

- **Key Finding #1:** The implementation team is applying assumptions that are inconsistent with the IL-TRM V9.0 for air source heat pumps and advanced thermostats.
 - Recommendation: We recommend verifying that the parameters listed in the relevant version of the IL-TRM for the current program year are applied to ex ante savings when actual data and equipment specifications are not available.
- **Key Finding #2:** The implementation team does not always apply the parameters that are available in the tracking data in ex ante savings calculations and instead applies unknown defaults from the IL-TRM V9.0 or makes other unsourced assumptions. For example, ex ante advanced thermostat savings assumed incorrect SEER and cooling capacities despite their inclusion in the tracking data, and applied unsourced heating reduction factors.
 - Recommendation: We recommend checking the tracking data for all available parameters that can be applied in savings algorithms. These parameters should be considered project-specific in most cases and applied if they are reasonable.
- **Key Finding #3:** The IL-TRM V9.0 and V10.0 do not provide information on the baseline heating and cooling equipment to assume for ASHPs and DMSHPs in scenarios where the heating and cooling equipment are unknown. The implementation and evaluation teams' methods are aligned for 2021, assuming that ASHPs with unknown heating/cooling equipment have a natural gas furnace and central air conditioner baseline and DMSHPs with unknown heating/cooling equipment have an electric resistance and central air conditioner baseline.
 - Recommendation: We recommend that the implementation and evaluation teams collaborate in the Illinois Technical Advisory Committee (TAC) to develop baseline assumptions for inclusion in the IL-TRM V11.0. Specifically, baseline assumptions should be consistent across HVAC measures when heating and cooling equipment is unknown. Because the HVAC Initiative is shifting to an entirely midstream program design in 2022, these assumptions will become more critical as the existing heating and cooling equipment will be unknown in all cases.

3.6 Appliance Recycling Initiative

3.6.1 Initiative Description

The goal of the Appliance Recycling Initiative is to eliminate the electricity consumption associated with old, inefficient appliances. AIC offered incentives to its residential electric customers to encourage the recycling of functioning full size refrigerators and freezers.²⁸ In 2021, participants received a \$50 incentive and free pick up and recycling services for up to two eligible appliances. In addition to the \$50 incentive, there was no cost for pickups of room air conditioners at the same time as a refrigerator or freezer pickup. AIC also distributed free energy savings kits to participants that contained LED bulbs, advanced power strips, low-flow showerheads, and faucet aerators. The kits were provided by implementation staff immediately after appliance pickup.

The Initiative implementer, Solutions for Energy Efficient Logistics (SEEL), is responsible for scheduling appointments, picking up appliances, delivering units to the recycling partner, sending out incentives, data collection, and reporting. SEEL is also responsible for conducting QA/QC inspections throughout the implementation process. Leidos administers the program and is responsible for the generation and distribution of marketing materials, data validation, and general oversight of SEEL.

AIC concluded the Appliance Recycling Initiative in 2021. SEEL stopped scheduling new appliance recycling pickups on November 12, 2021. The Initiative officially closed on December 31, 2021. AIC provided locations on their website for customers to continue to recycle their refrigerator and freezers outside of the Initiative.

3.6.2 Participation Summary

Table 63 presents Appliance Recycling Initiative participation during 2021. In total, AIC customers recycled 6,620 units through the Appliance Recycling Initiative. Refrigerators represented the bulk of Initiative activity with 4,780 refrigerators recycled compared to 1,383 freezers and 457 room air conditioners.

Table 63. 2021 Appliance Recycling Initiative Participation Summary by Measure

Measure Category	IL-TRM Measure Name	Measure Quantity	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
Refrigerators	Refrigerator and Freezer Recycling	4,780	4,193,637	517.15	N/A
Freezers	Refrigerator and Freezer Recycling	1,383	1,142,654	134.00	N/A
Room Air Conditioners	Room Air Conditioner Recycling	457	117,085	118.91	N/A
Total		6,620	5,453,376	770.06	N/A

Table 64 presents participation in the Appliance Recycling Kits channel in 2021. In total, AIC distributed 2,663 kits.

²⁸ Full size is defined as 10–27 cubic feet.

Table 64. 2021 Appliance Recycling Kit Participation Summary by Measure

Kit Type	Kits Distributed	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
IQ Full AR Kit 1	324	84,981	11	3,441
IQ Full AR Kit 2	752	197,240	25	7,985
Non-IQ Full AR Kit 2	1,557	381,143	49	16,534
Total	2,633	663,364	85	27,960

Summary of Key Implementation Changes in 2021

The only key change during 2021 was that SEEL added additional marketing direct to customers in the online portal to streamline scheduling and reduce call center costs.

3.6.3 Initiative Annual Savings Summary

Table 65 presents Appliance Recycling Initiative annual savings achieved in 2021. The 2021 Appliance Recycling Initiative achieved 3,178 MWh, 0.44 MW, and 27,960 therms in verified net savings.

Table 65. 2021 Appliance Recycling Initiative Annual Savings

	Electric Energy Savings (MWh)	Electric Demand Savings (MW)	Gas Savings (Therms)
Ex Ante Gross Savings	6,117	0.86	27,960
Gross Realization Rate	96%	96%	100%
Verified Gross Savings	5,858	0.82	27,960
NTGR	0.543	0.539	1.000
Verified Net Savings	3,178	0.44	27,960

3.6.4 Initiative Savings Detail

The 2021 Appliance Recycling Initiative achieved 2,515 MWh in verified net energy savings and 0.36 in verified net peak demand savings. Refrigerators represented the majority of total Initiative savings (Table 66 and Table 67).

Table 66. 2021 Appliance Recycling Initiative Electric Energy Savings by Measure

Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
Refrigerators	4,194	92%	3,864	0.470	1,816
Freezers	1,143	104%	1,186	0.540	641
Room Air Conditioner	117	100%	117	0.500	59
Total	5,453	95%	5,167	0.487	2,515

Table 67. 2021 Appliance Recycling Initiative Electric Demand Savings by Measure

Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
Refrigerators	0.517	92%	0.476	0.470	0.224
Freezers	0.134	104%	0.139	0.540	0.075
Room Air Conditioner	0.119	100%	0.119	0.500	0.059
Total	0.770	95%	0.735	0.488	0.359

Additionally, kits measures distributed through the Initiative achieved 663 MWh, 0.09 MW, and 27,960 therms in net verified savings. Lighting and advanced power strip measures represented the majority of total savings for this distribution channel (Table 68, Table 69, and Table 70).

Table 68. 2021 Appliance Recycling Kits Electric Energy Savings by Measure

Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
IQ Full AR Kit 1					
9W LED	35	100%	35	1.000	35
Tier 1 APS	30	100%	30	1.000	30
Showerhead	10	100%	10	1.000	10
Kitchen Aerator	8	100%	8	1.000	8
Bath Aerator	1	100%	1	1.000	1
IQ Full AR Kit 2					
9W LED	82	100%	82	1.000	82
Tier 1 APS	70	100%	70	1.000	70
Showerhead	24	100%	24	1.000	24
Kitchen Aerator	18	100%	18	1.000	18
Bath Aerator	2	100%	2	1.000	2
Non-IQ Full AR Kit 2					
9W LED	143	119%	170	0.840	143
Tier 1 APS	146	100%	146	1.000	146
Showerhead	49	100%	49	1.000	49
Kitchen Aerator	38	100%	38	1.000	38
Bath Aerator	5	100%	5	1.000	5
Total	663	104%	691	0.961	663

Table 69. 2021 Appliance Recycling Kits Electric Demand Savings by Measure

Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
IQ Full AR Kit 1					
9W LED	0.004	100%	0.004	1.000	0.004
Tier 1 APS	0.003	100%	0.003	1.000	0.003

Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
Showerhead	0.001	100%	0.001	1.000	0.001
Kitchen Aerator	0.001	100%	0.001	1.000	0.001
Bath Aerator	0.001	100%	0.001	1.000	0.001
IQ Full AR Kit 2					
9W LED	0.010	100%	0.010	1.000	0.010
Tier 1 APS	0.008	100%	0.008	1.000	0.008
Showerhead	0.002	100%	0.002	1.000	0.002
Kitchen Aerator	0.003	100%	0.003	1.000	0.003
Bath Aerator	0.002	100%	0.002	1.000	0.002
Non-IQ Full AR Kit 2					
9W LED	0.017	119%	0.021	0.840	0.017
Tier 1 APS	0.016	100%	0.016	1.000	0.016
Showerhead	0.004	100%	0.004	1.000	0.004
Kitchen Aerator	0.006	100%	0.006	1.000	0.006
Bath Aerator	0.005	100%	0.005	1.000	0.005
Total	0.086	104%	0.089	0.963	0.086

Table 70. 2021 Appliance Recycling Gas Savings by Measure

Measure Category	Ex Ante Gross Savings (Therms)	Gross Realization Rate	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
IQ Full AR Kit 1					
9W LED	0	N/A	0	1.000	0
Tier 1 APS	0	N/A	0	1.000	0
Showerhead	1,874	100%	1,874	1.000	1,874
Kitchen Aerator	1,394	100%	1,394	1.000	1,394
Bath Aerator	173	100%	173	1.000	173
IQ Full AR Kit 2					
9W LED	0	N/A	0	1.000	0
Tier 1 APS	0	N/A	0	1.000	0
Showerhead	4,350	100%	4,350	1.000	4,350
Kitchen Aerator	3,235	100%	3,235	1.000	3,235
Bath Aerator	401	100%	401	1.000	401
Non-IQ Full AR Kit 2					
9W LED	0	N/A	0	0.840	0
Tier 1 APS	0	N/A	0	1.000	0
Showerhead	9,006	100%	9,006	1.000	9,006
Kitchen Aerator	6,699	100%	6,699	1.000	6,699
Bath Aerator	829	100%	829	1.000	829
Total	27,960	100%	27,960	1.000	27,960

The 2021 Appliance Recycling Initiative achieved a gross realization rate of 95% for both electric energy and electric demand savings. We describe the key drivers of differences between ex ante and verified savings below.

- **Appliance Recycling:** Gross realization rates for refrigerators and freezers were 92% and 104%, respectively. The evaluation team identified the following data quality issues that affected savings:
 - **Operation Location:** The tracking data did not include reliable information on unit operational location. The evaluation team found that the information in the operational location field often mimicked the information from the pickup location field. In many cases, this led to non-intuitive unit characteristics, such as primary refrigerators or freezers operating outdoors in a driveway, yard, porch, road, or garage. The evaluation team addressed this issue by making assumptions using supporting variables (e.g., primary appliances operate in conditioned spaces).
 - **Unit Type:** 35 records included conflicting information in the unit type and unit model fields (e.g., “chest” refrigerators, “side-by-side” freezers). In these cases, we assumed the unit model information was accurate and reclassified the unit types.
 - **Unit Age:** 64 records did not include unit age information. In these cases, record level verified electric energy savings or electric demand savings could not be accurately estimated and, therefore, these records were not included in the calculation.
- **Appliance Recycling Kits – 9W LEDs (38% of ex ante energy and 35% of ex ante demand for Non-IQ Kits):** For the Non-IQ Full AR Kit #2, the implementation team reported ex ante net savings in the program tracking database instead of ex ante gross. These savings included an assumed 84% NTGR for 9W LEDs included in the kits. The verified analysis corrected this error, which results in increased gross realization rates but does not affect verified net savings overall.

3.6.5 Cumulative Persisting Annual Savings

Table 71 presents CPAS and WAML for the 2021 Appliance Recycling Initiative. Here, measure-specific and total verified gross savings for the Initiative are summarized, and CPAS in 2021–2024 and 2030 are presented.²⁹ The WAML for the Initiative is 6.7 years. CPAS and WAML for each channel at a measure level are summarized in the following tables.

Table 71. 2021 Appliance Recycling Initiative CPAS and WAML

Measure Category	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Appliance Recycling	6.4	5,167	0.487	2,515	2,515	2,515	2,515	...	0	...	16,202
AR Kits	8.9	691	0.961	663	663	663	663	...	303	...	5,287
2021 CPAS		5,858	0.543	3,178	3,178	3,178	3,178	...	3030	...	16,202
Expiring 2021 CPAS				0	0	0		...	0	...	
Expired 2021 CPAS				0	0	0	0	...	2,875	...	
WAML	6.7										

Table 72. 2021 Appliance Recycling Channel CPAS and WAML

Measure	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
Refrigerator Recycling	6.5	3,864	0.470	1,816	1,816	1,816	1,816	...	0	...	11,804
Freezer Recycling	6.5	1,186	0.540	641	641	641	641	...	0	...	4,164
Room Air Conditioner Recycling	4.0	117	0.500	59	59	59	59	...	0	...	234
2021 CPAS		5,167	0.487	2,515	2,515	2,515	2,515	...	0	...	16,202
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	2,515	...	
WAML	6.4										

²⁹ For further detail, including achieved CPAS in years not presented in this table, please see Appendix C.

Table 73. 2021 Appliance Recycling Kits Channel CPAS and WAML

Measure	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
9W LED	10.0	170	0.840	143	143	143	143	...	54	...	898
9W LED (IQ)	10.0	118	1.000	118	118	118	118	...	93	...	1,102
Tier 1 APS	7.0	247	1.000	247	247	247	247	...	0	...	1,728
Showerhead	10.0	83	1.000	83	83	83	83	...	83	...	831
Kitchen Aerator	10.0	64	1.000	64	64	64	64	...	64	...	645
Bath Aerator	10.0	8	1.000	8	8	8	8	...	8	...	84
2021 CPAS		691	0.961	663	663	663	663	...	303	...	5,287
Expiring 2021 CPAS				0	0	0	0	...	0	...	
Expired 2021 CPAS				0	0	0	0	...	360	...	
WAML	8.9										

3.6.6 Conclusions and Recommendations

Based on the results of this evaluation, the evaluation team offers the following key findings for the Appliance Recycling Initiative:

- **Key Finding #1:** In general, the implementation team is collecting the correct and necessary information to accurately estimate electric energy and demand savings. An important exception is that the Initiative database currently does not document if a refrigerator or freezer unit was operating in a conditioned or unconditioned space prior to being recycled. This information is a key input in savings calculations and currently must be inferred from the unit location field. Also, the evaluation team observed erroneous data entries for unit type and unit model fields.
 - Recommendation: If the Initiative were to continue, we would recommend that the implementation team begin tracking whether an appliance was operating in a conditioned or unconditioned space prior to being recycled. This could be done by either adding a new field to the tracking database or including this information in the unit location field. We would suggest collecting this information during the enrollment process, if possible. Additionally, we would recommend that the program administrator prioritize capturing accurate unit model fields in their QA/QC efforts.
- **Key Finding #2:** Initiative tracking data lacked unit-specific characteristics for recycled room air conditioners.
 - Recommendation: For any future AIC efforts to recycle room air conditioners, we suggest that the implementation team transition to a record-level savings analysis to mirror the IL-TRM methodology used by the evaluation team. Specifically, using ZIP codes to apply climate zone-specific full load hour (FLH) would improve the accuracy of ex ante calculations and would likely be relatively simple to implement. The implementation team could also consider attempting to collect unit-specific information from the room air conditioner nameplates to allow energy savings calculations to reflect the specific recycled units.
- **Key Finding #3:** The evaluation team identified several cases where unit age data was omitted from the tracking database for recycled refrigerators and freezers.
 - Recommendation: The evaluation team would recommend, for any future refrigerator or freezer recycling effort, that the implementation team record the age of each recycled refrigerator and freezer unit. We would also recommend that the program administrator prioritize capturing this data as part of their QA/QC efforts to help ensure data integrity and a more accurate evaluation.
- **Key Finding #4:** As in prior years, the implementation team calculated ex ante savings using a deemed approach. They developed per-unit savings values for refrigerators and freezers using population-level averages for key parameters. The implementation team then calculated initiative-level savings estimates by applying their deemed per-unit values to the total number of recycled refrigerators and freezers in the tracking database. Based on guidance provided in the IL-TRM V9.0, the evaluation team calculated savings for each recycled unit using their unique characteristics provided in the tracking database for each record. These differing approaches led to differences between ex ante and verified savings estimates.
 - Recommendation: If this Initiative were to continue, we would suggest the implementation team transition to a record-level savings analysis to mirror the IL-TRM methodology used by the evaluation team. The implementation team's current approach produces relatively accurate estimates, which we recognize may be sufficient for performance tracking, but presents evaluation risk as this deemed approach will systematically produce different results than the evaluation.

3.7 Direct Distribution of Efficient Products Initiative

3.7.1 Initiative Description

The Direct Distribution Initiative provided energy savings kits to primarily low-income AIC customers through three main delivery channels in 2021: School Kits and Community Kits.

- **School Kits:** The School Kits channel provided free energy savings kits and in-class energy education presentations to students throughout AIC’s service territory.
- **Community Kits:** The Community Kits channel distributed energy efficiency kits to income-qualified customers at community events or following home visits conducted as part of the Income Qualified Initiative. In addition, through the Community Kits channel, AIC distributed free energy-saving measures through food pantries.

Table 74 outlines the measures included in each separate kit type.

Table 74. 2021 Direct Distribution Initiative Kit Contents

Channel	Kit Type	Kit Contents
School Kits	Full School Kit	<ul style="list-style-type: none"> ▪ Four 9W LEDs ▪ Advanced power strip ▪ Door sweep ▪ Kitchen aerator ▪ Bath aerator ▪ Low-flow showerhead ▪ Shower timer ▪ Water temperature card ▪ Pipe insulation
Community Kits	Credit and Collections Kit	<ul style="list-style-type: none"> ▪ Four 9W LEDs ▪ ENERGY STAR Desk Lamp ▪ Advanced power strip ▪ Kitchen aerator ▪ Bath aerator ▪ Low-flow showerhead ▪ Water temperature card
	Electric Community Kit	<ul style="list-style-type: none"> ▪ Six 9W LEDs ▪ Four 4.5W Globe LEDs ▪ 2 8W Reflector LEDs ▪ Advanced power strip
	Full Community Kit	<ul style="list-style-type: none"> ▪ Four 9W LEDs ▪ Advanced power strip ▪ Kitchen aerator ▪ Bath aerator ▪ Low-flow showerhead
	Gas Community Kit	<ul style="list-style-type: none"> ▪ Kitchen aerator ▪ Bath aerator ▪ Low-flow showerhead ▪ Thermostatic restrictor valve ▪ Water temperature card ▪ Shower timer
	Food Pantry Distribution	<ul style="list-style-type: none"> ▪ Four 9W LEDs

Channel	Kit Type	Kit Contents
		<ul style="list-style-type: none"> ▪ Advanced power strip ▪ Two LED nightlights

3.7.2 Participation Summary

Table 75 summarizes the number of kits distributed through the Direct Distribution Initiative in 2021.

Table 75. 2021 Direct Distribution Initiative Participation Summary by Measure

Measure Category	Kit Type	Kits Distributed	Ex Ante Gross kWh	Ex Ante Gross kW	Ex Ante Gross Therms
School Kits	Full School Kit	8,500	2,388,913	553	67,322
Community Kits	Credit and Collections Kit	2,505	629,732	79	17,644
	Electric Community Kit	1,070	568,954	67	0
	Full Community Kit	2,031	519,860	65	19,296
	Gas Community Kit	153	0	0	2,247
Community Kits - Food Pantry Distribution	Four 9W LEDs	34,992	4,655,336	560	0
	Tier 1 APS	5,000	469,000	53	0
	Two LED Nightlights	11,655	419,580	0	0
Total		65,906	9,651,376	1,376	106,510

3.7.3 Initiative Annual Savings Summary

Table 76 presents Direct Distribution Initiative annual savings achieved in 2021. The 2021 Direct Distribution Initiative achieved 9,651 MWh, 1.38 MW, and 106,510 therms in verified net savings.

Table 76. 2021 Direct Distribution Initiative Annual Savings

	Electric Energy Savings (MWh)	Electric Demand Savings (MW)	Gas Savings (Therms)
Ex Ante Gross Savings	9,651	1.38	106,510
Gross Realization Rate	103%	103%	100%
Verified Gross Savings	9,947	1.41	106,510
NTGR	1.000	1.000	1.000
Verified Net Savings	9,947	1.41	106,510

In addition to minor errors in ex ante savings calculations for a handful of kit measures, discussed further in Section 3.7.4, we note that the implementation team has continued to calculate kit savings outside of the Residential Program tracking database and transfer assumptions into the database, unlike for other initiatives. This continues to lead to minor rounding errors and disagreements between backup calculations provided to the evaluation team and savings recorded in the tracking database. For the purposes of internal consistency, we calculate all savings (ex ante gross, verified gross, and verified net) using unit-level savings for kits calculated at full precision and multiplied by the number of kits recorded in the program tracking database. This leads to very minor disagreements between ex ante savings recorded in the tracking database and those reported here.

3.7.4 Initiative Savings Detail

Table 77, Table 78, and Table 79 summarize 2021 Direct Distribution Initiative savings by measure and channel.

Table 77. 2021 Direct Distribution Initiative Electric Energy Savings by Measure

Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
School Kits					
Full School Kit					
9W LED	845	100%	845	1.000	845
Tier 1 APS	454	100%	454	1.000	454
Door Sweep	95	100%	95	1.000	95
Kitchen Aerator	248	100%	248	1.000	248
Bath Aerator	30	100%	30	1.000	30
Showerhead	284	100%	284	1.000	284
Shower Timer	288	100%	288	1.000	288
Water Temperature Card	44	100%	44	1.000	44
Pipe Insulation	101	100%	101	1.000	101
<i>School Kits Subtotal</i>	<i>2,389</i>	<i>100%</i>	<i>2,389</i>	<i>1.000</i>	<i>2,389</i>
Community Kits					
Credit and Collections Kit					
9W LED	256	133%	341	1.000	341
ENERGY STAR Desk Lamp	27	133%	36	1.000	36
Tier 1 APS	220	100%	220	1.000	220
Kitchen Aerator	45	102%	45	1.000	45
Bath Aerator	6	102%	6	1.000	6
Showerhead	74	101%	75	1.000	75
Water Temperature Card	3	100%	3	1.000	3
Electric Community Kit					
9W LED	175	133%	234	1.000	234
4.5W Globe	107	133%	143	1.000	143
8W Reflector	86	133%	115	1.000	115
Tier 1 APS	201	100%	201	1.000	201
Full Community Kit					
9W LED	222	133%	296	1.000	296
Tier 1 APS	190	100%	190	1.000	190
Showerhead	64	100%	64	1.000	64
Kitchen Aerator	39	100%	39	1.000	39
Bath Aerator	5	100%	5	1.000	5
Gas Community Kit					
Showerhead	0	N/A	1	1.000	1

Measure Category	Ex Ante Gross Savings (MWh)	Gross Realization Rate	Verified Gross Savings (MWh)	NTGR	Verified Net Savings (MWh)
Thermostatic Valve	0	N/A	<1	1.000	<1
Kitchen Aerator	0	N/A	1	1.000	1
Bath Aerator	0	N/A	<1	1.000	<1
Water Temperature Card	0	N/A	0	1.000	0
Shower Timer	0	N/A	1	1.000	1
Food Pantry Distribution					
9W LED	4,655	100%	4,655	1.000	4,655
Tier 1 APS	469	100%	469	1.000	469
LED Nightlights	420	100%	420	1.000	420
<i>Community Kits Subtotal</i>	<i>7,262</i>	<i>104%</i>	<i>7,558</i>	<i>1.000</i>	<i>7,558</i>
Total	9,651	103%	9,947	1.000	9,947

Table 78. 2021 Direct Distribution Initiative Electric Demand Savings by Measure

Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
School Kits					
Full School Kit					
9W LED	0.102	100%	0.102	1.000	0.102
Tier 1 APS	0.051	100%	0.051	1.000	0.051
Door Sweep	0.000	N/A	0.000	1.000	0.000
Kitchen Aerator	0.050	100%	0.050	1.000	0.050
Bath Aerator	0.037	100%	0.037	1.000	0.037
Showerhead	0.028	100%	0.028	1.000	0.028
Shower Timer	0.268	100%	0.268	1.000	0.268
Water Temperature Card	0.005	100%	0.005	1.000	0.005
Pipe Insulation	0.012	100%	0.012	1.000	0.012
<i>School Kits Subtotal</i>	<i>0.553</i>	<i>100%</i>	<i>0.553</i>	<i>1.000</i>	<i>0.553</i>
Community Kits					
Credit and Collections Kit					
9W LED	0.031	133%	0.041	1.000	0.041
ENERGY STAR Desk Lamp	0.003	133%	0.004	1.000	0.004
Tier 1 APS	0.025	100%	0.025	1.000	0.025
Kitchen Aerator	0.008	100%	0.008	1.000	0.008
Bath Aerator	0.006	100%	0.006	1.000	0.006
Showerhead	0.006	100%	0.006	1.000	0.006
Water Temperature Card	<0.001	100%	<0.001	1.000	<0.001
Electric Community Kit					
9W LED	0.021	133%	0.028	1.000	0.028
4.5W Globe	0.013	133%	0.017	1.000	0.017

