AEG

Evaluation of Rockland Electric's PY1 Energy Efficiency Programs

Prepared for: Rockland Electric Utilities

Prepared By: Applied Energy Group, Inc.

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AEG Key Contact: Kelly Marrin

This work was performed by

Applied Energy Group, Inc.
500 Ygnacio Valley Blvd., Suite 250
Walnut Creek, CA 94596

Project Director: K. Marrin
Project Manager: K. Chiccarelli

Project Team: B. Ryan
T. Williams
L. Tang
J. Wallis
D. Burdjalov

ABSTRACT

This report provides the results of a comprehensive portfolio evaluation conducted by Applied Energy Group (AEG) of Rockland Electric Company's (RECO) Electric Portfolio performance during Program Year 1 (PY1), which spans July 2021 through June 2022.

Impact Evaluation Results

For the PY1 evaluation, AEG conducted an impact evaluation for each of RECO's programs with sufficient participation. The impact evaluation results are presented in the tables below.

Table E-1 RECO EE Portfolio Impact Evaluation Results - MWh

Program	Initiative	Unique Participants	Claimed MWh Savings	Adjusted MWh Savings	Realization Rate
Residential Efficient Products	**Total**	**38,219**	**3,707**	**3,179**	**85%**
	Appliance Recycling	51	60	60	100%
	Rebated Products	51	9	9	100%
	Appliance Markdown	NA	19	19	100%
	Behavioral	36,800	464	0	0%
	Midstream HVAC	7	3	3	100%
	Midstream Lighting	NA	2,707	2,654	98%
	Online Marketplace	1,310	444	434	98%
Existing Homes	**Total**	**0**	**0**	**0**	**NA**
	Home Performance with Energy Star	0	0	0	NA
	Moderate Income Weatherization	0	0	0	NA
Multifamily		0	0	0	NA
C&I Rebates		49	811	800	99%
C&I Midstream Lighting		5	106	111	105%
Commercial Direct Install		0	0	0	NA
Residential Portfolio Total		38,219	3,707	3,179	86%
C&I Portfolio Total		54	917	911	99%
Total Portfolio		38,279	4,624	4,089	88%

Table E-2 RECO EE Portfolio Impact Evaluation Results - kW

Program	Initiative	Unique Participants	Claimed kW Savings	Adjusted kW Savings	Realization Rate
Residential Efficient Products	**Total**	**38,219[1]**	**544**	**229**	**42%**
	Appliance Recycling	51	10	10	100%
	Rebated Products	51	1	1	100%
	Appliance Markdown	NA	4	4	100%
	Behavioral	36,800	53	0	0%
	Midstream HVAC	7	2.4	2.1	87%
	Midstream Lighting	NA	203	199	98%
	Online Marketplace	1,310	271	15	6%
Existing Homes	**Total**	**0**	**0**	**0**	**NA**
	Home Performance with Energy Star	0	0	0	NA
	Moderate Income Weatherization	0	0	0	NA
Multifamily		0	0	0	NA
C&I Rebates		49	109	90	83%
C&I Midstream Lighting		5	32	27	85%
Commercial Direct Install		0	0	0	NA
		38,219	544	229	42%
C&I Portfolio Total		54	141	117	83%
Total Portfolio		38,279	685	346	51%

For compliance purposes throughout the first triennium, RECO calculates program savings based on a mix of protocols from the FY20 NJCEP Protocols, FY21 NJCEP Protocols Addendum, and TRMs from other states when no applicable NJ-specific measure calculation is available. The PY1 evaluation followed the same protocols. The table below shows the MWh by sector if the recently created 2022 TRM Addendum was used.

Table E-3 Sector Level MWh Savings Comparison 2020 TRM vs. 2022 TRM

Sector	2020 TRM	2022 TRM
Residential	3,179	1,417
Multifamily	0	0
C&I	917	917

Net to Gross Analysis

Due to low participation, AEG was only able to conduct a net-to-gross (NTG) analysis for the Online Marketplace initiative. AEG estimated the NTG ratio for the Marketplace initiative using self-reported responses to the

[1] This does not include the Resi Midstream Lighting initiative because unique customers were not tracked. The breakdown of unique customers by initiative is as follows: Behavioral – 36,800, Rebated Products – 51, Appliance Recycling - 51, Midstream HVAC – 7, and Marketplace 1,310.

participant survey, shown in Table E-3. AEG used the approach for downstream programs outlined in the New Jersey EM&V Guidelines[2]. For all other programs a NTG of 100% was used.

Table E-4 RECO EE Portfolio NTG Results

Program	Initiative	Measure	NTG kWh	NTG kW
Residential Efficient Products	Appliance Recycling	NA	NA	NA
	Rebated Products	NA	NA	NA
	Appliance Markdown	NA	NA	NA
	Behavioral	NA	NA	NA
	Midstream HVAC	NA	NA	NA
	Midstream Lighting	NA	NA	NA
	Online Marketplace	Program	0.87	0.81
	Online Marketplace	Smart Thermostat	0.94	NA
Existing Homes		NA	NA	NA
Multifamily		NA	NA	NA
C&I Rebates		NA	NA	NA
C&I Midstream Lighting		NA	NA	NA
Commercial Direct Install		NA	NA	NA

TRM Assessment

The impact evaluation identified the following issues with the NJ FY2020 TRM, resulting recommendations are outlined in the table below.

Table E-5 NJ FY2020 TRM Assessment

Program	Initiative	TRM Recommendations
Residential Efficient Products	Residential Appliances Rebated Products	Clothes Washers- Allow for an entry of 100% electric Domestic Hot Water (DHW) since program only rebates for electric DHW. As of this report, this has already been addressed in the NJ FY2021 which now has an algorithm that you could enter 100% DHW if your program only rebates for electric or gas DHW.
C&I Rebates		Use the exterior HOUs for lamps/fixtures that can be used in exterior applications. Exclude HVACe, HVACd, and CF, given that there is no interaction with HVAC and that the coincidence factor does not apply.

The impact evaluation focused on ensuring that the savings estimations adhered to the NJ FY2020 TRM. In a separate effort spanning Q4 2022 – Q1 2023, AEG reviewed the TRM calculations for reasonableness and provided forward-looking recommendations for improvements. Those recommendations are summarized in Appendix B.

[2] NJ EMV Guidelines Net-to-Gross (NTG) Guidance for Downstream Rebate Programs

Program Evaluability

Table E-6 provides recommendations regarding any data that are missing or needed to complete a standard impact or process evaluation as an assessment of the evaluability of the RECO portfolio going forward.

Table E-6 Program Evaluability Assessment

Program	Initiative	Recommendation
Residential Efficient Products	Residential Appliances	• Request that the implementer take photos of recycled appliances • Confirm key inputs are included in the documentation, such as CADR value, input capacity, and liters per kWh for applicable appliances.
Residential Efficient Products	Online Marketplace	• Confirm savings parameters are included in project documentation. • As of Q3 PY2, RECO is using customer data to determine the appropriate water heater fuel type, and therefore accurately account for savings from the showerhead and faucet aerator components of the kit.

AEG's evaluability assessment of RECO's C&I Rebates and Midstream Lighting programs found no issues with the documentation collected for PY1 projects. Key inputs were provided in the backup documentation, and any discrepancies between claimed and verified savings were not a result of a lack of information but rather a miscalculation or discrepancy between documentation and RECO's calculations.

AEG did not conduct an evaluability assessment of the Existing Homes, Multifamily, and C&I Direct Install program because they did not have any PY1 participation.

Program Recommendations

Table E-7 summarizes the process evaluation recommendations for each program resulting from the PY1 evaluation.

Table E-7 Program Recommendations – Process Evaluation

Program	Initiative	Recommendations
Residential Efficient Products	Residential Appliances	• Shorten the amount of time it takes for customers to receive a rebate for the Rebated Products initiative. • Monitor monthly statistics regarding the time it takes from receiving the rebate application to mailing the incentive check. Have a set goal of 2 weeks or less and identify issues on a timely basis if that goal is not being met. • Target marketing efforts on harder to reach customers who are less likely to be aware of the benefits of energy efficiency to reduce free ridership. • Marketing plans designed to increase overall awareness of the rebate and the benefits of EE should also include strategies to target hard to reach customers who are less likely to be free riders.
Home Performance with Energy Star		• Create a marketing plan for this initiative highlighting the availability of financing. • Implement a variety of marketing strategies designed to increase overall customer awareness and introduce the availability of financing.
C&I Rebates	Downstream	• Shorten the amount of time it takes for customers to receive a rebate. • Monitor monthly statistics regarding the time it takes from receiving the rebate application to mailing the incentive check. Have a set goal of 2 weeks or less and identify issues on a timely basis if that goal is not being met.
C&I Rebates	Midstream HVAC	• Continue to offer kits and limited time offers to increase participation when needed. • If the program is falling short of its goal, increase the incentive for a specific period of time, or offer contractors additional rebate for applications submitted in short time period. • Highlight the availability of financing on all marketing materials. Although RECO is unable to offer on bill financing like PSE&G, they do have third party financing available. Marketing materials should highlight the availability of financing and the terms.
Commercial Direct Install		• Work with contractors on how the incentive structure is presented to customers. • The tiered incentive structure is complicated, but it can be simplified when communicating with customers by just presenting them with the total incentive amount. • Highlight the availability of financing on all marketing materials. Financing is even more crucial for this program than it is for Midstream HVAC. Although RECO is unable to offer on bill financing like PSE&G, they do have third party financing available. Marketing materials should highlight the availability of financing and the terms.

Table E-8 summarizes the process evaluation recommendations for each program resulting from the PY1 evaluation.

Table E-8 Program Recommendations – Impact Evaluations

Program	Initiative	Recommendations
Residential Efficient Products	Midstream HVAC	• Use the known EER when available • Use the coincident factor from the TRM.
Residential Efficient Products	Online Marketplace	For dehumidifiers, use the current NJ TRM savings calculations going forward • For thermostats, verify that the correct savings amount is being used based on the heating and cooling systems in the premise, and do not claim kW savings • For water measures in kits, use a 13% water heater factor when the water heater energy resource is unknown. As of Q3 PY2, RECO is using customer data to determine the appropriate water heater fuel type, and therefore accurately account for savings from the showerhead and faucet aerator components of the kit. • For lighting components of kits, ensure that the coincidence and HVAC interactive factors is consistent with the TRM. • For lighting, verify that correct lumens and quantity of bulbs are used In savings calculations. • For lighting, ensure that the coincidence and HVAC interactive factors is consistent with the TRM.
C&I Rebates		• For custom refrigeration, use the post-2017 federal standard baseline. • For HVAC, verify that the baseline tonnage inputs are consistent with the TRM. • Existing lighting calculator has been updated and is now consistent with TRM inputs and calculating properly. • For prescriptive refrigeration, correctly identify refrigeration measures in the program tracking database.
C&I Midstream Lighting		• Use the HVAC factor for the correct heating and building types.

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REPORT GLOSSARY

Acronym	Definition
AHRI	Air Conditioning, Heating, and Refrigeration Institute
ARCA	Implementer for the Appliance Recycling initiative
BPI	Building Performance Institute
BPU	Board of Public Utilities
BYOT	Bring Your Own Thermostat
CDI	Commercial Direct Install
C&I	Commercial and Industrial
CAC	Commercial Central Air Conditioner
CADR	Clean Air Delivery Rate
CDI	Commercial Direct Install
CEMP	Customer Engagement and Marketplace Platform, referred to an Online Marketplace
CF	Coincidence Factor
CI	Confidence Interval
CSRP	Commercial System Relief Program
DHW	Domestic Hot Water
ECM	Energy Conservation Measure
EE	Energy Efficiency
EER	Energy Efficiency Ratio
EFHLc	Cooling Equivalent Full-load Hours
EP	Efficient Products
ER	Error Ratio
FPC	Finite Population Correction
FR	Free Ridership
HER	Home Energy Report
HES	U.S. Department of Energy Home Energy Score
HID	High Intensity Discharge
HOU	Hours of Use
HPwES	Home Performance with ENERGY STAR
HVAC	Heating, ventilation and air conditioning systems
ICF	(company name?) ICF International Inc.
IDI	In-Depth Interview
IEER	Integrated Energy Efficiency Ratio
ILIP	Instant Lighting Incentive Program
IOU	Investor Owned Utilities
ISR	In-service-rate
MF	Multifamily
MIW	Moderate Income Weatherization

NJCEP	New Jersey's Clean Energy Program
NTG	Net-To-Gross ratio
PA	Program Administrator
PM	Project Manager
PPE	Personal Protective Equipment
PY	Program Year
QA/QC	Quality Assurance, Quality Control
QHEC	Quick Home Energy Checkup
RFP	Request For Proposal
RI	Resource Innovations
RR	Realization Rate
SEER	Seasonal Energy Efficiency Ratio
SP	Spillover
SWC	Statewide Coordinator
SWE	NJ Statewide Evaluator
TRM	Technical Resource Manual

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EXECUTIVE SUMMARY

In 2022, Applied Energy Group, Inc. (AEG) was retained by Rockland Electric Company (RECO) to conduct a comprehensive portfolio evaluation of their Residential and C&I EE programs. RECO is an electric utility in northern New Jersey serving approximately 75,181 customers in Bergen, Passaic, and Sussex Counties. This report covers RECO's Electric Portfolio performance during Program Year 1 (PY1) which spans July 2021 through June 2022.

Table 1-1 RECO's Residential and C&I EE Portfolio

Residential	Residential Efficient Products
	Existing Homes*
	Multi-family*
	Bring Your Own Thermostat (BYOT) Program (Pilot)**
	Clean Heat Beneficial Electrification (Pilot)*
Commercial and Industrial	Commercial and Industrial Direct Install*
	Commercial and Industrial Rebates (Energy Solutions)
	Commercial System Relief Program (CSRP)*

*Note, these programs had zero participation in PY1 and therefore were not included in the evaluation or only had a limited process evaluation for PY1.

** The BYOT program had participation in PY1 but did not have any events due to the slow ramp-up. It was not included in the PY1 Evaluation.

Evaluation Activities

The tables below summarize the evaluation activities for each program.

Table 1-2 Evaluation Activities- Residential

		Impact Activities				Process Activities		
Program	**Initiative**	Savings Replication	Billing Analysis	Eng. Desk Reviews	Participant Survey	Trade Ally Interviews	IDI Program Staff	IDI participants
Residential Efficient Products	Residential Appliances	√		√			√	√
	Online Marketplace			√	√		√	
	Midstream	√		√		√	√	
	Behavioral	√	√				√	
Existing Homes	Home Performance with Energy Star						√	
	Moderate Income Weatherization						√	
Multifamily							√	

Table 1-3 Evaluation Activities- C&I

		Impact Activities		Process Activities		
Program	**Initiative**	Savings Replication	Eng. Desk Reviews	Trade Ally Interviews	IDI Program Staff	IDI Participants
C&I Direct Install		√	√	√	√	
C&I Rebates (Energy Solutions)	Downstream	√	√	√	√	√
	Midstream HVAC	√	√	√	√	
C&I Midstream Lighting		√	√	√	√	√

Residential Program Overview

RECO's Residential Portfolio consists of seven initiatives, although only Residential Efficient Products had participation in PY1. Table 1-3 shows the mapping of programs, initiatives and implementors.

Table 1-4 Residential Portfolio Programs, Initiatives and Implementors

Program	Initiative	Implementor
Residential Efficient Products	Residential Appliances	ARCA (Recycling component)
	Online Marketplace	Uplight
	Midstream Lighting/HVAC	ICF
	Behavioral	Opower
Home Performance with Energy Star		ICF
Moderate Income Weatherization		ICF and Franklin
Multifamily		ICF and Franklin

Residential Efficient Products

The Residential Efficient Products Program (EP) promotes the installation of ENERGY STAR and other high-efficiency electric equipment by residential customers through a variety of initiatives. We describe the four key initiatives of the Residential Efficient Products Program below:

- **Residential Appliances Initiative**. This initiative has three sub-initiatives: Rebated Products, Appliance Markdown, and Appliance Recycling. Rebated Products provides rebates for energy-efficient appliances purchased by customers at third-party retail stores. Customers must first buy the appliance, then apply for the rebate using RECO's online portal application. The application requires information on the purchased equipment and proof of purchase to determine rebate eligibility. Appliance Markdown allows customers to purchase their energy-efficient appliances at select retail stores and receive an instant discount after confirming eligibility. Appliance Recycling provides incentives for customers who recycle their appliances.
- **Online Marketplace Initiative**. The Customer Engagement and Marketplace Platform (CEMP) provides instant rebates through the online MyORU Store for low-cost energy efficiency products. The CEMP also incorporates an advisory suite that includes personalized recommendations and several other enhancements.
- **Midstream Initiative**. The Midstream initiative has a lighting and HVAC component. It incentivizes energy-efficient lighting, space cooling, and heating equipment. A third-party vendor implements the program by moving rebates midstream to engage lighting retailers and HVAC distributors and contractors in the RECO service territory.

- **Behavioral Initiative**. The primary goal of this initiative is to encourage energy savings through voluntary behavioral changes among residential customers. The behavioral initiative includes a paper and an online Home Energy Report (HER).

Residential Appliances, the Online Marketplace, and the Midstream initiatives provide incentives for energy-efficient lighting, appliances, electronics, heating and cooling equipment, and other energy-efficiency products (e.g., smart thermostats, water-saving measures, and prepackaged kits). The program provides intuitive and cost-effective access to energy efficiency measures by meeting customers where they shop both in store and online. Efficient measures range in type and price and include electric technologies that improve energy efficiency in the home. Up-front rebates reduce initial costs on purchases, and access to financing for HVAC equipment became available Q2 2023 (i.e., Q4 of PY2), to minimize first-cost barriers for select products further. The incentive details can be found on their website[3], and marketplace on the MyORU.com store page[4]

Home Performance with Energy Star

The Home Performance with ENERGY STAR (HPwES) Program provides a holistic approach for customers to invest in the efficiency and comfort of their homes. The program follows guidelines and qualifying criteria associated with the U.S. Environmental Protection Agency HPwES program. It also includes a Quick Home Energy Checkup (QHEC) audit performed directly by a qualified HPwES contractor or auditor. The QHEC is an additional utility-led initiative intended to provide residential customers with an understanding of opportunities to save energy and obtain immediate benefits by installing standard energy-saving measures at no cost to participants. Interested customers sign up for an in-home visit from a qualified energy auditor, participating contractor, a RECO employee, or a third-party implementation contractor. During the visit, the auditor will perform a walk-through of the customer's home to provide education about the opportunities to save energy. The auditor may also identify more significant opportunities for energy savings, including making referrals to other energy efficiency programs and program opportunities based on the needs for that premise and the customer's interest in pursuing additional upgrades. This may include sharing information about the products and incentives available under the Efficient Products Program, and the potential for comprehensive upgrades through either the HPwES Program, the Moderate-Income Weatherization, or the Comfort Partners Program. This no-risk program is intended to appeal and provide benefits to both renters and homeowners. In all cases, the QHEC results in an energy efficiency action plan, including recommendations for upgrades and available incentives. Throughout the first triennium, RECO will increase the number of contractors certified to offer a U.S. Department of Energy Home Energy Score (HES) to help customers understand how HPwES improvements can advance the efficiency and comfort of their home.

Moderate Income Weatherization

The Moderate Income Weatherization (MIW) Program targets customers 250-400% above the federal poverty threshold with low or no-cost weatherization, lighting, low-flow showerheads, and smart thermostats. Comfort Partners currently offers no-cost weatherization to customers up to 250% of the federal poverty threshold, providing energy-saving opportunities to moderate-income customers who may struggle to participate in other programs.

The program includes a no-cost audit of the customer's home, which may include an air leakage blower door test. Contractors install energy-savings measures based on the results of the audit. The energy-savings measures may consist of lighting, weatherization (air sealing, insulation, and duct insulation), low or no-cost HVAC replacement (for customers with non-functioning heating systems), smart thermostats, and water-saving measures. All measures are installed by a qualified contractor. The program also includes an "up-to" amount to cover health and safety concerns that need to be resolved prior to weatherization.

[3] https://www.oru.com/en/save-money/rebates-incentives-credits/new-jersey-customers/incentives-for-residential-customers-nj/efficient-products;

[4] https://nj.home.myorustore.com/

Multifamily

The Multifamily Program addresses multifamily structures with five or more units. There can be significant variation in the types of structures served under this program ranging from residential dwellings with five units to large garden apartment complexes, to multi-story high-rise buildings. In addition, the program is designed to target either the building owner or the tenants themselves to address as many units as possible. To meet each participant's specific needs, the Multifamily Program provides a structured screening review to identify and develop the project plan. Potential program services include engagement with energy efficiency education through energy assessments, installation of standard energy savings measures, comprehensive energy savings opportunities, including prescriptive equipment replacement, custom retrofit projects, and emergency equipment replacement. In addition, the Multifamily Program provides access to low or no-interest interest financing. This program is constrained by the small number of multifamily properties in RECO's service territory. According to a recent demographic study, 6% of residential customers are multifamily customers.

Commercial and Industrial Program Overview

RECO's C&I Portfolio consists of three programs: Commercial and Industrial Rebates (C&I Rebates), Midstream Lighting and Commercial Direct Install (CDI). Please note that CDI did not have any participation in PY1. Table 1-5 shows the mapping of programs, initiatives, and implementors.

Table 1-5 C&I Portfolio Programs, Initiatives and Implementors

Program	Initiative	Implementor
C&I Rebates	Downstream Rebates	In - House
	Midstream HVAC	ICF
Midstream Lighting		ICF
Commercial Direct Install		Resource Innovations

Commercial and Industrial Rebates

The Commercial and Industrial Rebate Program (C&I Rebates) promotes the installation of high-efficiency electric equipment to RECO C&I customers by offering rebates for prescriptive or custom measures. The program has a downstream and midstream initiative. The rebates incentivize energy-efficient lighting, appliances, heating and cooling equipment, and food service equipment, among other various efficiency measures. Up-front rebates reduce initial costs, and some purchases may qualify for low to no-interest financing (available in Q2 2023) to further reduce first-cost barriers. The incentive details can be found on their website[5].

Prescriptive measures provide easy and cost-effective access to energy-efficient measures through customers' preferred initiatives. Prescriptive rebates:

- Provide incentives to facility owners and operators for the installation of high-efficiency equipment and controls.
- Promote the stocking and marketing of high-efficiency measures by trade allies such as electrical contractors, mechanical contractors, and their distributors to increase market demand.
- Ensure the participation process is straightforward.

Custom measures and projects are designed to address specific customer needs. They include energy efficiency upgrades that are more complex and do not lend themselves to simple savings estimation approaches, including refrigeration, HVAC, motors, pumps, complex lighting controls, and other types of projects.

[5] https://www.oru.com/en/save-money/rebates-incentives-credits/new-jersey-customers/incentives-for-business-customers-nj/prescriptive-rebate-program; https://www.oru.com/en/save-money/rebates-incentives-credits/new-jersey-customers/incentives-for-business-customers-nj/custom-rebate-program.

Commercial Midstream Lighting

The C&I Midstream Lighting initiative, also referred to as the Instant Lighting Incentive program ("ILIP"), provides incentives or buydowns for lighting to participating distributors. Customers receive an instant rebate at the time of the sale when they purchase a qualifying LED from a participating distributor. Products are discounted instantly, with no additional rebate forms or applications to fill out. The incentive details can be found on their website[6].

Commercial and Industrial Direct Install

Commercial and Industrial Direct Install (CDI) is focused on the installation of efficiency measures for small businesses, non-profit organizations, municipalities, schools, and faith-based organizations (eligible customers) that typically lack the time, knowledge, or financial resources necessary to investigate and pursue energy efficiency. To be eligible, a business must have an average peak demand of less than 200kW. The program is run by an implementation contractor, Resource Innovations, working with local trade allies and eligible customers to provide a turnkey, streamlined customer experience and easy investment decisions for the direct installation of energy efficiency projects. The program pays up to 80% of the up-front cost to install the recommended energy efficiency measures, with the participating customer contributing to the balance of the project not covered. The program also provides a financing option to the customer for their required contribution. The no-cost energy assessment mitigates time constraints and knowledge barriers while reducing overall costs to ease up-front cost barriers and assist participants in making decisions that might otherwise be difficult to justify. The CDI program plays an important role in the marketplace because private providers of energy efficiency services typically do not target smaller customers due to the lower overall profit for their services compared with larger customers. For these reasons, small businesses, non-profit organizations, municipalities, schools, and faith-based organizations are often hard to reach, and the program fills a significant gap by targeting, promoting, and delivering efficient services to these customers directly.

Portfolio Performance

Program year 1 (PY1) served as an introductory ramp-up period for RECO's Residential and C&I programs, concluding with a claimed savings of 4,625 MWh savings, or 51% of the annual target of 9,007 MWh. It should be noted that RECO had no existing program delivery infrastructure in NJ, and while PY1 was a ramp-up period, PY2 program performance is anticipated to be on target.

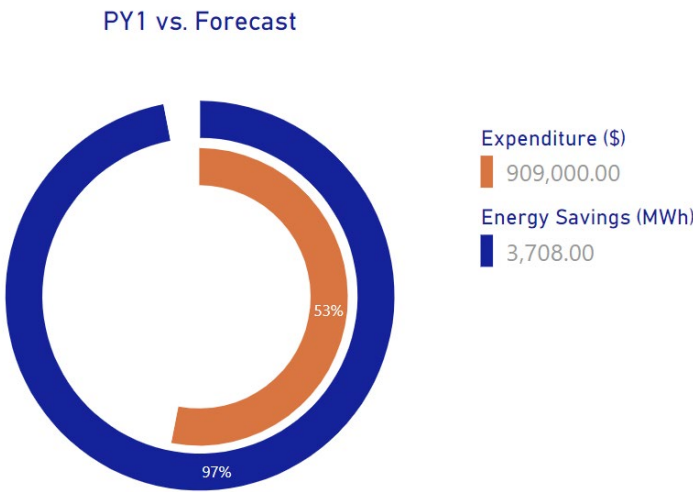
The strongest performing programs under RECO's portfolio were the EP and C&I Rebates. The EP program's performance was driven primarily by its Retail Lighting and Online Marketplace subcomponents, while the C&I Rebate program's performance was driven primarily by the Prescriptive/Custom subcomponent. Sector-level performance is described in more detail in the following sections.

[6] https://www.oru.com/en/save-money/rebates-incentives-credits/new-jersey-customers/incentives-for-business-customers-nj/instant-lighting-incentive-program.

Residential Program Performance

RECO's Residential programs sector achieved a total of 3,708 MWh of electric energy savings during PY1 or 97% of forecast at the cost of approximately $909K or 53% of the Residential sector's allocated budget. This achievement was primarily due to the Midstream initiative, which provides instant midstream rebates to customers who shop for general service and specialty LED lamps at qualifying retailers. The final quarter of PY1 saw significant growth in participation due to the Company's effort to expand across most major retailers in its service territory.

Figure 1-1 Residential Program Expenditure vs. Savings



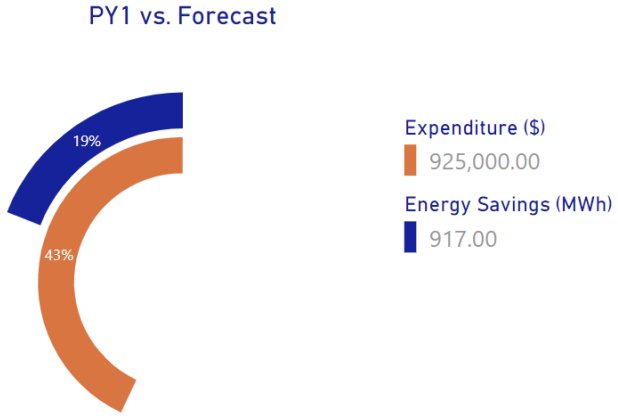
The Online Marketplace and Behavioral initiatives began to ramp up significantly in the third and fourth quarters of PY1 and were the primary contributor to RECO's overachievement of its residential customer participation forecast[7] for the year. These programs require direct customer engagement via e-mail and other communication forms, which took some time for RECO to roll out.

The HPwES and MIW programs did not achieve energy savings in PY1 due to delays in contractor recruitment. These programs also require a longer lead time to obtain customer commitment because they cover a broad range of home improvement measures.

Commercial & Industrial Performance

RECO's C&I sector programs achieved a total of 917 MWh of electric energy savings during PY1 (19% of forecast) at the cost of approximately $925K or 43% of the sector's allocated budget, which included program start-up costs. The PY1 savings were attributed to the C&I Downstream initiative, which provides rebates to customers who utilize a qualified contractor to perform ECMs related to the lighting, controls, or HVAC systems within their existing facility along with Midstream Lighting or Instant Lighting Incentive program ("ILIP"). The final quarter of PY1 saw significant growth in participation due to the Company's effort to recruit more installation contractors to its qualified network and lighting distributors incorporating the midstream model into their day-to-day business.

Figure 1-2 C&I Program Expenditure vs. Savings



The Commercial Direct Install program did not achieve savings in PY1, as this program also experienced delays in contractor recruitment.

[7] RECO's annual forecast of 2,094 participants did not include the count of treatment customers in the Behavioral subprogram. Furthermore, it assumed a definition for participants in the Online Marketplace and Retail Lighting subprograms as the quantity of unique customers rather than the quantity of ECM units sold.

Multifamily Program Performance

RECO's Multifamily program did not achieve energy savings in PY1. This lack of performance can be attributed to delays in contractor recruitment and, similar to the Home Performance program, requires longer lead times to obtain customer commitments. Furthermore, RECO's residential customer demographic overwhelmingly consists of suburban single-family homes, which makes it difficult to find and recruit larger multi-unit buildings for program participation. According to a recent demographic study, only 6% of residential customers are multifamily.

Methodology

The evaluation methods conducted for RECO's PY1 portfolio are consistent with the NJ Statewide Evaluator's (SWE) Guidance for Evaluation Measurement and Verification at the basic rigor level. AEG's planned approach coordinated impact and process evaluations across all programs. The evaluation approach includes the following essential tasks:

- **Process evaluation.** AEG conducted process evaluation for each program, focusing on the challenges and successes of current programs transitioning from BPU to IOU management, the success of the rollout of new programs, and fine-tuning of the implementation and delivery process.
- **Impact evaluation.** AEG completed program-specific impact evaluations using appropriate activities, including savings replication, engineering desk review, verification surveys, and billing analysis. The evaluation also supports the statewide net-to-gross study by adding the approved net-to-gross battery of questions to the residential Online Marketplace survey.

Impact Evaluation Key Findings

The evaluation of RECO's PY1 EE portfolio verified 4,089 MWh gross savings or an 88% realization of their total claimed savings of 4,624 MWh.

