Guidehouse
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Appliance Rebates Program Evaluation Report

Evaluation Cycle 1 – Program Year 1

Prepared for:

Atlantic City Electric

atlantic city electric℠
AN EXELON COMPANY

Submitted by:

Guidehouse Inc.
2000 Lenox Drive, Suite 100
Lawrenceville, NJ 08648
609.896.4000

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guidehouse.com

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Abstract

Guidehouse conducted an impact evaluation, process evaluation and net-to-gross study of Atlantic City Electric's Appliance Rebate program for program year 1 (PY 1) (July 1st, 2021-June 30th, 2022). Our evaluation activities in PY 1 primarily focused on developing a robust understanding of the program and the implementer's data collection activities to establish a foundation for future evaluations. We conducted a tracking database review to verify savings calculations and fielded online surveys to gather information on quantity and types of measures installed. The same survey was also used to gather information on process evaluation, net-to-gross and demographics. Additionally, we conducted program staff and implementer interviews to develop a robust understanding of the program. We did not find any concerns with evaluability for the measures in the Appliance Rebates program. All the information we need for evaluation is available in the tracking data. Guidehouse's impact evaluation results and NTG results are summarized below in Table AB-1 and Table AB-2.

Table AB-1: ACE Appliance Rebate Impact Evaluation Results

Type of Savings	FY 2020 Tracked Savings	FY 2020 Evaluated Savings	FY 2020 Realization Rates	FY 2022 Evaluated Savings	FY 2022 Realization Rates
Energy Savings (MWh)	284	364	1.28	300	1.05
Utility Peak Demand Savings (kW)	33	42	1.25	34	1.03

Table AB-2: Net-to-Gross Results

Type	Results
Freeridership	0.54
Spillover	0.04
Net-to-Gross Ratio	0.50

Our impact and process evaluation recommendations are provided in Table AB-3.

Table AB-3: Appliance Rebate Program Recommendations

Evaluation Area	Recommendations
Process	Recommend communicating the logic used to determine the rebate amount and notifying customers if they filled out the rebate application incorrectly. This notification can communicate that incomplete verification documentation will delay check disbursement.
	Consider altering the process to allow digital receipts to reduce the overall burden to the customer.
	Recommend creating an automated mechanism to determine a customer's eligibility to participate in the program before they apply. The automated system should include eligibility screener questions and a link to qualified models.

	Recommend additional training for customer service representatives to be able to respond to program specific questions, or to forward the customer to the most appropriate person.
Impact	Request implementers use the savings algorithms agreed upon by the utilities and signed off by the SWE for calculating savings.
	Conduct QA/QC to ensure quantities for each project are correct on a measure level basis.
	Review algorithms used to calculate savings to ensure that they are in alignment with the protocols agreed upon by SWE and joint utilities.

Executive Summary

Guidehouse conducted an impact evaluation, process evaluation and net-to-gross study for Atlantic City Electric's (ACE) Residential Appliance Rebate program, a sub-program of the Efficient Products Program, for PY 1. This program offers incentives to contractors and residential customers for installing ENERGY STAR certified appliances such as heat pump water heaters, clothes dryers/washers, refrigerators, air purifiers, dehumidifiers, and room air conditioners. The objective of our impact evaluation was to check completeness of the tracking data, its evaluability, and verify the savings calculation methodology used by the implementers. As part of the impact evaluation, Guidehouse conducted a tracking data review and verified installation using online surveys. The tracking database review compared the savings calculated by the implementers with independent calculations conducted by Guidehouse using the New Jersey's protocols.[1] Guidehouse calculated savings using the FY2020 and FY 2022 protocols. Table E-1 below shows the impact evaluation results using the FY 2020 and FY 2022 protocols.

Table E-1: ACE Appliance Rebate Impact Evaluation Results

	FY 2020			FY 2022	
Type of Savings	**Tracked Savings**	**Evaluated Savings**	**Realization Rates**	**Evaluated Savings**	**Realization Rates**
Energy Savings (MWh)	284	364	1.28	300	1.05
Utility Peak Demand Savings (kW)	33	42	1.25	34	1.03

We also compared the results with similar programs offered by other utilities. Results show that ACE's program is smaller compared to other utilities in terms of total program savings and savings per participant. We believe this is because the program is still ramping up.

Guidehouse also put forth several findings and recommendations to improve documentation, data availability and savings calculations. Table E-2 below shows the findings and recommendations from the impact evaluation.

Table E-2: ACE Appliance Rebate Impact Evaluation Findings and Recommendations

Measures Impacted	Finding	Recommendation
Clothes Washers	Implementers currently use deemed savings values from 2020 NJ TRM; Guidehouse aligned savings to 2021 NJ TRM algorithm per the updated Coordinated Measures list.	We recommend aligning savings algorithms to methodologies agreed upon by the utilities.
Clothes Dryers, Clothes Washers, Refrigerators,	Some participants indicated that they bought differing quantities of appliances which were incentivized by the program.	We recommend conducting additional QA/QC of the quantities and incentives paid to each customer.

[1] https://www.njcleanenergy.com/files/file/NJCEP%20Protocols%20to%20Measure%20Resource%20Savings%20Clean.pdf

Measures Impacted	Finding	Recommendation
Air Purifiers, Dehumidifiers		
Dehumidifiers, Room Air Conditioners	Guidehouse noticed some discrepancies between the tracked energy savings and evaluated savings. The source of this discrepancy likely rests in the way implementers' tracking system is set up to calculate savings. We are working with the implementers to correct these differences.	We recommend reviewing the algorithms and inputs to align the savings calculations with the NJ TRM.

For the process evaluation, Guidehouse conducted program staff and implementer interviews to gather information on the delivery, marketing approach, implementation, trade allies and customer outreach. These interviews also provided information on barriers to increasing participation experienced by the program staff and implementers. Guidehouse also conducted online surveys to identify challenges and barriers experienced by customers. Our online surveys included questions on awareness, satisfaction, experience in the program, and measure-related questions. Table E-3 below shows the key findings and recommendations from our process evaluation.

