New Jersey Residential Appliance Saturation Survey

Final

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SUBMITTED TO:
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Abstract

Rutgers, the State University of New Jersey, and the New Jersey Board of Public Utilities (BPU) contracted with NMR to implement a Residential Appliance Saturation Survey (RASS) for the state of New Jersey. The objective of the study was to document current saturations, efficiency levels, and usage behaviors associated with energy consuming equipment and features of single-family and two- to four-unit multifamily residences.

NMR completed a multimedia self-report survey of 1,251 homes with a nested sample of 70 on-site surveys. The surveys asked homeowners and tenants to provide information related to energy consuming equipment in their homes, including heating, cooling, water heating, appliances, consumer electronics, distributed energy systems, and electric vehicles. The on-site surveys included verification of the self-reported data and collected data on lighting and building shell. NMR implemented the survey in 2023.

The study provided statewide results weighed proportionally across electric utility service areas, as well as results by overburdened community status, income levels, and energy-efficiency program participation history. The results of this study can inform the basis from which utility energy-efficiency programs claim savings; support the assessment of demand-side resource potential; and aid in the development of market intervention strategies.

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Acronyms

Acronym	Definition
AC	Air Conditioner
ACE	Atlantic City Electric
AFUE	Annual Fuel Utilization Efficiency
ASHP	Air-Source Heat Pump
BPU	New Jersey Board of Public Utilities
BTU	British Thermal Unit
BTUh	British Thermal Units per Hour
CAC	Central Air Conditioner
CEP	New Jersey Clean Energy Program
CFA	Conditioned Floor Area
CFL	Compact Fluorescent Lamp
DHW	Domestic Hot Water
EDC	Electric Distribution Company
EE	Energy efficiency
EER	Energy-Efficiency Ratio
EF	Energy Factor
E'Town	Elizabethtown Gas
EUL	Effective Useful Life
EV	Electronic Vehicle
GDC	Gas Distribution Company
GIS	Geographic Information System
GSHP	Ground Source Heat Pump
HPWH	Heat Pump Water Heater
HSPF	Heating Season Performance Factor
HVAC	Heating Ventilation and Air Conditioning
IECC	International Energy Conservation Code
JCP&L	Jersey Central Power & Light
kW	Kilowatt
kWh	Kilowatt Hour
LED	Light-Emitting Diode
LMI	Low- to Moderate-Income
Low-E	Low-Emissivity
MSHP	Mini or Multi-Split Heat Pump (commonly referred to as a ductless mini-split)
MUNI	Municipal electric utilities
MWh	Megawatt Hour
NJNG	New Jersey Natural Gas
NMR	NMR Group, Inc.
Non-OBC	Non-Overburdened Community
OBC	Overburdened Community
PSE&G	Public Service Electric & Gas
PV	Photovoltaic
RAC	Room Air Conditioner

Acronym	Definition
RASS	Residential Appliance Saturation Survey
RECO	Rockland Electric Company
RECS	Residential Energy Consumption Survey
R-value	A measure of material's resistance to the flow of heat
SEER	Seasonal Energy-Efficiency Ratio
SJG	South Jersey Gas
SWE	Statewide Evaluators
TRM	Technical Reference Manual
UEF	Uniform Energy Factor
U-Factor	Measure of the rate of heat transfer of a window or other glazing

Executive Summary

This report presents results of the Residential Appliance Saturation Survey (RASS) in 2023 for the state of New Jersey. Rutgers, the State University of New Jersey, contracted with NMR to conduct a comprehensive multimedia survey of New Jersey residences. The objective of the survey was to characterize the existing building stock of single-family homes and two- to four-unit multifamily buildings in New Jersey through a representative sample of all homes in the state.

This report presents saturation, efficiency, and usage behaviors for the following measures:

- Appliances
- Consumer electronics
- Building shell characteristics
- Air and duct sealing
- Heating, ventilation, and air conditioning (HVAC) equipment and controls
- Domestic hot water (DHW) systems
- Lighting

NMR surveyed 1,251 homeowners with a nested sample of 70 on-site visits. Including on-site visits and respondents who submitted photos of equipment through the survey, the study collected verified photo data for 838 respondents (67%). The sample was stratified by Electric Distribution Companies (EDCs) and overburdened community (OBC) status. Results for Gas Distribution Companies (GDCs) were determined through a post-stratification process. NMR developed weights based on Census data for occupied housing units in New Jersey to ensure study results accurately represent the households in single-family housing units across the state.

The report describes high-level methodology and findings; appendices provide additional details:

- Overburdened Community Status
- Income Levels
- Electric and Gas Utility Service Area
- Energy-Efficiency Program Participation
- Climate Zone

In addition to this report, NMR developed a well-documented and user-friendly database available for the New Jersey Evaluation, Measurement, and Verification Working Group.

Key Findings

The homes in this study were primarily detached single-family homes (75%), followed by attached single-family (15%) and two- to four-unit multifamily buildings (10%).[1] The average size of detached homes was close to 2,000 square feet. As most homes were detached single-family homes, the average size of all homes in the sample was about 1,900 square feet. Statewide, 40% of homes were built prior to 1960 and 13% of homes were built after 2000.

The study highlights differences in penetration and efficiency of equipment and appliances for low- or moderate-income households and residents of overburdened communities (OBCs) to identify any opportunities for these communities. OBCs are defined by the New Jersey Department of Environmental Protection as areas exposed to a disproportionate amount of environmental health impacts. The sample design accounted for OBCs; 43% of homes in the study were located in an OBC and the remainder located in non-overburdened communities (non-OBC). The study also asked participants to self-report their income:

- One-quarter (25%) were low-income (LIHEAP-eligible based on their household size)
- 17% were moderate-income (above LIHEAP but eligible for the Payment Assistance for Gas and Electric Program)
- 32% were neither moderate nor low-income (non-LMI)
- 17% did not disclose their income status[2]

Nearly all of the census blocks in New Jersey designated as OBCs (92%) qualified due to the racial composition of the population, while 40% of the OBCs qualified due to income. Census blocks are designated an OBC if they meet at least one of the following criteria: 1) at least 35% of the households are low-income; 2) at least 40% of the residents identify as a member of a minority group or a state-recognized tribal community; 3) at least 40% of the households have limited English proficiency.[3] Among survey respondents, 32% of households in OBCs are low-income (compared to 18% of non-OBCs) and 31% have at least one member identifying as a racial or ethnic minority, compared to 11% of households in non-OBCs. Results are presented by OBC status and income throughout the report to identify any potential opportunities for policies or programs to relieve the energy burden on low-income households and communities with environmental health disparities.

Furnaces and boilers are the dominant primary heating system type in New Jersey, with nearly 85% of existing homes being primarily heated by one of these system types. Air-source heat pumps (ASHPs) and geothermal heat pumps (GSHPs) combined only represent 2% of primary heating equipment.

Natural gas is the most common fuel source for primary heating equipment, heating nearly three-quarters of homes statewide (70%), and 10% of homes are primarily heated by

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[1] Weighted; unweighted, 87% of homes were single-family detached. As discussed in the Methodology, the study had difficulty reaching multifamily two- to four-unit homes because the third-party property database that was purchased in the absence of utility customer data lacked unit numbers for most buildings.
[2] See Section 2.9.2 for additional details on income classifications.
[3] https://dep.nj.gov/ej/communities/

electricity. Natural gas is the primary fuel used in furnaces (92%) followed by oil (7%), with little variation by OBC and income status. Boilers are also primarily fueled by natural gas (71%) but over one-quarter use oil (27%). Boilers found in non-OBC homes and low-income households are more likely to use oil. In addition, low-income, and moderate-income households are significantly more likely to have electric primary heating systems than non-low-income households (14% and 16% vs. 6%). For homes with electric heat, electric resistance heating equipment is more common than heat pumps in all income categories, with low-income homes having the fewest heat pumps.

The average efficiency for furnaces is 87.8 AFUE (median efficiency of 90.5 AFUE), and nearly half of furnaces (47%) met minimum ENERGY STAR qualifications at the time of manufacture. The median efficiency of furnaces suggests that a large proportion of furnaces observed in this study were condensing, or high-efficiency furnaces. This could have implications on whether the assumption of minimum federal efficiency requirements (80 AFUE), which are used as baseline conditions for equipment that is replaced on failure in the New Jersey TRM, are the most appropriate to estimate savings, as 51% of furnaces were over 90 AFUE (of furnaces with available efficiency data). Additional analysis on efficiencies of equipment that were manufactured in 2021 and later show that 70% of newer furnaces were over 90 AFUE, well beyond the baseline efficiency of 80 AFUE. The average efficiency for boilers is 84.9 AFUE, the median efficiency is 83.5 AFUE, and only two in five boilers met the minimum ENERGY STAR qualifications at the time of manufacture.

Nearly one-half of boilers (46%) and one in five furnaces (18%) are more than 20 years old. There was little variation in furnace age between OBC and non-OBC homes. However, boilers in non-OBC homes had a higher average age (24 years vs. 14 years) and median age (21 vs. 17) compared to OBC homes. The statewide average age of furnaces is 12.4 years, and the median age is 10.5 years. The statewide average age of boilers is 20 years, and the median age is 19 years. Both furnaces and boilers have an EUL of 20 years. Given that EUL indicates the median age of equipment, the ages of furnaces in this study suggest that the EUL may be higher than what is occurring in the field, while the boiler EUL is close to current EUL expectations.

Nearly all homes have a central air conditioner, room air conditioner, or heat pump (96%). Central air conditioners (68%) and room air conditioners (23%) are the most common types of primary cooling systems. Homes in OBCs were significantly less likely to have a central air conditioner (56% vs. 77%) and significantly more likely to have a room air conditioner (37% vs. 12%) compared to non-OBC homes. A similar trend was observed based on income-status. Low-income households were significantly less likely to have a central air conditioner (44% vs. 75% and 82%) and significantly more likely to have a room air conditioner (48% vs. 16% and 10%) than moderate and non-LMI households. Fewer than 3% of homes, statewide, use heat pumps as their primary cooling system. The average cooling efficiency for permanent equipment was 13.8 SEER, driven by the prevalence of central air conditioners, which were less efficient than heat pumps. (13.2 SEER vs. 19.0 EER).

Of the 71% of homes with a central cooling system (central air conditioner or central heat pump), 8% of these homes currently have a supplementary cooling system (room air conditioner or MSHP) installed. As many as 31% to 35% of homes with central cooling systems are not adequately cooled by existing equipment. One-third of central air conditioners are older than 15 years, and 12% of homes have duct systems but no central cooling. This represents an opportunity to install more efficient central systems, such as heat pumps, in these homes. Low-income households were more likely to have homes with duct systems but no central cooling (24%) than moderate (7%) and non-LMI (5%) households.

From 2020 to 2023, 9% of homes installed cooling equipment to cool an area of the home not previously cooled. Over half of the room air conditioners (52%) and 75% of the mini-split heat pumps installed after 2020 added cooling load. The majority of central air conditioner and central heat pump installations since 2020 replaced a previously installed cooling system (84% and 88%).

Heat pump awareness is relatively low (33%) and most of those respondents do not have positive or negative opinions about heat pumps. Among respondents who are aware of heat pumps, 33% agreed that heat pumps can save them money on their energy bills, 32% agreed that heat pumps can provide enough heat, and 26% agreed that they cool as well as or better than other cooling systems. Increasing consumer education about the benefits of heat pumps is key to encouraging the adoption of the technology.

Programmable thermostats were the most common thermostat type found in homes statewide (49%), followed by manual (40%) and then smart thermostats (31%). While smart thermostat market penetration lags behind programmable thermostats, the data suggests smart thermostats are being adopted in New Jersey. The penetration of smart thermostats was higher than observed recently in Pennsylvania (15%), though there is a higher penetration of homes that primarily use electric baseboard heating systems with manual thermostats in Pennsylvania.

Statewide, natural gas was the most common fuel used for water heating, accounting for 84% of water heaters, followed by electricity at 13%. While homes in OBC communities were less likely to have electric water heaters, low- and moderate-income households have higher rates of electric water heaters (20% and 19%, respectively) compared to non-LMI households (10%). The most common water heater type were storage tanks, accounting for 88% of water heaters, of which 14% were electric. Only 1% of homes had a heat pump water heater (HPWH). The average efficiency for water heaters statewide was 0.70 UEF, and 27% of water heaters met minimum ENERGY STAR qualifications.

LED penetration is high but inefficient bulbs remain in almost one in four sockets. Nearly all homes had at least one LED bulb or fixture (97%), but overall socket saturation of LEDs is 52%. Of the remaining incandescent and halogen bulbs in sockets (18%), most are A-line or reflector/flood, bulb shapes that are covered by federal efficacy standards. While non-OBC homes have more LEDs (56%) than OBC homes (45%), little variation in overall efficient bulb saturation was observed between OBC (74%) and non-OBC (76%) homes. Overall, nearly three in four households reported purchasing lightbulbs in the previous year, with little difference in purchasing behaviors across income groups. Of those that purchased light bulbs, LEDs were the most common, with 88% of respondents who purchased a bulb in the past year (or 63% of all survey respondents) purchasing an LED, while about one in ten households purchased incandescent or halogen bulbs (13% of recent purchasers or 9% of all survey respondents).

Most homes statewide contained fiberglass batts in their exterior wall cavities (74%). However, a non-trivial proportion of both OBC and non-OBC homes did not have any wall insulation (25% and 19%, respectively). Only half of the homes that were built before 1960 had wall insulation, while all homes built after 1960 had insulated walls. The average R-value of exterior above grade walls was R-11. The average R-value of flat ceilings was R-23.7. One in five OBC homes lacked insulation in flat or vented attics, compared to one in 20 non-OBC homes. Homes with framed floors over unconditioned spaces are primarily uninsulated (93%). The average R-value for framed floors over unconditioned spaces was 1.7.

One in ten homes statewide (11%) have PV panels with an average capacity of 7.68 kWh, and 5% of homes have a battery back-up system. Among homes with solar PV systems, fossil fuels are still the dominant heating fuel, with 80% using natural gas or oil to fuel their primary heating system. There are additional opportunities for electrification among homes generating electricity on-site.

The penetration of consumer electronics is similar across income groups, with most households statewide having at least one cell phone (99%), television (97%), and laptop computer (88%). Someone in the household works from home in 41% of households. Non-LMI households are more likely to have at least one householder working from home (54%), compared to 20% of low-income and 36% of moderate-income households. On average, non-LMI households have more laptop computers (2.13) and computer monitors (1.65) per household than low-income households (1.70 and 0.91, respectively).

Opportunities and Considerations

Conduct additional research to assess current Industry Standard Practices (ISP) to better understand whether baseline assumptions for savings calculations are appropriately reflecting current market conditions. Efficiencies for equipment manufactured in 2021 and later were assessed to highlight whether recently manufactured and installed equipment in New Jersey homes aligned with the current baseline scenario. While sample sizes for newer equipment were often limited, some measures such as furnaces, dishwashers, and clothes washers have high rates of equipment that exceeded the current baseline value in the New Jersey TRM, while gas storage tank water heaters, gas clothes dryers, and central air conditioners had larger proportions of equipment at or near baseline efficiency levels. For example, 70% of newer furnaces had efficiency ratings over 90 AFUE, while the baseline efficiency is 80 AFUE. This may highlight the need to adjust savings calculations, incentive amounts, or alter program tactics. Additional research on ISP, especially for measures with high volumes of incentives and savings, is recommended to understand whether adjustments to baseline efficiency values could better reflect current market conditions and more accurately calculate savings.

Capture age information of heating, cooling, and water heating equipment in program tracking data. This study found that in some cases, median ages were lower than expected compared to the EUL of the equipment. It is recommended that the program capture age information from nameplates (e.g., manufacture dates, serial numbers) of existing mechanical equipment being replaced with program incentives. All programs focused on heating, ventilation, and air conditioning (HVAC) and domestic hot water (DHW) replacements should collect this data, as should programs that conduct audits, direct installations, and other activities that allow for data collection. These programs' data collection efforts should also capture fuel type, equipment type, and efficiency. Programs are uniquely positioned to capture ages of failed equipment; this data can help assess current remaining useful life (RUL) assumptions for existing equipment and inform stock turnover rates for market estimates of sales and rates of adoption for mechanical equipment in New Jersey. This data might not be useful for assessing the current EUL assumptions, given that those values are applied to the installation of new, efficient equipment. In addition to validating or adjusting RULs, a better understanding of when equipment typically fails can help programs determine the most beneficial time for outreach to homes with aging equipment, promoting awareness of high-efficiency options or technologies and their incentives before the equipment is replaced.

Promote the use of heat pumps as primary heating equipment. There is high potential for increased uptake of heat pumps as only 2% of households statewide use a heat pump as a primary heating source.[4] Households with electric resistance heating are primary candidates to save energy with mini-split heat pumps, with low- and moderate-income households significantly more likely to use electric resistance as a primary heating source. Extending the program's incentive focus beyond like-for-like equipment and fuel type replacement represent a wide opportunity to electrify heating in existing buildings, thereby contributing to any current or future statewide goals for greenhouse gas reductions. Most furnaces and boilers are fueled by natural gas in New Jersey, but there is a subset that use oil and propane. Boilers commonly do not have duct systems and are potential candidates to be displaced, fully or partially, with mini- and multi-split heat pump systems. Moreover, central air-source heat pumps may replace ducted heating systems. Nearly half of the existing boiler stock and one in five furnaces are older than 20 years, the expected useful life (EUL) for these equipment types.[5] Although the EUL of equipment does not indicate failure, programs could provide targeted heat pump awareness to homes with older heating equipment to increase the potential for replacement of fossil fuel equipment and with the installation of more efficient heat pumps for heating (and cooling) as their existing equipment fails.

Expect more load growth from the addition of cooling in coming years and be prepared to manage that growth through the promotion of heat pump adoption. The addition of new cooling systems, improvement of existing cooling solutions, or changing from removable to permanent systems suggest further cooling-associated load growth will occur in New Jersey. These reasons are also more likely to motivate heat pump adoption in New Jersey homes. Heat pumps are installed for various cooling reasons, whether it is supplementing existing cooling systems (i.e., adding cooling to previously uncooled spaces) or replacing existing cooling systems. Although heat pumps account for only 3% of primary cooling equipment, they are an efficient cooling option for homes replacing central air conditioners, room air conditioners, or for homes adding cooling. Programmatic efforts that emphasize high-efficiency cooling replacements of existing or failed equipment or cooling of new spaces should primarily focus on the adoption of heat pumps due to efficiency benefits, which can also limit the load growth associated with added

[4] The 2020 Residential Energy Consumption Survey (RECS) reported a 1% saturation of heat pumps in New Jersey, indicating a potential minor increase in heat pump adoption since 2020.

[5] The Expected Useful Life (EUL) of equipment signify the median lifetime a piece of efficient equipment is expected to be in operation. The EULs in this report are based on the New Jersey Technical Reference Manual. https://nj.gov/bpu/pdf/publicnotice/4.%20EE%20T2%20Technical%20Reference%20Manual%202023.pdf

cooling equipment. It will be a missed opportunity if programs do not influence the choices for homes that add cooling (either additional or new cooling). In addition, ensuring the program is designed to ensure that those heat pumps are being used as much as possible for heating purposes.

Communicate the benefits of installing heat pumps when cooling systems are added to or replaced in homes located in underserved communities. Findings show that residents in these communities, who are aware of heat pumps, generally have positive or neutral perceptions of their ability to provide cooling, heating, save energy, as well as potentially reduce maintenance costs. Further research and communication of the non-energy impacts of heat pumps, such as health and safety benefits, could support increased adoption in homes adding cooling or replacing existing cooling systems. Quantifying these non-energy impacts can provide additional inputs for cost-effectiveness tests and may help address potential cost-effectiveness challenges.

Promote the installation of smart thermostats along with instructions on their operation. While one-third of households (31%) already have a smart thermostat, there is potential to upgrade the manual thermostats found in 40% of homes. Emphasizing operational knowledge of smart and/or programmable devices will help maximize benefits. This is especially important for OBC and low-income households, where manual thermostats are more likely and using programmable features is less common. Low-income and OBC households are significantly less likely to use the programmable features of thermostats. Both the installation of smart thermostats and operational education may have a larger impact on reducing the overall energy burden experienced by OBC and low-income households.

Heat pump water heater (HPWH) show strong potential as replacements for aging water heater stock. The water heaters found in New Jersey homes were most commonly traditional storage tanks, fueled by natural gas.[6] HPWHs, while the most efficient water heater equipment on the market, are rarely found in the existing home stock in New Jersey. (Note, HPWH saturation throughout the U.S. is still low, especially in existing homes). The survey data and the RECS data suggest that approximately 7% to 9% of the water heater stock is replaced annually. Often, failed water heaters are replaced immediately with like-for-like equipment. Opportunities exist to consistently increase efficiency, reduce greenhouse gasses, and influence the choice of water heater technology at the point of failure. This requires that distributors have HPWHs readily stocked and available to allow contractors to install them in emergency replacement scenarios. These are common barriers that prevent broader HPWH adoption. In addition, building general customer awareness of heat pumps can help generate demand. Programs that interact with the participant directly, such as direct installation programs, have an opportunity to emphasize the benefits of these technologies, especially in homes where equipment is older.

[6] HPWHs could be further expanded by considering fuel-switching opportunities in addition to electric replacements. However, given the widespread use of natural gas in the state, focusing solely on converting equipment that uses delivered fuels (such as propane or oil) would provide only limited opportunities. While some homes may require electrical upgrades to accommodate HPWHs, advancements in HPWH technology, such as 120V plug-in models, may facilitate greater adoption without the need for extensive electrical work.

New Jersey can maximize energy savings by recording the replaced bulb type and wattages in any current or future direct-install programs seeking to include lighting. There is limited potential remaining for lighting programs, as fewer than one-quarter of bulbs in residential sockets (22%) are inefficient.[7] Most of the remaining inefficient bulbs are A-line (52%) or reflector (30%), bulb shapes that are covered by federal efficacy standards, which limit the sale of most incandescent or halogen bulbs. The current TRM specifies that the baseline for non-exempt bulbs is 45 lumens per watt if the wattage of the replaced bulb was not recorded.[8] Data collected by a technician during the direct install may provide greater and more accurate savings when removing inefficient bulbs. For example, in a scenario where an 800-lumen LED replaced a 60-watt bulb, this calculation would yield a deemed baseline value of 18 watts.

Older homes have more opportunities for program interventions, including insulation and weatherization efforts based on home age. Among all web-survey respondents, there was a statistically significant difference between the proportion of OBC-respondents that lived in homes built prior to 1960 (44%) and non-OBC respondents (36%). Uninsulated walls were exclusively observed in older homes, and these homes are disproportionately located in overburdened communities. Despite the higher concentration of older homes located in over-burdened communities, respondents did not report a difference in insulation upgrades over the past two years between OBC and non-OBC respondents. This suggests that programmatic efforts that target older homes, especially those found in overburdened communities, may result in greater energy savings potential on a per-home basis while expending resources in an equitable manner.

Install insulation in unconditioned basements. One-half of homes have unconditioned basements (50%), which present an opportunity to improve thermal performance by insulating the framed floor or by insulation-wrapping the ductwork or HVAC equipment. Alternatively, the homeowners with an unconditioned basement might choose to finish and/or condition the basement, a project that could include adding insulation within the foundation-wall framing or expanding the heating and cooling capacity of the home, perhaps via heat-pump installation. While insulation could be installed in the ceiling of such basements, insulating the foundation walls is best practice. This would bring the basement and any mechanical equipment within it into the thermal boundary. Locating mechanical equipment in conditioned space creates energy-efficiency gains by reducing distribution system losses in cold, uninsulated space. Determining the best way to handle basement improvements can be a complicated decision process when factoring in mechanical equipment, ductwork, moisture issues, and whether the homeowner has future plans to condition the space. [9]

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[7] The on-site sample had limited available data to inform differences in socket saturation by income status. However, it should be noted that there could be greater potential to replace inefficient bulbs in low- or moderate-income homes

[8] NJ TRM, p. 133, https://nj.gov/bpu/pdf/publicnotice/4.%20EE%20T2%20Technical%20Reference%20Manual%202023.pdf.

[9] To stay in line with New Jersey's climate goals, programs could encourage the use of insulation materials with low embodied carbon. Some products with high embodied carbon might help reduce a home's energy consumption, but the manufacture and installation of those materials is carbon-intensive and may offset some of the operational savings [Magwood]. Materials with lower embodied carbon emissions may also have the benefit of avoiding volatile organic compounds (VOCs) sometimes also found in carbon-intensive materials.

Involve utilities in future studies to increase response rate and reduce cost. For this study, NMR sent over 146,000 postcards inviting New Jersey residents to take the survey and achieved an overall response rate of 0.85%. In contrast, for the one electric utility (JCP&L) that provided customer contact data; the overall response rate was 1.05% (and as high as 1.18% for postcards sent to utility-provided addresses). Additionally, for all utilities except JCP&L, NMR had had difficulty reaching renters and residents of two- to four-unit buildings due to the characteristics of the third-party dataset. Had NMR received customer data from all utilities in New Jersey, a response rate similar to the JCP&L data could have been expected and would have saved the study $25,800. The cost to purchase the third-party data was $28,662, for a total cost of $54,462.[10]

Magwood, C., J. Ahmed, E. Bowden, and J. Racusin. 2021. Achieving Real Net-Zero Emission Homes: Embodied Carbon Scenario Analysis of the Upper Tiers of Performance in the 2020 Canadian National Building Code. Natural Resources Canada and Builders for Climate Action. https://www.buildersforclimateaction.org/uploads/1/5/9/3/15931000/bfca-enercan-report-web_08_21.pdf

[10] NMR conducted a recent study with very similar survey and incentive structure using utility customer contact data and achieved a 1.7% response rate. If the NJ study had been closer to 1.7%, the study could have saved over $44,000 in mailing costs in addition to the $28,662 from the cost of the third-party data.

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Section 1 Introduction

This report presents results of the Residential Appliance Saturation Survey (RASS) in 2023 for the state of New Jersey. Rutgers, the State University of New Jersey, contracted with NMR to conduct a comprehensive multimedia survey of New Jersey residences. The objective of the survey was to characterize the existing building stock of single-family homes and two- to four-unit multifamily buildings in New Jersey through a representative sample of all homes in the state.

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The report describes high-level methodology and findings; appendices provide additional detail:

- Appendix A Detailed Methodology
- Appendix B Detailed Findings (on-sites, thermostats, additional trends in cooling)
- Appendix C Results by Overburdened Community Status
- Appendix D Results by Income Levels
- Appendix E Results by Utility
- Appendix F Results by Program Participation
- Appendix G Results by Climate Zone
- Appendix H Benchmarking
- Appendix I Data Collection Instruments

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[11] In addition to the EDCs and GDCs, NMR collected data from homeowners in service areas of municipal utilities.
[12] Overburdened communities are identified in environmental justice legislation and include communities that are low-income, minority, or have limited English proficiency. Definition and map accessed through the New Jersey Department of Environmental Protection: https://dep.nj.gov/ej/communities/.
[13] Note that households were stratified by gas utility based on their geographic location within a gas utility territory and does not indicate that the home had gas service.

In addition to this report, NMR developed a database available for the New Jersey Evaluation, Measurement, and Verification Working Group.

Section 2 Methodology

NMR fielded a mobile-optimized multi-modal web survey with 1,251 respondents and on-site audits of 70 homes to document the existing housing stock in New Jersey. 838 of the 1,251 respondents (67%) submitted photo(s) of their equipment and appliances through the survey. Table 1 summarizes the data collection activities that informed this study.

Table 1: Overview of Evaluation Tasks

	Count	Objectives
Survey	1,251	• Guided inventory of appliances, electronics, PV systems, electric vehicles, and other energy-using equipment • Appliance use and energy-saving behavior • Attitudes about heat pumps • Awareness of and participation in energy-efficiency programs • Demographics • Recruit for on-site visits
Self-audit photos	838	• Nameplates for mechanical equipment and appliances (fuel type, efficiency, age, and ENERGY STAR status) • Configuration and type of equipment and appliances
On-site	70	• Collect data on building characteristics, including lighting, appliances, HVAC, water heating, renewables, and building shell • Verify web survey results for key equipment

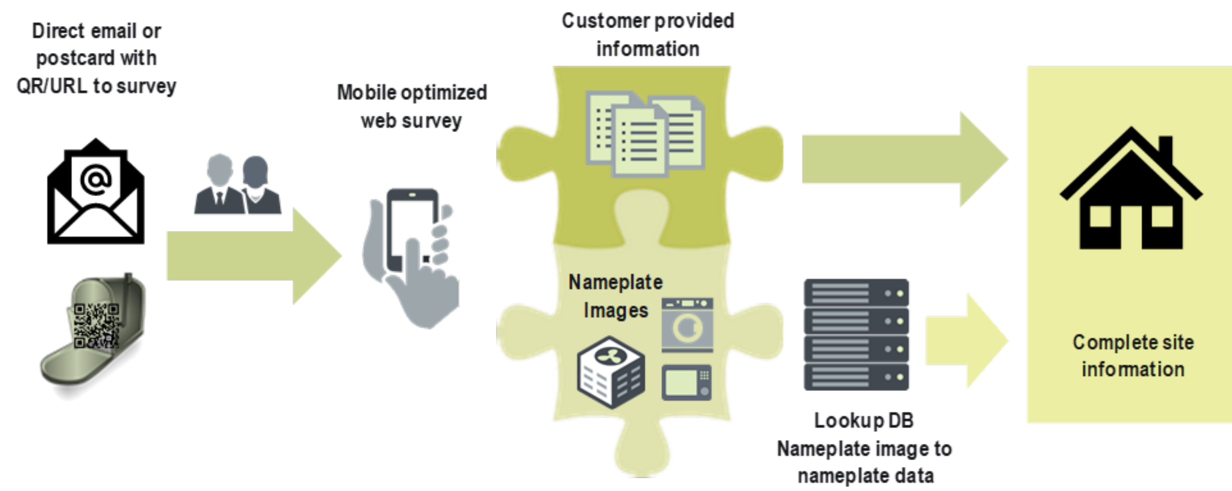
This section provides a high-level overview of the study methodology, including survey design, fielding, sampling, on-site verification, and analysis. Appendix A includes additional details related to the methodology.

2.1 Multi-Modal Web Survey Methodology

The survey gathered information about homes in New Jersey, including their mechanical systems, appliances, electronics, lighting, and other energy-using equipment. Respondents received $25 for completing the survey and could receive up to an additional $25 (for a total of $50) for providing equipment nameplate photos. Two-thirds of all survey respondents provided photos (67%). Figure 1 describes the overall web survey approach, from recruiting to developing an inventory of that home's systems.[14]

[14] While this graphic describes the standard approach for respondents to complete the survey, to ensure maximum accessibility, the team made themselves available to respondents who requested a phone-completion option. The team attempted to walk these respondents through the survey over the phone. Respondents couldn't participate in all survey modules (e.g., uploading nameplate photos), but would still be eligible for the $25 survey incentive.

Figure 1: Multi-modal Data Collection Approach



2.2 Sample Design

The multi-model survey targeted 1,320 completes from occupants of single-family homes, defined as detached and attached homes and multifamily homes with two to four units. The primary goal of the sample design was to develop samples that were representative of single-family homes in New Jersey. Secondarily, the sample was designed to provide each utility with representative samples from their own service areas and provide insight into overburdened communities (OBCs). NMR developed the sample using a complete set of residential data for New Jersey from a third-party property aggregator. The sample was stratified by electric utilities[15] and overburdened community (OBC) status.

Table 2 displays the estimated populations, sample sizes, and sampling error for the survey effort, including the targeted completions and achieved completions. For all strata, the survey achieved 10% or better sampling error and 2.6% sampling error at the statewide level.

Table 2: Sample Size and Achieved Completes

Stratum	Population of Single-Family Homes	Target		Achieved	
		Target	Sampling Error @ 90% Confidence	Completes	Sampling Error @ 90% Confidence
ACE	247,324	120	7.5%	114	7.7%
ACE (OBC)	93,899	70	9.8%	86	8.9%
JCP&L	588,364	300	4.7%	282	4.9%
JCP&L (OBC)	110,959	70	9.8%	81	9.1%
PSE&G	452,099	220	5.5%	191	6.0%
PSE&G (OBC)	529,984	260	5.1%	207	5.7%

[15] While electric utility service territories and gas utility service territories do not perfectly align, we sampled on electric utility because all residents receive electric service but not all receive gas service.

Stratum	Population of Single-Family Homes	Target		Achieved	
		Target	Sampling Error @ 90% Confidence	Completes	Sampling Error @ 90% Confidence
Rockland	42,421	70	9.8%	68	10.0%
Rockland (OBC)	7,430	70	9.8%	67	10.0%
Municipal	27,107	70	9.8%	71	9.7%
Municipal (OBC)	14,023	70	9.8%	84	8.9%
Overall	**2,113,610**	**1,320**	**2.5%**	**1,251**	**2.6%**

2.3 Recruitment and Final Survey Response Disposition

NMR recruited survey participants via postcards mailed to random samples of households selected from the third-party database. NMR mailed over 145,000 postcards inviting respondents to the survey, for an overall response rate of 0.85%. Response rates in overburdened communities were 0.72%, lower than in non-overburdened communities, which had a response rate of 0.98%.

2.4 Data Collection Instrument

The data collected at each home varied based on the equipment in the home, but generally the survey asked about the following information:

- Home characteristics (e.g., building type, age, square footage, room count by type)
- Count, location, and type of appliances, HVAC, and mechanical equipment, with details verified via photo documentation
- Efficiency ratings and age of appliances and mechanical equipment
- Thermostat type and temperature settings
- Counts and types of consumer electronics
- Presence of photovoltaic (PV) panels and battery storage
- Presence of plug-in hybrid and electric vehicles and charging infrastructure
- Weatherization upgrades completed at the home in the past two years
- Household occupancy, overall and during different time periods
- Tenure (renters or homeowners) and responsibility for paying utility bills
- Attitudes toward heat pumps and current energy-saving practices
- Awareness of energy-efficiency programs and recall of program participation
- Demographics

2.5 On-Site Visits

NMR completed a nested sample of site visits for a sample of 70 survey respondents.[16] NMR sent a trained technician to the homes of respondents who opted in and met our sampling quota needs. On-site visits were completed in May through July 2023. During the visits, NMR collected data pertaining to building characteristics, building shell, and lighting equipment. Additionally, the technician verified the self-reported data from the completed surveys while on-site.

2.6 Weighting

To ensure that the sample is representative of the New Jersey households, NMR used multiple weighting schemes: full sample (combined on-site and surveys), on-site only, and survey only. To develop analysis weights for this study, NMR compared the web-survey sample with census data representing the New Jersey electric utility customer population.

Throughout the report, all tables are weighted unless otherwise noted.

2.7 Adjustment factors

The multi-modal survey guides respondents through self-reporting appliances and equipment, but it can still be difficult for some respondents to distinguish between types of equipment (e.g., furnaces and boilers). For the fraction of measures where we do not have photo evidence confirming the equipment type, we applied adjustment factors to those self-reported responses to correct for presumed mischaracterization.

Table 3 shows which measures received adjustment factors for *penetration* (the presence of the measure in the household was incorrect or equipment type or fuel was mischaracterized) and/or *saturation* (the number of measures present in the household was incorrect). If a measure is not shown in the table, an adjustment factor was not required.

[16] Sixty of the respondents who received an on-site had submitted at least one photo through the self-audit tool, while 10 of the respondents completed the self-report survey only.

Table 3: Adjustment Factors

Category	Measure	Penetration Adjustment Factor	Saturation Adjustment Factor
Heating	ASHP or GSHP	0.34	--
	MSHP	0.89	--
	Furnace	0.98	--
	Boiler	1.17	--
	Electric Baseboard	1.04	--
Heating Fuel	Electricity	0.73	--
	Natural gas	1.05	--
	Oil	1.03	--
Cooling	Central AC	1.02	--
	ASHP or GSHP	0.64	--
	MSHP	1.22	--
Appliances	Air purifier	0.54	0.68
	Dehumidifier	0.81	0.82
	Refrigerator	--	1.03
	Freezer	0.95	0.93
	Front-loading Clothes Washer	0.90	0.90
	Top-loading Clothes Washer	1.09	1.09
Thermostats	Manual	0.54	0.43
	Programmable	--	1.01
	Smart or Learning	1.02	1.01
Renewables	PV Panel	1.03	--

2.8 Statistical Testing

In statistical tables, the means presented are weighted means unless otherwise noted. Likewise, all proportion tables present weighted proportions unless otherwise noted. Superscript letters indicate that there is 90% probability that the compared results are truly different from each other, and only a 5% probability that observed differences happened by chance. Significance testing was only performed when both tested samples had sample sizes of at least ten. Throughout the report, the terms "significant" and "significantly" always refer to *statistical* significance at the 90% confidence level.

2.9 Data Classification Definitions

The data collected as part of this study were analyzed by various splits and are presented in the appendices of this report. The splits include:

- Overburdened community status
- Income status
- Electric utility territory
- Gas utility territory

- Program participation
- Climate zone

The results in the main body of the report focus primarily on statewide, OBC and non-OBC, and household income status (Table 4).

Table 4: Income Status of Households in OBCs

Income	OBC	Non-OBC
n (households)	*525*	*726*
Low-income	32%	18%
Moderate-income	15%	20%
Non-LMI	24%	38%
Refused	30%	24%

2.10 Benchmarking

The results of this study were benchmarked against the 2020 Residential Energy Consumption Survey (RECS)[17, 18] state-level estimates for New Jersey and the recently completed 2023 residential baseline study in Pennsylvania (results are in Appendix H).

2.11 Study limitations

The study had some limitations including limited ability to reach many two- to four-unit multifamily homes or renters due to limitations of the property dataset in lieu of utility customer data, limited coverage of seasonal or vacation homes, lack of information on central building systems in multifamily homes, and, as with all surveys, self-reported information is inherently uncertain.

[17] https://www.eia.gov/consumption/residential/data/2020/index.php?view=state
[18] https://www.puc.pa.gov/media/2883/2023_pa_residential_baseline_study.pdf

3

Section 3 Building Characteristics

This section presents building characteristics on the sample of survey respondents and audited homes, including:

- Building type
- Average conditioned floor area (CFA)
- Occupants and occupancy
- Decade the home was built

As shown in Table 5, survey respondents primarily lived in detached single-family homes (75%). As discussed in the methodology, the study had difficulty reaching residents of multifamily two- to four-unit homes due to the structure of the sample data.

Table 5: Home Type Distribution by Survey Completes

	Detached single-family	Attached single-family	Multifamily (2-4 unit)
Counts (unweighted)	1,098	113	40
Percentage (weighted)	**75%**	**15%**	**10%**

The data purchased for the survey sample contained data on the square footage of a home and year it was built. The sample contained data on year built for 79% of the respondents and square footage for 71% of them.[19] The survey displayed these values to respondents and asked them to confirm the accuracy and self-report a different value if needed.

Table 6 shows the distribution of age of audited homes by decades. Two in five (40%) of surveyed homes statewide were built before 1960. Newer homes, such as those built in 2010 or later made up 2% of surveyed homes statewide.[20]

Table 6: Age of Sampled Homes

(Source: Survey and Real Estate Records)

Home Age	Statewide	Detached single-family	Attached single-family	Multifamily (2-4)
n (households)	*1,251*	*1,098*	*113*	*40*
Before 1960	40%	42%	32%	38%
1960 to 1979	24%	26%	15%	22%
1980 to 1999	19%	17%	31%	10%
2000 to 2009	11%	11%	14%	10%
2010 or later	2%	1%	4%	0%
I’m not sure	5%	3%	4%	20%

[19] Unweighted

[20] The distribution of home ages in this study aligns with New Jersey census estimates for single-family homes. Appendix A contains detailed tables comparing demographics and home characteristics with the census.

Table 7 shows the distribution of conditioned floor area for the three categories of homes considered in this study. Conditioned floor area refers to the total floor area of conditioned floors, which are defined as those served intentionally by the HVAC system. This excludes unconditioned basements, enclosed porches, and unheated attics. The average weighted conditioned square footage statewide was 1,917 square feet, with detached single-family homes having the highest conditioned floor area amongst the home types.

Table 7: Sampled Home Conditioned Floor Area (Sq. Ft.)

(Source: On-site, self-audit, and survey)

Conditioned Floor Area	Statewide[1]	Detached single-family	Attached single-family	Multifamily (2-4)[a]
n (households)	*1,244*	*1,092*	*113*	*39*
Mean	1,917	1,998	1,730[a]	1,579[a]
Minimum	560	560	800	600
Median	1,864	1,900	1,664	1,500
Maximum	6,500	6,500	4,220	3,570
Standard Deviation	796	806	606	817

[a] It is possible that some respondents in multifamily 2-4-unit households may have reported the conditioned floor area for their entire building, despite prompts from the survey to consider only their individual unit.

[1] CFA estimates are missing for six respondents and one response was excluded due to an inaccurate CFA estimate.

The average household has three occupants (Table 8). The average number of occupants per household of four is higher for multifamily units than single-family homes.

Table 8: Occupants per Household

(Source: Survey data)

Occupants	Statewide	Detached single-family	Attached single-family	Multifamily (2-4 unit)
n	*1,236*	*1,088*	*110*	*38*
Mean	3	3	3	4
Min	1	1	1	1
Median	3	3	3	2
Max	10	10	10	10
Standard Deviation	1	1	2	2

[a] 15 responses were excluded due to inaccurate occupant counts and missing counts.

Overall, at least 87% of homes were occupied by at least one person between the hours of 9am and 5pm. Low-income respondents were more likely than non-LMI and moderate-income respondents to report having at least one person at home during the day (Table 9).

Table 9: Occupancy During Times of Day by Income

(Source: Survey data)

Households (%) with at least one person at home:	Statewide	Low-income	Moderate-income	Non-LMI
n	*1,161*	*202*	*211*	*452*
9am to 12pm	87%	95%	82%	84%
12pm to 5pm	91%	94%	87%	88%
5pm to 9pm	100%	100%	100%	100%

Excludes 90 respondents who opted not to respond to the question.