The Residential programs claimed a total of 3,708 MWh of electric energy savings during PY1, 97% of forecast, at the cost of approximately $909K or 53% of the Residential sector's allocated budget. The evaluation resulted in a total verified savings of 3,179 MWh, equivalent to an 86% realization rate. These findings are further described below:

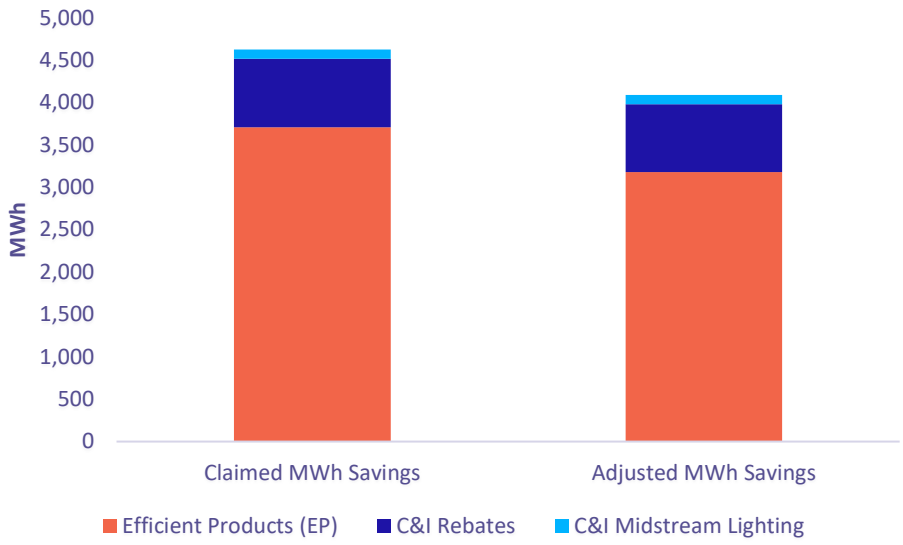
- **Residential Appliances** resulted in a 100% realization rate.
- **Online Marketplace** resulted in a 98% realization rate due to the application of ISRs.
- **Midstream** resulted in a 98% realization rate due to the application of ISRs.
- **Behavioral** resulted in a zero percent realization rate due to the statistically insignificant savings. AEG's point estimates were similar to the claimed savings; however, the mid-year program launch, as well as the lack of summer participation, resulted in small savings estimates and wide confidence bounds.

The C&I sector programs claimed a total of 917 MWh of electric energy savings during PY1, 19% of forecast, at the cost of approximately $925K or 43% of the sector's allocated budget. The evaluation resulted in a verified savings of 911 MWh, equivalent to a 99% realization rate. The table and associated figure below illustrate the claimed and verified savings by program.

Table 1-6 RECO PY1 Portfolio Impact Evaluation Results –Program Level Savings (MWh)

Program	Initiative	Unique Participants	Claimed MWh Savings	Adjusted MWh Savings	Realization Rate
Residential Efficient Products	**Total**	**38,219**	**3,707**	**3,179**	**85%**
	Appliance Recycling	51	60	60	100%
	Rebated Products	51	9	9	100%
	Appliance Markdown	NA	19	19	100%
	Behavioral	36,800	464	0	0%
	Midstream HVAC	7	3	3	100%
	Midstream Lighting	NA	2,707	2,654	98%
	Online Marketplace	1,310	444	434	98%
Existing Homes	**Total**	**0**	**0**	**0**	**NA**
	Home Performance with Energy Star	0	0	0	NA
	Moderate Income Weatherization	0	0	0	NA
Multifamily		0	0	0	NA
C&I Rebates		49	811	800	99%
Midstream Lighting		5	106	111	105%
Commercial Direct Install		0	0	0	NA
Residential Portfolio Total		38,219	3,707	3,179	86%
C&I Portfolio Total		54	917	911	99%
Total Portfolio		38,279	4,624	4,089	88%

Figure 1-3 Claimed vs Adjusted Savings – Program level (MWh)



Process Evaluation Key Findings- Portfolio

The process evaluation yielded the following insights at the sector level:

The programs are understaffed.

- At the time of the interviews, RECO was in the process of hiring two people dedicated to the New Jersey programs: One strategy and planning manager and one operations manager.
- Program Administration is performed by a team who splits their time between Orange and Rockland (ORU) programs in New York and the RECO programs. The RECO programs added additional responsibility to staff members who already had full-time jobs working on the ORU programs. RECO also lost one staff member.
- Additional staffing is required to run these programs successfully RECO staff estimate the need for at least four people dedicated to the New Jersey programs. In addition to the two positions described above, the C&I programs could also use an in-house engineer, and someone dedicated to overseeing evaluation, measurement, and verification activities.
    - In addition to the main duties required to run the programs, an estimated 24 working groups require staffing.
    - As of PY2 Q3, RECO has hired and onboarded two new staff members dedicated full-time to RECO program administration.

The ramp up to portfolio launch took significant time, taking up most of Program Year (PY) 1.

- In contrast to other utilities in New Jersey, RECO did not have any similar active programs in place prior to Triennial 1, and had what staff refers to as a cold start. This made the ramp-up period longer and more challenging.
- Although the programs officially started in PY1, only a few of the programs had projects completed in the first year, with most activity during the second half of PY1. The majority of participation in PY1 was in the Residential Efficient Products program.

- Working with over 20 different Joint Utility committees and working groups on the program design that met an average of once per week, and sometimes as much as three times per week, was very time-consuming and complicated the program launch. This activity, while critical due to the program structure in NJ, took time away from the actual implementation of programs, and the added complexity slowed down the launch of the programs for RECO. RECO's part-time staff members had to spend the majority of their efforts on committee meetings rather than administrative program operations.
- Financing for the programs was not in place until PY2.

Marketing is needed to increase customer awareness.

- All the implementers feel that more marketing is needed to meet the program goals. Marketing will be especially important once the financing component is rolled out.
- RECO is responsible for all customer-facing marketing. The marketing done to date has primarily been at the portfolio level and for the Online Marketplace. Marketing has been delayed due to the onboarding of a new marketing vendor.
- The RECO corporate marketing department is working on a marketing plan and schedule covering horizontal program awareness for PY2 and beyond

The relationship between the electric and gas utilities is unclear.

- RECO shares the service territory with two GDC utilities – PSE&G, the largest, and Elizabethtown Gas. Under the Stipulation rules for Statewide Coordination, PSE&G is able to serve as the lead utility in providing program services to RECO customers – including rebating electric measures. This makes the RECO programs less attractive to participating contractors who often are involved in both utility service territories. Since the PSE&G service territory is larger, contractors have more projects with PSE&G and tend to work with utilities they have more experience with.

  Due to the delays with the Statewide Coordinator ("SWC"), there is limited visibility on the electric projects and measures that PSE&G Is incentivizing in RECO's territory. This creates a situation where the RECO implementers are not in control of their budget or their savings. In addition, RECO could not rely on PSEG forecasts since they don't have insight into RECO's electric customers' historical electric usage. Any PSEG forecast could only be directional in nature and not used for any financial planning.

Recommendations

AEG recommends the following actions to improve the portfolio:

Recommendation 1: Create a marketing plan for each program to increase program awareness.

A marketing plan specific to each program is necessary to inform prospective customers about the program offerings, increase participation and announce the newly available program financing. Include strategies for working with trade allies to promote program offerings.

> **Rationale:** Since a new ad agency was being onboarded, very little marketing had been done at the time of evaluation and had been mainly limited to the portfolio level. All the implementers feel that more marketing is needed to meet the program goals, and the trade allies also feel the programs could benefit from additional marketing.

Recommendation 2: Improve program coordination with the natural gas utilities.

Once the SWC system is up and running, there will be transparency into projects executed in RECO's service territory by the gas utilities. Communicate on a regular basis on the energy savings value achieved and how the programs can work together to complement each other to increase participant and trade ally satisfaction and achieve greater savings.

> **Rationale:** At the time of the evaluation, the SWC system was not up and running, which prevented the RECO team from knowing the energy savings value of projects executed by the gas utilities. In addition, tracking costs has been challenging because there is a large difference between the forecasts provided by the gas utilities and the actual spend.

Report Structure

The remainder of this report is structured as follows:

Chapter 2 – Methodology: Description of the evaluation methodology and data collection processes used for the process and impact evaluations across all programs.

Chapter 3 - Residential Efficient Products: Impact and Process Evaluation Results for the EP Program.

Chapter 4 - Existing Homes Program: Process Evaluation Results for the Existing Homes Program.

Chapter 5 - Multifamily Program: Process Evaluation Results for the Multifamily Program.

Chapter 6 - C&I Rebates: Impact and Process Evaluation Results for C&I Rebates.

Chapter 7 - C&I Midstream Lighting: Impact and Process Evaluation Results for Midstream Lighting.

Chapter 8 - C&I Direct Install: Process Evaluation Results for CDI.

2

METHODOLOGY

This chapter describes the methodology and data collection processes used for the process and impact evaluations across all programs.

Overview of the Approach

The evaluation methods conducted for RECO's PY1 portfolio are consistent with the NJ Statewide Evaluator's (SWE) Guidance for Evaluation Measurement and Verification at the basic rigor level. AEG's planned approach coordinated impact and process evaluations across all programs. The evaluation approach includes the following essential tasks:

- Process evaluation. AEG conducted process evaluation for each program, focusing on the challenges and successes of current programs transitioning from BPU to IOU management, the success of the rollout of new programs, and fine-tuning of the implementation and delivery process.
- Impact evaluation. AEG completed program-specific impact evaluations using appropriate activities, including savings replication, engineering desk review, verification surveys, and billing analysis. The evaluation also supports the statewide net-to-gross study by adding the approved net-to-gross battery of questions to the residential Online Marketplace survey.

Table 2-1 Evaluation Activities- Residential

		Impact Activities				Process Activities		
Program	**Initiative**	Savings Replication	Billing Analysis	Eng. Desk Reviews	Participant Survey	Trade Ally Interviews	IDI Program Staff	IDI participants
Residential Efficient Products	Residential Appliances	√		√			√	√
	Online Marketplace			√	√		√	
	Midstream	√		√		√	√	
	Behavioral	√	√				√	
Existing Homes	Home Performance with Energy Star						√	
	Moderate Income Weatherization						√	
Multifamily							√	

Table 2-2 Evaluation Activities- C&I

		Impact Activities		Process Activities		
Program	**Initiative**	Savings Replication	Eng. Desk Reviews	Trade Ally Interviews	IDI Program Staff	IDI Participants
C&I Direct Install		√	√	√	√	
C&I Rebates	Downstream	√	√	√	√	√
	Midstream HVAC	√	√	√	√	
Midstream Lighting		√	√	√	√	

Impact Evaluation Approach

The impact evaluation has two objectives listed below. We present an overview of the evaluation activities addressing each objective and discuss each activity in detail in the remainder of this subsection.

- Estimate verified gross energy (kWh/yr) and peak demand (kW/yr) savings, and
- Estimate verified net energy (kWh/yr) and peak demand (kW/yr) savings.

Estimate Verified Gross Savings. For all programs and initiatives, AEG conducted a combination of the following impact activities to estimate verified gross savings:

- Savings replication duplicates the savings from the tracking database and ensures that deemed or partially deemed reported savings estimates, associated inputs, and assumptions are correct and reasonable. Savings replication takes place at the census level for all programs and initiatives.
- Engineering desk reviews check the accuracy of input variables, model numbers, and other project-specific information in the backup documentation for a sample of applications or projects. Desk reviews can be "simple" when checking documentation for prescriptive and semi-prescriptive measures or "complex," as is the case for most custom projects.
- Realization rate calculation produces a metric that compares the verified gross savings to the reported gross savings.

Estimate Verified Net Savings. For the Online Marketplace, AEG conducted a participant survey to estimate a net-to-gross ratio ("NTG"). For all other programs, an assumed 100% NTG was used.

Impact Activity Descriptions

Savings Replication

Savings replication, performed at the census level, duplicates the savings from the tracking database and ensures that claimed savings estimates, associated inputs, and assumptions are correct and reasonable. Savings replication included the following two steps:

- We reviewed RECO's program tracking database to verify the accuracy of input assumptions and savings calculations and confirm that the database covers an appropriately comprehensive suite of project information, focusing on required data fields for the verification. We ensured that the necessary data was available to facilitate the most accurate estimates of program savings.
- We replicated the savings using the current NJECP TRM or other approved documentation to calculate savings for the population of deemed and semi-prescriptive measures and services in the program tracking database. We include this activity in the PY1-PY3 verifications using a transparent, Microsoft Excel-based tool.

Billing Analysis

For the behavioral initiative, the billing analysis was conducted on an average daily level, and savings were estimated using a one-way fixed effects approach. This estimate is rolled up to a total program level by multiplying by the number of participants and summing relevant days and months of PY1 participation. Separate models were used to evaluate the savings for the two waves of participants: the initial launch in November 2021 and an additional wave in April 2022. The duration of treatment for the November wave was seven months, spanning December 2021 through June 2022. The duration of treatment for the April wave was just two months, spanning May and June 2022. A full description of the billing analysis methodology can be found in Appendix A.

Engineering Desk Reviews

AEG performed engineering desk reviews on a sample of participants, checking the accuracy of input variables, model numbers, and other project-specific information in the backup documentation for a sample of applications or projects.

We used a multi-step engineering review approach following the NJCEP TRM that included requesting all backup documentation for a representative sample of participants. Then completing a more thorough review of the impacts, including verification of model numbers, measure counts, and other algorithm inputs based on the documentation provided.

Sampling Plan

For all programs/initiatives with PY1 Participation except for Residential Behavioral, AEG used sampling for the impact evaluation activities. The target confidence and precision for the samples was 90%/±10% at the program level, allowing for 85%/±15% by initiative. AEG took the following steps to design the sampling plan:

- Determined whether sampling was required to complete the impact evaluation activities. Some activities, such as billing analyses, did not require a sampling plan.
- Reviewed program data. AEG reviewed the population distribution of records in each tracking database across measures, reported savings, and other metrics as relevant to ensure that we built an efficient sampling plan specific to projects and customers in the current evaluation year.
- Stratified the project population based on the program data review and verification goals. We stratified the project population by initiative and major end use or measure category.
- Used simple random sampling (SRS) to select a representative sample of projects for verification activities.

Table 2-3 and Table 2-4 show the total number of unique participants in each stratum and the number of participants sampled for the impact analysis to achieve the level of precision and the confidence interval required.

Table 2-3 Residential PY1 Sample Design

Initiative	Stratum	Unique Participants	Z-score	ER	precision	confidence	Sampled N
Residential Efficient Products	Appliance Recycling	51	1.44	0.5	15%	85%	17
	Rebated Products	51	1.44	0.5	15%	85%	10
	Total	**102**	**1.44**	**0.5**	**15%**	**85%**	**27**
Midstream	HVAC	**7**					**7**
Online Marketplace	Thermostats	1086	1.64	0.5	10%	90%	20
	Lighting	152	1.64	0.5	10%	90%	40
	Others	72	1.64	0.5	10%	90%	7
	Total	**1,310**	**1.64**	**0.5**	**10%**	**90%**	**67**
Total Residential		***1,419***	***1.64***	***0.5***	***10%***	***90%***	***101***

Table 2-4 C&I PY1 Sample Design

Initiative	Stratum	Unique Participants	Z-score	ER	precision	confidence	Sampled n
C&I Rebates	Prescriptive Lighting (MWh)	44	1.64	0.5	10%	90%	27
	Midstream HVAC/Others	5					5
	Total C&I Rebates	**49**	**1.64**	**0.5**	**10%**	**90%**	**32**
Midstream Lighting		**5**	**1.44**	**0.5**	**15%**	**85%**	**5**
Total C&I		***54***	***1.64***	***0.5***	***15%***	***90%***	***37***

Realization Rate

For each initiative AEG calculates a realization rate based on the difference between the claimed savings and the evaluated savings. Evaluated savings are a product of the savings replication, the desk reviews, and the in-service rates for retail measures[8]. For non-retail measures ISRs are assumed to be 100%. AEG used ISR's from the Illinois TRM Volume 10. The IL TRM was used because it was the source used in the NJ coordinated measure list to establish ISRs for energy efficiency kit components.

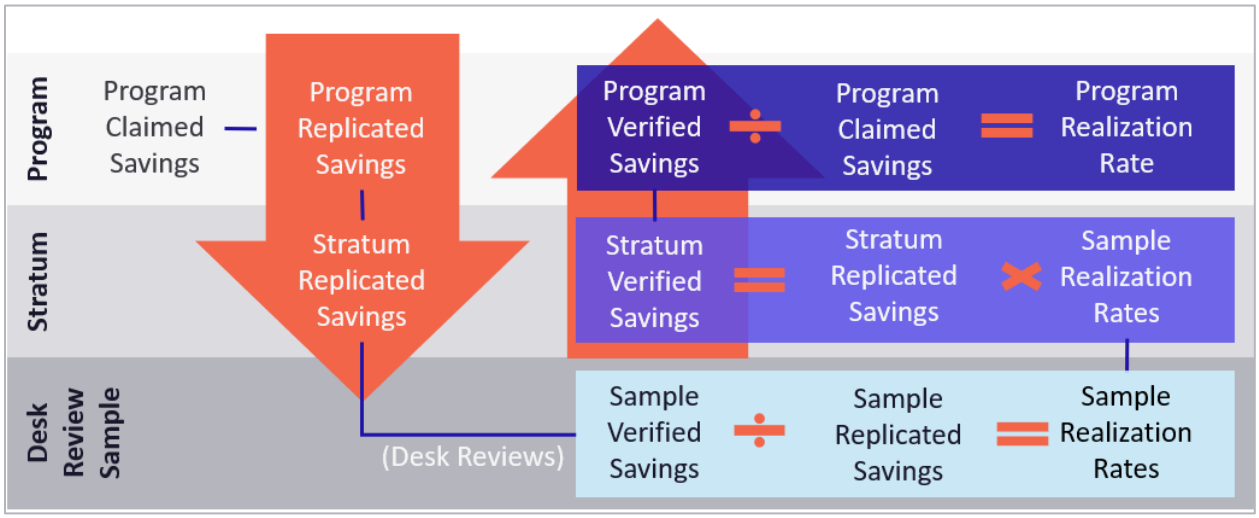
Table 2-5 PY1 In Service Rates Used for Retail Measures (ISR)

Measure	Measure Detail	ISR
Kit	LED (A19 or equivalent)	93%
	Tier 1 Smart Strip	55%
	LF Showerhead	62%
	Bathroom Aerator	61%
Lighting	All LED lights	98%
Power Strips	Tier 1 Smart Strip	71%
	Tier 2 Smart Strip	73%
Air Purifier	Air Purfiers	100%
Dehumidifier	Dehumidifiers	100%
Thermostats	Programmable Thermostats	56%
	Smart Thermostats (Heating)	100%
	Smart Thermostats (Cooling)	90%

[8] Evaluated savings = (Replicated Savings + Engineering review adjustment) * ISR.

Figure 2-1 illustrates the process to expand the sampled realization rates to the population, for an overall program level realization rate.

Figure 2-1 Sample Expansion Process



Process Evaluation Approach

AEG's approach to process evaluations is to provide quantifiable, actionable results that can be replicated over time to measure progress toward the program's goals. The major process evaluation activities for PY1 included the following:

- Interviews with program managers and implementers.
- Interviews with trade allies.
- Surveys and/or interviews with participants.

The table below shows the process activities conducted for each of the program initiatives. Each activity is described in more detail below.

Table 2-6 Process Evaluation Methodology by Initiative

Program	Initiative	PA and Implementer Interviews	Trade Ally Interviews	Participant Surveys/IDIs
Residential Efficient Products	Prescriptive/Downstream	√	NA	√
	Appliance Recycling	√	NA	√
	Behavioral	Planned for PY2		Planned for PY2
	Online Marketplace	√	NA	√
	Midstream	√	√	Planned for PY2
Home Performance w/ Energy Star	Existing Homes	√	Planned for PY2	Planned for PY2
	Moderate Income Weatherization	√	Planned for PY2	Planned for PY2
Multifamily		√	NA	Planned for PY2
C&I Direct Install		√	√	Planned for PY2
C&I Rebates	Downstream	√	√	√
	Midstream HVAC	√	√	Planned for PY2
Midstream Lighting		√	√	Planned for PY2

Program Administrator and Implementer Interviews

AEG interviewed the program administrators and implementation contractors involved in each program. A listing of each individual interviewed and their role in the portfolio is below.

Table 2-7 Program Administrator and Implementation Contractors Interviewed

Contact	Role	Program/Initiative
Jeremy Scott	Former Program Administrator	C&I Programs
Gigi Aniciete-Quijano	Program Administrator	C&I Programs
Patricia Moss	Program Administrator	CDI
Mark Maloney	Former Program Administrator	Residential Programs
Mark Jenson	Implementer – ARCA	Appliance Recycling (EP)
Tamara Lowe	Implementer- ICF	C&I and Res Midstream Lighting, HVAC (EP & C&I Rebates)
Chris Seymour	Implementer – ICF	C&I Midstream Lighting
Taylor Adler	Implementer – Franklin Energy	QHEC (HPwES) MIW & Multifamily
Brendan Cassidy	Implementer – ICF	HPwES, MIW, Multifamily
Sina Salehi	Implementer – Resource Innovations	CDI

The interviews explored program/initiative performance, strengths and challenges, and back-office processes. The process evaluation treats Midstream HVAC as one initiative (including both C&I and Residential).

Trade Ally Interviews

AEG conducted interviews with participating trade allies for the C&I/Residential midstream HVAC initiative, the C&I direct install program, and the C&I Midstream Lighting program. The table below shows the number of participating trade allies for each initiative and the number of interviews completed.

Table 2-8 Trade Ally Interviews

Program	Initiative	Participating Trade Allies	Number of Interviews
Residential Efficient Products/C&I Rebates	Midstream HVAC	10	3
C&I Direct Install		15	6
Midstream Lighting		15	2

For the Midstream Lighting program, three trade allies declined to conduct interviews because they did not have any practical experience with the program.

The purpose of the interviews was to get feedback from trade allies participating in the program/initiatives to gain a better understanding of how the program/initiative operates, including:

- The type of contractors involved in program delivery
- The strength of the relationship between trade allies and the implementation contractor
- Drivers and barriers of participation
- Program satisfaction
- Program effectiveness
- Suggestions to address challenges/barriers, and other recommendations for program improvement

Participant Surveys/Interviews

The Online Marketplace was the only program/initiative with sufficient participation in PY1 to conduct a full participant survey. For the other programs/initiatives with smaller participation, we conducted short telephone interviews. The table below shows the number of unique participants for each program and the resulting methodology used for obtaining feedback from participants.

Table 2-9 Participant Survey Methodology by Initiative

Program	Initiative	Unique Participants	Participant Survey Methodology
Residential Efficient Products	Rebated products	51	Telephone Interview
	Appliance Recycling	51	Telephone Interview
	Online Marketplace	1310	Online Participant Survey
	Midstream	7	None – insufficient sample
Home Performance w/ Energy Star	Existing Homes	0	NA
	Moderate Income Weatherization	0	NA
Multifamily		0	NA
C&I Direct Install		0	NA
C&I Rebates	Downstream	47	Telephone Interview
	Midstream HVAC	2	None - insufficient sample
Midstream Lighting		5	None - insufficient sample

Online Marketplace Participant Survey

The Online Marketplace survey was conducted online with customers who had visited the Online Marketplace and received an instant rebate for purchasing an energy-efficient product. The survey was conducted online, with customers receiving an email invitation, including a survey link.

The purpose of the survey was to get data from customers who made purchases at the Online Marketplace to gain a better understanding of the value of the initiative, including:

- Customers' experience (how they heard about it, the reason for visiting, ease of use)
- Net-to Gross estimates
- Customer satisfaction
- Characteristics of customers making purchases at the Online Marketplace.

Table 2-10 Marketplace Survey Sample Disposition

Sample Frame	Number of Participants
Unique Participants	1,310
Bad email	22
Survey Sample	1,288
Completed Surveys	**99**
Response Rate	8%

Survey invitations were sent to 1,291 customers with a valid email address in February 2023. After sending two reminders, the response was lower than expected, and a $5 gift card was offered to improve the response rate. Customers who had completed the survey prior to the gift card offer were sent the $5 gift card as a thank you. The gift card was successful in improving response with a total of 99 completed surveys representing a response rate of 8%, shown in Table 2-9.

Telephone Interviews

Telephone interviews were conducted for initiatives with fewer participants. The purpose of the interviews was to get feedback from customers participating in the initiatives to gain a better understanding of how the program operates, including:

- How customers became aware of the program
- Drivers of participation
- Barriers to participation
- Program satisfaction
- Program effectiveness
- Recommendations for program improvement.

The table below shows the telephone interview sample dispositions for the Residential Prescriptive, Appliance Recycling, and C&I Downstream initiatives.

Table 2-11 Telephone Interview Sample Disposition

Sample Frame	Rebated Products	Appliance Recycling	C&I Rebates Downstream
Unique Participants	51	51	47
Bad contact info	4	2	14
Survey Sample	47	49	33
Completed Surveys	15	21	8
Refusals	9	5	6
Response Rate	32%	43%	24%

It's important to note that due to the limited number of participants in PY1, these results should be considered qualitative. Also, a formal net-to-gross battery will be conducted for these initiatives in PY2.

Net to Gross Methodology

The Net-to-Gross (NTG) methodology followed the Self Report NTG approach outlined in the NJ EM&V Guidelines: Net-to-Gross (NTG) Guidance for Downstream Rebate Programs. A complete description of the approach can be found in Appendix D.

3

RESIDENTIAL EFFICIENT PRODUCTS (EP)

The Residential Efficient Products Program promotes the installation of ENERGY STAR and other high-efficiency equipment and appliances through a variety of initiatives. There are several key initiatives in this program, including Prescriptive Rebates, the Online Marketplace, Midstream HVAC, Appliance Recycling, and Home Energy Reports.

These initiatives consist of the following:

- **Residential Appliances** is the prescriptive/downstream initiative consisting of three initiatives: Appliance Markdown, Appliance Recycling, and Rebated Products.
- **Online Marketplace** is the Customer Engagement Marketplace Platform
- **Midstream** initiative includes lighting and HVAC measures.
- **Behavioral** Initiative includes Home Energy Reports (HERS)

Results from the Process and Impact Evaluations of the Efficient Products (EP) program are presented in the following sections.

Process Evaluation Results

AEG conducted a process evaluation of the EP Program by interviewing program administrators, implementers, Trade Allies, and participants, as well as conducting a participant survey for the Online Marketplace. Appliance Markdown, Rebated Products, and the Online Marketplace are implemented in-house by RECO with support from Uplight. Appliance Recycling is implemented by ARCA, the Home Energy Reports is implemented by OPower, and Midstream initiative is implemented by ICF. Although two different PAs at RECO manage the Residential and C&I sectors of the Midstream program, ICF implements both sectors identically and runs Midstream as one program. Therefore, the Midstream HVAC initiative process evaluation is included in the C&I Rebates section below.

The process evaluation covered the following initiatives:

- Residential Appliances: Appliance Markdown and Rebated Products
- Residential Appliances: Appliance Recycling
- Online Marketplace
- Midstream HVAC, covered in C&I Midstream Chapter 7

Residential Appliances- Appliance Markdown and Rebated Products

The Appliance Markdown and Rebated Products initiatives under the Residential Appliances program provide incentives for appliances purchased by customers at third-party retail stores. The initiative includes both downstream and midstream incentives.

The Appliance Markdown initiative is a midstream initiative where customers receive instant discounts for air purifiers and dehumidifiers purchased at participating retail stores.

The Rebated Products initiative is a downstream initiative where customers must first buy the appliance, then apply for the rebate using RECO's online portal application. The application requires customer account information and proof of purchase to determine rebate eligibility. Downstream rebates are available for high-efficiency refrigerators, clothes washers and dryers, room air conditioners, and smart thermostats.

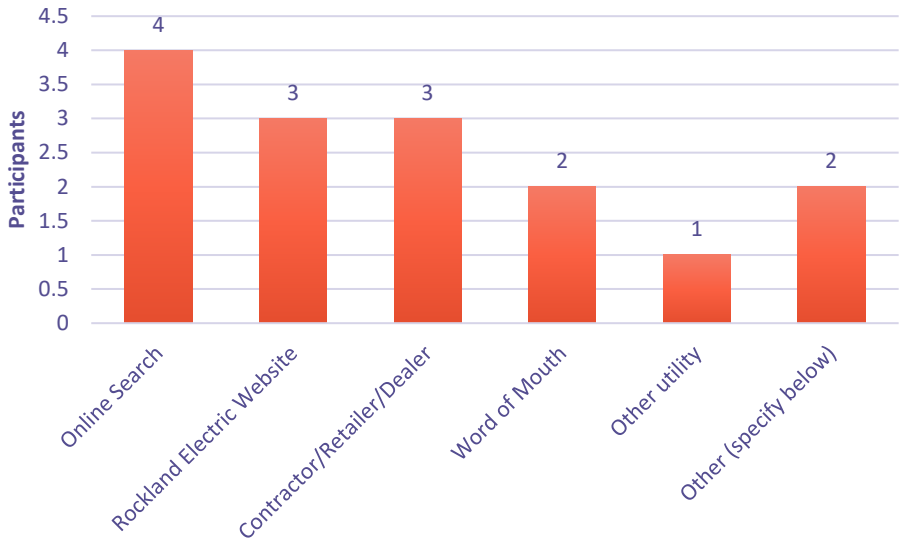
Program Performance

This initiative, along with the Online Marketplace, is responsible for the bulk of RECOs PY1 savings. One reason for the success of these initiatives is that they largely mirror the programs ORU offers in New York and have the same program administrator.

There has been a steady stream of applications and purchases for the Rebated Products initiative, and the PA expects to meet the goals for PY2.

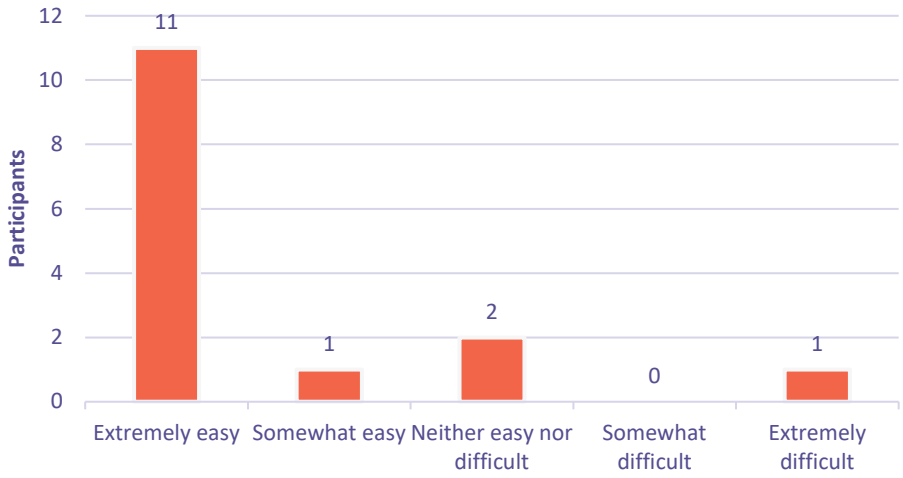
Short telephone interviews were conducted with PY1 Rebated Products participants. Participants heard about the initiative in a variety of ways, including online searches, the RECO website, retailers, dealers or contractors, and word of mouth.

Figure 3-1 How Participants Became Aware of the Rebate (n=15)



Almost all the participants interviewed found the application extremely easy to complete. Only one participant said it was extremely difficult. When asked why they found it difficult to complete the application the participant said it was not user friendly and recommended updating the RECO website.