Table E-3: Appliance Rebate Program Process Findings and Recommendations

Finding	Recommendation
Multiple customers (n=9) received rebate checks for incorrect amounts or had not received a rebate check at the time of the survey.	We recommend communicating to program applicants the guidelines used to determine rebate amounts. Notify applicants if they filled out the rebate application incorrectly and that incomplete applications will cause delays in check disbursement.
Many customers (n=13) found the receipt and appliance photo verification process of the application onerous.	Consider altering the process to allow digital receipts to reduce the overall burden to the customer.
Respondents (n=14) reported being inaccurately rejected from the rebate program.	We recommend implementing an automated screening mechanism including a link to a list of qualified models. The screener questions will determine program eligibility prior to application submission.
Customers (n=10) experienced challenges with customer service representatives' lack of program knowledge.	We recommend additional training for customer service representatives to be able to respond to program specific questions or forward the customer to the most appropriate person.

Our surveys also included questions on net-to-gross and demographics. Guidehouse used the survey questions recommended by the SWE to capture net-to-gross and demographic information. Table E-4 below shows the net-to-gross results from this study. The results achieved a relative precision of 6% at 90% confidence level.

Table E-4: Net-to-Gross Results

Type	Results
Freeridership	0.54
Spillover	0.04
Net-to-Gross Ratio	0.50

This program had 1,838 unique participants in PY 1. Out of these, 97% of the participants had usable email addresses. This reduced the evaluation participant pool to 1,796 customers. Guidehouse received 294 survey responses out of which 94 customers did not complete the survey. We believe this high drop-out is due to our questions requesting pictures of receipts or appliances to verify the measure. We plan on addressing this issue of high dropouts in the next evaluation. We used the 170 usable responses to come up with our impact, process and net-to-gross results, findings, and recommendations.

1. Introduction

1.1 Program Description

The Appliance Rebate program was previously administered by the New Jersey Board of Public Utilities (NJ BPU) and was transitioned to ACE on July 1, 2021. This program offers incentives to contractors and residential customers for installing ENERGY STAR certified appliances through a paper or online application. Rebates are paid to the customer once the program team can verify that the appliance meets the program's eligibility requirements. Program measures include Hybrid water heaters, Clothes dryers, Clothes washers, refrigerators, air purifiers, dehumidifiers, and room ACs.

Table 1-1 below provides PY 1 planned program savings and reported savings. The PY 1 population consisted of 1,838 unique customers and a total of 2,163 measures installed.

Table 1-1: PY 1 Program Participation and Reported Savings

Measure	Planned Savings	Reported Savings	Reported Energy Savings as a % of Portfolio Energy Savings
Energy Savings (MWh)	307	284	1%
Peak Demand Savings (kW)	318	33	

Note: The planned savings in the table is estimated based on ACE's planned savings filed for Efficient Products program.

1.1.1 Program Population

As part of our impact evaluation, Guidehouse stratified the population based on measure types. This method of stratification allows for the investigation of savings results from specific measures and provides more focused recommendations. Table 1-2 shows the total number of participants and savings from the program in PY 1.

Table 1-2: PY 1 Appliance Rebates Program Survey Population

Measure Strata	Total Measures	Total Energy Savings (MWh)	Total Peak Demand Savings (kW)
Air Purifiers	157	94	11
Clothes Dryers	296	57	5
Clothes Washers	846	48	4
Refrigerators	643	43	5
Heat Pump Water Heaters	13	22	3
Dehumidifiers	185	19	4
Room Air Conditioners	23	1	1
Total	2,163	**284**	**33**

1.2 Conclusions and Recommendations

Guidehouse had the following conclusions from the PY 1 evaluation:

- Impact Evaluation –
    - Guidehouse recommends implementers align their algorithms with the protocols accepted by NJ utilities and the statewide evaluator. We found some discrepancies between evaluated and reported savings.
        - While the savings for the majority of the dehumidifiers and room air conditioners were found to be accurately calculated, there were many instances where the reported savings appeared to deviate from the standard calculation methodology for this measure. This most commonly, though not exclusively, resulted in an underestimation of energy and demand savings.
    - We recommend more QA/QC to ensure that the quantities of appliances incentivized is accurate.
- Process Improvements
    - Customers appear to be concerned or dissatisfied with some aspects of the application process. For example, some customers stated that they were notified that their application was incomplete or ineligible but were unclear of the reasons why.
    - Guidehouse recommends the implementer improve the application process to improve communication, simplify the process, and increase transparency with the customer. Some of our recommendations include:
        - Automated screening for eligibility.
        - Include a link to qualified appliances eligible for incentive.
        - Notifying customers if their application is incomplete
        - Allowing customers to send digital receipts instead of pictures
    - ACE should also consider additional training for customer service representatives to be able to respond to program specific questions, or to forward the customer to the most appropriate person.

2. Evaluation Analysis

This section presents the results of our PY 1 evaluation. Section 2.1 of this report compares our results with similar utilities. Section 2.2 speaks to the evaluability concerns for this program. Sections 2.3, 2.4 and 2.5 discuss the methodology and results from our impact, process, and net-to-gross studies. Section 2.6 includes our results from cost-effectiveness analysis of this program.

2.1 Benchmarking

This section provides comparison of the evaluation results with similar utilities.

2.1.1 Savings and Realization Rates

Guidehouse compared the savings and realization rates (RRs) of ACE's Appliance Rebates Program with similar programs offered by other utilities. Table 2-1 shows the difference between ACE's savings and realization rates and the savings and realization rates of peer utilities.

Table 2-1: Appliance Rebate Program Impact Evaluation Benchmarking

Utility	Program Size - Gross Reported Energy Savings (MWh)	Reported Energy Savings per Participant (kWh)	Peak Demand Savings per Participant (kW)	Energy RR	Peak Demand RR
Pepco	2,715	488	0.05	0.92	0.95
Delmarva	853	386	0.05	0.98	1.02
ComEd*	58,200	375	0.08	0.97	0.98
DTE	3,700	272	0.12	0.96	0.95
Potomac Edison	2,154	169	0.02	1.04	0.97
SMECO	1,382	156	0.04	0.9	0.42
ACE	**284**	**155**	**0.02**	**1.29**	**1.25**
BGE	9,127	128	0.02	0.95	0.95
PECO*	22,522	NA	NA	0.98	1.05

**ComEd and PECO's reported results for Appliance Rebates programs are bundled with Online Marketplace*

2.1.2 Measure Mix

ACE's Appliance Rebates program offers similar measures as peer utility programs and includes comparable measure eligibility criteria and rebate values to peer utility programs. Table 2-2 shows these results.