4

Section 4 Mechanical Equipment

This section presents notable findings for key mechanical measures, including heating, cooling, and water heating equipment, and thermostats. Information on equipment type, use, and fuel was gathered from the web survey and a subset of the data was verified via photo verification from web survey submissions and from on-site visits. Data collection covered equipment types, fuels, capacity, efficiency, age, and ENERGY STAR status. This section explores the following questions:

- What is the heating, cooling, and water heating equipment type saturations in New Jersey?
- What fuel types are used to provide heating and water heating?
- How efficient is mechanical equipment in New Jersey?
- How old is the mechanical equipment stock in New Jersey?
- What proportion of equipment observed in this study is ENERGY STAR qualified?

Table 10 summarizes the average efficiency levels for key mechanical equipment statewide. Detailed findings are presented by various splits in Appendix B through Appendix H.

Table 10: Key Mechanical Equipment Efficiencies

	Statewide Value
Heating system AFUE	86.9
Cooling system SEER	13.8
Water heater UEF	0.70
Share of programmable thermostats	49%
Share of connected or smart thermostats	31%

4.1 Heating

Furnaces and boilers are the dominant primary heating system type in New Jersey, with nearly 85% of existing homes being primarily heated by one of these system types (59% and 25%).[21] Homes in OBC communities are significantly more likely to have a boiler compared to non-OBC homes (29% vs. 23%). This trend continues in low-income households compared to moderate and non-LMI (32% vs. 21%). Low-income households were also more likely to have electric resistance heating equipment. The non-LMI and moderate-income households were more likely to have furnaces.

Air-source heat pumps (ASHPs) and geothermal heat pumps (GSHPs) combined only represent 2% of primary heating equipment. Results from this study are similar to the statewide Residential Energy Consumption Survey (RECS) saturation values (1%) and suggest a slight

[21] A primary system handles the majority of the heating load.

NMR Group, Inc.

increase in heat pump adoption since 2020.[22] There are minimal differences in saturation of ASHP/GSHP equipment when comparing OBC and non-OBC homes and low- and moderate-income and non-LMI households.

Natural gas is the most common fuel source for primary heating equipment, heating nearly three-quarters of homes statewide (70%), and 10% of homes are primarily heated by electricity.[23] Oil is the next most common fuel for primary heating equipment statewide (8%). There are minimal differences between heating fuels in OBC and non-OBC homes. Natural gas is the primary fuel used in furnaces (92%) followed by oil (7%), with little variation by OBC and income status. Boilers are also primarily fueled by natural gas (71%) but over one-quarter use oil (27%). Boilers found in OBC homes and low-income households are more likely to use oil. In addition, low-income, and moderate-income households are significantly more likely to heat with electricity (4% and 16%) and significantly less likely to use natural gas (65% and 66%) compared to non-LMI (6% and 78%, respectively). For homes with electric heat, electric resistance heating is more common than heat pumps in all income categories, with low-income homes having the fewest heat pumps.

The average efficiency for furnaces is 87.8 AFUE (median efficiency of 90.5 AFUE). Nearly half of furnaces (47%) met minimum ENERGY STAR qualifications at the time of manufacture. The median efficiency of furnaces suggests that a large proportion of furnaces observed in this study were condensing, or high-efficiency furnaces. This could have implications on whether the assumption of minimum federal efficiency requirements (80 AFUE) – used as baseline conditions in the New Jersey TRM for gas furnace equipment replaced on failure – are the most appropriate to estimate savings, as 51% of furnaces were over 90 AFUE (of furnaces with available efficiency data).[24] The average efficiency and saturation of ENERGY STAR qualified furnaces did not vary much between OBC and non-OBC homes. However, the median efficiency in OBC homes was much higher (92.0) compared to non-OBC homes (84.9). Moderate-income households had a higher average efficiency of furnaces than both low-income and non-LMI households. Median efficiencies in low-income (92.0) and moderate-income (92.1) households were much higher than non-LMI homes (81.0). However, despite lower average and median efficiency, non-LMI households had a higher proportion of furnaces that met ENERGY STAR qualifications compared to moderate-income households.

The average efficiency for boilers is 84.9 AFUE, the median efficiency is 83.5 AFUE, and only two in five boilers met the minimum ENERGY STAR qualifications at the time of manufacture. The average and median efficiency of boilers did not vary much between OBC and

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[22] The recent Pennsylvania baseline study reported 22% of homes used ASHPs or GSHPs as primary heating. However, there were methodological differences between the studies. One primary difference is this study incorporates web survey results that have been adjusted based on photo and on-site verification, where the Pennsylvania study only reported based on on-site and photo verification results.

[23] State-level RECS data estimated that 83% of single-family New Jersey households heats with natural gas. 9% of respondents in the NJ RASS survey did not know their fuel type, but it is reasonable to assume that most of them used natural gas, putting the NJ RASS study estimate closer to the RECS estimate for primary fuel type.

[24] Note in some cases efficiency information is unavailable for older equipment, which tends to be less efficient. Efficiency data was collected for 198 furnaces out of 243 furnaces that were submitted in the self-audit survey or found during the on-site visits.

non-OBC homes. Additionally, the proportion of boilers that met minimum ENERGY STAR qualifications was higher in OBC homes (53% vs. 29%). The average and median efficiency of boilers was also similar regardless of income status. Low-income households were more likely to have a boiler that met ENERGY STAR minimum qualifications.

Nearly one-half of boilers (46%) and one in five furnaces (18%) are older than 20 years.[25] Given that EUL indicates the median age of equipment, the ages of furnaces in this study suggest that the furnace EUL may be higher than EUL expectations, while the boiler EUL is close to current EUL expectations. Furnaces were similarly aged among OBC and non-OBC homes, while ages of furnaces varied amongst the three income groups but 29% to 60% of furnaces are at least 15 years old regardless of income group. There was a higher proportion of boilers manufactured in the last two years installed in OBC homes (19% vs. 8%). Nearly two in five boilers in low-income households (38%) were manufactured in the last two years, indicating they had recently replaced old or failed equipment. Moderate- and low-income households generally had older boiler equipment compared to non-LMI households; however, over 60% of boilers in all households with boilers were more than 15 years old. The median age of furnaces is 10.5 years, and the average age is 12.4 years. The median age of boilers is 19 years, and the average age of boilers is 20 years. Both furnaces and boilers have an EUL of 20 years. There was little variation in furnace age between OBC and non-OBC homes. However, boilers in non-OBC homes had a higher average age (24 years vs. 14 years) and median age (21 vs. 17) compared to OBC homes. While furnace ages align similarly to the age of equipment observed in the RECS data for New Jersey, boiler equipment is noticeably older than the RECS data, which estimated that most boilers were within 10 and 20 years old.[26]

4.2 Cooling

Nearly all homes have a central air conditioner, room air conditioner, or heat pump (96%). Central air conditioners (68%) and room air conditioners (23%) are the most common types of primary cooling systems. Fewer than 3% of homes use heat pumps as their primary cooling system. The saturation of cooling equipment aligns similarly to the state-level RECS data for New Jersey. However, there are notable differences in cooling strategies among OBC and non-OBC homes. OBC homes are significantly more likely to use room air conditioners (37% vs. 12%) and significantly less likely to use central air conditioners (56% vs. 77%). This trend continues for low-income households. Low-income households are significantly more likely to use room air conditioners as their primary cooling system (48%) compared to moderate-income (16%) and non-LMI households (10%). Non-LMI households primarily cool their homes with central air conditioners (82%), compared to fewer than half of low-income households (44%). While few

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[25] The Expected Useful Life (EUL) of equipment signify the median lifetime a piece of equipment is expected to be in operation. The EULs in this report are based on the New Jersey Technical Reference Manual. https://nj.gov/bpu/pdf/publicnotice/4.%20EE%20T2%20Technical%20Reference%20Manual%202023.pdf

[26] This difference could be methodological, as the NJ RASS study recorded actual age of manufacture from equipment nameplates while RECS relied on self-reported data.

homes statewide lack any cooling system (3%), low-income households are more likely to have no cooling at all (4%) than moderate-income (0%) or non-LMI households (1%).

The average cooling efficiency for permanent equipment was 13.8 SEER, driven by the prevalence of central air conditioners, which were less efficient on average than the limited amount of heat pumps in the study sample (13.2 SEER vs. 19.0 SEER). More permanent cooling systems met minimum ENERGY STAR qualifications in non-OBC homes compared to OBC homes (46% vs. 35%). The trend follows the same pattern when considering income status. Half of permanent cooling systems met the minimum ENERGY STAR qualifications in non-LMI homes, but only one-quarter met the minimum qualifications in low-income households. In addition, low-income households had significantly less efficient permanent cooling systems compared to non-low-income households.

Overall, ages of central air conditioners installed in homes are lower than expected lifetime of 15 years, with one in three central air conditioners older than 15 years (34%). The median age is ten years old, while the average age of central air conditioners is 11.8 years. The EUL of central air conditioners is 15 years. Given that EUL indicates the median age of equipment, the ages of central air conditioners in this study suggest that the EUL may be higher than EUL expectations. While this may indicate that central air conditioners are failing earlier than expected, additional factors that may influence the age of air conditioners is the prevalence of added or new cooling, inability to determine ages for old equipment still in operation, a higher non-response rate for homes with older cooling equipment, or other factors. However, additional research is needed to understand any EUL implications or whether downward EUL adjustments are needed. While there is some variation in cooling equipment age by OBC status, both have a similar proportion of central air conditioners older than 15 years and still in operation. Low-income households with central air conditioners are more likely to have one that is older than 15 years.

In contrast, most heat pumps were manufactured in the past five years (75%). The average age of heat pumps used for cooling was 5.8 years, and the median age was five years. While the average and median age of heat pumps suggest newer equipment, only one heat pump (4%) was manufactured after 2021. The sample size for heat pumps are low (n-15), but the data suggests that there has been limited heat pump adoption in the last two years.

One in three room air conditioners meet minimum ENERGY STAR qualifications despite being generally newer equipment. Nearly 80% of room air conditioners are newer than ten years old. Room air conditioners in OBC homes are significantly less likely to have met minimum ENERGY STAR qualifications than non-OBC homes (24% vs 43%). However, the average efficiency is nearly identical (11.0 vs. 11.1). Room air conditioners had similar rates of ENERGY STAR qualified units and efficiencies regardless of income status.

4.2.1 Additional Trends in Cooling

Over half of the room air conditioners (52%) and 75% of the mini-split heat pumps installed after 2020 added cooling load. These equipment types are more often cooling areas of the home that were not previously cooled rather than replacing existing cooling systems. These systems are more capable of providing supplemental cooling or cooling for homes without existing duct systems.

From 2020 to 2023, 9% of homes installed cooling equipment to cool an area of the home not previously cooled. Statewide, approximately 4.7% of homes added room air conditioners, 2.0% added central air conditioners, 1.1% added a mini-split heat pump, and 0.1% added ASHP or GSHPs, to cool a space that did not previously have cooling since 2020. This indicates that there is a fair amount of additional cooling load statewide. While only 3% of homes indicated they did not have any cooling equipment, the survey results suggest participants adding new cooling load to supplement older equipment, cool more areas of the home, or to upgrade old or failed equipment. Statewide estimates were developed to understand the scale at which cooling was added to previously uncooled homes or in previously uncooled spaces in homes, using a combination of various survey question responses and saturation estimates collected in this study. Note that the survey asked respondents whether they added new cooling to a previously uncooled space or replaced and existing cooling system but did not further distinguish whether the additional cooling system was completely new (no pre-existing cooling equipment) or supplemented existing cooling.

The majority of central air conditioner and central heat pump installations since 2020 replaced a previously installed cooling system (84% and 88%). One in ten central air conditioner systems (11%) and ducted heat pumps (12%) installed since 2020 were installed to provide new or additional cooling and not to replace an existing system.

Of the 71% of homes with a central cooling system (central air conditioner or central heat pump), 8% of these homes currently have a supplementary cooling system (room air conditioner or MSHP) installed. One-half of households that reported installing a MSHP since 2020 (50%) and one in five households (19%) that reported installing a room or window air conditioner since 2020 also have a central air conditioner in the home. Most homes with central cooling systems (central air conditioners, ducted air source heat pumps, and ground source heat pumps) do not have any supplemental systems, while 12% of homes with central cooling also have mini-split heat pumps and/or room air conditioners. Table 86 in Appendix B.5 shows an estimate of how much of a home is served by the existing cooling system. The estimates are derived from cooling capacities for on-site and self-audit households that have central cooling systems where the output capacity in BTU is known.[27] About one-third of homes with central cooling systems (31% to 35%) may not have systems that provide cooling coverage to the whole house.

About one in ten homes have duct systems but no central cooling systems (12%). Statewide, 84% of homes are estimated to have ducts due to the presence of a ducted central heating and/or cooling system. Households with an existing duct system but no central cooling were more common in low-income homes (24%) than moderate-income (7%) and non-LMI (5%) households.

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[27] The estimated cooling coverage calculation assumes that the central cooling system requires 20 BTU for each square foot of living space. Given other unknowns about how the contractor may have sized the central cooling system, the team assumed that a cooling system that covered at least 80% of the square footage of the home provided sufficient cooling.

4.3 HEAT PUMP PENETRATION AND AWARENESS

Five percent of households use a heat pump for heating and/or cooling. Some of these heat pumps are supplementary, with only 2% of households using heat pumps for primary heating and cooling. Heat pump penetration is similar across income groups and between OBC and non-OBC households.

One-third of respondents (33%) either own a heat pump or had heard of them. Most of those respondents do not have strongly formed opinions about heat pumps, positive or negative. More than half of respondents neither agreed nor disagreed about a series of statements about heat pumps (Table 11). One-third of respondents agreed that heat pumps can save money on their energy bills (33%) and that they can provide heat on the coldest days (32%),

Table 11: Attitudes about Heat Pumps

(Source: Survey respondents who have a heat pump or had heard of them before survey, n=452)

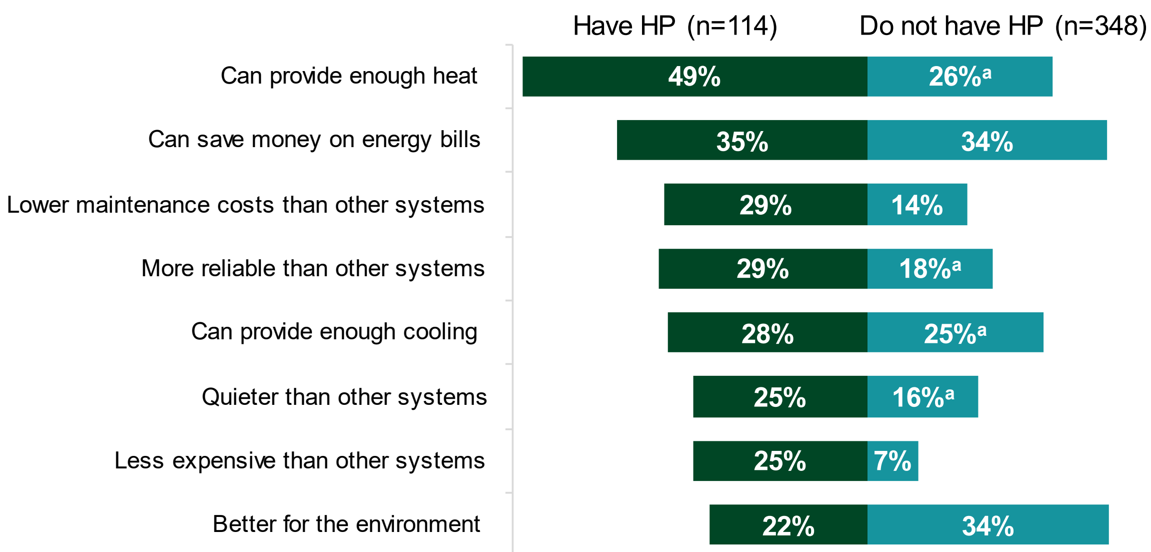
Statements:[1]	Strongly Disagree	Somewhat Disagree	Neither	Somewhat agree	Strongly agree
Heat pumps are better for the environment than other heating or cooling systems.	3%	8%	59%	17%	14%
Heat pumps can save money on my energy bills.	2%	7%	57%	25%	8%
A heat pump can provide enough heat, even on the coldest days.	6%	15%	46%	23%	9%
A heat pump cools as well as or better than other cooling systems.	6%	9%	59%	16%	10%
Heat pumps are less expensive to install than other heating and cooling systems.	10%	20%	57%	6%	6%
Heat pumps are more reliable than other heating and cooling systems.	3%	7%	69%	18%	3%
Heat pumps are quieter than other heating and cooling systems.	1%	9%	71%	14%	5%
Heat pumps have lower maintenance costs than other heating and cooling systems.	4%	12%	65%	15%	3%

[1] Rows may not sum to 100% due to rounding.

Respondents who use a heat pump at home are more likely than respondents who do not have a heat pump to agree that heat pumps can provide sufficient heating and cool as well as or better than other systems. Respondents who use a heat pump were also more likely to say they are more reliable, less expensive, and have lower maintenance costs than other heating or cooling systems (Figure 2).

Figure 2: Heat Pump Attitudes by Heat Pump Ownership and Heat Pump Awareness

(Source: Survey data)



Prior program participants generally have higher positive perceptions of heat pumps than those who have not previously participated in an energy-efficiency program. Program participants are significantly more likely than non-participants to agree that heat pumps provide sufficient and reliable heating and cooling, save money on energy bills, and are better for the environment. The results suggest that those who have participated in utility incentive programs view heat pumps more positively than those who have not, though it is unclear if the program interaction itself is driving that perception. This suggests that customer interaction with utility programs and building awareness of potential incentives associated with heat pumps could further drive heat pump adoption regardless of whether the participant is replacing HVAC equipment at the time of the program interaction. Respondents in overburdened communities are significantly more likely than those in non-overburdened communities to agree that heat pumps can provide enough heating and cooling while saving money on energy bills and maintenance costs, suggesting an opportunity for programs looking to increase heat pump penetration in these communities.

4.4 Thermostats

Programmable thermostats were the most common thermostat type found in homes statewide (49%) followed by manual (40%) and then smart thermostats (31%).[28] The penetration of smart thermostats in New Jersey is higher than in Pennsylvania (15%), though there is a higher penetration of homes that primarily use electric baseboard heating systems with

[28] The web survey allowed for multiple thermostat responses to account for homes with multiple thermostat types.

manual thermostats in Pennsylvania. Given the high rate of gas heating in New Jersey (70%), smart thermostats could be installed on more systems than currently observed. Thermostat type penetration rates were similar among OBC and non-OBC homes.

Low-income households were significantly more likely to have manual thermostats compared to moderate- and non-LMI households and significantly less likely to have a smart thermostat compared to non-LMI households.

Two-thirds of households with programmable or smart thermostats typically use the programmable features of the thermostat. However, respondents from homes in OBC communities reported rarely utilizing the features of the thermostat significantly more than non-OBC respondents (39% vs.25%). Limited use of programmable thermostat features was also more common in low-income households, where 47% of respondents reported rarely using the programmable features on their thermostat, significantly more than non-LMI households (29%). Most households (87%) reported having at least one person at home during the hours of 9am to 5pm. Low-income households were more likely to say that someone was home during the day (more than 90% of households). Among households where no one is home during the day, the average heating temperature is set five degrees lower, and the average cooling temperature is three degrees higher than households with at least one person at home during the day.

Primary heating and cooling equipment types seem to influence occupant behavior. Heating set points were generally set higher for heat pumps, which are more efficient than traditional fossil fueled equipment, such as furnaces and boilers. Depending on time of day, heat pumps were generally set 1 to 1.5 degrees higher than furnaces or boilers. For cooling equipment, central air conditioners and heat pumps had similar cooling set points to each other but are set nearly four degrees higher than room air conditioners.

Low-income households and those in OBCs have higher penetration of room air conditioners, which have lower set points than other cooling equipment. Thermostat set points were similar between OBC and non-OBC homes, but OBC homes had slightly lower cooling temperature set points and slightly higher heating set points. Heating set points were similar by income category, but low-income households had significantly lower *cooling* set points compared to moderate and non-low-income households.

4.5 Water Heating

Statewide, natural gas was the most common fuel used for water heating, accounting for 84% of water heaters, followed by electricity at 13%. Propane and oil were uncommon, and solar water heaters were only found in two homes. Compared to the state-level RECS estimates for water heating fuels used in New Jersey, this study sample had a higher proportion of natural gas water heaters than the RECS estimate (84% vs. 76%) and lower proportions of electric water heaters and oil-fired water heaters. Minor differences existed between OBC and non-OBC homes, with OBC homes having more natural gas (88% vs. 80%) and fewer electric (10% vs. 15%) water heaters than non-OBC homes. In contrast, low- and moderate-income households have higher rates of electric water heaters (20% and 19%, respectively) compared to non-LMI households (10%).

Standalone storage tanks were by far the most common water heater type, accounting for 88% of water heaters, followed by instantaneous (8%) and indirect storage tanks (3%). Given the dominance of traditional standalone storage tanks and natural gas, there is limited variation among the types of water heaters in OBC and non-OBC homes. Water heaters in moderate-income households were almost exclusively standalone storage tanks (97%). Statewide, 14% of households have an electric resistance storage water heater, largely driven by low- and moderate-income households where one in five standalone storage tanks are electric. While this study did not assess the feasibility of HPWH installation (e.g., space constraints), HPWHs can replace electric resistance storage tanks as they are similar equipment and fuel types.

One percent of homes have heat pump water heaters, which are highly efficient electric storage water heaters. This is similar to the recent Pennsylvania baseline estimate of 2%.[29] There were no heat pump water heaters present in any of the OBC homes, nor in any low- or moderate-income households. Heat pump water heaters have an average efficiency of 3.41 UEF compared to 0.62 UEF for fossil-fueled storage tanks and 0.93 UEF for electric resistance storage tanks.

Overall, the average statewide efficiency of water heating equipment was 0.70 UEF. Water heaters in OBC homes were significantly less efficient than non-OBC homes (0.67 UEF vs. 0.72 UEF). Water heaters in moderate income homes were the least efficient among the income groups, likely due to almost exclusively being standalone storage tanks.

Overall, 27% of water heaters in eligible categories were ENERGY STAR qualified. OBC homes were significantly less likely to use ENERGY STAR equipment, at 21% compared to 32% for non-OBC homes. Moderate-income households were significantly less likely (14%) to have ENERGY STAR water heaters compared to low-income (34%) and non-LMI households (28%). All heat pump water heaters and 93% of instantaneous water heaters were ENERGY STAR qualified, compared to 22% of storage tank water heaters.

One in three water heaters are at least ten years old (32%), and one in five water heaters are over 15 years old (20%). The average age of water heaters was nearly 16 years while the median age was only eight years. The EUL of a water heater is around 10 or 11 years for storage tanks and up to 20 years for an instantaneous water heater. Comparing the distribution of water heater ages in this study to the RECS estimates, there is a similar alignment between new and old equipment. Water heater ages were closely aligned between OBC and non-OBC homes. While there were still about one in three water heaters over ten years old regardless of household income status, non-LMI homes had more water heaters manufactured in the last two years than low- and moderate-income households (18% vs. 12% and 10%). The higher proportion of new water heaters did not extend to the OBC and non-OBC households.

[29] The 2020 Residential Energy Consumption Survey (RECS) data did not distinguish heat pump water heaters in the survey and cannot be compared to the HPWH saturation results from this study. A residential stocking study of existing single-family homes was recently conducted in Massachusetts, which reported HPWH saturation at 2%. https://ma-eeac.org/wp-content/uploads/Residential-Building-Use-and-Equipment-Characterization-Study-Comprehensive-Report-2023-12-22.pdf

Section 5 Appliances

Key summary data for appliances are provided in Table 12 through Table 14, with detailed results provided in the appendices of this report.

Table 12: Summary of Appliance Penetration Rate and Units Per Home, Statewide

Kitchen Appliance	Penetration	Average Units per Home
Oven/range	98%	--
Refrigerator	97%	1.28
Clothes washer	93%	0.95
Clothes dryer	92%	0.95
Microwave	91%	0.97
Dishwasher	79%	0.82
Dehumidifier	38%	0.44
Standalone freezer	31%	0.36
Air Purifier	29%	0.41
Beverage cooler or wine fridge	14%	0.17

28% of households have two or more refrigerators and 31% have at least one standalone freezer. Non-LMI households are more likely to have two or more refrigerators (32%) than low-income households (22%). Refrigerators in non-LMI households are larger and use more energy, on average, than in low- or moderate-income households. One-third of homes have a standalone freezer. Penetration is increasing among homes in overburdened communities, with more than half (57%) of freezers in OBCs installed within the past five years, compared to 33% in non-OBCs.

ENERGY STAR appliance saturation is high for certain appliance types, including air quality appliances and dishwashers. Program participants and non-LMI households have higher saturation of ENERGY STAR appliances than non-participants and low- or moderate-income households, providing an opportunity to target these households with appliance rebate programs.

Table 13: Summary of Appliance Average Efficiency and ENERGY STAR status, Statewide

Kitchen Appliance	ENERGY STAR	Average efficiency
Dehumidifier	89%	1.7 IEF/1.8 EF
Air Purifier	77%	299 kWh/yr
Dishwasher	74%	299 kWh/yr
Clothes washer	63%	2.0 IMEF
Refrigerator	62%	585 kWh/yr
Clothes dryer	42%	3.1 CEF
Standalone freezer	35%	361 kWh/yr

Most customers with natural gas service opt for natural gas appliances. 69% of clothes dryers statewide (63% of households) and 76% of ovens (74% of households) use natural gas. 72% of households statewide use natural gas as their primary heating fuel. Clothes dryers may have lower ENERGY STAR saturation due to the high saturation of natural gas clothes dryers, which likely have fewer qualified products than electric clothes dryers.

Penetration of air quality appliances is higher in non-low-income households than it is in low-to-moderate income households. Dehumidifier penetration statewide is at 38% and for air purifiers it is at 29%.

Generally, only about one-third of large appliances were in operation and beyond their measure EUL (17%-39%). The EUL for a given measure is associated with the median age at which equipment typically needs replacement. This suggests that some appliances are replaced more rapidly than the current EUL, with closer to half of any equipment type expected to still be operational beyond the EUL. In particular, clothes washers and dryers had the fewest units older than the EUL for larger appliances.

Some factors may influence the lower-than-expected amount of older equipment, such as increased demand for a newer product type (i.e., air purifiers), new additional appliances installed in the home, or remodels that include replacement of existing appliances still in working condition.[30] Additionally, verifying age of manufacture can be difficult for older appliances, so there may be some additional older equipment without age data in operation. However, it should be noted that additional research is required to understand whether updates to EULs are necessary in New Jersey. Despite this, there is some opportunity for programs to encourage adoption of ENERGY STAR appliances as older, failed, or newly added appliances are installed, particularly for appliances with a lower share of ENERGY STAR-qualified appliances.

Table 14: Summary of Appliances Beyond Useful Life, Statewide

Appliance	Effective Useful Life (NJ TRM)	Share of Appliances Older than EUL (%)	Median Age (Years)	Average Age (Years)
Dishwasher	11	29%	7	9.0
Refrigerator	12	32%	10	10.0
Standalone freezer	11	39%	14	11.5
Clothes dryer	12	27%	8	9.1
Clothes washer	14	17%	7	9
Dehumidifier	12	8%	6	5.5
Air Purifier	9	11%	4	4.4

[30] External forces, such as the COVID-19 pandemic and increasing public awareness of health implications associated with indoor air quality, can also be attributed to the growth of certain product categories, such as air purifiers.

Section 6 Lighting, Electronics, and Other End Uses

6.1 Lighting

Lighting data was collected for bulbs in the entire household for the 70 on-site visits. The on-site homes had an average of 36 bulbs per home. As 14 of the 70 households in the on-site sample declined to disclose their income status, on-site results are only presented statewide and by OBC status. In addition to data collected on-site, the web survey asked respondents about lighting purchase behavior.

Overall, efficient bulb saturation is high statewide. Three of four light bulbs installed in the state are either LED or CFL. Nearly all homes have at least one LED (97%) or CFL bulb (89%). While non-OBC homes have more LEDs (56%) than OBC homes (45%), little variation in overall efficient bulb saturation was observed between OBC and non-OBC homes (74% vs. 76%). CFL saturation is significantly higher in OBC homes (29%) compared to non-OBC homes (20%). OBC homes have a higher saturation of CFL bulbs, which generally are less expensive up front than LEDs.

Nearly one-quarter of sockets contain incandescent (18%) or halogen (4%) bulbs. Most households (81%) have at least one incandescent or halogen bulb. Most of the inefficient bulbs are A-line (52%) or reflector/flood (30%), which are covered by federal efficacy standards. There is limited potential remaining for direct installation programs to replace existing inefficient bulbs. Programs with direct install components should encourage auditors to record the existing bulb type and wattages they replace to maximize energy savings.

LEDs were the most frequently purchased light bulb in the past year, with little difference in purchasing behavior across income groups or program participants. 72% of survey respondents reported purchasing light bulbs in the past year (2022 – 2023). LEDs were the most frequently purchased bulb, with 88% of respondents who purchased a bulb in the last year (63% of all respondents) purchasing an LED. Nearly one in ten households (9% of all respondents, or 13% of respondents who recalled purchasing a bulb in the past year) purchased an incandescent or halogen. Federal standards limiting the sale of most incandescent and halogen bulbs went into effect in 2023.

6.2 Consumer Electronics

Cell phones (including smart phones) appeared in nearly every home (99%) and were the most commonly found household consumer electronic with an average of 2.58 cellphones per home. Moderate-income and non-LMI households had a slightly higher penetration of cell phones (100%) compared to low-income households (99%). Televisions (97%), laptops computers (88%) and printers (85%) followed closely in terms of penetration in homes.

Televisions had the highest household saturation of consumer electronics at 2.60 televisions per household. Moderate-income households had the highest average count of televisions (2.74) as compared to other households (OBC: 2.46, non-OBC: 2.68, Low-Income: 2.54, Non-LMI: 2.65). The average quantity of both desktop and laptops were similar between OBC homes and non-OBC homes. As expected, respondents reported having desktop computers plugged in longer than laptop computers (44% increase).

Respondents reported working from home was common, with at least one individual working from home in 41% of households. Low-income households were least likely to report working from home. More than half of non-LMI respondents reported at least one householder working from home (54%), compared to only 20% of low-income and 36% of moderate-income households. On average, respondents reported that someone in their household worked from home an average of 29 hours per week, with 38% working full-time (40 or more hours per week).

6.3 Renewables and Electric Vehicles

11% of homes had solar photovoltaic (PV) systems for on-site power generation with an average capacity of 7.68 kWh.[31] 5% of homes had a battery back-up system. The study observed similar levels of PV system penetration between OBC and non-OBC homes. There were similar levels of PV systems regardless of LMI status, but PV was most prevalent in moderate income households (15%) and least prevalent in low-income households (11%). Low-income households had slightly smaller PV systems than moderate- and non-low-income households. Moderate income households had the highest proportion of PV systems with battery back-up (11%). Residents in Southern New Jersey (Atlantic City Electric and Southern Jersey Gas) reported higher levels of solar PV penetration (23% and 21%, respectively) than other utilities.[32] Among homes with solar PV systems, fossil fuels are still the dominant heating fuel, with 80% using natural gas or oil to fuel their primary heating system.

Six percent of single-family households reported owning an electric vehicle and 2% have a plug-in hybrid. Electric-only vehicles were more common for OBC homes (6%) compared to non-OBC homes (4%). However, low-income households were less likely to have an electric or hybrid vehicle (2%) compared to moderate (6%) or non-LMI (10%) households. More than two-thirds of electric vehicle owners reported having a Level 2 charger at home. Most electric vehicle owners charge between the times of 8pm and 8am (80%). Additionally, over one-quarter of electric vehicle owners also reported charging their vehicles during peak hours (12pm to 8pm). Two percent of households have electric bicycles (2%) or electric scooters (2%).

[31] Respondents who did not know the capacity of their systems reported the total amount of panes they owned. Solar PV systems were assumed to have an average capacity of 300 watts per panel to estimate total capacity of unknown systems.

[32] This study does not have evidence on the reason there is higher solar penetration in these service territories.

6.4 Other Energy-Using Equipment

Fourteen percent of single-family homes have a swimming pool and are primarily heated with natural gas. Overall, 8% of homes have spas (hot tubs) and 1% have saunas. Spas are more prevalent in non-OBC homes (9%) than in OBC homes (6%), while swimming pools appeared similarly in both communities (13% in OBC and 14% in non-OBC). 64% of pool heaters were powered by natural gas (80% in OBC; 58% in non-OBC) and 25% of pool heaters were powered by electricity (7% in OBC; 32% in non-OBC).

Whole house generators were reported in 8% of homes and were slightly more common in non-OBC homes (6% vs. 10%). These generators are typically fueled by natural gas (66%) or fuel oil or kerosene (21%); however, generators in OBC homes were more likely to use fuel oil or kerosene. Electric lawn equipment had a 32% penetration rate in homes**.** One-quarter of households had a home gym with electric consuming equipment (treadmills, indoor cycling trainers) with non-OBC homes having a higher presence of home gyms (28%) compared to OBC homes (22%)

Section 7 Building Envelope

This section describes the key findings for building envelope measures, insulation types, and R-values of homes that received an on-site visit. Observations of the building envelope components were collected through in-person site visits of 70 homes based on a subsample of survey respondents. Details on the data collection practices are provided in Section 2.5. Given the smaller sample size, data is presented only for statewide with splits by OBC, and non-OBC homes. The detailed data can be found in Appendix B.1.

Table 15: Key Building Envelope Efficiencies

Measure	Statewide Average Value
Exterior Wall R-value	11.0
Flat Ceiling R-value	23.7
Vaulted Ceiling R-value	18.1
Framed Floor R-value over Unconditioned Space	1.7
Conditioned Foundation Wall R-value	8.7

7.1 Above-Grade Walls

Most homes statewide contained fiberglass batts in their exterior wall cavities (74%). However, a non-trivial proportion of homes in both OBC and non-OBC communities did not have any wall insulation (25% and 19%, respectively). While the difference was not statistically significant between OBC and non-OBC communities, over one-fifth of homes in the sample did not have any insulation in exterior walls. Spray foam insulation, a material with strong energy-efficiency performance but a high embodied carbon content, is uncommon (less than 1% of homes).

Only half of the homes that were built before 1960 had wall insulation, while all homes built after 1960 had insulated walls. Above-grade wall insulation correlates with home age because building energy codes have evolved over time, including insulation requirements. Statewide, 40% of homes in this study were built prior to 1960.[33]

The average R-value of exterior above grade walls was R-11. The median R-value was R-13, which corresponds to a typical fiberglass batt that is installed in 2x4 framing cavities. Average R-values were similar between OBC and non-OBC homes overall.

7.2 Flat Ceilings

88% of flat ceilings were insulated.[34] One in five OBC homes lacked insulation in flat or vented attics, compared to one in 20 non-OBC homes. As with above grade walls, the only homes without

[33] The U.S. Household Census data estimates 37.5% of housing units in New Jersey were built prior to 1960. https://data.census.gov/table/ACSST1Y2022.S2504?q=S2504:%20Physical%20Housing%20Characteristics%20for%20Occupied%20Housing%20Units&g=040XX00US34

[34] Flat ceilings have attic space above the ceiling, and they can also be thought of as unconditioned attic floors.

insulation in flat attics were built prior to 1960. However, it should be noted that adding insulation to a flat attic is a more straightforward weatherization upgrade compared to other areas of the building envelope. This feasibility is a likely contributor to the higher rates of insulation presence compared to the other envelope components in the home. Adding blown attic insulation is among the simplest of building envelope efficiency upgrades because no holes are needed and cellulose is inexpensive compared to fiberglass or foam. In addition, flat attics can support a much greater quantity of insulation compared to framed walls, much of which rests continuously over the joists and thus prevents thermal bridging.

The most common type of insulation was fiberglass-batt insulation. These were present alone in 60% of flat ceilings and in combination with blown insulation in an additional 11% of homes (6% with cellulose and 5% with blown-fiberglass). Blown fiberglass was present in 8% of homes, about as common statewide as blown cellulose (9%). Blown fiberglass was present in 13% of OBC homes and only 1% of non-OBC homes, although these results were not statistically significant.

The average R-value of flat ceilings was R-23.7. There was no significant difference between the values among overburdened communities (R-21.8) and among non-OBC homes (R-25.2). The median value was R-30, but insulation levels can vary significantly based on the type of insulation present, more so than walls or framed floors, as there can be different levels of insulation laying above the attic floor framing, or combinations of multiple types of insulation.

7.3 Vaulted Ceilings

39% of vaulted ceilings lacked insulation.[35] The sample size was too small to yield significant results, but all three vaulted ceilings found in non-OBC homes were insulated, while only three out of five in OBC homes were. As heat rises, this can lead to considerable heat loss, but is more difficult to retrofit than a flat attic ceiling.

The mean R-value for vaulted ceilings was R-18. The median was R-19, which corresponds to fiberglass-batt insulation within 2x6 framing. All insulated examples used fiberglass batts.

7.4 Foundation

About half of the homes in the on-site sample had unconditioned foundation space and about one-third were built directly on-slab.[36] Less than 15% of homes in the sample had either a conditioned basement or a mix of conditioned and unconditioned basements.

[35] Vaulted ceilings, also known as cathedral ceilings, are angular and follow the roofline, with no space above them. In some cases, technicians may be able to see or probe for insulation, but information on vaulted ceilings often comes from building design documents or the owner's recollection.

[36] Slab floors form the lower boundary of the thermal envelope in homes with conditioned basements or crawlspaces or with homes built on-grade, in other words, homes without basements. It is best practice to insulate slabs that serve as part of the thermal boundary, though the presence of insulation is usually not possible to verify post-construction without building plans or other documentation. Field technicians were not able to verify presence of slab insulation in any of the 21 homes with on-grade slabs or the nine homes with below-grade slabs (i.e., conditioned basements).

The average R-value for conditioned foundation walls was 8.7. There were only nine conditioned basements observed out of 43 sites with basements or other accessible foundations, all of which were non-OBC. Six homes with foundation walls in conditioned space had insulation. Five of these contained insulation in interior framed walls and one home had exterior foundation wall insulation; the other three were uninsulated. There were no homes with unconditioned basements that also had foundation wall insulation.

7.5 Framed Floors

Homes with framed floors over unconditioned spaces are primarily uninsulated (93%).[37] In rare cases where insulation was present, it was typically an R-30 fiberglass batt. Generally, insulated framed floors were more common in non-OBC homes than OBC homes (11% vs. 1%). The average R-value for framed floors over unconditioned spaces was 1.7. This represents an opportunity for insulation upgrades, especially since these cavities are usually open and allow for easy application of insulation materials.

7.6 Fenestration

Technicians generally cannot verify detailed window specifications (e.g., U-factors, solar heat gain coefficient, and the presence of an insulating gas between windowpanes) in existing homes due to lack of documentation. However, they can verify the number of windowpanes and the presence of low-emissivity (low-e) coatings.

Double-pane windows are the dominant window type with nearly 90% of window area being filled by a double-pane window. However, low-e coatings were only confirmed in 18% of the total window area. Single-pane windows represented 11% of window area and no triple-pane windows were found on-site.

7.7 Weatherization Upgrades

As a part of the web-survey, respondents were asked about whether they had conducted any weatherization upgrades in the past two years. The survey asked respondents if they added insulation to portions of their home (walls, attic and or basement), if they installed weatherstripping on windows or doors or if they upgraded their windows or doors.

Over one-third of respondents self-reported that a weatherization upgrade occurred in the last two years (34%). Of the respondents that indicated they conducted some sort of weatherization within the past two years, weatherstripping was the most common (51%) followed by upgrades to windows or doors (48%), and then adding insulation to portions of the home (40%). Very few respondents reported that they performed all three weatherization upgrades within the

[37] Unconditioned basements here are defined as spaces that lack a heating source adequate to fully heat the room year-round and are not finished spaces (i.e., do not have walls and ceiling cavities closed and drywall or other finishing materials installed). This classification method follows RESNET protocols. Enclosed crawl spaces are grouped with unconditioned basements in this analysis.

past two years (7%). Over one-quarter (29%) of respondents who only performed one upgrade tend to upgrade their windows or doors followed by installing weatherstripping (25%).

Table 16: Performed a Weatherization Upgrades in the Past Two Years by OBC

(Source: Survey)

Upgraded in the Past Two Years	Statewide	OBC	Non-OBC
n (households)	*1,251*	*525*	*726*
Yes	34%	33%	35%
No	62%	63%	62%
I don't know	4%	4%	3%

Table 17: Types of Weatherization Upgrades in the Past Two Years

(Source: Survey)

Type	Installed Weatherstripping	Upgraded Windows or Doors	Added Insulation
n (households)	*425*	*425*	*425*
Upgraded (multiple responses)	51%	48%	40%
Only one upgrade	25%	29%	15%
Two upgrades	18%	11%	17%
All weatherization upgrades	7%	7%	7%

Multiple Responses Permitted: may not sum to 100%

Section 8 Recent Industry Standard Practices

This section explores results on the efficiency patterns of new equipment purchased by homes in New Jersey homes since 2021. While the rest of the report focuses on the statewide stock of equipment and its characteristics, the results in this section focus on equipment purchased between 2021 and 2023. These results provide insights into standard industry practices and the baselines used for programs, showing where the New Jersey residential market may be already adopting efficient equipment and opportunities for program impact. While this study does not recommend ISP values for certain measures, it does provide insights and information that could inform future ISP research.

The results of this section seem to indicate that gas furnaces, dishwashers, and top- and front-load clothes washers purchased in the last three years have largely been efficient. However, gas storage tank water heaters, gas clothes dryers, and central air conditioners had more equipment at or closer to baseline or minimum efficiencies. Details are provided in the tables below. Results for lighting purchase decisions over the previous year are presented in Section 6.1.

Table 18 summarizes the efficiency values for equipment manufactured since 2021 and provides the corresponding baseline TRM value for the measure. For all energy metrics (units) listed in the table below, with the exception of annual energy consumption (kWh/year), higher values indicate higher efficiency equipment. In the case of annual energy consumption (kWh/year), lower values indicate more efficient equipment. Note that for some equipment types there are multiple subcategories or baseline efficiencies for an individual measure. For example, in the New Jersey TRM[38], refrigerators are further broken out by configuration, including bottom-freezer, top-freezer, side-by-side, and single-door configurations and by various features. For measures with subcategories, the sample sizes of the data collected in this study for equipment that was manufactured 2021 or after are too small to present.