Measure Category	Ex Ante Gross Savings (MW)	Gross Realization Rate	Verified Gross Savings (MW)	NTGR	Verified Net Savings (MW)
8W Reflector	0.010	133%	0.014	1.000	0.014
Tier 1 APS	0.023	100%	0.023	1.000	0.023
Full Community Kit					
9W LED	0.027	133%	0.036	1.000	0.036
Tier 1 APS	0.021	100%	0.021	1.000	0.021
Showerhead	0.005	100%	0.005	1.000	0.005
Kitchen Aerator	0.007	100%	0.007	1.000	0.007
Bath Aerator	0.005	100%	0.005	1.000	0.005
Gas Community Kit					
Showerhead	0.000	N/A	0.000	N/A	0.000
Thermostatic Valve	0.000	N/A	0.000	N/A	0.000
Kitchen Aerator	0.000	N/A	0.000	N/A	0.000
Bath Aerator	0.000	N/A	0.000	N/A	0.000
Water Temperature Card	0.000	N/A	0.000	N/A	0.000
Shower Timer	0.000	N/A	0.000	N/A	0.000
Food Pantry Distribution					
9W LED	0.560	101%	0.564	1.000	0.564
Tier 1 APS	0.053	100%	0.053	1.000	0.053
Night Light	0.000	N/A	0.000	1.000	0.000
<i>Community Kits Subtotal</i>	0.823	104%	0.858	1.000	0.858
Total	1.376	103%	1.415	1.000	1.415

Table 79. 2021 Direct Distribution Initiative Gas Savings by Measure

Measure Category	Ex Ante Gross Savings (Therms)	Gross Realization Rate	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
School Kits					
Full School Kit					
9W LED	0	N/A	0	1.000	0
Tier 1 APS	0	N/A	0	1.000	0
Door Sweep	24,987	100%	24,987	1.000	24,987
Kitchen Aerator	10,336	100%	10,336	1.000	10,336
Bath Aerator	1,217	100%	1,217	1.000	1,217
Showerhead	12,036	100%	12,036	1.000	12,036
Shower Timer	12,208	100%	12,208	1.000	12,208
Water Temperature Card	2,038	100%	2,038	1.000	2,038
Pipe Insulation	4,500	100%	4,500	1.000	4,500
<i>School Kits Subtotal</i>	67,322	100%	67,322	1.000	67,322

Measure Category	Ex Ante Gross Savings (Therms)	Gross Realization Rate	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Community Kits					
Credit and Collections Kit					
9W LED	0	N/A	0	1.000	0
ENERGY STAR Desk Lamp	0	N/A	0	1.000	0
Tier 1 APS	0	N/A	0	1.000	0
Kitchen Aerator	5,998	100%	5,998	1.000	5,998
Bath Aerator	706	100%	706	1.000	706
Showerhead	10,394	100%	10,394	1.000	10,394
Water Temperature Card	546	100%	546	1.000	546
Electric Community Kit					
9W LED	0	N/A	0	1.000	0
4.5W Globe	0	N/A	0	1.000	0
8W Reflector	0	N/A	0	1.000	0
Tier 1 APS	0	N/A	0	1.000	0
Full Community Kit					
9W LED	0	N/A	0	1.000	0
Tier 1 APS	0	N/A	0	1.000	0
Showerhead	11,730	100%	11,730	1.000	11,730
Kitchen Aerator	6,769	100%	6,769	1.000	6,769
Bath Aerator	797	100%	797	1.000	797
Gas Community Kit					
Showerhead	885	100%	885	1.000	885
Thermostatic Valve	279	100%	279	1.000	279
Kitchen Aerator	511	100%	511	1.000	511
Bath Aerator	60	100%	60	1.000	60
Water Temperature Card	46	100%	46	1.000	46
Shower Timer	466	100%	466	1.000	466
Food Pantry Distribution					
9W LED	0	N/A	0	1.000	0
Tier 1 APS	0	N/A	0	1.000	0
LED Nightlights	0	N/A	0	1.000	0
<i>Community Kits Subtotal</i>	<i>39,188</i>	<i>100%</i>	<i>39,188</i>	<i>1.000</i>	<i>39,188</i>
Total	106,510	100%	106,510	1.000	106,510

Overall, the 2021 Direct Distribution Initiative achieved realization rates of 103%, 103%, and 100% for electric energy, electric demand, and gas, respectively. We describe the key drivers of differences between ex ante and verified savings below.

- **Community Kits – LED Lighting (38% of ex ante energy and 37% of ex ante demand):** For the Credit and Collections Kit, the Electric Community Kit, and the Full Community Kit, the implementation team inadvertently applied the IL-TRM V9.0 ISR of 66% for Direct Mail Kits to LED lighting distributed through

the kits, rather than the 88% Community Kits ISR. This error appears to stem from a response to an evaluation recommendation from the 2021 Direct Distribution Interim Impact Analysis Memo; the implementation team (correctly) updated the ISR for Appliance Recycling Kits to 66% but appears to have inadvertently carried over this change to Community Kits as well. The verified analysis applies the 88% ISR, which increases savings.

- **Gas-Only Kits – Secondary Electric Savings:** For the Gas Community Kit and Credit and Collections Kits distributed to gas-only AIC customers, ex ante savings did not claim secondary electric savings. The verified analysis includes secondary effects, which increases savings.

3.7.5 Cumulative Persisting Annual Savings

Table 80 presents CPAS and WAML by channel for the 2021 Direct Distribution Initiative. Here, channel-specific and total verified gross savings for the Initiative are summarized, and CPAS in 2021–2024 and 2030 are presented.³⁰ The WAML for the Initiative is 9.3 years. CPAS and WAML for each channel at a measure level are summarized in Table 80, Table 81, and Table 82.

Table 80. 2021 Direct Distribution Initiative CPAS and WAML

Channel	WAML	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
School Kits	8.9	2,389	1.000	2,389	2,389	2,057	2,057	...	1,425	...	20,794
Community Kits	9.5	7,558	1.000	7,558	7,558	7,554	7,554	...	4,795	...	67,693
2021 CPAS		9,947	1.000	9,947	9,947	9,611	9,611	...	6,221	...	88,488
Expiring 2021 CPAS				0	0	336	0	...	0	...	
Expired 2021 CPAS				0	0	336	336	...	3,726	...	
WAML	9.3										

³⁰ For further details, including achieved CPAS in years not presented in this table, please see Appendix C.

Table 81. 2021 School Kits Channel CPAS and WAML

Measure	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
9W LED	10.0	845	1.000	845	845	845	845	...	667	...	7,917
Tier 1 APS	7.0	454	1.000	454	454	454	454	...	0	...	3,178
Door Sweep	20.0	95	1.000	95	95	95	95	...	95	...	1,906
Kitchen Aerator	10.0	248	1.000	248	248	248	248	...	248	...	2,480
Bath Aerator	10.0	30	1.000	30	30	30	30	...	30	...	297
Showerhead	10.0	284	1.000	284	284	284	284	...	284	...	2,840
Shower Timer	2.0	288	1.000	288	288	0	0	...	0	...	576
Water Temperature Card	2.0	44	1.000	44	44	0	0	...	0	...	88
Pipe Insulation	15.0	101	1.000	101	101	101	101	...	101	...	1,513
2021 CPAS		2,389	1.000	2,389	2,389	2,057	2,057	...	1,425	...	20,794
Expiring 2021 CPAS				0	0	332	0	...	0	...	
Expired 2021 CPAS				0	0	332	332	...	964	...	
WAML	8.9										

Table 82. 2021 Community Kits Channel CPAS and WAML

Measure	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS – Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
9W LED	10.0	5,526	1.000	5,526	5,526	5,526	5,526	...	4,366	...	51,782
ENERGY STAR Desk Lamp	10.0	36	1.000	36	36	36	36	...	25	...	330
Tier 1 APS	7.0	1,079	1.000	1,079	1,079	1,079	1,079	...	0	...	7,556
Kitchen Aerator	10.0	85	1.000	85	85	85	85	...	85	...	846
Bath Aerator	10.0	10	1.000	10	10	10	10	...	10	...	105
Showerhead	10.0	140	1.000	140	140	140	140	...	140	...	1,400
Thermostatic Valve	10.0	0.3	1.000	0.3	0.3	0.3	0.3	...	0.3	...	3.2
Water Temperature Card	2.0	3	1.000	3	3	0	0		0		6
Shower Timer	2.0	1	1.000	1	1	0	0	...	0	...	1
4.5W Globe	10.0	143	1.000	143	143	143	143	...	88	...	1,264
8W Reflector	10.0	115	1.000	115	115	115	115	...	80	...	1,042
LED Nightlights	8.0	420	1.000	420	420	420	420	...	0	...	3,357
2021 CPAS		7,558	1.000	7,558	7,558	7,554	7,554	...	4,795	...	67,693
Expiring 2021 CPAS				0	0	4	0	...	0	...	
Expired 2021 CPAS				0	0	4	4	...	2,763	...	
WAML	9.5										

3.7.6 Conclusions and Recommendations

Based on the results of this evaluation, the evaluation team offers the following key findings and recommendations for the Direct Distribution Initiative moving forward:

- **Key Finding #1:** Most kits are being tracked in an aggregated form, which makes it challenging to ensure that kit savings are being appropriately tracked.
 - Recommendation: While we recognize that implementation challenges may prevent this recommendation from being implemented, the ideal approach for tracking savings from energy efficiency kits is to track all kits and measures as separate line items in alignment with other AIC initiatives.
- **Key Finding #2:** As part of the 2021 evaluation, the implementation team and the evaluation team coordinated on a high-level interim review of kit savings that appear to have significantly improved realization rates from previous years.
 - Recommendation: Continuing this process in future years is advisable and should lead to continued strong realization rates.

3.8 Efficient Choice Tool

3.8.1 Pilot Description

The AIC Efficient Choice Tool (ECT) Pilot, launched in 2020 and implemented by Enervee, is an online platform for comparing and reviewing residential home appliances and consumer electronics.³¹ The ECT is designed to eliminate barriers to adoption of energy-efficient (EE) products and help AIC customers conduct relevant product research, providing a range of information that includes product specifications, pricing, tips for use, reviews, images, and vendor locations. Key factors differentiating the ECT from other sources of product information include:

- **Enervee Score:** A number between 0 and 100 assigned to all models available in the market; the closer to 100, the more EE the particular model.
- **YOUSAVE:** YOUSAVE translates energy savings to dollars. It shows how much money consumers could save in energy costs by choosing a given product over typical similar products in the market.³²
- **CLEARCOST:** CLEARCOST shows the combined implications of a product's cost and energy usage. It uses the current lowest price available for a given product along with its estimated lifetime energy use to present an approximate cumulative cost relative to a representative alternative product with an Enervee Score of 50.³³
- **Aggregation of Retail Offers:** Currently available prices from a wide array of retailers, updated daily, allows shoppers to make comparisons and set price drop alerts for preferred products.

3.8.2 Participation Summary

In this section, we provide a summary of the population of AIC customers who engaged with the ECT and estimates of the number of non-incented EE products purchased by these customers during 2021. We also outline how the evaluation team estimated savings from these energy efficient purchases. For a more complete discussion of our approach to estimating savings, see Appendix A.

While the ECT Pilot does not have a tracked population of “participants” in the same way as other residential initiatives, website traffic indicates that over 33,000 unique active shoppers visited and engaged with the ECT during 2021 (see Table 83).³⁴ To estimate savings for the Pilot, the evaluation team completed a participant survey in two waves to estimate purchase rates for product categories found on the site and the proportions of those purchases that were EE and did not receive an incentive through another AIC initiative. The survey included a verification component to validate EE purchases reported by respondents. We then used implementer-tracked unique active shopper counts based on observed site traffic to scale estimated EE

³¹ <https://amerenillinoisefficientchoice.com/>

³² YOUSAVE estimates are based on assumptions about the number of years a product will be used, the amount of product usage, and the cost of energy (defaulted to the typical residential rate for the AIC service territory). These assumptions can be adjusted by the shopper to customize outputs.

³³ CLEARCOST employs the same assumptions as YOUSAVE and can likewise be adjusted by the shopper to customize outputs. An Enervee Score of 50 indicates that a product is in the 50th percentile of Enervee's market catalogue when ranked based on efficiency.

³⁴ Website traffic in this context refers to all observable site visitation and engagement. Unique active shoppers are defined by Enervee as ECT visitors that conducted at least one of nine specific actions on the site based on observed traffic.

purchase quantities to the population of ECT users.³⁵ Based on participant survey results, we estimate that AIC customers purchased nearly 6,000 energy-efficient products after engaging with the ECT.

The sample of likely ECT users consisted of customers who created a profile or responded to a pop-up survey on the ECT website as well as those who engaged with marketing emails during the evaluation period (i.e., used embedded links directing them to the ECT). Marketing emails included regular outreach to over 200,000 AIC customers as well as more targeted drip campaigns focused on much smaller groups of customers. Despite the ECT website receiving nearly as much traffic in the latter six months of 2021 as it did in the first half of the year, as evidenced by observed counts of unique active shoppers, the Wave 2 sample amounted to just 24% of the sample developed for Wave 1. The smaller Wave 2 sample primarily reflects lower click rates on marketing emails (fewer than half as many marketing email recipients clicked embedded links in the latter six months of 2021 when compared to the first half of the year), as well as the exclusion of 4,732 emails that would have been included had they not already been used for Wave 1 or in prior 2020 research. Table 83 summarizes the Wave 1 and Wave 2 sample frames, samples, and completes from each source along with unique active shopper counts.

Table 83. Survey Sample and Fielding Summary

	Wave 1				Wave 2			
	Sample Frame	Sample	Completes	Unique Active Shoppers	Sample Frame	Sample	Completes	Unique Active Shoppers
Engaged with ECT marketing email ^a	22,350	16,330	546	N/A	8,026	4,057	149	N/A
Responded to ECT pop-up survey	904	679	43		506	114	8	
Created ECT profile	743	576	34		497	126	5	
Total	23,997	17,585	623	18,510	9,029	4,297	162	14,872

^a Counts shown exclude customers who also provided contact info on the ECT website.

3.8.3 Pilot Annual Savings Summary

Based on our analysis of survey responses, an engineering analysis, and implementer-tracked web activity, the evaluation team estimates net savings totaling 430 MWh, 0.06 MW, and 24,209 therms resulting from ECT-influenced purchases of 6,086 EE products over the course of 2021. Table 84 summarizes estimated gross and net savings for the ECT.

Table 84. 2021 Efficient Choice Tool Annual Savings

	Electric Energy Savings (MWh)	Electric Demand Savings (MW)	Gas Savings (Therms)
Verified Gross Savings	630	0.09	45,738
NTGR	0.683	0.650	0.529
Verified Net Savings	430	0.06	24,209

³⁵ User online behaviors are automatically tracked by IP address and this data is used to define the total population of active shoppers. Implementer staff define unique active shoppers as ECT visitors that conduct at least one of nine specific actions on the site.

3.8.4 Pilot Savings Detail

To develop verified savings estimates, we calculated counts of EE products purchased by customers for each product category following engagement with the ECT. We then applied per-unit gross savings developed using IL-TRM V9.0 recommendations and survey-based NTGRs to estimate total gross and net savings for each product category.

Table 85, Table 86, and Table 87 summarize electric energy, electric demand, and gas savings resulting from verified EE purchases for each evaluated measure.

Table 85. 2021 ECT Electric Energy Savings by Measure

Measure Category	Quantity ^a	Total Gross MWh Savings	ECT Influence (NTGR)	Total Net MWh Savings
LED Lighting	1,480	53	0.758	40
Refrigerators	1,285	65	0.650	42
Clothes Washers	839	49	0.471	23
Dehumidifiers	701	72	0.597	43
Air Purifiers	418	66	0.756	50
Advanced Thermostats	257	55	0.628	35
Room Air Conditioners	151	3	0.619	2
Heat Pump Water Heaters ^b	96	229	0.750	172
Electric Clothes Dryers	87	15	0.542	8
Dishwashers	78	1	0.680	1
Advanced Power Strips	64	5	0.733	4
Freezers	44	2	0.682	1
Pool Pumps	10	14	0.650	9
Total	5,510	630	0.683	430

^a Quantity refers to the estimated total number of energy efficient purchases for each corresponding measure group based on results from the participant survey scaled to the population of ECT unique active shoppers based on observed site traffic.

^b Only heat pump water heaters are considered EE and included in electric water heater savings calculations based on IL-TRM V9.0 guidance.

Table 86. 2021 ECT Electric Peak Demand Savings by Measure

Measure Category	Quantity ^a	Total Gross MW Savings	ECT Influence (NTGR)	Total Net MW Savings
LED Lighting	1,480	0.007	0.758	0.005
Refrigerators	1,285	0.010	0.650	0.006
Clothes Washers	839	0.006	0.471	0.003
Dehumidifiers	701	0.016	0.597	0.010
Air Purifiers	418	0.008	0.756	0.006
Advanced Thermostats	257	0.019	0.628	0.012
Room Air Conditioners	151	0.003	0.619	0.002
Heat Pump Water Heaters ^b	96	0.011	0.750	0.008
Electric Clothes Dryers	87	0.002	0.542	0.001
Dishwashers	78	0.000	0.680	0.000

Measure Category	Quantity ^a	Total Gross MW Savings	ECT Influence (NTGR)	Total Net MW Savings
Advanced Power Strips	64	0.001	0.733	0.000
Freezers	44	0.000	0.682	0.000
Pool Pumps	10	0.010	0.650	0.006
Total	5,510	0.093	0.650	0.060

^a Quantity refers to the estimated total number of energy efficient purchases for each corresponding measure group based on results from the participant survey scaled to the population of ECT unique active shoppers based on observed site traffic.

^b Only heat pump water heaters are considered EE and included in electric water heater savings calculations based on IL-TRM V9.0 guidance.

Table 87. 2021 ECT Gas Savings by Measure

Measure Category	Quantity ^a	Total Gross Therm Savings	ECT Influence (NTGR)	Total Net Therm Savings
Clothes Washers	839	2,014	0.471	949
Gas Water Heaters	449	24,154	0.454	10,966
Advanced Thermostats	257	19,517	0.628	12,257
Dishwashers	78	48	0.680	33
Gas Clothes Dryers	7	6	0.800	5
Total	1,630	45,738	0.529	24,209

^a Quantity refers to the estimated total number of energy efficient purchases for each corresponding measure group based on results from the participant survey scaled to the population of ECT unique active shoppers based on observed site traffic.

3.8.5 Cumulative Persisting Annual Savings

Table 88 presents CPAS and WAML for the 2021 ECT Pilot. The measure-specific and total verified gross savings for the Pilot are summarized, and CPAS in 2021-2024 and 2030 are presented.³⁶ The WAML for the Pilot is 13.2 years.

Table 88. 2021 ECT Pilot CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross Savings (MWh)	NTGR	CPAS - Verified Net Savings (MWh)							Lifetime Savings (MWh)
				2021	2022	2023	2024	...	2030	...	
LED Lighting	10.0	53	0.758	40	40	40	40	...	21	...	289
Refrigerators	17.0	65	0.650	42	42	42	42	...	42	...	713
Clothes Washers	14.0	49	0.471	23	23	23	23	...	23	...	324
Dehumidifiers	12.0	72	0.597	43	43	43	43	...	43	...	517
Air Purifiers	9.0	66	0.756	50	50	50	50	...	0	...	452
Advanced Thermostats	11.0	55	0.628	35	35	35	35	...	35	...	382
Room Air Conditioners	12.0	3	0.619	2	2	2	2	...	2	...	22
Heat Pump Water Heaters	15.0	229	0.750	172	172	172	172	...	172	...	2,571
Electric Clothes Dryers	16.0	15	0.542	8	8	8	8	...	8	...	132
Dishwashers	11.0	1	0.680	1	1	1	1	...	1	...	9
Advanced Power Strips	7.0	5	0.733	4	4	4	4	...	0	...	26
Freezers	22.0	2	0.682	1	1	1	1	...	1	...	29
Pool Pumps	7.0	14	0.650	9	9	9	9	...	0	...	63
2021 CPAS		630	0.683	430	430	430	430	...	349	...	5,531
Expiring 2021 CPAS				0	0	0	0	...	50	...	
Expired 2021 CPAS				0	0	0	0	...	81	...	
WAML	13.2										

³⁶ For further detail, including achieved CPAS in years not presented in this table, please see Appendix C.

3.8.6 Conclusions and Recommendations

Based on the results of this evaluation, the evaluation team offers the following key findings and recommendations for the ECT Pilot moving forward:

- **Key Finding #1:** Based on survey results, we estimate that nearly 6,000 EE products were purchased as a direct result of customers engaging with the ECT without the need for incentives through other AIC program offerings over the course of 2021.
- **Key Finding #2:** High NTGR estimates for nearly all product categories indicate that information presented by the ECT played a substantial role in driving purchase decisions among those who purchased EE products after engaging with the site. While the population of ECT users could in theory be more likely to make efficient purchasing decisions, when compared to the general population of shoppers, these results validate the platform as an effective and scalable approach for promoting EE product adoption without incentives.
- **Key Finding #3:** High rates of EE purchases after interacting with the website and very high EE verification rates suggest that the ECT is accomplishing its goal of encouraging customers to make more energy efficient purchasing decisions.
- **Key Finding #4:** Diminishing returns on email marketing outreach efforts may present a challenge for future evaluation efforts and for promotion of the offering itself. Regular email outreach to large numbers of AIC customers resulted in fewer than half as many recipients clicking embedded links in the latter six months of 2021 when compared to the first half of the year. This suggests that many of the most interested customers have already visited the site (and have been included in survey samples to-date).
- **Recommendation:** AIC and the implementation team should continue to carefully monitor ECT site traffic. Downward trends in email marketing click-throughs could be an early indicator of similar shifts in ECT site traffic. Because traffic on the ECT website drives changes in customer purchase behaviors and resulting energy savings, ensuring that site traffic remains strong will be critical to the success of the ECT as an energy efficiency program over time.
- **Recommendation:** AIC, the implementation team, and the evaluation team should work with stakeholders in Illinois to define more prescriptive evaluation methodology to be used for ECT moving forward. The survey-based evaluation approach used in 2020 and 2021 is dependent on availability of contact information for large numbers of likely ECT users to include in survey samples. Downward trends in marketing click-throughs therefore present a risk to the continued evaluability of the ECT using current methods. A more prescriptive approach that relies on less frequently updated survey-based inputs coupled with readily available site traffic information could decrease evaluation costs and evaluability risk while increasing the transparency and predictability of ECT benefits and savings, but all parties will need to agree on the necessary frequency of updates to inputs.

Appendix A. Impact Analysis Methodology

Retail Products Initiative

The evaluation team calculated verified savings for the Retail Products Initiative by applying savings algorithms from the IL-TRM V9.0. The team leveraged initiative tracking data containing a wide range of measure specifications and participant information (e.g., LED wattage, bulb type, heating and cooling equipment type) to inform savings assumptions. For variables outside these parameters, the evaluation team relied on defaults from the IL-TRM V9.0. Table 89 lists the measures in the Retail Products Initiative, their corresponding IL-TRM entries, and whether or not TRM errata applied to the measure in the 2021 evaluation.

Table 89. Retail Products Measures Evaluated

Evaluation Measure Category	IL-TRM Measure	Errata Applied?
Standard LEDs	4.5.4 & 5.5.8	Errata applied
Specialty LEDs	4.5.4 & 5.5.6	No errata present
LED Fixtures	4.5.4 & 5.5.9	No errata present
LED Nightlights	5.5.11	No errata present
Connected LEDs	5.5.12	No errata present
Advanced Power Strips	5.2.1	Errata applied
Advanced Thermostat	5.3.16	Errata applied
Variable-Speed Pool Pump	5.7.1	No errata present
Clothes Washer	5.1.2	No errata present
Electric Clothes Dryer	5.1.10	No errata present
Refrigerator	5.1.6	No errata present
Freezer	5.1.5	No errata present
Dehumidifier	5.1.3	No errata present
Air Purifier	5.1.1	No errata present
Water Dispenser	5.1.11	No errata present
Room Air Conditioner	5.1.7	No errata present
Heat Pump Water Heater	5.4.3	No errata present

Lighting Savings Assumptions

The evaluation team calculated verified gross electric and demand savings for 2021 Retail Products Initiative lighting products using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand savings for LED lighting:

Equation 1. Lighting Energy and Demand Savings Equations

$$kWh = \left[Qty \times LA \times \%Res \times \left[\frac{(Watt_{base} - Watt_{ee})}{1000} \times ISR_{res} \times HOU_{res} \times WHFe_{res} \right] \right] + \left[Qty \times LA \times \%Com \times \left[\frac{(Watt_{base} - Watt_{ee})}{1000} \times ISR_{com} \times HOU_{com} \times WHFe_{com} \right] \right]$$

$$kW = \left[Qty \times LA \times \%Res \times \left[\frac{(Watt_{base} - Watt_{ee})}{1000} \times ISR_{res} \times CF_{res} \times WHFd_{res} \right] \right] + \left[Qty \times LA \times \%Com \times \left[\frac{(Watt_{base} - Watt_{ee})}{1000} \times ISR_{com} \times CF_{com} \times WHFd_{com} \right] \right]$$

where

- Qty = Quantity of bulbs from initiative tracking data
- LA = Leakage adjustment (1 - leakage rate)
- %Res = Portion of bulbs purchased for residential application
- %Com = Portion of bulbs purchased for commercial application
- Watt_base = Energy Independence and Security Act (EISA)-compliant baseline wattage
- Watt_ee = Actual wattage of installed energy-efficient bulb
- ISR = In-service rate
- HOU = Hours of use
- WHFe = Waste heat factor for energy savings
- WHFd = Waste heat factor for demand savings
- CF = Coincidence factor
- res = Residential values
- com = Commercial values

Lighting Leakage and Residential versus Commercial Installation

The nature of an upstream lighting offering prevents implementers from directly verifying that each bulb sold goes to an AIC customer and is installed in a residential setting. The IL-TRM V9.0, therefore, stipulates a 13.1% leakage rate for AIC upstream lighting programs to account for bulbs sold to non-AIC customers. Of the remaining 86.9% of bulbs, the IL-TRM V9.0 stipulates that 97% of standard LEDs, 96% of specialty LEDs, and 100% of LED nightlights should be assumed to be installed in residential applications. The remaining 3% of standard LEDs and 4% of specialty LEDs that are purchased should be assumed to be installed in commercial applications. Given that no LED nightlights are assumed to be installed in commercial applications, commercial parameters in the following sections do not apply for these products.