Figure 3-2 Ease of Completing Application (n=15)



Strengths and Challenges

The fact that this initiative mirrors the ORU initiative has made the transition very easy for the program administrator. In PY1, the Rebated Products initiative transitioned to an online application which has been very successful.

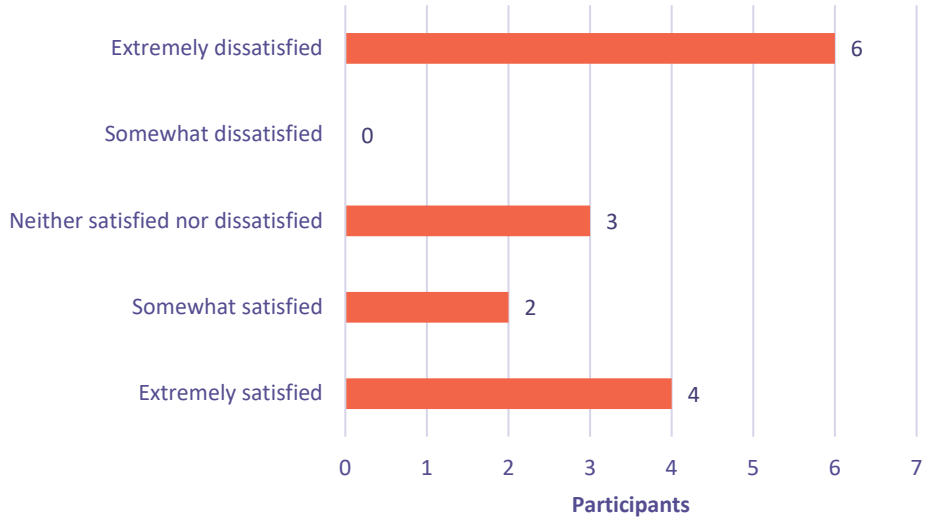
One challenge identified by the PA is that reviewing the Rebated Products applications can be time-consuming, especially given that the PA's time is already stretched with the additional responsibilities of all the RECO residential programs.

The PA is aware that the lighting savings achieved through the Appliance Markdown initiative will deteriorate once the new lighting rules go into effect, currently anticipated to begin in August 2023. There currently isn't a plan in place to replace some of those savings. More research is needed, particularly information on what other measures are available, expected savings, costs, and useful life of those measures, and any contractor network requirements.

Participant Satisfaction

The Rebated Products participants interviewed had mixed reactions regarding satisfaction with the time it took to receive the rebate. Six participants were extremely dissatisfied, and the remainder ranged from extremely satisfied (4) to neutral (3).

Figure 3-3 Satisfaction with the Time it Took to Receive the Rebate (n=15)



When asked to clarify their dissatisfaction, three participants said they had to follow up with program staff to receive their check, two said it just took too long, and one said they had not received the rebate check at the time of the interview.

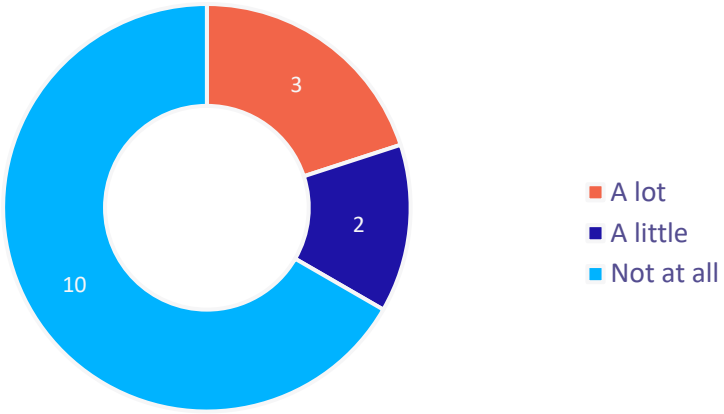
Satisfaction with the program overall was poor, with 6 participants extremely dissatisfied and 3 neutral. Nine out of 15 participants not being satisfied identifies a need for program improvement.

Figure 3-4 Overall Program Satisfaction – Residential Prescriptive/Downstream (n=15)

Program Effectiveness

All of the 15 participants interviewed said their equipment was still installed. The majority, however, said that the rebate had no influence on their decision to purchase high efficiency equipment.

Figure 3-5 Influence of Rebate on Decision to Purchase High Efficiency Equipment (n=15)



When asked what they would have purchased if the rebate was not available, most participants said the same equipment. One participant said they would have bought a cheaper model if the rebate was not available.

Residential Appliances- Appliance Recycling

The Appliance Recycling program picks up and recycles working refrigerators and freezers. Customers can also recycle room air conditioners and dehumidifier units during a scheduled refrigerator or freezer pick up. The customer incentive is $50 for refrigerators and freezers and $25 for air conditioners and dehumidifiers.

RECO contracts with ARCA to implement the program. The contract period started in 2021, with the first appliance pick-ups taking place in September 2021. ARCA is also the implementation contractor for all the appliance recycling programs in New Jersey.

If a customer is interested in participating, they call ARCA's call center or sign up through the online portal on RECO's website. They are required to provide their RECO account number when they sign up. If they don't have their account number, they can enter their last name, house number, and zip code. According to ARCA, it is about a 50/50 split between call and online enrollments.

During the initial contact, the customers schedule a pickup time. If no date is selected, the customer is contacted at a later date to schedule an appointment.

Program Performance

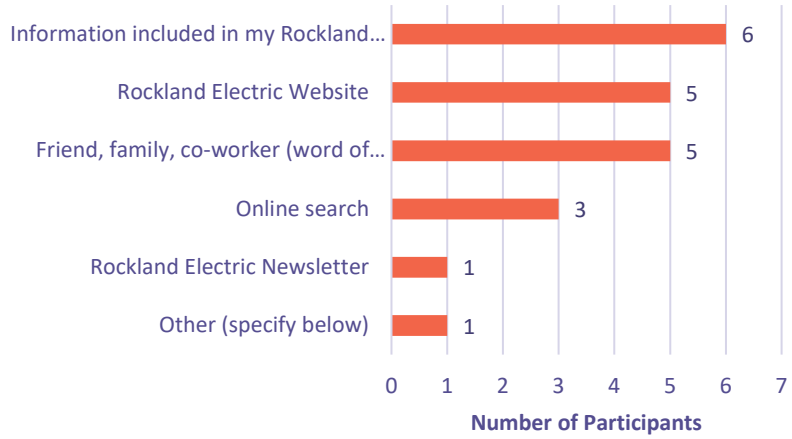
According to the program implementer, they recycled 63 units in PY1 and were struggling to meet their goals in 2022. At the time of the interview, they had a cancellation rate of 17% - slightly higher than what they see in other programs – which is typically 15%.

ARCA keeps detailed statistics about the health of the program. They track the number of units picked up, number of units scheduled, dropouts, and average days from scheduled to pick up. ARCA has an internal goal of completing picks up within two weeks of the initial contact. At the time of the interview, 99% of RECO customers had a pickup within two weeks. The average number of days from scheduled to pick up is 5.82. That is well within the ARCA internal goal of 10 business days.

Program marketing is not currently tracked by the RECO program administrator, and ARCA has not been involved or aware of any marketing campaigns. ARCA has significant experience with Appliance Recycling programs and is available to provide additional support to RECO if requested. ARCA believes additional marketing would greatly benefit the program because program awareness is a current obstacle. They are willing to share best marketing practices and demographic information with RECO.

The majority of participants said they heard about the program from RECO, either in a bill insert or on the company's website. Word of mouth also generated awareness of the program.

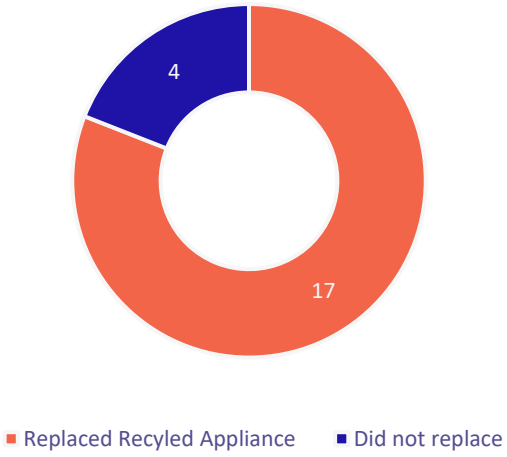
Figure 3-6 How Participants Heard about the Program – Appliance Recycling (n=21)



Most participants said they decided to recycle their appliance because the heard about the program/rebate (7), got a new appliance (7), or because their appliance was old or outdated (4).

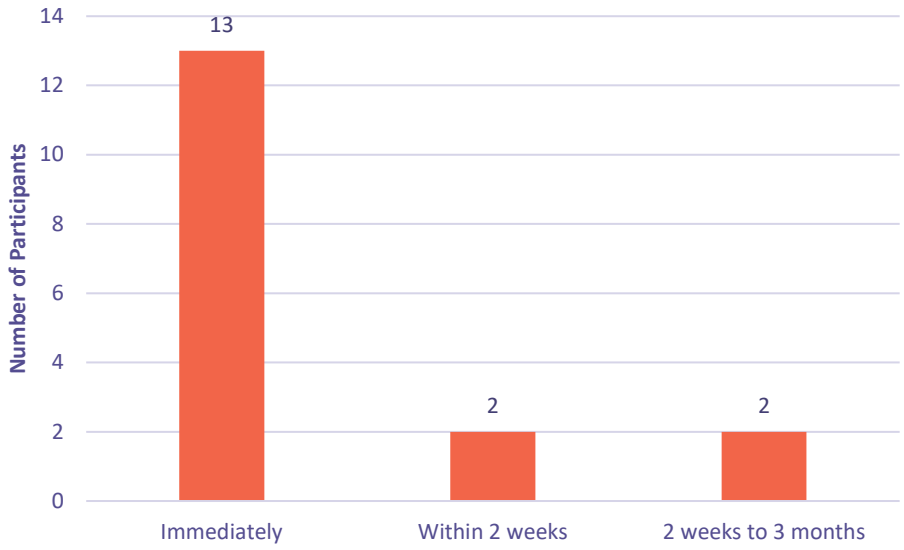
Seventeen of the 21 participants interviewed said they replaced their appliance.

Figure 3-7 Number of Participants Who Replaced Recycled Appliance (n=21)



Most participants said they replaced their appliance within 2 weeks of recycling.

Figure 3-8 How Long Until Participants Replaced Appliance (n=21)



Program Strengths and Challenges

Program strengths include ease of enrollment and high customer satisfaction. Program challenges include low participation rates, supply chain issues, and inflation. People are waiting longer to buy new units, and there is more activity in the used markets. As a result, there are fewer units available to recycle.

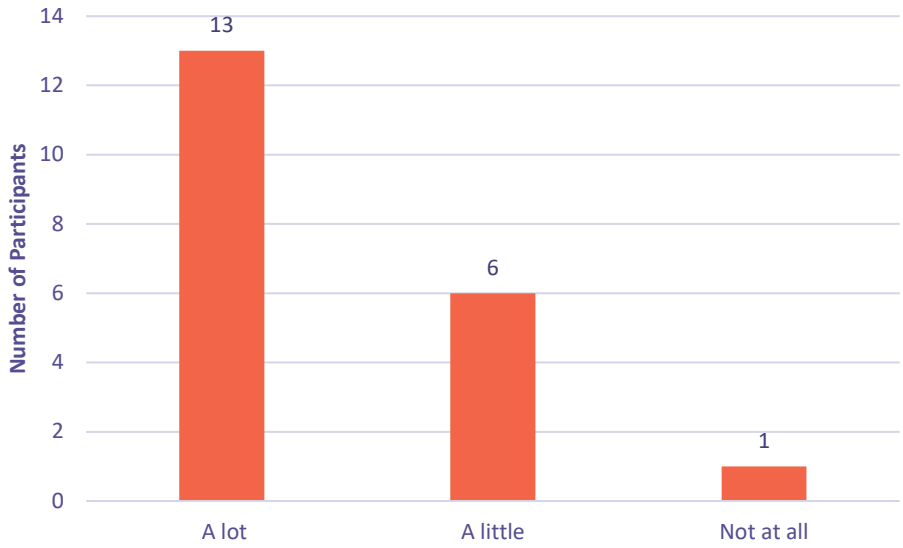
To overcome this challenge, ARCA would like to do a limited time offer or increase the incentive amount. For a limited-time offer, they would recommend increasing the incentive to $100 for the larger appliances. ARCA has had success with similar limited time offers in other programs. When a limited-time offer is active, fewer units end up in the used market, and more smaller units get recycled – even though that incentive stays at $25.

ARCA feels that the incentive for the larger appliances needs to be raised to $75 to meet participation goals. Also, if RECO is focused on reducing demand savings (kW), recycling the smaller air conditioners and dehumidifiers has been effective in lowering demand in other service territories. If kW savings are a priority, RECO could also offer to pick up small appliances on their own – rather than only being coupled with a larger unit.

Program Effectiveness

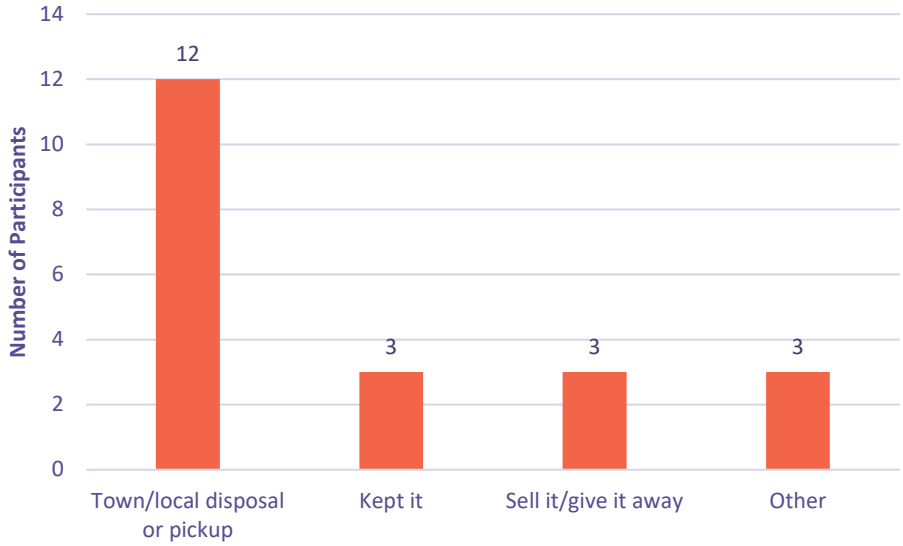
Thirteen of the 21 participants interviewed said the program had a lot of influence on their decision to recycle their appliance. Only one participant said it had no influence on their decision.

Figure 3-9 Influence of Program on Decision to Recycle Appliance (n=20)



If the program had not been available most participants said their town or local municipality would pick it up and/or recycle.

Figure 3-10 What Participants Would Have Done with Appliance if Program Had Not Been Available (n=21)



Program satisfaction among participants is very high, with all 21 participants interviewed saying they were extremely satisfied with the program overall and the time it took to schedule a pickup.

Online Marketplace

The Online Marketplace initiatives provide incentives for energy-efficient lighting and appliances purchased by customers through RECOs Online Marketplace. Customers can receive instant discounts for LEDs, air purifiers, and dehumidifiers through the Online Marketplace. The Online Marketplace also includes instant discounts for

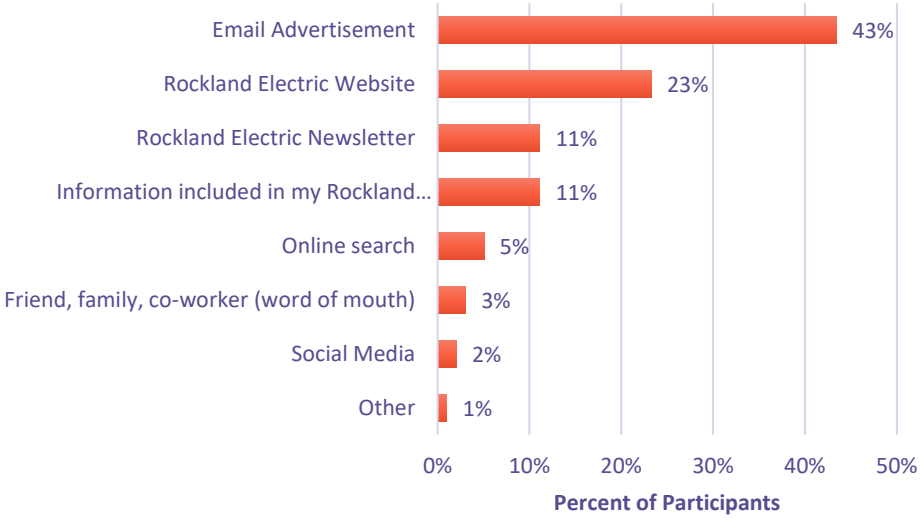
thermostats, advanced power strips, and energy-saving kits. Customers are required to provide their RECO Name and service address to get the instant rebate at the Online Marketplace.

Program Performance

The Online Marketplace, along with the Rebated Products initiative, is responsible for the bulk of RECOs PY1 savings. In PY1, RECO conducted a marketing campaign to promote the launch of the Online Marketplace in New Jersey. This included targeted emails, social media advertising, bill inserts, and newsletters. Limited time offers available through the Online Marketplace were also promoted.

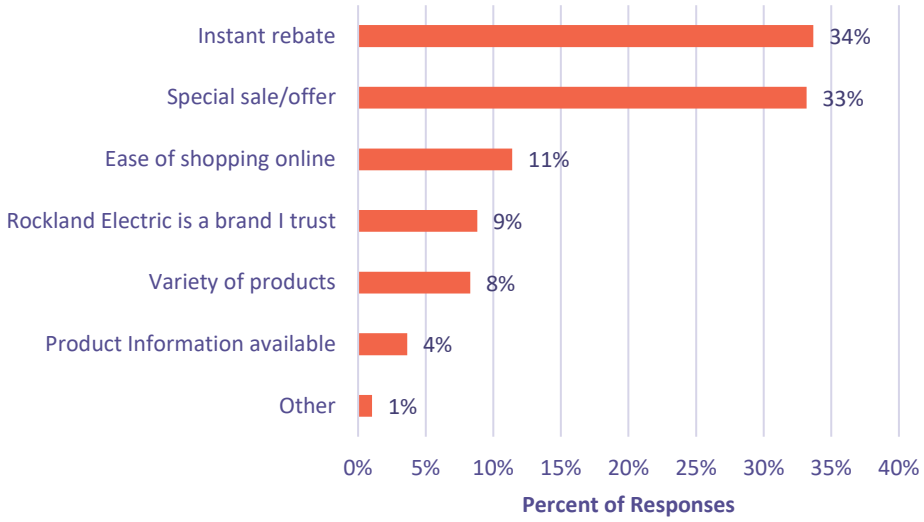
Participants said they became aware of the Online Marketplace, primarily through email advertisements and the Rockland Electric website.

Figure 3-11 Program Awareness – Online Marketplace (n=99)



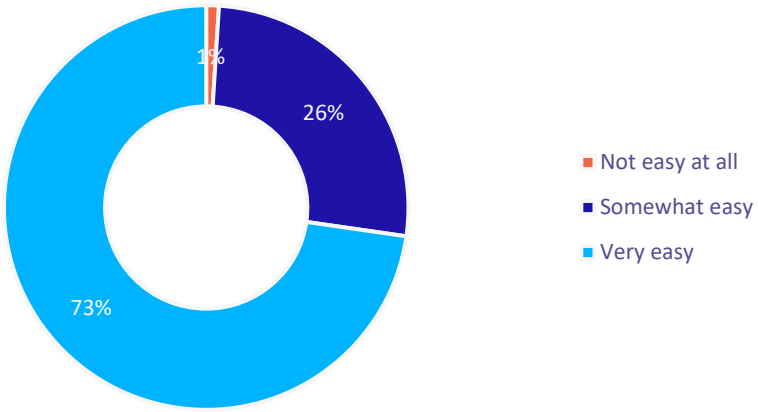
The majority of participants cited the instant rebate, or a special offer sale/offer was their reason for visiting the store and making a purchase.

Figure 3-12 Reason for Visiting Online Marketplace (n=99)



Almost three-fourths of customers found the marketplace very easy to make a purchase and receive the discount.

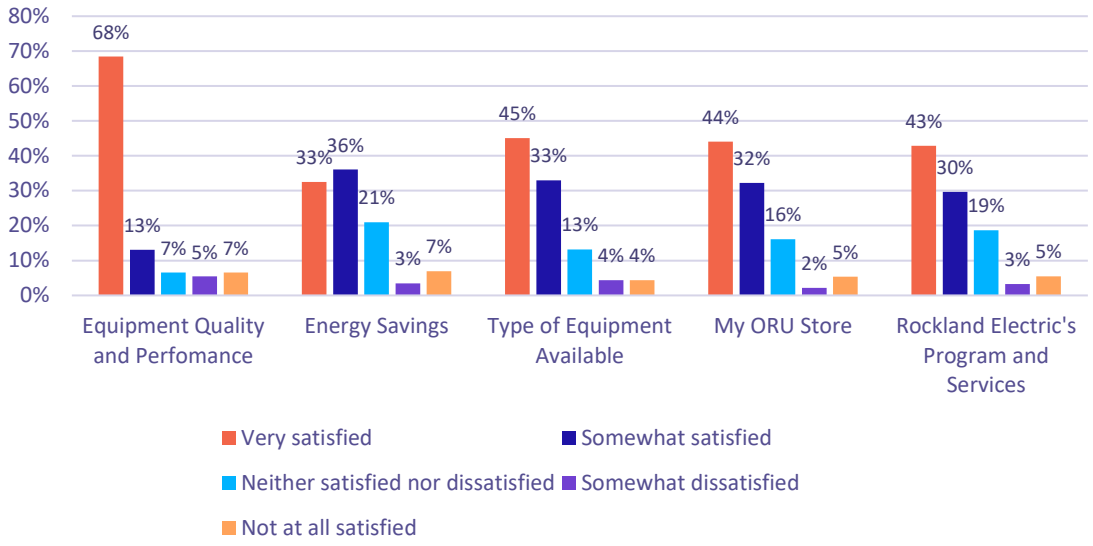
Figure 3-13 Ease of Purchase and Receiving Discount – Online Marketplace (n=99)



Program Satisfaction

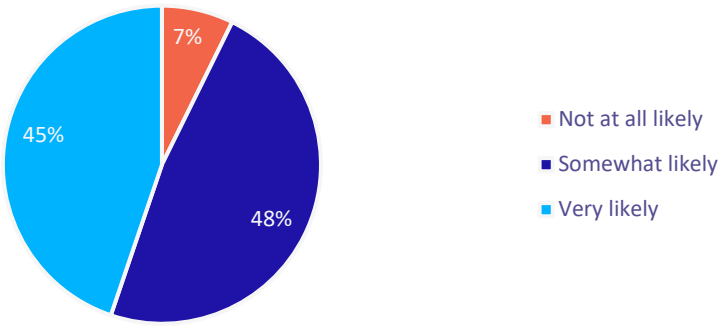
Participants were asked to rate their satisfaction with various aspects of the Online Marketplace on a scale of 1 – 5. The majority of participants were somewhat or very satisfied with the Online Marketplace, particularly the quality and performance of the equipment purchased.

Figure 3-14 Participant Satisfaction – Online Marketplace (n=99)



Almost all of participants said they are at least somewhat likely to recommend the Marketplace to someone else.

Figure 3-15 Likelihood of Recommending Online Marketplace to Someone Else (n=99)



Net to Gross Analysis

AEG estimated the NTG ratio for the Marketplace initiative using self-reported responses to the participant survey. AEG used the approach for downstream programs outlined in the New Jersey EM&V Guidelines[9]. A complete description of the methodology and analysis can be found in Appendix D.

The final NTG (kwh) ratio for smart thermostats and the Online Marketplace program are 0.94 and 0.87, respectively, and the NTG (kW) ratio is 0.81 for the Online Marketplace program, shown in Table 3-1.

[9] NJ EMV Guidelines Net-to-Gross (NTG) Guidance for Downstream Rebate Programs

Table 3-1 Online Marketplace NTG Ratio

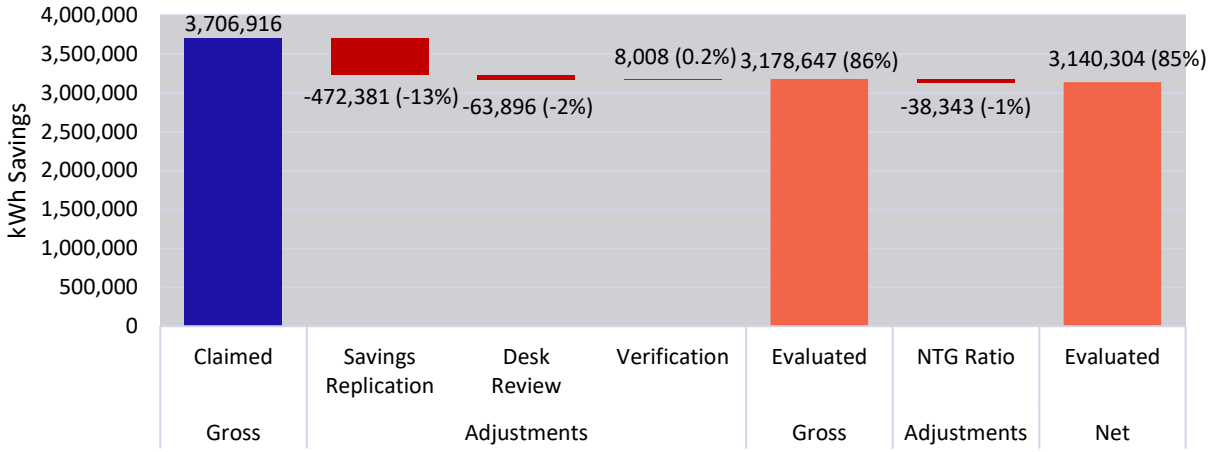
Measure	Free Rider Estimate (kWh)	Participant Spillover Ratio (kWh)	NTG (kWh)	Free Rider Estimate (kW)	Participant Spillover Ratio (kW)	NTG (kW)
Smart thermostat	.11	.05	0.94	0	NA	NA
Online Marketplace Program	.16	.03	0.87	.21	.02	.81

Impact Evaluation Results

The impact evaluation of the Residential Efficient Products Program resulted in an 86% gross realization rate for energy, and 42% realization rate for demand. The main reason for the realization rate was that the behavioral initiative resulted in a zero percent realization rate due to statistically insignificant savings. AEG's point estimates were similar to the claimed savings, but the mid-year program launch, as well as the lack of summer participation, resulted in small savings estimates and wide confidence bounds.

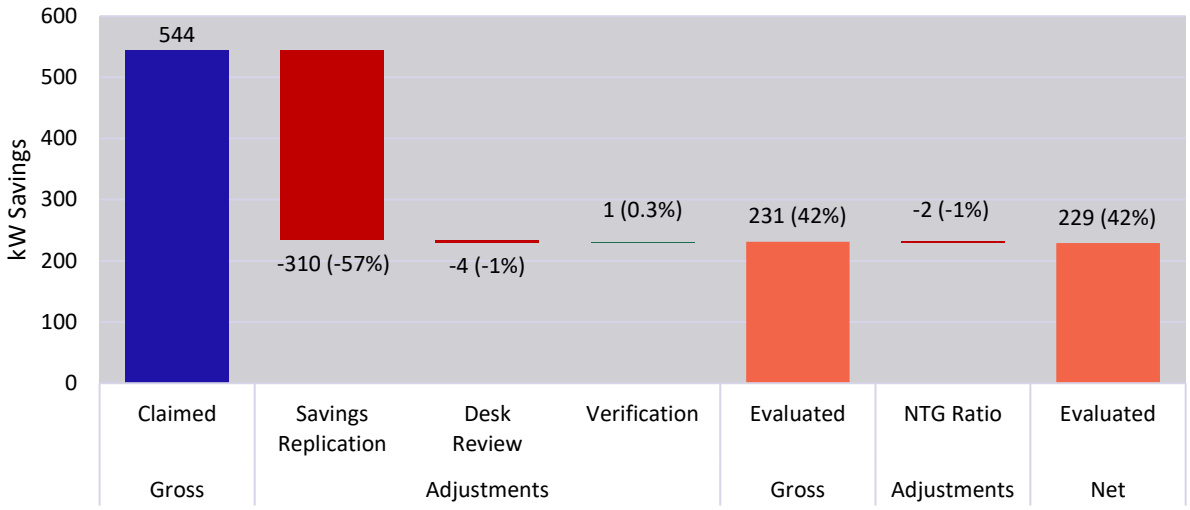
Additional adjustments to gross savings stem from savings discrepancies of Online Marketplace measures, and the application of in-service rates (ISRs) for Online Marketplace and midstream lighting measures.

Figure 3-16 Residential Efficient Products kWh Impact Evaluation



Adjustments to the kW realization rate stem largely from erroneous claimed savings for thermostats sold on the Online Marketplace that were found in the savings replication. RECO claimed kW savings for smart thermostats but there are no kW savings associated with that measure.

Figure 3-17 Residential Efficient Products kW Impact Evaluation



Residential Appliances

The Residential Appliances program underwent savings replication and engineering desk review and resulted in a 100% realization rate. This is comprised of three programs: Appliance Recycling, Rebated Products, and Appliance Markdown.

Appliance Recycling

The Appliance Recycling program recycled a total of 58 appliances during PY1, including 47 refrigerators, six freezers, one dehumidifier, and four Air Conditioners. AEG replicated savings for all units and conducted an engineering desk review of a sample of 20 units. Neither activity found discrepancies between claimed and verified savings.