[38] https://nj.gov/bpu/pdf/publicnotice/4.%20EE%20T2%20Technical%20Reference%20Manual%202023.pdf

Table 18: Summary of Efficiencies for Equipment Manufactured since 2021

Measure Category	Equipment Type	Unit	Count	Mean	Median	Min	Max	Std. Dev.	NJ TRM Baseline Value
Heating[1]	Furnace (Gas)	AFUE	*22*	92	96	80	97	7.0	Gas Furnace: 80 Oil Furnace: 78
Heating[1]	Boiler	AFUE	*6*	90	91	84	95	4.8	Gas hot water: 84 Gas Steam: 82 Oil hot water: 86 Oil steam: 85
Heating[1]	Heat Pumps	HSPF	*1*	13	13	13	13	N/A	8.2
Cooling[1]	Central AC	SEER	*29*	15	15	13	21	1.7	14
Cooling[1]	Room AC	CEER	*16*	12	11	6	15	2.5	11.0
Cooling[1]	Heat Pumps	SEER	*1*	24	24	24	24	N/A	14
Water heating[1]	Storage, standalone - Fossil fuel	UEF	*44*	0.64	0.62	0.72	0.57	0.04	Various based on size and first hour rating. 50 gallon, 75 gallon first hour: 0.64
Water heating[1]	Instantaneous	UEF	*7*	0.98	0.99	0.99	0.96	0.01	Baseline equivalent to 40 gallon water tank of same fuel. 40 gallon gas: 0.52
Water heating[1]	HPWH	UEF	*2*	3.88	3.88	3.88	3.88	0.0	Varies based on existing conditions, and fuel Elec 50 gallon: 0.92
Water heating[1]	Indirect	UEF	*2*	0.81	0.82	0.86	0.77	0.06	0.75
Appliances[2]	Refrigerator[4]	kWh /yr	*95*	589	653	228	799	135	Various, calculated based on Adjusted Volume and configuration type
Appliances[2]	Dishwasher	kWh /yr	*55*	264	269	239	279	8.7	307
Appliances[2]	Clothes dryer (gas)	CEF	*37*	3.3	3.3	2.3	3.5	0.2	Gas: 3.30

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Measure Category	Equipment Type	Unit	Count	Mean	Median	Min	Max	Std. Dev.	NJ TRM Baseline Value
Appliances [2]	Clothes dryer (electric)	CEF	*11*	3.8	3.7	3.3	3.9	0.2	Electric: 3.74
Appliances [2]	Clothes washer (top Load)	IMEF	*25*	1.9	2.1	0.8	2.8	0.4	Top load: 1.57
Appliances [2]	Clothes washer (front load)	IMEF	*17*	2.9	2.9	1.8	3.1	0.3	Front load: 1.84
Appliances [2]	Dehumidifier (25 or less pints)r	IEF	*5*	1.7	1.7	1.6	1.7	0.0	25 or less: 1.3
Appliances [2]	Dehumidifier (25 to 50 pints)	IEF	*20*	1.8	1.8	1.8	2.0	0.1	25 to 50: 1.6
Appliances [2]	Freezer	KWh/yr	*15*	278	250	216	442	60.6	Upright: 439, Chest: 239
Appliances [3]	Air purifier	KWh /yr	*3*	165.9	180	2.2	220	116	Calculated baseline

[1] Heating, cooling, and water heating equipment baseline efficiency values are the minimally code compliant value in the New Jersey TRM.
[2] Most appliance baseline efficiency values are equal to the federal minimum standards.
[3] Air purifier baseline efficiency values are non-ENERGY STAR models that also meet minimum New Jersey P.L. 2021, C.464, minimum standards.
[4] There are 22 categories of refrigerators for various configurations and features in the New Jersey TRM. Breakouts for each category of refrigerator were beyond the scope of this analysis.

8.1 Equipment Efficiency Distributions for Select Measures

The following charts show the distribution of efficiencies for equipment manufactured 2021 and afterward for measures with sufficient sample sizes. As noted above, in some cases there may be a larger sample size for a base measure category. However, when considering any additional subcategories such as configuration, size, fuel type, etc., the sample sizes shrink and do not provide meaningful data. We present efficiency distribution by the TRM subcategory in cases where there is enough information.

Figure 3 shows the efficiency distribution for gas furnaces manufactured from 2021. Most furnaces (72%) are over 90 AFUE, well beyond the minimum compliance or baseline efficiency value of 80 AFUE in New Jersey.

Figure 3: Gas Furnaces Manufactured 2021 and Later by Efficiency Category

(Source: On-site and self-audit data)

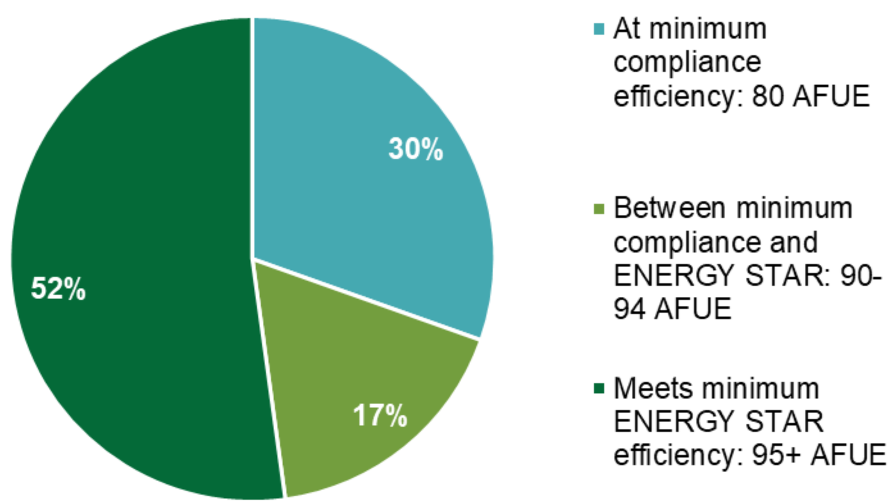


Figure 4 shows the efficiency distribution for central air conditioners manufactured from 2021. Almost one in four air conditioners manufactured since 2021 are 13 SEER, below the current minimum compliance for efficiency of central air conditioners in New Jersey. Note that the central air conditioning efficiency standard was updated in 2023, and none of the central air conditioners observed in this study were manufactured in 2023, so the results do not suggest that uncompliant models were installed after 2023. One-third of newer models had ENERGY STAR efficiency requirements of 15.2 SEER or above, at minimum.

Figure 4: Central Air Conditioners Manufactured 2021 and Later by Efficiency Category

(Source: On-site and self-audit data)

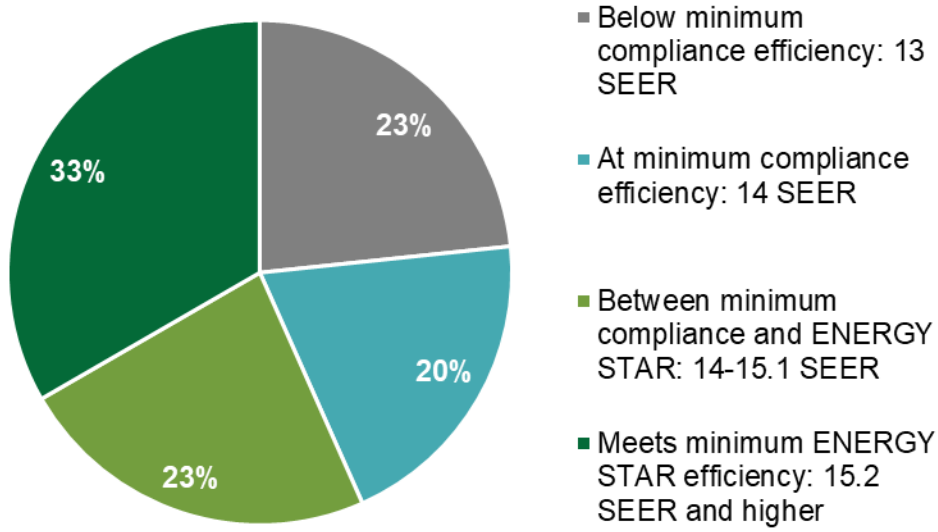


Figure 5 shows the distribution of natural gas fueled standalone storage tank water heater efficiencies that were manufactured since 2021. Note that the baseline efficiency for these storage tanks is variable and is based on the tank size, fuel type, and first hour rating. The baseline efficiency presented below is based on the most common characteristics for the 2021 and newer storage tanks (50-gallon tanks with a first hour rating over 75 gallons). Given the variability in baseline efficiencies, there are some water heaters that do not meet the average baseline efficiency of these most common characteristics. While 27% of gas storage water heaters met minimum ENERGY STAR qualifications at the time of manufacture, none of the water heaters met the updated 2023 ENERGY STAR efficiency requirements for gas storage tanks.[39]

[39] https://www.energystar.gov/products/water_heaters/residential_water_heaters_key_product_criteria

Figure 5: Gas Storage Tank Water Heaters Manufactured 2021 and Later by Efficiency Category

(Source: On-site and self-audit data)

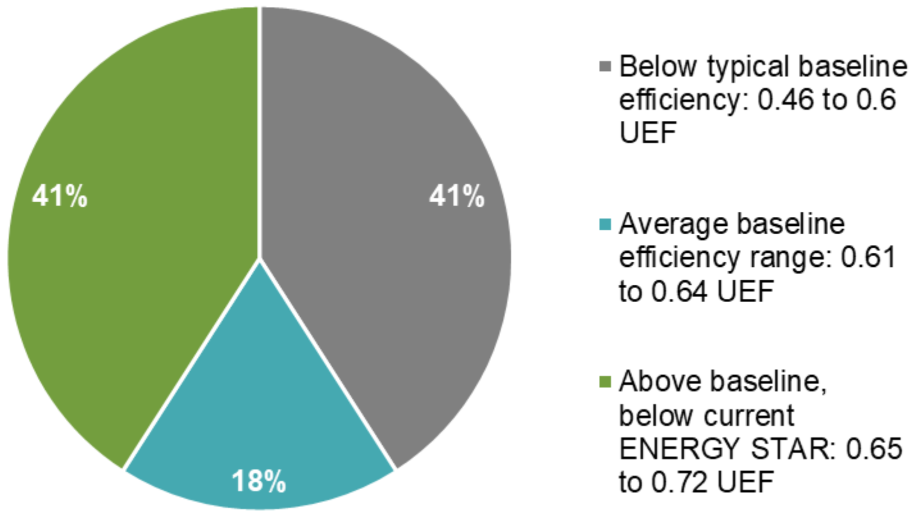


Figure 6 shows the distribution of energy consumption for dishwashers manufactured since 2021. All of the dishwashers were more efficient than the baseline or federal minimum standard efficiency of 307 kWh/year. All but two of the dishwashers manufactured after 2021 also met the minimum ENERGY STAR standard efficiency at the time of manufacturer. However, the ENERGY STAR minimum energy consumption has since decreased to 240 kWh/Year as of January 2024. Only two dishwashers met the new energy consumption requirement.

Figure 6: Dishwashers Manufactured 2021 and Later by Efficiency Category

(Source: On-site and self-audit data)

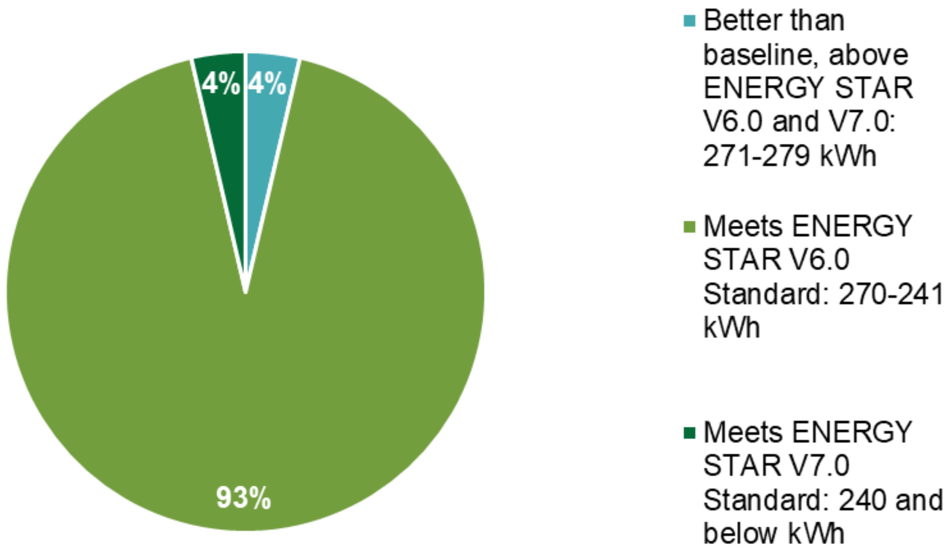


Figure 7 shows the distribution of energy consumption for top-loading clothes washers manufactured since 2021. Four out of five top loading clothes washers were above the baseline or federal minimum efficiency of 1.57 IMEF. 60% of top load clothes washers manufactured in 2021 and later met current minimum ENERGY STAR energy-efficiency specifications (2.06 IMEF).

Figure 7: Top Load Clothes Washer Manufactured 2021 and Later by Efficiency Category

(Source: On-site and self-audit data)

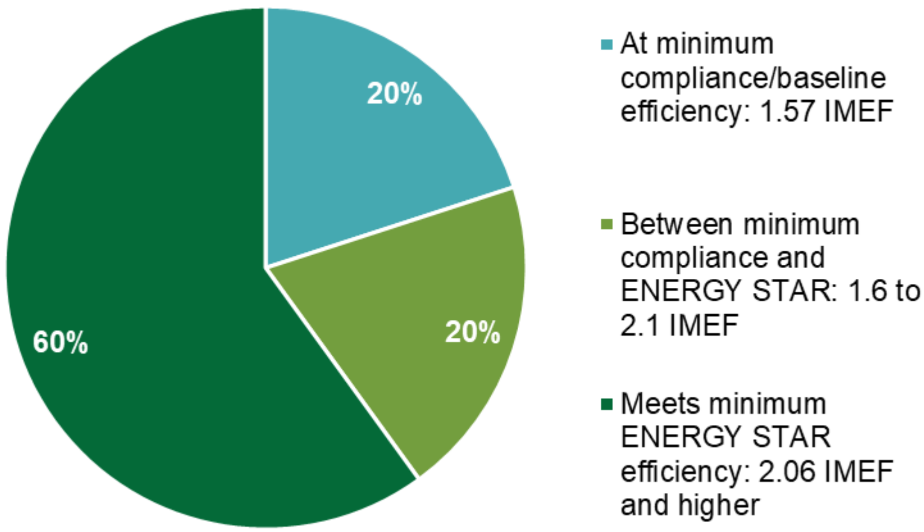


Figure 8 shows the distribution of energy consumption for front-loading clothes washers manufactured since 2021. Only one (5%) of front-loading clothes washers manufactured since 2021 were at baseline or federal minimum efficiency levels. 80% of front-loading clothes washers manufactured since 2021 met the current minimum ENERGY STAR efficiency specifications (2.76 IMEF).

Figure 8: Front Load Clothes Washers Manufactured 2021 and Later by Efficiency Category

(Source: On-site and self-audit data)

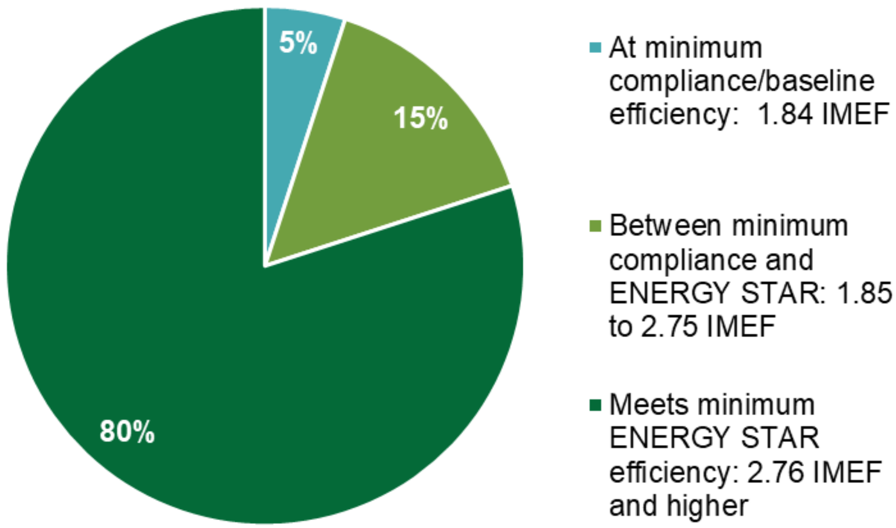
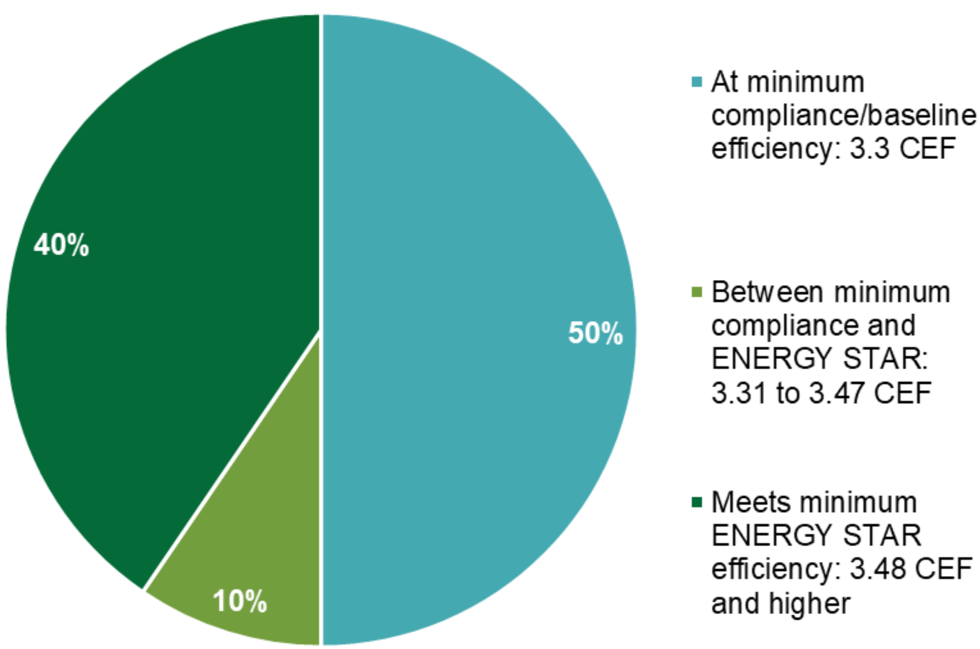


Figure 9 shows the distribution of energy consumption for gas fueled clothes dryers manufactured since 2021. Half of gas clothes dryers were at the baseline or federal minimum standard efficiency.

Figure 9: Gas Clothes Dryers Manufactured 2021 and Later by Efficiency Category

(Source: On-site data and self-audit data)



Appendix A Detailed Methodology

This appendix contains additional details about the study methodology.

A.1 Multi-Modal Web Survey Methodology

The survey gathered information about homes in New Jersey, including their mechanical systems, appliances, electronics, lighting, and other energy-using equipment. Respondents also indicated their use of and attitudes about energy-saving equipment, awareness of and participation in energy-efficiency programs, and recent purchases of lighting and cooling equipment. The survey included questions in a typical web survey format as well as a self-audit component, in which respondents used their mobile device's camera to provide photos of the configuration and nameplate of key energy-using equipment, including heating, cooling, water heating, appliances, photovoltaic systems, and electric vehicle chargers. The survey provided guidance for respondents, including definitions and descriptions of the measures included in the survey, to help respondents provide relevant results.

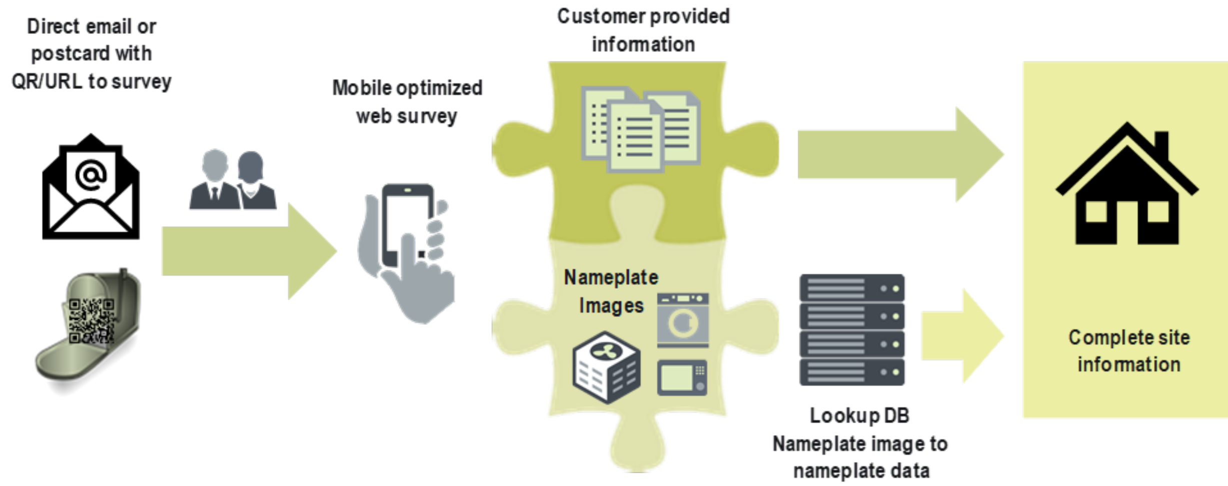
The team extracted make and model data from nameplate images and cross-referenced those against an internal equipment database to append model-specific information on rated annual consumption, rated efficiency, rated capacity, and other key performance parameters.[40]

Respondents received $25 for completing the survey and could receive up to an additional $25 (for a total of $50) for providing equipment nameplate photos. Two-thirds of all survey respondents provided photos (67%). Figure 1 describes the overall web survey approach, from recruiting to developing an inventory of that home's systems.[41]

[40] Based on data available from the U.S. DOE's Compliance Certification Database, the California Energy Commission's Modernized Appliance Efficiency Database, the U.S. EPA's Energy Star Qualified Product List, the Consortium for Energy Efficiency's Qualified Product List, manufacturer spec sheets, and web searches.

[41] While this graphic describes the standard approach for respondents to complete the survey, to ensure maximum accessibility, the team made themselves available to respondents who requested a phone-completion option. The team attempted to walk these respondents through the survey over the phone. Respondents would not be able to participate in all survey modules (e.g., uploading nameplate photos), but would still be eligible for the $25 survey incentive.

Figure 10: Multi-modal Data Collection Approach



A.2 Sample Design

The multi-model survey targeted 1,320 completes from occupants of single-family homes, defined as detached and attached homes and multifamily homes with two to four units. The primary goal of the sample design was to develop samples that were representative of single-family homes in New Jersey. Secondarily, the sample was designed to provide each utility with representative samples from their own service areas and provide insight into overburdened communities (OBCs). NMR developed the sample using a complete set of residential data for New Jersey from a third-party property aggregator.[42] The sample was stratified[43] by electric utilities[44] and overburdened community (OBC) status.

[42] NMR developed the initial work plan with the preference that electric and natural gas utilities would provide databases of customer contact information for sample design and recruiting. However, customer contact information was not available at the time needed for sampling and recruiting participants. Without data from the utilities, NMR could not sample on energy consumption, participation in fuel-assistance programs, or energy-efficiency program participation. Additionally, NMR couldn't incorporate utility branding on the recruitment postcards mailed to homeowners. As an alternative to customer contact information from the utilities, NMR purchased a complete set of residential data for New Jersey from a third-party property aggregator. The data included addresses and basic information about the homes and the names of the owners but not current occupants of individual units, which limited our ability to reach renters. As a result, survey participation rates were lower than planned.

[43] NMR considered stratifying by climate zone and discussed the possibility with Rutgers and SWE. The New Jersey state Climatologist office uses five climate zones for the state and the Technical Reference Manual (TRM) Working Group is integrating the five-zone system into the savings calculations. However, at the time the team developed study weights, mapping the sample and populations to the five-zone system was deemed too difficult and there was uncertainty that the TRM Working Group would convert to the five climate zones at the time of the analysis. As such, we as a group decided not to stratify by climate zone because stratifying using the two-zone system would not be directly comparable to future iterations of the RASS. Data is available by two-zone climate zone in Appendix H.

[44] While electric utility service territories and gas utility service territories do not perfectly align, we sampled on electric utility because all residents receive electric service but not all receive gas service.

Utility. To determine customer population by electric utility service area, the study used data from the Utility Demographic and Firmographic Profile 2020. The sample design included Atlantic City Electric (ACE), Jersey Central Power & Light (JCP&L), Public Service Electric & Gas (PSE&G), Rockland Electric Company (Rockland), and a combined stratum for all municipal electric utility providers. The sample design intentionally oversampled Rockland and municipal utilities because of their smaller customer populations compared to the other utilities. NMR used post-stratification to develop sampling weights and results for gas utilities.

Overburdened Community status. Our sample design further stratified each utility stratum into customers in overburdened communities (OBCs) and not in OBCs by leveraging GIS data defining the geographical boundaries of overburdened communities.[45]

Table 2 displays the estimated populations, sample sizes, and sampling error for the survey effort, including the targeted completions and achieved completions. For all strata, the survey achieved 10% or better sampling error and 2.6% sampling error at the statewide level.

Table 19: Sample Size and Achieved Completes

Stratum	Population of Single-Family Homes	Target		Achieved	
		Target	Sampling Error @ 90% Confidence	Completes	Sampling Error @ 90% Confidence
ACE	247,324	120	7.5%	114	7.7%
ACE (OBC)	93,899	70	9.8%	86	8.9%
JCP&L	588,364	300	4.7%	282	4.9%
JCP&L (OBC)	110,959	70	9.8%	81	9.1%
PSE&G	452,099	220	5.5%	191	6.0%
PSE&G (OBC)	529,984	260	5.1%	207	5.7%
Rockland	42,421	70	9.8%	68	10.0%
Rockland (OBC)	7,430	70	9.8%	67	10.0%
Municipal	27,107	70	9.8%	71	9.7%
Municipal (OBC)	14,023	70	9.8%	84	8.9%
Overall	**2,113,610**	**1,320**	**2.5%**	**1,251**	**2.6%**

A.3 Recruitment and Final Survey Response Disposition

NMR recruited survey participants via postcards mailed to random samples of households selected from the third-party database. The postcards contained invitation language in English and Spanish,[46] a personalized survey access code, a link to the survey, and a QR code to enable mobile device users to quickly enter the survey. Postcards were mailed in waves[47] so that we could monitor sample quotas and redirect mailings to specific areas as needed.

[45] https://experience.arcgis.com/experience/548632a2351b41b8a0443cfc3a9f4ef6
[46] 1% of survey respondents took the survey in Spanish.
[47] The survey was soft-launched with 3,000 invitations in March 2023, followed by five waves of postcard invitations from March to June 2023.

Table 20 shows the final survey disposition compared to targets, response rates, and sampling error by stratum. The survey achieved 1,251 completes (95% of the original target of 1,320 completes). NMR mailed over 145,000 postcards inviting respondents to the survey, for an overall response rate of 0.85%.[48] Response rates in overburdened communities were 0.72%, lower than in non-overburdened communities, which had a response rate of 0.98%.

Table 20: Final Survey Response Disposition and Response Rate by Stratum

Stratum	Completes	Total Postcards	Response Rate
ACE	114	14,758	0.77%
ACE (OBC)	86	13,801	0.62%
JCP&L	282	24,552	1.15%
JCP&L (OBC)	81	11,192	0.72%
PSE&G	191	13,343	1.33%
PSE&G (OBC)	207	18,191	0.89%
Rockland	68	14,306	1.01%
Rockland (OBC)	67	23,261	1.08%
Municipal	71	6,700	0.53%
Municipal (OBC)	84	6,225	0.46%
Overall	**1,251**	**146,389**	**0.85%**

The response rate is similar to a previous New Jersey study fielded by NMR with a similar multi-model web survey design, [49] but lower than we might expect if all of the utilities had provided contact information at the beginning of the study. For example, in a recent baseline study in a Northeast state, NMR employed a similar survey to a sample of utility contacts and achieved a 1.7% response rate. One utility, JCP&L, provided customer contact data for use in Waves 2 through 5. JCP&L had one of the highest response rates of the study (1.16%), compared to 0.96% for the other utilities. JCP&L's response rate increased from 1.11% using the third-party data to 1.18% using customer data provided by the utility.[50]

On average, postcards cost $0.60 each. If the response rate was 1.18%, NMR would have needed to send 42,900 fewer postcards for a study savings of $25,800. The cost to purchase the third-party data was $28,662, for a total cost of $54,462.

To increase response rate, NMR sent email reminders to any respondent who had opened the survey link but had not completed it.[51] Besides the survey incentive, the postcards advertised an

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[48] Nearly 26,000 (18%) of the postcards were sent during Waves 4 and 5 to households that did not respond to an invitation during a previous wave.

[49] The New Jersey Energy Code Compliance study employed the self-audit tool on new construction homes using data from the same third-party source as this study and achieved a response rate of 0.8%.

[50] These estimates do not include the 26,000 remind postcards sent to contacts that had not previously responded to the survey. When these postcards are taken into account, the overall response rate drops to 0.85%.

[51] The third-party data contained addresses only and no email addresses. Email addresses were collected at the beginning of the survey for the purposes of delivering the incentive and communicating with survey respondents as needed about incomplete or illegible photo submissions.

opportunity for participants to win an additional $500 gift card. NMR randomly selected one survey respondent to receive the gift card at the conclusion of the study; however, it is unclear whether this strategy increased response rates beyond what would have been achieved with the incentive only.

In the absence of utility customer data, NMR purchased property data (including the name(s) of the property owner, square footage of the home, and the year it was built) of all single-family homes in New Jersy from a third-party data broker. Because the database recorded property owners, not current occupants, it ultimately proved difficult to reach renters and/or residents of individual units in two- to four-unit buildings. The survey required respondents to be located at their home at the address on record to submit photographs of equipment and nameplates. To ensure delivery of postcards to the current occupant of each home, postcards were addressed to "[Owner Name] or Current Resident." In the case of some of the two- to four-unit buildings, the property owner may live in one of the units and would receive a postcard; in other cases, the property owner appeared to live offsite and property records listed the address of the entire building, without unit numbers. This feature of the dataset made it difficult to reach individual occupants of these buildings, unlike utility customer data, which includes premise addresses.

Table 21 shows that renters and residents of two- to four-unit buildings were under-sampled by the survey. While those respondents were weighted higher (see Appendix A), weights could not overcome the sampling bias and as such, results as not presented by home type or tenure.

Table 21: Completes by Tenure and Home Type

Stratum	% of population (Census)	Number of Completes	% of Survey Responses (Unweighted)
Owner-occupied SF detached	63%	1,072	86%
Owner-occupied SF attached	8%	95	8%
Owner-occupied 2-4 units	5%	21	2%
Renter-occupied SF detached	6%	26	2%
Renter-occupied SF attached	4%	18	1%
Renter-occupied 2-4 units	14%	19	2%
Total	**100%**	**1,251**	**100%**

A.4 Data Collection Instrument

NMR developed a self-report survey, available in English and Spanish, which allowed participants to identify and provide photographs of relevant equipment in their home. The data collected at each home varied based on the equipment in the home, but generally the survey asked about the following information:

- Home characteristics (e.g., building type, age, square footage, room count by type)
- Count, location, and type of appliances, HVAC, and mechanical equipment, with details verified via photo documentation
- Efficiency ratings and age of appliances and mechanical equipment

- Thermostat type and temperature settings
- Counts and types of consumer electronics
- Presence of photovoltaic (PV) panels and battery storage
- Presence of plug-in hybrid and electric vehicles and charging infrastructure
- Weatherization upgrades completed at the home in the past two years
- Household occupancy, overall and during different time periods
- Tenure (renters or homeowners) and responsibility for paying utility bills
- Attitudes toward heat pumps and current energy-saving practices
- Awareness of energy-efficiency programs and recall of program participation
- Demographics

A.4.1 Data Collection Sources by Measure

Table 22 shows the full list of end-uses collected in the web survey and verified by self-audit and/or on-site data collection efforts, as applicable.

Table 22: Data Collection Variables

Measure	Survey	Self-Audit	On-Site
Appliances			
Clothes washer	✓	✓	✓
Clothes dryer	✓	✓	✓
Dishwasher	✓	✓	✓
Refrigerator	✓	✓	✓
Stand-alone freezer	✓	✓	✓
Microwave	✓		
Oven	✓	✓	✓
Stovetop	✓	✓	✓
Consumer Electronics			
Personal computers	✓		
Monitors	✓		
TVs	✓		
Gaming consoles	✓		
Sound systems	✓		
Cell phones	✓		
Integrated devices (modem, printer, router, etc.)	✓		
Primary Heating Fuel			
Natural gas	✓	✓	v
Electric	✓	✓	
Propane	✓	✓	
Oil	✓	✓	
Heating System			
Furnace	✓	✓	✓
Boiler	✓	✓	✓

Measure	Survey	Self-Audit	On-Site
Air source heat pump (ducted)	✓	✓	✓
Ductless mini-split heat pump	✓	✓	✓
Ground source or geothermal heat pump	✓	✓	✓
Electric baseboard	✓	✓	✓
Electric space heater	✓	✓	✓
Electric wall heater	✓		
Electric radiant floors or wall panels	✓		
Gas fireplace or heating stove	✓		
Wood fireplace or heating stove	✓		
Pellet stove	✓		
Solar heater	✓		
Cooling System			
Central air conditioning	✓	✓	✓
Air source heat pump	✓	✓	✓
Ground source or geothermal heat pump	✓	✓	✓
Ductless mini split heat pump	✓	✓	✓
Window or room air conditioner	✓	✓	✓
Whole house fan	✓		
Ceiling fan	✓		
Portable fan	✓		
Thermostat			
Standard manually adjustable	✓	✓	✓
Basic programmable	✓	✓	✓
Wi-Fi connected or smart learning	✓	✓	✓
Water Heating Fuel			
Electric	✓	✓	✓
Natural gas	✓	✓	✓
Propane	✓	✓	✓
Oil	✓	✓	✓
Water Heating System			
Stand-alone storage	✓	✓	✓
Heat pump or electric hybrid	✓	✓	✓
Instantaneous or tankless	✓	✓	✓
Indirect	✓	✓	✓
Solar	✓	✓	✓
Electric Transportation			
Electric-only vehicle	✓	✓	✓
Plug-in hybrid vehicle	✓	✓	✓
Dedicated electric vehicle charging station	✓	✓	✓
Electric scooter or E-scooter	✓		
Electric bicycle or E-bike	✓		
Miscellaneous Measures			
Solar PV	✓	✓	✓
Energy storage battery	✓		
Sump pump	✓		
Well pump	✓		
Pool pump	✓		

Measure	Survey	Self-Audit	On-Site
Pool/spa heater	✓		
Whole-home generator	✓		
Dehumidifier	✓	✓	✓
Humidifier	✓		
Aquarium	✓		
Air purifier	✓	✓	✓
Waterbed	✓		
Building Shell			
Insulation			✓
Windows			✓
Lighting			✓

A.5 On-Site Visits

NMR completed a nested sample of site visits for a sample of 70 survey respondents.[52] NMR sent a trained technician to the homes of respondents who opted in and met our sampling quota needs. On-site visits were completed in May through July 2023. During the visits, NMR collected data pertaining to building characteristics, building shell, and lighting equipment. Additionally, the technician verified the self-reported data from the completed surveys while on site.

A.5.1 Recruitment

At the end of the survey, respondents were offered the opportunity to express interest in participating in a follow-up on-site visit for an additional $150. Of 1,251 survey respondents, 356 respondents (28%) indicated they would be interested in the on-site visit and an additional 219 respondents (18%) said that they might be interested but would like more information. NMR contacted 226 respondents to schedule 70 visits. On average, prospective on-site participants were contacted 1.25 times.

Renters and respondents in multifamily two- to four-unit households were less likely than homeowners and single-family householders to express interest in participating in the on-site and were more difficult to schedule. Due to low sample sizes, NMR contacted all renters and multifamily two- to four- unit respondents that expressed interest in scheduling or receiving additional information about an on-site visit.

Table 23: Interest in Participating in On-site Visit by Home Type

Stratum	Survey Respondents	Interested in on-site (%)
Single-family attached	1,098	29%
Single-family detached	113	28%
Multifamily 2-4 unit	40	10%
Total	**1,251**	**28%**

[52] Sixty of the respondents who received an on-site had submitted at least one photo through the self-audit tool, while 10 of the respondents completed the self-report survey only.

Table 24: Interest in Participating in On-site Visit by Tenure

Stratum	Survey Respondents	Interested in on-site (%)
Owner	1,183	29%
Renter	63	21%
Total	**1,251**	**28%**

A.5.2 Sampling Plan and Composition

Table 25 shows the sample design and achieved completes for the 70 on-site visits. The sample was stratified by OBC and non-OBC and soft quota maximums were set to ensure a representative sample of on-sites. Due to challenges with surveying renters and households in two- to four-unit buildings using the third-party data with contact records for building owners rather than individual units or occupants, NMR had difficulty recruiting on-site visits for these groups from a limited sample.

Table 25: On-site Sample Design

	Sample Design		Achieved	
Data Type	OBC	Non-OBC	OBC	Non-OBC
Hard quota	28	42	28	42
Soft quotas:				
Building type: Maximum 1-unit	*20*	*30*	*19*	*40*
Tenure: Maximum	*22*	*35*	*24*	*41*
Utility: Maximum JCP&L	*--*	*20*	*--*	*18*
Utility: Maximum PSE&G customers (PSE&G)	*20*	*15*	*10*	*11*

The 70 achieved on-site visits were distributed across electric utility service territories (Table 26).

Table 26: Achieved On-site Completes by Electric Utility

Electric Utility	OBC	Non-OBC
ACE	7	10
JCP&L	8	18
Rockland	1	1
PSE&G	10	11
Municipal	2	2
Total	**28**	**42**

A.5.3 Data Collection Points and Procedures

During on-site visits, NMR technicians gathered information about the following types of measures, complementing and expanding on the survey results:

- General home information (age, type, etc.)
- Areas and volume of home components
- Building shell characteristics (material, insulation types, insulation level, etc.)
- Heating, cooling, and ventilation equipment
- Domestic hot water equipment
- Lighting
- Appliances
- Consumer electronics
- Renewables
- Electric vehicles and chargers

Survey respondents were able to upload photos of equipment and appliance configuration and nameplates, but building envelope components are difficult for typical householders to assess and self-report. While on-site, NMR technicians verified data collected via the survey and self-audit uploads and collected additional data on the following components when available/accessible:

- Wall insulation
- Window U-factor
- Vaulted ceiling insulation
- Exterior foundation wall insulation
- Slab insulation
- Basement, garage, and cantilevered floor insulation

NMR relied on the following approaches to gain access to measures for data collection:

On-site visual verification of actual component. Actual observations in the field are the first and most important source of data. When direct access to the component was not possible, we looked for non-invasive alternative methods to gather whatever information we could. For example, when trying to determine exterior wall insulation, we might have removed an electrical outlet cover to probe for the presence of insulation and visually confirm the type of insulation directly or with a borescope.

On-site visual verification of similar component. Once NMR exhausted opportunities to examine the actual component, we used similar locations to inform our assessment. For example, we might have found visible/accessible above-grade wall insulation in an attic knee wall or a walkout basement that could inform our assessment of the enclosed wall cavities.

Documentation from the homeowner. In some cases, the homeowner possessed documentation with information on hard-to-access home components. This could include invoices from the insulation contractor, detailed plans, or photos taken during construction. This documentation can provide useful information on insulation types and R-values in inaccessible cavities, window U-factors, and the presence of insulation on exterior foundation walls or under slabs. We asked for this documentation as needed. Additionally, for homes that had completed the web survey, at times survey data could be used to inform assumptions made by NMR technicians.

A.6 Detailed Weighting Methodology

To ensure that the sample is representative of the New Jersey households, NMR used multiple weighting schemes: full sample (combined on-site and surveys), on-site only, and survey only. To develop analysis weights for this study, NMR compared the web-survey sample with census data representing the New Jersey utility customer population. Similar to the approach used in Utility Demographic and Firmographic Profile 2020, the team assigned a census block group to any service territory that intersected the block group, meaning that some block groups are counted in two service territories. Block groups were matched with service territories using GIS data from the state of New Jersey.[53]

Throughout the report, all tables are weighted unless otherwise noted. The weighting subsections below provide expanded detail on the process and development of the weighting scheme applied in this study.

A.6.1 Survey Weight Development

To develop weights, we compared the web-survey sample with census data representing the New Jersey electric utility customer population. Similar to the approach used in Utility Demographic and Firmographic Profile 2020, the team assigned a census block group to any service territory that intersected the block group, meaning that some block groups are counted in two service territories. Block groups were matched with service territories using GIS data from New Jersey.[54]

[53] https://njogis-newjersey.opendata.arcgis.com/datasets/d23845cc51454ee59affd226cff3fcd5/explore
[54] https://njogis-newjersey.opendata.arcgis.com/datasets/d23845cc51454ee59affd226cff3fcd5/explore

Table 27 shows the households per census block group by service territory and Table 28 shows survey completes by tenure and units in structure in each service territory.

Table 27: Households by Tenure and Units in Structure (Census)

Units and Tenure	ACE		JCP&L		PSE&G		Rockland		Municipal	
	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC
Owner-occupied										
1-unit detached	197,243	67,526	553,028	106,564	407,950	393,129	49,511	11,514	32,569	17,122
1-unit attached	13,595	9,784	53,542	22,244	36,679	81,067	4,782	1,242	1,397	713
2-4 units	3,843	1,570	10,095	6,046	15,851	99,915	1,409	88	985	811
Renter-occupied										
1-unit detached	14,337	11,007	35,597	15,478	20,693	54,484	3,087	940	2,501	2,846
1-unit attached	3,514	8,433	12,654	12,650	10,684	54,530	490	664	5,73	753
2-4 units	8,204	12,654	24,538	23,320	37,334	266,647	1,411	966	2,980	2,879

Source: Census table B25008

Table 28: Survey Completes by Tenure and Units in Structure

Units and Tenure	ACE		JCP&L		PSE&G		Rockland		Municipal	
	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC
Owner-occupied										
1-unit detached	110	72	234	45	172	166	68	62	67	76
1-unit attached	3	9	16	8	10	12	0	0	3	0
2-4 units	1	1	7	11	6	22	0	1	1	5
Renter-occupied										
1-unit detached	0	2	10	3	2	3	0	4	0	2
1-unit attached	0	1	1	4	1	1	0	0	0	1
2-4 units	0	1	14	10	0	3	0	0	0	0

Table 29 shows weights by service territory, combining categories zero or too few completes to calculate its own weight.