Lighting Baseline Wattage and EISA Compliance

The baseline wattages in the IL-TRM V9.0 vary depending on the bulb type. Baseline wattages for standard LEDs are based on the lumen output and account for EISA efficiency standards, where appropriate. Table 90 lists the baseline wattages as they were applied to calculate 2021 verified savings for standard LEDs.

Table 90. Baseline Wattages for Standard LEDs

Lumen Range	Base Wattage
250-309	25
310-749	29
750-1,049	43
1,050-1,489	53
1,490-2,600	72
2,601-3,300	150
3,301-5,279	200
5,280-6,209	300

The baseline wattages for directional LEDs vary depending on the directional bulb type and lumen range and account for the Department of Energy (DOE) energy efficiency standards for incandescent reflector lamps and any appropriate exemptions to the standards. Table 91 lists the baseline wattages as they were applied to calculate 2021 verified savings for specialty reflector LEDs.

Table 91. Baseline Wattages for Reflector LEDs

Bulb Type	Lumen Range	Base Wattage
R, ER, BR with medium screw bases w/diameter >2.25" (*see exceptions below)	420-472	40
	473-524	45
	525-714	50
	715-937	65
	938-1,259	75
	1,260-1,399	90
	1,400-1,739	100
	1,740-2,174	120
	2,175-2,624	150
	2,625-2,999	175
*R, BR, and ER with medium screw bases w/diameter ≤2.25"	3,000-4,500	200
	400-449	40
	450-499	45
	500-649	50
*ER30, BR30, BR40, or ER40	650-1,199	65
	400-449	40
	450-499	45
BR30, BR40, or ER40	500-649	50
	650-1419	65
*R20	400-449	40
	450-719	45
*All reflector lamps below lumen ranges specified above	200-299	20
	300-399	30

For PAR and MR directional products, we used bulb diameter (D), center beam candle power (CBCP), and beam angle (BA) to calculate baseline wattage using the following equation:

Equation 2. Baseline Wattage for PAR and MR Reflector LEDs

$$375.1-4.355(D)-\sqrt{227,800-937.9(D)-0.9903(D^2)-1479(BA)-12.02(D*BA)+14.69(BA^2)-16,720*\ln(CBCP)}$$

Table 92 lists the baseline wattages as they were applied to calculate 2021 verified savings for specialty non-reflector LEDs, such as 3-way, globe, and candelabra bulbs.

Table 92. Baseline Wattages for Specialty Non-Reflector LEDs

Bulb Type	Lumen Range	Base Wattage
3-way	250-449	25
	450-799	40
	800-1,099	60
	1,100-1,599	75

Bulb Type	Lumen Range	Base Wattage
	1,600-1,999	100
	2,000-2,549	125
	2,550-2,999	150
Globe (medium and intermediate bases less than 750 lumens)	90-179	10
	180-249	15
	250-349	25
	350-749	40
Decorative (Shapes B, BA, C, CA, DC, F, G, medium and intermediate bases less than 750 lumens)	70-89	10
	90-149	15
	150-299	25
	300-749	40
Globe (candelabra bases less than 1,050 lumens)	90-179	10
	180-249	15
	250-349	25
	350-499	40
	500-1,049	60
Decorative (Shapes B, BA, C, CA, DC, F, G, candelabra bases less than 1,050 lumens)	70-89	10
	90-149	15
	150-299	25
	300-499	40
	500-1,049	60

For LED nightlights, the baseline wattage is assumed to be 7 unless actual wattages are available.

Lighting In-Service Rate and Carryover Savings

Per the IL-TRM V9.0, the first-year ISR varies by bulb type and installation location, and 98% of all bulbs are projected to be installed within three years of purchase; the remaining 2% are never installed. Using this trajectory, savings are claimed in the year that bulbs are installed. Therefore, the 2021 Retail Products Initiative claims savings from first-year installations of 2021 bulb sales, as well as carryover savings from bulbs sold in previous years but not installed until 2021. Likewise, savings associated with bulbs purchased in 2021 but not installed until the second or third year after purchase will be claimed as carryover savings the year they get installed. One hundred percent of residential LED fixtures are assumed to be installed in the year purchased. Table 93 provides an installation trajectory by bulb type and installation location.

Table 93. IL-TRM V9.0 LED Lighting ISR Trajectory

Install Location	Bulb Type	First Year	Second Year	Third Year	Cumulative
Residential	Standard LEDs	76.0%	11.9%	10.1%	98.0%
	Specialty LEDs	81.5%	8.9%	7.6%	98.0%
	LED fixtures	100.0%	0.0%	0.0%	100.0%
	LED nightlights	84.0%	7.6%	6.4%	98.0%
Commercial	All	82.5%	8.4%	7.1%	98.0%

Lighting Hours of Use

The IL-TRM V9.0 provides different residential hours-of-use (HOU) assumptions for different bulb types depending on where they get installed. Table 94 provides the applied HOU assumptions.

Table 94. Illinois Statewide TRM Version 9.0 Lighting HOU Assumptions

Install Location	Bulb Type	HOU
Residential	Standard LEDs	1,159
	Specialty LEDs	1,020
	Indoor and downlight fixtures	926
	Task/under cabinet fixtures	730
	Outdoor fixtures	2,475
	LED nightlights	4,380
Commercial	LED bulbs	3,612
	LED fixtures	3,379

Lighting Waste Heat Factor

The IL-TRM V9.0 provides different waste heat factor values for energy and demand savings, depending on installation location. Table 95 outlines waste heat factor assumptions by savings type and installation location.

Table 95. IL-TRM V9.0 Lighting Waste Heat Factor Assumptions

Install Location	Bulb Type	Waste Heat Factor (Energy)	Waste Heat Factor (Demand)
Residential	Standard LEDs	1.051	1.093
	Specialty LEDs	1.046	1.083
	LED fixtures	1.051	1.093
	LED Nightlights	1.054	1.098
Commercial	All	1.09	1.36

Lighting Coincidence Factor

The IL-TRM V9.0 provides peak CFs based on installation location and bulb type. Table 96 provides the applied CF assumptions.

Table 96. IL-TRM V9.0 Lighting Coincidence Factor Assumptions

Install Location	Bulb Type	Coincidence Factor
Residential	Standard LEDs	0.135
	Specialty LEDs	0.117
	LED fixtures	0.127
	LED nightlights	0.000
Commercial	All	0.580

Connected LEDs

The evaluation team calculated verified gross electric and demand savings for 2021 Retail Products Initiative connected LEDs using the initiative tracking database and applying the following algorithms

and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand savings for connected LEDs:

Equation 3. Connected LED Energy and Demand Savings Equations

$$\Delta kWh = (((WattsEE/1000) * HOU * SVGe * WHFe) - StandbykWh) * ISR * (1 - Leakage) * Qty$$

$$\Delta kW = (WattsEE/1000) * SVGd * WHFd * ISR * (1 - Leakage) * CF * Qty$$

where

- Qty = Quantity of bulbs from initiative tracking data
- Leakage = Leakage rate
- Watt_ee = Actual wattage of installed energy-efficient bulb
- ISR = In-service rate
- HOU = Hours of use
- WHFe = Waste heat factor for energy savings
- WHFd = Waste heat factor for demand savings
- CF = Coincidence factor
- StandbykWh = Standby power draw of the controlled lamp = 0.35 kWh
- SVGe = Percentage of annual lighting energy saved by lighting control = 0.30
- SVGd = Percentage of annual lighting demand saved by lighting control = 0.30

Advanced Power Strip Savings Assumptions

The evaluation team calculated verified gross electric and demand savings for 2021 Retail Products Initiative APS using the initiative tracking database and applying the following algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand savings for APS:

Equation 4. Advanced Power Strip Energy and Demand Savings Equations

$$\Delta kWh = Qty \times kWh_{per} \times ISR$$

$$\Delta kW = \Delta kWh / HOU \times CF$$

where

- Qty = Quantity of APS from initiative tracking data
- kWh_{per} = Per-unit deemed energy savings = 56.5 (5-plug); 103.0 (7-plug)
- ISR = In-service rate = 100%
- HOU = Hours of use = 7,129
- CF = Coincidence factor = 0.80

Advanced Thermostat Savings Assumptions

The evaluation team calculated verified gross electric and gas savings for 2021 Retail Products Initiative advanced thermostats using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy, electric demand, and gas savings for advanced thermostats:

Equation 5. Advanced Thermostat Energy and Demand Savings Equation

$$kWh = kWh_{Cool} + kWh_{Heat}$$

$$\Delta kWh_{Heat} = Qty \times \%Elec_{Heat} \times ElecUse_{Heat} \times Reduct_{Heat} \times HF \times ISR + (Qty \times \Delta Therms \times Furnace_e \times 29.3)$$

$$\Delta kWh_{Cool} = Qty \times Ctrl_{Cool} \times ((FLH_{Cool} \times Capacity_{Cool} \times 1/SEER)/1000) \times Reduct_{Cool} \times ISR$$

$$\Delta kW = Qty \times \%AC \times (1 \div EER)/1000 \times Capacity_{Cool} \times Reduct_{Cool} \times CF \times ISR$$

$$\Delta Therms = Qty \times Gas_{Heat} \times GasUse_{Heat} \times HF \times Reduct_{Heat} \times ISR$$

where

- Qty = Quantity of homes with advanced thermostats from tracking data
- %Elec_{Heat} = Portion of heating assumed to be electric = 100% if electric space heating fuel, 0% if gas space heating fuel, 3% if unknown
- ElecUse_{Heat} = Estimated annual household heating consumption for electrically heated homes applied by heating type and climate zone (see Table 97)

Table 97. Electric Heating Consumption (kWh) by Climate Zone

Climate Zone	Electric Resistance	Heat Pump
1 (Rockford)	21,748	12,793
2 (Chicago)	20,778	12,222
3 (Springfield)	17,794	10,467
4 (Belleville)	13,726	8,074
5 (Marion)	13,970	8,218
Weighted Average	21,749	11,617

- Reduct_{Heat} = Reduction in heating energy consumption = 7.0% if unknown previous thermostat
- HF = Household factor to adjust heating consumption for multifamily = 96.5% if unknown
- ISR = Percentage of thermostats installed and effectively programmed = 100% for heating, 90% for cooling
- Ctrl_{Cool} = Portion of cooling controlled by thermostat = 100% if central cooling or heat pump, 82.5% if unknown
- FLH_{Cool} = Full load cooling hours applied by home type and climate zone (assume 90% SF and 10% MF if home type unknown; see Table 98)

Table 98. Full Load Cooling Hours by Climate Zone

Climate Zone	FLH (Single Family)	FLH (Multifamily)	FLH (Blended)
1 (Rockford)	512	467	507.5
2 (Chicago)	570	506	563.8
3 (Springfield)	730	663	723.3
4 (Belleville)	1,035	940	1025.5
5 (Marion)	903	820	894.7
Weighted Average	629	564	N/A

- Capacity_{Cool} = Cooling capacity of air conditioner by home type = 31,864 BTU/hour if home type unknown
- SEER = Cooling equipment seasonal energy efficiency ratio = 9.3 if unknown
- Reduct_{Cool} = Reduction in cooling energy consumption due to installing an advanced thermostat = 8.0%
- EER = Cooling efficiency of CAC or heat pump = 7.5 if unknown
- CF = Summer system peak coincidence factor = 0.34
- Gas_{Heat} = 100% if gas space heating fuel, 0% if electric space heating fuel, 97% if unknown
- GasUse_{Heat} = Estimated annual household heating consumption for gas-heated homes applied by climate zone (see Table 99)

Table 99. Gas Heating Consumption by Climate Zone

Climate Zone	Therms
1 (Rockford)	1,052
2 (Chicago)	1,005
3 (Springfield)	861
4 (Belleville)	664
5 (Marion)	676
Average	955

- Furnace_e = Furnace fan energy consumption as a percentage of annual fuel consumption = 3.14%

Advanced thermostat tracking data included detailed information on heating fuel and heating and cooling systems for most participants. Climate zones were assigned based on customer zip code from the initiative tracking data. Per the IL-TRM V9.0, additional savings cannot be claimed for a second advanced thermostat installed in a single location.

Dehumidifier Savings Assumptions

The evaluation team calculated verified gross electric and demand savings for 2021 Retail Products Initiative dehumidifiers using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand savings for dehumidifiers:

Equation 6. Dehumidifier Energy and Demand Savings Equation

$$\Delta kWh = \left(\left(\left(Capacity * 0.473 \right) / 24 \right) * Hours \right) * \left(1 / (L/kWh_Base) - 1 / (L/kWh_Eff) \right)$$

$$\Delta kW = \Delta kWh / Hours * CF$$

where

- Capacity = Average capacity of the unit (pints/day) from tracking data
- Hours = Annual operating hours = 1,632
- L/kWh = Defined as below:

Capacity (pints/day)	Federal Standard (L/kWh_Base)	ENERGY STAR (L/kWh_Eff)
<25	1.30	1.57

Capacity (pints/day)	Federal Standard (L/kWh_Base)	ENERGY STAR (L/kWh_Eff)
25 and ≤50	1.60	1.80
>50	2.80	3.30
Unknown	2.80	3.30

CF = Summer coincidence factor = 0.37

Air Purifier Savings Assumptions

The evaluation team calculated verified gross electric and demand savings for 2021 Retail Products Initiative air purifiers using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand savings for air purifiers:

Equation 7. Air Purifier Energy and Demand Savings Equation

$$\Delta kWh = \text{Annual Electrical Savings}$$

$$\Delta kW = \Delta kWh / \text{Hours} * CF$$

where

Hours = Average annual operating hours = 5,844

CF = Summer coincidence factor = 0.667

kWh_{Base} and kWh_{Eff} are defined as below:

Clean Air Delivery Rate (CADR)	Electrical Savings
30-100	39
101-150	395
151-200	173
Over 200	328

Clothes Washer Savings Assumptions

The evaluation team calculated verified gross electric and gas savings for the 2021 Retail Products Initiative clothes washers using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy, electric demand, and gas savings for clothes washers:

Equation 8. Clothes Washer Energy and Demand Savings Equations

$$\Delta kWh = \left[Capacity \times \frac{1}{IMEF_{base}} \times Ncycles \times (\%CW_{base} + (\%DHW_{base} \times \%Elec_{DHW})) + (\%Dryer_{base} \times \%Elec_{Dryer}) \right] - \left[Capacity \times \frac{1}{IMEF_{ee}} \times Ncycles \times (\%CW_{ee} + (\%DHW_{ee} \times \%Elec_{DHW})) + (\%Dryer_{ee} \times \%Elec_{Dryer}) \right]$$

$$\Delta kW = \Delta kWh / \text{Hours} * CF$$

$$\Delta Therms = \left[\left(Capacity \times \frac{1}{IMEF_{base}} \times Ncycles \times \left((\%DHW_{base} \times \%Gas_{DHW} \times R_{eff}) + (\%Dryer_{base} \times \%Gas_{Dryer}) \right) \right) - \left(Capacity \times \frac{1}{IMEF_{ee}} \times Ncycles \times \left((\%DHW_{ee} \times \%Gas_{DHW} \times R_{eff}) + (\%Dryer_{ee} \times \%Gas_{Dryer}) \right) \right) \right] \times kWh_{therm}$$

where

Capacity	= Clothes washer capacity from tracking data (cubic feet)
IMEF	= Integrated Modified Energy Factor = 1.75 for baseline, 2.23 for ENERGY STAR
Ncycles	= Number of annual cycles = 264
%CW	= % of energy consumption from clothes washer = 8.1% for baseline, 5.8% for ENERGY STAR
%DHW	= % of energy consumption from water heating = 26.5% for baseline, 31.2% for ENERGY STAR
%Dryer	= % of energy consumption from dryer = 65.4% for baseline, 63.0% for ENERGY STAR
%Elec _{DHW}	= % of water heaters with electric heaters = 32% for unknown
%Elec _{Dryer}	= % of dryers with electric heaters = 100% for electric dryers, 62% for unknown
Hours	= Annual hours = 264
CF	= Summer coincidence factor = 0.038
R _{eff}	= Recovery efficiency factor = 1.26
%Gas _{DHW}	= 62%
%Gas _{Dryer}	= 0%
kWh _{therm}	= kWh to therms conversion factor = 0.03412

Electric Clothes Dryer Savings Assumptions

The evaluation team calculated verified gross electric and demand savings for 2021 Retail Products Initiative electric clothes dryers using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand savings for electric clothes dryers:

Equation 9. Electric Clothes Dryer Energy and Demand Savings Equations

$$\Delta kWh = \left(\frac{Load}{CEF_{base}} - \frac{Load}{CEF_{ee}} \right) \times Ncycles \times \%Elec$$

$$\Delta kW = \Delta kWh / HOU \times CF$$

where

Load	= Drum capacity (standard = 8.45, compact = 3)
CEF	= Combined Energy Factor = 3.11 lbs/kWh for baseline standard vented electric, 3.93 lbs/kWh for ENERGY STAR standard vented electric
Ncycles	= 283 if actual is unknown
%Elec	= Portion of usage assumed to be electric = 100%
HOU	= Annual hours = 283

CF = Summer peak coincidence factor = 3.8%

Refrigerator Savings Assumptions

The evaluation team calculated verified gross electric and demand savings for the 2021 Retail Products Initiative refrigerators using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand savings for refrigerators:

Equation 10. Refrigerator Energy and Demand Savings Equations

$$\Delta kWh = Qty \times UEC_{base} - UEC_{ee}$$

$$\Delta kW = (\Delta kWh/Hours) \times TAF \times LSAF$$

where

- Qty = Quantity of refrigerators from tracking data
- AV = Adjusted volume = (Refrigerator volume * (14.75 / 21.51)) + (Freezer volume * (6.76 / 21.51) * 1.63)
- UEC_{base} = Federal baseline unit energy consumption (see Table 100)
- UEC_{ee} = ENERGY STAR unit energy consumption (see Table 100)

Table 100. Refrigerator Energy Usage Specifications

Product Category	Assumptions after September 2014	
	Federal Baseline UEC in kWh/year	ENERGY STAR UEC in kWh/year
Refrigerator-Freezers—automatic defrost with top-mounted freezer without through-the-door ice service, and all-refrigerators—automatic defrost	8.07AV + 233.7	7.26 * AV + 210.3
Refrigerator-Freezers—automatic defrost with side-mounted freezer without through-the-door ice service	8.51AV + 297.8	7.66 * AV + 268.0
Refrigerator-Freezers—automatic defrost with bottom-mounted freezer without through-the-door ice service	8.85AV + 317.0	7.97 * AV + 285.3
Refrigerator-freezer—automatic defrost with bottom-mounted freezer with through-the-door ice service	9.25AV + 475.4	8.33 * AV + 436.3
Refrigerator-Freezers—automatic defrost with top-mounted freezer with through-the-door ice service	8.40AV + 385.4	7.56 * AV + 355.3
Refrigerator-Freezers—automatic defrost with side-mounted freezer with through-the-door ice service	8.54AV + 432.8	7.69 * AV + 397.9

- TAF = Temperature adjustment factor = 1.25
- LSAF = Load shape adjustment factor = 1.057
- Hours = Annual hours of use = 8,766

Freezer Savings Assumptions

The evaluation team calculated verified gross electric and demand savings for the 2021 Retail Products Initiative freezers using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand for freezers:

Equation 11. Freezer Energy and Demand Savings Equations

$$\Delta kWh = Qty \times UEC_{base} - UEC_{ee}$$

$$\Delta kW = (\Delta kWh / Hours) \times CF$$

where

Qty	= Quantity of freezers from tracking data
AV	= Adjusted volume = 1.73 * actual volume (cubic ft)
UEC _{base}	= Federal baseline unit energy consumption = 8.62 * AV + 228.3 for upright freezers with automatic defrost
UEC _{ee}	= ENERGY STAR unit energy consumption = 7.76 * AV + 205.5 for upright freezers with automatic defrost
Hours	= Full load hours per year = 5,890
CF	= Summer peak coincidence factor

Variable-Speed Pool Pump Savings Assumptions

The evaluation team calculated verified gross electric and demand savings for 2021 Retail Products Initiative variable-speed pool pumps using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand savings for variable-speed pool pumps:

Equation 12. Variable Speed Pool Pump Energy and Demand Savings Equations

$$\Delta kWh = Qty \times \frac{\left[\left(\frac{(HOU_{base} \times GPM_{base} \times 60)}{EF_{base}} \right) - \left(\frac{(HOU_{vsH} \times GPM_{vsH} \times 60 + HOU_{vsL} \times GPM_{vsL} \times 60)}{EF_{VS}} \right) \right]}{1000 \times Days}$$

$$\Delta kW = \left[\left(\frac{kWh_{day_{base}}}{Days} \right) / HOU_{base} \right] - \left[\left(\frac{kWh_{day_{vsH}} + kWh_{day_{vsL}}}{Days} \right) / (HOU_{vsH} + HOU_{vsL}) \right] \times CF$$

where

Qty	= Quantity of variable-speed pool pumps from tracking data
HOU	= Daily runtime/daily hours of use = 11.4 for single-speed in-ground, 2 for variable-speed in-ground at high speed, 16 for variable-speed in-ground at low speed
GPM	= Gallons per minute = 64.4 for single-speed in-ground, 50 for variable-speed in-ground at high speed, 30.6 for variable-speed in-ground at low speed

- EF = Energy factor = 2.1 for single-speed, 6.6 for in-ground variable speed ENERGY STAR Version 2.0, 11.05 for in-ground variable speed ENERGY STAR Version 3.0
- Days = Days per year that swimming pool is operational = 125
- CF = Coincidence factor = 0.831
- kWh_day = Daily energy consumption
- base = Single-speed pump
- vsH = Variable-speed pump at high speed
- vsL = Variable-speed pump at low speed

Water Dispenser Savings Assumptions

The evaluation team calculated verified gross electric and demand savings for 2021 Retail Products Initiative water dispensers using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand savings for water dispensers:

Equation 13. Water Dispenser Energy and Demand Savings Equations

$$\Delta kWh = (kWh_{Base} - kWh_{Eff}) * Days$$

$$\Delta kW = \Delta kWh / Hours * CF$$

where

- kWh_Base = Daily energy use for baseline measure
- kWh_Eff = Daily energy use for ENERGY STAR measure

Type	kWh_Base	kWh_Eff
On Demand	0.330	0.170
Storage	1.090	0.747

- Days = Days per year = 365.25
- Hours = Average annual operating hours = 5844
- CF = Summer coincidence factor = 0.667

Vent Fan Savings Assumptions

The evaluation team calculated verified gross electric and demand savings for 2021 Retail Products Initiative bathroom vent fans using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand savings for bathroom vent fans:

$$\Delta kWh = CFM * (1/n_{Base} - 1/n_{Eff}/1000) * Hours$$

$$\Delta kW = CFM * (1/n_{Base} - 1/n_{Eff}/1000) * CF$$

where

- CFM = Nominal capacity from tracking data or lookup
- n_Base = Average efficacy for baseline fan (CFM/watts)
- n_Eff = Average efficacy for efficient fan (CFM/watts)

Standard Usage CFM	Baseline Efficacy (n_Base)	ENERGY STAR Efficacy (n_Eff)
10-89	1.7	4.9
90-200	2.6	5.6
Unknown	2.2	5.3

Hours = Annual run hours = 1,089 for standard usage
 CF = Coincidence factor = 0.135 for standard usage

Room Air Conditioners

The evaluation team calculated verified gross electric and demand savings for 2021 Retail Products Initiative room air conditioners using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations from the IL-TRM V9.0 to estimate electric energy and electric demand savings for room air conditioners:

Equation 14. Room Air Conditioners Energy and Demand Savings Equations

$$\Delta kWh == (FLH_{RoomAC} * Btu/H * (1/CEER_{base} - 1/CEER_{ee}))/1000$$

$$\Delta kW = Btu/H * ((1/(CEER_{base} * 1.01) - 1/(CEER_{ee} * 1.01)))/1000 * CF$$

where:

FLH_{RoomAC} = Full Load Hours of room air conditioning unit; see Table 101.