Table 2-2: Appliance Rebates Program Measure Mix Benchmarking

Measures Offered by ACE's Appliance Rebates Program	Measures Offered by Peer Utilities
Heat pump water heater ($750)	Heat pump water heater ($350-$700)
Clothes dryer ($300)	Clothes dryer ($40-$75)
Clothes washer ($75)	Clothes washer ($25-$40)
Refrigerator ($75)	Refrigerator ($20-$50)
Air purifier ($50)	Air purifier ($25-$50)
Dehumidifier ($25)	Dehumidifier ($20-$30)
Room AC ($15)	Room AC ($10)

2.1.3 Process Evaluation Results

Table 2-3 below shows the process results of ACE's Appliance Rebates program benchmarked with another similar utility. We note these results are based on a small population and results will likely change as the program gets larger and the survey gets more responses in PY 2.

Table 2-3: Residential Rebates Program Process Benchmarking

Focus Area	ACE (n=130)	Midwestern Utility (n=321)
Program Awareness	Customers became aware of the program mostly through equipment vendors (25%), ACE's website (17%), and in-store product advertisements (10%)	Utility's website (35%), Retail/in-store advertising (25%), bill insert (11%)
Program Satisfaction	Program satisfaction: **4.47** using a 1-5 scale. Dissatisfaction was primarily driven by issues with the application process, specifically approval and rejection notices (n=6) and the complexity of the application (n=1) were the main drivers of dissatisfaction	Program satisfaction: **94%** - using a scale of 0-10 satisfaction is calculated using percentage of applicable responses that rate satisfaction with the program as 6 or higher
Other Satisfaction	Rebates received satisfaction: **4.51** - drivers of dissatisfaction included issues with receiving the rebate (n=3), customer service (n=1), ineligible products (n=1), and check cancellation (n=1)	Rebate satisfaction: **89%**

Barriers	Customers primarily identified issues with product eligibility (n=14), the application form requirements (n=13), and customer service and communication (n=10).	NA

2.1.4 Net-to-Gross

Table 2-4 below shows the results of ACE's Appliance Rebates program benchmarked against other utilities with similar programs. Based on the results, ACE's program has a higher Net-to-Gross ratio (NTGR) primarily due to customers reporting that the rebate influenced their decision to purchase a more efficient measure, which lowered the freeridership score and increased the NTGR.

Table 2-4: Net-to-Gross Results Benchmarked with Other Utilities

Utility	Freeridership	Participant Spillover	NTGR
Atlantic City Electric	0.54	0.04	0.50
Midwestern Utility	0.73	0.05	0.32
Mid-Atlantic Utility	-	-	0.31

2.2 Evaluability

The accuracy and comprehensiveness of program tracking data is critical to conduct an effective evaluation. For PY 1, Guidehouse used the tracking database to obtain contact information for customer surveys and savings calculation inputs (such as equipment capacities, appliance ENERGY STAR numbers, etc.) as part of a basic rigor evaluation. Guidehouse did not find any evaluability concerns with the tracking data and data collection methods used by the implementers.

2.3 Impact Evaluation

2.3.1 Impact Evaluation Overview and Methodology

Guidehouse applied industry-standard methods and approaches to conduct the evaluation as established in the following documents:

- Uniform Methods Project (UMP)[2]
- NJ Coordinated measure list – approved by NJ utilities for estimating savings for PY 1.
- New Jersey's Clean Energy Program Protocols (NJCEP) FY 2020[3] and FY 2022

[2] See Department of Energy, Office of Energy Efficiency and Renewable Energy website at http://energy.gov/eere/about-us/ump-home.

[4] See New Jersey's Clean Energy Program website at https://njcleanenergy.com/files/file/NJCEP%20Protocols%20to%20Measure%20Resource%20Savings%20FY20_FINAL.pdf

To estimate evaluated savings, Guidehouse calculated energy and peak demand savings for the Appliance Rebates Program using FY 2020 and FY 2022 New Jersey protocols. The second set (FY 2022 protocols) included updates recommended by the Technical Reference Manual (TRM) working group.

2.3.1.1 Evaluation Objectives

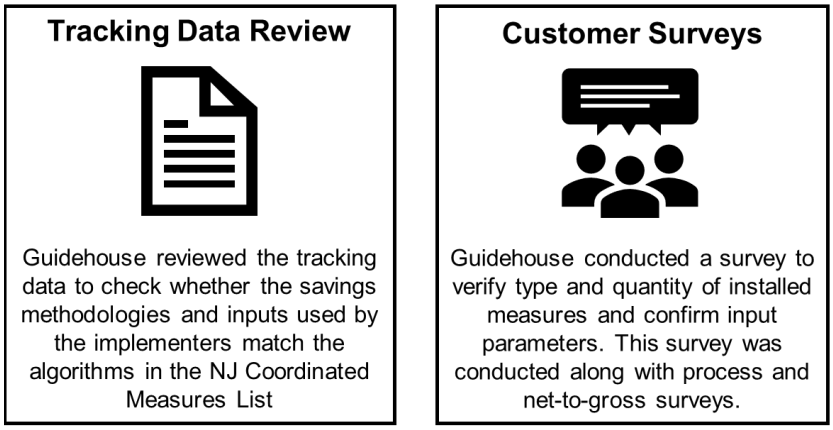
The following are the key objectives this first impact evaluation addresses:

- Review the data being collected by the implementation contractor (IC)
- Establish a smooth process for transfer of tracking data and project files with the aim of streamlining the process for future evaluations.
- Calculate evaluated gross energy and peak demand savings using the agreed savings protocols.
- Calculate savings using new and revised measures developed by New Jersey's TRM working group.
- Highlight areas for the implementation team to improve data collection, estimate savings, etc.
- Highlight gaps or inaccuracies in the savings algorithms.
- Benchmark ACE's program with similar programs implemented by other utilities in the US.

2.3.1.2 Evaluation Methods and Tools

For PY 1, Guidehouse conducted basic rigor impact evaluations of the Appliance Rebates program. The level of evaluation rigor will increase in future program years as ACE programs evolve and mature. Figure 1 below provides an overview of the impact evaluation methods.

Figure 1: Impact Evaluation Methodology for ACE's Appliance Rebates Program



2.3.2 Impact Evaluation Results

2.3.2.1 Program-Level Verified Gross Energy and Peak Demand Savings

Guidehouse calculated two sets of evaluated savings. The first set was based on the FY 2020 protocols discussed and agreed on by ACE and the SWE for the first year of savings calculations. The second set (FY 2022 protocols) included updates recommended by the Technical Reference Manual (TRM) working group. The second set of evaluated savings are only for informational purposes and will not count toward the goals set by the NJ BPU.