Figure 3-18 Appliance Recycling kWh Impact Evaluation

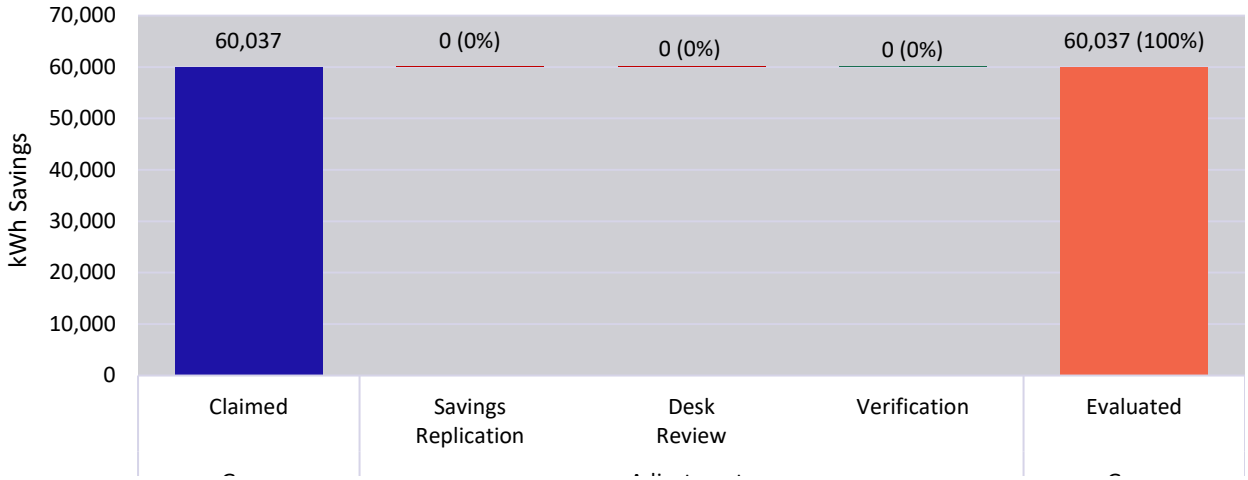


Table 3-2 Appliance Recycling Impact Evaluation Results –Program Level Savings (kWh)

Measure	Total Units	Sampled Units	Claimed Savings	Verified Savings	Realization Rate
Air Conditioner	4	2	445	445	100%
Dehumidifier	1	1	392	392	100%
Freezer	6	2	4,291	4,291	100%
Refrigerator	47	15	54,910	54,910	100%
Total	58	20	60,037	60,037	100%

Figure 3-19 Appliance Recycling kW Impact Evaluation

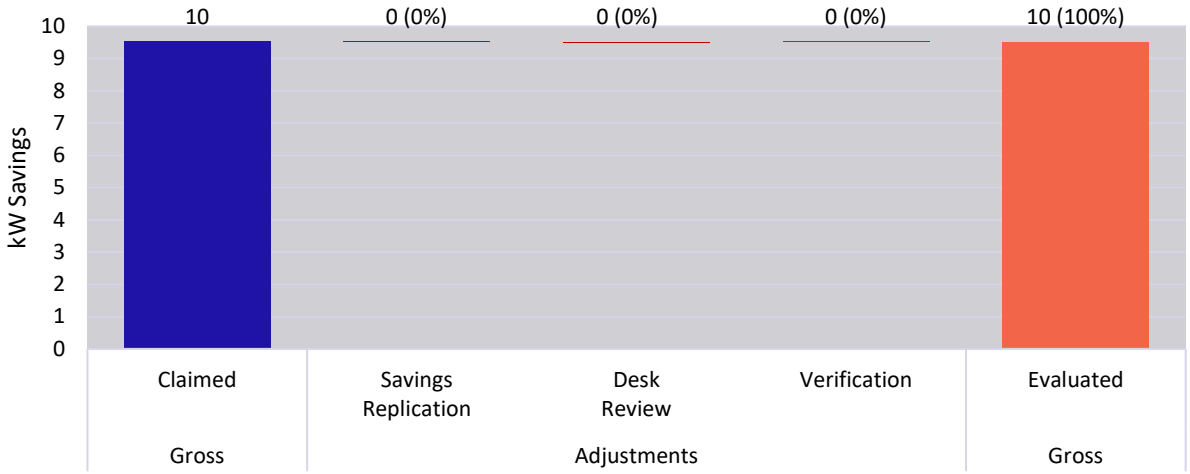


Table 3-3 Appliance Recycling Impact Evaluation Results –Program Level Savings (kW)

Measure	Total Units	Sampled Units	Claimed Savings	Verified Savings	Realization Rate
Air Conditioner	4	2	0.45	0.45	100%
Dehumidifier	1	1	0.23	0.23	100%
Freezer	6	2	0.64	0.64	100%
Refrigerator	47	15	8.20	8.20	100%
Total	58	20	9.52	9.52	100%

Rebated Products

The rebated products program rebated a total of 70 appliances during PY1. AEG replicated savings for all units and conducted an engineering desk review of a sample of 15 units. Neither activity found discrepancies between claimed and verified savings.

Figure 3-20 Rebated Products kWh Impact Evaluation

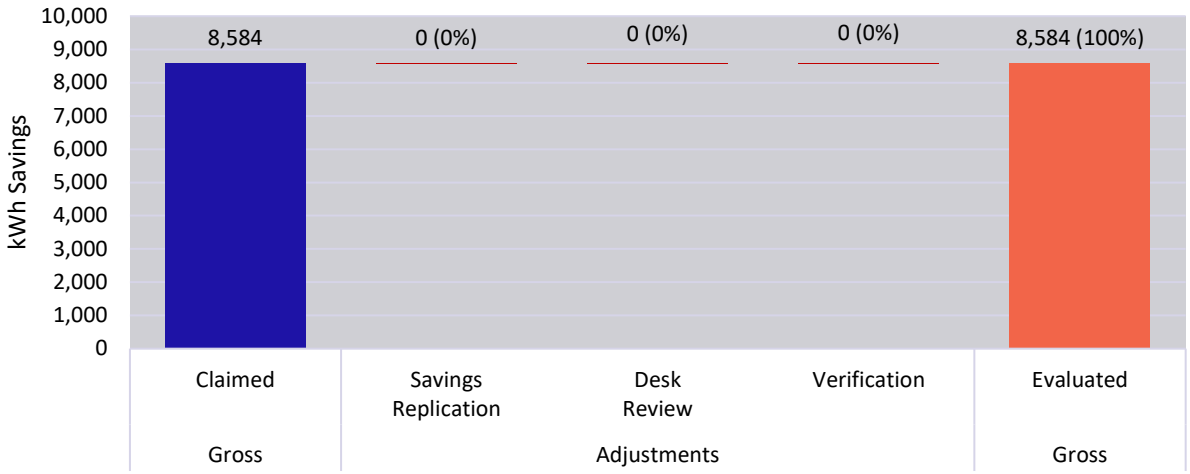


Table 3-4 Rebated Products Impact Evaluation Results –Program Level Savings (kWh)

Measure	Total Units	Sampled Units	Claimed Savings	Verified Savings	Realization Rate
Air Purifier	1	1	1,755	1,755	100%
Clothes Dryer	18	4	3,349	3,349	100%
Clothes Washer	26	5	1,514	1,514	100%
Dehumidifier	4	1	504	504	100%
Refrigerator	20	4	1,419	1,419	100%
Room AC	1	0	43	43	100%
Total	70	15	8,584	8,584	100%

Figure 3-21 Rebated Products kW Impact Evaluation

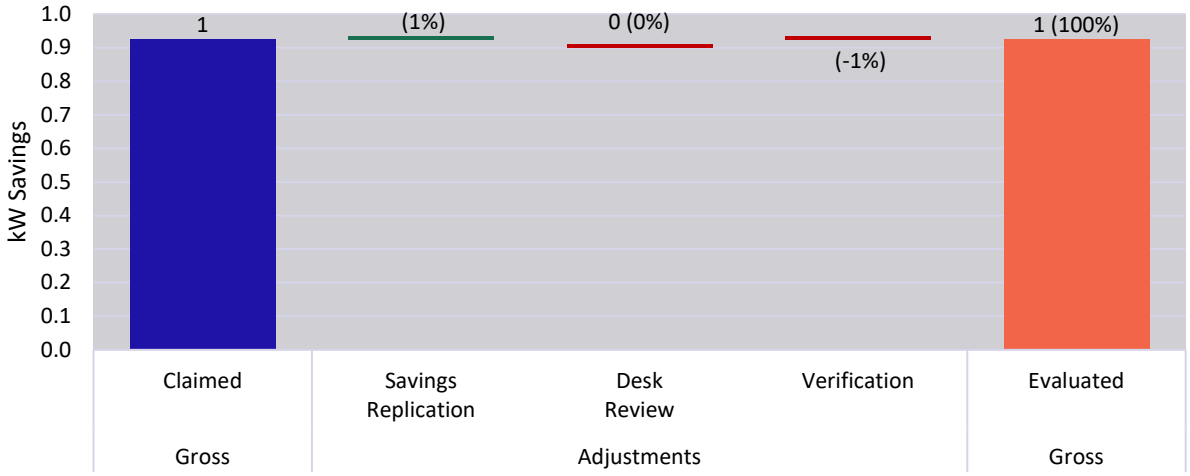


Table 3-5 Rebated Products Impact Evaluation Results –Program Level Savings (kW)

Measure	Total Units	Sampled Units	Claimed Savings	Verified Savings	Realization Rate
Air Purifier	1	1	0.20	0.20	100%
Clothes Dryer	18	4	0.29	0.29	100%
Clothes Washer	26	5	0.14	0.14	100%
Dehumidifier	4	1	0.11	0.11	100%
Refrigerator	20	4	0.16	0.16	100%
Room AC	1	0	0.02	0.02	100%
Total	70	15	0.93	0.93	100%

Appliance Markdown

The appliance markdown program rebated 195 Dehumidifiers—no discrepancies were found between claimed and verified saving during the savings replication process.

Figure 3-22 Appliance Markdown kWh Impact Evaluation

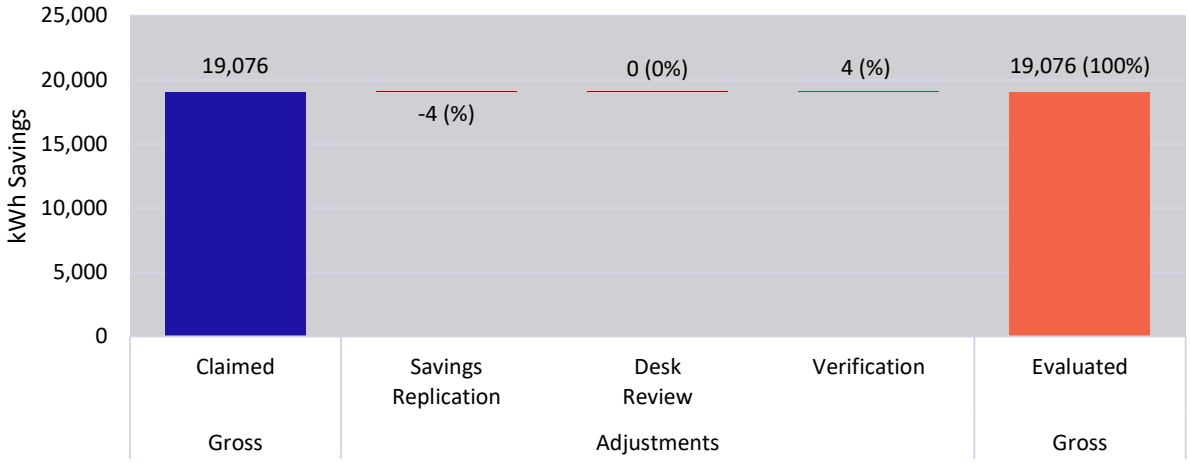


Table 3-6 Appliance Markdown Impact Evaluation Results –Measure Level Savings (kWh)

Measure	PY1 Participation	Claimed Savings	Verified Savings	Realization Rate
Dehumidifier	195	19,076	19,076	100%
Total	195	19,076	19,076	100%

Figure 3-23 Appliance Markdown kW Impact Evaluation

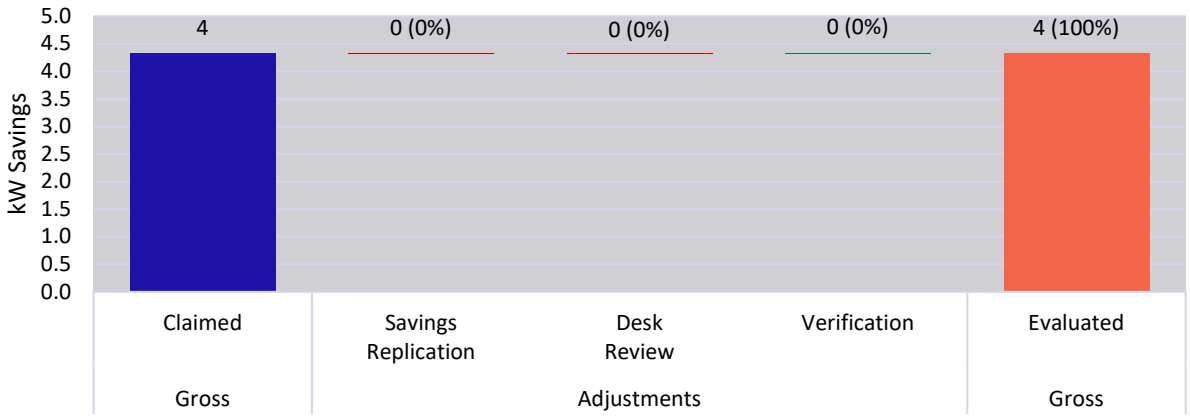


Table 3-7 Appliance Markdown Impact Evaluation Results –Measure Level Savings (kW)

Measure	PY1 Participation	Claimed Savings	Verified Savings	Realization Rate
Dehumidifier	195	4.32	4.32	100%
Total	195	4.32	4.32	100%

Residential Behavioral

The Residential Behavioral program was launched in November 2021, four months after the start of PY1. The initial launch included just over 32,000 participants, and a second wave of 4,800 participants was added in April 2022. This evaluation utilized a regression analysis of monthly billing data and resulted in statistically insignificant savings, resulting in a zero percent realization rate. The analysis approach and results are detailed in Appendix A.

Figure 3-24 Residential Behavioral kWh Impact Evaluation

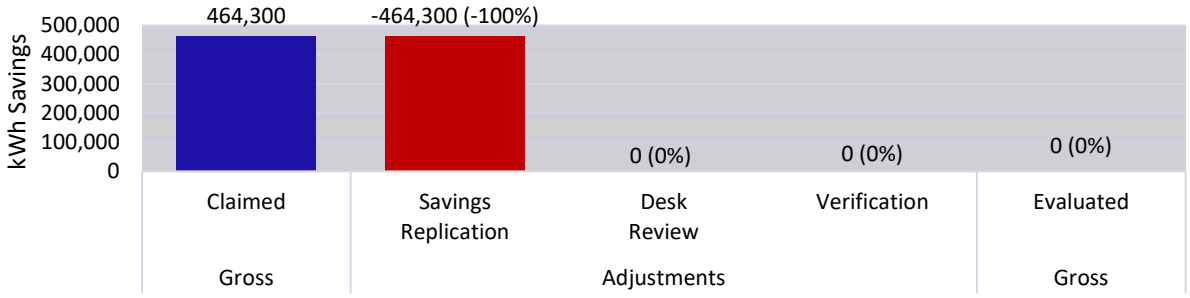


Table 3-8 Residential Behavioral Impact Evaluation Results –Program Level Savings (kWh)

Participation Wave	PY1 Participation	Claimed Savings	Adjusted Savings	Realization Rate
November 2021 Wave	32,101	464,300	334,200 +/- 770,000 kWh	0%
April 2022 Wave	4,822		0	0%
Total	36,923	464,300	0	0%

Figure 3-25 Residential Behavioral kW Impact Evaluation

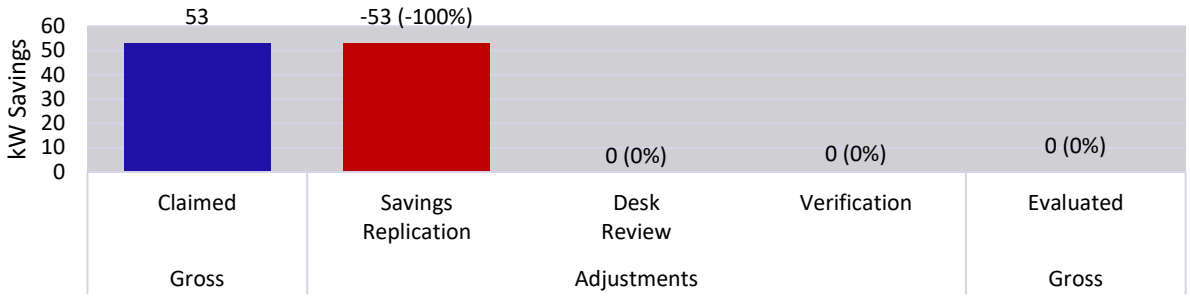


Table 3-9 Residential Behavioral Impact Evaluation Results –Program Level Savings (kW)

Participation Wave	PY1 Participation	Claimed Savings	Adjusted Savings	Realization Rate
November 2021 Wave	32,101	53.082	38.151 +/- 87.900 kW	0%
April 2022 Wave	4,822		0	0%
Total	36,923	53.082	0	0%

Midstream

The Residential Midstream program has a lighting component as well as an HVAC component.

HVAC

The HVAC program rebated 6 Central Split AC and one Mini-Split HP system. AEG replicated the savings and conducted an engineering desk review of all 7 units; both approaches resulted in a 100% realization rate between claimed and verified kWh savings, but a slight difference in the kW savings.

Figure 3-26 Midstream HVAC kWh Impact Evaluation

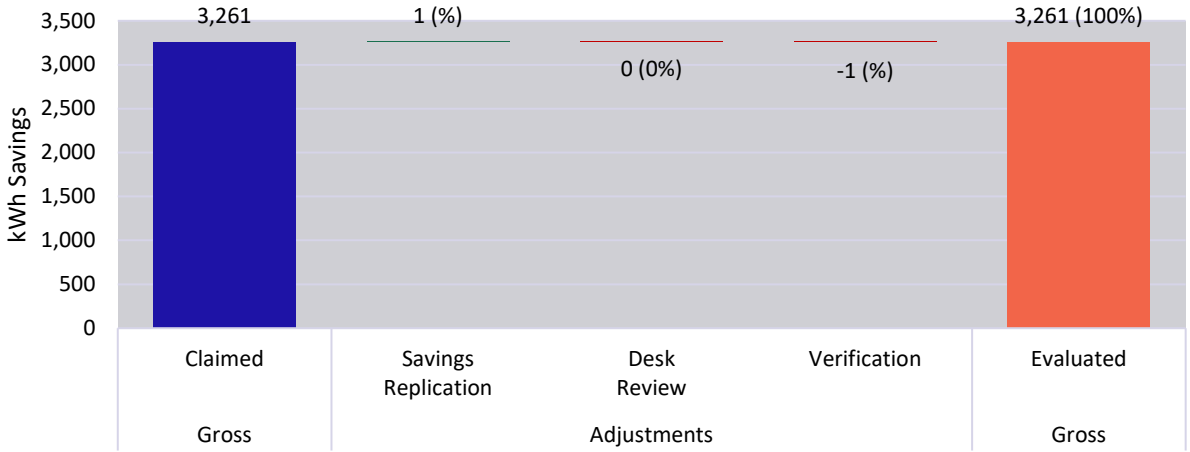


Table 3-10 Residential Midstream HVAC Impact Evaluation Results –Measure Level Savings (kWh)

Measure	Total Units	Claimed Savings	Verified Savings	Realization Rate
Central Split AC	6	2,473	2,473	100%
Mini-Split HP	1	788	788	100%
Total	7	3,261	3,261	100%

The desk review found that the claimed kW calculation used an imputed value for the EER of the installed unit when the actual EER unit was known. The formula also applied two coincident factors for the peak usage. This led to an 87% realization rate for kW savings.

Figure 3-27 Midstream HVAC kW Impact Evaluation

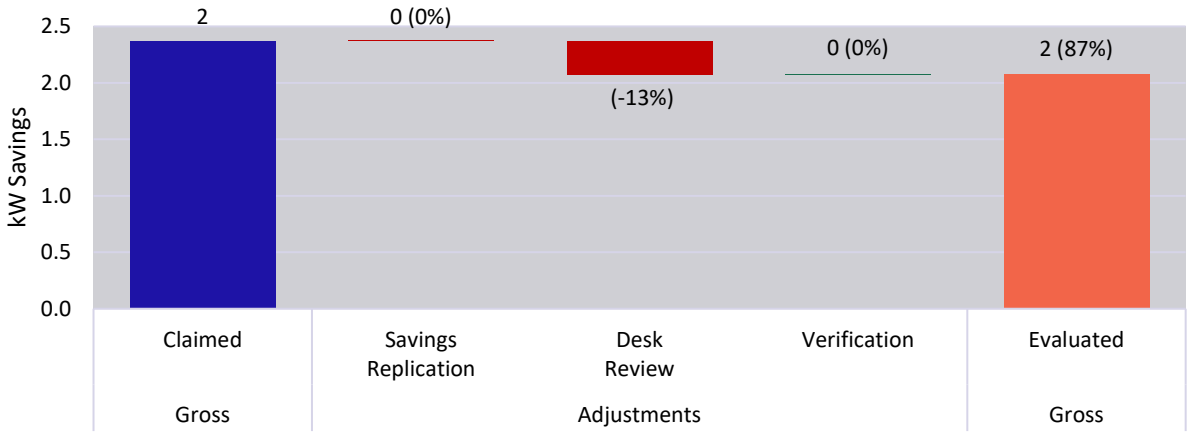


Table 3-11 Residential Midstream HVAC Impact Evaluation Results –Measure Level Savings (kW)

Measure	Total Units	Claimed Savings	Verified Savings	Realization Rate
Central Split AC	6	2.1	1.9	90%
Mini-Split HP	1	0.3	0.2	66%
Total	7	2.4	2.1	87%

Table 3-12 Residential Midstream HVAC Realization Rate Explanation

Measure	Finding	Resulting Recommendation
All	Claimed kW calculation uses an imputed formula for the EER of the installed unit when the EER of the installed unit is known.	Use the known EER when available
All	The claimed kW formula applies two coincident factors for the peak usage (one from the TRM and one from service territory CF).	Use the coincident factor from the TRM.

Midstream Lighting

The midstream lighting rebated 54,355 LED light bulbs in PY1. AEG's savings replication found no discrepancies to the claimed savings using New Jersey's Clean Energy Program (NJCEP) formulas; a 98% In-Service Rate (ISR) was applied to the verified savings.

Figure 3-28 Midstream Lighting kWh Impact Evaluation

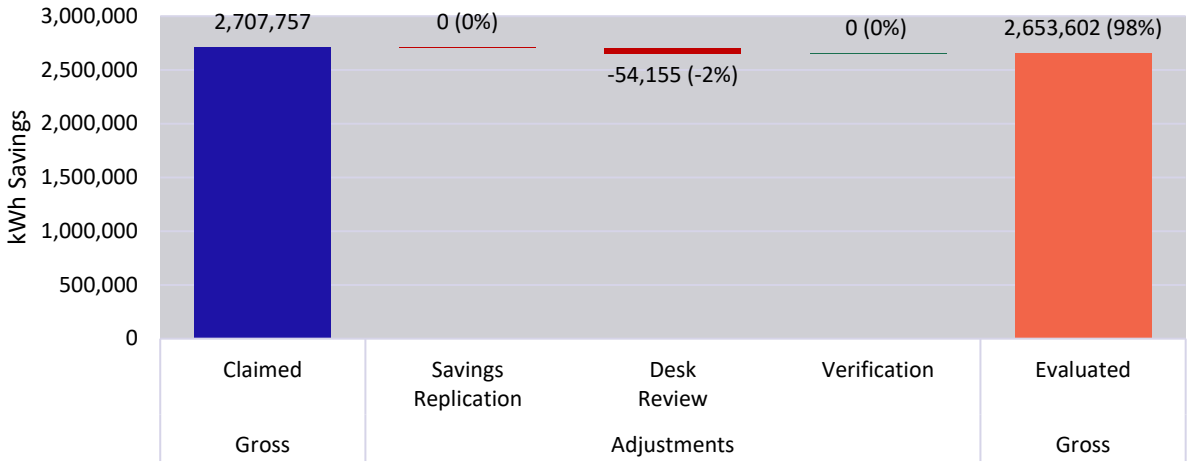


Table 3-13 Residential Midstream Lighting Impact Evaluation Results –Measure Level Savings (kWh)

Measure	PY1 Participation	Claimed Savings	Verified Savings	Realization Rate
LED Specialty - ESTAR V2.0	25,391	1,436,544	1,407,814	98%
LED Standard - ESTAR V2.0	28,964	1,271,213	1,245,789	98%
Total	54,355	2,707,757	2,653,602	98%

The evaluated kW savings were adjusted for the 98% in-service rate which is included in the desk review adjustment.

Figure 3-29 Midstream Lighting kW Impact Evaluation

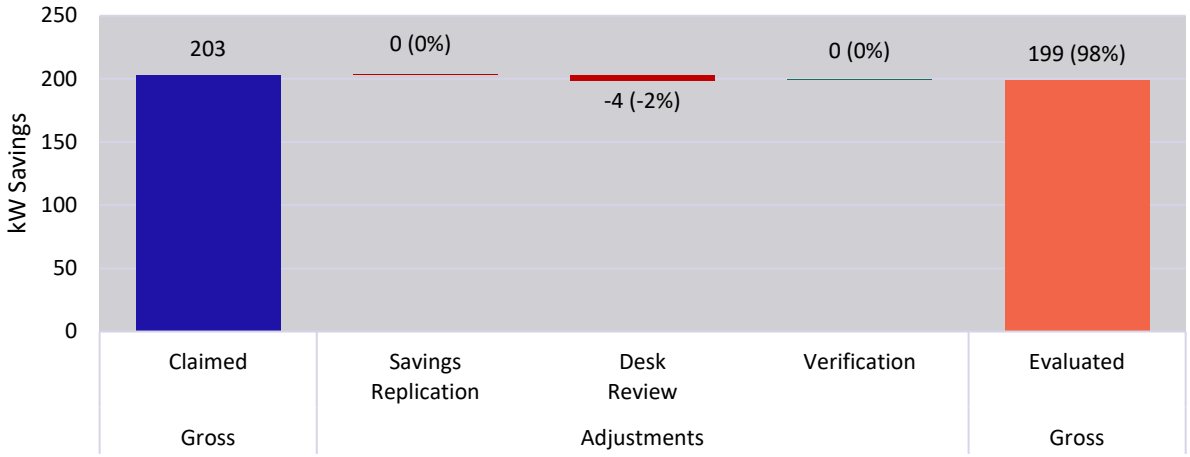


Table 3-14 Residential Midstream Lighting Impact Evaluation Results –Measure Level Savings (kW)

Measure	PY1 Participation	Claimed Savings	Verified Savings	Realization Rate
LED Specialty - ESTAR V2.0	25,391	107.9	105.8	98%
LED Standard - ESTAR V2.0	28,964	95.5	93.6	98%
Total	54,355	203.0	199.4	98%

Online Marketplace

The Online Marketplace rebated 4,335 units in PY1. AEG replicated savings for all appliances and conducted an engineering desk review of a sample of 212 units, and found a realization rate of 98% for the initiative overall. Discrepancies between claimed and verified savings are detailed in Table 3-17

No discrepancies were found in the Power Strips savings; a 71% ISR was applied to the verified savings.

Figure 3-30 Online Marketplace kWh Impact Evaluation

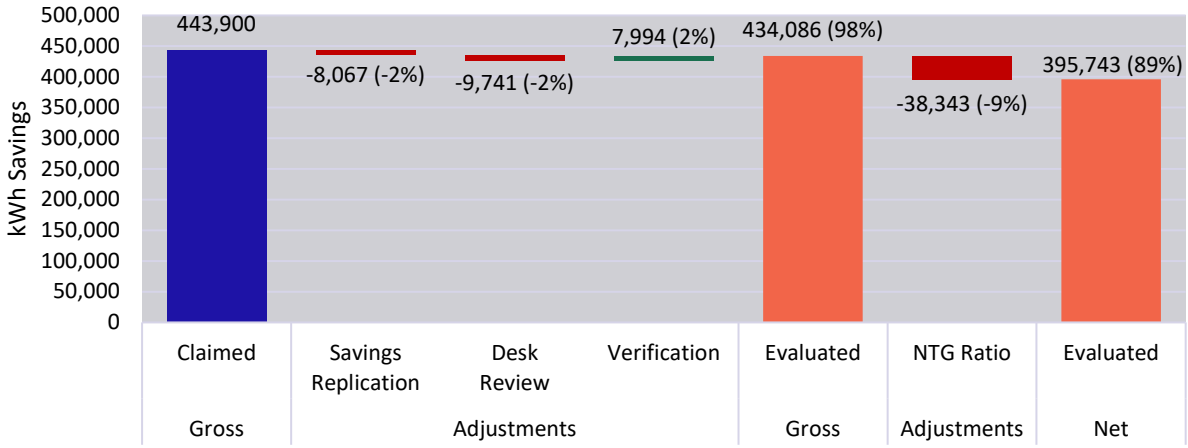


Table 3-15 Online Marketplace Impact Evaluation Results –Measure Level Savings (kWh)

Measure	PY1 Participation	Desk Review Sampled Units	Claimed Savings	Adjusted Gross Savings	Realization Rate
Air Purifier	41	8	16,094	16,094	100%
Dehumidifier	9	3	1,089	1,232	113%
Kits	4	1	1,092	863	79%
Lighting	2135	100	135,472	139,214	103%
Power Strips	236	10	25,709	18,288	71%
Thermostats	1910	96	264,444	258,394	98%
Total	4335	212	443,900	434,086	98%

RECO erroneously claimed kW savings for thermostats. This along with other discrepancies outlined in Table 3-17, resulted in a 6% realization rate for the Online Marketplace.

Figure 3-31 Online Marketplace kW Impact Evaluation

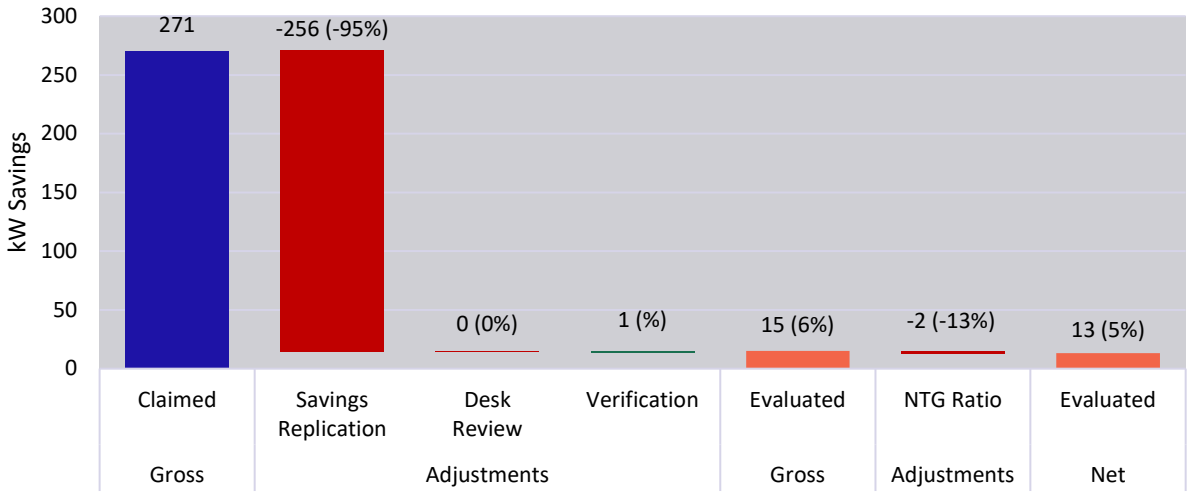


Table 3-16 Online Marketplace Impact Evaluation Results –Measure Level Savings (kW)

Measure	PY1 Participation	Desk Review Sampled Units	Claimed Savings	Adjusted Gross Savings	Realization Rate
Air Purifier	41	8	1.9	1.4	76%
Dehumidifier	9	3	0.3	0.3	113%
Kits	4	1	0.1	0.1	80%
Lighting	2135	100	10.2	11.2	110%
Power Strips	236	10	2.7	2.1	76%
Thermostats	1910	96	255.6	0.0	0%
Total	4335	212	270.6	15.0	6%

Table 3-17 Online Marketplace Realization Rate Explanation

Measure	Finding	Resulting Recommendation
Dehumidifier	When the program launched there were no savings in the NJ TRM for dehumidifiers, so the NY TRM calculations were used., the verified savings use formula for Residential Energy Star Dehumidifier in NJCEP FY20 .	• Use the current NJ TRM savings calculations going forward
Thermostats	Some electric heating accounts with CAC had claimed savings of 142.45 kWh, which should be 291.19 kWh according to the NJ Coordinated Measure List deemed savings; this error affects 56 units across 38 accounts. 10% of the units applied ISRs. There are no kW savings associated with thermostats.	• Verify that the correct savings amount is being used based on the heating and cooling systems in the premise. • Do not claim kW savings
Kits	Claimed savings assumed water heaters were natural gas for showerhead and aerator with "unknown" water heater energy resource; AEG applied a 13% electric water heater factor to the “unknown” measures. ISR applied to each kit component verified savings. Claimed kW savings used coincidence factors for lighting of 0.082 and HVAC interactive factors of .049 while the NJCEP FY20 cites a coincidence factor of .08 and an HVAC interactive factor of .155.	• Use a 13% water heater factor when the water heater energy resource is unknown. • For lighting components, ensure that the coincidence and HVAC interactive factors is consistent with the TRM.
Lighting	Reported Lumens were low for two bulb types, which led to baseline wattages increased from 29 to 43 on these bulbs, and an increase in savings on every instance of these bulbs. The engineering desk review found several bulbs were not accounted for in the claimed savings. ISR applied to verified savings. Claimed kW savings used coincidence factors for lighting of 0.082 and HVAC interactive factors of .049 while the NJCEP FY20 cites a coincidence factor of .08 and an HVAC interactive factor of .155.	• Verify that correct lumens and quantity of bulbs are used In savings calculations. • Ensure that the coincidence and HVAC interactive factors is consistent with the TRM.