Table 101. Full Load Hours by Climate Zone

Climate Zone	FLH
1 (Rockford)	220
2 (Chicago)	210
3 (Springfield)	319
4 (Belleville)	428
5 (Marion)	374
Weighted Average ³⁷	248

Btu/H = Size of rebated unit, actual; if unknown, assume 8,500 Btu/hr
 EER_{exist} = Efficiency of existing unit, actual if unknown, assume 7.7
 1.01 = Factor to convert EER to CEER (CEER includes standby and off power consumption)
 CEER_{base} = Combined Energy Efficiency Ratio of baseline unit
 CEER_{ee} = Combined Energy Efficiency Ratio of ENERGY STAR unit
 CF = Summer Peak Coincidence Factor = 0.3

Heat Pump Water Heaters

The evaluation team calculated verified gross electric and demand savings for 2021 Retail Products Initiative heat pump water heaters using the initiative tracking database and applying algorithms and savings assumptions based on the IL-TRM V9.0. The evaluation team used the following equations

³⁷ Weighted based on number of residential occupied housing units in each zone.

from the IL-TRM V9.0 to estimate electric energy and electric demand savings for heat pump water heaters:

Equation 15. Heat Pump Water Heaters Energy and Demand Savings Equations

$$\Delta kWh = (((1/UEF_{base} - 1/UEF_{efficient}) * GPD * Household * 365.25 * \gamma_{Water} * (T_{out} - T_{in}) * 1.0) / 3412) + kWh_{cooling} - kWh_{heating} * Qty$$

$$\Delta kW = \Delta kWh / Hours * CF$$

$$\Delta kWh_{heating} = ((((((GPD * Household * 365.25 * \gamma_{Water} * (T_{out} - T_{in}) * 1.0) / 3412) - ((1/UEF_{NEW} * GPD * Household * 365.25 * \gamma_{Water} * (T_{out} - T_{in}) * 1.0) / 3412)) * LF * 49\%) / COP_{heat}) * (1 - \%NaturalGas)$$

$$\Delta kWh_{cooling} = ((((((GPD * Household * 365.25 * \gamma_{Water} * (T_{out} - T_{in}) * 1.0) / 3412) - ((1/UEF_{NEW} * GPD * Household * 365.25 * \gamma_{Water} * (T_{out} - T_{in}) * 1.0) / 3412)) * LF * 27\%) / COP_{cool}) * LM$$

where

- Qty = Quantity of heat pump water heaters from tracking data
- UEFbase = Uniform Energy Factor of standard electric water heater (for ≤ 55 gallons: 0.9307 – (0.0002 * rated volume in gallons); for > 55 gallons: 0.9299)
- UEFefficient = Uniform Energy Factor of heat pump water heater
- GPD = Gallons per day of hot water = 17.6
- Household = Average number of people per household (single family = 2.56)
- γWater = Specific weight of water = 8.33
- Tout = Tank temperature = 125 degrees F
- Tin = Incoming water temperature from well or municipal system
- kwh_heating = Heating cost from conversion of heat in home to water heat
- kwh_cooling = Variable-speed pump at low speed
- LF = Location Factor = 1.0 in conditioned space, 0.5 in unknown, 0.0 in unconditioned space
- COP_{cool} = COP of central air conditional: actual; if unknown assume 2.8
- COP_{heat} = COP of electric heating system: actual; if not available use:

System Type	Age of Equipment	HSPF Estimate	COP _{heat}
Heat Pump	Before 2006	6.8	1.7
	After 2006–2014	7.7	1.92
	2015 on	8.2	2.04
Resistance	N/A	N/A	1.00
Unknown	N/A	N/A	1.28

LM = Latent multiplier to account for latent cooling demand

Measure Lives and Cumulative Persisting Annual Savings

The evaluation team assigned the following EUL assumptions recommended by the IL-TRM V9.0 to calculate CPAS:

Table 102. IL-TRM V9.0 Recommended Effective Useful Life Assumptions

Measure	EUL (Years)
LED Bulbs (residential application)	10.0
LED Fixtures (residential application)	15.0
Standard LEDs (commercial application)	5.5
Reflector LEDs (commercial application)	6.9
Decorative LEDs (commercial application)	4.7
Connected LEDs (commercial application)	5.5
LED Fixtures (commercial application)	14.8
LED Nightlights	8.0
Advanced Power Strips	7.0
Advanced Thermostats	11.0
Dehumidifiers	12.0
Air Purifiers	9.0
Clothes Washers	14.0
Refrigerators	17.0
Electric Clothes Dryers	16.0
Bathroom Vent Fans	19.0
Water Dispensers	10.0
Room Air Conditioners	12.0
Freezers	22.0
Pool Pumps	7.0
Heat Pump Water Heaters	15

Net Impact Methodology

The evaluation team applied SAG-approved 2021 NTGRs to verified gross savings to calculate verified net savings. Table 103 outlines the SAG-approved NTGR values applied to verified gross savings to calculate verified net savings.

Table 103. SAG-Approved Retail Products Initiative NTGRs

Measure	Market Rate NTGR	IQ NTGR
LED Lighting	0.690	1.0
Tier 1 Advanced Power Strips	1.000	1.0
Pool Pumps	0.860	1.0
Advanced Thermostats (Heating)	0.900	1.0
Advanced Thermostats (Cooling)	0.800	1.0
Refrigerators	0.650	1.0
Freezers	0.630	1.0
Clothes Washers	0.630	1.0
Electric Clothes Dryers	0.670	1.0
Air Purifiers	0.760	1.0
Dehumidifiers	0.670	1.0
Bathroom Vent Fans	0.660	1.0

Measure	Market Rate NTGR	IQ NTGR
Water Dispensers	0.670	1.0
Heat Pump Water Heaters	0.800	1.0
Room Air Conditioners	0.800	1.0

Table 104 outlines IQ allocation approaches by delivery channel for the 2021 Retail Products Initiative. This captures all anticipated 2021 delivery channels based on available implementation planning and discussion with the implementation team.

Table 104. Summary of 2021 IQ Classification Approaches by Measure and Delivery Channel

Downstream or Instant Rebates	POS (Thrift Stores)	POS (All Other Retailers)
ZIP code-specific allocations used to estimate the portion of sales to customers in each ZIP code to be treated as IQ	Approved list of retailers exempted from RSAT approach and treated as 100% IQ	RSAT allocations used to estimate the portion of sales from each store location to be treated as IQ

Income Qualified Initiative

Gross Impact Methodology

The evaluation team calculated verified savings for the IQ Initiative by applying savings algorithms from the IL-TRM V9.0. The team leveraged initiative tracking data such as primary heating and cooling type, the delivery mechanism (e.g., direct install, leave behind), LED wattage, LED lamp type, project location (e.g., for weather-dependent variables), and installed measure location (e.g., for faucet aerators) to inform savings assumptions. For variables outside these parameters, the evaluation team relied on defaults from the IL-TRM V9.0. Table 105 lists the measures in the IQ Initiative, their corresponding IL-TRM entry, and whether or not TRM errata applied to the measure in the 2021 evaluation.

Table 105. Income Qualified Measures Evaluated

Evaluation Measure Category	IL-TRM Measure	Errata Applied?
ENERGY STAR Room Air Conditioner	5.1.7	No errata present for this measure
Advanced Power Strip - Tier 1	5.2.1	Errata applied
ASHP	5.3.1	No errata present for this measure
CAC	5.3.3	No errata present for this measure
Duct Insulation and Sealing	5.3.4	No errata present for this measure
Furnace Blower Motor	5.3.5	No errata present for this measure
Gas High-Efficiency Boiler	5.3.6	No errata present for this measure
Gas High-Efficiency Furnace	5.3.7	No errata present for this measure
High-Efficiency Bathroom Exhaust Fan	5.3.9	No errata present for this measure
Advanced Thermostats	5.3.16	Errata applied
Domestic Hot Water Pipe Insulation	5.4.1	No errata present for this measure
Heat Pump Water Heaters	5.4.3	No errata present for this measure
Low-Flow Faucet Aerators	5.4.4	No errata present for this measure
Low-Flow Showerheads	5.4.5	No errata present for this measure

Evaluation Measure Category	IL-TRM Measure	Errata Applied?
Thermostatic Restrictor Shower Valve	5.4.8	No errata present for this measure
Shower Timer	5.4.9	No errata present for this measure
LED Specialty Lamps	5.5.6	No errata present for this measure
LED Screw Based Omnidirectional Bulbs	5.5.8	Errata applied
Air Sealing	5.6.1	Errata applied
Basement Sidewall Insulation	5.6.2	No errata present for this measure
Floor Insulation Above Crawlspace	5.6.3	No errata present for this measure
Wall Insulation	5.6.4	No errata present for this measure
Ceiling/Attic Insulation	5.6.5	Errata applied
Rim/Band Joist Insulation	5.6.6	No errata present for this measure

Measure Lives and Cumulative Persisting Annual Savings

The evaluation team applied measure lives and baseline shifts from the IL-TRM V9.0 to calculate CPAS.

Net Impact Methodology

The evaluation team applied SAG-approved 2021 NTGRs to verified gross savings to calculate verified net savings. Table 106 outlines the SAG-approved NTGR values applied to verified gross savings to calculate verified net savings. Note that the SAG-approved NTGRs for the Income Qualified Initiative are 1.00 for all measures. Therefore, gross savings are equivalent to net savings.

Table 106. SAG-Approved Income Qualified NTGRs

Measure	Electric NTGR	Gas NTGR
All measures	1.000	1.000

Multifamily Initiatives

Gross Impact Methodology

The evaluation team calculated verified savings for the Multifamily Initiatives by applying savings algorithms from the IL-TRM V9.0. The team leveraged initiative tracking data such as primary heating and cooling type, water heating fuel type, cooling and heating efficiencies and capacities, delivery mechanism (e.g., direct install, leave behind), LED wattage, LED lamp type, project location (e.g., for weather-dependent variables), and installed measure location (e.g., for faucet aerators and LEDs) to inform savings assumptions. For variables outside these parameters, the evaluation team relied on defaults from the IL-TRM V9.0. Table 107 lists the measures in the Multifamily Initiatives, their corresponding IL-TRM V9.0 entries, and whether IL-TRM V9.0 errata applied to the measure in the 2021 evaluation.

Table 107. Multifamily Initiatives Measures Evaluated

Evaluation Measure Category	IL-TRM Measure	Errata Applied?
Standard LED (Common Area)	4.5.4	No errata present for this measure
Specialty LED (Common Area)	4.5.4	No errata present for this measure

Evaluation Measure Category	IL-TRM Measure	Errata Applied?
Room Air Conditioner ER	5.1.7	No errata present for this measure
APS – Tier 1	5.2.1	Errata applied
Ductless Heat Pump	5.3.12	No errata present for this measure
Advanced Thermostat	5.3.16	Errata applied
Pipe Insulation	5.4.1	No errata present for this measure
Faucet Aerator	5.4.4	No errata present for this measure
Showerhead	5.4.5	No errata present for this measure
Restrictor Shower Valve	5.4.8	No errata present for this measure
Specialty LED	5.5.6	No errata present for this measure
Standard LED	5.5.8	Errata applied
Air Sealing	5.6.1	Errata applied
Door Sweep	5.6.1	Errata applied
Wall Plate Gasket	5.6.1	Errata applied
Attic Insulation	5.6.5	Errata applied

Measure Lives and Cumulative Persisting Annual Savings

The evaluation team applied measure lives and mid-life adjustments as provided in the IL-TRM V9.0 to determine CPAS for the Multifamily Initiatives.

Net Impact Methodology

The evaluation team applied SAG-approved 2021 NTGRs to verified gross savings to calculate verified net savings. Table 108 outlines the SAG-approved NTGR values applied to verified gross savings to calculate verified net savings.

Table 108. SAG-Approved Multifamily Initiatives NTGRs

Measure	Electric NTGR	Gas NTGR
Public Housing		
All measures	1.000	1.000
Income Qualified – Multifamily		
All measures	1.000	1.000
Multifamily (Market Rate)		
Advanced Power Strips – Tier 1	0.980	N/A
Advanced Thermostats – Cooling	0.800	N/A
Advanced Thermostats – Heating	0.900	0.900
Air Sealing	0.861	0.800
Air Sealing (when insulation is also installed)	0.929	0.900
Common Area Lighting (LEDs)	0.773	N/A
Ductless Heat Pump	0.800	N/A
Faucet Aerators	1.004	1.000
LEDs (In-Unit)	0.960	N/A
Pipe Insulation	0.794	1.000
Restrictor Shower Valve	0.800	0.800

Measure	Electric NTGR	Gas NTGR
Showerheads	1.004	1.000

Home Efficiency – Market Rate Initiative

The evaluation team calculated verified savings for the Home Efficiency – Market Rate Initiative by applying savings algorithms from the IL-TRM V9.0. The team leveraged initiative tracking data such as primary heating and cooling type, the delivery mechanism (e.g., direct install, leave behind), LED wattage, LED lamp type, and project location (e.g., for weather-dependent variables) to inform savings assumptions. For variables outside these parameters, the evaluation team relied on defaults from the IL-TRM V9.0. Table 109 lists the measures in the Home Efficiency – Market Rate Initiative, their corresponding IL-TRM entries, and whether or not TRM errata applied to the measure in the 2021 evaluation.

Table 109. Home Efficiency - Market Rate Measures Evaluated

Evaluation Measure Category	IL-TRM Measure	Errata Applied?
Air Sealing	5.6.1	Errata applied
Bathroom Exhaust Fan	5.3.9	No errata present for this measure
Attic Insulation	5.6.5	Errata applied
Advanced Thermostat	5.3.16	Errata applied
Crawlspace Insulation	5.6.2	No errata present for this measure
Rim Joist Insulation	5.6.6	No errata present for this measure
Wall Insulation	5.6.4	No errata present for this measure
Duct Sealing	5.3.4	No errata present for this measure
Floor Insulation	5.6.3	No errata present for this measure
LED Screw Based Omnidirectional Bulbs	5.5.8	Errata applied

Measure Lives and Cumulative Persisting Annual Savings

The evaluation team applied measure lives and baseline shifts from the IL-TRM V9.0 to calculate CPAS.

Net Impact Methodology

The evaluation team applied SAG-approved 2021 NTGRs to verified gross savings to calculate verified net savings. Table 110 outlines the SAG-approved NTGR values applied to verified gross savings to calculate verified net savings.

Table 110. SAG-Approved Home Efficiency - Market Rate NTGRs

Measure	Electric NTGR	Gas NTGR
Air Sealing (with Attic Insulation)	0.900	0.900
Air Sealing (without Attic Insulation)	0.800	0.800
Bathroom Exhaust Fan	0.800	0.800
Attic Insulation	0.800	0.800
Crawlspace Insulation	0.800	0.800
Rim Joist Insulation	0.800	0.800
Wall Insulation	0.800	0.800
Duct Sealing	0.800	0.800

Measure	Electric NTGR	Gas NTGR
Floor Insulation	0.800	0.800
Advanced Thermostat (Cooling)	0.800	N/A
Advanced Thermostat (Heating)	N/A	0.900
SSP LEDs (Dusk to Dawn)	0.800	0.800

Midstream HVAC Initiative

Gross Impact Methodology

The evaluation team calculated verified savings for the Midstream HVAC Initiative by applying savings algorithms from the IL-TRM V9.0. The team leveraged initiative tracking data such as primary heating and cooling type, new and existing heating and cooling efficiencies and capacities, project location (e.g., for weather-dependent variables), and water heater tank volumes. For variables outside these parameters, the evaluation team relied on default values from the IL-TRM V9.0. Table 111 lists the measures in the HVAC Initiative, their corresponding IL-TRM entries, and whether TRM errata applied to the measure in the 2021 evaluation.

Table 111. Midstream HVAC Initiative Measures Evaluated

Evaluation Measure Category	IL-TRM Measure	Errata Applied?
Air Source Heat Pump	5.3.1	No errata present for this measure
Central Air Conditioning	5.3.3	No errata present for this measure
Ductless Heat Pump	5.3.12	No errata present for this measure
Advanced Thermostat	5.3.16	Errata applied
Heat Pump Water Heater	5.4.3	No errata present for this measure

Measure Lives and Cumulative Persisting Annual Savings

The evaluation team applied measure lives and baseline shifts from the IL-TRM V9.0 to calculate CPAS.

Net Impact Methodology

The evaluation team applied SAG-approved 2021 NTGRs to verified gross savings to calculate verified net savings. Table 112 outlines the SAG-approved NTGR values applied to verified gross savings to calculate verified net savings.

Table 112. SAG-Approved Midstream HVAC Initiative NTGRs

Measure	Electric NTGR	Gas NTGR
CAC Standard	0.822	N/A
CAC Midstream	0.800	N/A
CAC ER	0.742	N/A
ASHP Standard	0.822	N/A
ASHP Midstream	0.800	N/A
Ductless Heat Pumps Standard	0.822	N/A
Ductless Heat Pumps Midstream	0.800	N/A
Advanced Thermostat – Cooling	0.800	N/A
Advanced Thermostat – Heating	0.900	0.900

Measure	Electric NTGR	Gas NTGR
Advanced Thermostat Midstream – Cooling	0.800	N/A
Advanced Thermostat Midstream – Heating	0.900	0.900
Heat Pump Water Heater Midstream	0.800	0.800

Appliance Recycling Initiative

Gross Impact Methodology

The evaluation team calculated verified savings for the Appliance Recycling Initiative by applying savings algorithms from the IL-TRM V9.0. The team leveraged initiative tracking data, such as appliance type, age, size, model, usage type, operational location, and ZIP code to inform savings assumptions. For variables outside these parameters, the evaluation team relied on defaults from the IL-TRM V9.0. Table 113 lists the measures in the Appliance Recycling Initiative, their corresponding IL-TRM entry, and whether or not TRM errata applied to the measure in the 2021 evaluation.

Table 113. Appliance Recycling Initiative Measures Evaluated

Evaluation Measure Category	IL-TRM Measure	Errata Applied?
Refrigerator Recycling	5.1.8	No errata present for this measure
Freezer Recycling	5.1.8	No errata present for this measure
Room Air Conditioner Recycling	5.1.9	No errata present for this measure

The IL-TRM V9.0 algorithms provide coefficients to calculate the energy consumption of recycled appliances based on a collaborative metering study conducted for Commonwealth Edison Company and two Michigan utilities (Consumers Energy and DTE Energy). Holding all other variables constant, the coefficient of each independent variable indicates the influence of that variable on annual consumption:

- A positive coefficient indicates an upward influence on consumption.
- A negative coefficient indicates a downward influence on consumption.

With the exception of the intercept, the coefficient value indicates the marginal impact of a one-point increase in the independent variable on the unit energy consumption (UEC). For instance, a single cubic-foot increase in refrigerator size results in a 27.149 kWh increase in average annual consumption. For dummy variables, the coefficient value represents the difference in consumption if a given condition holds true. For example, the 161.857 coefficient for the dummy variable “Primary Usage Type” indicates that the customer used the refrigerator as a primary unit; all else being equal, this means that a primary refrigerator annually consumes 161.857 kWh more than a secondary unit. Table 114 lists the IL-TRM V9.0 coefficients for refrigerators and freezers.

Table 114. Appliance Recycling Initiative Energy Savings Calculation Coefficients

Appliance	Independent Variable Description	Estimate Coefficient
Refrigerator	Intercept	83.324
	Age (years)	3.678
	Pre-1990 (= 1 if manufactured pre-1990)	485.037
	Size (cubic feet)	27.149
	Dummy: Side-by-Side (= 1 if side-by-side refrigerator)	406.779

Appliance	Independent Variable Description	Estimate Coefficient
	Dummy: Primary Usage Type (in absence of the program) (= 1 if primary unit)	161.857
	Interaction: Located in Unconditioned Space x CDD/365.25	15.366
	Interaction: Located in Unconditioned Space x HDD/365.25	-11.067
Freezer	Intercept	132.122
	Age (years)	12.130
	Pre-1990 (= 1 if manufactured pre-1990)	156.181
	Size (cubic feet)	31.839
	Dummy: Chest (= 1 if chest freezer)	-19.709
	Interaction: Located in Unconditioned Space x CDD/365.25	9.778
	Interaction: Located in Unconditioned Space x HDD/365.25	-12.755

The evaluation team applied appliance-specific characteristics included in the 2021 tracking database to the regression model coefficients in Table 114 to calculate unit-level energy savings using the algorithms in Section 5.1.8 of IL-TRM V9.0. Note that the part-use factor included in the savings algorithms accounts for appliances not plugged in year-round prior to participation. For 2021, the evaluation team applied a part-use factor of 0.86 for refrigerators and 0.81 for freezers, estimated using 2019 survey responses. We also calculated demand savings using the algorithm in Section 5.1.8 of IL-TRM V9.0.

We calculated energy and demand savings for room air conditioners by applying the applicable savings algorithms from Section 5.1.9 of IL-TRM V9.0. The 2021 tracking data did not include information on unit capacity or efficiency, so we applied the default values included in IL-TRM V9.0: 8,500 Btu/hr and 9.8 EER for capacity and efficiency, respectively.

Measure Lives and Cumulative Persisting Annual Savings

The evaluation team applied the measure lives from Measures 5.1.8 and 5.1.9 of the IL-TRM V9.0 to determine CPAS for the Appliance Recycling Initiative.

Net Impact Methodology

The evaluation team applied SAG-approved 2021 NTGRs to verified gross savings to calculate verified net savings (Table 115).

Table 115. SAG-Approved Appliance Recycling NTGRs

Measure	Electric NTGR	Gas NTGR
Refrigerator	0.470	N/A
Freezer	0.540	N/A
Room Air Conditioner	0.500	N/A

Direct Distribution of Efficient Products Initiative

The evaluation team calculated verified savings for the Direct Distribution Initiative by applying savings algorithms from the IL-TRM V9.0. The team leveraged Initiative tracking data, such as primary heating and cooling type, delivery mechanism (e.g., direct install, leave behind), LED wattage, LED lamp type, project location (e.g., for weather-dependent variables), home type (single family or family), and installed measure location (e.g., for faucet aerators), to inform savings assumptions. For variables

outside these parameters, the evaluation team relied on defaults from the IL-TRM V9.0. Table 116 lists the measures in the Direct Distribution Initiative, their corresponding IL-TRM entry, and whether or not TRM errata applied to the measure in the 2021 evaluation.

Table 116. Direct Distribution Initiative Measures Evaluated

Evaluation Measure Category	IL-TRM Measure	Errata Applied?
9W LED	5.5.8	Errata applied
4.5 W Globe	5.5.6	No errata present for this measure
8W Reflector	5.5.6	No errata present for this measure
ENERGY STAR Desk Lamp	5.5.6	Errata applied
Advanced Power Strip – Tier 1	5.2.1	Errata applied
Showerhead	5.4.5	No errata present for this measure
Shower Timer	5.4.9	No errata present for this measure
Bath Aerator	5.4.4	No errata present for this measure
Kitchen Aerator	5.4.4	No errata present for this measure
Water Temperature Card	5.4.6	No errata present for this measure
Thermostatic Shower Valve	5.4.8	No errata present for this measure
Pipe Insulation	5.4.1	No errata present for this measure
Door Sweep	5.6.1	Errata applied
LED Nightlights	5.5.11	No errata present for this measure

Measure Lives and Cumulative Persisting Annual Savings

The evaluation team applied measure lives and mid-life adjustments from the IL-TRM V9.0 and errata to calculate CPAS for the Direct Distribution Initiative.

Net Impact Methodology

The evaluation team applied SAG-approved 2021 NTGRs to verified gross savings to calculate verified net savings (Table 117).

Table 117. SAG-Approved Direct Distribution NTGRs

Measure	Electric NTGR	Gas NTGR
LEDs (Non-Income Qualified)	0.840	N/A
All Other Measures	1.000	1.000

Efficient Choice Tool

This appendix outlines the steps that the evaluation team took to estimate electric and gas savings associated with the ECT. These estimates are derived from customer self-reported ECT engagement and subsequent purchases of EE products as well as from model numbers provided by some customers as verification of their EE purchases. We then used implementer-tracked counts of unique active shoppers that interacted with the ECT to scale estimated EE purchase quantities to the population of ECT users and applied per-unit gross savings estimates and NTGRs for each product category. Figure 2 outlines the overarching process for estimating ECT savings.

Figure 2. The ECT Energy Savings Estimation Process



Survey Sampling and Fielding

Opinion Dynamics conducted two waves of online surveys with likely ECT users in 2021. We conducted the first wave in August of 2021 and included users from January through June. Our team fielded the second wave in February of 2022 and included users from July through December of 2021. The population of likely ECT users consisted of customers that created a profile or responded to a pop-up survey on the ECT website and those who engaged with marketing emails during the evaluation period (i.e., customers that clicked on embedded links directing them to the ECT). The sample excluded those who had already been included in prior ECT survey samples. Table 118 and Table 119 summarize population, sample, and the resulting survey yields by source.