The evaluation team calculated savings for rebate-eligible appliances and found that the FY2022 Addendum calculations yielded the same evaluation results as the savings calculated using the methodology specified in the FY2020 New Jersey Protocols. Table 2-5 and Table 2-6 show the program-level savings and realization rates using FY 2020 and FY 2022 NJ Savings Protocols, respectively.

Table 2-5: FY 2020 Appliance Rebate Program Calculated Savings

Program	Tracked Energy (MWh)	Tracked Peak Demand (kW)	Evaluated Energy FY 2020 (MWh)	Evaluated Peak Demand FY 2020 (kW)	FY 2020 Energy RR	FY 2020 Peak Demand RR
Residential Rebates	284	33	364	42	1.28	1.25

Table 2-6: FY 2022 Appliance Rebate Program Calculated Savings

Program	Tracked Energy (MWh)	Tracked Peak Demand (kW)	Evaluated Energy FY 2022 (MWh)	Evaluated Peak Demand FY 2022 (kW)	FY 2022 Energy RR	FY 2022Peak Demand RR
Residential Rebates	284	33	300	34	1.05	1.03

2.3.2.2 Measure-Level Verified Gross Energy and Peak Demand Savings

Table 2-7 and Table 2-8 show the measure-level savings and realization rates using FY 2020 and FY 2022 NJ Savings Protocols, respectively. The FY 2020 and FY 2022 realization rates are calculated relative to the reported energy and peak demand savings.

Table 2-7: FY2020 Appliance Rebate Program Measure Level Calculated Savings

Measure	Measure Counts	Ex Ante Energy (MWh)	Ex Ante Peak Demand (kW)	Ex Post Energy FY2020 (MWh)	Ex Post Peak Demand FY2020 (kW)	Energy RR	Peak Demand RR
Clothes Dryers	296	57	5	57	5	0.99	0.99

Measure	Measure Counts	Ex Ante Energy (MWh)	Ex Ante Peak Demand (kW)	Ex Post Energy FY2020 (MWh)	Ex Post Peak Demand FY2020 (kW)	Energy RR	Peak Demand RR
Clothes Washers	846	48	4	126	12	2.63	2.77
Refrigerators	643	43	5	43	5	1.00	1.00
Air Purifiers	157	94	11	94	11	1.00	1.00
Dehumidifiers	185	19	4	21	5	1.11	1.11
Room Air Conditioners	23	1	1	1	1	1.25	1.28
Heat Pump Water Heaters	13	22	3	22	3	1.00	1.00

Table 2-8: FY2022 Appliance Rebate Program Measure Level Calculated Savings

Measure	Measure Counts	Ex Ante Energy (MWh)	Ex Ante Peak Demand (kW)	Ex Post Energy FY2022 (MWh)	Ex Post Peak Demand FY2022 (kW)	Energy RR	Peak Demand RR
Clothes Dryers	296	57	5	57	5	0.99	0.99
Clothes Washers	846	48	4	126	12	2.63	2.77
Refrigerators	643	43	5	43	5	1.00	1.00
Air Purifiers	157	94	11	29	3	0.31	0.31
Dehumidifiers	185	19	4	21	5	1.11	1.11
Room Air Conditioners	23	1	1	1	1	1.25	1.28
Heat Pump Water Heaters	13	22	3	22	3	1.00	1.00

2.3.3 Key Findings and Recommendations

2.3.3.1 Recommendation Summary

Table 2-9 represents the Guidehouse evaluation team's impact findings and recommendations.

Table 2-9: Appliance Rebate Program Impact Findings and Recommendations

Measure Type(s)*	Finding	Recommendation
CW	Implementers currently use inputs from an older version of the TRM. Guidehouse aligned savings to 2021 NJ TRM algorithm per the updated Coordinated Measures list.	We recommend implementers review their algorithms and tracking system to align savings calculation methods approved by utilities and SWE.

CD, CW, Ref, AP, Dehums	A small number of customers indicated that they had purchased differing appliance quantities than what was listed in the tracking data. Customers affected by this finding - 2 CD, 2 CW, 1 Ref, 1 AP, 2 Dehums.	Recommend doing additional QA/QC of projects and incentives to ensure accurate measure quantities.
Dehums, RAC	Guidehouse noticed some discrepancies between the tracked energy savings and evaluated savings. The source of this discrepancy likely rests in the way implementers tracking systems are set up to calculate savings. We are working with the implementers to correct these differences.	Recommend analyzing current database algorithms for the measure to ensure all individual measure calculations are in alignment.

** CW – Clothes Washers, CD – Clothes Dryers, Ref - Refrigerators, AP – Air Purifiers, Dehums – Dehumidifiers, RAC – Room ACs*

2.4 Process Evaluation

2.4.1 Process Evaluation Overview and Methodology

Guidehouse reviewed the program materials and tracking database, surveyed customers, and interviewed program implementors and program managers to identify areas for improvement and barriers to participation.

2.4.1.1 Process Evaluation Objectives

The objective of the process evaluation is to better understand what is going well and what could be improved in the program. The SWE's guidance for such programs recommends conducting a process evaluation with the objectives outlined in Table 2-10. Guidehouse used the guidance provided by the SWE to define the objectives for this process evaluation.

Table 2-10: Process Evaluation Objectives

Overall Objective	Detailed Objectives
Document changes from NJ BPU to IOU	Document what changes occurred in the program implementation and what stayed the same when the IOU began implementing the program.
Participation Metrics	Document participation rate, closing rate, project completion rate, number of participants, partial participants and, where possible, compare with NJ BPU management.
End-user satisfaction	Satisfaction with all key steps and elements of the program process by end users, reasons for participation, challenges to participation, decision-making, reasons for adoption or rejection of recommended measures, and suggestions to address challenges and barriers.
Program staff satisfaction	Satisfaction with the back-office processes by the implementation team; cycle time findings for back-office processes.
Implementation team satisfaction	Satisfaction with all key steps and elements of the program processes by market actors involved in program delivery and for market actors involved in NJ BPU period request assessment of any differences, their reasons for being

	in the program, challenges to participating in the program, access to products, reasons for recommending services and products, comparison of experiences prior to and during program, and suggestions to address challenges and barriers.
Challenges	Document any difficulties with program-related efficiency products from end user and implementation team perspectives such as availability, quality of materials, installation, quality of product, waiting times, etc. Differentiate COVID-19-related causes where possible.