Table 29: Initial Survey Population Weights

<table>
<tr><th rowspan="2">Units and Tenure</th><th colspan="2">ACE</th><th colspan="2">JCP&L</th><th colspan="2">PSE&G</th><th colspan="2">Rockland</th><th colspan="2">Municipal</th></tr>
<tr><th>Non-</th><th>OBC</th><th>Non-</th><th>OBC</th><th>Non-</th><th>OBC</th><th>Non-</th><th>OBC</th><th>Non-</th><th>OBC</th></tr>
<tr><td>Owner-occupied, 1-unit detached</td><td>0.787</td><td>0.412</td><td>1.038</td><td>1.038</td><td>1.042</td><td>1.040</td><td>0.320</td><td>0.082</td><td>0.213</td><td>0.099</td></tr>
<tr><td>Owner-occupied, other</td><td>1.914</td><td>0.499</td><td>1.215</td><td>0.654</td><td>1.442</td><td>2.338</td><td colspan="2">3.303</td><td>0.262</td><td>0.134</td></tr>
<tr><td>Renter-occupied (all)</td><td colspan="2">6.384</td><td>1.279</td><td>1.329</td><td colspan="2">19.515</td><td colspan="2">0.830</td><td colspan="2">1.834</td></tr>
</table>

The team applied the initial weights shown in Table 29 to compare survey demographic results to the census to determine if any adjustments are necessary. Table 30 compares the highest level of education achieved by survey respondents to the census.

Table 30: Comparison of Education Level of Survey Respondents to Census

Units and Tenure	ACE		JCP&L		PSE&G		Rockland		Municipal	
	Census	Survey	Census	Survey	Census	Survey	Census	Survey	Census	Survey
Less than HS	7%	1%	5%	1%	9%	1%	3%	1%	7%	1%
HS grad/GED	30%	16%	22%	10%	23%	11%	15%	5%	24%	9%
Some college/ associate’s	29%	28%	24%	19%	22%	10%	20%	21%	25%	33%
Bachelor’s or higher	34%	53%	48%	67%	46%	67%	61%	67%	45%	54%
I’d rather not say	--	2%	--	3%	--	10%	--	6%	--	3%

Source: Census table B25013

Accordingly, NMR determined that an education adjustment would be prudent and applied weight adjustment factors for education shown in Table 31.

Table 31: Weight Adjustment Factors for Education

Highest level of education achieved	ACE	JCP&L	PSE&G	Rockland	Municipal
High school or less	2.212	2.421	2.605	2.998	3.130
College or more	0.756	0.818	0.780	0.867	0.772

The initial survey weights shown in Table 29 were adjusted by the education adjusted factors in Table 31 as follows:

$$Final\ weight = initial\ weight * adjustment\ factor\ for\ education$$

After the education adjustments were applied to the initial weights, NMR checked for any outliers in the weights; trimmed them if needed, and redistributed the weights to ensure the weighted totals matched the population totals.

A.6.1.1 Comparison of Survey Weights to Census

NMR applied the weights and compared the weighted demographics to the census to confirm the weighted results were representative of the state in terms of key demographics. This section contains detailed tables comparing weighted survey results for home type, tenure, race, education, income, home age, and age of householder.

Table 32: Comparison of Survey Weights to Census – Tenure and Home Type

Tenure and Home Type	Statewide		OBC		Non-OBC	
	Census	Survey (n=1,251)	Census	Survey (n=525)	Census	Survey (n=726)
Owner occupied 1-unit detached	64%	68%	46%	52%	79%	80%
Owner-occupied 1-unit attached or 2-4 unit	13%	15%	17%	22%	9%	9%
Renter occupied (all home types)	23%	17%	36%	27%	11%	10%

Table 33: Comparison of Survey Weights to Census – Education

Highest Education Level Achieved	Statewide		OBC		Non-OBC	
	Census	Survey (n=1,251)	Census	Survey (n=525)	Census	Survey (n=726)
Less than high school	7%	3%	10%	3%	4%	3%
High school graduate or GED	23%	25%	25%	28%	21%	22%
Some college or associate's degree	24%	14%	24%	15%	23%	13%
Bachelor's degree or higher	46%	54%	41%	46%	51%	59%
I'd rather not say	--	5%	--	8%	--	2%

Table 34: Comparison of Survey Weights to Census – Race

Race	Statewide		OBC		Non-OBC	
	Census	Survey (n=1,251)	Census	Survey (n=525)	Census	Survey (n=726)
Non-Hispanic White Alone	52%	58%	31%	39%	79%	71%
Non-Hispanic Black Alone	12%	5%	20%	8%	3%	2%
Non-Hispanic Asian Alone	10%	12%	13%	18%	6%	7%
Non-Hispanic Other Race	4%	2%	7%	2%	5%	2%
Hispanic	22%	13%	30%	19%	8%	9%
I'd rather not say	--	11%	--	13%	--	9%

Table 35: Comparison of Survey Weights to Census – Home Age

Year Home Built	Statewide		OBC		Non-OBC	
	Census	Survey (n=1,251)	Census	Survey (n=525)	Census	Survey (n=726)
Before 1960	39%	39%	48%	45%	38%	35%
1960 to 1979	26%	24%	23%	20%	27%	27%
1980 to 1999	22%	19%	18%	17%	23%	21%
2000 or later	13%	13%	11%	12%	12%	13%
I'm not sure	--	5%	--	6%	--	4%

Table 36: Comparison of Survey Weights to Census – Households with Occupants Aged 65 and Over

Age of Householder	Statewide		OBC		Non-OBC	
	Census	Survey (n=1,251)	Census	Survey (n=525)	Census	Survey (n=726)
Households with no occupants aged 65+	68%	66%	72%	67%	64%	65%
Households with one or more occupants aged 65+	33%	34%	28%	33%	36%	35%
I'd rather not say	--	<1%	--	<1%	--	<1%

A.6.2 Self-Audit Weights

NMR applied a similar weighting methodology to the subset of survey responses that submitted self-audit photos and/or completed an on-site visit to make them representative of the state when this subset of responses is analyzed separately. These 838 respondents submitted at least one photo. Overall, 67% of survey responses included photo submissions (Table 37); a similar percentage of respondents from OBCs submitted photos (67%) as respondents from non-OBCs (67%).

Table 37: Self-Audit Completes by Strata

Stratum	Total Survey Completes	Self-Audit Completes	Self-Audit (%)
ACE	200	131	65%
ACE_obc	87	54	62%
JCP&L	363	245	67%
JCP&L_obc	72	52	72%
PSE&G	398	273	69%
PSE&G_obc	208	141	68%
Rockland	135	92	68%
Rockland_obc	67	45	67%
Municipal	155	97	63%
Municipal_obc	84	55	65%
Overall	**1,251**	**838**	**67%**

Table 27 above (not repeated here) shows the households per census block group by service territory and Table 38 shows survey completes by tenure and units in structure in each service territory.

Table 38: Survey Completes with Photos (Self-Audit) by Tenure and Units in Structure

Units and Tenure	ACE		JCP&L		PSE&G		Rockland		Municipal	
	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC
Owner-occupied										
1-unit detached	75	43	159	33	115	112	47	43	40	50
1-unit attached	2	6	9	3	10	9	0	0	1	0
2-4 units	1	0	3	7	5	15	0	1	1	3
Renter-occupied										
1-unit detached	0	2	7	3	2	1	0	1	0	1
1-unit attached	0	1	1	3	1	1	0	0	0	1
2-4 units	0	1	8	9	0	2	0	0	0	

Table 29 shows weights by service territory, combining categories zero or too few completes to calculate its own weight.

Table 39: Initial Self-Audit Population Weights

Units and Tenure	ACE		JCP&L		PSE&G		Rockland		Municipal	
	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC	Non-OBC	OBC
Owner-occupied, 1-unit detached	0.774	0.462	1.023	0.950	1.044	1.033	0.310	0.079	0.240	0.101
Owner-occupied, other	1.710	0.557	1.560	0.832	1.030	2.218	2.212		0.350	0.149
Renter-occupied (all)	4.276		1.338	1.009	6.738	27.627	2.223		1.843	

The team applied the initial weights shown in Table 29 to compare survey demographic results to the census to determine if any adjustments are necessary. Table 30 compares the highest level of education achieved by survey respondents to the census.

Table 40: Comparison of Education Level of Self-Audit Respondents to Census

Units and Tenure	ACE		JCP&L		PSE&G		Rockland		Municipal	
	Census	Self-Audit	Census	Self-Audit	Census	Self-Audit	Census	Self-Audit	Census	Self-Audit
Less than HS	7%	0%	5%	0%	9%	1%	3%	1%	7%	1%
HS grad/GED	30%	17%	22%	10%	23%	16%	15%	5%	24%	7%
Some college/ associate's	29%	29%	24%	17%	22%	9%	20%	19%	25%	39%
Bachelor's or higher	34%	53%	48%	70%	46%	64%	61%	60%	45%	49%
I'd rather not say	--	2%	--	2%	--	11%	--	15%	--	3%

Source: Census table B25013

Accordingly, NMR determined that an education adjustment would be prudent and applied weight adjustment factors for education shown in Table 31.

Table 41: Self-Audit Weight Adjustment Factors for Education

Highest level of education achieved	ACE	JCP&L	PSE&G	Rockland	Municipal
High school or less	2.213	2.527	1.923	3.170	3.492
College or more	0.755	0.813	0.820	0.864	0.764

The initial survey weights shown in Table 29 were adjusted by the education adjusted factors in Table 31 as follows:

$$Final\ weight = initial\ weight * adjustment\ factor\ for\ education$$

After the education adjustments were applied to the initial weights, NMR checked for any outliers in the weights; trimmed them if needed, and redistributed the weights to ensure the weighted totals matched the population totals.

A.6.3 On-Site Weights

NMR calculated on-site weights to use for calculations involving only on-site data. Table 42Table 27 shows the households per census block group by service territory and Table 43 shows survey completes by tenure and units in structure in each service territory.

Table 42: Households by Tenure and Units in Structure (Census) for On-site Weights

Electric utility, tenure, and home type	OBC	Non-OBC
JCP&L: owner-occupied 1-unit detached	106,564	553,028
PSE&G: owner-occupied 1-unit detached	393,129	407,950
ACE, Rockland, & Municipal utilities: owner-occupied 1-unit detached	96,162	279,323
Any utility: owner-occupied 1-unit attached or 2-4 unit	223,480	142,178
Any utility: renter-occupied, all home types	468,251	178,597

Table 43: On-site Completes by Tenure and Units in Structure

Electric utility, tenure, and home type	OBC	Non-OBC
JCP&L: owner-occupied 1-unit detached	3	16
PSE&G: owner-occupied 1-unit detached	8	10
ACE, Rockland, & Municipal utilities: owner-occupied 1-unit detached	8	13
Any utility: owner-occupied 1-unit attached or 2-4 unit	5	2
Any utility: renter-occupied, all home types	4	1
Total	**28**	**42**

Table 44: On-site Weight Adjustment Factors for Education

Highest level of education achieved	OBC	Non-OBC
High school or less	2.812	1.184
College or more	0.740	0.949

The initial survey weights shown in Table 45 were adjusted by the education adjusted factors in Table 31 as follows:

$$Adjusted\ weight = initial\ weight * adjustment\ factor\ for\ education$$

NMR applied the adjusted education weights to the on-site data and compared demographics to the census to determine if any additional adjustments were necessary (Table 31).

Table 45: Comparison of Home Age of On-site Respondents to Census

Home age	OBC		Non-OBC	
	Census	On-sites (n=28)	Census	On-sites (n=42)
Before 1960	48%	21%	38%	28%
1960 to 1979	23%	9%	27%	29%
1980 to 1989	18%	12%	23%	18%
2000 or later	11%	45%	12%	25%
I'm not sure	--	13%	--	0%

Accordingly, NMR determined that an education adjustment would be prudent and applied weight adjustment factors for education shown in Table 46.

Table 46: On-site Weight Adjustment Factors for Home Age

Home age	OBC	Non-OBC
Before 1960	1.350	2.257
1960 to 1979	0.940	2.579
1980 to 1989	1.278	1.555
2000 or later	0.486	0.186

The initial education-adjusted weights shown in Table 45 were adjusted by the home age adjustment factors Table 31 as follows:

$$Final\ weight = adjusted\ weight * adjustment\ factor\ for\ home\ age$$

After the education and home age adjustments were applied to the initial on-site weights, NMR checked for any outliers in the weights; trimmed them if needed, and redistributed the weights to ensure the weighted totals matched the population totals.

A.7 Detailed Adjustment Factor Methodology

The multi-modal survey guides respondents through self-reporting appliances and equipment, but it can still be difficult for some respondents to distinguish between types of equipment (e.g., furnaces and boilers). For the fraction of measures where we do not have photo evidence confirming the equipment type, we applied adjustment factors to those self-reported responses to correct for presumed mischaracterization.

NMR developed the following approach to create adjustment factors:

1) Calculate a net error rate using validated information from the on-site visits as well as self-audit photos for key equipment types.
2) Develop adjustment factors based on the net error rate.
3) Apply the adjustment factor to unverified self-reports of the same equipment on the customer survey to correct for self-report errors.

Definitions:

- A *false positive* for an equipment type occurred when a respondent incorrectly reported the presence of that equipment in their home – i.e., they reported on the survey that they have this equipment in their homes but the on-site data or verified photos indicate something else.
- A *false negative* for an equipment type occurred when a respondent incorrectly reported the absence of that equipment in their home – i.e., they reported on the survey that they have some other type of equipment in their homes but the on-site data or verified photos indicate that they actually do have this equipment.
- A *true positive* for a given type of equipment type occurred when a respondent correctly reported the presence of that equipment in their home – i.e., they reported on the survey that they have this equipment in their homes and the on-site data or verified photos confirm it.
- *Verified responses* are the sum of *false positive* responses, *false negative* responses, and *true positive* responses.

Calculations:

$$\%\, False\ Positive = \frac{Number\ of\ false\ positive\ responses}{Number\ of\ all\ verified\ responses} * 100\%$$

$$\%\, False\ Negative = \frac{Number\ of\ false\ negative\ responses}{Number\ of\ all\ verified\ responses} * 100\%$$

$$Adjustment\ factor = 100\% - \%\, False\ Positive + \%\, False\ Negative$$

Additional details about the approach are provided in the subsections below.

Using this approach, NMR developed adjustment factors for measures with photo verification collected through the survey or on-site sites. Some measures have adjustment factors for *saturation* (they had more or fewer units of the appliance than reported in the survey) and *penetration* (the presence of the measure in the household was incorrect or equipment type or fuel was mischaracterized). An adjustment factor less than 1.0 indicates that false positives exceed false negatives for that equipment, i.e., saturation and penetration figures among unverified survey responses is overstated due to self-report errors for that equipment.

To ensure precision-related robustness, NMR applied these adjustment factors only when there are at least ten photo/on-site cases, and an absolute precision criterion of 90/25 is met for the estimate from verified cases.

A.7.1 Overview of Primary Data Collection

The survey was completed by 1,251 respondents. Survey respondents had the options of taking the survey only and self-reporting the mechanical equipment and appliances in their home for a base incentive of $25 or participating in a “self-audit” by submitting photos of the equipment and the nameplate for $5 per item (for a total incentive of up to $50). Two-thirds of those respondents (n=838) submitted at least one photo of an appliance or mechanical equipment and nameplate. NMR also completed a nested sample of on-site audits at 70 homes, where technicians collected information on the efficiency, location, and characteristics of any appliances or equipment not previously recorded by self-audit photos, if any, at that site.[55] Technicians also collected some lighting and building shell data during the site visits. Table 47 shows the breakdown of the type of survey responses.

Table 47: Sample Size by Data Collection Activity

Data Type	Number of Respondents	% of Survey Respondents
Surveys	1,251	100%
Self-Audit (Respondent submitted at least one photo)	838	67%
On-site	70	6%

As shown in Table 48, NMR verified 41% to 65% of self-reported survey responses with photos submitted through the self-audit tool and/or on-site data collection efforts.

[55] Sixty of the respondents who received an on-site had submitted at least one photo through the self-audit tool, while 10 of the respondents completed the self-report survey only. On-site visits were recruited from among survey respondents who indicated their interest in additional study participation on the survey.

Table 48: Photo Verification of Survey Responses, by End Use

End Use	Percentage of Survey Responses with Photo Verification (On-Site and/or Self-Audit)
Appliances	
Refrigerator	65%
Dishwasher	59%
Clothes washer	47%
Clothes dryer	42%
Mechanical	
Heating (including heat pumps)	55%
Cooling	41%
Water heating	57%

NMR created a “recoded” variable, which was first populated with verified data from the on-site visits, followed by verified data from the self-audit photos, and lastly any self-reported survey results with no photo data. A companion variable to this recoded variable indicates the source of the data. For example, if a furnace was recorded in an on-site visit, the recoded furnace variable would receive a value of 1 and the source variable reads “On-site.” If this study participant had self-reported having a boiler on the survey, but the technician observed a furnace, not a boiler, the recoded boiler variable would receive a value of 0. In a scenario in which there was no on-site visit and no self-audit photos of that end use, the survey respondent’s self-reported data would be taken at face value and the source would be listed as “Survey.” The subset of respondents that did not receive an on-site visit or submit photos through the self-audit tool are unverified responses.

A.7.2 Adjustment Factor

The study’s approach to develop the adjustment factors is as-follows:

1) Calculate a net error rate using validated information from the on-site visits as well as self-audit photos for key equipment types.
2) Develop adjustment factors based on the net error rate.
3) Apply the adjustment factor to unverified self-reports of the same equipment on the customer survey to correct for self-report errors.

Definitions:

- A *false positive* for an equipment type occurs when a respondent incorrectly reports the presence of that equipment in their home – i.e., they reported on the survey that they have this equipment in their homes but the on-site data or verified photos indicate something else.
- A *false negative* for an equipment type occurs when a respondent incorrectly reports the absence of that equipment in their home – i.e., they reported on the survey that they have some other type of equipment in their homes but the on-site data or verified photos indicate that they actually do have this equipment.

- A *true positive* for a given type of equipment type occurs when a respondent correctly reports the presence of that equipment in their home – i.e., they reported on the survey that they have this equipment in their homes and the on-site data or verified photos confirm it.
- *Verified responses* are the sum of *false positive* responses, *false negative* responses, and *true positive* responses.

Calculations:

$$\% \, False \ Positive = \frac{Number \ of \ false \ positive \ responses}{Number \ of \ all \ verified \ responses} * 100\%$$

$$\% \, False \ Negative = \frac{Number \ of \ false \ negative \ responses}{Number \ of \ all \ verified \ responses} * 100\%$$

$$Adjustment \ factor = 100\% - \% \, False \ Positive + \% \, False \ Negative$$

Table 49 shows how adjustment factors were calculated for heating end uses. An adjustment factor less than 1.0 indicates that false positives exceed false negatives for that equipment, i.e., saturation and penetration figures among unverified survey responses is overstated due to self-report errors for that equipment.

To ensure precision-related robustness, NMR applied these adjustment factors only when there are at least ten photo/on-site cases, and an absolute precision criterion of 90/25 is met for the estimate from verified cases.

Table 49: Adjustment Factor for Heating End Uses

End Use	Photos (n)	False Positive (A)	False Negative (B)	Adjustment Factor (100%-A+B)
ASHP/GSHP	32	66%	0%	34%
MSHP	11	11%	0%	89%
Furnace	399	10%	7%	97%
Boiler	192	6%	23%	116%
Electric Baseboard	26	0%	4%	104%

Table 50 demonstrates how the adjustment factor was be applied to primary heating type. In this example, adjustment factors are only applied to furnaces, boilers, heat pumps, and electric baseboards, because photo verification data was not collected for space heaters, fireplaces, or heating stoves. Adjustment factors from Table 49 were applied to the percentage of responses that were self-reported only (i.e., respondents reported having these on the survey but there were no photos from the on-sites or self-audits to verify the reported equipment). The adjusted saturations are scaled proportionally to make them sum to 100%.

Table 50: Adjustment Factor Applied to Primary Heating Type

End Use	Total Unadjusted Saturation (Verified & Self-Reported)	Verified Saturation (On-Site/Self-Audit Photos)	Self-Reported Saturation (Survey Results) – *Apply Adjustment*	Adjusted Saturation *(Verified Saturation + Adjusted Self-Reported)*	Adjusted Saturation (After Proportional Scaling to 100%)
Furnace	59%	*25%*	*34% (**	58%	59%
Boiler	23%	*12%*	*11%*	25%	27%
ASHP/GSHP	5%	*1%*	*4% (*34%)*	2%	2%
Electric Baseboard	3%	*1%*	*2% (* 104%)*	3%	3%
MSHP	0%	*0%*	*0% (* 89%)*	0%	0%
Electric wall or space heater	2%			2%	3%
Wood fireplace or pellet stove	1%			1%	1%
Gas fireplace or heating stove	1%			1%	1%
No heat/don't know	6%			6%	6%
Total	**100%**			**99%**	**100%**

A.7.3 Other RASS & Baseline Study Approaches to Adjustment Factors

NMR reviewed several previous RASS and baseline studies to compare our approach. The studies generally included a small number of on-sites that comprised small shares of the total study sample. The studies used the on-site validated data to correct for reporting errors in the much larger number of self-reported survey responses.

None of the similar studies we reviewed explicitly recognized the tradeoff between precision and validity or had a consideration for the nested design (small samples of higher quality data nested within larger samples of lower quality data) other than determining a threshold below which no adjustment factor would be applied, as further described below.

NMR's adjustment method is similar to those used in comparable studies in the past. Past studies had much lower on-site sample sizes relative to the survey sample to validate information and develop adjustment factors. In contrast, in addition to on-site visits, NMR's NJ RASS study had photographic data from a much larger sample of respondents to validate information. Therefore, compared to past studies, a much larger share of the total sample in the NJ RASS study had validated information and a smaller share of unverified data to which the adjustment factors would be applied.

A.7.3.1 Massachusetts Baseline Studies and RASS

The 2020 and 2022[56] MA Baseline Study and the 2009 MA RASS study collected data from both on-sites and survey sample. These studies adjusted survey responses by comparing the saturation of a given measure claimed in the survey to on-site results for the same sites.

The 2022 study used on-site data to adjust statewide saturations using the ratio of the number of each type of equipment verified on-site to the number of each type of equipment claimed in the survey. These adjustment factors were applied when the equipment was present in at least 10 on-sites.

The 2009 study collected data from 118 in-home visits to validate data and adjust for the 2,667 survey responses. The study first developed an adjustment factor based on values from the 118 site visits and the values from the survey responses of the same 118 households. The adjustment factors were then multiplied by the values from the survey responses for all 2,667 households. There was no threshold used for the number of validated responses.

A.7.3.2 Connecticut RASS

The 2019 RASS study[57] conducted by NMR Group used on-site data to adjust survey responses using the same adjustment factor calculations used in Massachusetts. Adjustment factors were applied in cases where on-site verified results differed statistically significantly from the web survey results at the 90% confidence level. The same approach was used in a related study in Rhode Island (2018).[58]

A.7.3.3 California RASS

The 2019 California RASS study[59] implemented by DNV GL included online and mailed paper surveys. The study did not include any photographic data nor on-site data collection to adjust unverified survey responses.

A.7.3.4 Vermont Single-Family Residential New Construction Baseline Study

The 2020[60] Vermont Single-Family Residential New Construction Baseline and Compliance Study implemented by NMR collected data through a multi-modal web survey and on-sites. While the study explored calculating adjustment factors using a method like the 2019 Connecticut RASS study, NMR ultimately did not apply the adjustment factors because of insufficient on-site sample sizes. The study design was different from NJ RASS; the adjustment factors in the Vermont study would have been applied to self-audit data, not unverified survey responses.

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[56] https://ma-eeac.org/wp-content/uploads/Residential-Building-Use-and-Equipment-Characterization-Study-Comprehensive-Report-2022-03-01.pdf

[57] https://energizect.com/sites/default/files/documents/R1706%20and%20R1616-R1708%20CT%20RASS%20Lighting_Final%20Report_10.1.19.pdf

[58] https://rieermc.ri.gov/wp-content/uploads/2019/04/national-grid-ri2311-rass-final-report-11oct2018.pdf

[59] https://www.energy.ca.gov/sites/default/files/2021-08/CEC-200-2021-005-MTHLGY.pdf

[60] https://publicservice.vermont.gov/sites/dps/files/documents/VT_2020_SF_RNC_Baseline_Final_Report_Jan242023.pdf

A.8 Statistical Testing

In statistical tables, the means presented are weighted means unless otherwise noted. Likewise, all proportion tables present weighted proportions unless otherwise noted. Superscript letters indicate that there is 90% probability that the compared results are truly different from each other, and only a 5% probability that observed differences happened by chance. Significance testing was only performed when both tested samples had sample sizes of at least ten. Throughout the report, the terms "significant" and "significantly" always refer to *statistical* significance at the 90% confidence level.

Table 51 shows an example of a statistical table found in the appendices B through G. The percentage of households with boilers as the primary heating type in overburdened communities ("OBC") are significantly different from the "non-OBC" households as denoted by the "a" in superscript. The "Statewide" column represents the overall distribution for the table and is not tested for significance against any of the sub-groups.

Table 51: Significance Testing Example: Primary Heating Type by OBC

Heating Type	Statewide	OBC	Non-OBC
n (households)	*1,251*	*525*	*726*
Furnace	59%	56%	61%
Boiler	25%	29%[a]	23%
ASHP/GSHP	2%	2%	2%
Electric Baseboard	3%	2%	3%
MSHP	0%	0%	0%
Electric wall or space heater	2%	2%	2%
Wood fireplace or pellet stove	1%	1%	2%
Gas fireplace or heating stove	1%	3%[b]	0%
No heat/don't know	6%	6%	6%

[a] Significantly different than households in non-overburdened communities at the 90% confidence level.

In addition to statistical tables and proportional tables, this report frequently presents *penetration* and *saturation* results. *Penetration* is defined as the number of homes that have at least one of the relevant measures. For example, the penetration of LED bulbs shows the percentage of homes that have at least one LED bulb. *Saturation* is defined as the number of units of a relevant technology per household or across the sample. For example, the saturation of LEDs refers to the percentage of all light bulbs that are LED bulbs. Since a single home may have, for example, light bulbs of several different types, penetration tables may sum to more than 100%. Saturation and proportion tables sometimes do not sum to exactly 100% due to rounding error.

A.9 Classification of Data and Definitions

The following describes how the collected data was analyzed by the various splits presented throughout the main body and the appendices of the report.

A.9.1 Overburdened Communities

Overburdened communities (OBCs) are defined as census block groups that satisfy at least one of three conditions:

1) At least 35% low-income households; or
2) At least 40% of the residents identify as minority or as members of a State-recognized tribal community; or
3) At least 40% of the households have limited English proficiency.

Residents of OBCs are disproportionately impacted by environmental and public health stressors. A 2023 Environmental Justice law instituted additional protections and regulations on the permitting process for new industrial facilities.[61]

NMR used the mapping tools provided by the New Jersey Department of Environmental Protection to assign addresses in our sample into two samples: overburdened communities (hereafter, "OBC") or non-overburdened community ("non-OBC").

According to the New Jersey Department of Environmental Protection, 41% of the census blocks qualify for OBC status because they are low-income and 92% qualify because at least 40% of the residents identify as minority (Table 52).

Table 52: Population in OBC by Criteria

(Source: NJ Department of Environmental Protection)

Overburdened Community Criteria	NJ Population	Percentage
Low-income	296,799	6%
Low-income & Limited English	787	<1%
Low-income & Minority	1,557,772	31%
Low-income, Minority, & Limited English	165,707	3%
Minority	3,034,009	60%
Minority & Limited English	41,992	1%
Total	5,097,065	100%

Overall, 32% of the households in OBCs identified as low-income compared to 18% of the houses in non-OBCs (Table 53).

Table 53: Income Status of Households in OBCs

Income	OBC	Non-OBC
n (households)	*525*	*726*
Low-income	32%	18%
Moderate-income	15%	20%
Non-LMI	24%	38%
Refused	30%	24%

[61] https://dep.nj.gov/wp-content/uploads/ej/docs/ej-rule-frequently-asked-questions.pdf

Nearly one-third of respondents in OBC homes identified as non-white, compared to 11 in non-OBC homes (Table 54).

Table 54: Race or Ethnicity of Households in OBC

Race/Ethnicity	OBC	Non-OBC
n (households)	*525*	*726*
White	69%	89%
Non-white	31%	11%

When results are presented by OBC throughout the report, they are not synonymous with results by income, but might suggest additional opportunities to invest in these communities that struggle with other challenges including environmental health impacts, financial insecurity, or difficulty accessing services due to limited English proficiency.

Detailed results by OBC status are shown in Appendix B.

A.9.2 Income Status

Survey respondents were asked to self-report their household occupancy and total household income in 2022. Household occupancy was used to determine eligibility for assistance programs (Table 55) and piped into a series of questions about whether total household income was more or less than the eligibility thresholds.

Table 55: Eligibility for Income-based Assistance Programs by Household Size

	2022 Program Eligibility Thresholds[1]		
Number of Occupants	LIHEAP	ARP/USF	PAGE
1	$41,569	$54,360	$69,282
2	$54,360	$73,240	$90,600
3	$67,151	$92,120	$111,918
4	$79,942	$111,000	$133,237
5	$92,732	$129,880	$154,553
6	$105,523	$148,760	$175,872
7	$107,922	$167,640	$179,970
8 or more	$110,320	$186,520	$183,867

[1] https://www.nj.gov/bpu/assistance/programs/

Income categories were assigned based on self-reported income:

- *Low-income* respondents reported total household incomes less than 60% of the state median income and are eligible for LIHEAP;
- *Moderate-income* respondents reported incomes that fall between LIHEAP and the Payment Assistance for Gas and Electric (PAGE) program; and
- *Non-low-and-moderate income* (hereafter, “non-LMI”) reported that their income is more than the PAGE eligibility threshold.

One-quarter of respondents (26%) opted not to provide income information and are excluded from income analyses splits and tables in Appendix C.

A.9.3 Electric and Gas Utilities

Data is shown for each electric and gas utility in New Jersey.

Electric utilities:

- Atlantic City Electric (ACE)
- Jersey Central Power & Light (JCP&L)
- Public Service Electric and Gas (PSE&G)
- Rockland Electric Company (RECO)
- Municipal electric utilities (MUNI)

Gas utilities:

- Elizabeth Town Gas (E'TOWN)
- New Jersey Natural Gas (NJNG)
- Public Service Electric and Gas (PSE&G)
- South Jersey Gas (SJG)

A.9.4 Program Participation

Survey respondents were asked to self-report awareness of and participation in programs and rebates offered through their utility and the New Jersey Clean Energy Program. Over two-thirds of respondents (70%) were aware that their utility and/or the NJ Clean Energy program offers programs and rebates(Table 56).[62]

Table 56: Awareness of Energy-Efficiency Programs and Rebates

(Source: Survey)

Awareness	Total awareness (any program)	Utility program or rebates	NJ Clean Energy Program
n (households)	*1,251*	*1,096[a]*	*1,251*
Aware	70%	56%	58%
Not aware	16%	29%	29%
Don't know	5%	15%	13%

[a] Question not asked of municipal electric customers.

Overall, nearly one-quarter of survey respondents (23%) recalled participating in a program or receiving a rebate (Table 57). Respondents most frequently reported receiving rebates for installing energy-efficient appliances (9%) and purchasing equipment through their utility's online marketplace (8%). Note that survey respondents are likely unaware if they participated in an upstream or midstream program, such as upstream lighting programs.

[62] Effective July 1, 2021, some programs and rebates that had formerly been administered by the New Jersey Clean Energy program were offered through gas and electric utilities. The survey included awareness questions about both utility programs and the New Jersey Clean Energy program as respondents may have recalled participating through either program. (New Jersey Clean Energy Program. "Rebates and Promotions." https://njcleanenergy.com/main/rebates-and-promotions/rebates-and-promotions. Accessed February 11, 2024.)

Table 57: Self-Reported Program Participation

(Source: Survey)

Program Description	Participation (%)
n (households)	*1,251*
Any program[1]	23%
Rebate(s) for installing energy-efficient appliances	*9%*
Purchased equipment through utility's online marketplace	*8%*
Home energy assessment[2]	*6%*
Rebate(s) for heating or cooling equipment	*4%*
Appliance recycling	*3%*
Financed upgrades through 0% interest loan or on-bill financing	*2%*
Electric vehicle or charger rebates	*1%*
Aware of programs and did not participate	41%
Unaware of programs or unsure	37%

[1] Does not sum to 100%; some respondents self-reported participating in more than one program.
[2] Includes Home Performance with ENERGY STAR, quick home energy check-up, and income-eligible home weatherization programs

Table 58 shows the income status of self-reported program participants. Fewer low-income respondents recalled participating in a program in the past two years. Some respondents may be unaware if their household participated if their landlord was involved or they recently moved.

Table 58: Program Participation by Income

Income	Statewide	Program Participant	Non-Participant
n (households)	*1,251*	*306*	*945*
Low-income	24%	14%	28%
Moderate-income	17%	26%	15%
Non-LMI	32%	36%	31%
Refused	26%	24%	27%

Throughout the report, *program participants* are those respondents that self-reported participating in any program, and all other respondents, including those who were unaware that their utility or the NJ Clean Energy Program offered programs or rebates, are considered *non-participants.* Detailed results by program participation are provided in Appendix F.

A.9.5 Climate Zone

While the state of New Jersey is adapting to a five-climate zone model, this study provides data for climate zones 4A and 5A, which align with current building codes.[63]

A.10 Benchmarking

[63] https://www.nj.gov/dca/codes/publications/pdf_bulletins/b.15_4.pdf

The results of this study were benchmarked against the 2020 Residential Energy Consumption Survey (RECS)[64, 65] state-level estimates for New Jersey and the recently completed 2023 residential baseline study in Pennsylvania. While it can be useful to compare these results to see recent changes and jurisdictional differences, it should be noted that there are some methodological differences between these studies. For example, RECS data relies on self-reported results but does not include on-site visits or photo verification that was conducted as a part of this study. The Pennsylvania baseline study only reported on photo verified and on-site survey results, not on self-reported data. The results of the benchmarking are shown in Appendix H.

A.11 Study Limitations

This subsection outlines some limitations due to the design or circumstances of the study.

The study could not reach many multifamily two- to four-unit homes or renters due to limitations of the property dataset purchased in lieu of utility customer data. The contact information was for property owners, not occupants of individual units, and a property with multiple units was listed as the same address. JCP&L did provide customer data that was used in survey invitations after Wave 1. Two-thirds of the renters (67%) and 60% of the respondents from two- to four-unit homes were in the JCP&L service territory, even though by population JCP&L has 19% of the renters and 12% of the two- to four-unit homes in the state.

By design, the study is an occupied homes study and has limited coverage of seasonal rentals or vacation homes. To capture detailed information on efficiency, equipment configuration, age, and ENERGY STAR status, the survey asked respondents to take photos of their appliances and equipment. For this reason, the survey required the respondent to be located at the address listed on the study invitation while taking the survey.

Multifamily two- to four-unit respondents reported on appliances and equipment that served their unit. Central building systems or appliances located in common areas (e.g., clothes washers and dryers) would not be captured by this study.

As with all surveys, some information is self-reported, which has inherent uncertainty. The study sought to address self-report challenges in the survey by providing detailed instructions and pop-up resource lists with photo examples to minimize any areas of misunderstanding. Further, NMR verified survey responses when photos from the self-audit or virtual audit were available to clarify or corroborate self-reported responses. NMR used the difference between self-reported responses and verified photo evidence to create adjustment factors that are applied only to the portion of responses that are self-reported, if applicable. Tables and figures note whether the data comes from the survey (self-report), self-audit (photo evidence), and/or on-sites (verified on-site by an NMR technician).

[64] https://www.eia.gov/consumption/residential/data/2020/index.php?view=state
[65] https://www.puc.pa.gov/media/2883/2023_pa_residential_baseline_study.pdf

B

Appendix B Detailed Findings

B.1 Building Envelope Data (On-Site Visits)

This subsection includes detailed building envelope data observed during the 70 on-site inspections.

Table 59: Above-Grade Wall Insulation Type

(Source: On-site data)

Insulation Type	Statewide	OBC	Non-OBC
n (households)	*69[a]*	*27*	*42*
No Insulation	22%	25%	19%
Fiberglass Batt	74%	68%	78%
Blown-in Cellulose	3%	7%	--
Fiberglass Batt + Rigid Foam	1%	--	2%
Closed-cell Spray Foam + Rigid Foam	0%	--	1%

[a] Excludes one basement apartment with no above-grade framed walls.

Table 60: Above-Grade Wall Insulation R-Value

(Source: On-site data)

R-Value	Statewide	OBC	Non-OBC
n (households)	*69[a]*	*27*	*42*
Mean	11.0	10.8	11.2
Min	0.0	0.0	0.0
Max	33.0	20.4	33.0
Median	13.0	13.0	13.0
Std. Dev.	6.2	5.8	6.5

[1]Excludes one basement apartment with no above-grade framed walls

Table 61: Flat Attic Insulation Type

(Source: On-site data)

Insulation Type	Statewide	OBC	Non-OBC
n (households)	*55[a]*	*19*	*36*
No Insulation	12%	20%	5%
Fiberglass Batt	60%	53%	66%
Blown-in Cellulose	9%	12%	7%
Blown-in Fiberglass	8%	1%	13%
Blown-in Cellulose + Fiberglass Batt	6%	13%	--
Blown-in Fiberglass + Fiberglass Batt	5%	1%	9%
Rock Wool Batt	0%	--	1%

[a] Excludes 5 attics that were inaccessible for the technician

Table 62: Flat Attic R-Value

(Source: On-site data)

R-Value	Statewide	Yes	No
n (households)	*55*[a]	*19*	*36*
Mean	23.7	21.8	25.2
Min	0.0	0.0	0.0
Max	60.0	45.8	60.0
Median	30.0	30.0	30.0
Std. Dev.	13.0	12.7	13.2

[a] Excludes 5 attics that were inaccessible for the technician

Table 63: Vaulted Ceiling Insulation Type

(Source: On-site data)

Insulation Type	Statewide	OBC	Non-OBC
n (households)	*8*[a]	*5*	*3*
No Insulation	39%	39%	--
Fiberglass Batt	61%	61%	100%

[a] Excludes two homes that only had adiabatic ceilings with apartments above them

Table 64: Vaulted Ceiling R-Value

(Source: On-site data)

R-Value	Statewide	OBC	Non-OBC
n (households)	*8*	*5*	*3*
Mean	18.1	17.3	19.0
Min	0.0	0.0	19.0
Max	38.7	38.7	19.0
Median	19.0	19.0	19.0
Std. Dev.	11.1	14.6	0.0

Table 65: Foundation Type

(Source: On-site data)

Foundation Type	Statewide	Detached single-family	Attached single-family	Multifamily (3-5)
n (households)	*70*	*58*	*9*	*3*
Apt. over Enclosed Space	7%	--	4%	63%
Cond./Uncond. Mix	3%	4%	--	--
Conditioned Basement	7%	10%	--	--
Enclosed Crawlspace	13%	16%	5%	--
Slab	19%	13%	41%	37%
Unconditioned Basement	50%	57%	49%	--

Table 66: Framed Floor Over Unconditioned Space, Insulation Type

(Source: On-site data)

Insulation Type	Statewide	OBC	Non-OBC
n (households)	*43*	*17*	*26*
No Insulation	93%	99%	89%
Fiberglass Batt	7%	1%	11%

Table 67: Framed Floor Over Unconditioned Space, R Value

(Source: On-site data)

R-Value	Statewide	OBC	Non-OBC
n (households)	*43*	*17*	*26*
Mean	1.7	0.3	2.8
Min	0.0	0.0	0.0
Max	30.0	18.0	30.0
Median	0.0	0.0	0.0
Std. Dev.	9.8	4.4	11.7

Table 68: Glazing Type (Percentage of Total Window Area)

(Source: On-site data)

Type	Statewide	OBC	Non-OBC
n (window area, ft^2)	*12,118*	*4,151*	*7,967*
Double-Pane, Low-E	18%	16%	32%
Double-Pane, No Low-E	72%	83%	60%
Single-Pane	11%	1%	7%

B.3 LIGHTING DATA (ON-SITE VISITS)

Table 69: Bulb Type Saturation by OBC

(Source: Survey data)

Bulb Type	Statewide	OBC	Non-OBC
n (bulbs)	*2,955*	*992*	*1,963*
LED	52%	45%	56%[a]
LED Bulb	*33%*	*28%*	*35%[a]*
LED Fixture	*19%*	*17%*	*20%*
CFL	23%	29%	20%[a]
Incandescent	18%	18%	18%
Halogen	4%	4%	4%
Fluorescent	3%	3%	2%
Empty Socket	<1%	<1%	<1%

[a] Statistically significantly different from OBC households at the 90% confidence level.

Table 70: Bulb Type Penetration by OBC

(Source: On-site data)

Bulb Type	Statewide	OBC	Non-OBC
n (bulbs)	*70*	*28*	*42*
LED	97%	95%	98%
LED Bulb	*95%*	*95%*	*96%*
LED Fixture	*70%*	*59%*	*76%*
CFL	89%	80%	94%
Incandescent	81%	73%	85%
Fluorescent	45%	49%	42%
Halogen	44%	31%	52%
Empty Socket	10%	5%	12%

Table 71: Inefficient Bulb Configuration Saturation by OBC

(Source: On-site data)

Configuration	Statewide	OBC	Non-OBC
n (halogen & incandescent bulbs)	*695*	*240*	*455*
A-line	52%	53%	51%
Spot/Reflector/Flood	30%	28%	31%
Candle (B/C/F)	11%	13%	10%
Globe	7%	5%	8%
Other[1]	<1%	<1%	--

[1] Includes strip/tape and under cabinet lighting.