Table 3-18 Online Marketplace Net Verified Savings

Measure	Verified Gross Savings	NTG Ratio	Verified Net Savings	Verified Net % of Claimed
Air Purifier	16,094	87%	14,002	87%
Dehumidifier	1,232	87%	1,072	87%
Kits	863	87%	751	87%
Lighting	13,9214	87%	12,1116	87%
Power Strips	18,288	87%	15,911	87%
Thermostats	258,394	94%	242,890	94%
Total Program	434,086		395,742	91%

Residential EP Evaluability and TRM Assessment

Residential EP Evaluability Assessment

AEG's evaluability assessment of RECO's EP programs are detailed in Table 3-19.

Table 3-19 Residential Efficient Products Evaluability Assessment

Program	Evaluability Assessment	Resulting Recommendation
Residential Appliances	**Appliance Recycling:** No backup documentation or pictures of recycled appliance provided **Rebated Products:** *Air Purifier*- CADR value not provided in RECO documentation. Verified via Energy STAR lookup table. *Dehumidifier*- Input capacity not provided in RECO documentation. Verified capacity through VisionDSM tracking database. **Appliance Markdown**: *Dehumidifier*- Liters per kWh for the replacement unit were not provided. Value was inferred based on capacity of unit provided.	• Request implementer to take photos of recycled appliances • Confirm key inputs are included in documentation, such as CADR value, input capacity, and liters per kWh for applicable appliances.
Online Marketplace	*Dehumidifiers*- Capacity, base liters per kWh, and efficient liters per kWh were not provided in the RECO documentation and are all savings parameters according to the NJCEP FY20. *Kits*- Most individual savings equation parameters were not included in the RECO documentation and needed to be inferred. Water heater fuel type wasn't provided in RECO documentation and an electric unknown factor of 13% needed to be applied in absence of this information to the aerator and showerhead portions of the kit savings.	• Confirm savings parameters are included in project documentation. • As of Q3 PY2, RECO is using customer data to determine the appropriate water heater fuel type, and therefore accurately account for savings from the showerhead and faucet aerator components of the kit.
Residential Behavioral	The April Wave had insufficient participation to be evaluated in PY1	• Claim behavioral savings only from waves that have a full year of participation.

Residential EP TRM Assessment

The impact evaluation focused on ensuring that the savings estimations adhered to the NJ FY2020 TRM. In a separate effort spanning Q4 2022 – Q1 2023, AEG reviewed the TRM calculations for reasonableness and provided forward-looking recommendations for improvements. Those recommendations are summarized in Appendix B.

Table 3-20 Residential Efficient Products TRM Findings

Program	TRM Findings
Residential Appliances	Clothes Washers- The deemed values (no algorithm) in NJ FY2020, used an assumed % electric Domestic Hot Water (DHW) and % Natural Gas (NG) DHW. As of this report, this has already been addressed in the NJ FY2021 which now has an algorithm that you could enter 100% DHW if your program only rebates for electric or gas DHW.

Benchmarking Assessment

As part of the evaluation, AEG also benchmarked RECO's offerings against other neighboring utilities in neighboring states and throughout the northeast. The results of this effort are outlined in the following section, by sector and program. Due to a lack of participation in some of RECO's Residential programs, only Residential Efficient Products results are detailed below. The Home Performance with Energy Star, Moderate Income Weatherization, and Multifamily offerings will be included in the PY2 evaluation. The key metrics include the following:

- Free Ridership (FR)
- Spillover (SP)
- Net to Gross ratio (NTG)
- Participation
- Savings per participant

Residential Efficient Products Results

The EP program's four initiatives are compared to neighboring utilities for the metrics that were available for RECO's programs. Metrics such as free ridership, spillover, and net-to-gross ratio are only available for RECO's Online Marketplace. These metrics from benchmarked utilities are included for context and may be updated during the PY2 evaluation.

Residential Appliances

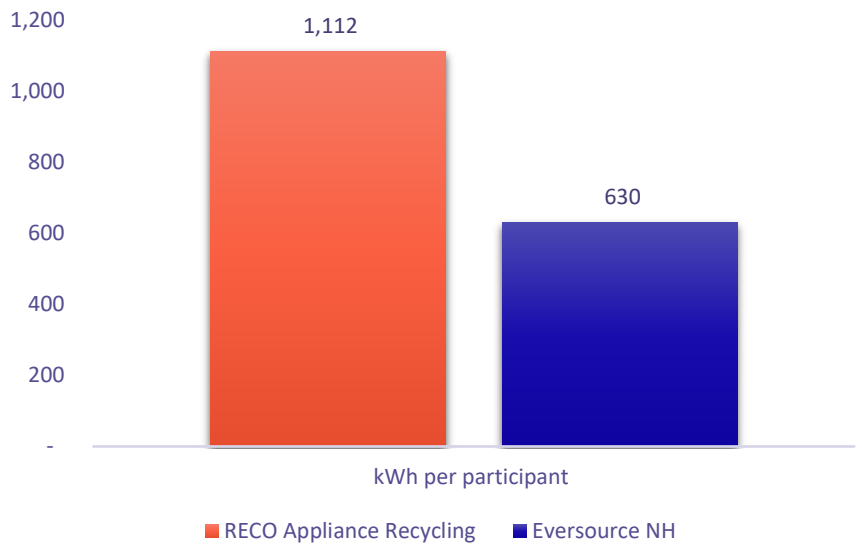
Appliance Recycling

Table 3-21 presents data on energy savings achieved by Appliance Recycling programs implemented by Eversource New Hampshire. As can be seen from the table below, RECO's Appliance Recycling program achieved the higher energy savings of 1,112 kWh per participant, followed by New Hampshire Utility 1 at 630 kWh per participant.

Table 3-21 Residential Appliance Recycling Benchmarking Results

Measures	RECO Appliance Recycling	Eversource NH	Average
FR	NA	38%	NA
SP	NA	0%	NA
NTG	NA	62%	NA
Sum of Participants	54	688	371
Saving Methodology	TRM	TRM	
Air Conditioner	445	350	398
Dehumidifier	392	-	196
Freezer	4,290	51,521	27,906
Refrigerator	54,900	381,326	218,113
Total kWh Savings	60,027	433,198	246,612
kWh per participant	1,112	630	871

Figure 3-32 Appliance Recycling per-participant Savings Comparison



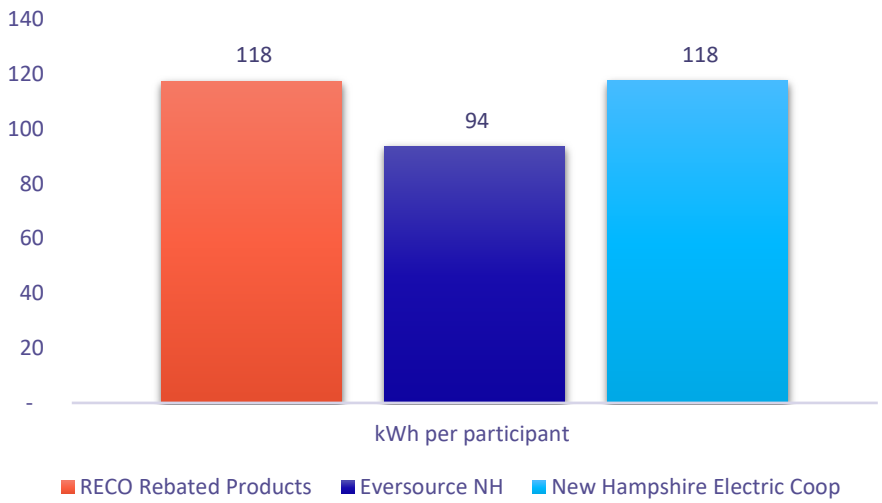
Rebated Products

Table 3-22 presents data on energy savings achieved by Appliance Rebate programs implemented by Eversource New Hampshire and Liberty New Hampshire. As can be seen from the table below, RECO Appliance Rebate program achieved the highest energy savings of 118 kWh per participant and the same with Eversource New Hampshire. Followed by Liberty New Hampshire at 94 kWh per participant. The result demonstrates the success of RECO energy efficiency Rebated Products program.

Table 3-22 Rebated Products Benchmarking Results

Measures	RECO Rebated Products	Eversource NH	Liberty NH	Average
FR	NA	51%	57%	54%
SP	NA	9%	39%	24%
NTG	NA	58%	82%	
Sum of Participants	73	8,878	3,183	4,045
Saving Methodology	TRM Deemed	TRM Deemed	TRM Deemed	
Air Purifier kWh Savings	1,755	96,000	88,757	62,171
Clothes Dryer kWh Savings	3,348	137,640	63,426	68,138
Clothes Washer kWh Savings	1,514	133,500	60,698	65,237
Dehumidifier kWh Savings	504	337,050	116,844	151,466
Refrigerator kWh Savings	1,419	96,000	37,824	45,081
Room AC kWh Savings	43	32,368	7,280	13,230
Total kWh Savings	8,583	832,558	374,829	405,323
kWh per participant	118	94	118	109

Figure 3-33 Rebated Products per-participant Savings Comparison



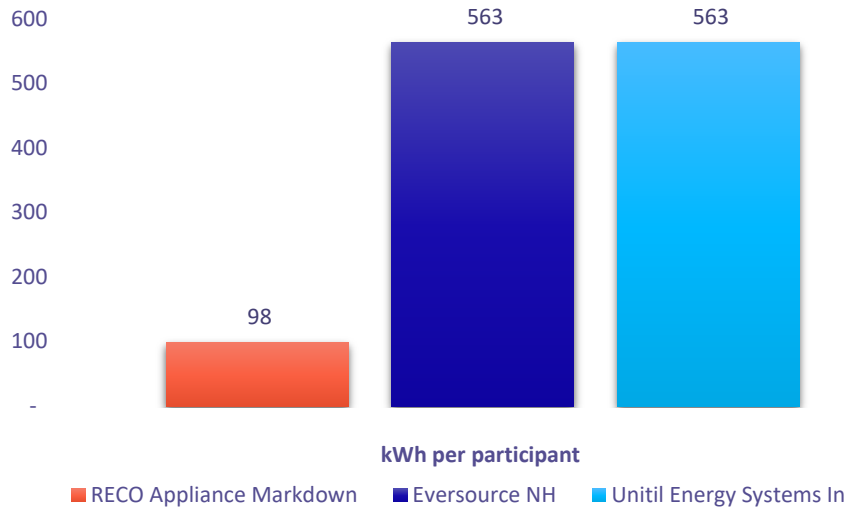
Appliance Markdown

Table 3-23 presents data on energy savings achieved by Appliance Markdown programs implemented by Eversource New Hampshire and Maine.

Table 3-23 Appliance Markdown Benchmarking Results

Measures	RECO Appliance Markdown	Eversource NH	Unitil Energy Systems	Average
FR	NA	38%	38%	0.38
SP	NA	0%	0%	-
NTG	NA	62%	62%	0.62
Number of Participants	195	1,575	400	885
Saving Methodology	TRM	TRM	TRM	
Dehumidifier	19,072	337,050	85,600	147,241
Total Saving per program kWh	97.81	214	214.00	6,500
kWh per participant	1	563	563	408

Figure 3-34 Appliance Markdown per-participant Savings Comparison



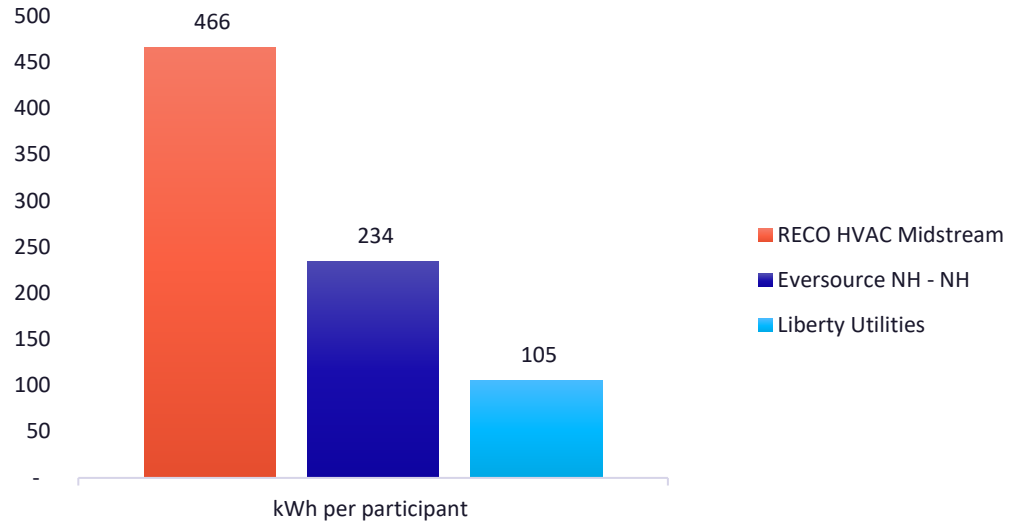
HVAC Midstream program

Table 3-24 presents data on energy savings achieved by HVAC Midstream programs implemented by Eversource and Liberty New Hampshire in 2022. As can be seen from the table below, RECO HVAC program achieved the highest energy savings, 466 kWh per participant. Followed by Eversource at 234 kWh. The result demonstrates the success of RECO's HVAC program.

Table 3-24 HVAC Midstream Benchmarking Results

Measures	RECO HVAC Midstream	Eversource NH	Liberty Utilities	Average
FR	NA	12%	12%	12%
SP	NA	0%	0%	-
NTG	NA	52%	52%	-
Sum of Participants	7	3,446	125	1,193
Saving Methodology		TRM		
Mini-Split HP	788	742,613	12,566	251,989
Central Split AC	2,472	65,000	600	22,691
Total Saving per program kWh	3,260	807,613	13,166	274,680
kWh Savings per participant	466	234	105	230

Figure 3-35 Residential Midstream HVAC per-participant Savings Comparison



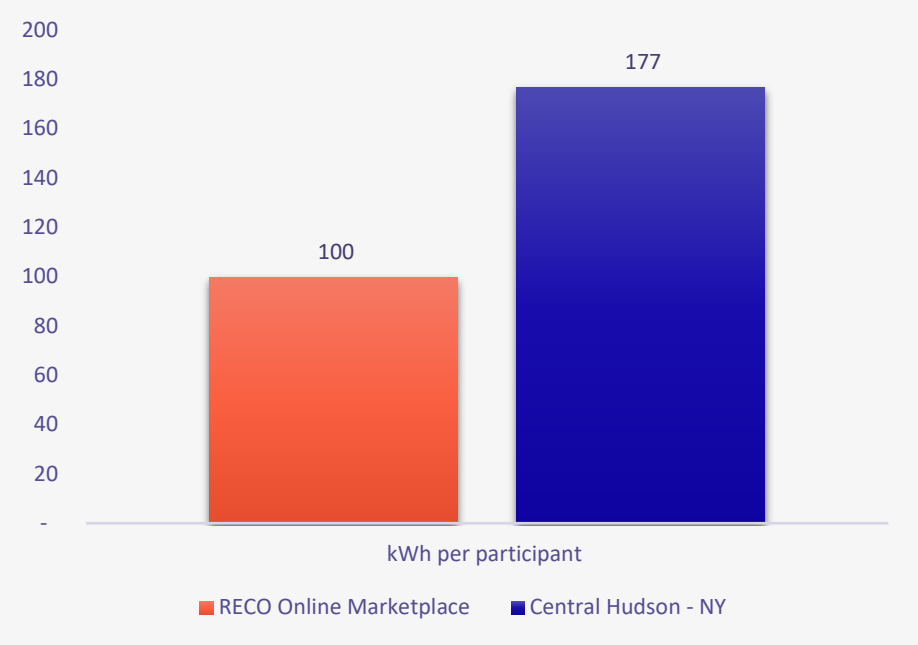
Online Marketplace

Table 3-25 presents data on energy savings achieved by Online Marketplace programs implemented by Central Hudson New York in 2022. New York utility achieved 177 kWh per participant versus 100 kWh per participant savings achieved by RECO.

Table 3-25 Online Marketplace Benchmarking Results

Measures	RECO Marketplace	Central Hudson - NY	Average
FR	NA	37%	0%
SP	NA	6%	6%
NTG	87%	69%	75%
Sum of Participants	4,418	5,654	5,036
Saving Methodology	TRM	TRM	na
Air Purifier	15,949	NA	15,949
Dehumidifier	1,079	NA	1,079
Kits	1,082	NA	1,082
LED Lighting	134,248	NA	134,248
Advanced Power Strips	25,477	NA	25,477
Thermostats	262,054	NA	262,054
Total Saving per program kWh	439,888	999,000	439,888
kWh per participant	100	177	138.5

Figure 3-36 Online Marketplace per-participant Savings Comparison



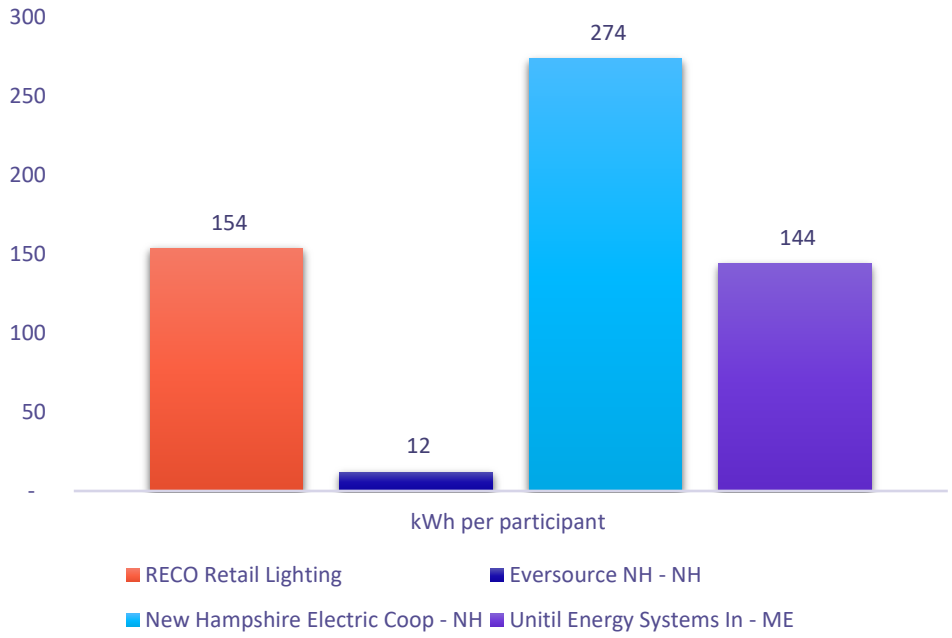
Residential Midstream Lighting

Table 3-26 presents data on energy savings achieved by Retail Lighting Midstream programs implemented by Eversource, New Hampshire Electric and Until Energy Systems. As can be seen from the table below, New Hampshire Electric's Retail Lighting Midstream program achieved the highest energy savings of 274 kWh per participant. Followed by RECO at 154 kWh per participant. The result demonstrates the success of RECO energy efficiency Rebated Products program.

Table 3-26 Residential Midstream Lighting Benchmarking Results

Measures	RECO Retail Lighting	Eversource NH	New Hampshire Electric Coop	Unitil Energy Systems	Average
FR	NA	72%	72%	72%	72%
SP	NA	0%	0%	0%	0%
NTG	NA	1%	1%	1%	
Sum of Participants	17,612	516,849	443	424	178,301
Saving Methodology	TRM	TRM	TRM	TRM	N/A
LED Specialty - ESTAR V2.0	1,436,544	na	na	na	1,436,544
LED Standard - ESTAR V2.0	1,271,213	na	na	na	1,271,213
Total Saving per program kWh	2,707,757	6,202,188	121,382	61,056	2,273,096
kWh per participant	154	12	274	144	146

Figure 3-37 Midstream Lighting per-participant Savings Comparison



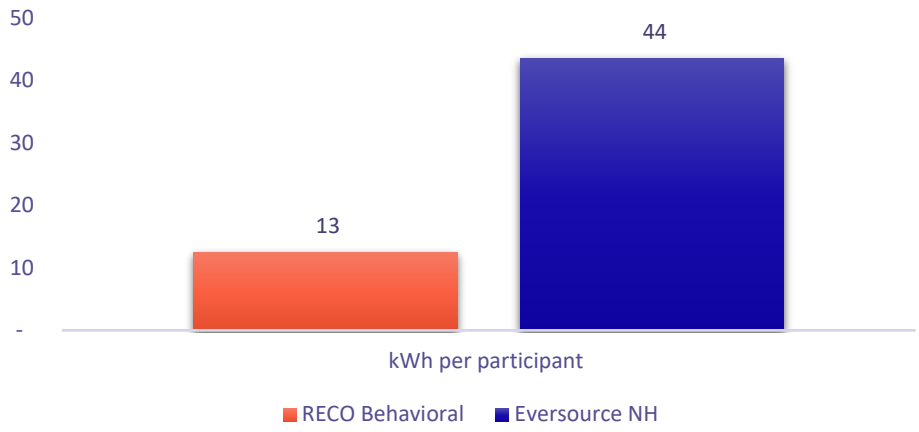
Behavioral

Table 3-27 presents data on energy savings achieved by Behavioral programs implemented by Eversource New Hampshire. As can be seen from the table below, RECO Behavioral program achieved energy savings of 13 kWh per participant and Eversource achieved energy savings of 44 kWh per participant.

Table 3-27 Residential Behavioral Benchmarking Results

Measures	RECO Behavioral	Eversource NH	Average
FR	NA	NA	NA
SP	NA	NA	NA
NTG	NA	NA	NA
Number of Participants	37,106	112,956	75,031
Saving Methodology	TRM Deemed	TRM	NA
Net Total saving Behavioral (kWh)	465,000	4,920,050	2,692,525
Total Saving per program kWh	464,300	4,920,050	2,692,525
kWh per participant	13	44	36

Figure 3-38 Residential Behavioral per-participant Savings Comparison



Residential Efficient Products Key Findings and Recommendations

The Residential Efficient Products program produced an 86% realization rate with 3,178.6 MWh of gross savings. After applying the net-to-gross (NTG) ratio, the total adjusted net savings is 3,140.3 MWh which equates to 85% of claimed savings and 82% of the targeted savings for PY1.

Table 3-28 Residential Efficient Products Impact Evaluation Results Compared to Goal

Program	Adjusted Gross Savings	NTG Ratio	Adjusted Net Savings
Residential Appliances	87.7	100%	87.7
Online Marketplace	434.1	91%	395.7
Midstream HVAC and Lighting	2,656.9	100%	2,656.9
Residential Behavioral	0.0	100%	0.0
Total Adjusted Gross Savings	3,178.6		3,140.3
Percent of Target Savings: 3,822.7 MWh			82%

Key Findings

The following key findings for the Residential Efficient Products program are highlighted below.

- The Rebated Products and Online Marketplace initiatives have strong participation because they largely mirror the programs ORU offers in New York and have the same program administrator.
- Satisfaction is high among participants of the Online Marketplace and Appliance Recycling initiatives. But the Rebated Products satisfaction scores indicate a definite need for improvement.
- Interviews with Rebated Products participants suggest that the initiative may have a high percentage of free riders.
- The Online Marketplace and Appliance Recycling programs are influencing customers to make energy-efficient purchases and recycle old appliances.
- Meeting Year 2 goals are expected to be a challenge for the Appliance Recycling program.

Recommendations

Recommendation 1: Shorten the amount of time it takes for customers to receive a rebate for the Appliance Markdown initiative.

Monitor monthly statistics regarding the time it takes from receiving the rebate application to mailing the incentive check. Have a set goal of 2 weeks or less and identify issues on a timely basis if that goal is not being met.

Rationale: Half of the customers interviewed expressed dissatisfaction with the time it took to receive the rebate. This metric appears to be impacting overall program satisfaction.

Recommendation 2: Target marketing efforts on harder-to-reach customers who are less likely to be aware of the benefits of energy efficiency to reduce free ridership.

Marketing plans designed to increase overall awareness of the rebate and the benefits of EE should also include strategies to target hard-to-reach customers who are less likely to be free riders.

Rationale: Most appliance markdown participants interviewed said the program did not have any influence on their purchasing decision. Given that little has been done to market the program, PY1 participants were likely the "low hanging fruit" – more savvy customers who already knew about the benefits of energy efficiency, had planned to purchase higher efficiency equipment, and took advantage of the rebate offer.

Recommendation 3: Consider implementing limited time offers or raising incentives for the Appliance Recycling Program.

Raise the incentive to $100 for larger appliances for a limited time or permanently raise the incentive to $75.

Rationale: The implementer is concerned the program will not meet its goals. They recommend limited time offers or increasing the incentive. This strategy has worked for appliance recycling programs in other service territories.

Recommendation 3: Develop a plan for replacing some of the savings that will be lost from lighting.

Conduct research on what other measures are available, expected savings, costs, useful life of those measure and any contractor network requirements.

Rationale: Due to the EISA backstop, there will no longer be savings attributable to the program for lighting. More research is needed to recoup some of those lost savings.

4

EXISTING HOMES PROGRAM

The Existing Homes Program consists of the Home Performance with Energy Star initiative and the Moderate Income Weatherization initiative.

Process Evaluation Results

Home Performance with Energy Star

The Home Performance with ENERGY STAR ("HPwES") Program provides a holistic approach for customers to invest in the efficiency and comfort of their homes. The program is based on the U.S. Environmental Protection Agency HPwES program, which includes a free in-home assessment, a report detailing recommended energy efficiency improvements, and incentives for installing the recommended improvements.

ICF implements the program. The program manager at ICF started in August 2022. His first 30-60 days were devoted to setting up the contractor network. The contractor network currently has 8 participating contractors.

Process Evaluation

There were no completed projects for the program in PY1. As a result, the process evaluation consisted of interviews with the program administrator and implementer. A summary of those interviews is included below.

Program Performance

At the time of the interview, no projects had been completed. There had been one assessment completed, but the customer decided not to move forward. The implementer is concerned about meeting PY2 goals but is hopeful that they can catch up at some point in the 3-year cycle and meet the 3-year goal.

In speaking with other HPwES implementers in the state, the implementer learned that 90% of the projects utilize financing. Once financing for the RECO programs is available, he expects to see an uptick in participation. The implementer also learned that HPwES is PSEG's second most popular program. Based on that data, he believes the incentives are working, and there is no reason why the program should not be successful in the RECO territory once the financing is in place.

To date, there has been very limited customer-facing marketing. The program relies on the contractor network to market the program. RECO has done some bill inserts advertising the entire EE portfolio. But the implementer has not seen any increased activity due to that campaign. ICF does not have the budget for marketing campaigns but can provide marketing support to RECO.

Program Strengths and Challenges

Program strengths include a strong, experienced contractor network that knows how to close sales. Challenges include RECO's small service territory – both geographically and in the number of customers. The program goals reflect that there is a limited number of customers available to participate within their small territory, but meeting those limited goals is still a challenge. There are also supply chain issues that can affect customers' interest in installing the recommended measures.

The implementer would like to see additional marketing to help increase program participation. A campaign around the availability of financing will be very important because they expect financing to be a "game changer" for the program.

Program Processes

The Joint Utilities in New Jersey agreed to use the same software platform for their HPwES programs. They are using the Snuggpro software platform. This is the same platform that was used by the State in the past, which led to a very smooth transition.

ICF and RECO both use VisionDSM as their program tracking platform. Data collected includes customer data, savings, incentive amounts, measure information, and data collected during the assessment. Cycle time data is tracked in Snuggpro. They have data on customers who complete the assessment but do not install the recommended measures.

ICF conducted a webinar with participating contractors to provide education and training about the program. Most contractors have been involved in the statewide program and are very qualified and familiar with the program. Given the experience level of the contractors, ICF feels there is not a huge need for further education or training. ICF does not provide any oversight on the projects completed by the contractors.

The QA/QC process is not well established because the program did not have any projects completed at the time of the interview. ICF plans to bring on a subcontractor to perform the QA/QC role. It's been difficult to find a contractor for the RECO service territory; however, it's a non-issue since the volume of projects is so small. QA/QC will be handled internally until the volume of projects increases. ICF plans to inspect the first few projects conducted by each contractor and then 10-15% of all projects overall.

Moderate Income Weatherization

The Moderate-Income Weatherization (MIW) Program targets customers in the 250-400% above the federal poverty threshold and provides no-cost weatherization, lighting, low-flow showerheads, and smart thermostats. The state program, Comfort Partners, currently offers no-cost weatherization to customers of up to 250% of the federal poverty threshold, so this program provides energy-saving opportunities to moderate-income customers who may struggle to participate in other programs.

The program includes an audit of the customer's home, which may include an air leakage blower door test. Contractors install energy-saving measures based on the results of the audit. The potential energy-saving measures include lighting, weatherization (air sealing, insulation, and duct insulation), no-cost HVAC replacement (for customers with non-functioning heating systems), smart thermostats, and water-saving measures. The audit measures are provided at no cost to the customer. All measures are installed by a qualified contractor. The program also includes an "up-to" amount to cover health and safety concerns that need to be resolved prior to weatherization.

ICF is the implementation contractor, with Franklin Energy as their subcontractor. Franklin Energy is the customer-facing entity.