2.4.2 Process Evaluation Results

Table 2-11 presents the participant survey disposition. The survey response rate (9.5%) was in part impacted by the short evaluation timeframe. Additionally, our survey started off with verification questions and required the customer to submit a picture of the appliance name plate or receipt to verify installation. About 94 out of 294 customers dropped out of the survey at this question. We believe the customer may have found it difficult to locate the receipt or take a picture of the appliance nameplate resulting in high drop out. We will adjust the verification approach for PY 2.

Table 2-11: Appliance Rebates Participant Survey Disposition

Description	Count
Unique participants	1,838
Unique participants with emails	1,796
Survey responses	294
Dropouts	94
Screen outs	30
Usable responses	170
Response rate	9.5%

Note: Screen outs refer to customers that could not provide information on their participation in the program and dropouts consist of customers that did not move past the question asking for pictures of their appliance nameplate. Usable responses are the total number of surveys completed minus screen outs and dropouts.

The remaining sections provide the process evaluation survey results by topic.

2.4.2.1 Program Satisfaction

Customers that responded to the survey (n=170) were generally satisfied with ACE's Appliance Rebate program, providing an average satisfaction score of 4.47 using a scale of 1-5, where 1 is extremely dissatisfied and 5 extremely satisfied. Issues with the application process, specifically

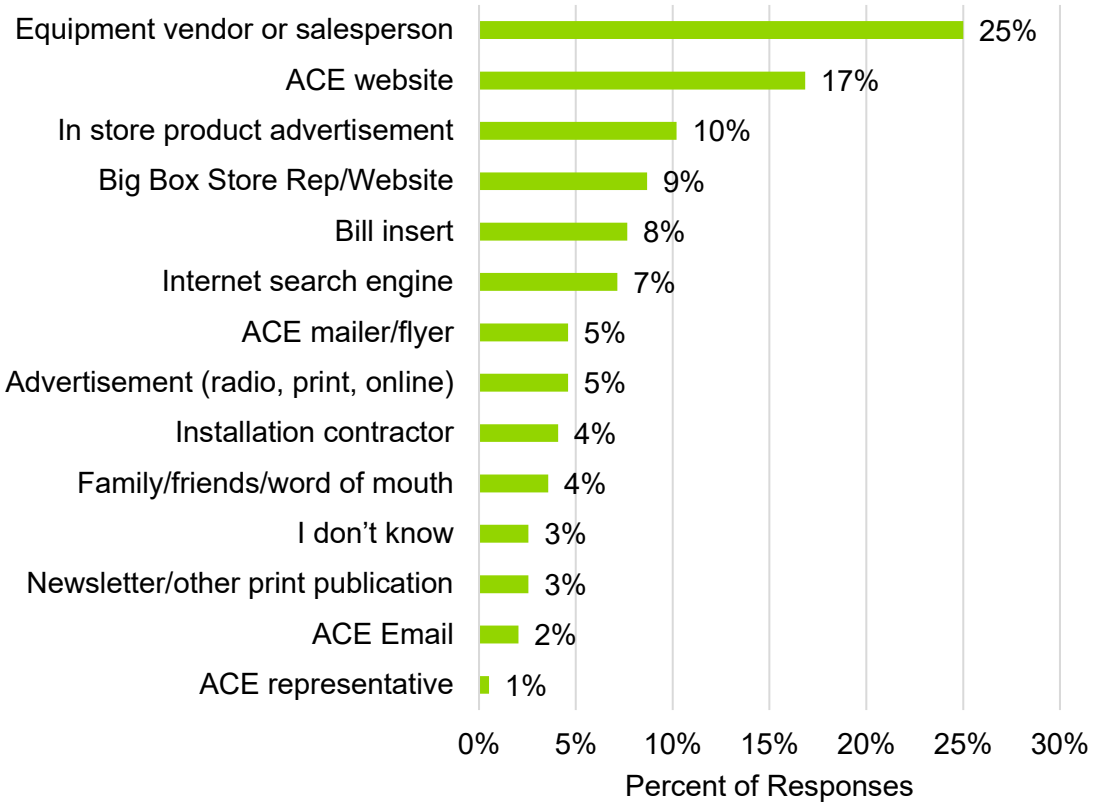
approval and rejection notices (n=6) and the complexity of the application (n=1) were the main drivers of dissatisfaction. Responses are based on a 0-10 scale and calculated using the percentage of applicable responses that rate satisfaction with the program as 6 or higher. A similar appliance rebate program in the mid-west had a satisfaction score of 94%.

In PY 2, Guidehouse will implement a 9-point satisfaction scale to better assess customer's sentiment on the above mentioned factors.

2.4.2.2 Program Implementation

Customers reported primarily learning about the program through the energy equipment salesperson (25%), ACE's website (17%), and in store product advertisements or stickers on products (10%). Methods that were least reported by customers included learning about the program through an ACE representative (1%), ACE email (2%), and newsletters and other print publications (3%). Other benchmarked programs had similar top awareness channels; DTE's website (35%), retail/in-store advertising (25%), DTE bill insert (11%).

Figure 2: Appliance Rebate Program Awareness (n=196)[4]



Guidehouse also found that respondents were generally satisfied with the rebate received through the program, providing an average satisfaction score of 4.51. Drivers of dissatisfaction included issues with receiving the rebate (n=3), customer service (n=1), ineligible products

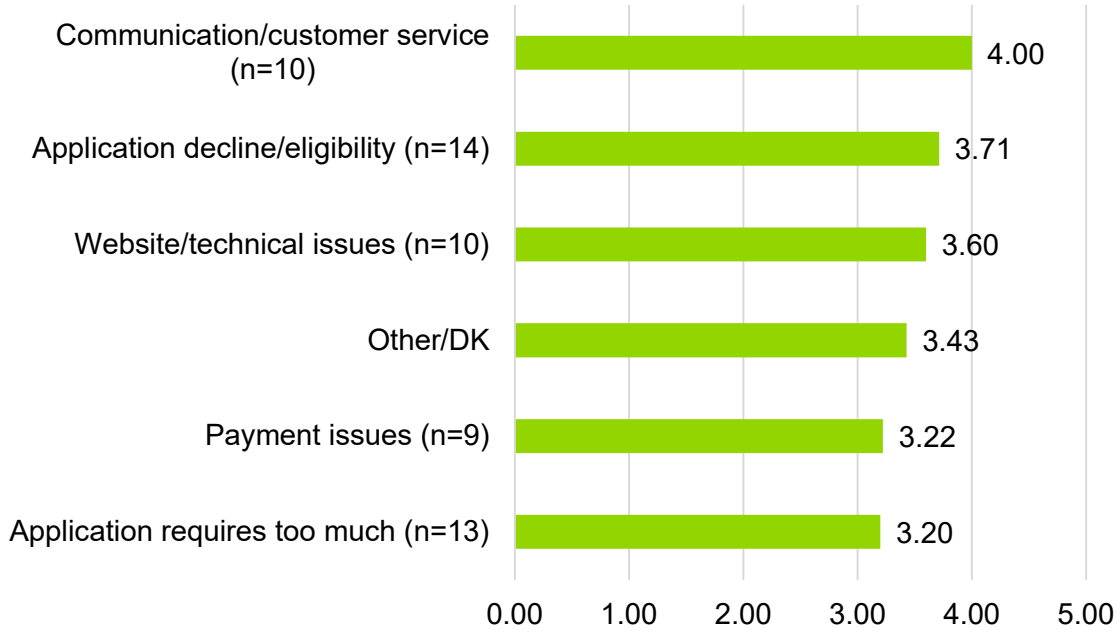
[4] Customers were allowed to provide multiple responses to the question, "How did you learn about ACE's Appliance Rebate Program? Select all that apply.", which is why the n value is higher than the number of respondents.