Table 72: Bulb Configuration Saturation by OBC

(Source: On-site data)

Configuration	Statewide	OBC	Non-OBC
n (bulbs)	*2,945*	*988*	*1,957*
A-line	36%	31%	37%[a]
Spot/Reflector/Flood	34%	33%	34%
Twist	12%	15%	11%[a]
Candle (B/C/F)	6%	5%	6%
Fixture	4%	7%	3%[a]
Globe	4%	4%	4%
Tube	3%	4%	3%
Other[1]	1%	1%	2%

[a] Statistically significantly different from OBC households at the 90% confidence level.
[1] Includes strip/tape and under cabinet lighting.

Table 73: Bulb Configuration Penetration by OBC

(Source: on-site data)

Configuration	Statewide	OBC	Non-OBC
n (bulbs)	*70*	*28*	*42*
A-line	100%	100%	100%
Spot/Reflector/Flood	83%	80%	85%
Twist	77%	69%	81%
B/C/F	75%	71%	78%
Fixture	54%	56%	54%
Globe	54%	58%	52%
Tube	50%	56%	47%
Other[1]	<1%	1%	--

[1] Includes strip/tape and under cabinet lighting.

Table 74: Bulb Location by OBC

(Source: on-site data)

Location	Statewide	OBC	Non-OBC
n (bulbs)	*2,955*	*992*	*1,963*
Interior	92%	93%	91%
Exterior	8%	7%	9%

Table 75: Interior Bulb Type Saturation by OBC
(Source: on-site data)

Bulb Type	Statewide	OBC	Non-OBC
n (bulbs)	*2,698*	*908*	*1,790*
LED	52%	45%	56%[a]
CFL	22%	29%	19%[a]
Incandescent	18%	18%	19%
Halogen	4%	4%	4%
Fluorescent	3%	4%	3%
Empty Socket	<1%	<1%	<1%

[a] Statistically significantly different from OBC households at the 90% confidence level.

Table 76: Exterior Bulb Type Saturation by OBC
(Source: on-site data)

Bulb Type	Statewide	OBC	Non-OBC
n	*257*	*84*	*173*
LED	52%	46%	54%
CFL	34%	30%	35%
Incandescent	8%	18%	5%[a]
Halogen	6%	6%	6%
Empty Socket	<1%	1%	--

[a] Statistically significantly different from OBC households at the 90% confidence level.

B.4 THERMOSTATS

Table 77: Average Heating Temperature by Primary Heating Type
(Source: survey data)

Average setting in degrees Fahrenheit:	Furnace or Boiler	Heat pump
n (respondents)	*1,023*	*44*
Morning (6am – 9am)	67.6	69.1
Day (9am – 5pm)	67.2	68.3
Evening (5pm – 9pm)	68.4	69.5
Night (9pm – 6am)	66.1	67.4

Table 78: Average Cooling Temperature by Primary Cooling Type
(Source: survey data)

Average setting in degrees Fahrenheit:	Central AC	RAC	Heat pump
n (respondents)	*871*	*159*	*41*
Morning (6am – 9am)	72.1	68.2	72.6
Day (9am – 5pm)	72.7	68.7	72.6
Evening (5pm – 9pm)	72.1	68.1	72.4
Night (9pm – 6am)	71.9	68.1	72.4

Table 79: Average Daytime Temperature by Occupancy

(Source: survey data)

Average setting in degrees Fahrenheit:	At least one person at home	No one is home
n (respondents)	*954*	*72*
Heating	67.7	62.5
Cooling	71.6	74.5

B.5 Statewide Equipment Age

This section shows the average and median ages of equipment (statewide).

Table 80: Age of Heating Equipment

(Source: Self-audit and on-site data)

	Furnaces	Boilers	Heat Pumps
n (equipment)	*156*	*73*	*15*
Mean	12.4	20.2	5.8
Median	10.5	19.0	5.0
Minimum	0	1	1
Maximum	39	83[1]	18
Standard Deviation	9.0	12.3	4.2

[1] One boiler that was still in use was estimated to be manufactured in 1950; dates of manufacture are less precise for older equipment, but efficiency was recorded accurately from the nameplate.

Table 81: Age of Cooling Equipment

(Source: Self-audit and on-site data)

	Central AC	Room AC	Heat Pumps
n (equipment)	*218*	*75*	*15*
Mean	11.8	7.8	5.8
Median	10.0	8.0	5.0
Minimum	1	0	1
Maximum	39	24	18
Standard Deviation	8.7	5.5	4.2

Table 82: Age of Kitchen Appliances

(Source: Self-audit and on-site data)

	Refrigerator	Freezer	Dishwasher
n (equipment)	*705*	*99*	*431*
Mean	9.7	11.1	10.0
Median	8.0	8.0	7.0
Minimum	0	0	0
Maximum	56	60	42
Standard Deviation	7.6	10.2	6.7

Table 83: Age of Laundry and Air Appliances

(Source: Self-audit and on-site data)

	Clothes Washer	Clothes Dryer	Air Purifier	Dehumidifier
n (equipment)	*403*	*426*	*20*	*106*
Mean	9.1	9.1	4.0	6.0
Median	7.0	8.0	3.0	4.0
Minimum	0	0	1	1
Maximum	44	36	17	23
Standard Deviation	7.0	6.8	4.2	4.5

B.6 Additional Trends in Cooling

Table 84: Households that Installed Cooling in 2020 or Later

(Source: Survey, on-site, and self-audit data)

	Central AC	ASHP/GSHP	MSHP	Room AC
n (households)	*232*	*11*	*19*	*114*
Replaced previously installed cooling system	84%	88%	25%	37%
New cooling load	11%	12%	75%	52%
I'm not sure	5%	--	--	11%

Table 85: Households with CAC that Installed MSHP or RAC in 2020 or Later

(Source: Survey, on-site, and self-audit data)

	MSHP	Room AC
n (households)	*11*	*25*
Replaced previously installed cooling system	13%	17%
New cooling load	87%	69%
I'm not sure	--	14%

Table 86: Estimated Coverage of Cooling Systems

(Source: On-site and self-audit data)

	On-site	Self-audit*
n (households with central cooling & recorded output in BTU)	*55*	*170*
Central AC, ASHP, or GSHP only	89%	88%
Sufficiently cooled (≥80%)	*54%*	*57%*
Insufficiently cooled (<80%)	*35%*	*31%*
Central AC/ASHP/GSHP + supplemental (MSHP/room AC)	11%	12%
Sufficiently cooled (≥80%)	*11%*	*10%*
Insufficiently cooled (<80%)	--	*3%*

*Does not sum to 100% due to rounding.

Table 87: Ducted Homes without Central Cooling

(Source: Survey, on-site, and self-audit data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*215*	*226*	*482*
Homes with ducts	84%	74%	85%	91%
Ducts but no central cooling	12%	24%	7%	5%

B.7 HEAT PUMP AWARENESS

Table 88: Agreement with Statements About Heat Pumps

(Source: Survey respondents who have owned a heat pump or had heard of them before survey)

Agreement with statements:	Statewide	Own a HP	Aware but do not Own a HP
n (respondents)	*452*	*132*	*320*
Heat pumps are better for the environment than other heating or cooling systems.	31%	23% [a]	37%
Heat pumps can save money on my energy bills.	34%	32%	35%
A heat pump can provide enough heat, even on the coldest days.	33%	49% [a]	28%
A heat pump cools as well as or better than other cooling systems.	25%	32% [a]	25%
Heat pumps are less expensive to install than other heating and cooling systems.	30%	28%	33%
Heat pumps are more reliable than other heating and cooling systems.	10%	11%	6%
Heat pumps are quieter than other heating and cooling systems.	10%	10%	9%
Heat pumps have lower maintenance costs than other heating and cooling systems.	16%	26% [a]	14%

[a] Statistically significantly different from HP-Own households at the 90% confidence level.

C

Appendix C Results by Overburdened Community

This section shows detailed tables for penetration, saturation, fuel, efficiency, configuration, age and ENERGY STAR status by whether the home is located in an OBC or non-OBC designated area.

C.1 Heating

C.1.1 Primary Heating

Table 89: Primary Heating Fuel by OBC
(Source: On-site, self-audit, and survey)

Primary Heating	Statewide	OBC	Non-OBC
n (households)	*1,251*	*525*	*726*
Natural gas	70%	69%	68%
Electricity	10%	12%	13%
Oil	8%	6%	9%
Wood or pellet	1%	1%	2%
Propane	1%	0%	2%
No heat/don't know	10%	12%	7%

Table 90: Primary Heating Type by OBC
(Source: On-site, self-audit, and survey data)

Heating Type	Statewide	OBC	Non-OBC
n (households)	*1,251*	*525*	*726*
Furnace	59%	56%	61%
Boiler	25%	29%[a]	23%
ASHP/GSHP	2%	2%	2%
Electric baseboard	3%	2%	3%
MSHP	0%	0%	0%
Electric wall or space heater	2%	2%	2%
Wood fireplace or pellet stove	1%	1%	2%
Gas fireplace or heating stove	1%	3%[b]	0%
No heat/don't know	6%	6%	6%

[a] Significantly different than households in non-overburdened communities at the 90% confidence level.

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Table 91: Penetration of All Heating Systems by OBC

(Source: On-site, self-audit, and survey data)

Heating Type	Statewide	OBC	Non-OBC
n (households)	*1,251*	*525*	*726*
Furnace	63%	61%	65%
Boiler	31%	36%[a]	27%
Electric space heater, wall heater, or radiant heat	10%	11%	9%
Electric baseboard heat	8%	11%[a]	6%
Wood fireplace or pellet stove	8%	4%[a]	11%
Gas fireplace or heating stove	6%	7%	6%
ASHP or GSHP	5%	6%	4%
MSHP	2%	1%	2%
No heat/don't know	5%	5%	6%

[a] Significantly different than households in non-overburdened communities at the 90% confidence level.

C.1.2 Furnaces

Table 92: Furnace Fuel by OBC

(Source: Self-audit and on-site data)

Fuel	Statewide	OBC	Non-OBC
n (furnaces)	*243*	*99*	*144*
Natural gas	92%	95%	89%
Oil	7%	4%	9%
Propane	1%	1%	1%
Electric	0%	0%	1%

Table 93: ENERGY STAR Qualification of Furnaces by OBC

(Source: Self-audit and on-site data)

	Statewide	OBC	Non-OBC
n (furnaces)	*226*	*97*	*129*
ENERGY STAR-qualified	47%	46%	48%
Certified	*39%*	*39%*	*40%*
Meets minimum qualifications	*8%*	*7%*	*8%*
Non-qualified	53%	54%	52%

Table 94: Age of Furnaces by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (furnaces)	*156*	*64*	*92*
2021 to 2023	13%	12%	14%
2018 to 2020	16%	14%	16%
2013 to 2017	21%	22%	20%
2008 to 2012	15%	16%	15%
2003 to 2007	17%	16%	17%
1993 to 2002	14%	19%	12%
1992 or earlier	4%	1%	6%

Table 95: Average Year of Manufacture of Furnaces by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (furnaces)	*156*	*64*	*92*
Average	2011	2011	2011
Median	2013	2012	2013
Minimum	1984	1992	1984
Maximum	2023	2022	2023
Standard Deviation	9.0	8.6	9.4

Table 96: Furnace Efficiency by OBC

(Source: Self-audit and on-site data)

Unit - AFUE	Statewide	OBC	Non-OBC
n (furnaces)	*198*	*83*	*115*
Average	87.8	87.6	88.0
Median	90.5	92.0	84.9
Minimum	66.0	66.0	68.0
Maximum	98.1	98.0	98.1
Standard Deviation	7.5	7.5	7.5

C.1.3 Boilers

Table 97: Boiler Fuel by OBC

(Source: Self-audit and on-site data)

Fuel	Statewide	OBC	Non-OBC
n (boilers)	*146*	*48*	*98*
Natural gas	71%	83%	73%
Oil	27%	17%	24%
Propane	1%	0%	2%

Table 98: ENERGY STAR Qualification of Boilers by OBC

(Source: Self-audit and on-site data)

	Statewide	OBC	Non-OBC
n (boilers)	*131*	*45*	*86*
ENERGY STAR-qualified	38%	53%	29%
Certified	*17%*	*19%*	*16%*
Meets minimum qualifications	*21%*	*34%[a]*	*13%*
Non-qualified	61%	47%[a]	71%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 99: Age of Boilers by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (boilers)	*75*	*26*	*49*
2021 to 2023	12%	19%	8%
2018 to 2020	4%	9%	0%
2013 to 2017	12%	5%	16%
2008 to 2012	9%	8%	10%
2003 to 2007	17%	24%	12%
1993 to 2002	28%	21%	33%
1992 or earlier	18%	14%	21%

Table 100: Boiler Year of Manufacture by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (boilers)	*73*	*24*	*49*
Average	2003	2007	2000
Median	2004	2005	2003
Minimum	1950	1979	1950
Maximum	2022	2022	2022
Standard Deviation	12.3	11.8	12.5

Table 101: Boiler Efficiency (AFUE)

(Source: Self-audit and on-site data)

Unit - AFUE	Statewide	OBC	Non-OBC
n (boilers)	*106*	*31*	*75*
Average	84.9	84.5	85.0
Median	83.5	82.7	83.6
Minimum	78.0	78.8	78.0
Maximum	96.0	95.5	96.0
Standard Deviation	4.8	4.6	4.9

C.2 COOLING

C.2.1 Primary Cooling

Table 102: Primary Cooling System by OBC

(Source: On-site, self-audit, and survey data)

Cooling System	Statewide	OBC	Non-OBC
n (households)	*1,251*	*525*	*726*
Central AC	68%	56%[a]	77%
Window or room AC	23%	37%[a]	12%
Ceiling fans	2%	1%[a]	3%
ASHP	1%	0%	2%
MSHP	1%	1%	1%
Portable fans	1%	1%	1%
GSHP	0%	0%	0%
Whole house or attic fan	0%	0%	0%
No cooling system/don't know	3%	3%	2%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 103: Cooling System Penetration

(Source: On-site, self-audit, and survey data)

Cooling System*	Statewide	OBC	Non-OBC
n (households)	*1,251*	*525*	*726*
Central AC	69%	57%[b]	79%
Window or room AC	29%	42%[b]	19%
Ceiling fans	28%	24%	31%
ASHP	3%	3%	4%
MSHP	3%	2%	3%
Portable fans	12%	13%	12%
GSHP	0%	0%	0%
Whole house or attic fan	3%	3%	4%
No cooling system/don't know	2%	3%	2%

*Does not sum to 100% because some households have more than one cooling system.
[a] Statistically significantly different from non-OBC households at the 90% confidence level.

C.2.2 Permanent Cooling

Table 104: ENERGY STAR Qualification of Permanent Cooling Equipment[1] by OBC

(Source: Self-audit and on-site data)

	Statewide	OBC	Non-OBC
n (cooling equipment)	*272*	*118*	*154*
ENERGY STAR-qualified	42%	35%	46%
Certified	*20%*	*20%*	*20%*
Meets minimum qualifications	*21%*	*15%[a]*	*26%*
Non-qualified	58%	65%	54%

[a] Significantly different than cooling equipment in non-OBC households at the 90% confidence level.
[1] Permanent cooling systems refer to equipment that cannot be easily removed, and excludes equipment such as room ACs and other portable AC units.

Table 105: Age of Permanent Cooling Equipment[1] by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (cooling equipment)	*312*	*143*	*169*
2021 to 2023	14%	14%	15%
2018 to 2020	32%	37%	27%
2013 to 2017	15%	19%	12%
2008 to 2012	14%	10%	17%
2003 to 2007	11%	13%	9%
1993 to 2002	12%	7%[a]	17%
1992 or earlier	2%	1%	3%

[a] Statistically significantly different than cooling equipment in non-OBC households at the 90% confidence level.
[1] Permanent cooling systems refer to equipment that cannot be easily removed, and excludes equipment such as room ACs and other portable AC units.

Table 106: Permanent Cooling Efficiency (SEER)[1] by OBC

(Source: Self-audit and on-site data)

Unit - SEER	Statewide	OBC	Non-OBC
n (units)	*265*	*117*	*148*
Average	13.8	13.6	14.0
Median	14.0	13.0	14.0
Minimum	8.2	9.0	8.2
Maximum	29.4	29.4	29.3
Standard Deviation	3.2	3.2	3.2

[1] Permanent cooling systems refer to equipment that cannot be easily removed and excludes equipment such as room ACs and other portable AC units.

C.2.3 Central AC

Table 107: ENERGY STAR Qualification of Central Acs by OBC

(Source: Self-audit and on-site data)

Qualification Status	Statewide	OBC	Non-OBC
n (units)	*236*	*108*	*128*
ENERGY STAR-qualified	38%	32%	43%
Certified	*19%*	*17%*	*20%*
Meets minimum qualifications	*19%*	*15%*	*23%*
Non-qualified	62%	68%	57%

Table 108: Age of Central AC Equipment by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (units)	*218*	*94*	*124*
2021 to 2023	15%	14%	16%
2018 to 2020	24%	28%	22%
2013 to 2017	11%	16%	9%
2008 to 2012	15%	14%	17%
2003 to 2007	12%	13%	11%
1993 to 2002	19%	14%	22%
1992 or earlier	3%	1%	4%

Table 109: Year of Manufacture of Central AC Equipment by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (units)	*218*	*94*	*124*
Average	2011	2013	2010
Median	2013	2013	2013
Minimum	1984	1984	1990
Maximum	2022	2022	2022
Standard Deviation	8.7	8.8	8.6

Table 110: Efficiency of Central AC Equipment

(Source: Self-audit and on-site data)

Unit - SEER	Statewide	OBC	Non-OBC
n (equipment)	*230*	*106*	*124*
Average	13.2	13.0	13.3
Median	13.4	13.0	13.5
Minimum	8.2	9.1	8.2
Maximum	23.0	19.7	23.0
Standard Deviation	2.1	1.9	2.4

C.2.4 Room Air Conditioner

Table 111: ENERGY STAR Qualification of Room Air Conditioners by OBC

(Source: Self-audit and on-site data)

Qualification Status	Statewide	OBC	Non-OBC
n (RAC units)	*112*	*64*	*48*
ENERGY STAR-qualified	31%	24%	43%
Certified	*31%*	*22%*[a]	*43%*
Meets minimum qualifications	*1%*	*1%*	*0%*
Non-qualified	69%	76%[a]	57%

[a] Statistically significantly different from RAC units in non-OBC households at the 90% confidence level.

Table 112: Age of Room Air Conditioners by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (RAC units)	*75*	*44*	*31*
2021 to 2023	14%	14%	14%
2018 to 2020	42%	45%	32%
2013 to 2017	23%	22%	24%
2008 to 2012	11%	7%	22%
2003 to 2007	9%	11%	4%
1993 to 2002	1%	0%	3%
1992 or earlier	0%	0%	0%

Table 113: Efficiency of Room Air Conditioners by OBC

(Source: Self-audit and on-site data)

Unit - CEER	Statewide	OBC	Non-OBC
n (RAC units)	*106*	*63*	*43*
Average	11.1	11.0	11.1
Median	11.0	11.0	11.1
Minimum	6.2	6.2	6.5
Maximum	15.0	15.0	15.0
Standard Deviation	1.4	1.3	1.5

C.3 HEAT PUMPS

Table 114: Heat Pump Saturation by OBC
(Source: On-site, self-audit, and adjusted survey data)

	Statewide	OBC	Non-OBC
n (households)	*1,251*	*525*	*726*
ASHP	2%	2%	2%
GSHP	1%	2%	<1%
MSHP	2%	1%	2%
Any heat pump	5%	5%	4%

Table 115: ENERGY STAR Qualification of Heat Pumps by OBC
(Source: Self-audit and on-site data)

	Statewide	OBC	Non-OBC
n (heat pumps)	*29*	*9*	*20*
ENERGY STAR-qualified	70%	84%	65%
Certified	38%	64%	28%
Meets minimum qualifications	32%	20%	37%
Non-qualified	30%	16%	35%

Table 116: Age of Heat Pumps by OBC
(Source: Self-audit and on-site data)

Age of Heat Pumps	Statewide	OBC	Non-OBC
n (heat pumps)	*15*	*3*	*12*
2021 to 2023	4%	0%	5%
2018 to 2020	70%	89%	66%
2013 to 2017	11%	11%	11%
2008 to 2012	9%	0%	10%
2003 to 2007	7%	0%	8%
1993 or earlier	0%	0%	0%

Table 117: Year of Manufacture of Heat Pumps by OBC
(Source: Self-audit and on-site data)

Age of Heat Pumps	Statewide	OBC	Non-OBC
n (heat pumps)	*15*	*3*	*12*
Average	2017	2019	2017
Median	2018	2018	2018
Minimum	2006	2016	2006
Maximum	2022	2020	2022
Standard Deviation	4.2	2.0	4.6

Table 118: Heat Pump Efficiency (HPSF) by OBC

(Source: Self-audit and on-site data)

Unit - HSPF	Statewide	OBC	Non-OBC
n (heat pumps)	*26*	*7*	*19*
Average	10.1	11.5[a]	9.6
Median	10.0	11.3	9.4
Minimum	7.7	10.0	7.7
Maximum	13.8	13.8	13.8
Standard Deviation	1.8	1.4	1.7

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 119: Heat Pump Efficiency (SEER) by OBC

(Source: Self-audit and on-site data)

Unit - SEER	Statewide	OBC	Non-OBC
n (equipment)	*30*	*9*	*21*
Average	19.0	22.7[a]	17.7
Median	19.0	20.3	18.2
Minimum	13.0	16.0	13.0
Maximum	29.4	29.4	29.3
Standard Deviation	4.6	4.6	4.2

[a] Statistically significantly different from heat pumps in non-OBC households at the 90% confidence level.

Table 120: Agreement with Statements About Heat Pumps by OBC

(Source: Survey respondents who have a heat pump or had heard of them before survey)

Agreement with statements:	Statewide	OBC	Non-OBC
n (respondents)	*452*	*174*	*278*
Heat pumps are better for the environment than other heating or cooling systems.	31%	32%	29%
Heat pumps can save money on my energy bills.	35%	37%[a]	32%
A heat pump can provide enough heat, even on the coldest days.	32%	35%[a]	30%
A heat pump cools as well as or better than other cooling systems.	26%	27%[a]	23%
Heat pumps are less expensive to install than other heating and cooling systems.	12%	17%[a]	23%
Heat pumps are more reliable than other heating and cooling systems.	21%	26%[a]	17%
Heat pumps are quieter than other heating and cooling systems.	19%	23%	17%
Heat pumps have lower maintenance costs than other heating and cooling systems.	18%	25%[a]	16%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 121: Energy Conservation Statements by OBC

(Source: Survey data)

What respondent has done in household to save energy	Statewide	OBC	Non-OBC
n (respondents)	*1,251*	*525*	*726*
Everything I can think of	11%	11%	11%
Most things	33%	31%[a]	35%
A few things	46%	46%	47%
Nothing	5%	6%	4%
I'm not sure	5%	6%	3%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

C.4 CONTROLS

Table 122: Thermostat Penetration by OBC

(Source: Self-audit and on-site data)

Type	Statewide	OBC	Non-OBC
n (thermostats)	*1,251*	*525*	*726*
Programmable	49%	47%	51%
Smart/Learning	31%	28%	34%
Manual	40%	39%	40%

Table 123: Programmable Feature Use by OBC

(Source: Self-audit and on-site data)

Type	Statewide	OBC	Non-OBC
n (households with programmable or smart/learning thermostats)	*558*	*227*	*331*
Use programmable features *often*	24%	19%	27%[a]
Use programmable features *sometimes*	44%	41%	46%
Use programmable features *rarely*	31%	39%	25%[a]
Use programmable features *never*	2%	2%	2%

[a] Statistically significantly different from OBC households at the 90% confidence level.

Table 124: Average Thermostat Set Point for Heating by OBC

(Source: Self-audit and on-site data)

Unit - Fahrenheit	Statewide	OBC	Non-OBC
n (households)	*1,171*	*487*	*684*
Morning (6am – 9am)	67.6	68.0[a]	67.3
Day (9am – 5pm)	67.2	67.3	67.1
Evening (5pm – 9pm)	68.3	68.6[a]	68.2
Night (9pm – 6am)	66.2	66.9[a]	65.7

[a] Statistically significantly different from Non-OBC households at the 90% confidence level.

Table 125: Average Thermostat Set Point for Cooling by OBC

(Source: self-audit and on-site data)

Unit - Fahrenheit	Statewide	OBC	Non-OBC
n (households)	*1,104*	*457*	*647*
Morning (6am – 9am)	71.3	70.9[a]	71.5
Day (9am – 5pm)	71.8	71.5[a]	72.0
Evening (5pm – 9pm)	71.2	71.0	71.3
Night (9pm – 6am)	71.0	70.8[a]	71.3

[a] Statistically significantly different from Non-OBC households at the 90% confidence level.

C.5 WATER HEATING

Table 126: Water Heating Fuel Share by OBC

(Source: On-site and self-audit data)

Fuel	Statewide	OBC	Non-OBC
n (water heaters)	*542*	*232*	*310*
Natural Gas	84%	88%	80%
Electric	13%	10%	15%
Propane	2%	1%	2%
Oil	1%	1%	2%
Solar	0%	0%	–

Table 127: Water Heating Fuel Share by Type and OBC

(Source: On-site and self-audit data)

Type and Fuel	Statewide	OBC	Non-OBC
n (water heaters)	*560*	*239*	*321*
Storage, Stand-alone	**88%**	**90%**	**87%**
Natural Gas	85%	88%	82%
Electric	14%	11%	16%
Propane	1%	0%	2%
Instantaneous	**8%**	**6%**	**9%**
Natural Gas	88%	90%	86%
Propane	9%	7%	9%
Electric	4%	3%	4%
Storage, Indirect heat	**3%**	**4%**	**3%**
Natural Gas	60%	80%	44%
Oil	39%	17%	56%
Electric	2%	3%	–
Storage, Heat pump	**1%**	**--**	**1%**
Storage, Solar	**0%**	**0%**	**--**
Combi Boiler, Natural gas	**0%**	**--**	**0%**

Table 128: Water Heating Equipment Age by OBC

(Source: On-site and self-audit data)

Age Group	Statewide	OBC	Non-OBC
n (water heaters)	*560*	*239*	*321*
2021 or later	14%	11%	16%
2018 to 2020	21%	20%	22%
2013 to 2017	32%	34%	31%
2008 to 2012	12%	13%	11%
2003 to 2007	13%	12%	13%
1993 to 2002	7%	9%	6%
1992 or earlier	1%	2%	1%

Table 129: Water Heater Efficiency by OBC

(Source: On-site and self-audit data)

Efficiency (UEF)	Statewide	OBC	Non-OBC
n (water heaters)	*505*	*217*	*288*
Mean	0.70	0.67[a]	0.72
Min	0.41	0.41	0.45
Max	3.88	0.99	3.88
Median	0.62	0.62	0.63
Std. Dev.	0.27	0.13	0.33

[a] Significantly different from non-OBC households at the 90% confidence level.

Table 130: Water Heater ENERGY STAR Status by OBC

(Source: On-site and self-audit data)

ENERGY STAR	Statewide	OBC	Non-OBC
n (water heaters)	*532*	*228*	*304*
ENERGY STAR Qualified	27%	21%[a]	32%
ENERGY STAR Certified	*19%*	*14%[a]*	*23%*
Meets Minimum Standards	*8%*	*7%*	*8%*
Not Qualified	73%	79%[a]	68%

[a] Significantly different from non-OBC households at the 90% confidence level.

Table 131: Water Heater Capacity by OBC

(Source: On-site and self-audit data)

Capacity (Gallons)	Statewide	OBC	Non-OBC
n (water heaters)	*481*	*208*	*271*
<40	479	7%	2%
40 to 55	4%	87%	88%
55 to 75	88%	6%	8%
>75	7%	1%	2%

C.6 Appliances

C.6.1 Kitchen Appliances

Table 132: Kitchen Appliance Penetration by OBC

(Source: Survey, self-audit, and on-site data)

Appliance	Statewide	OBC	Non-OBC
n (households)	*1,251*	*306*	*945*
Refrigerator	97%	96%	98%
Oven/range	98%	98%	99%
Microwave	91%	87%	94%
Dishwasher	79%	70%	87%
Stand-alone freezer	31%	29%	33%
Beverage cooler or wine fridge	14%	11%	17%

Table 133: Average Number of Kitchen Appliances per Household by OBC

(Source: Survey, self-audit, and on-site data)

Appliance	Statewide	OBC	Non-OBC
n (households)	*1,251*	*306*	*945*
Refrigerator	1.28	1.23[a]	1.31
Microwave	0.97	0.94[a]	0.99
Dishwasher	0.82	0.72[a]	0.89
Stand-alone Freezer	0.36	0.35	0.37
Beverage cooler or wine fridge	0.17	0.13[a]	0.19

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 134: Households with Multiple Kitchen Appliances by OBC

(Source: Survey, self-audit, and on-site data)

Appliance	Statewide	OBC	Non-OBC
n (households)	*1,251*	*306*	*945*
Two or more refrigerators	28%	26%	30%
Two or more dishwashers	2%	2%	2%
Two or more standalone freezers	3%	4%	2%

C.6.1.1 Refrigerators

Table 135: Refrigerator Door Configuration by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (refrigerators)	*773*	*318*	*455*
Bottom Freezer	43%	37%[a]	48%
Top Freezer	31%	40%[a]	24%
Side by Side	24%	22%	25%
Single Door	2%	1%	3%
Internal Freezer	<1%	--	<1%
Mini-fridge	<1%	--	<1%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 136: Refrigerator ENERGY STAR Status by OBC

(Source: Self-audit and on-site data)

Status	Statewide	OBC	Non-OBC
n (refrigerators)	*754*	*310*	*444*
ENERGY STAR-qualified	62%	58%	64%
Certified	*46%*	*42%*	*49%*
Meets minimum qualifications	*15%*	*16%*	*15%*
Non-qualified	38%	42%	36%

Table 137: Age of Refrigerators by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (refrigerators)	*705*	*290*	*415*
2021 to 2023	14%	14%	14%
2018 to 2020	24%	26%	22%
2013 to 2017	23%	19%	26%
2008 to 2012	21%	23%	19%
2003 to 2007	10%	12%	9%
1993 to 2002	7%	5%	9%
1992 or earlier	1%	1%	1%

Table 138: Average Refrigerator Volume by OBC

(Source: Self-audit and on-site data)

Unit – cubic feet	Statewide	OBC	Non-OBC
n (refrigerators)	*754*	*307*	*447*
Average	22.1	22.3	22.0
Median	22.4	22.3	22.5
Minimum	1.6	3.1	1.6
Maximum	36.7	34.8	36.7
Standard Deviation	5.3	4.9	5.5

Table 139: Average Refrigerator Consumption by OBC

(Source: self-audit and on-site data)

Unit – kWh/yr	Statewide	OBC	Non-OBC
n (refrigerators)	*760*	*313*	*447*
Average	584.6	573.2[a]	592.5
Median	587.0	583.0	594.0
Minimum	180.0	218.0	180.0
Maximum	1,887.0	1,887.0	1,570.0
Standard Deviation	149.2	160.4	140.9

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

C.6.1.2 Freezers

Table 140: Freezer Configuration by OBC

(Source: Self-audit and on-site data)

Configuration	Statewide	OBC	Non-OBC
n (freezers)	*127*	*56*	*71*
Chest	66%	68%	65%
Upright	34%	32%	35%

Table 141: Freezer ENERGY STAR Status by OBC

(Source: Self-audit and on-site data)

Status	Statewide	OBC	Non-OBC
n (freezers)	*121*	*54*	*67*
ENERGY STAR-qualified	35%	41%	29%
Certified	*21%*	*24%*	*19%*
Meets minimum qualifications	*13%*	*16%*	*11%*
Non-qualified	65%	59%	71%

Table 142: Age of Freezers by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (freezers)	*99*	*41*	*58*
2021 to 2023	11%	8%	14%
2018 to 2020	33%	49%[a]	19%
2013 to 2017	17%	20%	15%
2008 to 2012	9%	6%	12%
2003 to 2007	15%	10%	20%
1993 to 2002	11%	7%	15%
1992 or earlier	3%	0%	5%

[a] Significantly different from non-OBC households at the 90% confidence level.

Table 143: Average Freezer Volume by OBC

(Source: self-audit and on-site data)

Unit – cubic feet	Statewide	OBC	Non-OBC
n (freezers)	*121*	*52*	*69*
Average	10.3	8.8[a]	11.5
Median	7.2	7.0	10.0
Minimum	3.5	3.5	3.5
Maximum	30.0	30.0	21.0
Standard Deviation	5.9	6.3	5.6

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 144: Average Freezer Efficiency (Annual kWh) by OBC

(Source: self-audit and on-site data)

Unit – Annual kWh	Statewide	OBC	Non-OBC
n (freezers)	*122*	*54*	*68*
Average	360.9	309.8[a]	406.2
Median	284.5	280.0	305.0
Minimum	193.0	193.0	193.0
Maximum	1,302.0	1,223.0	1,302.0
Standard Deviation	205.5	180.9	221.2

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

C.6.1.3 Dishwashers

Table 145: Age of Dishwashers by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (dishwashers)	*431*	*164*	*267*
2021 to 2023	13%	11%	13%
2018 to 2020	22%	17%	24%
2013 to 2017	25%	22%	26%
2008 to 2012	18%	17%	18%
2003 to 2007	16%	24%[a]	11%
1993 to 2002	4%	6%	3%
1992 or earlier	3%	2%	3%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 146: Average Dishwasher Efficiency by OBC

(Source: Self-audit and on-site data)

Unit – Annual kWh	Statewide	OBC	Non-OBC
n (dishwashers)	*476*	*183*	*293*
Average	299.1	305.1	295.4
Median	270.0	270.0	270.0
Minimum	85.0	85.0	231.0
Maximum	680.0	680.0	614.0
Standard Deviation	63.6	70.7	58.8

Table 147: Dishwasher ENERGY STAR Status by OBC

(Source: Self-audit and on-site data)

Status	Statewide	OBC	Non-OBC
n (dishwashers)	*492*	*190*	*302*
ENERGY STAR Qualified	74%	66%[a]	78%
Certified	*66%*	*53%[a]*	*73%*
Meets minimum qualifications	*8%*	*13%[a]*	*5%*
Non-qualified	26%	34%[a]	22%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

C.6.1.4 Cooking

Table 148: Oven Fuel Type by OBC

(Source: Self-audit and on-site data)

Configuration	Statewide	OBC	Non-OBC
n (ovens)	*181*	*79*	*102*
Natural Gas	71%	61%[a]	80%
Electric	19%	20%	18%
Unknown (Natural gas or propane)	9%	19%[a]	--
Propane	1%	--	1%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 149: Range Fuel Type by OBC

(Source: Self-audit and on-site data)

Configuration	Statewide	OBC	Non-OBC
n (ranges)	*176*	*82*	*94*
Natural Gas	72%	65%	80%
Resistance Electric	16%	15%	17%
Unknown (Natural gas or propane)	10%	18%	--[a]
Induction Electric*	2%	2%	1%
Propane	1%	--	2%

*Based on visual inspection only.

Table 150: Convection Oven Saturation

(Source: Self-audit and on-site data)

Convection	Statewide
n (ovens)	141
Yes	58%
No	42%

C.6.2 Laundry

Table 151: Laundry Appliance Penetration by OBC

(Source: Survey, self-audit, and on-site data)

Appliance	Statewide	OBC	Non-OBC
n (households)	*1,251*	*525*	*726*
Clothes washer	93%	87%	98%
Clothes dryer	92%	86%	97%

Table 152: Average Number of Laundry Appliances per Household by OBC

(Source: Survey, self-audit, and on-site data)

Appliance	Statewide	OBC	Non-OBC
n (households)	*1,251*	*306*	*945*
Clothes washer	0.95	0.90[a]	0.99
Clothes dryer	0.95	0.89[a]	0.99

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 153: Households with Multiple Laundry Appliances by OBC

(Source: Survey, self-audit, and on-site data)

Appliance	Statewide	OBC	Non-OBC
n (households)	*1,248*	*524*	*724*
Two or more washers	2%	2%	1%
Two or more dryers	2%	3%	2%

C.6.2.1 Clothes Washers

Table 154: Age of Clothes Washers by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (clothes washers)	*403*	*167*	*236*
2021 to 2023	12%	10%	14%
2018 to 2020	27%	23%	29%
2013 to 2017	27%	27%	28%
2008 to 2012	16%	18%	15%
2003 to 2007	9%	8%	9%
1993 to 2002	8%	12%	5%
1992 or earlier	1%	2%	<1%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 155: Clothes Washer Configuration by OBC

(Source: Survey, self-audit, and on-site data)

Configuration	Statewide	OBC	Non-OBC
n (clothes washers)	*1,240*	*517*	*723*
Top Load	66%	63%	67%
Front Load	34%	36%	32%
Don’t know	1%	1%	0%

Table 156: Clothes Washer Capacity (ft^3) by OBC

(Source: Self-audit and on-site data)

FT^3 Volume	Statewide	OBC	Non-OBC
n (clothes washers)	*458*	*193*	*265*
Average	4.0	3.9[a]	4.1
Median	4.3	4.3	4.3
Minimum	0.8	0.8	2.2
Maximum	6.5	6.5	5.5
Standard Deviation	0.8	0.8	0.7

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 157: Clothes Washer Efficiency (IMEF) by OBC

(Source: Self-audit and on-site data)

Efficiency (IMEF)	Statewide	OBC	Non-OBC
n (clothes washers)	*368*	*157*	*211*
Average	2.0	1.9	2.1
Median	2.1	2.1	2.1
Minimum	0.5	0.5	0.5
Maximum	3.3	3.1	3.3
Standard Deviation	0.7	0.7	0.7

Table 158: Clothes Washer ENERGY STAR Status by OBC

(Source: Self-audit and on-site data)

Status	Statewide	OBC	Non-OBC
n (clothes washers)	*459*	*193*	*266*
ENERGY STAR Qualified	63%	57%[a]	67%
Certified	*56%*	*49%[a]*	*60%*
Meets minimum qualifications	*7%*	*7%*	*7%*
Non-qualified	37%	43%[a]	33%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

C.6.2.2 Clothes Dryers

Table 159: Clothes Dryer ENERGY STAR Status by OBC

(Source: Self-audit and on-site data)

Status	Statewide	OBC	Non-OBC
n (clothes dryers)	*438*	*191*	*247*
ENERGY STAR Qualified	42%	35%[a]	46%
Certified	*26%*	*23%*	*27%*
Meets minimum qualifications	*16%*	*12%[a]*	*19%*
Non-qualified	58%	65%[a]	54%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 160: Age of Clothes Dryers by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (clothes dryers)	*426*	*184*	*242*
2021 to 2023	13%	9%	16%
2018 to 2020	24%	24%	24%
2013 to 2017	28%	23%	31%
2008 to 2012	17%	21%	14%
2003 to 2007	11%	14%	9%
1993 to 2002	6%	9%	5%
1992 or earlier	1%	1%	1%

Table 161: Clothes Dryer Fuel Type by OBC

(Source: Self-audit and on-site data)

Configuration	Statewide	OBC	Non-OBC
n (clothes dryers)	*454*	*200*	*254*
Natural Gas	69%	74%	65%
Electric	31%	26%	35%

Table 162: Clothes Dryer Moisture Sensing Feature by OBC

(Source: Self-audit and on-site data)

Configuration	Statewide	OBC	Non-OBC
n (clothes dryers)	*341*	*149*	*192*
Yes	96%	95%	97%
No	4%	5%	3%

Table 163: Clothes Dryer Efficiency (CEF) by OBC

(Source: Self-audit and on-site data)

Efficiency (CEF)	Statewide	OBC	Non-OBC
n (clothes dryers)	*346*	*147*	*199*
Average	3.1	3.1	3.2
Median	3.3	3.3	3.3
Minimum	2.0	2.3	2.0
Maximum	5.8	5.8	3.9
Standard Deviation	0.5	0.6	0.5

C.6.3 Air Quality Appliances

Table 164: Air Quality Appliance Penetration by OBC

(Source: Survey, self-audit, and on-site data)

	Statewide	OBC	Non-OBC
n (households)	*1,232*	*519*	*713*
Dehumidifiers	38%	36%	40%
Humidifiers	27%	25%	28%
Air Purifiers	29%	33%	26%

[1] n varies by measure; see measure-specific tables for more details.

Table 165: Average Number of Air Quality Appliances per Household by OBC

(Source: Survey, self-audit, and on-site data)

	Statewide	OBC	Non-OBC
n (households)[1]	*1,232*	*519*	*713*
Dehumidifiers	0.44	0.42	0.46
Humidifiers	0.35	0.31	0.37
Air Purifiers	0.41	0.46[a]	0.38

[1] n varies by measure; see measure-specific tables for more details.
[a] Statistically significantly different from non-OBC sample at the 90% confidence level.