Table 118. Wave 1 Survey Response Rate

Source	Population	Sample	Screener Question Respondents	Survey Completes	% Yield
Engaged with ECT marketing email ^a	22,350	16,330	2,400	546	3.3%
Responded to ECT pop-up survey	904	679	141	43	6.3%
Created ECT profile	743	576	96	34	5.9%
Total	23,997	17,585	2,637	623	3.5%

^a Counts shown exclude customers who also provided contact info on the ECT website. 82% of ECT pop-up respondents and 69% of those that created profiles also engaged with at least one ECT marketing email.

Table 119. Wave 2 Survey Response Rate

Source	Population	Sample	Screener Question Respondents	Survey Completes	% Yield
Engaged with ECT marketing email ^a	8,026	4,057	564	149	3.7%
Responded to ECT pop-up survey	506	114	23	8	7.0%
Created ECT profile	497	126	17	5	4.0%
Total	9,029	4,297	604	162	3.8%

^a Counts shown exclude customers who also provided contact info on the ECT website. 100% of ECT pop-up respondents and 98% of those that created profiles also engaged with at least one ECT marketing email.

Opinion Dynamics sent email invitations to customers inviting them to participate in the survey. Customers were offered a \$5 gift card for qualifying and completing the survey. They were also offered additional tiered incentives of \$5, \$10, or \$15 to provide verification of an efficient purchase in the form of a photo or hand-entered model number.

Purchase, Non-Rebated Purchase, and EE Purchase Rates

Of the 3,241 customers that responded to the survey, 785 confirmed being an AIC customer and reported visiting the ECT website. The survey then presented each of these 785 respondents with a list of the product categories included on the ECT and asked them to identify which, if any, they considered or viewed using the ECT. Next, for any product categories they viewed, the survey asked which, if any, they later purchased, and which of those purchases received a discount or rebate from another AIC offering. Based on these responses, we calculated measure-level rates for each category that reflect a) the percentage of customers who considered each product category that later went on to purchase a product; and b) the percentage of those purchases that were not incentivized by an AIC offering.

We explored alternatives to the survey self-report approach to verifying the share of AIC customers that engaged with the ECT and also received a rebate through another AIC initiative. However, given the lack of personal identifying information (i.e., email address) available for certain measures, the self-report approach was preferable. For customers who purchased measures that were part of the AIC Retail Products Initiative, we did conduct a comparison of emails that appeared both as a respondent to the ECT survey and a participant in the Retail Products Initiative. However, we were limited by the Retail Products Initiative tracking data not having email addresses for point-of-sale (POS) measures (including LED lighting, dehumidifiers, etc.) and incomplete email coverage for non-POS measures. Specifically for non-POS measures, only about 5% of AIC Retail Products participants that purchased advanced thermostats in the tracking data had emails. Given these realities, we calculated measure-level rates exclusively using the survey responses.

For respondents that reported making a purchase not discounted by AIC, the survey then asked if the purchase was of an energy-efficient (“EE”) or ENERGY STAR product. To minimize respondent burden and survey attrition, we asked this question and associated follow-up questions for up to three product categories only. We used these responses to compute an EE purchase rate, or a portion of purchases that were reportedly EE. For relevant measures, we also asked for the quantity of units purchased.³⁸ By combining purchase rates with responses to these follow-up questions, we estimated counts of EE products purchased by survey respondents for each measure type. Of those who visited the ECT during the evaluation period, between 16% and 57% went on to make a purchase by the time of the survey with a weighted average of 40%. Among those who reported the efficiency of purchased products, the vast majority indicated EE purchases for most product categories. Those who did not indicate the efficiency of their purchased product are excluded from the calculation of EE purchase rate. Table 120 provides purchase, non-rebated purchase, and EE purchase rates for each product category.

³⁸ We asked about quantities for light bulbs and power strips as other product categories are not typically purchased in multiples or, in the case of thermostats, do not produce additional savings.

Table 120. Counts of Respondent Purchases by Product Category

Product Category	Viewed on ECT	Purchased After Viewing	Purchase Rate	Purchased Non-Rebated	Non-Rebated Purchase Rate	Reported Efficiency	Reported EE Purchase	EE Purchase Rate
LED Lighting	191	102	53.4%	62	60.8%	46	39	84.8%
Refrigerators	189	63	33.3%	52	82.5%	46	39	84.8%
Clothes Washers	123	38	30.9%	27	71.1%	25	20	80.0%
Dehumidifiers	89	28	31.5%	25	89.3%	22	17	77.3%
Air Purifiers	75	18	24.0%	15	83.3%	16	10	62.5%
Advanced Thermostats	377	213	56.5%	40	18.8%	37	21	56.8%
Air Conditioners	145	39	26.9%	39	100.0%	23	19	82.6%
Heat Pump Water Heaters ^a	74	12	16.2%	12	100.0%	10	1	10.0%
Electric Clothes Dryers	119	38	31.9%	32	84.2%	13	8	61.5%
Dishwashers	82	27	32.9%	27	100.0%	11	11	100.0%
Advanced Power Strips	110	52	47.3%	31	59.6%	20	12	60.0%
Freezers	74	23	31.1%	22	95.7%	16	12	75.0%
Pool Pumps	8	2	25.0%	2	100.0%	2	1	50.0%

^a Only heat pump water heaters are considered EE and included in electric water heater savings calculations based on IL-TRM V9.0 guidance.

EE Verification

The ECT does not provide incentives or deliver products directly to AIC customers, instead providing them with information and tools to help inform and influence their purchase decisions. As a result, the pilot cannot directly track product purchases. The evaluation team therefore relies on self-reported survey responses to quantify these purchases. As such, we also take steps in the survey to verify EE purchases by offering additional incentives for a proof of purchase.

We developed an EE verification rate to account for the degree to which customers may misreport purchases as EE when answering questions pertaining to EE purchase rates shown in Table 120. As part of the survey, we asked customers that reported purchasing at least one EE product to provide a model number to verify the purchase. In cases where customers reported multiple EE purchases, we asked about a single purchase to minimize respondent burden. To maximize sample sizes for uncommon product categories, we prioritized less commonly purchased measures.

We employed a tiered incentive strategy to encourage customers to provide model numbers via the most reliable method possible. We first offered respondents an additional \$15 incentive if they were willing to provide a photo of their purchase receipt or invoice. If they declined, we offered \$10 for a photo of the product nameplate. If they still declined, we offered \$5 for a manually entered model number. About a quarter (26%) of respondents agreed to provide a photo of their purchase receipt or invoice; 11% of respondents who declined to provide a photo of their purchase receipt or invoice agreed to provide a photo of their product nameplate; and 4% of respondents who declined both of the prior requests manually entered their product model numbers. The evaluation team researched each legible model to determine whether they qualified as EE. In total, 62 respondents provided a valid model number and 93.5% of them validated the customer's EE claim. This single value is applied for all product categories due to limited sample sizes and minimal variation across categories.

Population-Level EE Purchases

Unlike traditional energy efficiency programs, ECT participation is not readily trackable in terms of customer or measure counts. Conceptually, the participant population would be every ECT visitor who has engaged with the site. To approximate this population, the evaluation team worked with implementer staff to review and apply their tracked counts of unique IP addresses engaging with the site and with specific product categories. We refer to these counts as unique active shoppers.

A unique active shopper is defined by Enervee as an ECT visitor that conducted at least one of nine specific actions on the site. The actions include: (1) engaged with recommendations, (2) selected a model, (3) sorted a list, (4) filtered products, (5) engaged with a histogram, (6) favorited a product, (7) tracked prices, (8) clicked on an offer, or (9) compared models. Implementer staff provided counts of unique active shoppers by product category for each month of the evaluation period (January through December 2021).

We used the measure-specific sum of unique active shopper counts across the evaluation period as the base to which we applied purchase rates, EE purchase rates, and EE verification rates to estimate total population-level EE purchases. Equation 16 outlines how measure-specific purchase rates and the average EE verification rate are applied to the unique active shopper counts to estimate total population-level EE purchases.

Equation 16. Population-Level EE Purchases Estimation

$$Population - Level EE Purchases_p = UAS_p \times PR_p \times EEPR_p \times EEVR$$

- UAS = Unique Active Shoppers
- PR = Purchase Rate
- EEPR = EE Purchase Rate
- EEVR = EE Verification Rate
- p = Product Category

Per-Unit Gross Savings Methodology

The evaluation team calculated verified savings for the ECT by applying per-unit gross savings using algorithms from the IL-TRM V9.0. The following section details the calculation of per-unit gross savings, providing the equations and assumptions the evaluation team used to develop gross savings estimates presented earlier in this document. Table 121 lists the measures in the ECT, their corresponding IL-TRM entry, and whether or not TRM errata applied to the measure in the 2021 evaluation, along with a summary of per unit kWh, kW, and therm savings estimates for each.

Table 121. Efficient Choice Tool Measures Evaluated and Per Unit Savings Summary

Evaluation Measure Category	IL-TRM Measure	Errata Applied?	Per-Unit Gross kWh	Per-Unit Gross kW	Per-Unit Gross Therm
LED Lighting	5.5.6, 5.5.8	Errata applied	35.61	0.0048	N/A
Advanced Power Strips	5.2.1	Errata applied	80.00	0.0090	N/A
Advanced Thermostat	5.3.16	Errata applied	215.41	0.0741	75.91
Clothes Washer	5.1.2	No errata present	58.60	0.0075	2.40
Electric Clothes Dryer	5.1.10	No errata present	176.61	0.0200	N/A
Dishwasher	5.1.4	No errata present	16.15	0.0012	N/A
Refrigerator	5.1.6	No errata present	50.21	0.0076	N/A
Freezer	5.1.5	No errata present	43.78	0.0071	N/A
Room Air Conditioner	5.1.7	No errata present	23.24	0.0230	N/A
Dehumidifier	5.1.3	No errata present	103.00	0.0230	N/A
Air Purifier	5.1.1	No errata present	158.75	0.0183	N/A
Variable-Speed Pool Pump	5.7.1	No errata present	1,386.80	0.9600	N/A
Heat Pump Water Heater	5.4.3	No errata present	2,389.01	0.1132	N/A
Gas Water Heater	5.4.2	No errata present	N/A	N/A	53.77

LED Lighting

LED lighting per-unit savings reflect average gross verified savings for LED standard and specialty bulbs estimated as part of the 2021 evaluation of the Retail Products Initiative. These sales-weighted average

savings represent the wide variety of LED wattages and bulb shapes distributed as part of the that Initiative, of which 33% were standard omnidirectional, 41% were specialty reflector, and 27% were other types of specialty products. Table 122 provides per-unit gross savings applied for LED lighting.

Table 122. LED Lighting Per-Unit Gross Savings

Per-Unit Savings	Values
kWh savings	35.61
kW savings	0.0048

Advanced Power Strips

Table 123 provides per-unit gross savings applied for advanced power strips and Table 124 provides the algorithms and assumptions used to calculate them.

Table 123. Advanced Power Strips Per-Unit Gross Savings

Per-Unit Savings	Values
kWh savings	80.00
kW savings	0.0090

Table 124. Advanced Power Strips Algorithms and Assumptions

Algorithms		
kWh savings	= kWh * ISR	
kW savings	= kWh / Hours * CF	
Parameter	Values	Sources and Notes
kWh	80	Unknown Plugs
ISR	100%	Direct Install, Time of Sale
Hours	7,129	
CF	0.8	

Advanced Thermostats

Table 125 provides per-unit gross savings applied for advanced thermostats and Table 126 provides the algorithms and assumptions used to calculate them.

Table 125. Advanced Thermostats Per-Unit Gross Savings

Per-Unit Savings	Values	Notes
kWh savings	215.41	Accounts for both heating and cooling savings
kW savings	0.0741	Accounts for both heating and cooling savings
Therm savings	75.91	Accounts for heating savings from the portion of customers with gas heat

Table 126. Advanced Thermostats Savings Algorithms and Assumptions

Algorithms	
kWh savings	= kWh_heating + kWh_cooling
kWh_heating	= %ElectricHeat * Elec_Heating_Consumption * Heating_Reduction * JF * Eff_ISR_Heat + (Therms * Fe * 29.3)

Algorithms		
kWh_cooling	$\%AC * ((FLH * Capacity * 1/SEER)/1000) * Cooling_Reduction * Eff_ISR_Cool$	
kW savings	$= \%AC * ((FLH * Capacity * 1/SEER)/1000) * Cooling_Reduction * Eff_ISR_Cool$	
Therms savings	$= \%FossilHeat * Gas_Heating_Consumption * Heating_Reduction * HF * Eff_ISR$	
Parameter	Values	Sources and Notes
%ElecHeat	3%	Heating fuel: unknown
Elec_Heating_Consumption	15,683	Default from V9.0
Heating_Reduction	8.5%	Unknown (blended) previous thermostat type
HF	96.5%	TRM default for unknown
Eff_ISR_Heat	100%	
Eff_ISR_Cool	90%	
Fe	3.14%	Furnace fan as % of total energy consumption
%AC	82.5%	Thermostat-controlled cooling: Unknown
FLH	623	Default from V9.0
Capacity (Btu/hr)	33,040	AC unit size if housing type is unknown
SEER	12	
Cooling_Reduction	8.4%	Avg % reduction in total cooling energy
EER	10.5	EE ratio of existing cooling system (if unknown)
CF	34%	summer
%GasHeat	97%	Unknown deemed
%FossilHeat	97%	Unknown deemed

Clothes Washers

Table 127 provides per-unit gross savings applied for clothes washers and Table 128 provides the algorithms and assumptions used to calculate them.

Table 127. Clothes Washers Per-Unit Gross Savings

Per-Unit Savings	Values	Notes
kWh savings	215.41	Accounts for both heating and cooling savings
kW savings	0.0741	Accounts for both heating and cooling savings
Therm savings	75.91	Accounts for heating savings from the portion of customers with gas heat

Table 128. Clothes Washers Savings Algorithms and Assumptions

Algorithms	
kWh savings	$= [Capacity * 1/IMEFbase * Ncycles * (\%CWbase + (\%DHWbase * \%Electric_DHW) + (\%Dryerbase * \%Electric_Dryer))] - [Capacity * 1/IMEFeff * Ncycles * (\%CWeff + (\%DHWeff * \%Electric_DHW) + (\%Dryereff * \%Electric_Dryer))]$
kW savings	$= kWh/Hours * CF$
Therm savings	$= [(Capacity * 1/IMEFbase * Ncycles * ((\%DHWbase * \%Natural_Gas_DHW * R_eff) + (\%Dryerbase * \%Gas_Dryer))) - (Capacity * 1/IMEFeff * Ncycles *$

Algorithms		
	$((\%DHWEff * \%Natural\ Gas_DHW * R_eff) + (\%Dryereff * \%Gas_Dryer)) * Therm_convert$	
Parameter	Values	Sources and Notes
Capacity	3.50	
IMEFbase	1.75	Baseline
IMEFeff	2.23	ENERGY STAR
Ncycles	295	
%CWbase	8.1%	ENERGY STAR
%CWEff	5.8%	Baseline
%DHWbase	26.5%	ENERGY STAR
%DHWEff	31.2%	Baseline
%Dryerbase	65.4%	ENERGY STAR
%DryerEff	63.0%	Baseline
%Electric_DHW	16%	Unknown deemed
%Electric_Dryer	38%	Unknown deemed
Hours	295	Unknown deemed
CF	0.038	Unknown deemed
Therm_convert	0.03412	Unknown deemed
R_eff	1.26	Unknown deemed
Natural Gas_DHW	84%	Unknown deemed
%Gas_Dryer	62%	Unknown deemed

Clothes Dryers

Table 129 provides per-unit gross savings applied for clothes dryers and Table 130 provides the algorithms and assumptions used to calculate them.

Table 129. Clothes Dryer Per-Unit Gross Savings

Per-Unit Savings	Values	Notes
kWh savings	176.61	Average of standard and compact values
kW savings	0.0198	
Therm Savings	0.85	

Table 130. Clothes Dryer Savings Algorithms and Assumptions

Algorithms		
kWh savings	$= (Load/CEFbase - Load/CEFeff) * Ncycles * \%Electric$	
kW savings	$= kWh / Hours * CF$	
Inputs	Values	Sources and Notes
kWh Savings - Vented Electric, Standard (≥ 4.4 ft ³)	160.44	Heating fuel: electric
kWh Savings - Vented Electric, Compact (120V) (< 4.4 ft ³)	165.17	Heating fuel: gas
kWh Savings - Vented Electric, Compact (240V) (<4.4 ft ³)	182.81	Heating fuel: unknown
kWh Savings - Ventless Electric, Compact (240V) (<4.4 ft ³)	230.40	Default from IL-TRM V9.0

kW Savings - Vented Electric, Standard (≥ 4.4 ft3)	0.02	Unknown previous thermostat type
kW Savings - Vented Electric, Compact (120V) (< 4.4 ft3)	0.02	TRM default for unknown
kW Savings - Vented Electric, Compact (240V) (<4.4 ft3)	0.02	
kW Savings - Ventless Electric, Compact (240V) (<4.4 ft3)	0.03	
Parameter	Values	Sources and Notes
Standard Load	8.45	
Compact Load	3	
CEFbase	3.11	Vented Electric, Standard (≥ 4.4 ft3)
CEFbase	3.01	Vented Electric, Compact (120V) (< 4.4 ft3)
CEFbase	2.73	Vented Electric, Compact (240V) (<4.4 ft3)
CEFbase	2.13	Ventless Electric, Compact (240V) (<4.4 ft3)
CEFbase	2.84	Vented Gas
CEFeff	3.93	Vented or Ventless Electric, Standard (≥ 4.4 ft3)
CEFeff	3.80	Vented or Ventless Electric, Compact (120V) (< 4.4 ft3)
CEFeff	3.45	Vented Electric, Compact (240V) (< 4.4 ft3)
CEFeff	2.68	Ventless Electric, Compact (240V) (< 4.4 ft3)
CEFeff	3.48	Vented Gas
Ncycles	283	
Electric %	100%	
Gas %	16%	
Therm Convert	0.03412	Unknown deemed
Therms Savings - Ventless Gas	0.85	
Coincidence Factor (CF)	0.8	
Hours	7,129	

Dishwashers

Table 131 provides per-unit gross savings applied for dishwashers and Table 132 provides the algorithms and assumptions used to calculate them.

Table 131. Dishwashers Per-Unit Gross Savings

Per-Unit Savings	Values	Notes
kWh savings	16.15	Average of only “Standard” dishwashers due to very low volume of “Compact” options on ECT website
kW savings	0.0012	
Therm savings	0.62	

Table 132. Dishwashers Savings Algorithms and Assumptions

Algorithms				
kWh savings	= (kWh _{base} - kWh _{ESTAR}) * (%kWh _{op} + (%kWh _{heat} * %Electric_DHW))			
kW savings	= kWh / Hours * CF			
Therm savings	= (kWh _{base} - kWh _{ESTAR}) * %kWh _{heat} * %Natural Gas_DHW * R _{eff} * 0.03412			
Inputs	kWh	kW	Therms	Sources and Notes
ENERGY STAR Standard	19.6	0.0014	0.75	Unknown DHW by IL-TRM V9.0

Algorithms				
ENERGY STAR Standard with Connected Functionality	12.7	0.0009	0.49	Unknown DHW by IL-TRM V9.0
Parameter	Values		Sources and Notes	
kWh _{base}	307		Standard	
kWh _{ESTAR}	270, 283		Standard and Standard with connected functionality	
%kWh _{op}	44%			
%kWh _{heat}	56%			
%Electric_DHW	16%			
%Natural Gas_DHW	84%			
R _{eff}	1.26			

Refrigerators

Table 133 provides per-unit gross savings applied for refrigerators and Table 134 provides the algorithms and assumptions used to calculate them. An average of all refrigerator product categories was used.

Table 133. Refrigerators Per-Unit Gross Savings

Per-Unit Savings	Values	Notes
kWh savings	16.15	Average of all 6 categories
kW savings	0.0012	

Table 134. Refrigerators Savings Algorithms and Assumptions

Algorithms				
kWh savings	= UE _{Cbase} - UE _{Cee}			
kW savings	= (kWh/8766) * 1.25 * 1.057			
Inputs	kWh	kW	Sources and Notes	
Refrigerators and Refrigerator-freezers with manual defrost	36.9	0.0060	ENERGY STAR - Time of Sale and Early Replacement (last 11 years)	
Refrigerator-Freezer--partial automatic defrost	43.1	0.0060	ENERGY STAR - Time of Sale and Early Replacement (last 11 years)	
Refrigerator-Freezers--automatic defrost with top-mounted freezer without through-the-door ice service and all-refrigerators--automatic defrost	44.3	0.0070	ENERGY STAR - Time of Sale and Early Replacement (last 11 years)	
Refrigerator-Freezers--automatic defrost with side-mounted freezer without through-the-door ice service	51.7	0.0080	ENERGY STAR - Time of Sale and Early Replacement (last 11 years)	
Refrigerator-Freezers--automatic defrost with bottom-mounted freezer without through-the-door ice service	54.4	0.0080	ENERGY STAR - Time of Sale and Early Replacement (last 11 years)	
Refrigerator-freezer--automatic defrost with bottom-mounted freezer with through-the-door ice service	62.8	0.0090	ENERGY STAR - Time of Sale and Early Replacement (last 11 years)	
Refrigerator-Freezers--automatic defrost with top-mounted freezer with through-the-door ice service	51.7	0.0080	ENERGY STAR - Time of Sale and Early Replacement (last 11 years)	

Freezers

Table 135 provides per-unit gross savings applied for freezers and Table 136 provides the algorithms and assumptions used to calculate them. An average of all freezer product categories was used.

Table 135. Freezers Per-Unit Gross Savings

Per-Unit Savings	Values	Sources and Notes
kWh savings	43.78	Average of all 6 categories
kW savings	0.0071	

Table 136. Freezers Savings Algorithms and Assumptions

Algorithms			
kWh savings	= kWh _{Base} - kWh _{ESTAR}		
kW savings	= kWh/Hours * CF		
Inputs	kWh	kW	Sources and Notes
Upright Freezers with Manual Defrost	35.0	0.0057	ENERGY STAR
Upright Freezers with Automatic Defrost	46.8	0.0076	ENERGY STAR
Chest Freezers and all Other Non-Compact Freezers	31.2	0.0050	ENERGY STAR
Compact Upright Freezers with Manual Defrost	46.6	0.0075	ENERGY STAR
Compact Upright Freezers with Automatic Defrost	63.7	0.0103	ENERGY STAR
Compact Chest Freezers	39.4	0.0064	ENERGY STAR
Upright Freezers with Manual Defrost	35.0	0.0057	ENERGY STAR
Parameter	Values		Sources and Notes
Hours	5,890		Hours
CF	0.95		CF

Room Air Conditioners

Table 137 provides per-unit gross savings applied for room air conditioners and Table 138 provides the algorithms and assumptions used to calculate them.

Table 137. Room Air Conditioners Gross Per-Unit Savings

Per-Unit Savings	Values	Sources and Notes
kWh savings	19.22	Average across climate zones and through the wall vs. non-through the wall units
kW savings	0.0230	

Table 138. Room Air Conditioners Savings Algorithms and Assumptions

Algorithms			
kWh savings	= (FLHRoomAC * Btu/H * (1/CEERbase - 1/CEERee))/1000		
kW savings	= ΔkW = Btu/H * ((1/(CEERbase * 1.01) - 1/(CEERee * 1.01)))/1000 * CF		
Inputs	kWh	kW	Sources and Notes
Non-Through the Wall	17.73	0.0212	Weighted average across climate zones
Through the Wall	20.72	0.0248	Weighted average across climate zones
Parameter	Values		Sources and Notes

Algorithms		
FLHRoomAC	248	Weighted Average
Btu/H	8,500	
EERexist	7.7	
CEERbase	10.9	Non-Through the Wall
CEERee	12.0	Non-Through the Wall
CEERbase	9.6	Through the Wall

Dehumidifiers

Table 139 provides per-unit gross savings applied for dehumidifiers and Table 140 provides the algorithms and assumptions used to calculate them.

Table 139. Dehumidifiers Gross Per-Unit Savings

Per-Unit Savings	Values
kWh savings	103
kW savings	0.0230

Table 140. Dehumidifiers Savings Algorithms and Assumptions

Algorithms		
kWh savings	= (((Avg Capacity * 0.473) / 24) * Hours) * (1 / (L/kWh_Base) - 1 / (L/kWh_Eff))	
kW savings	= ΔkW = ΔkWh/Hours * CF	
Parameter	Values	Sources and Notes
Avg Capacity	59.2	
Hours	1,632	
L/kWhbase	2.80	
L/kWhEff	3.30	

Air Purifiers

Table 141 provides per-unit gross savings applied for air purifiers and Table 142 provides the algorithms and assumptions used to calculate them.