(n=1), and check cancellation (n=1). A similar rebate program in the mid-west had a satisfaction score of 89% with the rebate.

2.4.2.3 Challenges

Customers had issues with communication and customer service (n=10), application eligibility (n=14), payment issues (n=9), the application form requirements (n=13), and the website (n=10). Over half (n=6) of customers that identified communication and customer service as a barrier (n=10) rated this challenge as extremely serious with an average score of 4.0 out of 5, identifying customer service representatives' lack of knowledge about the program as a primary challenge. Additionally, customers were frustrated by the application process and lack of communication of program requirements, providing an average score of 3.71 out of 5 in terms of severity, as outlined in Figure 3. ACE may consider improving customer service representatives' knowledge of the program and clearly communicating the requirements and process to customers to help mitigate challenges in the future.

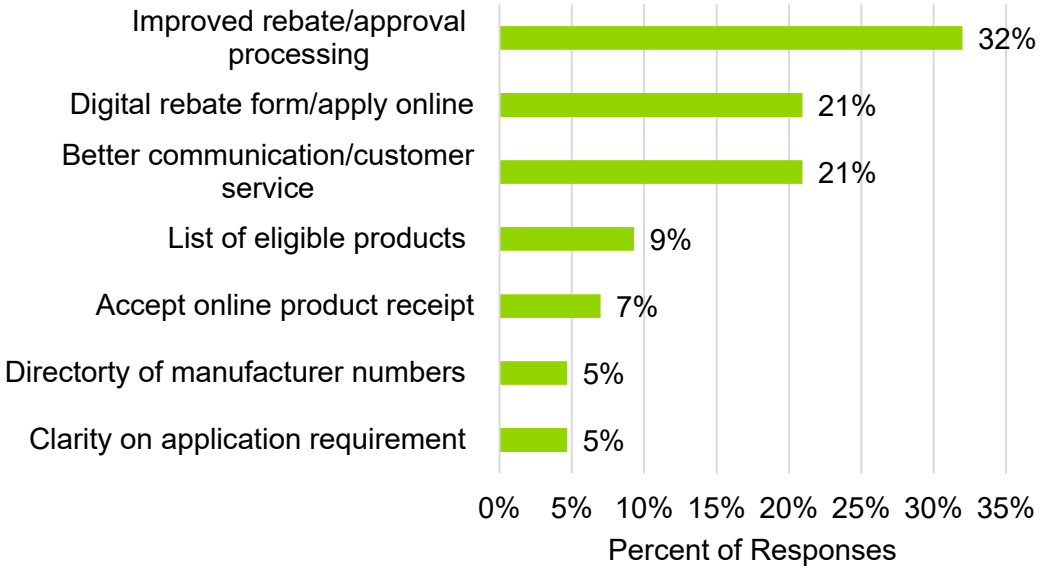
Figure 3: Appliance Rebate Program Challenges and Barriers Severity Ratings



Note: The 1-5 scale represent the severity of the challenge or barrier experienced by the customer. One represents not at all serious and 5 represents a very serious challenge as perceived by the customer.

Figure 4 shows the solutions that could help mitigate some the challenges experienced by the program. Customers stated that improved rebate and approval processing (n=14), an online application or digital rebate form (n=9), improved communication from ACE (n=9), and a list of eligible products (n=4) are some of the key solutions that would help mitigate challenges.

Figure 4: Appliance Rebate Program Solutions



2.4.3 Key Findings and Recommendations

Table 2-12 shows the findings and recommendations from the Process evaluation.

Table 2-12: Appliance Rebate Program Process Findings and Recommendations

Finding	Recommendation	Impact
Multiple customers (n=9) received rebate checks for incorrect amounts or had not received a rebate check at the time of the survey.	We recommend communicating to program applicants the guidelines used to determine rebate amounts. Notify applicants if they filled out the rebate application incorrectly and that incomplete applications will cause delays in check disbursement.	Improve satisfaction, Transparency
Many customers (n=13) found the receipt and appliance photo verification process of the application onerous.	Consider altering the process to allow digital receipts to reduce the overall burden to the customer.	Reduce customer burden
Respondents (n=14) reported being inaccurately rejected from the rebate program.	We recommend implementing an automated screening mechanism including a link to a list of qualified models. The screener questions will determine program eligibility prior to application submission.	Improve satisfaction
Customers (n=10) experienced challenges	We recommend additional training for customer service representatives to be	Improve satisfaction,

with customer service representatives' lack of program knowledge.	able to respond to program specific questions or forward the customer to the most appropriate person.	increase participation

2.5 Net-to-Gross Evaluation

The objective of the net-to-gross research is to better understand how the Residential Rebates program influenced the customer to participate in efficiency upgrades and what portion of the savings can be attributed to the program. This research is also an opportunity to provide recommendations on the methodology used to determine the program's net-to-gross ratio.

2.5.1 Net to Gross Data Collection Methodology

Guidehouse used the self-report method to calculate NTG ratios and net savings by estimating freeridership and spillover in a single survey. The battery utilized is referenced in the NJ EMV Guidelines-NTG Triennium 1 documentation provided by the SWE, however, Guidehouse experienced some challenges when applying this methodology.