The program operates in tandem with the Quick Home Energy Check Up (QHEC) program, which is technically under the HPwES. Franklin's team of Energy Advisors verifies customer income eligibility on site using customers' recent pay stubs. If the customer does not qualify for the MIW, the Energy Advisor automatically conducts the audit for the QHEC while they are on site. During the QHEC visit, the auditor performs a visual inspection of the customer's home and provides education about the opportunities to save energy. The auditor also identifies more significant opportunities for energy savings, including making referrals to other energy efficiency programs. This may include sharing information about the products and incentives available under the Efficient Products Program, and the potential for comprehensive upgrades through either the HPwES Program or the Comfort Partners Program. The QHEC results in an energy efficiency action plan, including recommendations for upgrades and available incentives. There will also be financing available beginning in Q2 of 2023.

Process Evaluation

There were no completed projects for the program in PY1. As a result, the process evaluation consisted of interviews with the program administrator and implementer. A summary of those interviews is included below.

Program Performance

At the time of the interviews, although both the MIW and QHEC were officially launched, Franklin has not been in the field yet because they were still working out the final details with RECO. The biggest barrier to starting was getting customer data from RECO. This is needed to verify customer eligibility. There had been some IT issues with transferring and updating the customer database. That was expected to be resolved within days of the interview.

The RECO website is currently live with program information. Franklin feels it would be very beneficial to have a marketing campaign for the program. They are also interested in conducting their own community engagement. This would largely include canvassing, visiting food banks, and attending community events. This type of effort would also have the benefit of increasing awareness of other RECO programs.

Program Strengths and Challenges

Program strengths include a strong, engaged, experienced staff at Franklin Energy. They have also had customers reach out and express interest in the program. Challenges include customer data issues delaying the program getting in the field as well as a general wariness among customers to trust free services and a hesitancy to do big projects. In addition, the fact that RECO is an electric-only utility is a challenge. Traditionally a lot of the savings from these types of programs come from natural gas measures.

Franklin staff feel that it is their main job to assure customers they are getting the best possible product and they can trust the program. Once they have the customer data, they plan to conduct targeted outreach to make sure they are reaching customers that will benefit the most from the program offerings.

Program Processes

Franklin utilizes Efficiency Manager, an infield data collection tool, for the assessments. This tool has built-in checks and balances to make sure that customers meet the eligibility requirements, and that all necessary data is collected, including customer information, audit data, recommended measures, and referrals to other programs.

Franklin takes care to ensure that all field staff are properly trained and BPI certified. They also require field staff to wear appropriate PPE and safety materials. Franklin has a small, well-trained, dedicated team. Managers and supervisors are engaged and continuously checking in with field staff.

For the MIW program, every participating property will be inspected before, during and after the project is completed. For the QHEC, 10% of projects are inspected once during or after the assessment.

Key Findings and Recommendations

Home Performance with Energy Star

- There were no projects completed in PY1, and the implementer is concerned about meeting PY2 goals.
- The program has a developing contractor network, many of which were involved in the statewide program and are very qualified and familiar with the program operations.

Recommendations

Recommendation 1: Create a marketing plan for this initiative highlighting the availability of financing.

Implement a variety of marketing strategies designed to increase overall customer awareness and introduce the availability of financing.

Rationale: The program did not have any projects in PY1 and may not meet its PY2 goals. The implementer would like to see additional marketing to help increase program participation. A campaign around the availability of financing will be very important because they expect financing to be a "game changer" for the program.

Moderate Income Weatherization

- No projects were completed in PY1 due to delays in contracting and delayed delivery of eligible customer lists to the contractor.
- The initiative appears to fulfill a need in the market where there is a gap in services for moderate-income customers. Before the program was up and running, customers were already reaching out to the implementor requesting services.

AEG had no recommendations for this initiative at this time.

5

MULTIFAMILY PROGRAM

The Multifamily (MF) Program addresses multifamily structures with three or more units and a shared common area. The Program provides a free screening review to identify and develop an energy efficiency project plan for the building owner and the installation of energy-saving products at no cost in units and common areas. ICF is the implementation contractor, with Franklin Energy as their subcontractor. Franklin Energy is the customer facing entity.

Franklin has found that the most successful strategy is for Energy Advisors to reach out to property managers/owners. They conduct the initial assessment, reviewing common areas and one unit to identify energy efficiency opportunities. If the owners agree, they schedule a team to install the free measures in all the units in the property. They are able to complete approximately 60 units a day.

Process Evaluation Results

There were no completed projects for the program in PY1. As a result, the process evaluation consisted of interviews with the program administrator and implementer. A summary of those interviews is included below.

Program Performance

Similar to the MIW program, although the MF program is officially launched at the time of the interview, Franklin was not yet in the field. They were waiting on the final piece of customer data to arrive, which would be used in their outreach efforts.

Marketing will consist of Franklin Energy Advisors conducting outreach with property owners/managers. That effort began when the customer list was received in September 2022.

Program Strengths and Challenges

Program strengths include a strong, engaged, experienced staff at Franklin Energy. They have Energy Advisors available to take a "boots on the ground" approach to the program. Challenges include the customer data issues delaying the program getting in the field as well as the split incentive issue for landlords.

Providing water measure and common area lighting helps overcome the split incentive issue. Common area upgrades help them get in the door, and water measures tend to be the most popular because landlords typically pay for water.

Program Processes

The MF program has identical program processes to the MIW program. For the MF program, 10% of the units at each property are inspected after the measures have been installed.

Key Findings and Recommendations

- No projects were completed in PY1 due to delayed delivery of eligible customer lists to the contractor.
- The implementation contractor has a strong, engaged, and experienced staff.
- A "boots on the ground" marketing approach and providing water measures and common area lighting are expected to help overcome the split incentive issue common in multifamily programs.

AEG had no recommendations for this initiative at this time.

6

C&I REBATES

The C&I Rebate Program promotes the installation of high-efficiency electric and/or natural gas equipment to RECO C&I customers by offering rebates for the installation of prescriptive or custom measures. The program includes both a downstream and a midstream HVAC initiative.

Process Evaluation Results

The C&I Downstream Rebate program provides downstream rebates for prescriptive and custom measures. The rebates incentivize energy-efficient lighting, appliances, heating and cooling equipment, and food service equipment, among other various efficiency measures. This program is run largely internally, although AEG does provide engineering support.

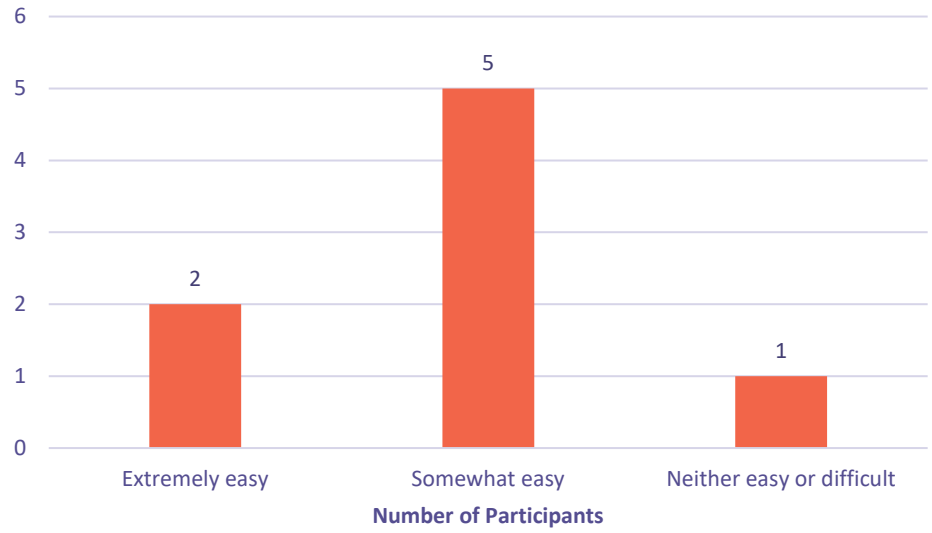
C&I Downstream

Customer Experience

The downstream rebate process is designed to be simple and efficient. All the customer needs to do is complete the application and attach the necessary documents, which include the specification sheets for all equipment, a copy of their RECO bill, and their W-9 form. RECO then reviews the application and equipment specifications for eligibility in order to process the rebate. Some projects require an on-site verification inspection prior to payment.

Seven of the eight participants interviewed said the application process was either somewhat or extremely easy.

Figure 6-1 Ease of Completing the Rebate Application -Downstream C&I Rebates (n=8)



All custom projects require pre-approval, an engineering analysis demonstrating savings, and a pre-inspection to determine eligibility. Incentives are calculated based on the lesser of two factors: 50% of project cost or $0.16/kWh saved in the first year. Custom LED projects receive an incentive of $0.16 per kWh saved and are capped at 25% of the total project cost with at least a one-year payback.

Only one participant interviewed had an inspection before receiving the rebate and was satisfied with the process.

After completing a review of the application and determination of eligibility, RECO sends a Preliminary Incentive Offer to the customer specifying the estimated incentive amount. If any proposed project does not meet program requirements, RECO notifies the customer that its Preliminary Incentive Offer has been rejected.

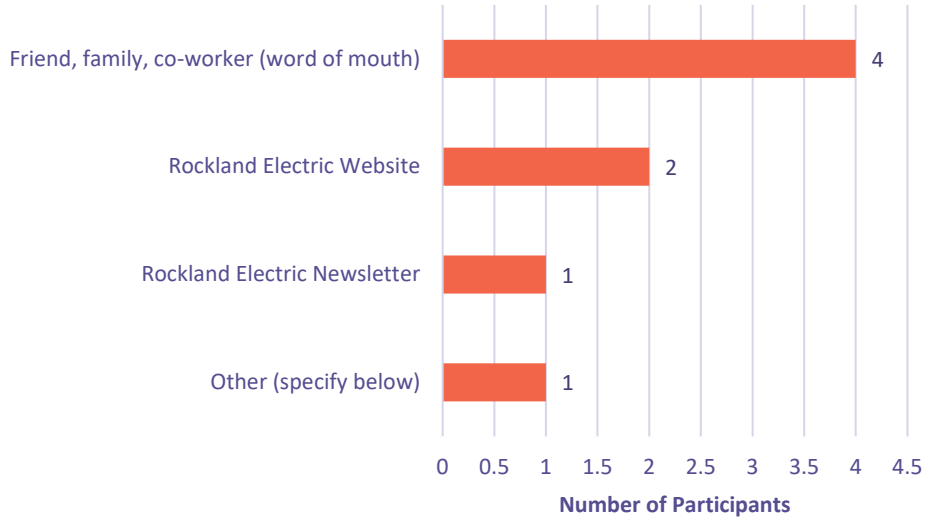
Program Performance

The program did not meet its goal in PY1. But in PY2, the program has already allocated 74% of the incentive budget for both Custom/Prescriptive and Midstream Lighting combined. They are getting a lot of traction on the prescriptive aspect of the program, with lighting being the dominant measure.

Marketing is needed to make customers aware of the program. There was a transition with the RECO corporate advertising and marketing group, and that has delayed program marketing. RECO is just starting to plan and implement its marketing strategies. They did conduct a webinar with contractors in 2021.

The eight participants interviewed mainly heard about the program from friends, family or co-workers, or the RECO website.

Figure 6-2 How Participants Heard about the Program - C&I Downstream (n=8)



Program Strengths and Challenges

Program strengths include the new streamlined application process and the lighting incentives. The lighting incentives are triple what ORU is offering in New York.

Due to these high incentives, the program has a large proportion of lighting projects. In an effort to increase the mix of projects, the implementation team is currently trying to promote more comprehensive projects with larger customers. These types of projects tend to generate the most savings. They are also working to get more non-lighting contractors involved in the program.

Program Processes

RECO uses the VisionDSM system for program tracking. The application process is very streamlined. A lot of improvements have been made to improve the experience for the customers and the contractors.

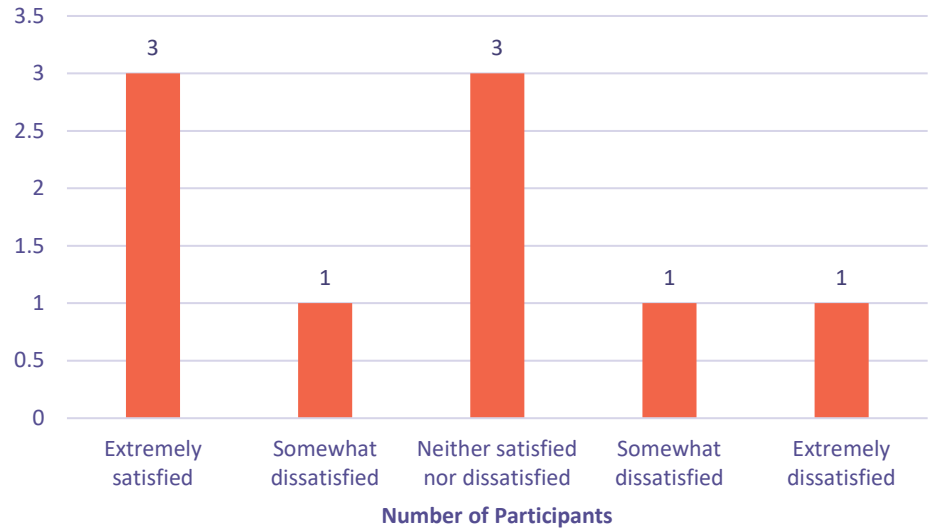
Custom projects are thoroughly reviewed by AEG, and 100% of custom projects require a pre and post inspection.

The prescriptive tool has been tested and reviewed by both RECO and AEG. RECO inspects 40 – 50% of prescriptive projects. The PA selects which projects to inspect. The first projects completed by new contractors are automatically chosen for inspection.

Program Satisfaction

Satisfaction with the program was mixed among the eight participants interviewed. Half of the participants felt the rebate took too long to receive and would like to have received it sooner. Half of the participants said they were satisfied with the program, but three felt neutral, and two expressed dissatisfaction with the program overall.

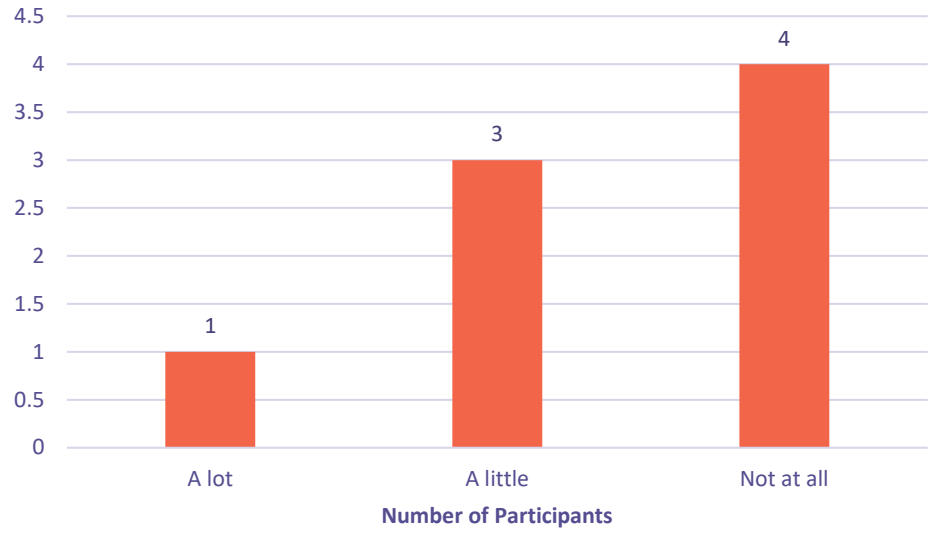
Figure 6-3 Overall Satisfaction with the- C&I Downstream Program (n=8)



Program Effectiveness

All of the eight customers interviewed said their rebated equipment was still installed and in working condition. The responses from the eight customers indicate that free ridership may be an issue for the program. Half of the eight participants interviewed said they heard about the rebate after making their purchase, and half also said the rebate had no influence on their purchasing decision.

Figure 6-4 Influence of Rebate on Purchasing Decision- C&I Downstream Program (n=8)



C&I Midstream HVAC

The Midstream HVAC initiative incentivizes energy-efficient space and water heating equipment. ICF implements the program by moving rebates midstream to engage HVAC distributors and contractors in the RECO service territory. Although two different PA's at RECO manage the various sectors of the program, ICF implements the Residential and C&I program identically and runs it as one program.

The program was launched on July 1, 2021.

Customer Experience

Customers participate in the program by working with a participating contractor. The contractor handles the application process, and the customer gets an instant rebate on the bill. The list of participating contractors is available on the RECO website.

If a customer is already working with a non-participating contractor, ICF will try to get the contractor enrolled as a participating contractor. This has been more common in the early stages of the program. In the very beginning, about 50% of the contractors were nonparticipants who got enrolled through a customer request.

When the contractor submits the application, it includes the name of the distributor. ICF reimburses the contractor for the customers' instant rebate and sends the distributor a SPIFF. The distributors decide if they want to share any of the SPIFF with the contractors.

The contractors interviewed said the RECO program was more difficult to get signed up for than others in the state. But they did feel that ICF was very helpful and clearly explained each step of the process. Most joined the program because they had a specific customer that was eligible for the RECO rebates.

Program Performance

The program had a slow start, with only a handful of projects in PY1. They are hoping to increase participation by offering kits and limited time offers, where the incentive is increased for a specific period of time or where the contractor receives an additional rebate for a short time period. They expect to reach their PY2 goal due to these efforts and having financing available in Q2 of 2023.

ICF markets the program through the participating contractor network. In New Jersey, if a contractor is approved as a participant for one utility, they can automatically participate in the RECO program once they sign the participation agreement. ICF also manages the program for PSE&G, and the two teams work closely together

since the service territories overlap. ICF feels the current contractor network is sufficient to achieve the program goals.

RECO is responsible for the customer facing marketing. They have advertised the program in newsletters, on their website, and with bill inserts. ICF feels the program would benefit from additional marketing, and the participating contractors interviewed agreed.

Program Strengths and Challenges

Program strengths include strong relationships with participating contractors and incentives that increase sales. ICF has been getting positive feedback from distributors that the program is driving sales and is very beneficial.

Program challenges include the fact that although the incentives are influential, they are still only a small fraction of the cost of the unit. Because of this, some contractors feel the incentive levels are sometimes not worth it to promote to customers. One contractor said the rebates offered by RECO were much lower than those offered by PSE&G.

Another challenge is the way the program is structured for utilities in overlapping service territories. If a contractor installs a gas furnace and central AC, they can get both the electric and gas rebates from the gas utility instead of requiring the customer to work with the two separate utilities. There is supposed to be a backend reimbursement in place, where RECO would pay the rebate and be able to claim the savings. But ICF is unclear if and how that is happening. According to the contractors interviewed, PSE&G has a large advantage because they offer on-bill financing to customers. They would like to see RECO offer the same.

Program Processes

The contractors do not have a required number of projects to complete each year. ICF keeps track of contractor performance, but there is no specific goal they are required to meet. Distributors must stick within a budget; a certain amount of money is allocated to each distributor. If distributors are underperforming, their dollars can be reallocated to other distributors.

ICF conducts a desktop review of each project submitted. Contractor provides the invoice, measure information, and baseline equipment information. They also conduct field inspections on 3-5% of projects overall. They decide which projects to inspect based on the contractor and the location. They want to make sure that each contractor has projects inspected. The inspection verifies that the equipment was installed and that the model number and serial number match the documentation. They also ask some customer satisfaction questions during the inspection.

Statewide contractor compliance requirements ensure that participating contractors are doing things appropriately and safely. Any infractions by the contractor could result in them getting kicked out of the program.

Impact Evaluation Results

The C&I Rebates program underwent savings replication for a census of all projects and an engineering desk review for a sample of projects. The Prescriptive component resulted in a total verified gross savings of 789.3 MWh and a 102% realization rate. The Custom component resulted in a total verified gross savings of 1.3 MWh and a 4% realization rate. Overall, C&I Rebates totaled 799.5 MWh verified gross savings, representing a 99% realization rate.

The prescriptive component of C&I Rebates consisted of two HVAC projects, 44 lighting projects, and three refrigeration projects during PY1. AEG replicated savings for all projects and conducted engineering desk reviews for a sample of 27 lighting projects and a census of the remaining 5 HVAC and Refrigeration projects.

The impact analysis resulted in a kWh realization rate of 99%. Detailed explanations of the findings can be found in Table 6-3.

Figure 6-5 C&I Rebates kWh Impact Evaluation

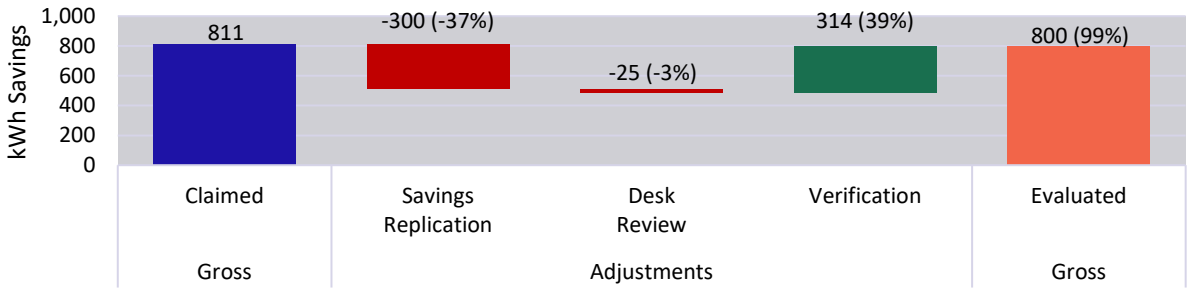


Table 6-1 C&I Rebates- Impact Evaluation Results –Measure Level Savings (kWh)

Measure	PY1 Project Count	Claimed Savings	Verified Savings	Realization Rate
Custom Refrigeration	1	30,931	1,288	4%
Midstream HVAC	2	4,406	4,288	97%
Prescriptive Lighting	44	774,208	789,662	102%
Prescriptive Refrigeration	2	1,247	4,310	346%
Total	49	810,791	799,548	99%

The kW realization is 83%. A detailed explanation of the analysis can be found in Table 6-3.

Figure 6-6 C&I Rebates kW Impact Evaluation

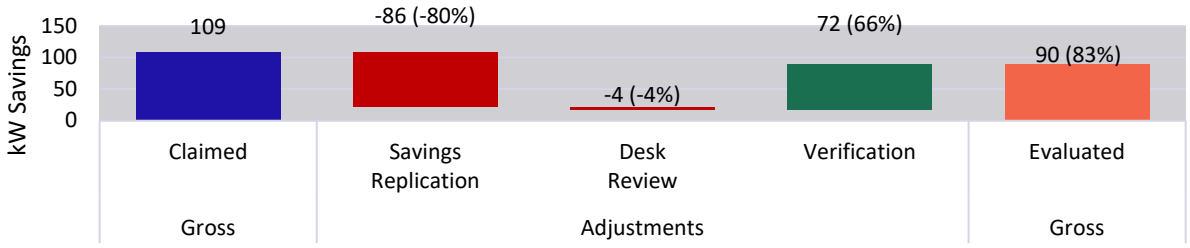


Table 6-2 C&I Rebates- Impact Evaluation Results –Measure Level Savings (kW)

Measure	PY1 Project Count	Claimed Savings	Verified Savings	Realization Rate
Custom Refrigeration	1	4.7	0.2	3%
Midstream HVAC	2	0.**7**	0.**7**	100%
Prescriptive Lighting	44	88.4	88.3	100%
Prescriptive Refrigeration	2	0.**2**	0.5	346%
Total	49	93.9	89.7	95%

Discrepancies between claimed and verified savings are detailed by measure below.

Table 6-3 C&I Rebates- Realization Rates Explanation

Measure	Finding	Recommendation
Custom Refrigeration	The engineering desk review of the single custom refrigeration project discovered that claimed savings were using pre-2017 federal standard/ASHRAE 2016 baseline. AEG updated the calculation to use post-2017 federal standard baseline due to these cases being installed after federal standard update. This resulted in reduced verified savings of 1.2 MWh, or 4% of claimed savings.	• Use the post-2017 federal standard baseline.
Midstream HVAC	The C&I Midstream HVAC program installed three HVAC units across two participants, for a total claimed savings of 4,527 MWh. The savings replication and desk review activities found one discrepancy regarding tonnage for one project and resulted in a verified savings of 4,406 kWh for an overall realization rate of 97%. The desk review activity confirmed inputs such as EFHLc, EER/IEER baseline and qualifying, tonnage inputs with NJ FY 2020 TRM based on unit model. IEER input value was updated given that the units are above the 5.4 ton threshold for calculating savings.	• Verify that the baseline tonnage inputs are consistent with the TRM.
Prescriptive Lighting	The desk review of the prescriptive lighting sampled projects confirmed key inputs: efficient wattage, Hours, CF, HVAC interactive effect for each unique lighting measure type. Savings replications lined up to 100% realization rate for all measures aside from select projects with gas heat which had a calculator issue regarding interior/exterior inputs (HVACe & CF) and only effected 3 projects in the sample. This only affected kWh savings that were dependent on the HVACe input.	• Existing lighting calculator has been updated and is now consistent with TRM inputs and calculating properly.
Prescriptive Refrigeration	The desk review of the two prescriptive refrigeration measures resulted in a 346% realization rate because this measure is a solid door freezer, and claimed savings are based on the NJ FY 2020 TRM Algorithm for Glass Door Freezer.	• Correctly identify refrigeration measures in the program tracking database.

C&I Rebate Evaluability Assessment

AEG's evaluability assessment of RECO's C&I Rebate program found no issues with the documentation collected for PY1 projects. Key inputs were provided in the backup documentation, and any discrepancies between claimed and verified savings were not a result of a lack of information but rather a miscalculation or discrepancy between documentation and RECO's calculations, detailed in the above table.

C&I Rebate TRM Assessment

The impact evaluation focused on ensuring that the savings estimations adhered to the NJ FY2020 TRM. In a separate effort spanning Q4 2022 – Q1 2023, AEG reviewed the TRM calculations for reasonableness

and provided forward-looking recommendations for improvements. Those recommendations are summarized in Appendix B.

Table 6-4 C&I Rebates TRM Findings

Program	TRM Findings
C&I Rebates	A few of the lamps/fixtures in the lighting section could be used in exterior applications and should therefore use the exterior HOUs. Evaluation corrected savings equation to exclude HVACe, HVACd, and CF, given that there is no interaction with HVAC and that the coincidence factor does not apply.

Benchmarking Assessment

As part of the evaluation, AEG also benchmarked RECO's offerings against other neighboring utilities in neighboring states and throughout the northeast. The results of this effort are outlined in the following sections by sector and program. The key metrics include the following:

- Free Ridership (FR)
- Spillover (SP)
- Net to Gross ratio (NTG)
- Participation
- Savings per participant

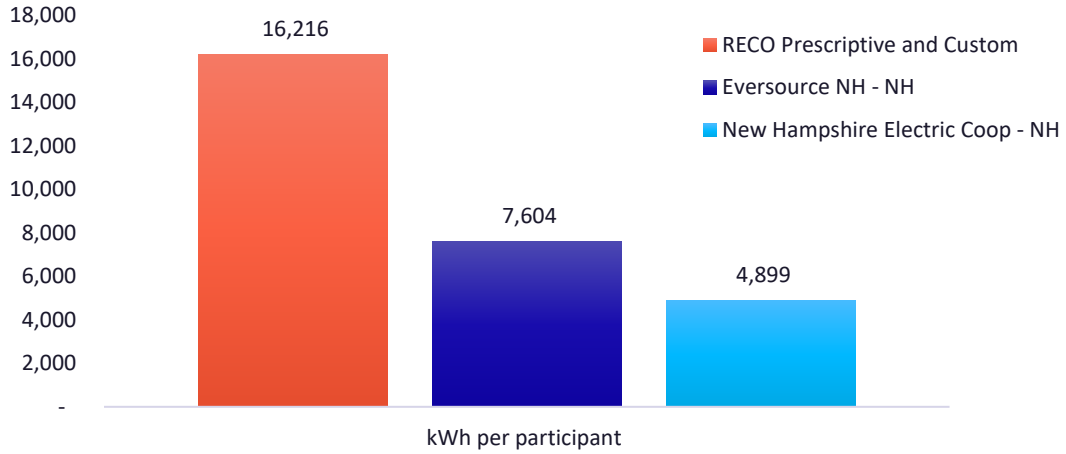
C&I Rebates Benchmarking Results

Table 6-5 compares energy savings achieved by similar C&I Rebate programs implemented by utilities across New Hampshire in 2022. RECO's C&I Rebate program achieved the highest energy savings of 16,216 kWh per participant when compared to New Hampshire Utilities 1 and 2, with 7,604 kWh and 4,899 kWh savings per participant, respectively.

Table 6-5 C&I Rebates Benchmarking Results

Measures	RECO C&I Rebates	Eversource NH	New Hampshire Electric Coop	Average
FR	NA	7%	7%	7%
SP	NA	0%	0%	0%
NTG	NA	1%	1%	1%
Sum of Participants	50	11	119	60
Saving Methodology	TRM	TRM	TRM	NA
Custom Refrigeration	30,931	83,649	80,978	65,186
Prescriptive HVAC	4,406	NA	NA	4,406
Prescriptive Lighting	774,208	NA	502,032	638,120
Prescriptive Refrigeration	1,247	NA	NA	1,247
Total kWh Savings	810,791	83,649	583,010	708,958
kWh per participant	16,216	7,604	4,899	11,816

Figure 6-7 C&I Rebates per-participant Savings Comparison



Key Findings and Recommendations

The main findings and recommendations from each program are discussed below.

C&I Downstream

- The downstream application process is easy and efficient.
- Although the program did not meet its goal in PY1, it is performing much better in PY2.
- Participant satisfaction with the program is mixed. There appears to be room for improvement, particularly in the time it takes for participants to receive rebates.
- Based on interviews with participants, free ridership may be an issue for the program.

Recommendations

Recommendation 1: Shorten the amount of time it takes for customers to receive a rebate.

Monitor monthly statistics regarding the time it takes from receiving the rebate application to mailing the incentive check. Have a set goal of 2 weeks or less and identify issues on a timely basis if that goal is not being met.

> **Rationale:** Customers interviewed expressed dissatisfaction with the time it took to receive the rebate. This metric appears to be impacting overall program satisfaction.

Recommendation 2: Educate customers on the benefits of conducting more comprehensive projects.

Use the generous lighting incentives to engage customers and then use that opportunity to provide them with educational/marketing materials on the benefits of completing more comprehensive projects.

> **Rationale:** Interviews with participants indicate that the program may have a high level of free ridership. Since many projects are lighting, it could be considered a gateway measure to influence customers to undertake additional, more comprehensive projects that will reduce free ridership and increase savings.

Midstream HVAC

- The program has had success increasing participation by offering kits and limited-time offers.
- Contractors feel the incentives are low and sometimes not worth the effort of participation.
- PSE&G has a large advantage because they offer on-bill financing to customers. Contractors would like to see RECO offer a similar program.

Recommendations

Recommendation 1: Continue to offer kits and limited time offers to increase participation when needed.

If the program is falling short of its goal, increase the incentive for a specific period of time, or offer contractors additional rebates for applications submitted in a short time period.

> **Rationale:** These strategies have been successful in helping to increase participation.

Recommendation 2: Highlight the availability of financing on all marketing materials.

Although RECO is unable to offer on-bill financing like PSE&G, they do have third-party financing available. Marketing materials should highlight the availability of financing and the terms.

> **Rationale:** Contractors feel that the ability to offer financing is very important for many prospective participants.