Table 141. Air Purifier Gross Per-Unit Savings

Per-Unit Savings	Values
kWh savings	158.75
kW savings	0.0183

Table 142. Air Purifier Savings Algorithms and Assumptions

Algorithms			
kWh savings	= Annual electrical savings		
kW savings	= ΔkWh/Hours * CF		
Inputs	kWh	kW	Sources and Notes
30 ≤ Smoke CADR < 100	39	0.005	IL-TRM V9.0

Algorithms			
100 ≤ Smoke CADR < 150	95	0.011	IL-TRM V9.0
150 ≤ Smoke CADR < 200	173	0.020	IL-TRM V9.0
200 ≤ Smoke CADR 328	328	0.037	IL-TRM V9.0
Parameter	Values		
Hours	5,844		
CF	66.7%		

Variable-Speed Pool Pumps

Table 143 provides per-unit gross savings applied for variable-speed pool pumps and Table 144 provides the algorithms and assumptions used to calculate them. A 60-40 split of in-ground vs above-ground variable-speed pool pumps was used based on the distribution of these products on the ECT website.

Table 143. Pool Pump Gross Per-Unit Savings

Per-Unit Savings	Values	Sources and Notes
kWh savings	1,386.80	60-40 split of “Inground” vs “Aboveground” Pool Pumps based on ECT website distribution. Only variable-speed is used, as all but 1 pool pump on ECT website is a variable-speed pool pump.
kW savings	0.9600	

Table 144. Pool Pump Savings Algorithms and Assumptions

Algorithms			
kWh savings	= (((Hrs/Daybase * GPMbase * 60)/EFbase) - (((Hrs/DayvsH* GPMvsH * 60)/ + (Hrs/DayvsL * GPMvsL * 60)/)/WEFvs))/1000 * Days		
kW savings	= ((kWh/daybase)/(Hrs/daybase) - (kWh/dayvr)/(Hr/dayvr)) * CF		
Inputs	kWh	kW	Sources and Notes
Self-Priming (In Ground) Pool Pumps	1,952	1.282	Variable Speed, Energy STAR V2.0
Non-Self Priming (Above Ground) Pool Pumps	539	0.638	Variable Speed, Energy STAR V2.0
Parameters	In-Ground	Above Ground	Sources and Notes
Hrs/Daybase	11.4	7.0	Base
GPMbase	64.4	36	Base
EFbase	2.1	2.1	Base
Hrs/DayvsH	2	1.2	Variable Speed
GPMvsH	50	28	Variable Speed
Days	125	125	Variable Speed

Heat Pump Water Heaters

Table 145 provides per-unit gross savings applied for heat pump water heaters and Table 146 provides the algorithms and assumptions used to calculate them.

Table 145. Heat Pump Water Heater Gross Per-Unit Savings

Per-Unit Savings	Values
kWh savings	2,389.01
kW savings	0.1132

Table 146. Heat Pump Water Heater Savings Algorithms and Assumptions

Algorithms	
kWh	$= (((1/UEF_{base} - 1/UEF_{efficient}) * GPD * Household * 365.25 * yWater * (Tout - Tin) * 1.0 / 3412) + kwh_{cooling} - kwh_{heating})$
kW	$= kwh / Hours * CF$
Parameter	Values
kWh_cooling	182.92
UEF_Baseline	0.9207
UEF_Efficient	3.61
GPD	17.6
Household	2.56
Days per year	365.25
yWater	8.33
Tout	125
Tin	54
LF	0.5
COPCOOL	2.8
LM	1.33
Hours	2533
CF	0.12

Gas Water Heaters

Table 147 provides per-unit gross savings applied for gas water heaters and Table 148 provides the algorithms and assumptions used to calculate them.

Table 147. Gas Water Heater Gross Per-Unit Savings

Per-Unit Savings	Values
Therms savings	53.77

Table 148. Gas Water Heater Savings Algorithms and Assumptions

Algorithms	
Therms	$(1/UEFBASE - 1/UEFEFFICIENT) * (GPD * Household * 365.25 * \gamma_{Water} * (TOUT - TIN) * 1.0) / 100,000$
Parameter	Values
UEF_Baseline	0.563
UEF_Efficient	0.64
UEF_Existing	0.52
GPD	17.6
Household	2.56
yWater	8.33
Tout	125
Tin	54

Measure Lives and Cumulative Persisting Annual Savings

The evaluation team assigned the following EUL assumptions recommended by the IL-TRM V9.0 to calculate CPAS.

Table 149. IL-TRM V9.0 Recommended Effective Useful Life Assumptions

Measure	EUL (Years)
LED Lighting	10.0
APS	7.0
Advanced thermostats	11.0
Dehumidifiers	12.0
Air purifiers	9.0
Clothes washers	14.0
Electric clothes dryers	16.0
Refrigerators	17.0
Freezers	22.0
Variable-speed pool pumps	7.0
Water dispensers	10.0
Bathroom vent fans	19.0
Air conditioners	12.0
Heat pump water heaters	15.0

Measure	EUL (Years)
Gas water heaters	13.0

Net Impact Methodology

Survey respondents were asked a series of questions to inform NTGR algorithms as outlined in the Prescriptive Rebate (With No Audit) Protocol section of Attachment A to the IL-TRM V9.0. Each respondent was asked this series of questions for up to three products that they reported purchasing since engaging with the ECT. For the pilot evaluation, the net-to-gross calculation does not include spillover.³⁹ As such, the estimated NTGR is based solely on free ridership (see Equation 2 below).

Equation 2. NTGR Calculation

$$NTGR = 1 - \text{Free Ridership}$$

Free Ridership

Free ridership (FR) represents the portion of customers who would have purchased products with at least the same level of efficiency in the absence of the ECT. In the same way that a typical program’s monetary incentive might encourage customers to purchase an EE product, the motivating factors for the ECT include a focus on eliminating market and cognitive barriers to encourage customers to choose the most energy efficient products to meet their needs. The ECT delivers a new energy-aware choice architecture that injects actionable energy efficiency information into the shopping journey while also providing an accurate, frequently updated product catalog that increases transparency on product efficiency.

The final FR score represents the degree to which visitors who purchased EE products after receiving information from the ECT would have purchased products of at least the same level of energy efficiency in the absence of the ECT.

As prescribed in the IL-TRM V9.0, Opinion Dynamics calculated FR as the average of two distinct scores—a program influence score and a no-program score:

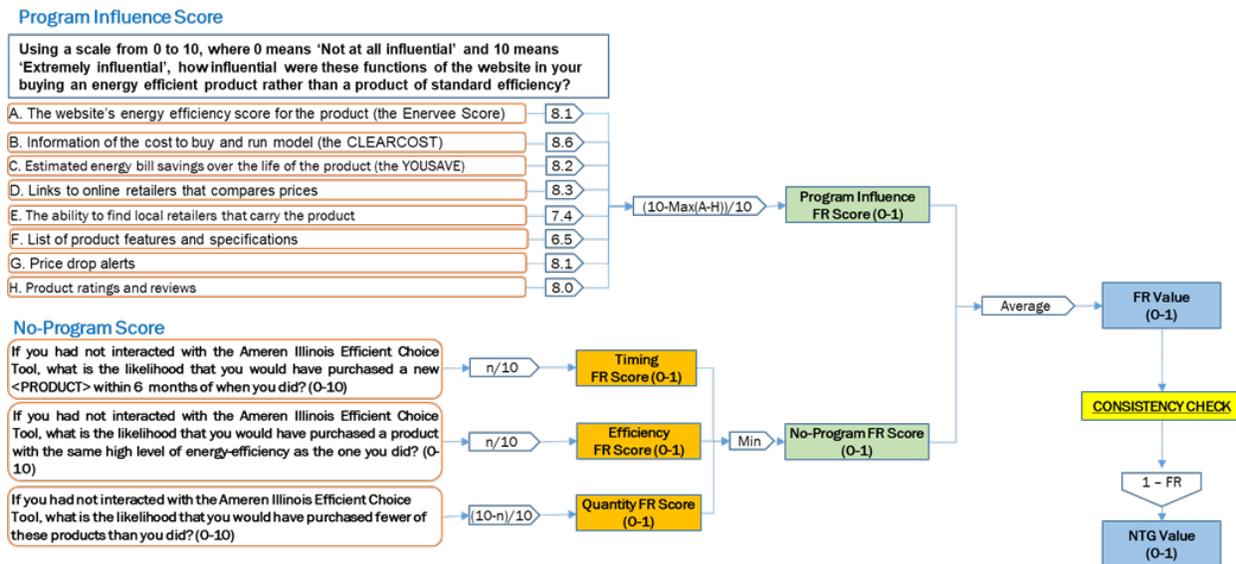
- **Program Influence Score.** This score is based on the importance of each of the ECT’s unique components, which include information on the Enervee Score, CLEARCOST, YOUSAVE, product specifications, pricing, reviews, etc.
- **No-Program Score.** This score is based on the participant’s self-reported likelihood of what the purchase might have looked like in the absence of the program. The timing of the purchase, the relative efficiency level of the purchase, and any potential change in quantity are considered separately.

Figure 3 illustrates the scoring algorithm.⁴⁰ Average scores for each of the program influence scores are shown below to provide a general idea of the influence of individual program factors. However, final pilot influence scores are calculated at the respondent level for each unique measure.

³⁹ Although spillover is currently excluded from the scope of the pilot study, we did ask standard spillover questions to monitor the issue. Responses to these questions will be used to explore the degree to which spillover may be occurring and inform a future decision as to whether it is reasonable to include spillover in future evaluations.

⁴⁰ Note that our single divergence from the IL-TRM is the removal of the rebate timing adjustment pathway from the Program Influence Score. Since rebates are not part of the ECT intervention, the timing question and adjustment are not relevant to the ECT evaluation.

Figure 3. AIC ECT NTG Scoring Algorithm Diagram



(Adapted from IL-TRM V9.0)

To address the possibility of conflicting responses, Opinion Dynamics also included an open-ended question asking respondents to describe in their own words the influence of the website on their decision to purchase the product(s) they did. Standard NTG evaluation practice as defined in the Illinois NTG Protocols (See Section 4.4.1.1.3 – Consistency Checks for more detail) is for the evaluator to assess open-ended follow-up questions when significant inconsistency is present between NTG responses and exclude the records from analysis when the open-ended response does not resolve the inconsistency.

The evaluation team reviewed responses to this question for internal consistency and omitted or adjusted FR scores in cases where they were inconsistent or where the open-end provided clarity on otherwise inconsistent responses. In total, we excluded 12 cases or 5.3% of FR scores from analysis due to internal inconsistency in responses. These 12 respondents each provided program influence and no-program FR scores differing by at least 0.8 out of a possible 1.0 and provided subsequent explanations that did not support adjustment or inclusion in the analysis.⁴¹

⁴¹ The separate program influence and no-program scores are designed as independent estimates of the same overall concept (FR) and should conceptually track together.

Appendix B. Cost-Effectiveness Inputs

In this appendix, we provide additional inputs for the cost-effectiveness testing of AIC's Residential Program. Two specific types of additional inputs are provided: summaries of gas penalties that are not counted toward goal attainment and summaries of secondary electric savings from water supply and wastewater treatment.

Gas Penalties

By agreement with SAG,⁴² AIC is not penalized for gas penalties resulting from the installation of efficient prescriptive measures that create an increase in energy usage when considering savings for goal attainment purposes. Therefore, we exclude those effects in all savings reported throughout the body of this report. However, these effects must be evaluated and considered as part of cost-effectiveness testing and are therefore presented in this appendix.

In the following sections, the evaluation team focuses specifically on the following gas penalties:

- **Lighting Heating Penalties.** The inclusion of waste heat factors for lighting is based on the concept that heating loads are increased to supplement the reduction in heat that was once provided by the existing, less-efficient lamp type. The team applied the IL-TRM waste heat factors to lamps based on heating fuel types provided in the tracking database to arrive at gross heating penalties. For the cases where tracking data did not provide the heating type, the team assumed natural gas heating per the IL-TRM.
- **Furnace Blower Motor Heating Penalties.** High-efficiency fan motors operate at cooler temperatures than traditional furnace blower motors. The amount of heat that is released decreases due to cooler operating conditions. Heating equipment must make up for this loss of heat during the heating season, resulting in an increase in HVAC heating loads. The team applied IL-TRM algorithms to calculate the associated heating penalty.
- **Heat Pump Water Heater Penalties.** When HPWHs are installed in conditioned space, they move heat from the ambient air into water stored in a tank. During the heating season, this can result in an increase in HVAC heating loads. The team applied IL-TRM algorithms to calculate the associated heating penalty.

All gas penalties were calculated using algorithms from the IL-TRM V9.0 (with applicable errata applied).

Secondary Electric Savings for Water Supply and Wastewater Treatment

Some measures delivered through the Residential Program produce water savings as well as energy savings. For applicable measures, the IL-TRM V9.0 includes an algorithm to calculate the secondary electric impacts of these water savings and decreased electricity usage for water supply and wastewater treatment as a result of water savings stemming from the energy efficient measures. As directly instructed in the IL-TRM, these savings may be included in savings considered for goal attainment but must be removed from savings for the purpose of cost-effectiveness calculations. Therefore, we present these savings separately in this appendix to provide transparency on the reduced savings that will be used when conducting testing for cost-effectiveness. All secondary electric savings were calculated using algorithms from the IL-TRM V9.0.

⁴² Treatment of interactive effects is consistent with a draft SAG policy agreement on this topic. The draft agreement is no longer available on the SAG website but can be provided by the evaluation team on request. SAG is currently working to finalize the draft agreement.

Retail Products Initiative

Gas Penalties

Table 150 presents gas penalties not reported in the body of the report for the Retail Products Initiative.

Table 150. 2021 Retail Products Gas Penalties

Measure	Therms
LED Lighting (Residential Application)	-816,009
LED Lighting (Commercial Application)	-84,687
Heat Pump Water Heaters	-577
Total Interactive Effects	-901,272

Secondary Electric Savings from Water Supply and Wastewater Treatment

Table 151 presents water savings and secondary electric savings for the Retail Products Initiative. Water savings are not reported in the body of the report because they are converted to secondary electric savings for the purposes of goal attainment. These electric savings occur due to the displaced energy usage needed to power the water supply and wastewater treatment. However, water savings are included in the Illinois TRC as gallons of water saved, and secondary electric savings are excluded to avoid double counting. As a result, we calculate water savings and then convert them into secondary energy savings in line with the guidance provided in IL-TRM V9.0.

Table 151. 2021 Retail Products Initiative Secondary Electric Savings

Measure	Gallons	Conversion Factor	Secondary Electric Savings (kWh)
ENERGY STAR Clothes Washer	7,960,150	5,010 kWh/million gal ^a	39,880
Total Savings	7,960,150		39,880

^a Source: IL-TRM V9.0.

Total Impacts for Cost-Effectiveness

Table 152 presents final total 2021 Retail Products Initiative verified gross impacts to be used for cost-effectiveness, adjusted for gas penalties and secondary electric savings.

Table 152. 2021 Retail Products Verified Gross Impacts for Cost-Effectiveness

	kWh	Therms	Gallons
Verified Gross Impacts for Goal Attainment	66,522,839	1,457,318	N/A
Gas Penalties	N/A	-901,272	N/A
Water Savings	N/A	N/A	7,960,150
Secondary Electric Savings	-39,880	N/A	N/A
Final Verified Gross Impacts for Cost -Effectiveness	66,482,959	556,045	7,960,150

Income Qualified Initiative

Gas Penalties

Table 153 presents gas penalties not reported in the body of the report for the Income Qualified Initiative.

Table 153. 2021 Income Qualified Initiative Gas Penalties

Measure	Therms
Single Family Channel	
Single Family Core	
Lighting Heating Penalty	-4,071
Furnace Blower Motor Heating Penalty	-2,073
HPWH Heating Penalty	-339
<i>Single Family Core Subtotal</i>	-6,483
BN Pilot	
Lighting Heating Penalty	-2,654
<i>BN Pilot Subtotal</i>	-2,654
SAVE Kits	
Verified SAVE Kit Lighting Heating Penalty	-3,326
Unverified SAVE Kit Lighting Heating Penalty	-44,825
Unverified SAVE Kit (No APS) Lighting Heating Penalty	-26,560
<i>SAVE Kits Subtotal</i>	-74,711
<i>Single Family Channel Subtotal</i>	-83,849
CAA Channel	
Lighting Heating Penalty	-3,365
Full Community Kit Lighting Heating Penalty	-26
<i>CAA Channel Subtotal</i>	-3,391
Total Gas Penalties	-87,239

Secondary Electric Savings from Water Supply and Wastewater Treatment

Table 154 presents water savings and secondary electric savings for the Income Qualified Initiative. Water savings are not reported in the body of the report because they are converted to secondary electric savings for the purposes of goal attainment. These electric savings occur due to the displaced energy usage needed to power the water supply and wastewater treatment. However, water savings are included in the Illinois TRC, as gallons of water saved and secondary electric savings are excluded to avoid double counting. As a result, we calculate water savings and then convert them into secondary energy savings in line with the guidance provided in IL-TRM V9.0.

Table 154. 2021 Income Qualified Initiative Secondary Electric Savings

Measure	Gallons	Conversion Factor	Secondary Electric Savings (kWh)	
Single Family Channel				
Single Family Core				
Faucet Aerator	170,273	5,010	853	
Showerhead	163,196	kWh/million gal ^a	818	
<i>Single Family Core Subtotal</i>	333,469		1,671	
BN Pilot				
Showerhead	8,774	5,010 kWh/million gal ^a	44	
Faucet Aerator	1,067		5	
BN Community Kit – Showerhead, 1.5 gpm	645,463		3,234	
BN Community Kit – Shower Timer	370,725		1,857	
BN Community Kit – Shower Valve	321,847		1,612	
BN Community Kit – Kitchen Aerator, 1.5 gpm	187,985		942	
BN Community Kit – Bath Aerator, 1.0 gpm	84,334		423	
<i>BN Pilot Subtotal</i>	1,620,195			8,117
SAVE Kits				
Verified SAVE Kit – Faucet Aerator	724,173	5,010 kWh/million gal ^a	3,628	
Verified SAVE Kit – Showerhead	595,723		2,985	
Verified SAVE Kit – Restrictor Shower Valve	157,478		789	
Unverified SAVE Kit – Showerhead, 1.5 gpm	6,730,172		33,718	
Unverified SAVE Kit – Kitchen Aerator, 1.5 gpm	6,045,222		30,287	
Unverified SAVE Kit (No APS) – Showerhead, 1.5 gpm	3,987,856		19,979	
Unverified SAVE Kit (No APS) – Kitchen Aerator, 1.5 gpm	3,582,000		17,946	
Unverified SAVE Kit – Shower TSV	1,355,170		6,789	
Unverified SAVE Kit – Bath Aerator, 1.0 gpm	909,531		4,557	
Unverified SAVE Kit (No APS) – Shower TSV	802,985		4,023	
Unverified SAVE Kit (No APS) – Bath Aerator, 1.0 gpm	538,928		2,700	
<i>SAVE Kits Subtotal</i>	25,429,238			127,401
<i>Single Family Channel Subtotal</i>	27,382,902			137,188
CAA Channel				
Showerhead	250,841	5,010 kWh/million gal ^a	1,257	
Faucet Aerator	102,407		513	
Full Community Kit – Showerhead, 1.5 gpm	11,964		60	
Full Community Kit – Kitchen Aerator, 1.5 gpm	8,336		42	
Full Community Kit – Bath Aerator, 1.0 gpm	1,193		6	
<i>CAA Channel Subtotal</i>	374,741		1,877	
Total	27,757,643		139,066	

^a Source: IL-TRM V9.0.

Total Impacts for Cost-Effectiveness

Table 155 presents final total 2021 Income Qualified Initiative verified gross impacts to be used for cost-effectiveness, adjusted for gas penalties and secondary electric savings.

Table 155. 2021 Income Qualified Initiative Verified Gross Impacts for Cost-Effectiveness

	kWh	Therms	Gallons
Verified Gross Impacts for Goal Attainment	13,021,354	946,124	N/A
Gas Penalties	N/A	-87,239	N/A
Water Savings	N/A	N/A	27,757,643
Secondary Electric Savings	-139,066	N/A	N/A
Final Verified Gross Impacts for Cost-Effectiveness	12,882,288	858,884	27,757,643

Multifamily Initiatives

Gas Penalties

Table 156, Table 157, and Table 158 present gas penalties not reported in the body of the report for the Multifamily Initiatives.

Table 156. 2021 Public Housing Initiative Gas Penalties

Measure	Therms
Standard LED	-211
Total Gas Penalties	-211

Table 157. 2021 Income Qualified Initiative – Multifamily Channel Gas Penalties

Measure	Therms
Standard LED	-3,003
Specialty LED	-1,960
Standard LED (Common Area)	-1,887
Specialty LED (Common Area)	-135
Total Gas Penalties	-6,985

Table 158. 2021 Multifamily Initiative Gas Penalties

Measure	Therms
Standard LED	-519
Specialty LED	-202
Total Gas Penalties	-721

Secondary Electric Savings from Water Supply and Wastewater Treatment

Table 159, Table 160, and Table 161 present water savings and secondary electric savings for the Multifamily Initiatives. Water savings are not reported in the body of the report because they are converted to secondary electric savings for the purposes of goal attainment. These electric savings occur due to the displaced energy usage needed to power the water supply and wastewater treatment. However, water savings are included in the Illinois TRC, as gallons of water saved and secondary electric savings are excluded to avoid double counting. As a result, we calculate water savings and then convert them into secondary energy savings in line with the guidance provided in IL-TRM V9.0.

Table 159. 2021 Public Housing Initiative Secondary Electric Savings

Measure	Gallons	Conversion Factor	Secondary Electric Savings (kWh)
Low Flow Faucet Aerators	184,363	5,010 kWh/million gal ^a	924
Low Flow Showerheads	229,060		1,148
Thermostatic Restrictor Shower Valve	579,627		2,904
Total Savings	993,050		4,975

^a Source: IL-TRM V9.0.

Table 160. 2021 Income Qualified Initiative – Multifamily Channel Secondary Electric Savings

Measure	Gallons	Conversion Factor	Secondary Electric Savings (kWh)
Low Flow Faucet Aerators	3,045,644	5,010 kWh/million gal ^a	15,259
Low Flow Showerheads	4,301,670		21,551
Thermostatic Restrictor Shower Valve	259,059		1,298
Total Savings	7,606,373		38,108

^a Source: IL-TRM V9.0.

Table 161. 2021 Multifamily Initiative Secondary Electric Savings

Measure	Gallons	Conversion Factor	Secondary Electric Savings (kWh)
Low Flow Faucet Aerators	980,654	5,010 kWh/million gal ^a	4,913
Low Flow Showerheads	1,077,359		5,398
Thermostatic Restrictor Shower Valve	18,408		92
Total Savings	2,076,421		10,403

^a Source: IL-TRM V9.0.

Total Impacts for Cost-Effectiveness

Table 162, Table 163, and Table 164 present final total 2021 verified gross impacts to be used for cost-effectiveness for the Multifamily Initiatives, adjusted for gas penalties and secondary electric savings.

Table 162. 2021 Public Housing Initiative Verified Gross Impacts for Cost-Effectiveness

	kWh	Therms	Gallons
Verified Gross Impacts for Goal Attainment	807,600	3,769	N/A
Gas Penalties	N/A	-211	N/A
Water Savings	N/A	N/A	993,050
Secondary Electric Savings	-4,975	N/A	N/A
Final Verified Gross Impacts for Cost-Effectiveness	802,625	3,557	993,050

Table 163. 2021 Income Qualified Initiative – Multifamily Channel Verified Gross Impacts for Cost-Effectiveness

	kWh	Therms	Gallons
Verified Gross Impacts for Goal Attainment	3,777,293	14,716	N/A
Gas Penalties	N/A	-6,985	N/A
Water Savings	N/A	N/A	7,606,373
Secondary Electric Savings	-38,108	N/A	N/A
Final Verified Gross Impacts for Cost-Effectiveness	3,739,185	7,731	7,606,373

Table 164. 2021 Multifamily Initiative Verified Gross Impacts for Cost-Effectiveness

	kWh	Therms	Gallons
Verified Gross Impacts for Goal Attainment	1,375,271	9,483	N/A
Gas Penalties	N/A	-433	N/A
Water Savings	N/A	N/A	2,076,421
Secondary Electric Savings	-10,403	N/A	N/A
Final Verified Gross Impacts for Cost-Effectiveness	1,364,868	9,050	2,076,421

Home Efficiency – Market Rate Initiative

No measures delivered through the Home Efficiency – Market Rate Initiative in 2021 produced interactive effects or secondary electric savings, and therefore savings presented in the body of the report will be used for cost-effectiveness testing.

Midstream HVAC Initiative

Gas Penalties

Table 165 presents gas penalties not reported in the body of the report for the Midstream HVAC Initiative.

Table 165. 2021 Midstream HVAC Initiative Gas Penalties

Measure	Therms
Heat Pump Water Heater	-433
Total Gas Penalties	-433

Secondary Electric Savings from Water Supply and Wastewater Treatment

No measures delivered through the Midstream HVAC Initiative in 2021 produce quantifiable water savings.