C.6.3.1 Dehumidifiers

Table 166: Number of Dehumidifiers per Household by OBC

(Source: Survey, self-audit, and on-site data)

	Statewide	OBC	Non-OBC
n (households)	*1,232*	*519*	*713*
Average	0.44	0.42	0.46
Median	0.00	0.00	0.00
Minimum	0.00	0.00	0.00
Maximum	6.00	6.00	3.00
Standard Deviation	0.63	0.69	0.59

Table 167: Dehumidifier Usage by OBC

(Source: Survey data)

Capacity (EF)	Statewide	OBC	Non-OBC
n (households with dehumidifier)	*557*	*232*	*325*
Only during summer months	34%	31%	36%
Year-round	33%	31%	34%
About half of the year	16%	15%	17%
Occasional use	15%	19%	11%
I'm not sure	2%	2%	3%
Never	<1%	<1%	<1%

Table 168: Age of Dehumidifiers by OBC

(Source: self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (dehumidifiers)	*106*	*45*	*61*
2021 to 2023	20%	20%	20%
2018 to 2020	43%	60%	29%
2013 to 2017	24%	17%	29%
2008 to 2012	7%	1%	11%
2003 to 2007	1%	--	2%
1993 to 2002	6%	2%	10%
1992 or earlier	--	--	--

Table 169: Dehumidifier Capacity (Pints/Day) by OBC

(Source: Self-audit and on-site data)

Capacity	Statewide	OBC	Non-OBC
n (dehumidifiers)	*136*	*55*	*81*
Average	43.9	39.2	47.4
Median	50.0	50.0	50.0
Minimum	1.9	2.0	1.9
Maximum	109.0	109.0	90.0
Standard Deviation	18.4	19.1	18.0

Table 170: Dehumidifier ENERGY STAR Status by OBC

(Source: Self-audit and on-site data)

Status	Statewide	OBC	Non-OBC
n (dehumidifiers)	*129*	*54*	*75*
ENERGY STAR-qualified	89%	97%[a]	84%
Certified	87%	91%	84%
Meets minimum qualifications	2%	6%[a]	--
Non-qualified	10%	3%[a]	16%

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 171: Dehumidifier Efficiency (IEF) by OBC

(Source: Self-audit and on-site data)

Efficiency (IEF)	Statewide	OBC	Non-OBC
n (dehumidifiers)	*57*	*24*	*33*
Average	1.7	1.7	1.8
Median	1.8	1.8	1.8
Minimum	1.3	1.6	1.3
Maximum	2.0	2.0	2.0
Standard Deviation	0.1	0.1	0.1

Table 172: Dehumidifier Efficiency (EF) by OBC

(Source: Self-audit and on-site data)

Capacity (EF)	Statewide	OBC	Non-OBC
n (dehumidifiers)	*67*	*26*	*41*
Average	1.8	1.9	1.7
Median	2.0	2.0	2.0
Minimum	0.8	1.4	0.8
Maximum	2.7	2.7	2.0
Standard Deviation	0.3	0.2	0.3

C.6.3.2 Humidifiers

Table 173: Number of Humidifiers per Household by OBC

(Source: Survey, self-audit, and on-site data)

	Statewide	OBC	Non-OBC
n (households)	*1,229*	*516*	*713*
Average	0.35	0.31	0.37
Median	0.00	0.00	0.00
Minimum	0.00	0.00	0.00
Maximum	6.00	6.00	6.00
Standard Deviation	0.76	0.78	0.75

C.6.3.3 Air Purifiers

Table 174: Number of Air Purifiers per Household by OBC

(Source: Survey, self-audit, and on-site data)

	Statewide	OBC	Non-OBC
n (households)	*1,233*	*518*	*715*
Average	0.41	0.46[a]	0.38
Median	0.00	0.00	0.00
Minimum	0.00	0.00	0.00
Maximum	6.00	6.00	5.00
Standard Deviation	0.79	0.78	0.79

[a] Statistically significantly different from non-program participants at the 90% confidence level.

Table 175: Age of Air Purifiers by OBC

(Source: Self-audit and on-site data)

Age	Statewide	OBC	Non-OBC
n (air purifiers)	*20*	*14*	*6*
2021 to 2023	55%	63%	33%
2018 to 2020	23%	19%	33%
2013 to 2017	9%	6%	17%
2008 to 2012	4%	--	17%
2003 to 2007	4%	6%	--
1993 to 2002	--	--	--
1992 or earlier	4%	6%	--

Table 176: Air Purifier ENERGY STAR Status by OBC

(Source: Self-audit and on-site data)

Status	Statewide	OBC	Non-OBC
n (air purifiers)	*44*	*26*	*18*
ENERGY STAR-qualified	77%	69%	88%
Certified	*64%*	*53%*	*81%*
Meets minimum qualifications	*13%*	*17%*	*6%*
Non-qualified	23%	31%	12%

Table 177: Air Purifier Efficiency (kWh/Yr) by OBC

(Source: Self-audit and on-site data)

Capacity	Statewide	OBC	Non-OBC
n (air purifiers)	*29*	*18*	*11*
Average	298.6	274.1	333.0
Median	309.5	304.3	316.0
Minimum	2.2	2.2	139.0
Maximum	1,095.0	1,095.0	641.0
Standard Deviation	228.2	275.6	129.3

C.7 LIGHTING

Table 178: Lighting Purchases in the Past Yearby OBC

(Source: Survey data)

Bulb Type	Statewide	OBC	Non-OBC
n (respondents)	*1,251*	*525*	*726*
Purchased bulbs in the past year	**72%**	**69%**	**74%**
LEDs	*63%*	*60%*	*66%*
Fluorescent	*6%*	*4%*	*8%*
Incandescent	*5%*	*2%*	*7%[a]*
Halogen	*4%*	*3%*	*5%*
CFL	*3%*	*1%*	*4%[a]*
Unsure which bulb type purchased	*5%*	*7%*	*4%[a]*
Did not purchase bulbs in past year	**18%**	**31%**	**26%**

Multiple responses permitted; may not sum to 100%.

[a] Statistically significantly different from OBC households at the 90% confidence level.

C.8 CONSUMER ELECTRONICS

Table 179: Penetration of Consumer Electronics by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents)	*1,251*	*525*	*726*
Cell phones	99%	99%	99%
Televisions	97%	96%	98%
Laptop Computers (exclude tablets)	88%	87%	89%
Printers	85%	83%	86%
Tablets	72%	71%	73%
Computer Monitors	64%	63%	64%
Stand-alone sound systems (e.g., stereos or Bluetooth speakers)	56%	53%	58%
Desktop Computers	50%	51%	49%
Game Consoles	46%	48%	44%
TV-Sound systems	43%	41%	44%
Copier/scanner	17%	18%	16%
Fax Machine	9%	10%	8%

Table 180: Saturation of Consumer Electronics by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents)	*1,251*	*525*	*726*
Televisions	2.60	2.46	2.68
Cell phones	2.58	2.58	2.58
Laptop Computers (exclude tablets)	1.85	1.83	1.87
Tablets	1.35	1.32	1.37
Computer Monitors	1.33	1.32	1.34
Printers	1.08	1.07	1.08
Stand-alone sound systems (e.g., stereos or Bluetooth speakers)	1.07	1.02	1.10
Game Consoles	0.80	0.80	0.80
Desktop Computer	0.78	0.81	0.75
TV-Sound systems	0.59	0.56	0.61
Copier/scanner	0.26	0.27	0.25
Fax Machine	0.15	0.18	0.12

Table 181: Percentage of Time Desktop Computer Plugged In by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents with desktop computer)	*676*	*295*	*381*
Average	76.5	74.6	78.0
Median	100	100	100
Minimum	0	0	0
Maximum	100	100	100
Standard Deviation	36.7	37.9	35.7

Table 182: Percentage of Time Laptop Computer Plugged In by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents with laptop computer)	*1,102*	*451*	*651*
Average	53.3	50.9	54.9
Median	50	50	50
Minimum	0	0	0
Maximum	100	100	100
Standard Deviation	34.1	33.7	34.2

Table 183: Percentage of Time Computer Monitor Plugged In by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents with computer monitor)	*830*	*343*	*487*
Average	74.7	72.2	76.4
Median	100	100	100
Minimum	0	0	0
Maximum	100	100	100
Standard Deviation	36.7	37.8	35.9

Table 184: Householder Works from Home by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (households)	*1,251*	*525*	*727*
Yes	41%	40%	42%
No	55%	55%	56%
Refused	4%	5%	2%

Table 185: Hours Worked from Home by OBC

(Source: Survey data)

Hours Worked from Home*	Statewide	OBC	Non-OBC
n (respondents that work from home)	*498*	*202*	*296*
20 or fewer	36%	39%	34%
21 to 30	14%	12%	16%
31 to 40	33%	31%	34%
More than 40	17%	19%	16%

Table 186: Presence of Connected Appliances by OBC

(Source: Survey data)

Has connected appliance	Statewide	OBC	Non-OBC
n (respondents)	*1177*	*518*	*659*
Yes	55%	51%	58%
No	43%	45%	41%
I'm not sure	3%	4%	1%

Table 187: Penetration of Connected Appliances by OBC

(Source: Survey)

Has connected appliance	Statewide	OBC	Non-OBC
n (respondents)	*643*	*264*	*379*
Thermostats	31%	28%	34%
Lights	45%	45%	44%
Audio or Bluetooth devices	42%	39%	44%
Televisions	21%	26%	18%
Garage door	17%	18%	16%
Kitchen appliances	5%	5%	5%
Portable heating or cooling equipment	5%	5%	4%
Clothes washer or dryer	4%	5%	3%
Security system and/or cameras	4%	4%	4%
Other	4%	4%	4%
Dehumidifier or air purifiers	2%	3%	2%
Pool pumps	2%	3%	2%
Water heater	2%	1%	2%
None of the above	6%	2%	7%
I'm not sure	9%	9%	9%

C.9 OTHER

C.9.1 Renewable Energy

Table 188: Presence of PV System by OBC

(Source: On-site and survey data)

Type	Statewide	OBC	Non-OBC
n (respondents)	*1,251*	*525*	*726*
Yes	11%	10%	12%
No	87%	87%	88%
I'm not sure	2%	4%[a]	1%

Table 189: Capacity of PV Systems by OBC

(Source: on-site and survey data)

Capacity (kW)	Statewide	OBC	Non-OBC
n (respondents with PV)	*111*	*55*	*56*
Average	7.64	7.57	7.71[a]
Median	7.10	6.90	7.35
Minimum	0.3	0.3	0.3
Maximum	21.9	20.0	21.9
Standard Deviation	4.5	4.7	4.2

[a] Statistically significantly different from OBC households at the 90% confidence level.

Table 190: Battery Back-up by OBC

(Source: On-site and survey data)

Type	Statewide	OBC	Non-OBC
n (respondents)	*154*	*72*	*82*
Yes	5%	4%	5%
No	87%	86%	88%
I'm not sure	8%	10%	6%

C.9.2 Electric Vehicles

Table 191: Electric Vehicles and Transportation by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents)	*1,251*	*525*	*726*
Electric-only vehicles	6%	6%	4%
Plug-in hybrid	2%	3%	2%
Electric bicycle	2%	2%	2%
Electric scooter	2%	2%	2%

Table 192: Electric Vehicle Chargers by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents with an EV)	*90*	*48*	*42*
Level 2 (charger installed)	68%	69%	67%
Level 1 (standard volt outlet)	26%	25%	26%
Do not charge EV at home	7%	7%	7%

Table 193: Electric Vehicle Charging Behavior by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents with an EV)	*90*	*48*	*42*
Between 8am and 12pm	14%	8%	21%
Between 12pm and 8pm	27%	21%	33%
Between 8pm and 8am	80%	85%	74%
Do not charge EV at home	4%	4%	5%
Don't know	2%	2%	2%

C.9.3 Other Energy-Using Appliances

Table 194: Types of Miscellaneous Equipment by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents)	*1,251*	*525*	*726*
Sump Pump	32%	30%	33%
Electric lawn equipment	32%	29%	34%
Home gym	25%	22%	28%
Workshop with power tools	23%	17%	28%
Swimming pool	14%	13%	14%
Well pump	12%	4%	18%
Whole-house generator	8%	6%	10%
Spa (e.g., Jacuzzi)	8%	6%	9%
Medical device(s) (e.g., ventilators, CPCP, dialysis)	7%	6%	8%
Pool heater	4%	3%	5%
Sauna	1%	1%	1%
None of the above	25%	31%	21%

Table 195: Spa/Jacuzzi Fuel by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents with a spa/jacuzzi)	*98*	*33*	*65*
Electricity	80%	76%	82%
Natural gas from utility	14%	15%	14%
Propane or LPG	1%	3%	0%
Don’t know	5%	6%	5%

Table 196: Pool Heater Fuel by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents with a pool)	*53*	*15*	*38*
Natural gas from utility	64%	80%	58%
Electricity	25%	7%	32%
Propane or LPG	9%	13%	8%
Solar	2%	0%	3%

Table 197: Sauna Fuel by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents with a sauna)	*11*	*3*	*8*
Electricity	82%	67%	88%
Natural gas from utility	9%	0%	13%
Don’t know	9%	33%	0%

Table 198: Whole House Generator by OBC

(Source: Survey data)

Type	Statewide	OBC	Non-OBC
n (respondents with a whole house generator)	*99*	*29*	*70*
Natural gas from utility	66%	55%	70%
Fuel oil or kerosene	21%	28%	17%
Propane or LPG	9%	10%	10%
Electricity	2%	3%	1%
Don’t know	2%	3%	1%

C.10 HOUSEHOLD CHARACTERISTICS

Table 199: Years at Address by OBC

(Source: Survey data)

Years at Address	Statewide	OBC	Non-OBC
n (respondents)	*1,251*	*525*	*726*
Average	14.7	14.2	15.2
Median	12.0	12.0	13.0
Minimum	0.0	0.0	0.0
Maximum	30.0	30.0	30.0
Standard Deviation	10.4	10.1	10.7

Table 200: Household Status by OBC

(Source: Survey data)

Household Status	Statewide	OBC	Non-OBC
n (households)	*1,251*	*525*	*727*
Own	95%	93%	96%
Rent	5%	7%	4%
Refused	<1%	<1%	<1%

*Does not sum to 100% due to rounding

D

Appendix D Results by Income

This appendix provides results by income status. Please note that some respondents did not disclose their income status. Statewide results include all respondents.

D.1 Heating

D.1.1 Primary Heating Type

Table 201: Primary Heating Fuel by Income

(Source: On-site, self-audit, and survey)

Primary Heating	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*210*	*223*	*476*
Natural gas	70%	65%[c]	66%[c]	78%[a,b]
Electricity	10%	14%[c]	16%[c]	6%[a,b]
Oil	8%	7%	8%	7%
Wood or pellet	1%	2%	3%	1%
Propane	1%	1%	1%	1%
No heat/don’t know	10%	12%	6%	6%

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households at the 90% confidence level.
[c] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 202: Primary Heating Type by Income

(Source: On-site, self-audit, and survey)

Primary Heating	Statewide	Low-Income	Moderate-Income	Non-LMI
n	*1,251*	*210*	*223*	*476*
Furnace	59%	49%[c]	61%	69%[a]
Boiler	25%	32%[c]	21%	21%[a]
Electric baseboard	3%	6%[c]	6%[c]	0%[a,b]
ASHP or GSHP	2%	1%	4%	2%
MSHP	0%	0%	1%	0%
Electric wall or space heater	2%	5%[c]	0%	1%[a]
Gas fireplace or heating stove	1%	3%	0%	0%
Wood fireplace or pellet stove	1%	2%	3%	1%
None/DK	6%	3%	5%	5%

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households at the 90% confidence level.
[c] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 203: Penetration of All Heating Systems by Income

(Source: Survey, on-site, and self-audit data)

Primary Heating	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*210*	*223*	*476*
Furnace	63%	54%[c]	64%	71%
Boiler	31%	38%[c]	26%	27%[a]
Electric space heater, wall heater, or radiant heat	10%	12%	4%	10%
Electric baseboard heat	8%	14%[c]	8%	5%[a]
Wood fireplace or pellet stove	8%	5%	6%	11%
Gas fireplace or heating stove	6%	5%	5%	7%
ASHP or GSHP	5%	8%	6%	4%
MSHP	2%	--[c]	1%	4%[a]
No heat/don't know	5%	3%	5%	5%

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households at the 90% confidence level.
[c] Statistically significantly different from non-LMI households at the 90% confidence level.

D.1.2 Furnaces

Table 204: Furnace Fuels by Income

(Source: On-site and self-audit data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (furnaces)	*243*	*34*	*38*	*127*
Natural Gas	92%	94%	96%	89%
Oil	7%	6%	4%	8%
Propane	1%	0%	0%	2%
Electric	0%	0%	0%	1%

Table 205: ENERGY STAR Qualification of Furnaces by Income

(Source: On-site and self-audit data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (furnaces)	*226*	*32*	*35*	*122*
ENERGY STAR-qualified	46%	45%	40%	48%
Certified	*39%*	*31%*	*33%*	*41%*
Meets minimum qualifications	*8%*	*13%*	*7%*	*8%*
Non-qualified	53%	55%	60%	52%

Table 206: Age of Furnaces by Income

(Source: On-site and self-audit data)

Age	Statewide	Low-Income	Moderate-Income	Non-LMI
n (furnaces)	*156*	*19*	*24*	*83*
2021 to 2023	13%	18%	10%	12%
2018 to 2020	16%	9%	18%	15%
2013 to 2017	21%	27%	5%	21%
2008 to 2012	15%	10%	6%	22%
2003 to 2007	17%	10%	27%	13%
1993 to 2002	14%	4%	30%	15%
1992 or earlier	4%	21%[a]	3%	1%

[a] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 207: Furnace Efficiency by Income

(Source: On-site and self-audit data)

Unit - AFUE	Statewide	Low-Income	Moderate-Income	Non-LMI
n (furnaces)	*198*	*28*	*25*	*107*
Average	87.8	87.9	90.7[c]	87.2
Median	90.5	92.0	92.1	81.0
Minimum	66.0	80.0	80.0	68.0
Maximum	98.1	96.5	98.0	98.1
Standard Deviation	7.5	7.3	5.9	7.7

D.1.3 Boilers

Table 208: Boiler Fuel Type by Income

(Source: On-site and self-audit data)

	Statewide	Low Income	Moderate Income	Non-LMI
n (boilers)	*146*	*19*	*27*	*68*
Natural Gas	*71%*	*55%*	*85%*	*74%*
Oil	*27%*	*45%*	*11%*	*26%*
Propane	*1%*	*0%*	*4%*	*0%*

Table 209: ENERGY STAR Qualification of Boilers by Income

(Source: On-site and self-audit data)

	Statewide	Low Income	Moderate Income	Non-LMI
n (boilers)	*131*	*18*	*28*	*59*
ENERGY STAR-qualified	35%	44%	36%	34%
Certified	*17%*	*32%*	*17%*	*18%*
Meets minimum qualifications	*21%*	*13%*	*12%*	*16%*
Non-qualified	61%	55%	71%	66%

Table 210: Age of Boilers by Income

(Source: On-site and self-audit data)

Age	Statewide	Low-Income	Moderate-Income	Non-LMI
n (boilers)	*75*	*8*	*17*	*38*
2021 to 2023	12%	38%	3%	12%
2018 to 2020	4%	0%	0%	7%
2013 to 2017	12%	0%	23%	14%
2008 to 2012	9%	0%	13%	5%
2003 to 2007	17%	13%	31%	8%
1993 to 2002	28%	37%	21%	28%
1992 or earlier	18%	12%	9%	27%

Table 211: Boiler Efficiency by Income

(Source: On-site and self-audit data)

Unit - AFUE	Statewide	Low-Income	Moderate-Income	Non-LMI
n (boilers)	*106*	*15*	*22*	*44*
Average	84.9	85.5	83.7	85.2
Median	83.5	84.0	82.5	83.2
Minimum	78.0	81.0	78.0	78.0
Maximum	96.0	95.0	95.5	96.0
Standard Deviation	4.8	4.1	4.9	5.1

D.2 COOLING

D.2.1 Primary Cooling

Table 212: Primary Cooling Systems by Income

Primary Cooling	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*210*	*223*	*476*
Central AC	68%	44%[b]	75%[a]	82%[a]
Window or Room AC	23%	48%[b]	16%[a]	10%[a]
Ceiling fans	2%	3%	2%	3%
ASHP	1%	0%	3%	1%
MSHP	1%	0%	2%	1%
Portable fans	1%	1%	2%	1%
GSHP	0%	0%	0%	0%
Whole house or attic fan	0%	0%	0%	1%
No cooling/don't know	3%	4%	0%	1%

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households at the 90% confidence level.

Table 213: Penetration of Cooling Systems by Income

(Source: Survey, on-site and self-audit data)

Cooling System*	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	1251	210	223	476
Central AC	69%	47%	75%[a]	84%[a]
Window or Room AC	29%	54%	23%[a]	16%[a]
Ceiling fans	28%	32%	32%	29%
ASHP	3%	1%	8%[a]	3%
MSHP	3%	0%	2%	4%[a]
Portable fans	12%	12%	13%	11%
GSHP	0%	0%	–	0%
Whole house or attic fan	3%	3%	1%	3%
No cooling/don't know	2%	4%	–	1%

*Does not sum to 100% because some households have more than one cooling system.
[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households at the 90% confidence level.
[c] Statistically significantly different from non-LMI households at the 90% confidence level.

D.2.2 Permanent Cooling

Table 214: ENERGY STAR Qualification of Permanent Cooling Equipment by Income[1]

(Source: Self-audit and on-site data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (cooling equipment)	*272*	*29*	*53*	*147*
ENERGY STAR-qualified	42%	25%	35%	50%
Certified	20%	9%	16%	23%
Meets minimum qualifications	21%	16%	17%	26%
Non-qualified	58%	75%	67%	50%

[1] Permanent cooling systems refer to equipment that cannot be easily removed, and excludes equipment such as room ACs and other portable AC units.

Table 215: Age of Permanent Cooling Equipment by Income[1]

(Source: Self-audit and on-site data)

Age	Statewide	Low-Income	Moderate-Income	Non-LMI
n (cooling equipment)	*312*	*57*	*58*	*145*
2021 to 2023	14%	13%	12%	16%
2018 to 2020	32%	39%	40%	24%
2013 to 2017	15%	20%	7%	16%
2008 to 2012	14%	7%	17%	18%
2003 to 2007	11%	9%	12%	7%
1993 to 2002	12%	7%	11%	19%
1992 or earlier	2%	4%	2%	0%

[1] Permanent cooling systems refer to equipment that cannot be easily removed, and excludes equipment such as room ACs and other portable AC units.

Table 216: Permanent Cooling Equipment Efficiency (SEER) by Income[1]

(Source: Self-audit and on-site data)

Unit - SEER	Statewide	Low-Income	Moderate-Income	Non-LMI
n (equipment)	265	25	53	140
Average	13.8	12.5[a]	13.2	14.2
Median	14.0	13.4	13.5	14.0
Minimum	8.2	9.0	9.5	8.2
Maximum	29.4	17.1	23.0	29.4
Standard Deviation	3.2	2.2	2.7	3.6

[a] Significantly different from non-LMI households at the 90% confidence level.
[1] Permanent cooling systems refer to equipment that cannot be easily removed, and excludes equipment such as room ACs and other portable AC units.

D.2.3 Central AC

Table 217: ENERGY STAR Qualification of Central ACs by Income

(Source: Self-audit and on-site data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (air conditioners)	*236*	*29*	*46*	*121*
ENERGY STAR-qualified	38%	25%	22%	49%
Certified	*19%*	*9%*	*10%*	*23%*
Meets minimum qualifications	*19%*	*16%*	*11%*	*25%*
Non-qualified	62%	75%	78%[c]	51%

Table 218: Age of Central AC Equipment by Income

(Source: Self-audit and on-site data)

Age	Statewide	Low-Income	Moderate-Income	Non-LMI
n (central AC)	*218*	*26*	*41*	*113*
2021 to 2023	15%	14%	11%	14%
2018 to 2020	24%	22%	42%	22%
2013 to 2017	11%	11%	1%	14%
2008 to 2012	15%	11%	12%	20%
2003 to 2007	12%	9%	17%	7%
1993 to 2002	19%	21%	15%	23%
1992 or earlier	3%	13%[c]	3%	0%

Table 219: Efficiency of Central AC Equipment by Income

(Source: Self-audit and on-site data)

Unit - SEER	Statewide	Low-Income	Moderate-Income	Non-LMI
n (equipment)	*230*	*24*	*46*	*116*
Average	13.2	12.8	12.4[c]	13.5
Median	13.4	13.4	13.0	14.0
Minimum	8.2	9.0	9.5	8.2
Maximum	23.0	17.1	16.0	23.0
Standard Deviation	2.1	2.1	1.6	2.3

D.2.4 Room Air Conditioner

Table 220: ENERGY STAR Qualification of Room Air Conditioners by Income

(Source: Self-audit and on-site data)

	Statewide	Low-Income	Moderate-Income	Non-Low Income
n (units)	*112*	*46*	*23*	*25*
ENERGY STAR-qualified	31%	30%	26%	29%
Certified	*31%*	*30%*	*22%*	*29%*
Meets minimum qualifications	*1%*	*0%*	*5%*	*0%*
Non-qualified	69%	70%	74%	71%

Table 221: Age of Room Air Conditioners by Income

(Source: Self-audit and on-site data)

Age	Statewide	Low-Income	Moderate-Income	Non-Low Income
n (units)	*75*	*31*	*13*	*20*
2021 to 2023	14%	13%	22%	41%
2018 to 2020	42%	48%	10%	12%
2013 to 2017	23%	25%	32%	36%
2008 to 2012	11%	5%	37%	6%
2003 to 2007	9%	10%	0%	0%
1993 to 2002	1%	0%	0%	5%
1992 or earlier	0%	0%	0%	0%

Table 222: Efficiency of Room Air Conditioners by Income

(Source: Self-audit and on-site data)

Unit - CEER	Statewide	Low-Income	Moderate-Income	Non-Low Income
n (units)	*106*	*45*	*22*	*24*
Average	11.1	10.8	10.6	11.7
Median	11.0	11.0	10.7	11.1
Minimum	6.2	6.5	6.2	8.1
Maximum	15.0	12.1	14.7	15.0
Standard Deviation	1.4	1.1	1.5	1.6

D.3 Heat Pumps

Table 223: ENERGY STAR Qualification of Heat Pumps by Income

(Source: Self-audit and on-site data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (heat pumps)	*29*	*--*	*7*	*20*
ENERGY STAR-qualified	70%	--	100%	56%
Certified	38%	--	48%	31%
Meets minimum qualifications	32%	--	52%	25%
Non-ENERGY STAR-qualified	30%	--	0%	44%

Table 224: Age of Heat Pumps by Income

(Source: Self-audit and on-site data)

Age	Statewide	Low-Income	Moderate-Income	Non-LMI
n (heat pumps)	*15*	*--*	*4*	*10*
2021 to 2023	4%	--	0%	8%
2018 to 2020	70%	--	76%	62%
2013 to 2017	11%	--	5%	15%
2008 to 2012	9%	--	19%	4%
2003 to 2007	7%	--	0%	11%
1993 to 2002	0%	--	0%	10
1992 or earlier	0%	--	0%	8%

Table 225: Heat Pump Efficiency (SEER) by Income

(Source: Self-audit and on-site data)

Unit - HSPF	Statewide	Low-Income	Moderate Income	Non-LMI
n (heat pumps)	30	--	7	21
Average	19.0	--	18.4	18.9
Median	19.0	--	20.0	18.4
Minimum	13.0	--	14.0	13.0
Maximum	29.4	--	23.0	29.4
Standard Deviation	4.6	--	3.7	5.0

Table 226: Heat Pump Efficiency (HSPF) by Income

(Source: Self-audit and on-site data)

Unit - HSPF	Statewide	Low-Income	Moderate Income	Non-LMI
n (heat pumps)	*26*	*--*	*4*	*20*
Average	10.1	--	9.5	10.1
Median	10.0	--	9.5	10.0
Minimum	7.7	--	8.2	7.7
Maximum	13.8	--	11.5	13.8
Standard Deviation	1.8	--	1.6	1.8

Table 227: Agreement with Statements About Heat Pumps by Income

(Source: Survey respondents who have a heat pump or had heard of them before survey)

Agreement with statements:	Statewide	Low-Income	Moderate Income	Non-LMI
n (respondents)	*452*	*59*	*70*	*218*
Heat pumps are better for the environment than other heating or cooling systems.	31%	23%[b,c]	31%[c]	41%[a,b]
Heat pumps can save money on my energy bills.	35%	42%[b]	31%[a,c]	40%[b]
A heat pump can provide enough heat, even on the coldest days.	32%	36%	41%	31%[a,b]
A heat pump cools as well as or better than other cooling systems.	26%	19%	32%	25%
Heat pumps are less expensive to install than other heating and cooling systems.	12%	24%	9%	12%
Heat pumps are more reliable than other heating and cooling systems.	21%	34%[b,c]	33%	18%
Heat pumps are quieter than other heating and cooling systems.	19%	17%	28%[a,c]	16%
Heat pumps have lower maintenance costs than other heating and cooling systems.	18%	37%[b,c]	21%	17%

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households at the 90% confidence level.
[c] Statistically significantly different from non-LMI households at the 90% confidence level.

D.4 Controls

Table 228: Thermostat Penetration by Income

(Source: Self-audit and on-site data)

Type	Statewide	Low-Income	Moderate Income	Non-LMI
n (thermostats)	*1,251*	*210*	*223*	*476*
Programmable	49%	46%	50%	50%
Smart/Learning	31%	18%[c]	28%[c]	46%
Manual	40%	54%[c]	38%[a,c]	28%

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households at the 90% confidence level.
[c] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 229: Programmable Feature Use by Income

(Source: Self-audit and on-site data)

Type	Statewide	Low-Income	Moderate Income	Non-LMI
n (households with programmable or smart/learning thermostats)	*558*	*74*	*86*	*274*
Use programmable features *often*	24%	21%	27%	23%
Use programmable features *sometimes*	44%	31%[c]	45%	47%
Use programmable features *rarely*	31%	47%[c]	23%[a]	29%
Use programmable features *never*	2%	1%	4%	1%

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households at the 90% confidence level.
[c] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 230: Average Thermostat Set Point for Heating by Income

(Source: Self-audit and on-site data)

Unit - Fahrenheit	Statewide	Low-Income	Moderate Income	Non-LMI
n (households)	*1,171*	*201*	*212*	*462*
Morning (6am – 9am)	67.6	67.7	67.7	67.8
Day (9am – 5pm)	67.2	66.7	67.4	67.3
Evening (5pm – 9pm)	68.3	68.0	68.7	68.4
Night (9pm – 6am)	66.2	66.7	66.3	65.9

Table 231: Average Thermostat Set Point for Cooling by Income

(Source: Self-audit and on-site data)

Unit - Fahrenheit	Statewide	Low-Income	Moderate Income	Non-LMI
n (households)	*1,104*	*177*	*199*	*452*
Morning (6am – 9am)	71.3	69.6[c]	71.1[a,c]	71.9
Day (9am – 5pm)	71.8	69.9[c]	71.6[a,c]	72.5
Evening (5pm – 9pm)	71.2	69.6[c]	71.2[a]	71.8
Night (9pm – 6am)	71.1	69.4[c]	71.2[a]	71.5

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households at the 90% confidence level.
[c] Statistically significantly different from non-LMI households at the 90% confidence level.

D.5 Water Heating

Table 232: Water Heater Fuel by Income

(Source: On-site and self-audit data)

Fuel	Statewide	Low-Income	Moderate-Income	Non-LMI
n (water heaters)	*542*	*86*	*86*	*254*
Natural Gas	84%	78%	78%	85%
Electric	13%	20%	19%	10%
Propane	2%	1%	2%	3%
Oil	1%	0%	0%	2%
Solar	0%	–	–	0%

Table 233: Water Heater Fuel by Income

(Source: On-site and self-audit data)

Type and Fuel	Statewide	Low-Income	Moderate-Income	Non-LMI
n (water heaters)	*560*	*86*	*86*	*255*
Storage, Stand-alone	**88%**	**92%**	**97%[a]**	**83%**
Natural Gas	85%	77%[a]	78%	89%
Electric	14%	22%[a]	20%	10%
Propane	1%	1%	2%	2%
Instantaneous	**8%**	**8%**	**1%[a]**	**9%**
Natural Gas	88%	94%	100%	80%
Propane	9%	–	–	16%
Electric	4%	6%	–	5%
Storage, Indirect heat	**3%**	**1%**	**2%**	**5%**
Natural Gas	60%	49%	70%	61%
Oil	39%	51%	18%	39%
Electric	2%	–	12%	–
Storage, Heat pump	**1%**	**–**	**–**	**1%**
Storage, Solar	**0%**	**–**	**–**	**0%**
Combi Boiler, Natural gas	**0%**	**--**	**0%**	**--**

[a] Significantly different from non-LMI households at the 90% confidence level

Table 234: Water Heater Equipment Age by Income

(Source: On-site and self-audit data)

Equipment Age	Statewide	Low-Income	Moderate-Income	Non-LMI
n (water heaters)	*560*	*63*	*70*	*198*
2021 or later	14%	12%	10%	18%
2018 to 2020	21%	22%	29%	15%
2013 to 2017	32%	29%	25%	35%
2008 to 2012	12%	18%	10%	12%
2003 to 2007	13%	13%	13%	13%
1993 to 2002	7%	3%	12%	7%
1992 or earlier	1%	3%	1%	1%

Table 235: Water Heater Efficiency by Income

(Source: On-site and self-audit data)

Efficiency (UEF)	Statewide	Low-Income	Moderate-Income	Non-LMI
n (water heaters)	*505*	*82*	*78*	*239*
Mean	0.70	0.71	0.67	0.72
Min	0.41	0.41	0.52	0.45
Max	3.88	0.99	0.97	3.88
Median	0.62	0.65	0.62	0.62
Std. Dev.	0.27	0.15	0.13	0.36

Table 236: Water Heater Capacity by Income

(Source: On-site and self-audit data)

Capacity (Gallons)	Statewide	Low-Income	Moderate-Income	Non-LMI
n (water heaters)	*481*	*78*	*80*	*209*
<40	479	9%	3%	3%
40 to 55	4%	83%	93%	87%
55 to 75	88%	7%	3%	8%
>75	7%	1%	1%	2%

Table 237: Water Heater ENERGY STAR Status by Income

(Source: On-site and self-audit data)

ENERGY STAR	Statewide	Low-Income	Moderate-Income	Non-LMI
n (water heaters)	*532*	*89*	*85*	*243*
ENERGY STAR-qualified	27%	34%	14%[a,b]	28%
ENERGY STAR-certified	*19%*	*22%*	*7%[a,b]*	*20%*
Meets minimum qualifications	*8%*	*13%*	*7%*	*7%*
Non-qualified	73%	66%	86%[a,b]	72%

[a] Significantly different from the Low-Income sample at a 90% confidence level.
[b] Significantly different from the Non-LMI sample at a 90% confidence level.

D.6 APPLIANCES

D.6.1 Kitchen Appliances

Table 238: Kitchen Appliance Penetration by Income

(Source: Survey, self-audit, and on-site data)

Appliance	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*210*	*223*	*476*
Refrigerator	97%	99%	98%	99%
Oven/range	98%	97%	99%	100%
Microwave	91%	88%	94%	94%
Dishwasher	79%	61%	81%	92%
Stand-alone Freezer	31%	25%	29%	35%
Beverage cooler or wine fridge	14%	9%[a]	15%	22%

[a] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 239: Average Number of Kitchen Appliances per Household by Income

(Source: Survey, self-audit, and on-site data)

Appliance	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*210*	*223*	*476*
Refrigerator	1.28	1.24	1.27	1.34[a]
Microwave	0.97	0.94	1.01	0.99
Dishwasher	0.82	0.63	0.82[a]	0.95[a]
Stand-alone Freezer	0.36	0.28	0.30	0.39[a]
Beverage cooler or wine fridge	0.17	0.09	0.17[a]	0.25[a]

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 240: Households with Multiple Kitchen Appliances by Income

(Source: Survey, self-audit, and on-site data)

Appliance	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*210*	*223*	*476*
Two or more refrigerators	28%	22%[a]	27%	32%
Two or more dishwashers	2%	2%	0%	2%
Two or more standalone freezers	2%	2%	0%	2%

[a] Statistically significantly different from non-LMI households at the 90% confidence level.

D.6.1.1 Refrigerators

Table 241: Refrigerator Door Configuration by Income

(Source: On-site, self-audit, and survey)

Configuration	Statewide	Low-Income	Moderate-Income	Non-LMI
n (refrigerators)	*773*	*114*	*131*	*352*
Bottom Freezer	43%	27%	43%	51%[a]
Top Freezer	31%	46%	38%	22%[a,b]
Side by Side	24%	26%	17%	24%[a]
Single Door	2%	1%	2%	2%
Internal Freezer	<1%	--	--	<1%
Mini-fridge	<1%	--	--	<1%

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households at the 90% confidence level.

Table 242: Refrigerator ENERGY STAR Status by Income

(Source: On-site, self-audit, and survey)

ENERGY STAR	Statewide	Low-Income	Moderate-Income	Non-LMI
n (refrigerators)	*754*	*111*	*127*	*345*
ENERGY STAR-qualified	62%	57%	63%	67%
Certified	*46%*	*45%*	*41%*	*52%*
Meets minimum qualifications	*15%*	*13%*	*22%*	*15%*
Non-qualified	38%	43%	37%	33%

Table 243: Refrigerator Age by Income

(Source: On-site, self-audit, and survey)

Vintage	Statewide	Low-Income	Moderate-Income	Non-LMI
n (refrigerators)	*705*	*109*	*117*	*320*
2021 to 2023	14%	12%	24%[c]	12%
2018 to 2020	24%	26%	23%	22%
2013 to 2017	23%	18%	18%	26%
2008 to 2012	21%	31%[b]	15%[a]	21%
2003 to 2007	10%	5%	15%	10%
1993 to 2002	7%	7%	4%	6%
1992 or earlier	1%	1%	1%	1%

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households sample at the 90% confidence level.
[c] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 244: Refrigerator Volume by Income

(Source: On-site, self-audit, and survey)

Volume	Statewide	Low-Income	Moderate-Income	Non-LMI
n (refrigerators)	*584*	*112*	*126*	*346*
Mean	22.1	21.6	22.2	22.3
Median	22.5	22.0	21.9	23.0
Minimum	1.6	3.2	1.7	1.6
Maximum	34.8	30.6	34.8	32.4
Standard Deviation	5.2	5.0	5.5	5.2

Table 245: Refrigerator Efficiency by Income

(Source: On-site, self-audit, and survey)

kWh/yr	Statewide	Low-Income	Moderate-Income	Non-LMI
n (refrigerators)	*760*	*113*	*128*	*347*
Mean	584.6	569.8	572.4	580.3
Median	587.0	592.0	577.5	583.2
Minimum	180.0	218.0	253.0	180.0
Maximum	1 887.0	1,139.0	1,887.0	1,570.0
Standard Deviation	149.2	152.9	176.5	141.2

D.6.1.2 Freezers

Table 246: Freezer Door Configuration by Income

(Source: On-site, self-audit, and survey)

Configuration	Statewide	Low-Income	Moderate-Income	Non-LMI
n (freezers)	*127*	*22*	*19*	*56*
Chest	66%	65%	57%	65%
Upright	34%	35%	43%	35%

Table 247: Freezer ENERGY STAR Status by Income

(Source: On-site, self-audit, and survey)

ENERGYSTAR	Statewide	Low-Income	Moderate-Income	Non-LMI
n (freezers)	*121*	*21*	*18*	*54*
ENERGY STAR-qualified	35%	41%	45%	38%
Certified	21%	*31%*	*18%*	*21%*
Meets minimum qualifications	13%	*10%*	*27%*	*17%*
Non-qualified	65%	59%	55%	62%

Table 248: Freezer Age by Income

(Source: On-site, self-audit, and survey data)

Vintage	Statewide	Low-Income	Moderate-Income	Non-LMI
n (freezers)	*99*	*15*	*14*	*48*
2021 to 2023	11%	11%	13%	14%
2018 to 2020	33%	11%	46%	21%
2013 to 2017	17%	38%	9%	14%
2008 to 2012	9%	12%	--	6%
2003 to 2007	15%	13%	23%	25%
1993 to 2002	11%	15%	9%	13%
1992 or earlier	3%	--	--	7%

Table 249: Freezer Volume by Income

(Source: On-site, self-audit, and survey data)

Volume	Statewide	Low-Income	Moderate-Income	Non-LMI
n (freezers)	*121*	*20*	*18*	*54*
Mean	10.3	10.4	11.8	10.8
Median	7.2	7.1	11.3	7.2
Minimum	3.5	3.5	5.0	3.5
Maximum	30.0	21.0	22.0	20.9
Standard Deviation	5.9	6.6	5.5	5.5

Table 250: Freezer Efficiency by Income

(Source: On-site, self-audit, and survey data)

kWh/yr	Statewide	Low-Income	Moderate-Income	Non-LMI
n (freezers)	*122*	*21*	*18*	*55*
Mean	360.9	318.2	423.1	397.3
Median	284.5	277.0	311.0	296.0
Minimum	193.0	193.0	218.0	193.0
Maximum	1,302.0	737.0	1,302.0	1,302.0
Standard Deviation	205.5	154.8	273.1	198.0

D.6.1.3 Dishwashers

Table 251: Dishwasher ENERGY STAR Status by Income
(Source: On-site, self-audit, and survey data)

Qualification Status	Statewide	Low-Income	Moderate-Income	Non-LMI
n (dishwashers)	*492*	*56*	*85*	*247*
ENERGY STAR Qualified	74%	64%[a]	65%[a]	78%
Certified	*66%*	*61%*	*62%*	*70%*
Meets minimum qualifications	*8%*	*3%*	*3%*	*8%*
Non-qualified	26%	36%[a]	35%[a]	22%

[a] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 252: Dishwasher Age by Income
(Source: On-site, self-audit, and survey data)

Vintage	Statewide	Low-Income	Moderate-Income	Non-LMI
n (dishwashers)	*431*	*46*	*73*	*223*
2021 to 2023	13%	9%	6%	13%
2018 to 2020	22%	26%	27%	23%
2013 to 2017	25%	22%	16%	30%
2008 to 2012	18%	12%	16%	19%
2003 to 2007	16%	26%	25%[a]	12%
1993 to 2002	4%	5%	9%[a]	2%
1992 or earlier	3%	--	1%	2%

[a] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 253: Dishwasher Efficiency by Income
(Source: On-site, self-audit, and survey data)

Units - kWh/yr	Statewide	Low-Income	Moderate-Income	Non-LMI
n (dishwashers)	*476*	*54*	*83*	*236*
Mean	299.1	313.0[a]	317.5[a]	287.1
Median	270.0	270.0	270.0	270.0
Minimum	85.0	239.0	180.0	85.0
Maximum	680.0	573.0	680.0	574.0
Standard Deviation	63.6	75.6	88.5	48.5

[a] Statistically significantly different from non-LMI households at the 90% confidence level.