Recommendation 3: Educate ICF on the coordination process with the gas utilities.

Schedule a meeting or provide documentation explaining how the RECO programs coordinate with the gas utilities serving the same customer base.

> **Rationale:** ICF does not have a clear understanding of how the backend reimbursement takes place and affects the savings realized for electric measures incented by the gas utilities.

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7

C&I MIDSTREAM LIGHTING

The C&I Midstream Lighting initiative provides incentives or buydowns for lighting to participating distributors. Customers receive an instant rebate at the time of the sale. RECO has contracted with ICF to implement the program.

Process Evaluation Results

This initiative provides midstream incentives or buydowns for lighting to participating distributors. Customers receive an instant rebate at the time of the sale. RECO has contracted with ICF to implement the program.

The program was launched in Q4 of 2021. Customers started participating in March of 2022. It took ICF a few months to establish the participating distributor network.

It was very difficult for AEG to interview distributors in the network. Most said they had not yet actively participated in the program. The two distributors interviewed said the RECO program does not compete well with other programs in New Jersey. According to them, the other programs have much less paperwork, easy to use portals for trade allies, and higher incentives. The RECO service territory is also quite small, and as a result, the distributors don't spend a lot of effort in that area.

Customer Experience

Customers participate in the program by purchasing lighting products from a participating distributor. They receive an instant discount at the point of purchase. Their premise address is recorded to determine program eligibility. A post-inspection may be conducted by the implementer to make sure the lighting is installed. The program requires that the lighting must be installed within 30 days of purchase.

The distributors submit a request for payment to ICF, and ICF processes the rebate. If an inspection is required, the inspection takes place before the rebate is paid.

Program Performance

PY1 was mainly a ramp-up year. In the first 4 months of PY2, the program was at 34% of goal. According to the implementer, only two customers have dropped out of the program.

Distributors do most of the outreach for the program. As the program grows, more marketing will be needed.

Program Strengths and Challenges

According to the implementer, program strengths include effective communication with the distributors. They have firm rules in place that act as guardrails to make sure the program works well. Financing is not something that has been requested by distributors.

The availability of stock has been a concern this year. ICF pre-approves jobs, but because of supply chain issues, the projects sometimes cannot be completed for several months. Delays can cause customers to change their minds. The two customers who dropped out of the program did so because of supply chain issues. One lighting distributor interviewee agreed that supply chain issues have been a problem in the past but felt the issue was improving.

Program Processes

ICF conducts a full desktop review of each project, verifying that all data matches back up documentation. A second reviewer checks savings and incentive calculations on the monthly invoices delivered to RECO.

Inspections are conducted for all projects submitted in the first two months for a new distributor. They also inspect projects that are 30,000 kWh, or greater, and/or 100 fixtures or greater. ICF reserves the right to inspect any project that they feel needs additional review.

During the inspection, model numbers and account numbers are verified. Inspectors also verify building the type, heating type, and cooling type reported by the distributor.

Impact Evaluation Results

The midstream lighting rebated 263 units in PY1. AEG's savings replication resulted in an overall realization rate of 105% due to an incorrect HVAC factor. A 98% In-Service Rate (ISR) was applied to all midstream lighting measures, consistent with RECO's claimed savings.

Figure 7-1 C&I Midstream Lighting kWh Impact Evaluation

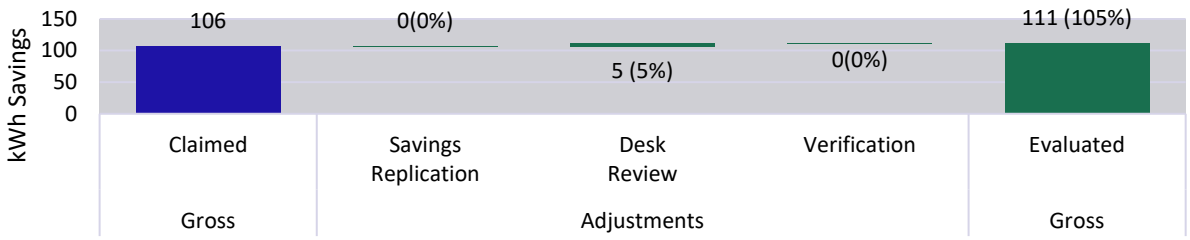


Table 7-1 C&I Midstream Lighting Impact Evaluation Results –Measure Level Savings (kWh)

Measure	PY1 Measure Count	Claimed Savings	Verified Savings	Realization Rate
2 x 4 LED new luminaire	62	12,224	12,224	100%
2 x 4 LED retrofit kit	148	18,947	18,947	100%
HID Replacement Lamp >125W - <=250W	25	22,341	27,305	122%
LED High-Bay Luminaires	28	52,764	52,764	100%
Total	263	106,277	111,242	105%

Discrepancies between claimed and verified savings are detailed in The table below details the findings from the savings replication and desk review and the resulting recommendation.

Table 7-3.

Figure 7-2 C&I Midstream Lighting kW Impact Evaluation

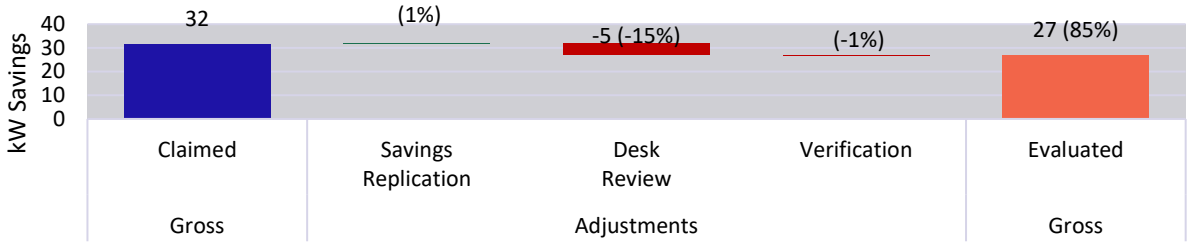


Table 7-2 C&I Midstream Lighting Impact Evaluation Results –Measure Level Savings (kW)

Measure	PY1 Measure Count	Claimed Savings	Verified Savings	Realization Rate
2 x 4 LED new luminaire	62	3.6	3.4	94%
2 x 4 LED retrofit kit	148	5.6	4.8	86%
HID Replacement Lamp >125W - <=250W	25	6.6	6.6	100%
LED High-Bay Luminaires	28	15.7	11.9	76%
Total	263	31.6	26.7	85%

The table below details the findings from the savings replication and desk review and the resulting recommendation.

Table 7-3 C&I Midstream Lighting- Realization Rate Explanations

Measure	Finding	Recommendation
HID Replacement Lamp	The HVAC factor used in the claimed savings for HID Replacement Lamps for a school/education building type was AC/Electric resistance, and AEG corrected this factor to the AC/Non Elec value using the NJ FY 2020 TRM. A 98% In-Service Rate (ISR) was applied to all midstream lighting measures, consistent with RECO's claimed savings.	• Use the HVAC factor for the correct heating and building types.

C&I Midstream Lighting Evaluability Assessment

AEG's evaluability assessment of RECO's C&I Midstream Lighting program found no issues with the documentation collected for PY1 projects, and that key inputs were provided in the backup documentation.

C&I Midstream Lighting TRM Assessment

The impact evaluation focused on ensuring that the savings estimations adhered to the NJ FY2020 TRM. In a separate effort spanning Q4 2022 – Q1 2023, AEG reviewed the TRM calculations for reasonableness and provided forward-looking recommendations for improvements. Those recommendations are summarized in Appendix B.

Benchmarking Assessment

As part of the evaluation, AEG also benchmarked RECO's offerings against other neighboring utilities in neighboring states and throughout the northeast. The results of this effort are outlined in the following sections by sector and program. The key metrics include the following:

- Free Ridership (FR)
- Spillover (SP)
- Net to Gross ratio (NTG)
- Participation
- Savings per participant

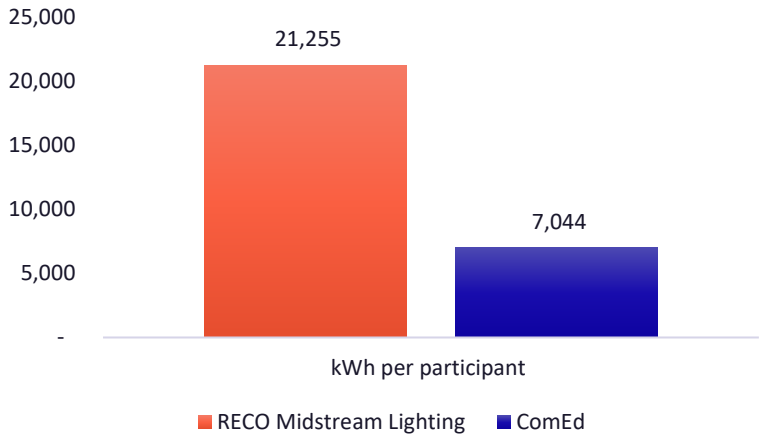
C&I Midstream Lighting Benchmarking Results

Table 7-4 compares energy savings achieved by similar C&I Midstream Lighting programs implemented by Com Ed in 2022. RECO's program achieved the higher energy savings per participant with 21,255 kWh when compared to a Wisconsin utility's savings of 7,044 kWh per participant.

Table 7-4 C&I Rebates Benchmarking Results

Measures	RECO C&I Midstream Lighting	Com Ed	Average
FR	NA	22%	22%
SP	NA	1%	1%
NTG	NA	80%	80%
Sum of Participants	5	430	218
Saving Methodology	TRM	TRM Algorithm	NA
2 x 4 LED new luminaire	12,224	2,728,421	1,370,323
2 x 4 LED retrofit kit	18,947	300,284	159,616
HID Replacement Lamp >125W - <=250W	22,341	NA	22,341
LED High-Bay Luminaires	52,764	NA	52,764
Total kWh Savings	106,277	3,028,705	1,605,044
kWh per participant	21,255	7,044	7,380

Figure 7-3 C&I Midstream Lighting per-participant Savings Comparison



Key Findings and Recommendations

- Distributors do most of the outreach for the program. As the program grows, more marketing will be needed.
- Supply chain issues have been an obstacle for the program, but they appear to be improving.

Recommendations

Recommendation 1: Coordinate program requirements with other electric utilities.

> **Rationale:** The distributors interviewed said the RECO program does not compete well with other programs in New Jersey. According to them, the other programs have much less paperwork, easy to use portals for trade allies, and higher incentives.

Recommendation 2: Develop a plan for replacing some of the savings that will be lost from lighting.

Conduct research on what other measures are available, expected savings, costs, useful life of those measure and any contractor network requirements.

Rationale: Due to the EISA backstop, there will no longer be savings attributable to the program for lighting. More research is needed to recoup some of those lost savings.

8

COMMERCIAL DIRECT INSTALL

The CDI Program is focused on the installation of efficiency measures for small businesses, non-profit organizations, municipalities, schools, and faith-based organizations that typically lack the time, knowledge, or financial resources necessary to investigate and pursue energy efficiency. The program is run by Resource Innovations (RI), who works with a network of local trade allies. The trade allies conduct customer outreach, perform audits, provide recommendations, and handle the installation of recommended measures.

The program launched in July 2021.

Process Evaluation Results

There was no participation for the program in PY1. At the time of the interview, 3 projects had been completed in PY2. RI feels it is going to be very hard to achieve the savings goal. They have communicated to RECO that the goal is too high.

The program relies heavily on contractor outreach. RI has a tool that contractors use to quickly identify customer eligibility. Contractors use that tool and then do walk-in visits with eligible customers to try and sell the program. The contractors interviewed felt that RI was a good partner, providing leads and supporting their efforts.

RECO is responsible for customer-facing marketing, and little has been done to promote the program. RI has seen other programs conduct very successful marketing campaigns that include targeted email outreach and co-branding marketing materials. The materials include fact sheets and measure lists for participating contractors that include both the logo of the utility and the contractor. This type of co-branding gives customers another level of assurance that this contractor is legitimate, they have an established relationship with the utility, and the customer can trust them. RI would like to see RECO conduct similar marketing campaigns. The contractors interviewed also felt the program could benefit from additional marketing.

Program Strengths and Challenges

The main program strength is the contractor network. Because of the extensive training RI provides for contractors as part of their closed network, they receive really good customer satisfaction rates. For RECO's service territory, based on the demographics of that area, they enlisted a dedicated Asian contractor and a Spanish contractor to serve their local communities. These local, community-based contractors tend to be the most successful.

There are several challenges for the program, including a complicated incentive structure, competition with PSE&G, and lack of financing.

The program has a weighted scale incentive system that the implementer feels is difficult to understand. The incentive structure is designed to encourage more comprehensive projects. Based on the lighting and energy savings of the project, the cost cap of the lighting portion of the project can change. If the project is 80%+ lighting, then the incentive would only cover 50% of the total project costs. But if the project is more comprehensive and has HVAC or other non-lighting measures, the incentive would increase and be a higher percentage of the project costs. RI feels the incentive structure is difficult to explain and is not working. After receiving this feedback, the Joint Utilities increased the thresholds, but they did not change the structure. The contractors interviewed agreed that the incentive structure is complicated and hard to explain to customers. Customers hear that "up to 80%" of the project is covered by incentives and are then disappointed when they only get 50%. Some contractors avoid going into details about the incentive with the customers and just tell them the final rebate amount.

According to RI, the incentives are much lower than when the program was offered by the state; when it was a state program the customer only needed to pay 20% of the project costs. With this program, it's typically around

50% of the project costs. RECO recognizes that customers have indeed seen reductions in incentives for typical commercial LED lighting measures over the last several years, but this is driven by the standard economic practice by which all utilities design energy efficiency programs. As the incremental costs for an energy efficient technology come down (due to market penetration) and the energy savings margin shrinks (due to rising code baseline), it is most prudent for a utility to scale down the incentive offering.

Another issue is the competition between the gas and electric programs. Because the program generates both gas and electric savings, the participating contractor has the option to go to either of the utilities. In the RECO territory, RECO is the electric company, and PSE&G is typically the gas provider. The contractor's preference is to go through PSE&G because they offer on-bill financing. On-bill financing is very hard to compete with. It's an easy sell for contractors; even if 90% of the scope of the project is electric, they prefer to go through PSE&G for the financing. In theory, RECO is supposed to be able to claim electric savings and reimburse PSE&G for the electric rebates. But how that is working in practice is unclear.

At the time of the interview, RECO did not have financing in place. According to RI, this was a large barrier to program participation. RECO's small businesses are dependent on financing, and RI has received feedback from multiple customers that projects didn't get completed because financing was not available.

RECO is expected to have a financing program in place in Q2 2024. The financing will be through a third party, however, and will not include on-bill financing. The contractors interviewed agreed that the lack of on-bill financing was a key hurdle for the RECO program. They said that working with third-party financing requires more credit reviews and sometimes personal guarantees, which can get "messy". One contractor doesn't put resources into marketing the RECO program because the financing is less attractive.

Program Processes

RI receives customer data from RECO on a quarterly basis, including the most up-to-date consumption and the eligibility for the program based on the average demand. Contractors search this data using the account number and the address to determine if the account is eligible for the program. They use RI's workbook spreadsheet for the site assessment, which generates a proposal for the customer. The tool tracks the project from customer application to paid, allowing the contractor to check on the progress throughout the project. According to RI, contractors really like the tool and feel it's easy to follow and is self-explanatory.

RI has technical reviewers that check everything from the baseline equipment, baseline wattage, baseline quantities, and base case photos for baseline measures. They have two sets of reviews: one primary review and then a secondary review conducted by the engineering manager to make sure the data is accurate. If the incentive exceeds $20,000, it requires a PM's review and approval. For the first seven projects for each contractor, RI conducts on-site verification; after the initial seven projects, 10% of projects are inspected. If a project is above a certain kWh, it will also trigger an inspection.

The goal of these inspections is to make sure the equipment that was supposed to be installed is installed correctly. They ensure everything is safe and the customer is happy.

Contractors go through a comprehensive RFP process that includes questions about their approach, key personnel, the types of measures they install, and three references. RI uses the RFP to select the top contractors for the program.

Once contractors are accepted as part of the network, they have onboarding training and 4-6 webinars/seminars per year as well as biweekly check-ins. Contractors are expected to do 2 assessments per month and 1 installation per month to stay active in the program.

Key Findings and Recommendations

- The program relies heavily on contractor outreach
- The contractors interviewed felt that RI was a good partner, providing leads and supporting their efforts.

- There are several challenges for the program, including a complicated incentive structure, competition with PSE&G, and the lack of financing in PY1.

Recommendations

Recommendation 1: Work with contractors on how the incentive structure is presented to customers.

The tiered incentive structure is complicated, but it can be simplified when communicating with customers by just presenting them with the total incentive amount.

> **Rationale:** Some contractors have had success with this strategy. They don't use the "up to 80%" costs covered by the incentive language, but instead tell customers incentives are available and only communicate the total incentive on the bid.

Recommendation 2: Highlight the availability of financing on all marketing materials.

Financing is even more crucial for this program than it is for Midstream HVAC. Although RECO is unable to offer on-bill financing like PSE&G, they do have third-party financing available. Marketing materials should highlight the availability of financing and the terms.

> **Rationale:** Small business programs like this typically require financing to meet participation goals.

Recommendation 3: Clarify the coordination process with the gas utilities and communicate that to the RI.

Schedule a meeting or provide documentation explaining how the RECO programs coordinate with the gas utilities serving the same customer base.

> **Rationale:** RI does not have a clear understanding of how the backend reimbursement takes place and affects the savings realized for electric measures incented by the gas utilities.

A

BEHAVIORAL EVALUTION RESULTS

To: Phil Madnick, RECO

CC: Charmaine Cigliano and Jon Hilowitz, RECO

From: Katie Chiccarelli and Lia Tang, AEG

Date: April 14, 2023

Re: RECO PY1 Behavioral Program Evaluation Results

Introduction

This memo summarizes AEG's analysis of RECO's Program Year 1 (PY1) Behavioral Program, which spans July 2021 through June 2022. This evaluation resulted in an insignificant point estimate of 334 MWh with an absolute error of 720 MWh at the 95% confidence level. These findings result in a zero percent realization rate for RECO's Behavioral program in PY1.

PY1 started in July 2021, and the Behavioral program was launched four months later in November 2021. The initial launch included just over 32,000 participants, and a second wave of 4,800 participants was added in April 2022.

Analysis Approach

This analysis was conducted on an average daily level, and savings were estimated using a one-way fixed effects approach. This estimate is rolled up to a total program level by multiplying by the number of participants and summing relevant days and months of PY1 participation. Separate models were used to evaluate the savings for the two waves of participants: the initial launch in November 2021 and an additional wave in April 2022. The duration of treatment for the November wave was 7 months spanning December 2021 through June 2022. The duration of treatment for the April wave was just two months, spanning May and June 2022. Equation 1 below illustrates the one-way fixed effects regression used to obtain average daily per-customer savings for participants.

$$kWh_{mit} = \alpha_i + \beta_i D_{it} + \epsilon_{it} \qquad (1)$$

In this equation

m	month
i	customer
t	time period (month-year)
kWh_{mit}	average daily per-customer electricity consumption
β_i	coefficient estimate of customer i
D_{it}	indicator variable for participation during the treatment period, on or after 1) November 2021; 2) April 2022.
α_i	vector of customer fixed effects
ϵ_{it}	error term

Data Cleaning and Validation

AEG was provided with raw billing data for both treatment and control groups from November 2020 through June 2022. AEG first cleaned this data and then validated that the treatment and control groups were comparable in the baseline period.

The data cleaning process was completed in two steps: prior to calendarization and post-calendarization. The impact of these steps is detailed in Table A-1. If a bill met the following criteria prior to calendarization, it was removed from the analysis:

1. bills with non-positive reads,
2. bills with an inactive date earlier than the program start date,
3. bills with durations of fewer than 15 days or more than 45 days.

After calendarization, bills that met the following criteria were removed from the analysis:

4. calendarized bills with a new duration of less than 75% of the month (around 23 days), and
5. data points outside of 3 standard deviations from mean usage by wave, month-year, and Treatment/Control group assignment.

Table A-1 Data Validation Row Counts

Step	# Data Points Affected	% of Data Points
Raw data	*1,262,081*	
1	0	0.0%
2	3,885	0.3%
3	3,662	0.3%
4	18,830	1.5%
5	21,939	1.7%

RCT Design Validation

After the calendarization process, AEG validated that the assigned control group is comparable to the treatment group in the baseline period. This baseline period is the 12 months preceding the program start for each wave: November 2020 to October 2021 for the November wave, and April 2021 to March 2022 for the April wave.

Results from the Two-sample T-test confirm the two groups are statistically equivalent, with p-values of 0.998 and 0.985 for the November and April waves, respectively. Therefore, there is no statistically significant difference between the treatment and the control group.

Finally, Figure A-1 and Figure A-2 compare daily usage of the Control and Treatment groups across pretreatment months. This visual representation shows that consumption varies seasonally and does so in a similar pattern for the Control and Treatment group. These boxplots display the five summary statistics of monthly billing dataset: the median, the quartiles (Q1 and Q3), and the minimum and maximum values (excluding any outliers). The line inside each box represents the median monthly bill, and the vertical lines, or whiskers, extend from the box to the minimum and maximum values, excluding any outliers.

Figure A-1 Treatment vs. Control Pretreatment Comparison for November Wave

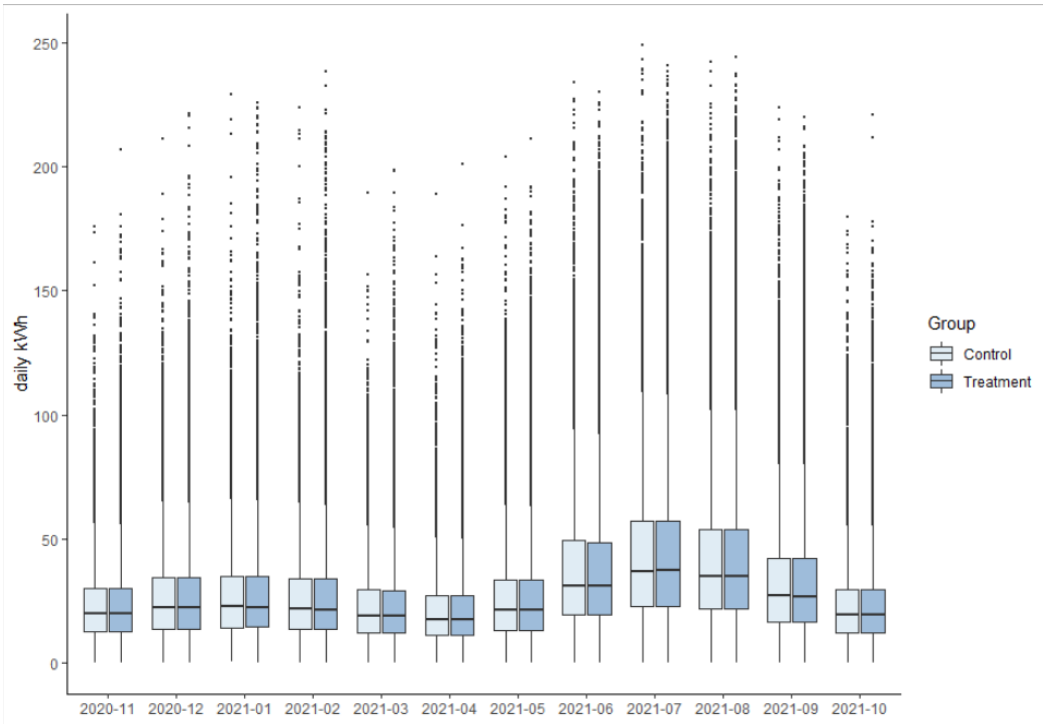
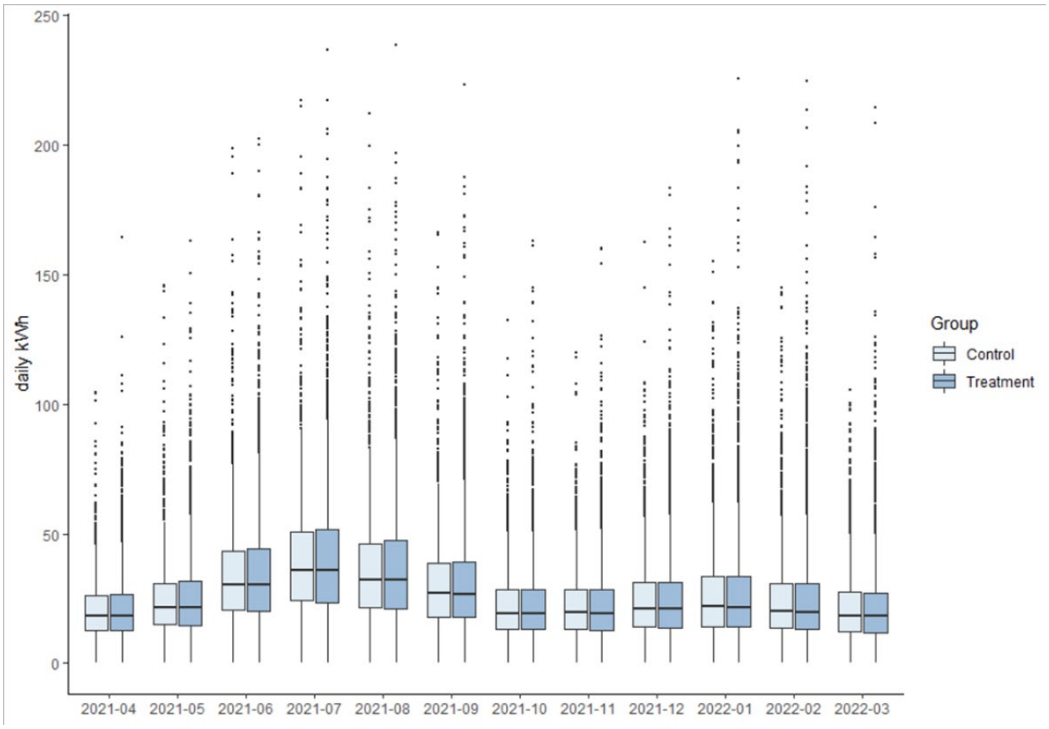


Figure A-2 Treatment vs. Control Pretreatment Comparison for April Wave



Evaluation Results

Table A-2 shows the average daily per-customer kWh savings, the percent savings, and associated absolute error at the 95% confidence level. The estimated average daily savings is 0.05 kWh for the November wave, and 0.34 kWh for the April wave.

Table A-2 PY1 Per-Customer Average Daily Impact Estimates

Program Wave	Number of participants	Average Daily kWh Savings	Daily % Savings	Absolute Error (+/-)
Nov 2021	32,101	0.05	0.20%	0.11
Apr 2022	4,822	0.34	1.22%	0.39
Combined	36,923	0.09	0.40%	0.11

The average daily results shown in Table A-2 are expanded to the total program level in Table A-3. The treatment period for the November wave spans seven months, or 212 days during PY1, while the treatment period for the April wave is limited to May and June 2021, or 61 days. The program level savings for the April wave is evaluated to be zero due to insufficient duration. Therefore, the total PY1 estimated savings of 334.2 MWh, or 0.20%, is comprised of the November wave only.

Table A-3 PY1 Program Level PY1 Aggregate Impact Estimates

Program Wave	Number of Participants	Total Actual MWh	Participation Duration (Days)	Estimated MWh Savings	PY1 % Savings	Absolute Error (+/-)
Nov 2021	32,101	168,906	212	334.2	0.20%	720.27
Apr 2022	4,822	7,928	61	N/A	N/A	N/A

Evaluated vs. Reported Savings Comparison

The evaluation resulted in an overall program savings of 334 MWh+/- 720 MWh at 95% confidence. The comparison of reported and evaluated savings are shown in Table A-4.

Table A-4 Evaluated Savings vs. Reported Savings for PY1, Population Level

	Reported MWh	Evaluated MWh	95% CI Lower Limit	95% CI Upper Limit	Verified MWh	Realization Rate
PY1 Total	464.3	334.2	-386.1	1054.5	0	0%

Conclusion

Key Finding	Recommendation
The 95% confidence interval of the evaluated savings of 334.2 MWh +/- 720 MWh does encompass RECO's claimed savings of 464.3 MWh. However, the evaluated savings is insignificant, and therefore results in a zero percent realization rate for PY1.	PY1 participation was dominated by winter and spring months; the lack of summer is likely a contributing factor to the insignificant savings estimate. Consider only claiming savings for waves that have a complete 12 months of participation.
AEG also notes that the outlier check in the data cleaning process detected 1.9% of total data points as outliers; this is higher than the 1% threshold stated in the guidance and warrants follow up with the implementer.[10]	Follow up with the implementer to better understand the treatment and control group selection process.

[10] Section 6.1.1.4.1 on page 119: https://www.puc.pa.gov/Electric/pdf/Act129/SWE_PhaseIII-Evaluation_Framework050818.pdf

B

OBC PARTICIPATION UNITS

NJ Program	Measure	Participants (as lead utility)
Efficient Products	HVAC	Sum of HVAC units (multiple units per customer, counts as multiple participants)
	Lighting - Upstream	Quantity of packages sold (based on SKU) - net of returns (negative in current period)
	Rebated Products	Quantity of units rebated (based on SKU)
	Mid-Stream Products	Quantity of units sold (based on SKU) - net of returns (negative in current period)
	Appliance Recycling	Count of visits to premise not units
	Online Marketplace	Quantity of units sold (based on SKU) - net of returns (negative in current period)
	EE Kits - Giveaway	Per kit delivered
	Consumer Electronics	For rebated programs, count of rebate applications For Midstream, every measure is considered a participant - net of returns (negative in current period)
Existing Homes	Home Performance with Energy Star	Count of completed HPwES projects
	Quick Home Energy Checkup	Count of completed visits
	Moderate Income Weatherization	Same as HPwES - (distinction would be paying for audit in this program)
Home Energy Education & Management	Behavioral	Count of treatment customers at end of reporting period
C&I Direct Install	Direct Install	Count based on number of applications/projects completed, not account number
Energy Solutions for Business	Prescriptive/Custom	Count based on number of applications/projects completed, not account number
	Energy Management	Count based on number of applications/projects completed, not account number
	Engineered Solutions	Count based on number of applications/projects completed, not account number
Multifamily	HPwES	Count of completed HPwES projects

NJ Program	Measure	Participants (as lead utility)
	Direct Install	Count based on number of projects completed (see approach)
	Prescriptive/Custom	Count based on number of applications/projects completed, not account number
	Engineered Solutions	Count based on number of applications/projects completed, not account number

C

AEG TRM RECOMMENDATIONS

In the table below we include a comprehensive list of the TRM recommendations and suggestions made by the AEG team through the TRM review process.