2.5.1.1 Deviations from SWE's Guidance

Guidehouse experienced two challenges in implementing SWE's guidelines and made adjustments that based on our experience with NTG studies:

- Challenges in determining how factors such as timing and efficiency were applied to the final freeridership ratio. In absence of this guidance, Guidehouse took an average of all scores to determine the intention score.
- The spillover calculations and the description provided were inconsistent. Guidehouse determined that the description was most accurate and decided against using the proposed calculations when determining spillover.

2.5.2 Net-to-Gross Results and Key Findings

Guidehouse found a freeridership value of 0.54 and participant spillover of 0.04, which produces a NTG ratio (NTGR) of 0.50 (see Table 2-13), which was calculated at ± 6% at a 90% confidence level.

Table 2-13: Program Year 2021 Appliance Rebate Program NTGR

Freeridership	Participant Spillover	NTGR
0.54	0.04	0.50

Freeridership was driven by customers stating that they already had plans to purchase the same measure before learning about ACE's program and wouldn't have changed their behavior. Here are some comments from the customers that point to freeridership:

- *"Our other washer broke so we needed one regardless of the rebate. But once we learned of the rebate program it was nice to be rewarded for making an energy efficient purchase that we didn't know existed prior."*

- *"Purchase of the refrigerator was necessary, and the rebate was a happy coincidence."*

Conversely, some customers were influenced by the program to buy a more efficient measure. Here are some comments from customers that indicate they were influenced by the program to go for a more efficient appliance:

- *"The rebate made a big difference in deciding which model to purchase to help offset some of the cost"*

- *"a rebate definitely encouraged me to choose the efficient model."*

Spillover was driven entirely by three respondents purchasing a combined 84 LEDs, and one respondent purchasing two mini splits. These customers stated that the program was very influential in their decision to purchase additional items outside of the program.

Guidehouse also calculated measure-specific free ridership value (see Table 2-14). Most of the measures had comparable freeridership except heat pump water heaters, which had a freeridership score of 0.0, and room air conditioners, which had a high freeridership score (0.97).

Table 2-14: Program Year 2021 Appliance Rebate Program Measure Level NTGRs

Measure	Number of Responses	Freeridership
Heat Pump Water Heaters	3	0.00
Air Purifiers	20	0.64
Clothes Dryers	28	0.64
Refrigerators	67	0.65
Dehumidifiers	24	0.66
Clothes Washers	59	0.68
Room Air Conditioners	2	0.97

2.6 Cost Effectiveness

Guidehouse collected adequate data to support a portfolio-wide cost effectiveness analysis for this program and adhered to the New Jersey Cost Test (NJCT). The NJCT was developed as

the primary test to evaluate the benefits and costs of EE and PDR programs established in the state pursuant to the Clean Energy Act (CEA) during the first three-year program cycle, starting with PY 1 on July 1, 2021, and running through the end of program year 3 (PY3) on June 30, 2024.

For PY 1, the program costs available to Guidehouse were aggregated for all Efficient Products programs combined. Costs were not disaggregated by sub-program (i.e., Appliance Rebates, Residential HVAC, Appliance Recycling, etc.). Therefore, Guidehouse calculated cost effectiveness for all Efficient Products programs grouped together as a single program.

Guidehouse calculated six cost tests for ACE's Efficient Products program, including the New Jersey cost test as defined in New Jersey BPU Order 8A[5]. Administrative costs were not tracked by sub-program in a manner that allowed for sub-program level cost testing. The Appliance Rebates sub-program contributed 3.83% of the Efficient Products program's NJCT benefits. Cost test results presented in Table 2-15 and Table 2-16 were calculated using net ex-post savings. The Efficient Products program achieved a NJCT ratio above 1.0.

Table 2-15: Net Efficient Products Program Cost Test Results

Program	NJCT	PCT	PACT	RIMT	TRCT	SCT
Efficient Products	2.49	14.99	0.80	0.22	0.85	1.03

Table 2-16: Efficient Products Program NJCT NPV Benefits and Costs

Program	NPV Benefits ($1,000)	NPV Costs ($1,000)	Net Benefits ($1,000)
Efficient Products	$6,866	$4,820	$4,110

[5] https://www.state.nj.us/bpu/pdf/boardorders/2020/20200824/8A%20-%20ORDER%20New%20Jersey%20Cost%20Test.pdf

Appendix A. Survey Verification

Guidehouse used participant contact information from the program tracking data to conduct online participant surveys. Guidehouse emailed survey invitations to a census of ACE's Appliance Rebates program participants with valid contact information.

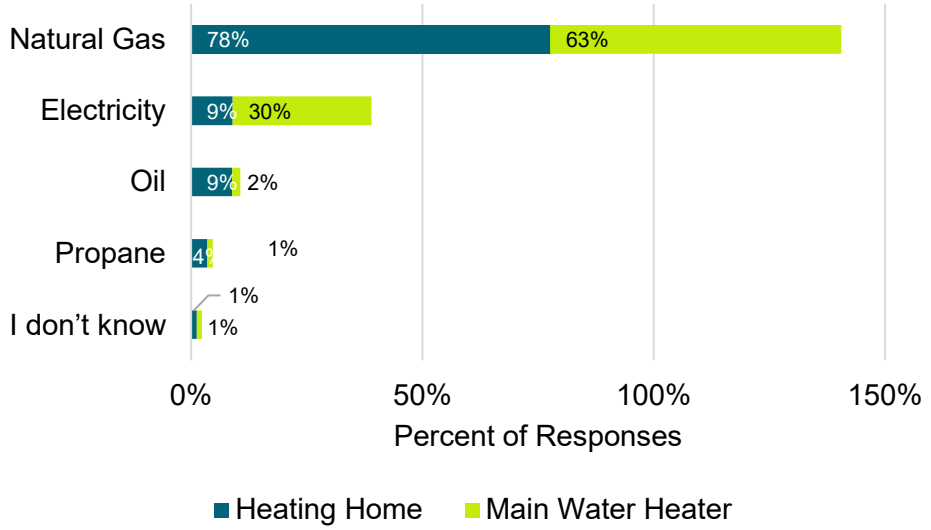
The participant survey included impact and process related questions. The statewide net-to-gross (NTG) battery of questions approved by the SWE were added to this survey and adjusted where necessary to match the specifics of the Appliance Rebates program. For the first year, the impact questions were high level with the goal of verifying installation, quantities, and model numbers.

A.1.1 Survey Demographics

The overwhelming majority of survey respondents (99%) own their own home, with 87% indicating a single-family dwelling. Other home types include apartment (5%), duplex (3%), row home (3%), and mobile home or other (2%), as seen in Figure 5. Additionally, most homes (80%) were reported as 3,000 square feet or less, with roughly 12% reporting a square footage of 3,000 square feet or larger[6].