D.6.1.4 Cooking

Table 254: Oven Fuel Type by Income

(Source: Self-audit and on-site data survey)

Fuel	Statewide	Low-Income	Moderate-Income	Non-LMI
n (ovens)	*181*	*34*	*32*	*71*
Natural Gas	71%	59%	82%	76%
Electric	19%	16%	17%	23%
Unknown (Natural gas or propane)	9%	24%[a]	1%	--
Propane	1%	--	--	1%

[a] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 255: Range Fuel Type by Income

(Source: Self-audit and on-site data)

Fuel	Statewide	Low-Income	Moderate-Income	Non-LMI
n (ranges)	*176*	*35*	*33*	*70*
Natural Gas	72%	59%	84%	82%
Resistance Electric	16%	13%	15%	14%
Unknown (Natural gas or propane)	10%	24%[a]	1%	--
Induction Electric	2%	3%	--	1%
Propane	1%	<1%	--	2%

[a] Statistically significantly different from non-LMI households at the 90% confidence level.

D.6.2 Laundry

Table 256: Laundry Appliances Penetration by Income

(Source: Survey, self-audit, and on-site data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*210*	*223*	*476*
Clothes Washers	93%	80%	98%	97%
Clothes Dryers	92%	78%	98%	98%

[a] Statistically significantly different from low-income households at the 90% confidence level.

Table 257: Laundry Appliances per Household by Income

(Source: Survey, self-audit, and on-site data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*210*	*223*	*476*
Clothes Washers	0.95	0.83	0.98	1.00[a]
Clothes Dryers	0.95	0.81	1.00[a]	1.00[a]

[a] Statistically significantly different from low-income households at the 90% confidence level.

Table 258: Households with Multiple Laundry Appliances by Income

(Source: Survey, self-audit, and on-site data)

Appliance	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*210*	*223*	*476*
Two or more clothes washers	2%	3%	1%	2%
Two or more clothes dryers	2%	3%	1%	2%

D.6.2.1 Clothes Washers

Table 259: Clothes Washer Type by Income

(Source: Survey, self-audit, and on-site data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (clothes washers)	*1,240*	*203*	*220*	*478*
Top-loading	66%	68%	77%[a]	62%
Front-loading	34%	32%	23%[a]	38%
Don't know	1%	0%	0%	0%

[a] Statistically significantly different from low-income households at the 90% confidence level.

Table 260: Clothes Washer ENERGY STAR Status by Income

(Source: On-site, self-audit, and survey)

ENERGYSTAR	Statewide	Low-Income	Moderate-Income	Non-LMI
n (clothes washers)	*459*	*70*	*84*	*202*
ENERGY STAR Qualified	63%	57%	62%	69%
Certified	*56%*	*50%*	*57%*	*60%*
Meets minimum qualifications	*7%*	*8%*	*5%*	*9%*
Non-qualified	37%	43%	38%	30%

Table 261: Clothes Washer Age by Income

(Source: On-site, self-audit, and survey)

Vintage	Statewide	Low-Income	Moderate-Income	Non-LMI
n (clothes washers)	*403*	*63*	*74*	*182*
2021 to 2023	12%	15%	8%	14%
2018 to 2020	27%	23%	34%	28%
2013 to 2017	27%	24%	26%	29%
2008 to 2012	16%	21%	13%	17%
2003 to 2007	9%	8%	13%	7%
1993 to 2002	8%	8%	4%	4%
1992 or earlier	1%	1%	1%	1%

Table 262: Clothes Washer Capacity (ft^3) by Income

(Source: On-site, self-audit, and survey)

Ft^3	Statewide	Low-Income	Moderate-Income	Non-LMI
n (clothes washers)	*458*	*71*	*85*	*202*
Mean	4.0	3.8	4.1[a]	4.1[a]
Median	4.3	3.9	4.2	4.3
Minimum	0.8	2.0	2.2	0.8
Maximum	6.5	5.3	5.5	6.5
Standard Deviation	0.8	0.8	0.7	0.8

[a] Statistically significantly different from low-income households at the 90% confidence level.

Table 263: Clothes Washer Efficiency (IMEF) by Income

(Source: On-site, self-audit, and survey)

IMEF	Statewide	Low-Income	Moderate-Income	Non-LMI
n (clothes washers)	*368*	*58*	*66*	*164*
Mean	2.0	1.9	2.0	2.1
Median	2.1	2.1	2.1	2.1
Minimum	0.5	0.5	0.6	0.6
Maximum	3.3	3.1	2.9	3.2
Standard Deviation	0.7	0.7	0.7	0.7

D.6.2.2 Clothes Dryers

Table 264: Clothes Dryer Fuel Type by Income

(Source: On-site and self-audit data)

Fuel	Statewide	Low-Income	Moderate-Income	Non-LMI
n (clothes dryers)	*454*	*69*	*76*	*210*
Natural Gas	69%	56%[a]	68%	71%
Electric	31%	44%[a]	32%	29%

[a] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 265: Clothes Dryer ENERGY STAR Status by Income

(Source: On-site, self-audit, and survey)

ENERGYSTAR	Statewide	Low-Income	Moderate-Income	Non-LMI
n (clothes dryers)	*438*	*68*	*73*	*202*
ENERGY STAR Qualified	42%	44%	43%	45%
Certified	*26%*	*18%*	*31%*	*30%*
Meets minimum qualifications	*16%*	*26%*	*12%*	*16%*
Non-qualified	58%	56%	57%	55%

Table 266: Clothes Dryer Age by Income

(Source: On-site, self-audit, and survey data)

Vintage	Statewide	Low-Income	Moderate-Income	Non-LMI
n (clothes dryers)	*426*	*68*	*71*	*202*
2021 to 2023	13%	17%	11%	13%
2018 to 2020	24%	23%	24%	26%
2013 to 2017	28%	23%	31%	26%
2008 to 2012	17%	24%	15%	14%
2003 to 2007	11%	9%	12%	13%
1993 to 2002	6%	4%	4%	8%
1992 or earlier	1%	1%	1%	1%

Table 267: Clothes Dryer Moisture Sensing by Income

(Source: On-site, self-audit, and survey)

Configuration	Statewide	Low-Income	Moderate-Income	Non-LMI
n (clothes dryers)	*341*	*58*	*53*	*157*
Moisture Sensor	96%	96%	96%	95%
No Moisture Sensor	4%	4%	4%	5%

Table 268: Clothes Dryer Combined Energy Factor (CEF) by Income

(Source: On-site, self-audit, and survey data)

CEF	Statewide	Low-Income	Moderate-Income	Non-LMI
n (clothes dryers)	*346*	*55*	*56*	*161*
Mean	3.1	3.1	3.2	3.2
Median	3.3	3.3	3.3	3.3
Minimum	2.0	2.0	2.3	2.3
Maximum	5.8	3.9	3.9	5.8
Standard Deviation	0.5	0.6	0.5	0.5

D.6.3 Air Quality Appliances

Table 269: Air Quality Appliance Penetration by Income

(Source: survey, self-audit, and on-site data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*210*	*223*	*476*
Dehumidifiers	38%	29%	33%	48%
Humidifiers	27%	17%	24%	33%
Air Purifiers	29%	22%	27%	32%

[a] Statistically significantly different from low-income households at the 90% confidence level.

Table 270: Air Quality Appliances per Household by Income

(Source: Survey, self-audit, and on-site data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,251*	*210*	*223*	*476*
Dehumidifiers	0.44	0.33[a]	0.38[a]	0.53
Humidifiers	0.35	0.19[a]	0.36[b]	0.45
Air Purifiers	0.41	0.27[a]	0.40	0.45

[a] Statistically significantly different from non-low-income households at the 90% confidence level.
[b] Statistically significantly different from low-income households at the 90% confidence level.

D.6.3.1 Dehumidifiers

Table 271: Penetration of Dehumidifiers per Household by Income

(Source: Survey data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,232*	*209*	*221*	*471*
Average	0.44	0.33[a]	0.38[a]	0.53
Median	0.00	0.00	0.00	0.00
Minimum	0.00	0.00	0.00	0.00
Maximum	6.00	4.00	3.00	3.00
Standard Deviation	0.63	0.58	0.60	0.57

[a] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 272: Dehumidifier Usage by Income

(Source: Survey data)

Capacity (EF)	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households with dehumidifier)	*557*	*66*	*91*	*158*
Only during summer months	34%	26%	30%	34%
Year-round	17%	18%	20%	19%
About half of the year	34%	32%	31%	38%
Occasional use	12%	20%	15%	8%
I'm not sure	4%	5%	3%	2%
Never used	1%	--	1%	--

Table 273: Dehumidifier Age by Income

(Source: On-site, self-audit, and survey)

Vintage	Statewide	Low-Income	Moderate-Income	Non-LMI
n (dehumidifiers)	*106*	*12*	*23*	*55*
2021 to 2023	20%	5%	15%	30%
2018 to 2020	43%	76%[a]	49%	27%
2013 to 2017	24%	16%	26%	30%
2008 to 2012	7%	--	8%	12%
2003 to 2007	1%	--	2%	2%
1993 to 2002	6%	3%	--	--
1992 or earlier	--	--	--	--

[a] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 274: Dehumidifier Capacity (pints/day) by Income

(Source: On-site, self-audit, and survey data)

Capacity	Statewide	Low-Income	Moderate-Income	Non-LMI
n (dehumidifiers)	*136*	*14*	*29*	*69*
Mean	43.9	35.2	44.3	47.3
Median	50.0	50.0	50.0	50.0
Minimum	1.9	2.0	20.0	1.9
Maximum	109.0	72.0	72.0	90.0
Standard Deviation	18.4	23.8	15.1	18.6

Table 275: Dehumidifier ENERGY STAR Status by Income

(Source: On-site, self-audit, and survey data)

ENERGYSTAR	Statewide	Low-Income	Moderate-Income	Non-LMI
n (dehumidifier)	*129*	*14*	*28*	*65*
ENERGY STAR Qualified	89%	96%	86%	95%
Certified	*87%*	*89%*	*82%*	*95%*
Meets minimum qualifications	2%	*7%*	*4%*	--
Non-qualified	10%	4%	14%	5%

Table 276: Dehumidifier Efficiency (IEF) by Income

(Source: On-site, self-audit, and survey data)

IEF	Statewide	Low-Income	Moderate-Income	Non-LMI
n (dehumidifiers)	*57*	*7*	*11*	*31*
Mean	1.7	1.6[b]	1.8[a]	1.8
Median	1.8	1.7	1.8	1.8
Minimum	1.3	1.4	1.6	1.3
Maximum	2.0	1.8	2.0	2.0
Standard Deviation	0.1	0.1	0.1	0.1

[a] Significantly different from low-income households at the 90% confidence level.
[b] Significantly different from non-LMI households at the 90% confidence level.

Table 277: Dehumidifier Efficiency (EF) by Income
(Source: On-site, self-audit, and survey data)

EF	Statewide	Low-Income	Moderate-Income	Non-LMI
n (dehumidifiers)	*67*	*5*	*17*	*32*
Mean	1.8	1.9[a]	1.9	1.8
Median	2.0	1.9	1.9	2.0
Minimum	0.8	1.9	1.4	0.8
Maximum	2.7	2.0	2.0	2.0
Standard Deviation	0.3	0.1	0.2	0.3

[a] Significantly different from non-LMI households at the 90% confidence level.

D.6.3.2 Humidifiers

Table 278: Number of Humidifiers per Household by Income
(Source: Survey, self-audit, and on-site data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,229*	*208*	*221*	*470*
Average	0.35	0.19	0.36[a]	0.45[a]
Median	0.00	0.00	0.00	0.00
Minimum	0.00	0.00	0.00	0.00
Maximum	6.00	4.00	6.00	5.00
Standard Deviation	0.76	0.59	0.90	0.77

[a] Significantly different from low-income households at the 90% confidence level.

D.6.3.3 Air Purifiers

Table 279: Number of Humidifiers per Household by Income
(Source: Survey, self-audit, and on-site data)

	Statewide	Low-Income	Moderate-Income	Non-LMI
n (households)	*1,233*	*209*	*222*	*472*
Average	0.41	0.27[a]	0.40	0.45
Median	0.00	0.00	0.00	0.00
Minimum	0.00	0.00	0.00	0.00
Maximum	6.00	3.00	3.00	6.00
Standard Deviation	0.79	0.61	0.76	0.81

[a] Significantly different from non-LMI households at the 90% confidence level.

Table 280: Air Purifier ENERGY STAR Status by Income

(Source: On-site, self-audit, and survey data)

ENERGYSTAR	Statewide	Low-Income	Moderate-Income	Non-LMI
n (air purifiers)	*44*	*7*	*8*	*23*
ENERGY STAR Qualified	77%	77%	73%	74%
Certified	*64%*	*77%*	*59%*	*65%*
Meets minimum qualifications	*13%*	*--*	*14%*	*9%*
Non-qualified	23%	23%	27%	26%

Table 281: Air Purifier Age by Income

(Source: On-site, self-audit, and survey data)

Vintage	Statewide	Low-Income	Moderate-Income	Non-LMI
n (air purifiers)	*20*	4	3	11
2021 to 2023	55%	33%	86%	24%
2018 to 2020	23%	32%	--	45%
2013 to 2017	9%	--	--	20%
2008 to 2012	4%	--	14%	--
2003 to 2007	4%	--	--	10%
1993 to 2002	--	--	--	--
1992 or earlier	4%	36%	--	--

Table 282: Air Purifier Efficiency (kWh/yr) by Income

(Source: On-site, self-audit, and survey data)

kWh/yr	Statewide	Low-Income	Moderate-Income	Non-LMI
n (air purifiers)	*29*	*6*	*6*	*12*
Mean	298.6	250.0	347.4	260.4
Median	309.5	281.0	312.8	304.3
Minimum	2.2	2.2	155.0	2.5
Maximum	1,095.0	584.0	641.0	393.0
Standard Deviation	228.2	277.8	207.6	121.2

D.7 Lighting

Table 283: Lighting Purchases in the Past Year by Income

(Source: survey data)

Bulb Type	Statewide	Low-Income	Moderate-Income	Non-LMI
n (respondents)	*1,251*	*210*	*223*	*476*
Purchased bulbs in the past year	*72%*	*71%*	*78%*	*72%*
LEDs	63%	61%	70%	66%
Fluorescent	6%	5%	9%	6%
Incandescent	5%	4%	7%	5%
Halogen	4%	2%	1%	6%
CFLs	3%	2%	3%	4%
I'm not sure	5%	8%	2%	3%

Multiple responses permitted; may not sum to 100%.

D.8 Consumer Electronics

Table 284: Penetration of Consumer Electronics by Income

(Source: Survey data)

Type	Statewide	Low-Income	Moderate-Income	Non-LMI
n (respondents)	*1,251*	*210*	*223*	*476*
Cell phones	99%	99%	100%	100%
Televisions	97%	96%	99%	98%
Laptop Computers (exclude tablets)	88%	86%	82%	93%
Printers	85%	77%	80%	90%
Tablets	72%	69%	74%	76%
Computer Monitors	64%	79%	58%	72%
Stand-alone sound systems (e.g., stereos or Bluetooth speakers)	56%	44%	53%	63%
Desktop Computers	50%	47%	49%	47%
Game Consoles	46%	47%	47%	46%
TV-Sound systems	43%	29%	38%	51%
Copier/scanner	17%	14%	13%	17%
Fax Machine	9%	7%	7%	8%

Table 285: Saturation of Consumer Electronics by Income

(Source: survey data)

Type	Statewide	Low-Income	Moderate-Income	Non-LMI
n (respondents)	*1,251*	*210*	*223*	*476*
Televisions	2.60	2.54	2.74	2.65
Cell phones	2.58	2.73	2.43	2.59
Laptop Computers (exclude tablets)	1.85	1.70	1.63	2.13
Tablets	1.35	1.17	1.38	1.45
Computer Monitors	1.33	0.91	1.03	1.65
Printers	1.08	0.91	0.98	1.16
Stand-alone sound systems (e.g., stereos or Bluetooth speakers)	1.07	0.72	0.91	1.31
Game Consoles	0.80	0.89	0.81	0.80
Desktop Computer	0.78	0.64	0.68	0.76
TV-Sound systems	0.59	0.36	0.51	0.71
Copier/scanner	0.26	0.24	0.26	0.31
Fax Machine	0.15	0.11	0.11	0.15

Table 286: Householder Works from Home by Income

(Source: Survey data)

Someone in Household Works from Home	Statewide	Low-Income	Moderate-Income	Non-LMI
n (respondents)	*1,251*	*210*	*223*	*476*
Yes	41%	20%	36%	54%
No	55%	76%	62%	43%
Refused	4%	3%	1%	2%

Table 287: Hours Householder Works from Home by Income

(Source: survey)

Hours Worked from Home	Statewide	Low-Income	Moderate-Income	Non-LMI
n (respondents that work from home)	*498*	*44*	*78*	*266*
20 or fewer	36%	48%	50%	30%
21 to 30	14%	18%	10%	15%
31 to 40	33%	14%	32%	37%
More than 40	17%	20%	8%	18%

Table 288: Percentage of Time Desktop Computer Plugged in by Income

(Source: Survey data)

Type	Statewide	OBC	Non-OBC	Non-LMI
n (respondents with desktop computer)	*676*	*98*	*118*	*248*
Average	76.5	73.5	76.2	79.9
Median	100	100	100	100
Minimum	0	0	0	0
Maximum	100	100	100	100
Standard Deviation	36.7	37.2	37.5	36.0

Table 289: Percentage of Time Laptop Computer Plugged in by Income

(Source: Survey data)

Type	Statewide	OBC	Non-OBC	
n (respondents with laptop computer)	*1,102*	*183*	*183*	*443*
Average	53.3	45.5	49.3	60.3
Median	50	50	50	50
Minimum	0	0	0	0
Maximum	100	100	100	100
Standard Deviation	34.1	34.6	34.1	34.2

Table 290: Percentage of Time Computer Monitor Plugged in by Income

(Source: Survey data)

Type	Statewide	OBC	Non-OBC	
n (respondents with computer monitor)	*830*	*115*	*131*	*348*
Average	74.7	66.3	74.1	81.2
Median	100	100	100	100
Minimum	0	0	0	0
Maximum	100	100	100	100
Standard Deviation	36.7	41.4	36.7	33.1

D.9 OTHER

D.9.1 Renewable Energy

Table 291: Presence of PV System by Income

(Source: On-site and survey data)

Type	Statewide	Low-Income	Moderate-Income	Non-LMI
n (respondents)	*1,251*	*210*	*223*	*476*
Yes	11%	11%	15%	13%
No	87%	89%	85%	87%
I'm not sure	2%	0%	0%	0%

Table 292: Capacity of PV Systems by Income

(Source: On-site and survey data)

Capacity (kW)	Statewide	Low-Income	Moderate-Income	Non-LMI
n (respondents with PV)	*111*	*19*	*27*	*53*
Average	7.64	7.16	4.16[a,c]	8.13[a]
Median	7.10	6.00	6.60	8.00
Minimum	0.30	2.70	0.60	0.30
Maximum	21.9	21.9	18.6	20.0
Standard Deviation	4.5	4.8	5.0[a,c]	3.7

[a] Statistically significantly different from low-income households at the 90% confidence level.
[b] Statistically significantly different from moderate-income households at the 90% confidence level.
[c] Statistically significantly different from non-LMI households at the 90% confidence level.

Table 293: Battery Back-up by Income

(Source: On-site and survey data)

Type	Statewide	Low-Income	Moderate-Income	Non-LMI
n (respondents with PV system)	*154*	*24*	*38*	*65*
Yes	5%	4%	11%	5%
No	87%	92%	89%	91%
I'm not sure	8%	4%	--	4%

D.9.2 Electric Vehicles

Table 294: Electric Vehicles and Transportation by Income

(Source: Survey data)

Type	Statewide	Low-Income	Moderate-Income	Non-LMI
n (respondents)	*1,251*	*210*	*223*	*476*
Electric-only vehicles	6%	2%	4%	7%
Plug-in hybrid	2%	<1%	2%	3%
Electric bicycle	2%	3%	1%	2%
Electric scooter	2%	2%	3%	3%

Table 295: Electric Vehicle Chargers by Income

(Source: Survey data)

Type	Statewide	Low-Income	Moderate-Income	Non-LMI
n (respondents with an EV)	*90*	*5*	*12*	*50*
Level 2 (charger installed)	68%	60%	42%	74%
Level 1 (standard volt outlet)	26%	40%	33%	24%
Do not charge EV at home	7%	--	25%	2%

Table 296: Electric Vehicle Charging Behavior by Income

(Source: Survey data)

Type	Statewide	Low-Income	Moderate-Income	Non-LMI
n (respondents with an EV)	*90*	*5*	*12*	*50*
Between 8am and 12pm	14%	17%	--	18%
Between 12pm and 8pm	27%	--	8%	32%
Between 8pm and 8am	80%	83%	83%	80%
Do not charge EV at home	4%	--	8%	4%
Don't know	3%	--	--	2%

D.9.3 Self-Assessment of Energy Savings

Table 297: Energy Conservation Statements by Income

(Source: self-audit and on-site data)

Thinking about all the things you could do in your household to conserve energy, would you say you have done…	Statewide	Low Income	Moderate Income	Non-LMI
n (respondents)	*1,251*	*210*	*223*	*476*
Everything I can think of	11%	12%	12%	9%
Most things	33%	29%	34%	36%
A few things	46%	45%	46%	50%
Nothing	5%	9%	6%	3%
I'm not sure	5%	5%	2%	2%

Appendix E Results by Utility

Please note that households were stratified by gas utility based on their geographic location within a gas utility territory and does not indicate that the home had gas service.

E.1 Heating

E.1.1 Primary Heating Type

Table 298: Primary Heating Fuel by Utility

(Source: On-site, self-audit, and survey data)

		Electric Utilities					Gas Utilities			
Heating Type	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (households)	*1,251*	*200*	*363*	*135*	*155*	*155*	*127*	*214*	*649*	*261*
Natural gas	70%	71%	63%	75%[b]	77%	69%	49%[h,i]	70%[f]	74%	72%
Electricity	10%	13%	8%	8%	2%	7%	14%	12%	7%	12%
Oil	8%	4%	13%	5%	5%	16%[a]	23% [h,i]	8%[f]	5%	5%
Wood or pellet	1%	2%	3%	<1%	2%	1%	5%[i]	1%	1%	2%
Propane	1%	2%	2%	<1%[d]	6%	2%	4%[i]	0%[f]	1%	2%
None/don't know	10%	8%	8%	12%	8%	5%	5%	9%	12%	8%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
[i] Significantly different from SJG at the 90% confidence level.

Table 299: Primary Heating Type by Utility

(Source: On-site, self-audit, and adjusted survey data)

Heating Type	Statewide	Electric Utilities					Gas Utilities			
		ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n	*1,251*	*200*	*363*	*398*	*135*	*155*	127	214	649	261
Furnace	59%	70%	57%	58%	49%	64%	44%[h,i]	59%	59%[i]	71%
Boiler	25%	9%[b,c,d,e]	22%[a]	31%[a]	44%[a]	28%[a]	31%[i]	22%[i]	30%[i]	9%
ASHP or GSHP	2%	4%	2%	2%	1%	2%	3%	1%	2%	3%
Electric baseboard	3%	1%	7%	1%[b]	0%	2%	5%[h]	8%[h,i]	1%	1%
MSHP	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Electric wall or space heater	2%	5%	4%	1%[a]	0%	0%	3%	4%[h]	1%[i]	5%
Gas fireplace or heating stove	1%	1%	0%	2%	0%	1%	6%[g]	0%[f]	1%	1%
Wood fireplace or pellet stove	1%	2%	2%	0%	2%	1%	5%[g]	1%	1%	2%
None/don't know	6%	8%	5%	6%	5%	2%	3%	5%	6%	7%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
[i] Significantly different from SJG at the 90% confidence level.

Table 300: Penetration of All Heating Systems by Utility

(Source: On-site, self-audit, and adjusted survey data)

Heating Type*	Statewide	Electric Utilities: ACE	JCP&L	MUNI	PSE&G	RECO	Gas Utilities: E'TOWN	NJNG	PSE&G	SJG
n (households)	*1,251*	*200*	*363*	*398*	*135*	*155*	127	214	649	261
Furnace	51%	72%	61%	63%	50%[a]	65%	61%[i]	62%	61%[i]	73%
Boiler	26%	12%[b]	27%	37%[a]	53%[a]	34%[a]	41%[i]	27%[i]	36%[i]	11%
Electric space heater, wall heater, or radiant heat	8%	15%	9%	9%	8%	9%	15%	10%	8%[i]	15%
Electric baseboard heat	7%	3%	11%	9%	1%	5%	8%	11%[i]	9%	3%
Wood fireplace or pellet stove	6%	8%	11%	5%	18%	10%	18%[h]	7%	6%	7%
Gas fireplace or heating stove	5%	9%	4%	7%	8%	5%	8%	4%	6%	8%
ASHP or GSHP	2%	5%	4%	6%	3%	4%	4%	3%	6%	5%
MSHP	1%	0%	1%	2%	2%	2%	1%	1%	2%	1%
No heat/don't know	4%	8%	5%	5%	4%	2%	3%	5%	6%	7%

**Some households have more than one heating system; columns sum to over 100%.*

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
[i] Significantly different from SJG at the 90% confidence level.

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E.1.2 Furnaces

Table 301: Furnace Fuels, by Utility

(Source: On-site and self-audit data)

Heating Type	Statewide	Electric Utilities ACE	JCP&L	PSE&G	Rockland	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (furnaces)	243	*53*	*70*	*79*	*12*	17	54	106	66
Natural Gas	92%	98%[b]	83%[a]	97%	100%	58%[g,h]	90%	98%	95%[f]
Oil	7%	2%	13%	1%	0%	32%[h]	9%	1%	5%[f]
Propane	1%	0%	3%	1%	0%	10%	0%	1%	0%
Electric	0%	0%	1%	0%	0%	0%	2%	0%	0%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 302: ENERGY STAR Qualification of Furnaces by Utility

(Source: on-site and self-audit data)

Heating Type	Statewide	Electric Utilities: ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities: E'TOWN	NJNG	PSE&G	SJG
n (furnaces)	*226*	*46*	*67*	*75*	*10*	*28*	*15*	*48*	*103*	*60*
ENERGY STAR-qualified	47%	70%	44%	44%	53%	24%	44%	47%	42%	61%
Certified	39%	*56%[e]*	*38%*	*37%*	*53%*	*14%[a]*	*38%*	*35%*	*37%*	*52%*
Meets minimum qualifications	8%	*14%*	*6%*	*6%*	*0%*	*10%*	*6%*	*11%*	*5%*	*9%*
Non-qualified	53%	30%[e]	56%	56%	47%	76%[a]	*56%*	*54%*	*58%*	*39%*

[a] Significantly different from ACE at the 90% confidence level.
[b] Significantly different from JCP&L at the 90% confidence level.
[c] Significantly different from PSE&G at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from municipal electric utilities (MUNI) at the 90% confidence level.

Table 303: Age of Furnaces by Utility

(Source: On-site and self-audit data)

Heating Type	Statewide	Electric Utilities: ACE	JCP &L	PSE&G	RECO	MUNI	Gas Utilities: E'TOWN	NJNG	PSE&G	SJG
n (furnaces)	*156*	*31*	*47*	*51*	*9*	*18*	*10*	*38*	*72*	*36*
2021 to 2023	13%	12%	7%	19%	13%	18%	0%	9%	16%	20%
2018 to 2020	16%	9%	20%	12%	17%	19%	0%	23%	17%	7%
2013 to 2017	21%	44%[c]	19%	12%[a]	38%	15%	37%	16%	16%	33%
2008 to 2012	15%	7%	23%	11%	11%	17%	38%	16%	13%	10%
2003 to 2007	17%	23%	9%	22%	0%	20%	8%	12%	18%	26%
1993 to 2002	14%	4%	14%	23%	0%	0%	15%	14%	20%	3%
1992 or earlier	4%	0%	8%	0%	21%	10%	2%	10%	1%	1%

[a] Significantly different from ACE at the 90% confidence level.
[b] Significantly different from JCP&L at the 90% confidence level.
[c] Significantly different from PSE&G at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from municipal electric utilities (MUNI) at the 90% confidence level.

Table 304: Furnace Efficiency by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Heating Type	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (furnaces)	198	40	57	67	11	23	12	41	95	50
Average	87.8	91.1[c,e]	87.7	87.2	83.9	84.1	88.5	88.1	86.5	90.4[h]
Median	90.5	92.1	85.0	92.0	80.0	82.0	88.5	92.0	80.0	92.0
Minimum	66.0	80.0	80.0	66.0	68.0	79.0	80.0	80.0	66.0	80.0
Maximum	98.1	98.1	98.0	98.0	98.0	96.0	98.0	98.0	98.0	98.1
Standard Deviation	7.5	7.0	7.1	8.1	9.3	6.0	7.5	7.2	7.9	6.9

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

E.1.3 Boilers

Table 305: Boiler Fuel by Utility

(Source: On-site and self-audit data)

Heating Type	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (boilers)	146	8	45	47	27	19	23	21	92	10
Natural Gas	71%	77%	51%	85%[b]	87%	89%	49%[h]	69%	79%	80%
Oil	27%	14%	47%	15%[b]	13%	11%	47%	31%	21%	12%
Propane	1%	9%	2%	0%	0%	0%	4%	0%	0%	8%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

Table 306: ENERGY STAR Qualification of Boilers by Utility

(Source: On-site and self-audit data)

Heating Type	Statewide	Electric Utilities					Gas Utilities			
		ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (boilers)	131	8	37	44	26	16	*19*	*18*	*84*	*10*
ENERGY STAR-qualified	39%	52%	30%	47%	23%	25%	36%	25%	42%	47%
Certified	*17%*	*9%*	*25%*	*14%*	*9%*	*19%*	*34%*	*15%*	*14%*	*10%*
Meets minimum qualifications	*21%*	*43%[b]*	*5%*	*33%[b]*	*14%*	*7%*	*2%*	*10%*	*28%*	*37%*
Non-qualified	61%	48%	70%	53%	77%	75%	64%	75%	58%	52%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

Table 307: Age of Boilers by Utility

(Source: On-site and self-audit data)

Unit - AFUE	Statewide	Electric Utilities					Gas Utilities			
		ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (boilers)	75	3	26	23	15	8	10	12	50	3
2021 to 2023	12%	0%	22%	4%	8%	0%	16%	14%	11%	0%
2018 to 2020	4%	0%	0%	8%	0%	11%	0%	0%	6%	0%
2013 to 2017	12%	0%	9%	15%	12%	14%	8%	7%	15%	0%
2008 to 2012	9%	33%	3%	15%	5%	14%	0%	0%	14%	33%
2003 to 2007	17%	33%	9%	24%	15%	27%	8%	21%	17%	33%
1993 to 2002	28%	0%	33%	23%	52%	0%	48%	21%	27%	0%
1992 or earlier	18%	33%	24%	11%	8%	34%	20%	37%	10%	33%

Table 308: Boiler Efficiency by Utility

(Source: on-site and self-audit data)

Heating Type	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (furnaces)	106	8	33	32	17	16	18	15	64	9
Average	84.9	88.4	85.2	84.1	83.1	85.3	86.2	84.7	83.8	88.5
Median	83.5	85.3	84.0	82.5	83.0	82.8	85.0	84.0	82.4	85.3
Minimum	78.0	79.0	80.1	78.8	78.0	78.0	80.1	81.8	78.0	79.0
Maximum	96.0	96.0	95.0	95.5	95.0	96.0	95.0	95.0	96.0	96.0
Standard Deviation	4.8	6.6	4.0	4.9	4.0	5.9	5.0	3.3	4.6	6.3

E.2 Cooling

E.2.1 Primary Cooling

Table 309: Primary Cooling System by Utility

(Source: on-site and self-audit data)

		Electric Utilities					Gas Utilities			
Cooling Type	**Statewide**	**ACE**	**JCP&L**	**PSE&G**	**RECO**	**MUNI**	**E'TOWN**	**NJNG**	**PSE&G**	**SJG**
n (households)	*1,251*	*200*	*363*	*398*	*135*	*155*	127	214	649	261
Central AC	68%	72%	71%	65%	70%	57%	49%[h,i]	74%[f]	69%	70%
Window/Room AC	23%	21%	19%	26%	20%	30%	30%	16%[f]	24%	23%
Ceiling fans	3%	1%	4%	1%	3%	5%	7%[h,i]	4%[h]	1%	1%
ASHP	1%	2%	2%	1%	1%	2%	1%	2%	1%	1%
MSHP	1%	0%	0%	2%	0%	2%	4%	0%	1%	1%
Portable fans	1%	2%	1%	1%	1%	1%	4%	0%	1%	1%
GSHP	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%
Whole house or attic fan	0%	0%	0%	0%	4%	0%	0%	0%	1%	0%
None/don't know	3%	2%	3%	3%	0%	2%	4%	3%	2%	2%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
[i] Significantly different from SJG at the 90% confidence level

Table 310: Penetration of Cooling Type by Utility

(Source: On-site, self-audit, and survey data)

		Electric Utilities					Gas Utilities			
Cooling Type	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (households)	1251	200	363	398	135	155	127	214	649	261
Central AC	69%	73%	74%	66%	74%	60%	50%[h,i]	79%[f]	70%	71%
Window/Room AC	29%	28%	25%	32%	25%	37%	39%	23%	29%	30%
Ceiling fans	28%	31%	27%	27%	26%	34%	34%	29%	25%	31%
ASHP	3%	3%	3%	3%	2%	4%	4%	3%	3%	3%
MSHP	3%	2%	2%	3%	4%	3%	5%	2%	3%	3%
Portable fans	12%	15%	13%	11%	11%	15%	14%	11%	12%	15%
GSHP	0%	1%	0%	0%	0%	0%	1%	0%	0%	1%
Whole house or attic fan	3%	3%	3%	4%	10%	3%	4%	2%	4%	3%
None/don't know	2%	2%	2%	3%	0%	2%	5%	2%	2%	1%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
[i] Significantly different from SJG at the 90% confidence level

E.2.2 Permanent Cooling

Table 311: ENERGY STAR Qualification – Permanent Cooling by Utility[1]

(Source: On-site, self-audit, and survey data)

ENERGY STAR Status	Statewide	Electric Utilities					Gas Utilities			
		ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (cooling equipment)	*272*	*60*	*75*	*86*	*26*	*25*	*20*	*48*	*135*	*69*
ENERGY STAR-qualified	42%	46%	44%	37%	63%	43%	33%	51%	37%	48%
Certified	20%	18%	20%	21%	36%	18%	21%	27%	20%	14%
Meets minimum qualifications	21%	29%	23%	16%	27%	25%	12%	24%	17%	34%
Non-qualified	58%	54%	56%	63%	37%	57%	67%	49%	63%	52%

[1] Permanent cooling systems refer to equipment that cannot be easily removed and excludes equipment such as room ACs and other portable AC units.

Table 312: Age of Permanent Cooling Equipment by Utility[1]

(Source: on-site and self-audit data)

		Electric Utilities					Gas Utilities			
Age	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (units)	312	61	98	97	16	40	26	61	148	77
2021 to 2023	14%	15%	10%	17%	5%	24%	7%	14%	13%	22%
2018 to 2020	32%	36%	23%	39%	25%	15%	36%	21%	36%	31%
2013 to 2017	15%	17%	19%	9%	43%	24%	13%	20%	14%	14%
2008 to 2012	14%	18%	17%	9%	11%	16%	11%	17%	12%	16%
2003 to 2007	11%	10%	11%	11%	0%	14%	16%	11%	10%	11%
1993 to 2002	12%	4%	16%	12%	16%	6%	17%	12%	14%	5%
1992 or earlier	2%	0%	3%	1%	0%	0%	0%	5%	1%	0%

[1] Permanent cooling systems refer to equipment that cannot be easily removed and excludes equipment such as room ACs and other portable AC units.

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Table 313: Permanent Cooling Efficiency by Utility[1]

(Source: On-site and self-audit data)

Unit - SEER	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (units)	265	57	74	84	28	22	15	50	135	65
Average	13.8	15.2[b,c]	13.4[a]	13.6[a]	14.0	13.7	13.5	13.6	13.6	14.9[g,h]
Median	14.0	14.0	13.5	13.2	13.2	13.3	13.0	14.0	13.5	14.0
Minimum	8.2	10.3	9.0	9.0	8.2	9.1	9.7	9.0	8.2	9.1
Maximum	29.4	24.6	19.2	29.4	28.9	29.3	18.4	19.0	29.4	24.6
Standard Deviation	3.2	3.0	2.4	3.3	4.1	4.2	3.0	2.0	3.6	3.2

[1] Permanent cooling systems refer to equipment that cannot be easily removed and excludes equipment such as room ACs and other portable AC units.
[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

E.2.3 Central AC

Table 314: ENERGY STAR Qualification – Central AC by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (units)	*236*	*51*	*65*	*76*	*21*	*23*	*13*	*47*	*116*	*60*
ENERGY STAR-qualified	38%	48%	36%	34%	59%	39%	13%	49%	33%	50%
Certified	19%	16%	20%	19%	34%	15%	13%	29%	18%	12%
Meets minimum qualifications	19%	32%	17%	16%	26%	23%	0%	20%	15%	38%[f,g]
Non-qualified	62%	52%	64%	66%	41%	61%	87%	52%	67%	50%[f]

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

Table 315: Age of Central AC by Utility

(Source: On-site and self-audit data)

Age	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (units)	*218*	*50*	*66*	*70*	*12*	*20*	13	45	101	59
2021 to 2023	15%	18%	8%	21%	8%	18%	6%	11%	14%	25%
2018 to 2020	24%	34%	24%	21%	41%	8%	38%	23%	21%	31%
2013 to 2017	11%	9%	12%	10%	10%	27%	12%	13%	13%	5%
2008 to 2012	15%	19%	17%	13%	13%	13%	6%	19%	15%	17%
2003 to 2007	12%	14%	9%	13%	0%	24%	6%	8%	13%	15%
1993 to 2002	19%	5%	25%	20%	27%	11%	31%	18%	22%	6%
1992 or earlier	3%	0%	5%	2%	0%	0%	0%	8%	2%	0%

Table 316: Central AC Efficiency by Utility

(Source: on-site and self-audit data)

Unit - SEER	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (furnaces)	230	48	67	72	23	20	9	49	116	56
Average	13.2	14.6[b,c]	13.0	12.9	12.9[a]	12.7[a]	11.9	13.5	12.8	14.3[f,g]
Median	13.4	14.0	13.3	13.0	13.0	13.0	13.0	14.0	13.0	13.8
Minimum	8.2	10.3	9.0	9.6	8.2	9.1	9.7	9.0	8.2	9.1
Maximum	23.0	23.0	19.0	19.7	17.7	16.5	16.0	19.0	19.7	23.0
Standard Deviation	2.1	2.2	2.2	1.9	2.3	2.1	2.1	2.0	2.0	2.5

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

E.2.4 Room Air Conditioner

Table 317: ENERGY STAR Qualification – Room Air Conditioner by Utility
(Source: Self-audit and on-site data)

		Electric Utilities					Gas Utilities			
Heating Type	**Statewide**	**ACE**	**JCP&L**	**PSE&G**	**RECO**	**MUNI**	**E'TOWN**	**NJNG**	**PSE&G**	**SJG**
n (boilers)	112	11	41	25	5	30	*8*	*25*	*57*	*22*
ENERGY STAR-qualified	31%	25%	40%	17%	57%	54%	39%	40%	26%	33%
Certified	*31%*	*25%*	*38%*	*17%*	*57%*	*54%*	39%	37%	26%	33%
Meets minimum qualifications	*1%*	*0%*	*2%*	*0%*	*0%*	*0%*	0%	3%	0%	0%
Non-qualified	69%	75%	60%	83%	43%	46%	61%	60%	74%	67%

Table 318: Age of Room Air Conditioner by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Age	Statewide	ACE	JCP &L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (units)	75	7	26	22	2	18	7	15	39	14
2021 to 2023	14%	0%	19%	13%	0%	30%	17%	22%	12%	10%
2018 to 2020	42%	44%	3%	68%	0%	25%	0%	5%[h]	59%	35%
2013 to 2017	23%	38%	37%	9%	90%	24%	13%	40%	16%	37%
2008 to 2012	11%	18%	21%	3%	10%	15%	31%	15%	6%	19%
2003 to 2007	9%	0%	20%	5%	0%	5%	39%	18%	5%	0%
1993 to 2002	1%	0%	0%	2%	0%	0%	0%	0%	1%	0%
1992 or earlier	3%	0%	5%	2%	0%	0%	0%	0%	0%	0%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 319: Room Air Conditioner Efficiency by Utility

(Source: on-site and self-audit data)

		Electric Utilities					Gas Utilities			
Unit - CEER	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (units)	*106*	*10*	*38*	*27*	*4*	*27*	7	23	54	22
Average	11.1	10.2	10.8	11.3	12.9	11.3	10.3	10.8	11.4	10.6
Median	11.0	10.7	10.9	11.0	11.1	11.2	10.7	10.9	11.0	11.0
Minimum	6.2	6.5	6.2	8.1	10.8	9.8	7.2	6.2	8.1	6.5
Maximum	15.0	12.1	15.0	15.0	15.0	12.1	11.1	12.0	15.0	12.1
Standard Deviation	1.4	1.6	1.4	1.6	2.0	0.7	1.4	1.2	1.4	1.3

E.3 Heat Pumps

Table 320: ENERGY STAR Qualification – Heat Pumps

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (heat pumps)	*29*	*7*	*7*	*8*	*5*	*2*	5	1	16	7
ENERGY STAR-qualified	70%	48%	80%	68%	82%	100%	83%	100%	66%	48%
Certified	*38%*	*35%*	*30%*	*47%*	*47%*	*50%*	50%	0%	43%	35%
Meets minimum qualifications	*32%*	*13%*	*50%*	*21%*	*35%*	*50%*	33%	100%	23%	13%
Non-qualified	30%	52%	20%	32%	18%	0%	17%	0%	34%	52%

Table 321: Age of Heat Pumps

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Age	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (heat pumps)	*15*	*2*	*6*	*4*	*2*	*1*	5	1	7	2
2021 to 2023	4%	50%	0%	0%	0%	0%	0%	0%	0%	50%
2018 to 2020	70%	50%	89%	50%	0%	0%	83%	100%	40%	50%
2013 to 2017	11%	0%	11%	0%	100%	0%	17%	0%	13%	0%
2008 to 2012	9%	0%	0%	25%	0%	100%	0%	0%	27%	0%
2003 to 2007	7%	0%	0%	25%	0%	0%	0%	0%	20%	0%
1993 to 2002	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1992 or earlier	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 322: Heat Pump Efficiency (SEER) by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Unit - SEER	**Statewide**	**ACE**	**JCP&L**	**PSE&G**	**RECO**	**MUNI**	**E'TOWN**	**NJNG**	**PSE&G**	**SJG**
n (heat pumps)	30	7	7	9	5	2	5	1	17	7
Average	19.0	19.5	16.5	20.5	20.8	23.6	16.9	15.0	20.5	19.5
Median	19.0	18.2	18.0	19.7	20.0	23.6	18.0	15.0	19.7	18.2
Minimum	13.0	14.0	14.0	13.0	16.0	18.0	14.0	15.0	13.0	14.0
Maximum	29.4	24.6	19.2	29.4	28.9	29.3	18.4	15.0	29.4	24.6
Standard Deviation	4.6	4.8	2.3	4.6	4.8	8.0	2.3	NA	4.7	4.8

Table 323: Heat Pump Efficiency (HSPF) by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Unit - HSPF	**Statewide**	**ACE**	**JCP&L**	**PSE&G**	**RECO**	**MUNI**	**E'TOWN**	**NJNG**	**PSE&G**	**SJG**
n (heat pumps)	*26*	*5*	*7*	*9*	*3*	*2*	5	1	15	5
Average	10.1	10.5	9.1	10.8	10.6	11.6	9.0	8.5	10.8	10.5
Median	10.0	9.0	9.4	11.0	10.0	11.6	8.2	8.5	7.7	8.2
Minimum	7.7	8.2	8.2	7.7	10.0	9.4	9.5	8.5	13.8	12.8
Maximum	13.8	12.8	11.0	13.8	12.1	13.8	9.4	8.5	11.0	9.0
Standard Deviation	1.8	2.3	1.0	1.6	1.2	3.1	0.7	NA	1.6	2.3

E.4 Controls

Table 324: Thermostat Penetration by Utility

(Source: Self-audit and on-site data)

Type	Statewide	ACE	JCP&L	PSE&G	Rockland	Municipal	E'TOWN	NJNG	PSE&G	SJG
n (households)	*1,251*	*200*	*363*	*398*	*135*	*155*	*127*	*214*	*649*	*261*
Programmable	49%	41%	48%	52%	57%	52%	47%	48%	53%	40%
Smart/Learning	31%	35%	31%	31%	35%	28%	42%	43%	38%	40%
Manual	40%	38%	42%	38%	39%	44%	28%	31%	31%	33%

Table 325: Programmable Feature Use by Utility

(Source: Self-audit and on-site data)

Type	Statewide	ACE	JCP&L	PSE&G	Rockland	Municipal	E'TOWN	NJNG	PSE&G	SJG
n (households with programmable or smart/learning thermostats)	558	74	160	202	66	56	53	102	309	94
Use programmable features *often*	24%	23%	31%	20%	18%	21%	23%	31%	21%	24%
Use programmable features *sometimes*	44%	49%	41%	44%	41%	51%	49%	42%	43%	46%
Use programmable features *rarely*	31%	29%	27%	34%	37%	27%	28%	25%	34%	30%
Use programmable features *never*	2%	0%	2%	2%	3%	1%	0%	2%	3%	0%

E.5 WATER HEATING

Table 326: Water Heater Fuel by Utility

(Source: On-site and self-audit data)

Fuel	Statewide	Electric Utilities					Gas Utilities			
		ACE	JCP&L	PSE&G	RECO	MUNI	E'Town	NJNG	PSE&G	SJG
n (water heaters)	*542*	*87*	*152*	*189*	*52*	*62*	*45*	*99*	*287*	*111*
Natural Gas	84%	80%	73%	92%[b]	94%	78%	70%[h]	80%	88%	82%
Electric	13%	18%	20%	7%[b]	–	19%[d]	18%	18%	9%	17%
Propane	2%	1%	3%	1%	2%	3%	6%	2%	1%	1%
Oil	1%	1%	3%	–	4%	–	4%	1%	1%	0%
Solar	0%	–	–	0%	–	–	2%	–	–	–

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 327: Water Heater Fuel and Type by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Fuel and Type	**Statewide**	**ACE**	**JCP&L**	**PSE&G**	**RECO**	**MUNI**	**E'Town**	**NJNG**	**PSE&G**	**SJG**
n (water heaters)	*560*	*89*	*158*	*193*	*56*	*64*	*47*	*103*	*298*	*112*
Storage, Stand-alone	**88%**	**79%**	**86%**	**92%**	**82%**	**91%**	**78%[c]**	**88%**	**91%**	**84%**
Natural Gas	85%	77%[c]	75%	93%[b]	98%	77%[c]	75%	79%	90%	80%
Electric	14%	22%[c]	22%	6%[b]	–	22%[c,d]	20%	20%	9%	19%
Propane	1%	1%	3%	0%	2%	1%	5%	1%	1%	1%
Instantaneous	**8%**	**19%[c]**	**8%**	**5%**	**3%**	**19%[c]**	**13%**	**9%**	**4%**	**14%[g]**
Natural Gas	88%	97%	75%	92%	100%	73%	50%	91%	90%	96%
Propane	9%	–	17%	8%	–	27%	25%	9%	10%	–
Electric	4%	3%	8%	–	–	–	25%	–	–	4%
Storage, Indirect heat	**3%**	**2%**	**6%**	**2%**	**13%[c]**	**4%**	**8%**	**3%**	**3%**	**2%**
Natural Gas	60%	63%	39%	100%	68%	70%	54%	67%	62%	50%
Oil	39%	37%	61%	–	32%	–	46%	33%	38%	30%
Electric	2%	–	–	–	–	30%	–	–	–	20%
Storage, Heat Pump (Electric)	**1%**	**–**	**–**	**1%**	**–**	**–**	**–**	**–**	**1%**	**–**
Combi Boiler (Natural Gas)	**0%**	**–**	**–**	**–**	**2%**	**–**	**–**	**–**	**0%**	**–**
Storage, Solar (Other)	**0%**	**–**	**–**	**0%**	**–**	**–**	**2%**	**–**	**–**	**–**

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

NMR Group, Inc.