Total Impacts for Cost-Effectiveness

Table 166 presents final total 2021 Midstream HVAC Initiative verified gross impacts to be used for cost-effectiveness, adjusted for gas penalties and secondary electric savings.

Table 166. 2021 Midstream HVAC Initiative Verified Gross Impacts for Cost-Effectiveness

	kWh	Therms	Gallons
Verified Gross Impacts for Goal Attainment	3,171,446	49,111	N/A
Gas Penalties	N/A	-433	N/A
Water Savings	N/A	N/A	0
Secondary Electric Savings	N/A	N/A	N/A
Final Verified Gross Impacts for Cost-Effectiveness	3,171,446	48,678	0

Appliance Recycling Initiative

Gas Penalties

Table 170 presents gas penalties not reported in the body of the report for the Appliance Recycling Initiative.

Table 167. 2021 Appliance Recycling Initiative Gas Penalties

Measure	Therms
9W LED	-22,430

Secondary Electric Savings from Water Supply and Wastewater Treatment

Table 171 presents water savings and secondary electric savings for the Appliance Recycling Initiative. Water savings are not reported in the body of the report because they are converted to secondary electric savings for the purposes of goal attainment. These electric savings occur due to the displaced energy usage needed to power the water supply and wastewater treatment. However, water savings are included in the Illinois TRC, as gallons of water saved and secondary electric savings are excluded to avoid double counting. As a result, we calculate water savings and then convert them into secondary energy savings in line with the guidance provided in IL-TRM V9.0.

Table 168. 2021 Appliance Recycling Initiative Secondary Electric Savings

Measure	Gallons	Conversion Factor	Secondary Electric Savings (kWh)
Low-Flow Faucet Aerators	3,616,455	5,010 kWh/million gal ^a	18,118
Low-Flow Showerheads	3,500,008		17,535
Total Savings	7,116,463		35,653

^a Source: IL-TRM V9.0.

Total Impacts for Cost-Effectiveness

Table 172 presents final total 2021 Appliance Recycling Initiative verified gross impacts to be used for cost-effectiveness, adjusted for gas penalties and secondary electric savings.

Table 169. 2021 Appliance Recycling Initiative Verified Gross Impacts for Cost-Effectiveness

	kWh	Therms	Gallons
Verified Gross Impacts for Goal Attainment	690,603	27,960	N/A
Gas Penalties	N/A	-22,430	N/A
Water Savings	N/A	N/A	7,116,463
Secondary Electric Savings	-35,653	N/A	N/A
Final Verified Gross Impacts for Cost-Effectiveness	654,949	5,529	7,116,463

Direct Distribution of Efficient Products Initiative

Gas Penalties

Table 170 presents gas penalties not reported in the body of the report for the Direct Distribution Initiative.

Table 170. 2021 Direct Distribution Initiative Gas Penalties

Measure	Therms
9W LED	-124,566
ENERGY STAR Desk Lamp	-760
4.5W Globe	-3,172
8W Reflector	-2,547
LED Nightlights	-9,510
Total Gas Penalties	-140,555

Secondary Electric Savings from Water Supply and Wastewater Treatment

Table 171 presents water savings and secondary electric savings for the Direct Distribution Initiative. Water savings are not reported in the body of the report because they are converted to secondary electric savings for the purposes of goal attainment. These electric savings occur due to the displaced energy usage needed to power the water supply and wastewater treatment. However, water savings are included in the Illinois TRC, as gallons of water saved and secondary electric savings are excluded to avoid double counting. As a result, we calculate water savings and then convert them into secondary energy savings in line with the guidance provided in IL-TRM V9.0.

Table 171. 2021 Direct Distribution Initiative Secondary Electric Savings

Measure	Gallons	Conversion Factor	Secondary Electric Savings (kWh)
Low-Flow Faucet Aerators	10,364,599	5,010 kWh/million gal ^a	51,927
Low-Flow Showerheads	10,789,037		54,053
Shower Timer	4,728,088		23,688
Thermostatic Restrictor Shower Valve	64,158		321
Total Savings	25,945,882		129,989

^a Source: IL-TRM V9.0.

Total Impacts for Cost-Effectiveness

Table 172 presents final total 2021 Direct Distribution Initiative verified gross impacts to be used for cost-effectiveness, adjusted for gas penalties and secondary electric savings.

Table 172. 2021 Direct Distribution Initiative Verified Gross Impacts for Cost-Effectiveness

	kWh	Therms	Gallons
Verified Gross Impacts for Goal Attainment	9,946,910	106,510	N/A
Gas Penalties	N/A	-140,555	N/A
Water Savings	N/A	N/A	25,945,882
Secondary Electric Savings	-129,989	N/A	N/A
Final Verified Gross Impacts for Cost-Effectiveness	9,816,921	-34,046	25,945,882

Efficient Choice Tool

Gas Penalties

Table 173 presents gas penalties not reported in the body of the report for the Efficient Choice Tool.

Table 173. 2021 Efficient Choice Tool Gas Penalties

Measure	Therms
LED Lighting	-1,030
Heat Pump Water Heaters	-2,053

Measure	Therms
Total Gas Penalties	-3,084

Secondary Electric Savings from Water Supply and Wastewater Treatment

Table 174 presents water savings and secondary electric savings for the Efficient Choice Tool. Water savings are not reported in the body of the report because they are converted to secondary electric savings for the purposes of goal attainment. These electric savings occur due to the displaced energy usage needed to power the water supply and wastewater treatment. However, water savings are included in the Illinois TRC as gallons of water saved and secondary electric savings are excluded to avoid double counting. As such, we calculate water savings and then convert them into secondary energy savings in line with the guidance provided in IL-TRM V9.0.

Table 174. 2021 Efficient Choice Tool Secondary Electric Savings

Measure	Gallons	Conversion Factor	Secondary Electric Savings (kWh)
ENERGY STAR Clothes Washers	1,086,477	5,010 kWh/million gal ^a	5,443
ENERGY STAR Dishwashers	19,561		98
Total Secondary Electric Savings	1,106,038		5,541

^a Source: IL-TRM V9.0.

Total Impacts for Cost-Effectiveness

Table 175 presents final total 2021 Efficient Choice Tool verified gross impacts to be used for cost-effectiveness, adjusted for gas penalties and secondary electric savings.

Table 175. 2021 Efficient Choice Tool Verified Gross Impacts for Cost-Effectiveness

	kWh	Therms	Gallons
Verified Gross Impacts for Goal Attainment	629,953	45,738	N/A
Gas Penalties	N/A	-3,084	N/A
Water Savings	N/A	N/A	1,106,038
Secondary Electric Savings	-5,541	N/A	N/A
Final Verified Gross Impacts for Cost-Effectiveness	624,412	42,655	1,106,038

Appendix C. Cumulative Persisting Annual Savings

This appendix presents detailed CPAS for the Residential Program and its subcomponents. Due to many years of CPAS, tables can be challenging to read; please reference the separately provided CPAS spreadsheet for additional detail as needed.

Table 176 presents CPAS for the 2021 Residential Program through 2044 at the channel level. Lifetime savings for the 2021 Residential Program are 1,146,997 MWh.

Table 176. 2021 Residential Program CPAS and WAML

Initiative/Channel	WAML	First-Year Verified Gross MWh	NTGR	CPAS – Verified Net MWh											
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Retail Products	9.8	66,523	0.831	55,264	55,264	55,264	55,264	46,745	45,792	45,486	35,648	35,517	35,249	13,466	2,693
Retail Products Carryover	9.5	15,454	0.690	10,666	10,666	10,666	10,666	6,814	6,683	6,458	5,468	5,468	5,468	0	0
Income Qualified – Single Family	11.6	8,216	1.000	8,216	8,216	8,207	8,207	8,207	8,207	7,720	5,456	5,443	5,443	1,753	1,622
Income Qualified – CAA	15.9	642	1.000	642	642	642	642	642	642	642	591	591	591	375	375
Smart Savers	11.0	4,163	1.000	4,163	4,163	4,163	4,163	4,163	4,163	4,163	4,163	4,163	4,163	4,163	0
Income Qualified – Multifamily	11.5	3,777	1.000	3,777	3,777	3,777	3,777	3,680	3,680	3,649	3,366	3,348	3,348	1,981	875
Income Qualified Carryover	10.0	638	1.000	638	638	638	638	638	638	638	459	459	459	0	0
Public Housing	12.6	808	1.000	808	808	808	808	739	739	723	664	664	664	402	360
Multifamily	10.9	1,375	0.906	1,247	1,247	1,247	1,247	1,149	1,149	1,146	1,118	1,118	1,118	862	55
Home Efficiency – Market Rate	15.0	135	0.833	112	112	112	112	105	105	105	105	100	100	96	51
HVAC	15.9	3,171	0.807	2,561	2,561	2,561	2,561	2,561	2,561	2,560	2,560	2,560	2,560	2,557	2,339
Appliance Recycling	6.4	5,167	0.487	2,515	2,515	2,515	2,515	2,457	2,457	1,228	0	0	0	0	0
AR Kits	8.9	691	0.961	663	663	663	663	575	575	575	303	303	303	0	0
AR Kits Carryover	10.0	10	1.000	10	10	10	10	10	10	10	8	8	8	0	0
School Kits	8.9	2,389	1.000	2,389	2,389	2,057	2,057	2,057	2,057	2,057	1,425	1,425	1,425	196	196
School Kits Carryover	10.0	188	0.977	184	184	184	184	170	170	170	136	136	136	0	0
Community Kits	9.5	7,558	1.000	7,558	7,558	7,554	7,554	7,554	7,554	7,554	5,215	4,795	4,795	0	0
Community Kits Carryover	10.0	540	1.000	540	540	540	540	540	540	540	426	426	426	0	0
Efficient Choice	13.2	630	0.683	430	430	430	430	412	412	412	399	399	349	326	290
Residential NPSO	10.2	1,614	0.712	1,149	1,149	1,149	1,149	861	861	823	778	776	768	379	121
Retail Products (gas conversion)	11.0	7,020	0.935	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	0
Smart Savers (gas conversion)	11.0	10,844	1.000	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	0
2021 Portfolio CPAS		141,554	0.854	120,941	120,941	120,596	120,596	107,486	106,403	104,068	85,698	85,109	84,783	43,966	8,977
Expiring 2021 Portfolio CPAS				0	0	345	0	13,111	1,083	2,335	18,370	589	326	40,817	34,989
Expired 2021 Portfolio CPAS				0	0	345	345	13,455	14,538	16,873	35,244	35,832	36,158	76,976	111,964

Table 176. 2021 Residential Program CPAS and WAML (Continued)

Initiative/Channel	WAML	First-Year Verified Gross MWh	NTGR	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Retail Products	9.8	66,523	0.831	2,029	2,029	1,539	366	157	35	35	8	8	8	0	0
Retail Products Carryover	9.5	15,454	0.690	0	0	0	0	0	0	0	0	0	0	0	0
Income Qualified - Single Family	11.6	8,216	1.000	1,619	1,619	1,619	1,347	1,198	1,198	1,143	1,006	0	0	0	0
Income Qualified - CAA	15.9	642	1.000	375	375	375	375	375	375	375	310	0	0	0	0
Smart Savers	11.0	4,163	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Income Qualified - Multifamily	11.5	3,777	1.000	866	866	866	104	104	104	104	104	0	0	0	0
Income Qualified Carryover	10.0	638	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Public Housing	12.6	808	1.000	327	327	327	65	65	65	65	65	0	0	0	0
Multifamily	10.9	1,375	0.906	55	55	55	6	6	6	6	6	0	0	0	0
Home Efficiency - Market Rate	15.0	135	0.833	51	51	51	51	51	51	51	44	0	0	0	0
HVAC	15.9	3,171	0.807	2,339	2,339	2,339	1,502	842	842	0	0	0	0	0	0
Appliance Recycling	6.4	5,167	0.487	0	0	0	0	0	0	0	0	0	0	0	0
AR Kits	8.9	691	0.961	0	0	0	0	0	0	0	0	0	0	0	0
AR Kits Carryover	10.0	10	1.000	0	0	0	0	0	0	0	0	0	0	0	0
School Kits	8.9	2,389	1.000	196	196	196	95	95	95	95	95	0	0	0	0
School Kits Carryover	10.0	188	0.977	0	0	0	0	0	0	0	0	0	0	0	0
Community Kits	9.5	7,558	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Community Kits Carryover	10.0	540	1.000	0	0	0	0	0	0	0	0	0	0	0	0
Efficient Choice	13.2	630	0.683	245	245	222	52	43	1	1	1	1	1	0	0
Residential NPSO	10.2	1,614	0.712	104	104	95	57	32	29	3	2	0	0	0	0
Retail Products (gas conversion)	11.0	7,020	0.935	0	0	0	0	0	0	0	0	0	0	0	0
Smart Savers (gas conversion)	11.0	10,844	1.000	0	0	0	0	0	0	0	0	0	0	0	0
2021 Portfolio CPAS		141,554	0.854	8,208	8,208	7,684	4,022	2,970	2,803	1,879	1,642	9	9	0	0
Expiring 2021 Portfolio CPAS				769	0	523	3,662	1,053	167	923	237	1,632	0	9	0
Expired 2021 Portfolio CPAS				112,733	112,733	113,257	116,919	117,971	118,139	119,062	119,299	120,932	120,932	120,941	120,941
WAML	10.2														

Retail Products Initiative

Table 177 provides CPAS and WAML for the 2021 Retail Products Initiative through 2048 by measure. Lifetime savings for the Initiative are 487,864 MWh.

Table 177. 2021 Retail Products Initiative CPAS and WAML

Measure	Measure Life	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)														
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Standard LED - Residential IQ	10.0	9,838	1.000	9,838	9,838	9,838	9,838	9,838	9,838	9,838	9,838	7,772	7,772	7,772	0	0	0	0
Standard LED - Commercial	5.5	1,058	1.000	1,058	1,058	1,058	1,058	402	201	0	0	0	0	0	0	0	0	0
Reflector LED - Residential Non-IQ	10.0	10,166	0.690	7,015	7,015	7,015	7,015	4,209	4,209	4,209	4,209	4,209	4,209	4,209	0	0	0	0
Reflector LED - Residential IQ	10.0	4,324	0.897	3,881	3,881	3,881	3,881	3,881	3,881	3,881	3,881	2,716	2,716	2,716	0	0	0	0
Reflector LED - Commercial	6.9	2,235	0.752	1,680	1,680	1,680	1,680	1,008	1,008	907	0	0	0	0	0	0	0	0
Specialty LED - Residential Non-IQ	10.0	12,225	0.690	8,435	8,435	8,435	8,435	5,145	5,145	5,145	5,145	5,145	5,145	5,145	0	0	0	0
Specialty LED - Residential IQ	10.0	3,646	0.802	2,926	2,926	2,926	2,926	2,926	2,926	2,926	1,814	1,814	1,814	0	0	0	0	0
Specialty LED - Commercial	4.7	2,448	0.716	1,752	1,752	1,752	1,752	748	0	0	0	0	0	0	0	0	0	0
LED Fixture - Residential Non-IQ	15.0	219	0.690	151	151	151	151	91	91	91	91	91	91	91	91	91	91	91
LED Fixture - Residential IQ	15.0	1,257	0.988	1,242	1,242	1,242	1,242	1,242	1,242	1,242	870	870	870	870	870	870	870	870
LED Fixture - Commercial	14.5	146	0.975	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143
Nightlight - Residential Non-IQ	8.0	92	0.690	64	64	64	64	64	64	64	64	0	0	0	0	0	0	0
Nightlight - Residential IQ	8.0	67	1.000	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
Connected LED - Residential Non-IQ	10.0	58	0.690	40	40	40	40	18	18	18	18	18	18	18	0	0	0	0
Connected LED - Residential IQ	10.0	8	0.911	7	7	7	7	7	7	7	6	6	6	6	0	0	0	0
Connected LED - Commercial	5.5	24	0.716	17	17	17	17	7	4	0	0	0	0	0	0	0	0	0
Advanced Power Strip - Non-IQ	7.0	34	0.860	29	29	29	29	29	29	29	0	0	0	0	0	0	0	0
Smart Thermostat - Non-IQ	11.0	8,295	0.869	7,212	7,212	7,212	7,212	7,212	7,212	7,212	7,212	7,212	7,212	7,212	7,212	0	0	0
Dehumidifier - Non-IQ	12.0	688	0.670	461	461	461	461	461	461	461	461	461	461	461	461	461	0	0
Air Purifier - Non-IQ	9.0	251	0.786	198	198	198	198	198	198	198	198	198	198	198	0	0	0	0
Clothes Washer - Non-IQ	14.0	455	0.630	287	287	287	287	287	287	287	287	287	287	287	287	287	287	287
Refrigerator - Non-IQ	17.0	114	0.647	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
Electric Clothes Dryer - Non-IQ	16.0	198	0.670	132	132	132	132	132	132	132	132	132	132	132	132	132	132	132
Bath Vent Fans - Non-IQ	19.0	30	0.661	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Water Dispenser - Non-IQ	10.0	110	0.670	74	74	74	74	74	74	74	74	74	74	74	0	0	0	0
Window Air Conditioners - Non-IQ	12.0	27	0.807	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Freezer - Non-IQ	22.0	8	0.630	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Pool Pump - Non-IQ	7.0	201	0.760	153	153	153	153	153	153	153	0	0	0	0	0	0	0	0
Heat Pump Water Heater - Non-IQ	15.0	86	0.801	69	69	69	69	69	69	69	69	69	69	69	68	68	68	68
Advanced Power Strip - IQ	7.0	3,980	1.000	3,980	3,980	3,980	3,980	3,980	3,980	3,980	0	0	0	0	0	0	0	0
Smart Thermostat - IQ	11.0	3,561	1.000	3,561	3,561	3,561	3,561	3,561	3,561	3,561	3,561	3,561	3,561	3,561	3,561	0	0	0
Dehumidifier - IQ	12.0	170	1.000	170	170	170	170	170	170	170	170	170	170	170	170	170	0	0
Air Purifier - IQ	9.0	71	1.000	71	71	71	71	71	71	71	71	71	71	0	0	0	0	0
Clothes Washer - IQ	14.0	175	1.000	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175
Refrigerator - IQ	17.0	48	1.000	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Electric Clothes Dryer - IQ	16.0	77	1.000	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Bath Vent Fans - IQ	19.0	8	1.000	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Water Dispenser - IQ	10.0	28	1.000	28	28	28	28	28	28	28	28	28	28	28	0	0	0	0
Window Air Conditioners - IQ	12.0	12	1.000	12	12	12	12	12	12	12	12	12	12	12	12	12	0	0
Freezer - IQ	22.0	3	1.000	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Pool Pump - IQ	7.0	54	1.000	54	54	54	54	54	54	54	0	0	0	0	0	0	0	0
Heat Pump Water Heater - IQ	15.0	29	1.000	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Total		66,523	0.831	55,264	55,264	55,264	55,264	46,745	45,792	45,486	35,648	35,517	35,249	13,466	2,693	2,029	2,029	
Expiring 2021 CPAS				0	0	0	0	8,519	953	305	9,838	131	268	21,783	10,773	664	0	
Expired 2021 CPAS				0	0	0	0	8,519	9,472	9,778	19,616	19,747	20,016	41,798	52,571	53,235	53,235	

Table 177. 2021 Retail Products Initiative CPAS and WAML (Continued)

Measure	Measure Life	First-Year Verified Gross MWh	NTGR	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
Standard LED - Residential IQ	10.0	9,838	1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Standard LED - Commercial	5.5	1,058	1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reflector LED - Residential Non-IQ	10.0	10,166	0.690	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reflector LED - Residential IQ	10.0	4,324	0.897	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reflector LED - Commercial	6.9	2,235	0.752	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Specialty LED - Residential Non-IQ	10.0	12,225	0.690	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Specialty LED - Residential IQ	10.0	3,646	0.802	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Specialty LED - Commercial	4.7	2,448	0.716	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LED Fixture - Residential Non-IQ	15.0	219	0.690	91	0	0	0	0	0	0	0	0	0	0	0	0	0
LED Fixture - Residential IQ	15.0	1,257	0.988	870	0	0	0	0	0	0	0	0	0	0	0	0	0
LED Fixture - Commercial	14.5	146	0.975	114	0	0	0	0	0	0	0	0	0	0	0	0	0
Nightlight - Residential Non-IQ	8.0	92	0.690	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nightlight - Residential IQ	8.0	67	1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Connected LED - Residential Non-IQ	10.0	58	0.690	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Connected LED - Residential IQ	10.0	8	0.911	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Connected LED - Commercial	5.5	24	0.716	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Advanced Power Strip - Non-IQ	7.0	34	0.860	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smart Thermostat - Non-IQ	11.0	8,295	0.869	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dehumidifier - Non-IQ	12.0	688	0.670	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Air Purifier - Non-IQ	9.0	251	0.786	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clothes Washer - Non-IQ	14.0	455	0.630	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Refrigerator - Non-IQ	17.0	114	0.647	74	74	74	0	0	0	0	0	0	0	0	0	0	0
Electric Clothes Dryer - Non-IQ	16.0	198	0.670	132	132	0	0	0	0	0	0	0	0	0	0	0	0
Bath Vent Fans - Non-IQ	19.0	30	0.661	20	20	20	20	20	0	0	0	0	0	0	0	0	0
Water Dispenser - Non-IQ	10.0	110	0.670	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Window Air Conditioners - Non-IQ	12.0	27	0.807	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freezer - Non-IQ	22.0	8	0.630	5	5	5	5	5	5	5	5	0	0	0	0	0	0
Pool Pump - Non-IQ	7.0	201	0.760	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heat Pump Water Heater - Non-IQ	15.0	86	0.801	68	0	0	0	0	0	0	0	0	0	0	0	0	0
Advanced Power Strip - IQ	7.0	3,980	1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smart Thermostat - IQ	11.0	3,561	1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dehumidifier - IQ	12.0	170	1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Air Purifier - IQ	9.0	71	1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clothes Washer - IQ	14.0	175	1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Refrigerator - IQ	17.0	48	1.000	48	48	48	0	0	0	0	0	0	0	0	0	0	0
Electric Clothes Dryer - IQ	16.0	77	1.000	77	77	0	0	0	0	0	0	0	0	0	0	0	0
Bath Vent Fans - IQ	19.0	8	1.000	8	8	8	8	8	0	0	0	0	0	0	0	0	0
Water Dispenser - IQ	10.0	28	1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Window Air Conditioners - IQ	12.0	12	1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freezer - IQ	22.0	3	1.000	3	3	3	3	3	3	3	3	0	0	0	0	0	0
Pool Pump - IQ	7.0	54	1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heat Pump Water Heater - IQ	15.0	29	1.000	29	0	0	0	0	0	0	0	0	0	0	0	0	0
Total		66,523	0.831	1,539	366	157	35	35	8	8	8	0	0	0	0	0	0
Expiring 2021 CPAS				491	1,172	210	122	0	27	0	0	8	0	0	0	0	0
Expired 2021 CPAS				53,726	54,898	55,107	55,229	55,229	55,256	55,256	55,256	55,264	55,264	55,264	55,264	55,264	55,264
WAML	9.8																

Table 178 provides CPAS converted from terms for the 2021 Retail Products Initiative through 2032 by measure. Lifetime savings for the 2020 Retail Products Initiative conversion are 72,203 MWh.

Table 178. 2021 Retail Products Initiative Gas Conversion CPAS and WAML

Measure	Measure Life	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)											
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Advanced Thermostats	11.0	7,020	0.935	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	0
2021 CPAS		7,020	0.935	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564	0
Expiring 2021 CPAS				0	0	0	0	0	0	0	0	0	0	0	6,564
Expired 2021 CPAS				0	0	0	0	0	0	0	0	0	0	0	6,564
WAML	11.0														

Table 179 provides CPAS for 2021 Retail Products Initiative carryover savings through 2032 by measure. Lifetime savings for 2021 Retail Products Initiative carryover are 79,024 MWh.