Survey respondents are primarily heating their home with natural gas (78%) or electric (9%). Similarly, natural gas is the most common fuel being used to heat their water (63%), followed by electric (30%). These results are shown in Figure 5.

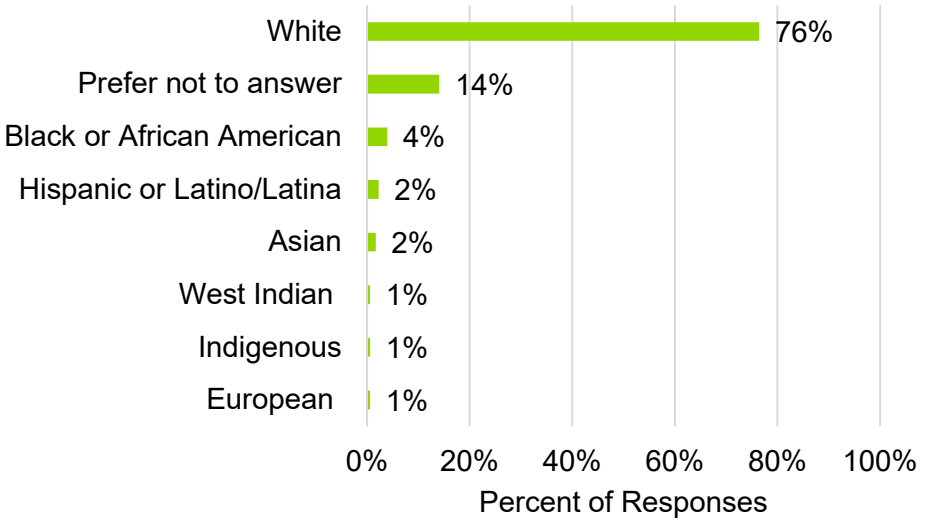
Figure 5: Fuel Type for Home and Water Heating



Shown in Figure 6, survey respondents are primarily identifying as white (76%) or black or African American (4%). Fourteen percent of customers preferred not to answer this question. Respondents overwhelmingly reported that English was the primary language spoken at home (95%), with less than 1% reporting Vietnamese.

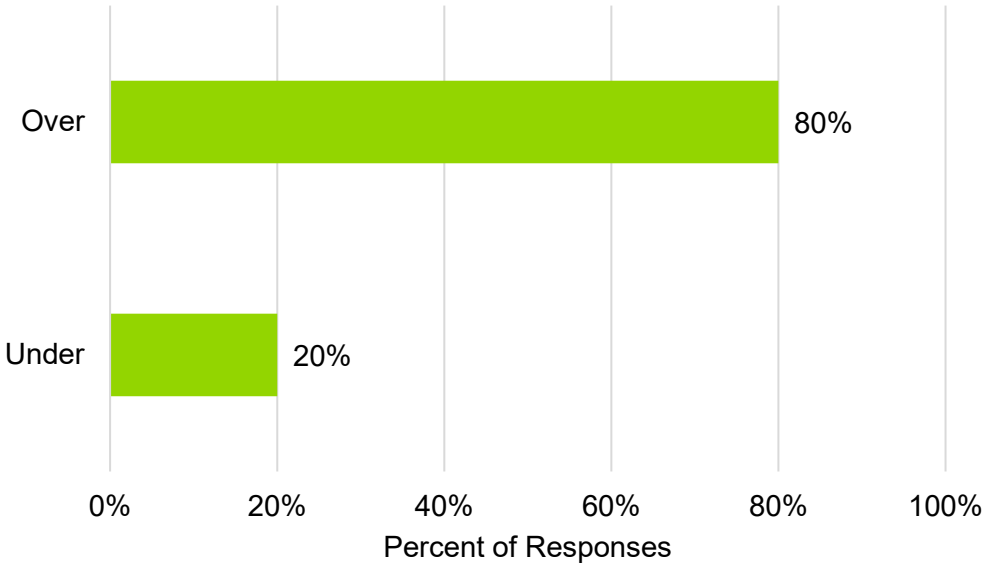
[6] Seven percent of respondents did not know the square footage of their home.

Figure 6: Survey Respondent's Race



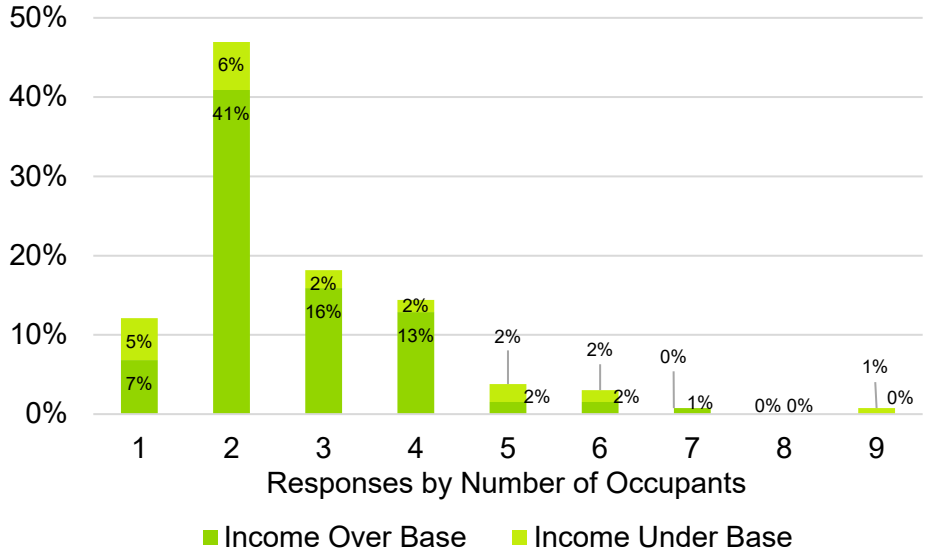
Most respondents (93%) reported between one and four occupants in the home. When asked about annual household income levels, 80% of customers reported their income was over 250% of the federal poverty guidelines, as shown in Figure 7.

Figure 7: Income Status Relative to 250 Percent of Federal Poverty Guidelines



Customers who reported one or two occupants in their household were the most likely to report their income was under the 250% of the federal poverty guidelines. These results are shown in Figure 8.

Figure 8: Income Status (Over or Under) by Stated Occupancy



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