Table C-1 AEG TRM Recommendations

Batch	Review Deadline	Measure	AEG Comments
Batch 1-2	1/27/2023	C&I_HVAC_Guest Room EMS	* Clarification whether measure only applies to PTAC/PTHP HVAC systems * Proposed edit in Description section clarifying temperature unit is Fahrenheit * Reference 1 citation and age of source.
Batch 1-2	1/27/2023	C&I_Lighting_Lighting Fixtures	* Clarification on fuel savings conversion factors.
Batch 1-2	1/27/2023	C&I_Refrigeration_Night Covers	* Reference 2 age of source.
Batch 1-2	1/27/2023	Residential_WaterHeating_FaucetAerator	* No comments
Batch 1-2	1/27/2023	Residential_WaterHeating_PoolPumps	* Recommend catgorizing this measure under a different section (currently under "Water Heating").
Batch 3	2/1/2023	C&I_HVAC_Chillers	* No comments
Batch 3	2/1/2023	C&I_PlugLoad_SmartStrip	* Recommend including deemed savings value using default variable options. * Reference 3 is from October 2008, making it 15 years old. Recommend trying to find a newer source. This comment applies for all measures with out-dated references.
Batch 3	2/1/2023	C&I_WaterHeating_PRSV	* Capitalize "prsv" in Table 1-1 in GPMq and GPMb descriptions. * Recommend revising Operating Days per Year table to align with facility types presented in the Hours/Day table. * Recommend having the temperature of supply water from main broken out by climate zone, not NJ as a whole.
Batch 3	2/1/2023	Residential_Appliances_AirPurifier	* No comments

Batch 3	2/1/2023	Residential_Appliances_ClothesDryer	* No comments
Batch 3	2/1/2023	Residential_Appliances_Dishwasher	* Recommend removing excessive definition of "dishwasher". * Recommend multiplying the annual electric energy savings algorithm by number of units. Same with annual fuel savings. * An example calculation may be useful for this measure.
Batch 3	2/1/2023	Residential_HVAC_Ventilation Fan	* Recommend updating kW savings formula to be expressed as Delta_kWh/Hrs * CF
Batch 3	2/1/2023	Residential_PlugLoad_SmartStrip	* Question regarding Tier 2 end use applicability.
Batch 4	2/7/2023	C&I_Refrigeration_Case Doors	* Recommend looking at annual energy savings algorithms. More in depth formulas used in other TRMs. Perhaps use more variables, as opposed to deemed values (like ESF and HSF).
Batch 4	2/7/2023	C&I_WaterHeating_Aerators and Showerheads	* Question regarding savings and delivery applicability, efficiency requirements. * Correction to fuel conversion factor * Comments on calculation parameters table and references.
Batch 4	2/7/2023	Residential_Appliances_Dehumidifier	* Recommend multiplying annual electric savings algorithm by number of units. * Recommend looking at coincidence factor. Other TRMs have coincidence factors of 0.5+
Batch 4	2/7/2023	Residential_Shell_Insulation	*An example calculation may be useful for this measure *Formatting in Table 1-1 Calculation Parameters. Center "See Measure Life" *Recommend existing insulation R-values being based on building vintage
Batch 5A	2/10/2023	C&I_Appliances_Clothes Washer	*Formatting in annual electric savings algorithm. Remove the underscore between kWh and dryer. *Recommend adding an unknown option into Table 1-3.
Batch 5A	2/10/2023	C&I_Appliances_Freezers	*Formatting comments: 1) Reformat "1/3". Instead of regular text, use fraction function under insert equation 2) Capitalize "New Construction" 3) Remove extra spacing between "freezer" and "Annual" 4) Consider re-formatting/cleaning up Table 1-4, it's a little hard to read at first glance. *Multiply the annual electric savings algorithm by number of units. Same for annual fuel savings. *Recommend HVACc, HVACd, and HVACff being

			based on facility type, location, and HVAC type instead of a deemed value. *Recommend renaming Tables 1-2, 1-3, 1-4 to specify that it is the maximum daily energy consumption. *Natural gas peak day factor (PDF) value not inputted.
Batch 5A	2/10/2023	C&I_HVAC_Advanced Rooftop Controls	*Formatting comments: 1) Change formatting of "It is important to note … " to be different than the titles of baseline case and efficient case 2) Remove double spacing between "area" and "square" 3) Change "Kwh" to "kWh" 4) Insert a space between "-" and "Exterior" to be consistent with the other building types. 5) Revise to: "that are not" in line above Baseline Case 6) Misspelling of "Commercial" in Reference 3 *Add natural gas peak day factor (PDF) value into Table 1-8, even if that value is 0. *The NY TRM (which is referenced for economizer savings) mentions multi / variable speed fan motors in their Advanced RTU Control write-up, for the efficient case. *We seem to be missing all the lifetime calculations (which are in other measures, so assume should be here also). We seem to be missing EUL also. *Need to include calculation for daily peak fuel savings. *Should tables 1-3 through 1-6 titles reference DCV Energy Savings (since that is what they represent). *Table 1-7: It would seem the NY TRM values are for air-side economizer, not dual enthalpy (however they still seem to use them for dual enthalpy savings, just a comment). The table values are not adjusted from NY TRM NYC values, should they be? There are additional building types on pgs 1197 /1198 (theoretically VAV econ values would be used). Also are these the standard NJ building types?

Batch 5A	2/10/2023	C&I_HVAC_Demand Controlled Ventilation	*Formatting comments: 1) Remove double spacing in the Area description 2) Change "Kwh" to "kWh" 3) Capitalize Elec in F_ElecHeat so it is consistent with the other subscripts 4) Capitalize Therms in the SF_Fuel row 5) Remove double spacing under the Measure Life section. *Update natural gas peak day factor (PDF) value. *Update the second reference, it is 18 years old. *Annual Peak Demand Savings: ESFfan and CF not defined in Table 1-1, CF in table (1-3 which should be 1-7) is N/A. IL TRM had peak demand savings as NA, should this calculation be revised? *SF_ElecCool in Table 1-1: Value lookup should be Table 1-7, and need to renumber the Table. *Last table should be Table 1-7, and need to renumber the Tables.
Batch 5A	2/10/2023	C&I_HVAC_Economizer Controls	*Update natural gas peak day factor (PDF) value. *Formatting comments: 1) Capitalize "Savings" in Table 1-2. 2) Remove colon after Lifetime Energy Savings Algorithms
Batch 5A	2/10/2023	C&I_HVAC_Make-up Air Unit	*Formatting comments: Remove colon to match previous title. *Update natural gas peak day factor (PDF) value. *In Table 1-1, under description for deltaP, misspelling of "section."
Batch 5A	2/10/2023	C&I_Refrigeration_Door Closer	*Formatting comments: Remove unnecessary spacing between Table 1-1 and "Peak Factors." As well as between "Measure Life" and "References." *Multiply anuual electric energy savings algorithm by number of units. Same for annual peak demand savings. *Annual electric energy savings and peak coincident demand electric savings values are higher in other TRMs. Recommend putting a per unit savings lookup table based on locations that includes: 1) Cooler - kWh and kW savings 2) Freezer - kWh and kW savings. *Input a value for natural gas peak day factor (PDF), even if it's 0.
Batch 5A	2/10/2023	C&I_Refrigeration_Door Gaskets	* No comments
Batch 5A	2/10/2023	C&I_Refrigeration_Strip Curtains	* No comments

Batch 5B	2/10/2023	C&I_Appliances_Refrigerators_TRM Committee	*Formatting comments: Insert the title "Annual Energy Savings Algorithms" above annual electric energy savings. *Recommend HVACc, HVACd, and HVACff being based on facility type, location, and HVAC type instead of a deemed value. *Recommend renaming Tables 1-2, 1-3, 1-4 to specify that it is the maximum daily energy consumption. *Update natural gas peak day factor (PDF) value.
Batch 5B	2/10/2023	C&I_Lighting_Exit Signs_TRM Committee	*Input a value for natural gas peak day factor (PDF), even if it's 0 or N/A. *Recommend updating reference 3, the VT TRM. It is outdated by 15 years (2008).
Batch 5B	2/10/2023	C&I_Refrigeration_VFD Compressor_TRM Committee	* No comments
Batch 5B	2/10/2023	Residential_ApplianceRecycling_Dehumidifier Recycling_TRM Committee	*Formatting comments: Pick either "Hr" or "Hours" for consistency (units column in Table 1-1). *Multiply the annual electric energy savingsd algorithm by the number of units.
Batch 6	2/17/2023	C&I_ApplianceRecycling_Dehumidifier Recycling_TRM Committee	*Formatting Comment: Capitalize "appliance recycling" in header of document. *Formatting Comment: Include a space between "Capacity" and "and" in title of Table 1-2. *Federal Standard source for Non-Energy Star values in Table 1-2 states a date of October 2012. Is there a reason November 2012 was sued for the table? *Recommend updating the capacity range in Table 1-2 from ">50 to ≤ 55" to ">50 to ≤ 54".
Batch 6	2/17/2023	C&I_Appliances_Dehumidifier_TRM Committee	*Formatting Comment: Should "Whole-Home" text in Tables 1-3 and 1-5 be updated to "Whole-Building" as this measure is technically a Commercial measure? *Is there a reason the value and source for Coincidence Factor for this measure is different from the value and source of the Coincidence Factor being used for the Dehumidifier Recycling measure? *Should reference to NY TRM v9 be updated to NY TRM v10 as this would be the most recent version starting in 2023.
Batch 6	2/17/2023	C&I_Appliances_Room Air Conditioner_TRM Committee	*Formatting Comment: Recommend capitalizing "room air conditioner" in title of Table 1-3. *Recommend updating the reference to source 4 (Mid-Atlantic TRM v8) to the latest version of the TRM (version 10).

Batch 6	2/17/2023	C&I_Food Service_Ice Machines_TRM Committee	*Formatting Comment: Recommend capitalizing "food service" in header of document. *Recommend updating source 4 (PGE Workpaper) from pg. 12 to pg. 10.
Batch 6	2/17/2023	C&I_HVAC_Central AC, Air Source Heat Pumps, Mini-Splits, PTAC_TRM Committee	* Comments on code compliance, OSF factor, RAC efficient case table entry, etc.
Batch 6	2/17/2023	C&I_HVAC_Geothermal and Watersource Heat Pump_TRM Committee	* Comments on syntax for clarity.
Batch 6	2/17/2023	C&I_HVAC_Programmable & Smart Tstats_TRM Committee	*Formatting Comment: Update "Btu/h)" to "Btu/hr" in Description section. *Broken URL for Source 7. *IF HCAP_fuel variable is is MMBtu/hr, does the Annual Fuel Savings calculation need a conversion factor to convert the final value to therms/yr?
Batch 6	2/17/2023	C&I_Lighting_Delamping_TRM Committee	* Clarification on aspect ratio and kWh/MMBTU conversion factor.
Batch 6	2/17/2023	C&I_Lighting_LEDSignLighting_TRM Committee	* No comments
Batch 6	2/17/2023	C&I_Motors and Drives_Motors_TRM Committee	* No comments
Batch 6	2/17/2023	C&I_Motors and Drives_VFD_TRM Committee	* Comment on Reference #1 citation.
Batch 6	2/17/2023	C&I_Refrigeration_Case Light Sensor_TRM Committee	* No comments
Batch 6	2/17/2023	C&I_Refrigeration_Defrost Controls_TRM Committee	* Comments on CF reference and References 3 & 4.
Batch 6	2/17/2023	Residential_Appliances_Clothes Washer_TRM Committee	*Formatting comments: 1) Remove double spacing ebtween "in" and "10" under Baseline Case 2) Remove underscore before dryer in annual electric energy saings algorithm. *Update PDF in Table 1-8.

Batch 6	2/17/2023	Residential_Appliances_Room AC_TRM Committee	*Formatting comments: 1) Remove excessive spacing under Description. *Multiply annual electric energy savings algorithm by number of units, same for annual peak demand savings. *Table 1-2 without reverse cycle: Recommend the first two values being < 8,000, then 8,000 to 10,999 Btu/hr. *Table 1-2 with reverse cycle: Recommend changing the Btu/hr to <14,000 ; 14,000 to 19,999 ; >= 20,000 (The current Btu/hr values don't make sense, overlap with >=14,000 and <20,000).
Batch 6	2/17/2023	Residential_HVAC_Central AC, Heat Pumps, Mini-Splits, PTAC,PTHP_TRM Committee	*Formatting comments: 1) Insert space between "the" and "proper" under Description. 2) In Table 1-1, capitalize the H in "Electric Resistance Heating" for consistency 3) Recommend adding degrees symbol for description of COP_q and COP_b in Table 1-4 4) Remove comma at the end of Reference 12. *Recommend breaking out into separate measures. *Example calculations may be helpful due to the number of measures.
Batch 6	2/17/2023	Residential_HVAC_Duct Sealing Insulation_TRM Committee	*Update PDF value in Table 1-6. *Recommend changing EUL. It is greater than 15 years in multiple TRMs (18, 20).
Batch 6	2/17/2023	Residential_HVAC_Ground Loop and Air-to-Water Heat Pump_TRM Committee	*Formatting comments: 1) Close parenthesis after "IECC 2012" under Baseline Case 2) Add period after "code" under Efficient Case 3) Put a space between the colon and value for GSPK_b in Table 1-4 4) Change "Kw" to "kW" under Variable 1000 in Table 1-4 5) Center "See Measure Life" under EUL in Table 1-4 *Recommend EFLH being broken about by climate zone, single family, and multifamily (could do building vintage as well). *Update PDF value in Table 1-6.
Batch 7A	2/22/2023	C&I_Refrigeration_Evaporator Fan EC Motor_TRM Committee	*Formatting comment: Space between "years" and [4] under Measure Life. *Recommend updating Reference 2, source is 10 years old.
Batch 7A	2/22/2023	C&I_Refrigeration_LED Case Lighting_TRM Committee	*Formatting comments: 1) Reference 5 font size is 9, while the rest of the text is 10 2) Capitalize header "Refrigeration." *Recommend updating Reference 1, source is 17 years old.
Batch 7A	2/22/2023	CI_Refrigeration_Anti-Sweat Heat Control_TRM Committee	*Formatting comments: 1) There are two periods after the word "installed" under Baseline Case 2) Remove extra row in table 1-1 3) Insert comma for hours in Table 1-1 8,760 4) In Table 1-1, under IF_e, correct "colling" to "cooling" 5) Baseline Case and Efficient Case should also be italicized.

Batch 7A	2/22/2023	CI_Refrigeration_Evaporator Fan Controller_TRM Committee	*Formatting comment: Baseline Case and Efficient Case should be italicized as well as underlined.
Batch 7A	2/22/2023	Residential_ApplianceRecycling_Room-AC-Recycling_TRM Committee	*Formatting comments: 1) Capitalize header "Appliance" *Recommend changing the variable "Btuh" to Btu/hr so that is more intuitive. *Recommend looking into EUL more, could potentially have a higher value. *Recommend having hours based on climate zone. *For EER_exist, could create table with: product type, product class (Btu/hr), federal standard with louvered sides (EER), and federal standard without louvered sides (EER).
Batch 7A	2/22/2023	Residential_Appliances_Refrigerators_TRM Committee	*Formatting comments: 1) Insert a space between "in" and "Table 1-4" under F_occ. *Recommend multiplying annual electric savings algorithm by number of units. Same for Annual Fuel Savings and Annual Peak Demand Savings. *Update PDF value in Table 1-5. *Recommend looking into EUL more, could have a slightly higher value.
Batch 7A	2/22/2023	Residential_HVAC_Smart Thermostat_TRM Committee	*Formatting comments: 1) Center value "0.07" under SF_elec,c ; "See Measure Life" under EUL ; "0.06" under SF_elec,h 2) Correct "kBTU" to "kBtu" 3) Remove blank row in Tabe 1-1 4) Consistency in capitalization amongst all variable names. Example: F_fuelHeat in algorithm, but F_FuelHeat in Table 1-1. *Update PDF value in Table 1-6. *Reference 8 is blank.
Batch 7A	2/22/2023	Residential_Lighting_Lamps and Fixtures_TRM Committee	*Formatting comments: 1) Insert space between word and reference 2) Remove unnecessary spacing between tables and headings 3) Add period after "Table 1-5" under Baseline Case. *Recommend looking into hours. Other states have higher hours of use. Hours could also be broken out by location, as well. *EUL is missing. Suggest 15 years. *References 12 and 13 missing. *Recommend adding PDF value, even if it's N/A.
Batch 7B	2/22/2023	C&I_Lighting_Lighting Controls_TRM Committee	*Formatting comments: 1) Change "Bilevel" to "Bi-level" 2) Remove double spacing. *Recommend multiplying bi-level annual electric energy savings algorithm by number of units, same for Annual Peak Demand Savings. *Update PDF in Table 1-8.

Batch 7B	2/22/2023	C&I_Refrigeration_Evaporator Fan Control_TRM Committee	*Formatting comments: 1) For consistency throughout the TRM, italicize both "Baseline Case" and "Efficient Case"
Batch 7B	2/22/2023	C&I_Water Heating_Heat Pump Water Heater_TRM Committee	*Formatting comments: 1) Remove unnecessary spacing 2) Add comma to 100000 to become 100,000 3) Multiplication symbol in Annual Electric Energy Savings algorithm instead of letter "x". *Recommend adding an "unknown" option to Table 1-9. *Update PDF in Table 1-10.
Batch 7B	2/22/2023	Residential_Water Heating_Heat Pump Water Heater_TRM Committee	*Formatting comments: 1) Add space in between "water." and "Due" under Description 2) The numbering of tables is off. *Recommend multiplying annual electric energy savings algorithm by number of units, same with annual fuel savings and annual peak demand savings. *Recommend breaking out T_main, F_cool, and F_heat by climate zone. *Recommend breaking out derating factors by climate zone, as well. *Need to add value for CF in Table 1-9. Also, need to update PDF value.
Batch 7B	2/22/2023	Residential_Whole Building_Behavior_TRM Committee	* Comment on Baseline Case and Efficient Case section draft timing * Recommend including savings formulas for clarity. * Comment on measure lifetime vs persistence assumptions. * Question on reference 3 & 4 citations in workpaper.
Batch 7B	2/22/2023	Residential_Whole Building_HPwES_TRM Committee	* Minor grammar comments.
Batch 8	2/27/2023	C&I_HVAC_EC Motors_TRM Committee	* Formatting comments: 1) In Table 1-1 e, d, and ff should be subscripts after HVAC 2) Peak Factors should be Table 1-3, not 1-8 3) Remove double spacing 4) Format "1/3" into fraction. * Recommend looking into adding DeltakWh_DHW component for circulator pumps annual electric energy savings algorithm. * Recommend multiplying energy saving algorithms by number on units. * Update PDF value in third table.
Batch 8	2/27/2023	C&I_HVAC_Heat or Energy Recovery Ventilator_TRM Committee	* Formatting comments: 1) Insert space 2) Remove double spacing 3) hx,sens and elec,c need to be subscripts after Eff in Table 1-1 4) Capitalization. *Recommend multiplying annual electric energy savings algorithm by number of units.

Batch 8	2/27/2023	Chapter 1 from 2021 Addendum with redline edits	* No comments
Batch 8	2/27/2023	Residential_ApplianceRecycling_Refrigerator-FreezerRecycling_TRM Committee	* Formatting comments: 1) Capitalize header "Appliance Recycling" 2) Format ft^3 * Recommend multiplying annual electric energy savings and annual peak demand savings algorithms by number of units. * References 1 and 2 outdated.
Batch 8	2/27/2023	Residential_HVAC_EC Motors_TRM Committee	* Formatting comments: 1) Punctuation 2) Capitalization 3) Fraction formatting 4) Add commas to CDD numbers in Table 1-3. * Recommend renaming "city" to climate zone in table 1-3.
Batch 8	2/27/2023	Residential_HVAC_Heat or Energy Recovery Ventilator_TRM Committee	* Formatting comments: 1) Remove double spacing. * Recommend multiplying annual electric energy savings algorithm by number of units. * Input value for PDF in Table 1-7, even if it's N/A or 0.

D

NET TO GROSS APPROACH

The NTG analysis used for the Online Marketplace evaluation followed the Self Report NTG approach outlined in the NJ EM&V Guidelines: Net-to-Gross (NTG) Guidance for Downstream Rebate Programs. A complete description of the approach is included below.

Self-Report NTG Approach

The self-report method will be used for the calculation of NTG ratios and net savings by estimating freeridership and spillover in a single survey.

Freeridership measures the part of savings that would have occurred absent program intervention. A participant can be classified as a:

- Full freerider (would have made no changes to the energy efficient project and/or activity without program intervention, for example, would have purchased the exact same measure, at the same time, and in the same quantity)
- Non freerider (would not have completed the energy efficient project and/or activity without the influence of the program)
- Partial freerider (would have partially replicated the program activity, for example, by purchasing a lesser quantity of the program-rebated equipment but in the same timeframe as they purchased the program-rebated equipment)

Participant spillover concerns the program influence on customers' decisions to invest in additional energy efficiency measures not rebated by any of the utility programs or another organization. The IPE will determine whether program participants installed other energy saving measures after participating in the program through the spillover questions. Additional measures purchased by customers after program participation would be considered participant spillover savings if they met the following conditions:

- The program significantly influenced their decisions to purchase additional measures; and
- They did not receive additional incentives for those measures.

If the participant reports installing one or more measures without program incentives, additional questions in the survey will address the quantity they installed and the program's influence on their purchasing decisions and confirm the equipment meets efficiency qualifications.

Freeridership Estimation

Freeridership is the portion of savings that would have occurred absent program intervention. One of the primary challenges with self-report methods concerns various biases in the response process. The approach used here looks to mitigate the effect of social desirability bias (i.e., answering questions in a manner so that the respondent might be viewed favorably by others).

This approach assesses freeridership by estimating two components:

- Intention – these questions ask respondents about the likelihood of carrying out the energy-efficient measure without the DSM program's support and results in a score between 0% – 100%.
- Influence – this second line of questions seeks to assess the program's direct influence on the customer's decision to take the energy-efficient action and results in a score between 0% – 100%.

Survey questions are used to calculate intention and influence scores; the two parts of the survey are scored separately and then combined to estimate one freeridership score for each survey respondent.

The final freeridership value for a program or analysis category is calculated as the arithmetic mean of the verified gross savings-weighted intention (maximum score 100%) and verified gross savings-weighted influence (maximum score 100%) freeridership components, resulting in a value between 0% and 100%, as shown in this equation:

Final Freeridership Ratio=(Intention Score + Influence Score)/2

The influence and intention scores contribute equally to the final freeridership score. The higher the final freeridership value, the greater the deduction of savings from the gross savings estimates.

Intention Freeridership Methodology and Scoring

Intention-focused freeridership batteries, as standard practice, ask customers to report on their decisions absent the program considering three core elements: timing, quantity, and efficiency. The IPE should ask about each of the three elements of intention (timing, quantity, and efficiency) independently.

As such, intention will be assessed through a battery of questions to estimate how the respondent's project would have differed in the absence of the program. Responses to the series of questions, taken together, indicate whether the respondent is a full freerider, a non freerider, or a partial freerider. The level of partial freeridership is informed by questions addressing how the program affected decision making related to three core elements: timing, quantity, and efficiency. Following is a simplified version of the intention question series; the full questions will be included in the final survey instruments for review:

- Were the participants planning on ordering or installing the measures before learning about the program?
- Would participants have installed measures without the program?
- Would participants have installed the measures at the same efficiency levels without the program?
- In the program's absence, would participants have installed the measures at a different time?
- Would participants have installed the same quantity of measures without the program?

The IPE should use a scoring matrix to assign a single intention score to each participant based on his or her responses to the survey questions. , The IPE should then aggregate all participants' scores into a verified gross savings weighted average intention score for the entire program category.

The process for estimating an intention score is as follows:

- Non Freerider: Customers are categorized as non (0%) intention freeriders in these instances:

  They had no plans to install the measure in the absence of the programs before learning about the program and would not have installed the measure(s) within a year for residential programs and within two years for commercial programs.

  They had specific plans to install the measure before learning about the program but would not have done so without program incentives/assistance.

  In the absence of program incentives, the customer would not have purchased or installed equipment to the same level of efficiency.

- Full Freerider: Customers are categorized as full (i.e., max score 100%) intention freeriders if they would have installed the measure(s) at the same time and at the same efficiency without the program, or if they had installed the measure before learning about the program.
- Partial Freerider: Customers receive a partial intention freeridership score (ranging from 12.5% to 75%) if they had plans to install the measure and their decision was influenced by the program in some way. This influence may have affected installation timing, the efficiency levels of measures installed, or the number of measures installed.

Influence Freeridership Methodology and Scoring

To estimate program influence, respondents are asked one question with several options to assess how program elements influenced their decisions about the energy efficiency measure they implemented. The influence of any one of these elements – program incentives or discounts, recommendations from utility staff, and information provided by the utility about energy-savings opportunities, previous participation in a utility energy efficiency program – determines how influential the program was in their decisions to install program-qualifying equipment. The program's influence score is equal to the maximum rating of any single program element, rather than an average, because if any given element had a substantial influence on the respondent's decision, then the program itself was successful in influencing the respondent's decision.

Calculating Program Participant Freeridership

As noted earlier, the final freeridership value for a program or analysis category is calculated as the arithmetic mean of the verified gross savings weighted intention (maximum score 100%) and verified gross savings weighted influence (maximum score 100%) freeridership components, resulting in a value between 0% and 100%, as shown in this equation:

Final Freeridership Ratio=(Intention Score + Influence Score)/2

Consistency Check and Adjustments

The survey should include a question to describe in their own words what impact, if any, the program had on their decision to implement or install energy-efficient equipment. If a respondent is determined to be a non-freerider (0%) or pure free-rider (100%), and their response to the open-ended consistency check question contradicts the determination of non-freerider or pure freerider, their intention freeridership score and influence freeridership score should be adjusted to 50%.

Participant Spillover Approach

Participant spillover addresses situations where the participant reports activities, purchases, and/or installations of high-efficiency equipment that is not funded through the program but was influenced by the customer's participation in the program.

The IPE will calculate participant spillover based on the installation and description of non-incented energy efficiency measures taken since program participation, an estimate of the energy savings generated by the measures, and the influence of the utility DSM programs on the decision to make energy efficiency improvements. The IPE should collect data using questions that ask program participants if the program prompted a decision to install other energy-efficient measures or to make other energy-efficient improvements beyond what was specifically rebated through the program, such as:

- Have participants taken any energy-efficient actions that enhance their home or facility's level of efficiency without direct program support?
- Did these actions take place after their involvement with the program?
- Were these actions, in their view, influenced by the program?

Participant Spillover Survey Questions

The participant self-report survey will assess the purchase and installation of any energy efficient measures, whether eligible for program rebates, in the New Jersey's Clean Energy Program Protocols to Measure Resource Savings but not eligible for rebates, or those measures not included in the New Jersey's Clean Energy Program Protocols to Measure Resource Savings. Data necessary to quantify spillover should be captured through the self-report survey and will include the number and description of non-incented energy efficiency measures purchased and installed since program participation, a rating of the program's influence on the participant's decision, and any information needed to inform an estimate of the energy savings for the measure(s). The self-report survey will include questions similar to the following:

> "Since participating in the Utility DSM program, have you made any energy-efficiency improvements or installed any other energy-efficiency products in your home (or business) that you did NOT receive for free or a program incentive for from PSE&G or another organization? [If yes] Please select the energy-efficient products or improvements that you purchased (and installed, if applicable) since participating in the Utility DSM program. Select all that apply."

The survey will then ask respondents about the level of influence the program participation had on their decision to install the added measures, using a question similar to the following:

> "On a scale from 1 to 5, with 1 meaning not at all important and 5 meaning extremely important, please rate how important your experience with the PSE&G program was in your decision to install this/these energy-efficient products(s)."

Additional measure purchases associated with an "extremely important" program rating will be considered for spillover attribution to the program.

Calculating Participant Spillover

Participant spillover savings is estimated for three categories:

- For program-eligible measures
- For measures in the New Jersey's Clean Energy Program Protocols to Measure Resource Savings but not eligible for incentives for the program in question
- For measures not in the New Jersey's Clean Energy Program Protocols to Measure Resource Savings but for which the IPE Team can provide reasonable documentation of savings

Residential participants should be asked an open-ended question about how they know the added measures they purchased are high efficiency. Commercial participants should be asked measure-specific follow-up questions that provide the IPE with information to determine whether the additional measures they purchased are high-efficiency.

The IPE should also include one open-ended question to both residential and commercial participants to gain further insights on the spillover savings, specifically why they did not apply for a utility program incentive if the added activity was similar to a measure rebated through a utility program.

Upon completion of data collection, the IPE should also conduct brief follow-up interviews with a sample of customers who claimed to install spillover-eligible measures, ensuring appropriate representation across all measure types. The IPE should use these interviews to check the accuracy of customers' self-reported spillover measure installations.

The steps to estimating participant spillover are as follows:

- Calculate total spillover savings for each participant as the product of measure savings and number of units associated with "extremely important" program influence ratings.
- Total the savings associated with each program participant to give the overall participant spillover savings.
- Multiply the mean participant spillover savings for the participant sample by the total number of participants to yield an estimated total participant spillover savings for the program.
- Divide that total participant spillover savings by the total gross program savings to yield a participant spillover ratio to be included in the calculation of the NTG ratio.

Online Marketplace NTG Calculations

A free ridership score was estimated using two components:

- Intention – these questions ask respondents about the likelihood of carrying out the energy-efficient measure without the DSM program's support and results in a score between 0% – 100%.

- Influence – this second line of questions seeks to assess the program's direct influence on the customer's decision to take the energy-efficient action and results in a score between 0% – 100%.

The number of surveys completed was not large enough to estimate free ridership for all measures purchased in the Marketplace. Therefore, we provide estimates for Smart Thermostats and the Marketplace initiative as a whole.

Online Marketplace Free Ridership Esimate

Measure	kWh Weighted FR Score	kW Weighted FR Score
Smart Thermostats	11%	NA
Total Online Marketplace Initiative	16%	21%

Spillover was estimated using the same participant survey and the New Jersey EM&V Guidelines. The table below shows the measures classified as participant spillover because they were purchased by participants, the participants did not receive a rebate for the measure and the participant's experience with the Online Marketplace was extremely influential in their decision to make the purchase.

Online Marketplace Participant Spillover

Measure	Annual kWh savings per unit	Number of units	Total kWh savings
Smart thermostat	142.45	4	569.80
LED bulbs	61.39	4	245.56
Energy Star Refrigerator	59	1	59.00
Total Participant Spillover			**874.36**

The total participant spillover savings were then calculated for the population of Online Marketplace participants.

Online Marketplace Total Participant Spillover Savings (population)

Measure	Participant Spillover (kWh)	Participant Spillover (kW)	Sample N	Population N	Spillover Savings (kWh)	Spillover Savings (kW)
Smart thermostat	874	NA	71	1027	12647.43	NA
Online Marketplace Program	874	0.025	99	1321	11666.96	0.33

The resulting spillover ratio is shown in the table below.

Online Marketplace Spillover Ratio

Measure	Participant Spillover (kWh)	Participant Spillover (kW)	Adjusted Gross kWh	Adjusted Gross kW	Spillover Ratio (kWh)	Spillover Ratio (kW)
Smart thermostat	12,647	NA	258,394	0	0.05	NA
Online Marketplace Program	11,667	0.33	434,100	14.1	0.03	.02

The final NTG (kwh) ratio for smart thermostats and the Online Marketplace program are 0.94 and 0.87 respectively and the NTG (kW) ratio is 0.81 for the Online Marketplace program

Applied Energy Group, Inc.

1377 Motor Parkway, Suite 401

Islandia, NY 11749