Table 179. 2021 Retail Products Initiative Carryover CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)											
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
2020 Standard LED - Residential Non-IQ	10.0	819	0.690	565	565	565	565	215	215	215	215	215	215	0	0
2020 Standard LED - Residential IQ	10.0	694	0.690	479	479	479	479	479	479	479	378	378	378	0	0
2020 Standard LED - Commercial	5.5	106	0.690	73	73	73	73	14	0	0	0	0	0	0	0
2020 Reflector LED - Residential Non-IQ	10.0	1,185	0.690	818	818	818	818	491	491	491	491	491	491	0	0
2020 Reflector LED - Residential IQ	10.0	872	0.690	601	601	601	601	601	601	601	421	421	421	0	0
2020 Reflector LED - Commercial	6.9	297	0.690	205	205	205	205	123	110	0	0	0	0	0	0
2020 Decorative LED - Residential Non-IQ	10.0	1,239	0.690	855	855	855	855	522	522	522	522	522	522	0	0
2020 Decorative LED - Residential IQ	10.0	892	0.690	616	616	616	616	616	616	616	382	382	382	0	0
2020 Decorative LED - Commercial	4.7	307	0.690	212	212	212	212	0	0	0	0	0	0	0	0
2020 LED Fixture - Commercial	10.0	12	0.957	12	12	12	12	7	7	7	7	7	7	0	0
2019 Standard LED - Residential Non-IQ	10.0	3,362	0.690	2,320	2,320	2,320	2,320	881	881	881	881	881	881	0	0
2019 Standard LED - Residential IQ	10.0	1,893	0.690	1,306	1,306	1,306	1,306	1,306	1,306	1,306	1,032	1,032	1,032	0	0
2019 Standard LED - Commercial	5.5	699	0.690	482	482	482	482	92	0	0	0	0	0	0	0
2019 Reflector LED - Residential Non-IQ	10.0	1,207	0.690	833	833	833	833	500	500	500	500	500	500	0	0
2019 Reflector LED - Residential IQ	10.0	615	0.690	424	424	424	424	424	424	424	297	297	297	0	0
2019 Reflector LED - Commercial	6.9	308	0.690	212	212	212	212	127	115	0	0	0	0	0	0
2019 Decorative LED - Residential Non-IQ	10.0	531	0.690	366	366	366	366	223	223	223	223	223	223	0	0
2019 Decorative LED - Residential IQ	10.0	280	0.690	193	193	193	193	193	193	193	120	120	120	0	0
2019 Decorative LED - Commercial	4.7	137	0.690	95	95	95	95	0	0	0	0	0	0	0	0
Total		15,454	0.690	10,666	10,666	10,666	10,666	6,814	6,683	6,458	5,468	5,468	5,468	0	0
Expiring 2021 CPAS				0	0	0	0	3,853	130	225	990	0	0	5,468	0
Expired 2021 CPAS				0	0	0	0	3,853	3,983	4,208	5,198	5,198	5,198	10,666	10,666
WAML	9.5														

Income Qualified Initiative

Table 180 provides CPAS for the Income Qualified Initiative⁴³ through 2044 by channel. Lifetime savings for the Initiative are 143,199 MWh.

Table 180. 2021 Income Qualified Initiative CPAS and WAML

Channel	WAML	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)											
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Single Family	11.6	8,216	1.000	8,216	8,216	8,207	8,207	8,207	8,207	7,720	5,456	5,443	5,443	1,753	1,622
CAA	15.9	642	1.000	642	642	642	642	642	642	642	591	591	591	375	375
Smart Savers	11.0	4,163	1.000	4,163	4,163	4,163	4,163	4,163	4,163	4,163	4,163	4,163	4,163	4,163	0
2021 CPAS		13,021	1.000	13,021	13,021	13,013	13,013	13,013	13,013	12,526	10,211	10,198	10,198	6,291	1,997
Expiring 2021 CPAS				0	0	9	0	0	0	487	2,315	13	0	3,907	4,295
Expired 2021 CPAS				0	0	9	9	9	9	496	2,811	2,823	2,823	6,730	11,025

Channel	WAML	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)											
				2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Single Family	11.6	8,216	1.000	1,619	1,619	1,619	1,347	1,198	1,198	1,143	1,006	0	0	0	0
CAA	15.9	642	1.000	375	375	375	375	375	375	375	310	0	0	0	0
Smart Savers	11.0	4,163	1.000	0	0	0	0	0	0	0	0	0	0	0	0
2021 CPAS		13,021	1.000	1,994	1,994	1,994	1,723	1,573	1,573	1,518	1,316	0	0	0	0
Expiring 2021 CPAS				3	0	0	271	149	0	55	202	1,316	0	0	0
Expired 2021 CPAS				11,027	11,027	11,027	11,299	11,448	11,448	11,503	11,705	13,021	13,021	13,021	13,021
WAML	11.6														

Table 181 provides CPAS converted from terms for the 2021 Income Qualified Initiative through 2032 by measure. Lifetime savings for the 2021 Income Qualified Initiative conversion are 119,288 MWh.

Table 181. 2021 Income Qualified Initiative Gas Conversion CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)												
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
Advanced Thermostats	11.0	10,844	1.000	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	0
2021 CPAS		10,844	1.000	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	10,844	0
Expiring 2021 CPAS				0	0	0	0	0	0	0	0	0	0	0	0	10,844
Expired 2021 CPAS				0	0	0	0	0	0	0	0	0	0	0	0	10,844
WAML	11.0															

⁴³ Less the Multifamily channel.

Table 182 provides CPAS for 2021 Income Qualified Initiative carryover savings through 2031 by measure. Lifetime savings for 2021 Income Qualified Initiative carryover are 5,843 MWh.

Table 182. 2021 Income Qualified Initiative Carryover CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)											
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
Standard LED (2020 Unverified SAVE Kit)	10.0	302	1.000	302	302	302	302	302	302	302	302	238	238	238	0
Decorative LED (2020 Unverified SAVE Kit)	10.0	176	1.000	176	176	176	176	176	176	176	176	109	109	109	0
Reflector LED (2020 Unverified SAVE Kit)	10.0	148	1.000	148	148	148	148	148	148	148	148	103	103	103	0
Standard LED (2020 Left SAVE Kit)	10.0	3	1.000	3	3	3	3	3	3	3	3	2	2	2	0
Decorative LED (2020 Left SAVE Kit)	10.0	4	1.000	4	4	4	4	4	4	4	4	2	2	2	0
Reflector LED (2020 Left SAVE Kit)	10.0	5	1.000	5	5	5	5	5	5	5	5	3	3	3	0
Standard LED (2020 BN Community Kit)	10.0	0.6	1.000	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.0
Decorative LED (2020 BN Community Kit)	10.0	0.2	1.000	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0
Standard LED (2020 BN Community Kit)	10.0	0.2	1.000	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0
2021 CPAS		638	1.000	638	638	638	638	638	638	638	638	459	459	459	0
Expiring 2021 CPAS				0	0	0	0	0	0	0	0	178	0	0	459
Expired 2021 CPAS				0	0	0	0	0	0	0	0	178	178	178	638
WAML	10.0														

Multifamily Initiatives

Table 183 provides CPAS for the 2021 Multifamily Initiatives by channel through 2044. Lifetime savings for the Initiatives are 64,549 MWh.

Table 183. 2021 Multifamily Initiatives CPAS and WAML

Channel	WAML	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)											
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Income Qualified - Multifamily	11.5	3,777	1.000	3,777	3,777	3,777	3,777	3,680	3,680	3,649	3,366	3,348	3,348	1,981	875
Public Housing	12.6	808	1.000	808	808	808	808	739	739	723	664	664	664	402	360
Multifamily	10.9	1,375	0.906	1,247	1,247	1,247	1,247	1,149	1,149	1,146	1,118	1,118	1,118	862	55
2021 CPAS		5,960	0.978	5,831	5,831	5,831	5,831	5,568	5,568	5,519	5,148	5,130	5,130	3,246	1,290
Expiring 2021 CPAS				0	0	0	0	263	0	50	370	18	0	1,884	1,956
Expired 2021 CPAS				0	0	0	0	263	263	313	683	701	701	2,586	4,542

Cumulative Persisting Annual Savings

Channel	WAML	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)											
				2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Income Qualified - Multifamily	11.5	3,777	1.000	866	866	866	104	104	104	104	104	0	0	0	0
Public Housing	12.6	808	1.000	327	327	327	65	65	65	65	65	0	0	0	0
Multifamily	10.9	1,375	0.906	55	55	55	6	6	6	6	6	0	0	0	0
2021 CPAS		5,960	0.978	1,248	1,248	1,248	176	176	176	176	176	0	0	0	0
Expiring 2021 CPAS				41	0	0	1,072	0	0	0	0	176	0	0	0
Expired 2021 CPAS				4,583	4,583	4,583	5,656	5,656	5,656	5,656	5,656	5,831	5,831	5,831	5,831
WAML	11.5														

Home Efficiency – Market Rate Initiative

Table 184 provides CPAS and WAML for the 2021 Home Efficiency – Market Rate Initiative through 2041 by measure. Lifetime savings for the Initiative are 1,617 MWh.

Table 184. 2021 Home Efficiency – Market Rate Initiative CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)										
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Air Sealing	20.0	22	0.897	20	20	20	20	20	20	20	20	20	20	20
Attic Insulation	20.0	16	0.800	13	13	13	13	13	13	13	13	13	13	13
Duct Sealing	20.0	8	0.800	6	6	6	6	6	6	6	6	6	6	6
Bathroom Exhaust Fan	19.0	9	0.800	7	7	7	7	7	7	7	7	7	7	7
Wall Insulation	20.0	3	0.800	2	2	2	2	2	2	2	2	2	2	2
Crawlspace Insulation	20.0	6	0.800	5	5	5	5	5	5	5	5	5	5	5
Advanced Thermostat	11.0	4	0.856	4	4	4	4	4	4	4	4	4	4	4
Rim Joist Insulation	20.0	1	0.800	1	1	1	1	1	1	1	1	1	1	1
SSP Advanced Thermostat	11.0	49	0.843	42	42	42	42	42	42	42	42	42	42	42
SSP LEDs (Dusk to Dawn)	8.0	16	0.800	13	13	13	13	5	5	5	5	5	0	0
2021 CPAS		135	0.833	112	112	112	112	105	105	105	105	105	100	100
Expiring 2021 CPAS				0	0	0	0	8	0	0	0	0	5	0
Expired 2021 CPAS				0	0	0	0	8	8	8	8	8	13	13

Cumulative Persisting Annual Savings

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
				Air Sealing	20.0	22	0.897	18	18	18	18	18	18	18
Attic Insulation	20.0	16	0.800	12	12	12	12	12	12	12	12	12	12	0
Duct Sealing	20.0	8	0.800	6	6	6	6	6	6	6	6	6	6	0
Bathroom Exhaust Fan	19.0	9	0.800	7	7	7	7	7	7	7	7	7	0	0
Wall Insulation	20.0	3	0.800	2	2	2	2	2	2	2	2	2	2	0
Crawlspace Insulation	20.0	6	0.800	5	5	5	5	5	5	5	5	5	5	0
Advanced Thermostat	11.0	4	0.856	4	0	0	0	0	0	0	0	0	0	0
Rim Joist Insulation	20.0	1	0.800	1	1	1	1	1	1	1	1	1	1	0
SSP Advanced Thermostat	11.0	49	0.843	42	0	0	0	0	0	0	0	0	0	0
SSP LEDs (Dusk to Dawn)	8.0	16	0.800	0	0	0	0	0	0	0	0	0	0	0
2021 CPAS		135	0.833	96	51	44	0							
Expiring 2021 CPAS				4	45	0	7	44						
Expired 2021 CPAS				16	61	69	112							
WAML	15.0													

Midstream HVAC Initiative

Table 185 provides CPAS and WAML for the 2021 Midstream HVAC Initiative through 2040 by measure. Lifetime savings for the Initiative are 40,704 MWh.

Table 185. 2021 Midstream HVAC Initiative CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)										
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
CAC Midstream	18.0	720	0.800	576	576	576	576	576	576	576	576	576	576	576
ASHP Midstream	16.0	679	0.800	544	544	544	544	544	544	544	544	544	544	544
Ductless Heat Pump Midstream	15.0	608	0.800	486	486	486	486	486	486	486	486	486	486	486
Heat Pump Water Heater Midstream	15.0	384	0.800	307	307	307	307	307	307	307	307	307	307	307
CAC Standard	18.0	323	0.822	265	265	265	265	265	265	265	265	265	265	265
ASHP Standard	16.0	142	0.822	117	117	117	117	117	117	117	117	117	117	117
Advanced Thermostat Midstream	11.0	140	0.835	117	117	117	117	117	117	117	117	117	117	117
Advanced Thermostat	11.0	117	0.863	101	101	101	101	101	101	101	101	101	101	101
Ductless Heat Pump Standard	15.0	55	0.822	45	45	45	45	45	45	45	45	45	45	45
CAC ER	18.0	2	0.742	2	2	2	2	2	2	0	0	0	0	0
2021 CPAS		3,171	0.807	2,561	2,561	2,561	2,561	2,561	2,561	2,560	2,560	2,560	2,560	2,560
Expiring 2021 CPAS				0	0	0	0	0	0	1	0	0	0	0
Expired 2021 CPAS				0	0	0	0	0	0	1	1	1	1	1

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)										
				2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
CAC Midstream	18.0	720	0.800	576	576	576	576	576	576	576	576	0	0	0
ASHP Midstream	16.0	679	0.800	544	544	544	544	544	544	0	0	0	0	0
Ductless Heat Pump Midstream	15.0	608	0.800	486	486	486	486	486	0	0	0	0	0	0
Heat Pump Water Heater Midstream	15.0	384	0.800	305	305	305	305	305	0	0	0	0	0	0
CAC Standard	18.0	323	0.822	265	265	265	265	265	265	265	265	0	0	0
ASHP Standard	16.0	142	0.822	117	117	117	117	117	117	0	0	0	0	0
Advanced Thermostat Midstream	11.0	140	0.835	117	0	0	0	0	0	0	0	0	0	0
Advanced Thermostat	11.0	117	0.863	101	0	0	0	0	0	0	0	0	0	0
Ductless Heat Pump Standard	15.0	55	0.822	45	45	45	45	45	0	0	0	0	0	0
CAC ER	18.0	2	0.742	0	0	0	0	0	0	0	0	0	0	0
2021 CPAS		3,171	0.807	2,557	2,339	2,339	2,339	2,339	2,339	1,502	842	842	0	0
Expiring 2021 CPAS				2	218	0	0	0	837	660	0	842	0	0
Expired 2021 CPAS				3	221	221	221	221	221	1,058	1,719	1,719	2,561	2,561
WAML	15.9													

Appliance Recycling Initiative

Table 186 provides CPAS and WAML for the 2021 Appliance Recycling Initiative through 2036 by measure. Lifetime savings for the Initiative are 21,489 MWh.

Table 186. 2021 Appliance Recycling Initiative CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR	Net MWh)							
				2021	2022	2023	2024	2025	2026	2027	2028
Appliance Recycling	6.4	5,167	0.487	2,515	2,515	2,515	2,515	2,457	2,457	1,228	0
AR Kits	8.9	691	0.961	663	663	663	663	575	575	575	303
2021 CPAS		5,858	0.543	3,178	3,178	3,178	3,178	3,031	3,031	1,803	303
Expiring 2021 CPAS				0	0	0	0	147	0	1,228	1,500
Expired 2021 CPAS				0	0	0	0	147	147	1,375	2,875

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR								
				2029	2030	2031	2032	2033	2034	2035	2036
Appliance Recycling	6.4	5,167	0.487	0	0	0	0	0	0	0	0
AR Kits	8.9	691	0.961	303	303	0	0	0	0	0	0
2021 CPAS		5,858	0.543	303	303	0	0	0	0	0	0
Expiring 2021 CPAS				0	0	303	0	0	0	0	0
Expired 2021 CPAS				2,875	2,875	3,178	3,178	3,178	3,178	3,178	3,178
WAML	6.7										

Direct Distribution of Efficient Products Initiative

Table 187 provides CPAS and WAML for the 2021 Direct Distribution Initiative through 2044 by channel. Lifetime savings for the Initiative are 88,488 MWh.

Table 187. 2021 Direct Distribution Initiative CPAS and WAML

Channel	WAML	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)											
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
School Kits	8.9	2,389	1.000	2,389	2,389	2,057	2,057	2,057	2,057	2,057	1,425	1,425	1,425	196	196
Community Kits	9.5	7,558	1.000	7,558	7,558	7,554	7,554	7,554	7,554	7,554	5,215	4,795	4,795	0	0
2021 CPAS		9,947	1.000	9,947	9,947	9,611	9,611	9,611	9,611	9,611	6,640	6,221	6,221	196	196
Expiring 2021 CPAS				0	0	336	0	0	0	0	2,971	420	0	6,024	0
Expired 2021 CPAS				0	0	336	336	336	336	336	3,307	3,726	3,726	9,751	9,751

Cumulative Persisting Annual Savings

Channel	WAML	First-Year Verified Gross MWh	NTGR	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
				School Kits	8.9	2,389	1.000	196	196	196	95	95	95	95	95
Community Kits	9.5	7,558	1.000	0	0	0	0	0	0	0	0	0	0	0	0
2021 CPAS		9,947	1.000	196	196	196	95	95	95	95	95	0	0	0	0
Expiring 2021 CPAS				0	0	0	101	0	0	0	0	95	0	0	0
Expired 2021 CPAS				9,751	9,751	9,751	9,852	9,852	9,852	9,852	9,852	9,947	9,947	9,947	9,947
WAML	9.3														

Table 188 provides CPAS for 2021 Direct Distribution Initiative carryover savings through 2031 by measure. Lifetime savings for 2021 Direct Distribution carryover are 6,812 MWh.

Table 188. 2021 Direct Distribution Initiative Carryover CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)											
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
2020 School Kits Standard LED	10.0	162	1.000	162	162	162	162	162	162	162	162	128	128	128	0
2019 School Kits Standard LED	10.0	27	0.840	22	22	22	22	8	8	8	8	8	8	8	0
2020 AR Kits Standard LED	10.0	9	1.000	9	9	9	9	9	9	9	9	7	7	7	0
2019 AR Kits Standard LED	10.0	2	1.000	2	2	2	2	2	2	2	2	1	1	1	0
2020 Food Pantry Distribution 9W Standard LED	10.0	519	1.000	519	519	519	519	519	519	519	519	410	410	410	0
2020 Community Kits - Standard LED (Customer Assistance Kit)	10.0	9	1.000	9	9	9	9	9	9	9	9	7	7	7	0
2020 Community Kits - ENERGY STAR Desk Lamp (Customer Assistance Kit)	10.0	1	1.000	1	1	1	1	1	1	1	1	1	1	1	0
2020 Community Kits - Standard LED (Electric Community Kit #1)	10.0	1	1.000	1	1	1	1	1	1	1	1	1	1	1	0
2020 Community Kits - Standard LED (Electric Community Kit #2)	10.0	5	1.000	5	5	5	5	5	5	5	5	4	4	4	0
2020 Community Kits - Decorative LED (Electric Community Kit #2)	10.0	2	1.000	2	2	2	2	2	2	2	2	1	1	1	0
2020 Community Kits - Directional LED (Electric Community Kit #2)	10.0	2	1.000	2	2	2	2	2	2	2	2	1	1	1	0
2021 CPAS		739	0.994	735	735	735	735	721	721	721	721	570	570	570	0
Expiring 2021 CPAS				0	0	0	0	14	0	0	0	150	0	0	570
Expired 2021 CPAS				0	0	0	0	14	14	14	14	164	164	164	735
WAML	10.0														

Efficient Choice Tool

Table 189 provides CPAS for the 2021 ECT pilot through 2040. Lifetime savings for the Pilot are 5,531 MWh.

Table 189. 2021 ECT CPAS and WAML

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)									
				2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
LED Lighting	10.0	53	0.758	40	40	40	40	21	21	21	21	21	21
Advanced Power Strips	7.0	5	0.733	4	4	4	4	4	4	4	0	0	0
Advanced Thermostats	11.0	55	0.628	35	35	35	35	35	35	35	35	35	35
Air Purifiers	9.0	66	0.756	50	50	50	50	50	50	50	50	50	0
Air Conditioners	12.0	3	0.619	2	2	2	2	2	2	2	2	2	2
Dehumidifiers	12.0	72	0.597	43	43	43	43	43	43	43	43	43	43
Dishwashers	11.0	1	0.680	1	1	1	1	1	1	1	1	1	1
Refrigerators	17.0	65	0.650	42	42	42	42	42	42	42	42	42	42
Freezers	22.0	2	0.682	1	1	1	1	1	1	1	1	1	1
Clothes Washers	14.0	49	0.471	23	23	23	23	23	23	23	23	23	23
Electric Clothes Dryers	16.0	15	0.542	8	8	8	8	8	8	8	8	8	8
Pool Pumps	7.0	14	0.650	9	9	9	9	9	9	9	0	0	0
Heat Pump Water Heaters	15.0	229	0.750	172	172	172	172	172	172	172	172	172	172
2021 CPAS		630	0.683	430	430	430	430	412	412	412	399	399	349
Expiring 2021 CPAS				0	0	0	0	18	0	0	13	0	50
Expired 2021 CPAS				0	0	0	0	18	18	18	31	31	81

Evaluation Measure Category	Measure Life	First-Year Verified Gross MWh	NTGR	CPAS (Verified Net MWh)									
				2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
LED Lighting	10.0	53	0.758	0	0	0	0	0	0	0	0	0	0
Advanced Power Strips	7.0	5	0.733	0	0	0	0	0	0	0	0	0	0
Advanced Thermostats	11.0	55	0.628	35	0	0	0	0	0	0	0	0	0
Air Purifiers	9.0	66	0.756	0	0	0	0	0	0	0	0	0	0
Air Conditioners	12.0	3	0.619	2	2	0	0	0	0	0	0	0	0
Dehumidifiers	12.0	72	0.597	43	43	0	0	0	0	0	0	0	0
Dishwashers	11.0	1	0.680	1	0	0	0	0	0	0	0	0	0
Refrigerators	17.0	65	0.650	42	42	42	42	42	42	42	0	0	0
Freezers	22.0	2	0.682	1	1	1	1	1	1	1	1	1	1
Clothes Washers	14.0	49	0.471	23	23	23	23	0	0	0	0	0	0
Electric Clothes Dryers	16.0	15	0.542	8	8	8	8	8	8	0	0	0	0
Pool Pumps	7.0	14	0.650	0	0	0	0	0	0	0	0	0	0
Heat Pump Water Heaters	15.0	229	0.750	171	171	171	171	171	0	0	0	0	0
2021 CPAS		630	0.683	326	290	245	245	222	52	43	1	1	1
Expiring 2021 CPAS				23	36	45	0	23	171	8	42	0	0
Expired 2021 CPAS				104	140	185	185	208	378	387	429	429	429
WAML	13.2												

Appendix D. Detailed Income Qualified Initiative Participation Summary

Presented at stakeholder request, Table 190 provides a detailed summary of measures received by participants in the Single Family and CAA channels of the 2021 Income Qualified Initiative, with an explicit focus on characterizing the percentage of participants in each channel that received a given measure.

Table 190. Detailed 2021 Income Qualified Participation Summary

Unique Participants	IL-TRM Measure Name	Participants Receiving Measure	% Participants Receiving Measure	Total Quantity	Unit	Average Quantity per Participant Receiving
Single Family Channel						
998	Floor Insulation Above Crawlspace	4	0%	3,132	square feet	783.0
998	LED Specialty Lamps	228	23%	1,651	lamps	7.2
998	Duct Insulation and Sealing	25	3%	25	participants	1.0
998	ENERGY STAR Room Air Conditioner	14	1%	31	systems	2.2
998	Basement Sidewall Insulation	278	28%	31,186	square feet	112.2
998	Low Flow Showerheads	81	8%	93	showerheads	1.1
998	Heat Pump Water Heaters	17	2%	17	systems	1.0
998	LED Screw Based Omnidirectional Bulbs	286	29%	3,252	bulbs	11.4
998	High Efficiency Bathroom Exhaust Fan	635	64%	635	fans	1.0
998	Wall Insulation	182	18%	140,511	square feet	772.0
998	Advanced Power Strip - Tier 1	230	23%	447	power strips	1.9
998	Rim/Band Joist Insulation	520	52%	61,787	square feet	118.8
998	Gas High Efficiency Furnace	515	52%	521	systems	1.0
998	Air Source Heat Pump	24	2%	25	systems	1.0
998	Gas High Efficiency Boiler	10	1%	10	systems	1.0
998	Ceiling/Attic Insulation	648	65%	706,411	square feet	1,090.1
998	Furnace Blower Motor	405	41%	410	motors	1.0
998	Central Air Conditioning	151	15%	151	systems	1.0
998	Advanced Thermostats	498	50%	502	thermostats	1.0
998	Low Flow Faucet Aerators	104	10%	152	aerators	1.5
998	Air Sealing	676	68%	796,458	CFM reduced	1,178.2
998	Domestic Hot Water Pipe Insulation	197	20%	1,734	linear feet	8.8

Detailed Income Qualified Initiative Participation Summary

Unique Participants	IL-TRM Measure Name	Participants Receiving Measure	% Participants Receiving Measure	Total Quantity	Unit	Average Quantity per Participant Receiving
CAA Channel						
333	Ceiling/Attic Insulation	267	80%	277,984	square feet	1,041.1
333	LED Specialty Lamps	67	20%	513	lamps	7.7
333	Wall Insulation	110	33%	88,686	square feet	806.2
333	LED Screw Based Omnidirectional Bulbs	307	92%	6,214	bulbs	20.2
333	Basement Sidewall Insulation	170	51%	22,683	square feet	133.4
333	Air Sealing	327	98%	681,733	CFM reduced	2,084.8
333	Floor Insulation Above Crawlspace	57	17%	49,316	square feet	865.2
333	High Efficiency Bathroom Exhaust Fan	299	90%	299	fans	1.0
333	Low Flow Showerheads	106	32%	129	showerheads	1.2
333	Low Flow Faucet Aerators	171	51%	304	aerators	1.8
333	Rim/Band Joist Insulation	213	64%	28,000	square feet	131.5

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