Table 328: Water Heater Equipment Age by Utility

(Source: On-site and self-audit data)

Equipment Age	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'Town	NJNG	PSE&G	SJG
n (water heaters)	*560*	*72*	*111*	*142*	*42*	*47*	*32*	*72*	*223*	*87*
2021 or later	14%	15%	14%	14%	23%	8%	8%	19%	12%	19%
2018 to 2020	21%	26%	19%	22%	23%	9%	16%	19%	24%	20%
2013 to 2017	32%	30%	33%	31%	36%	37%	45%	31%	33%	24%
2008 to 2012	12%	7%	14%	12%	10%	20%	8%	12%	14%	8%
2003 to 2007	13%	15%	12%	12%	2%	20%	11%	16%	10%	18%
1993 to 2002	7%	7%	7%	8%	6%	3%	12%	3%	8%	8%
1992 or earlier	1%	–	1%	1%	–	4%	1%	1%	0%	3%

Table 329: Water Heater Efficiency by Utility

(Source: On-site and self-audit data)

Efficiency (UEF)	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'Town	NJNG	PSE&G	SJG
n (water heaters)	*505*	*84*	*143*	*181*	*42*	*55*	*41*	*95*	*265*	*104*
Mean	0.70	0.73[d]	0.72	0.68	0.63[b]	0.67	0.70	0.71	0.69	0.71
Min	0.41	0.52	0.45	0.47	0.47	0.41	0.45	0.45	0.41	0.52
Max	3.88	0.99	2.33	3.88	0.96	0.98	0.97	0.99	3.88	0.99
Median	0.62	0.66	0.66	0.62	0.62	0.61	0.62	0.67	0.62	0.65
Std. Dev.	0.27	0.15	0.20	0.38	0.09	0.15	0.16	0.15	0.34	0.15

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 330: Water Heater Capacity by Utility

(Source: On-site and self-audit data)

Capacity (Gallons)	Statewide	Electric Utilities: ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities: E'Town	NJNG	PSE&G	SJG
n (water heaters)	*481*	*71*	*130*	*171*	*41*	*54*	*36*	*84*	*254*	*93*
<40	479	11%	2%	4%	1%	–	7%	2%	3%	8%
40 to 55	4%	86%	92%	86%	75%	95%	79%	93%	87%	88%
55 to 75	88%	3%	3%	9%	23%	5%	9%	3%	9%	4%
>75	7%	–	3%	1%	–	–	5%	2%	1%	–

Table 331: Water Heater ENERGY STAR Status by Utility

(Source: On-site and self-audit data)

ENERGY STAR	Statewide	Electric Utilities: ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities: E'Town	NJNG	PSE&G	SJG
n (water heaters)	*532*	*87*	*148*	*189*	*48*	*61*	43	99	281	109
ENERGY STAR-qualified	27%	40%[e]	32%	23%	19%	10%	32%	34%	23%	30%
ENERGY STAR-certified	*19%*	*14%*	*9%*	*6%*	*7%*	*7%*	*18%*	*5%*	*7%*	*11%*
Meets minimum qualifications	*8%*	*26%*	*23%*	*17%*	*12%*	*3%*	*14%*	*29%*	*16%[g]*	*20%*
Non-qualified	73%	68%	77%	81%	90%	60%[e]	68%	66%	77%	70%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

E.6 APPLIANCES

E.6.1 Kitchen Appliances

Table 332: Kitchen Appliance Penetration by Utility
(Source: On-site, self-audit, and adjusted survey data)

		Electric Utilities					Gas Utilities			
Heating Type	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'Town	NJNG	PSE&G	SJG
n	*1,251*	*200*	*363*	*398*	*135*	*155*	127	214	649	261
Refrigerator	97%	98%	96%	100%	96%	97%	94%	97%	98%	97%
Microwave	91%	95%	93%	88%	87%	93%	92%	91%	89%	96%
Dishwasher	79%	78%	82%	78%	91%	72%	78%	82%	79%	77%
Stand-alone Freezer	31%	33%	34%	28%	42%	36%	29%	36%	30%	33%
Beverage cooler or wine fridge	14%	15%	15%	13%	30%	10%[d]	13%	17%	14%	13%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from municipal electric utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 333: Kitchen Appliances per Household by Utility

(Source: On-site, self-audit, and adjusted survey data)

Heating Type	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'Town	NJNG	PSE&G	SJG
n	*1,251*	*200*	*363*	*398*	*135*	*155*	127	214	649	261
Refrigerator	1.28	1.20	1.30	1.27	1.41[a]	1.26	1.29	1.29	1.29	1.22
Microwave	0.97	0.99	0.98	0.96	0.91	0.94	0.95	0.97	0.96	0.98
Dishwasher	0.82	0.82	0.84	0.80	0.94[a,b,c]	0.73[d]	0.79	0.85	0.81	0.80
Stand-alone Freezer	0.36	0.36	0.38	0.33	0.44	0.37	0.34	0.40	0.35	0.36
Beverage cooler or wine fridge	0.17	0.17	0.17	0.15	0.32[a,b,c]	0.13[d]	0.13	0.20	0.17	0.14

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from municipal electric utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 334: Households with Multiple Kitchen Appliances by Utility

(Source: On-site, self-audit, and adjusted survey data)

		Electric Utilities					Gas Utilities			
Heating Type	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'Town	NJNG	PSE&G	SJG
n (households)	*1,251*	*200*	*363*	*398*	*135*	*155*	127	214	649	261
Two or more refrigerators	28%	20%	29%	29%	36%	28%	34%[i]	29%	29%	21%
Two or more dishwashers	2%	3%	1%	2%	2%	1%	1%	2%	2%	2%
Two or more standalone freezers	3%	2%	3%	3%	2%	1%	2%	3%	3%	2%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

E.6.1.1 Refrigerators

Table 335: Refrigerator Door Configuration by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Configuration	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'Town	NJNG	PSE&G	SJG
n (refrigerators)	*773*	*115*	*223*	*259*	*98*	*91*	*72*	*140*	*413*	*148*
Bottom Freezer	43%	40%	43%	44%	48%	39%	33%	46%	45%	40%
Top Freezer	31%	26%	27%	36%	21%	31%	32%	28%	33%	27%
Side by Side	24%	32%	26%	19%	29%	27%	32%	22%	20%	31%
Single Door	2%	2%	3%	1%	1%	2%	1%	3%	2%	2%
Internal Freezer	<1%	--	--	--	1%	1%	0%	0%	0%	0%
Mini-fridge	<1%	--	<1%	--	--	--	1%	0%	0%	0%

Table 336: Refrigerator ENERGY STAR Status by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
ENERGY STAR	**Statewide**	**ACE**	**JCP&L**	**PSE&G**	**RECO**	**MUNI**	**E'TOWN**	**NJNG**	**PSE&G**	**SJG**
n (refrigerators)	*754*	*115*	*223*	*259*	*98*	*91*	*71*	*134*	*403*	*146*
ENERGY STAR Qualified	62%	73%	61%	60%	55%	59%	57%	62%	60%	71%
ENERGY STAR Certified	*46%*	*59%*	*46%*	*44%*	*40%*	*43%*	46%	45%	44%	55%
Meets minimum qualifications	*15%*	*14%*	*15%*	*16%*	*15%*	*16%*	46%	45%	44%	55%
Non-qualified	38%	27%	40%	40%	45%	41%	43%	38%	40%	29%

Table 337: Refrigerator Age by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Age	**Statewide**	**ACE**	**JCP&L**	**PSE&G**	**RECO**	**MUNI**	**E'TOWN**	**NJNG**	**PSE&G**	**SJG**
n (refrigerators)	*708*	*107*	*202*	*231*	*83*	*85*	*68*	*126*	*372*	*139*
2021 to 2023	14%	6%	16%	15%	11%	11%	10%	17%	16%	7%
2018 to 2020	24%	38%	19%	24%	16%	19%	22%	24%	20%	36%[a]
2013 to 2017	23%	26%	27%	20%	20%	27%	36%	24%	20%	25%
2008 to 2012	21%	16%	21%	21%	25%	23%	15%	21%	23%	17%
2003 to 2007	10%	9%	8%	12%	16%	10%	8%	7%	12%	8%
1993 to 2002	7%	5%	7%	7%	11%	7%	6%	6%	8%	6%
1992 or earlier	1%	0%	1%	1%	1%	4%	2%	0%	1%	1%

[a] Significantly different from PSE&G (gas) at 90% confidence level.

Table 338: Refrigerator Volume by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Volume	**Statewide**	**ACE**	**JCP&L**	**PSE&G**	**RECO**	**MUNI**	**E'TOWN**	**NJNG**	**PSE&G**	**SJG**
n (refrigerators)	*755*	*114*	*217*	*246*	*90*	*88*	*71*	*137*	*399*	*147*
Mean	22.1	22.6	21.8	22.3	22.3	22.2	21.6	21.6	22.3	22.5
Median	22.5	23.9	22.1	22.6	22.6	21.9	21.8	22.1	22.6	23.1
Min	1.6	1.7	2.4	1.6	4.4	3.1	3.4	3.1	1.6	1.7
Max	36.7	31.0	36.7	34.8	32.6	32.4	30.7	36.7	34.8	31.0
Std. Dev.	5.3	5.3	5.6	5.3	4.2	5.3	5.4	5.6	5.1	5.3

Table 339: Refrigerator Efficiency by Utility (kWh/yr)

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
kWh/yr	**Statewide**	**ACE**	**JCP&L**	**PSE&G**	**RECO**	**MUNI**	**E'TOWN**	**NJNG**	**PSE&G**	**SJG**
n (refrigerators)	*755*	*114*	*217*	*246*	*90*	*88*	*71*	*137*	*405*	*147*
Mean	22.1	22.6	21.8	22.3	22.3	22.2	580.3	577.7	591.5	573.7
Median	22.5	23.9	22.1	22.6	22.6	21.9	585.0	594.0	587.0	581.0
Min	1.6	1.7	2.4	1.6	4.4	3.1	180.0	218.0	220.0	218.0
Max	36.7	31.0	36.7	34.8	32.6	32.4	1 043.0	784.0	1 570.0	1 887.0
Std. Dev.	5.3	5.3	5.6	5.3	4.2	5.3	154.1	129.1	146.6	170.8

E.6.1.2 Freezers

Table 340: Freezer Door Configuration by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Configuration	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (freezers)	*127*	*20*	*36*	*45*	*8*	*18*	*16*	*25*	*59*	*27*
Chest	66%	71%	42%[c]	83%	47%	67%	63%	37%[h]	78%	77%[g]
Upright	34%	29%	58%[c]	17%	53%	33%	37%	63%[h]	22%	23%[g]

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

Table 341: Freezer ENERGY STAR Status by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
ENERGY STAR	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (refrigerators)	*121*	*17*	*35*	*44*	*8*	*17*	*16*	*24*	*58*	*23*
ENERGY STAR Qualified	35%	22%	27%	39%	83%	48%	35%	35%	28%	40%
ENERGY STAR Certified	*21%*	*12%*	*20%*	*21%*	*53%*	*38%*	*21%*	*20%*	*22%*	*22%*
Meets minimum qualifications	*13%*	*10%*	*7%*	*18%*	*30%*	*10%*	*13%*	*15%*	*6%*	*18%*
Non-qualified	65%	78%	73%	61%	17%	52%	65%	65%	72%	60%

Table 342: Freezer Age by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Age	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (freezers)	*99*	*13*	*34*	*31*	*8*	*13*	*13*	*24*	*45*	*17*
2021 to 2023	11%	15%	14%	7%	20%	21%	16%	13%	8%	21%
2018 to 2020	33%	23%	14%	54%[b]	27%	19%	9%	20%	49%	15%
2013 to 2017	17%	18%	18%	15%	27%	26%	17%	18%	18%	11%
2008 to 2012	9%	9%	13%	7%	17%	--	22%	9%	7%	8%
2003 to 2007	15%	23%	20%	9%	10%	22%	14%	23%	8%	33%
1993 to 2002	11%	11%	14%	9%	--	12%	14%	17%	6%	13%
1992 or earlier	3%	--	7%	--	--	--	7%	0%	4%	0%

Table 343: Freezer Volume by Utility

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Volume	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (freezers)	*121*	*17*	*35*	*44*	*8*	*17*	*16*	*25*	*57*	*23*
Mean	10.3	10.7	12.4	8.8	12.2	8.0	11.5	12.7[h]	8.9	9.6
Median	7.2	9.0	12.8	7.1	10.5	7.0	7.2	12.8	7.1	7.0
Min	3.5	5.0	3.5	3.5	4.9	3.5	3.5	3.5	3.5	5.0
Max	30.0	20.5	20.9	30.0	20.2	21.0	30.0	20.6	22.0	20.5
Std. Dev.	5.9	5.3	6.2	5.9	6.6	4.8	7.8	6.3	5.6	4.5

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

Table 344: Freezer Efficiency by Utility (kWh/yr)

(Source: On-site and self-audit data)

kWh/yr	Statewide	Electric Utilities: ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities: E'TOWN	NJNG	PSE&G	SJG
n (freezers)	*122*	*17*	*36*	*44*	*8*	*17*	*16*	*25*	*58*	*23*
Mean	360.9	415.5	418.9	314.6	349.8	311.5	445.2	395.8	318.7	383.0
Median	284.5	296.0	416.0	257.0	340.5	277.0	301.5	435.0	278.0	281.0
Min	193.0	218.0	193.0	193.0	216.0	193.0	193.0	193.0	193.0	193.0
Max	1,302.0	725.0	1,302.0	1,302.0	480.0	621.0	1 302.0	737.0	1 302.0	725.0
Std. Dev.	205.5	157.4	222.5	237.2	116.2	128.6	346.2	152.1	194.4	144.0

E.6.1.3 Dishwashers

Table 345: Dishwasher Age by Utility

(Source: On-site and self-audit data)

Vintage	Statewide	Electric Utilities: ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities: E'TOWN	NJNG	PSE&G	SJG
n (dishwashers)	*431*	*68*	*119*	*150*	*50*	*44*	*37*	*74*	*237*	*83*
2021 to 2023	13%	8%	14%	14%	6%	17%	19%	6%	15%	10%
2018 to 2020	22%	36%[c]	25%	15%	30%	21%	24%	30%	16%	31%
2013 to 2017	25%	26%	27%	22%	29%	38%	25%	31%	22%	26%
2008 to 2012	18%	18%	18%	18%	20%	15%	15%	20%	17%	20%
2003 to 2007	16%	8%	11%	23%	4%	3%	15%	7%	21%	9%
1993 to 2002	4%	2%	5%	5%	--	4%	0%	5%	5%	2%
1992 or earlier	3%	1%	1%	3%	12%	2%	2%	1%	4%	2%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

Table 346: Dishwasher Efficiency by Utility (kWh/yr)

(Source: On-site and self-audit data)

kWh/yr	Statewide	Electric Utilities					Gas Utilities			
		ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (dishwashers)	*476*	*76*	*130*	*162*	*57*	*51*	*40*	*77*	*267*	*92*
Mean	299.1	289.8	286.3[c]	310.9	304.7	278.6[c]	285.1	288.0	306.4	293.8
Median	270.0	270.0	270.0	270.0	270.0	269.0	269.0	270.0	270.0	270.0
Min	85.0	231.0	234.0	85.0	234.0	206.0	255.0	234.0	85.0	206.0
Max	680.0	614.0	581.0	680.0	573.0	457.0	573.0	581.0	680.0	614.0
Std. Dev.	63.6	60.0	49.8	78.0	66.1	39.7	56.6	56.1	66.1	65.6

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

Table 347: Dishwasher ENERGY STAR Status by Utility

(Source: On-site and self-audit data)

ENERGY STAR	Statewide	Electric Utilities: ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities: E'TOWN	NJNG	PSE&G	SJG
n (dishwashers)	*492*	*79*	*135*	*168*	*59*	*51*	*41*	*82*	*275*	*94*
ENERGY STAR Qualified	74%	88%	81%	65%	74%	84%	87%[h]	86%[h]	66%	81%[h]
ENERGY STAR Certified	66%	79%[c]	75%[c]	54%	67%	84%	76%	79%[h]	57%	76%[h]
Meets minimum qualifications	8%	7%	6%	11%	7%	0%	10%	7%	9%	5%
Non-qualified	26%	15%	18%[c]	36%	27%	16%	13%[h]	14%[h]	34%	19%[h]

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

E.6.1.4 Cooking

Table 348: Oven Fuel Type by EDC

(Source: On-site and self-audit data)

configuration	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (ovens)	*181*	*33*	*55*	*55*	*16*	*22*	*15*	*37*	*87*	*42*
Electric	19%	40%	25%	9%[a]	28%	26%	49%	12%	16%	34%
Natural Gas	71%	60%	74%	72%	66%	71%	43%	88%[f]	68%	66%
Propane	1%	0%	1%	0%	5%	0%	7%	0%	0%	0%
Unknown gas	9%	0%	0%	19%[b]	0%	3%	0%	0%	16%	1%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

Table 349: Range Fuel Type by EDC

(Source: On-site and self-audit data)

configuration	Statewide	Electric Utilities: ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities: E'TOWN	NJNG	PSE&G	SJG
n (ranges)	*176*	*34*	*54*	*56*	*11*	*21*	*15*	*38*	*80*	*43*
Natural Gas	72%	67%	80%	68%	81%	74%	51%	88%	68%	69%
Electricity	13%	28%	12%	8%	12%	19%	12%	9%	11%	25%
Unknown gas	10%	0%	0%	19%	0%	3%	0%	0%	17%	1%
Resistance Electric	5%	3%	7%	4%	0%	3%	30%[h]	4%	3%	3%[f]
Propane	1%	2%	1%	0%	7%	0%	7%	0%	0%	2%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

E.6.2 Laundry

Table 350: Laundry Appliance Penetration by Utility

(Source: On-site, self-audit, and adjusted survey data)

Heating Type	Statewide	Electric Utilities: ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities: E'TOWN	NJNG	SJG	PSE&G
n	*1,251*	*200*	*363*	*398*	*135*	*155*	127	214	649	261
Clothes Washer	93%	94%	93%	92%	100%	100%	96%	93%	92%	95%
Clothes Dryer	92%	93%	91%	91%	99%	99%	92%	91%	92%	94%

Table 351: Laundry Appliances per Household by Utility

(Source: On-site, self-audit, and adjusted survey data)

Heating Type	Statewide	Electric Utilities: ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities: E'TOWN	NJNG	SJG	PSE&G
n	*1,251*	*200*	*363*	*398*	*135*	*155*	127	214	649	261
Clothes Washer	0.95	0.95[e]	0.95[d,e]	0.94[d,e]	1.00[b,c]	1.01[a,b,c]	0.98	0.94	0.94	0.95
Clothes Dryer	0.95	0.96	0.94[d]	0.94[d]	1.00[b,c]	1.05[b]	0.95	0.94	0.95	0.95

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from municipal electric utilities (MUNI) at the 90% confidence level.

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Table 352: Households with Multiple Laundry Appliances by Utility
(Source: On-site, self-audit, and adjusted survey data)

Appliance	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'town	NJNG	PSE&G	SJG
n	*1,251*	*200*	*363*	*398*	*135*	*155*	127	214	649	261
2+ clothes washers	2%	1%	2%	2%	0%	2%	1%	1%	2%	0%
2+ clothes dryers	2%	2%	1%	3%	0%	3%	1%	2%	3%	0%

E.6.2.1 Clothes Washers

Table 353: Clothes Washer Age

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Vintage	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (clothes washers)	*403*	*61*	*116*	*139*	*40*	*47*	*33*	*72*	*219*	*79*
2021 to 2023	12%	17%	9%	13%	12%	15%	11%	8%	13%	17%
2018 to 2020	27%	18%	39%	20%[b]	32%	28%	24%	46%	22%[g]	19%[g]
2013 to 2017	27%	33%	27%	25%	37%	32%	23%	21%	29%	33%
2008 to 2012	16%	19%	12%	19%	16%	9%	14%	15%	16%	18%
2003 to 2007	9%	7%	8%	10%	3%	6%	18%	6%	8%	7%
1993 to 2002	8%	5%	5%	12%	0%	9%	9%	4%	10%	4%
1992 or earlier	1%	1%	0%	2%	0%	2%	0%	0%	2%	1%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

Table 354: Clothes Washer Configuration

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Configuration	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (clothes washers)	*158*	*21*	*43*	*56*	*18*	*20*	*44*	*88*	*260*	*96*
Top Load	60%	74%	64%	56%	47%	63%	63%	64%	62%	64%
Front Load	40%	26%	36%	44%	53%	37%	37%	36%	38%	36%

Table 355: Clothes Washer Capacity (ft^3)

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
Volume	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (clothes washers)	*458*	*69*	*132*	*156*	*46*	*55*	*41*	*84*	*246*	*87*
Mean	4.0	3.8[b,d]	4.1	4.0	4.2	3.9	4.0	4.1	4.1	3.9
Median	4.3	4.2	4.2	4.3	4.5	4.1	4.3	4.2	4.3	4.2
Min	0.8	2.0	1.7	0.8	2.4	2.3	1.7	2.2	0.8	2.0
Max	6.5	5.3	6.5	5.5	5.5	5.3	5.2	6.5	5.5	5.5
Std. Dev.	0.8	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.8	0.8

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level

Table 356: Clothes Washer Efficiency (IMEF)

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
IMEF	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (clothes washers)	*368*	*58*	*108*	*122*	*37*	*43*	*29*	*69*	*197*	*73*
Mean	2.0	2.0	2.0	2.0	2.3	1.8[d]	1.9	2.0	2.1	2.0
Median	2.1	2.1	2.1	2.1	2.6	1.6	2.1	2.1	2.1	2.1
Min	0.5	0.5	0.6	0.5	0.6	0.6	0.7	0.6	0.5	0.5
Max	3.3	3.1	3.1	3.1	3.3	2.9	3.1	3.0	3.3	3.1
Std. Dev.	0.7	0.7	0.7	0.7	0.6	0.8	0.7	0.7	0.7	0.7

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 357: Clothes Washer ENERGY STAR Status

(Source: On-site and self-audit data)

		Electric Utilities					Gas Utilities			
status	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (clothes washers)	*459*	*71*	*132*	*156*	*47*	*53*	*40*	*85*	*246*	*88*
ENERGY STAR-qualified	63%	69%	67%	58%	81%	56%	56%	63%	64%	66%
Certified	56%	65%	60%	49%	64%	49%	56%	44%	56%	56%
Meets minimum qualifications	7%	3%	7%	8%	16%	7%	7%	11%	7%	8%
Non-qualified	37%	31%	33%	42%	19%	44%	37%	44%	37%	36%

E.6.2.2 Clothes Dryers

Table 358: Clothes Dryer Age

(Source: On-site and self-audit data)

Vintage	Statewide	Electric Utilities: ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities: E'TOWN	NJNG	PSE&G	SJG
n (clothes dryers)	*426*	*70*	*120*	*141*	*43*	*52*	*33*	*77*	*226*	*90*
2021 to 2023	13%	9%	15%	14%	9%	9%	8%	16%	13%	11%
2018 to 2020	24%	21%	27%	23%	16%	29%	27%	27%	24%	21%
2013 to 2017	28%	31%	28%	26%	32%	28%	22%	30%	27%	30%
2008 to 2012	17%	26%	15%	16%	9%	14%	23%	12%	15%	25%
2003 to 2007	11%	9%	6%	14%	27%	9%	10%	8%	13%	8%
1993 to 2002	6%	3%	7%	7%	5%	8%	8%	6%	6%	5%
1992 or earlier	1%	--	2%	1%	2%	2%	3%	0%	2%	0%

Table 359: Clothes Dryer Fuel Types

(Source: On-site and self-audit data)

fuel	Statewide	Electric Utilities: ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities: E'TOWN	NJNG	PSE&G	SJG
n (clothes dryers)	*454*	*76*	*124*	*151*	*44*	*59*	*37*	*80*	*241*	*96*
Natural Gas	69%	61%	64%	76%	87%	52%[d]	54%[h]	70%	76%	55%[h]
Electric	31%	39%	36%	24%	13%	48%[d]	46%[h]	30%	24%	45%[h]

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 360: Clothes Dryer Moisture Sensing

(Source: On-site and self-audit data)

configuration	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (clothes dryers)	*341*	*52*	*87*	*117*	*37*	*48*	*26*	*56*	*186*	*73*
Moisture Sensing	96%	95%	97%	95%	100%	97%	100%	96%	96%	96%
No Moisture Sensing	4%	5%	3%	5%	0%	3%	0%	4%	4%	4%

Table 361: Clothes Dryer ENERGY STAR Status

(Source: On-site and self-audit data)

status	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (clothes dryers)	*438*	*75*	*119*	*147*	*42*	*55*	*34*	*78*	*231*	*95*
ENERGY STAR-qualified	42%	39%	38%	45%	42%	38%	42%	39%	44%	38%
Certified	26%	26%	19%	30%	36%	21%	14%	21%	30%	24%
Meets minimum qualifications	16%	13%	19%	15%	6%	17%	28%	19%	13%	14%
Non-qualified	58%	60%	61%	55%	58%	61%	58%	61%	56%	62%

Table 362: Clothes Dryer Combined Energy Factor (CEF)

(Source: On-site and self-audit data)

CEF	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (clothes dryers)	*346*	*62*	*92*	*122*	*32*	*38*	*26*	*67*	*176*	*77*
Mean	3.1	3.1	3.2	3.1	3.1	3.2	3.1	3.1	3.1	3.1
Median	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Min	2.0	2.0	2.3	2.3	2.4	2.3	2.3	2.0	2.3	2.3
Max	5.8	3.9	3.9	5.8	3.9	5.2	3.9	3.9	5.8	3.9
Std. Dev.	0.5	0.5	0.5	0.6	0.5	0.7	0.6	0.5	0.6	0.5

E.6.3 Air Quality Appliances

Table 363: Air Quality Appliance Penetration by Utility

(Source: On-site, self-audit, and survey data)

		Electric Utilities					Gas Utilities			
Heating Type	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n	*1,251*	*200*	*363*	*398*	*135*	*155*	127	214	649	261
Dehumidifiers	38%	29%	37%	40%	55%	53%	40%	30%	43%	32%
Humidifiers	27%	28%	30%	23%	28%	26%	36%	25%	25%	27%
Air Purifiers	29%	22%	30%	30%	44%	26%	37%	22%	32%	22%

Table 364: Average Number of Air Quality Appliances by Utility

(Source: On-site, self-audit, and survey data)

		Electric Utilities					Gas Utilities			
Heating Type	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n	*1,251*	*200*	*363*	*398*	*135*	*155*	127	214	649	261
Dehumidifiers	0.44	0.34	0.43	0.45	0.64[a,b,c]	0.58[a,b]	0.49[g]	0.33[h]	0.50	0.37[h]
Humidifiers	0.35	0.39	0.40[c]	0.28	0.47	0.37	0.40	0.32	0.33	0.39
Air Purifiers	0.41	0.28[c]	0.43[a]	0.43	0.64[a,b,c]	0.42	0.56[g,i]	0.29[h]	0.46	0.29[h]

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

E.6.3.1 Dehumidifiers

Table 365: Dehumidifier Penetration
(Source: On-site, self-audit, and survey data)

		Electric Utilities					Gas Utilities			
Vintage	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (sites)	1,232	199	357	391	130	155	125	210	638	259
0	61%	71%	63%	60%	41%[a]	47%[a]	59%	69%[h]	56%	68%[h]
1	36%	26%	33%	38%	54%[a]	50%[a]	36%	29%[h]	40%	29%[h]
2+	3%	3%	4%	2%	4%	4%	6%	2%	3%	3%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 366: Dehumidifier Age

(Source: Self-audit and on-site data)

		Electric Utilities					Gas Utilities			
Vintage	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (dehumidifiers)	*106*	*11*	*28*	*40*	*10*	*17*	*16*	*12*	*62*	*16*
2021 to 2023	20%	14%	15%	21%	40%	27%	24%	21%	19%	15%
2018 to 2020	43%	54%	21%	53%	32%	28%	16%	28%	50%	52%
2013 to 2017	24%	11%	44%	16%	22%	23%	46%	41%	17%	9%
2008 to 2012	7%	21%	15%	0%	6%	16%	14%	11%	2%	23%[h]
2003 to 2007	1%	--	3%	--	--	6%	0%	0%	2%	0%
1993 to 2002	6%	--	3%	9%	--	--	0%	0%	9%	0%
1992 or earlier	--	--	--	--	--	--	--	--	--	--

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 367: Dehumidifiers Capacity (pints/day)

(Source: Self-audit and on-site data)

capacity	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (dehumidifiers)	*136*	*14*	*34*	*53*	*15*	*20*	*20*	*14*	*83*	*19*
Mean	43.9	58.8	45.5	40.9	41.1	49.7	48.2	48.8	40.3	58.2[h]
Median	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Min	1.9	2.0	1.9	8.4	22.0	22.0	20.0	20.0	1.9	2.0
Max	109.0	72.0	72.0	109.0	70.0	72.0	72.0	72.0	109.0	72.0
Std. Dev.	18.4	20.3	19.5	18.9	15.0	16.7	16.4	16.5	19.4	17.7

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 368: Dehumidifier ENERGY STAR Status

(Source: Self-audit and on-site data)

status	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (dehumidifiers)	*129*	*13*	*32*	*50*	*12*	*22*	*20*	*13*	*77*	*19*
ENERGY STAR-qualified	89%	96%	96%	86%	83%	87%	100%	100%	84%	97%
Certified	*87%*	*96%*	*96%*	*82%*	*83%*	*87%*	*100%*	*100%*	*81%*	*97%*
Meets minimum qualifications	*2%*	*0%*	*0%*	*4%*	*0%*	*0%*	*0%*	*0%*	*4%*	*0%*
Non-qualified	10%	4%	4%	14%	17%	13%	0%	0%	16%	3%

Table 369: Dehumidifier Efficiency (IEF)

(Source: Self-audit and on-site data)

		Electric Utilities					Gas Utilities			
IEF	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (dehumidifiers)	*57*	*7*	*11*	*26*	*6*	*7*	*10*	*6*	*32*	*9*
Mean	1.7	1.9	1.8	1.7	1.8	1.8	1.8[h]	1.9[h]	1.7	1.9
Median	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Min	1.3	1.8	1.3	1.4	1.6	1.7	1.6	1.7	1.3	1.8
Max	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0
Std. Dev.	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 370: Dehumidifier Efficiency (EF)

(Source: Self-audit and on-site data)

		Electric Utilities					Gas Utilities			
EF	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (dehumidifiers)	*68*	*5*	*22*	*22*	*7*	*12*	*10*	*7*	*43*	*8*
Mean	1.8	2.0	1.7	1.8	1.8	1.7	1.8	1.8	1.7	2.0
Median	2.0	2.0	1.9	2.0	1.9	2.0	2.0	1.9	2.0	2.0
Min	0.0	1.8	0.8	1.3	1.4	0.0	1.4	1.4	0.0	1.6
Max	2.7	2.0	2.0	2.7	2.0	2.0	2.0	2.0	2.7	2.0
Std. Dev.	0.4	0.1	0.3	0.3	0.2	0.6	0.3	0.2	0.4	0.1

E.6.3.2 Air Purifiers

Table 371: Air Purifier Penetration

(Source: Self-audit, on-site, and survey data)

		Electric Utilities					Gas Utilities			
Count	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (air purifiers)	*1,233*	*199*	*356*	*391*	*132*	*155*	*125*	*210*	*639*	*259*
0	70%	78%	70%	69%	55%[a]	74%[d]	62%[g,i]	77%	68%	77%
1	22%	17%	23%	23%	32%	14%[d]	28%	18%	23%	17%
2+	8%	5%	8%	8%	13%	12%	10%	5%	9%	5%

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[f] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
i Significantly different from SJG at the 90% confidence level.

Table 372: Air Purifier Age

(Source: Self-audit and on-site data)

		Electric Utilities					Gas Utilities			
Vintage	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (air purifier)	*20*	*4*	*8*	*8*	*0*	*0*	*4*	*1*	*11*	*4*
2021 to 2023	55%	75%	38%	62%	–	–	26%	100%	57%	75%
2018 to 2020	23%	25%	24%	23%	–	–	21%	--	25%	25%
2013 to 2017	9%	--	13%	7%	–	–	53%	--	--	--
2008 to 2012	4%	--	13%	--	–	–	--	--	6%	--
2003 to 2007	4%	--	--	7%	–	–	--	--	6%	--
1993 to 2002	4%	--	12%	--	–	–	--	--	6%	--
1992 or earlier	--	--	--	--	--	--	--	--	--	--

Table 373: Air Purifier ENERGY STAR Status

(Source: Self-audit and on-site data)

Status	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (air purifiers)	*44*	*6*	*11*	*22*	*1*	*4*	*3*	*6*	*28*	*7*
ENERGY STAR-qualified	77%	53%	93%	70%	--	100%	100%	100%	72%	56%
Certified	64%	53%	93%	49%	--	100%	100%	100%	55%	56%
Meets minimum qualifications	13%	--	--	21%	--	--	0%	0%	17%	0%
Non-qualified	23%	47%	7%	29%	100%	--	0%	0%	28%	44%

Table 374: Air Purifier Efficiency (kWh/yr)

(Source: Self-audit and on-site data)

kWh/yr	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (air purifiers)	*29*	*4*	*8*	*13*	*1*	*3*	*2*	*5*	*16*	*6*
Mean	298.6	366.2	254.8	312.4	361.0	405.4	245.3	394.7	286.5	255.4
Median	309.5	203.7	376.5	304.6	361.0	353.0	245.3	393.0	312.8	245.2
Min	2.2	2.2	36.0	2.5	361.0	183.0	186.0	139.0	2.5	2.2
Max	1,095.0	1,095.0	584.0	641.0	361.0	629.0	304.6	1 095.0	641.0	629.0
Std. Dev.	228.2	495.8	183.3	173.0	NA	225.1	83.8	361.9	188.5	221.4

E.7 OTHER

E.7.1 Renewable Energy

Table 375: Presence of PV System by Utility

(Source: On-site and survey data)

Has PV System	Statewide	Electric Utilities					Gas Utilities			
		ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (respondents)	*1,251*	*200*	*363*	*398*	*135*	*155*	*127*	*214*	*649*	*261*
Yes	11%	23%	10%[a]	9%[a]	5%[a]	4%[a]	12%	12%	9%	21%
No	87%	76%	89%[a]	88%[a]	94%[a]	95%[a]	87%	88%	90%	78%
I'm not sure	2%	1%	1%	4%	1%	1%	1%	--	2%	1%

[a] Significantly different from ACE at 90% confidence level.

Table 376: Capacity of PV System by Utility

(Source: On-site and survey data)

Has PV System	Statewide	Electric Utilities					Gas Utilities			
		ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (respondents with PV)	*111*	*41*	*24*	*34*	*8*	*4*	*10*	*16*	*42*	*43*
Average	7.64	8.32	7.63[a]	6.82[a,d]	8.74[e]	5.50[a,b,c]	7.83	7.42	7.07[i]	8.26[g]
Median	7.10	8.70	6.00	7.00	7.08	5.55	6.78	6.00	6.30	8.70
Minimum	0.30	0.30	1.50	0.30	2.40	1.30	3.30	3.30	0.30	0.30
Maximum	21.9	18.6	21.9	17.0	20.0	9.60	14.5	21.9	20.0	18.6
Standard Deviation	4.5	4.7	4.6	3.9	5.7	3.4	3.9	5.0	4.5	4.5

[a] Significantly different from ACE at 90% confidence level.
[b] Significantly different from JCP&L at 90% confidence level.
[c] Significantly different from PSE&G (electric) at the 90% confidence level.
[d] Significantly different from RECO at the 90% confidence level.
[e] Significantly different from Municipal Electric Utilities (MUNI) at the 90% confidence level.
[F] Significantly different from E'Town at the 90% confidence level.
[g] Significantly different from NJNG at the 90% confidence level.
[h] Significantly different from PSE&G (gas) at the 90% confidence level.
[i] Significantly different from SJG at the 90% confidence level.

Table 377: Battery Back-up System by Utility

(Source: Survey data)

Has PV System	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (respondents with PV system)	*154*	*55*	*36*	*45*	*10*	*8*	*14*	*25*	*60*	*55*
Yes	8%	2%	6%	7%	--	12%	7%	8%	7%	--
No	88%	88%	88%	86%	100%	63%	86%	80%	90%	89%
I'm not sure	5%	10%	6%	7%	--	25%	7%	12%	3%	11%

E.7.2 Electric Vehicles

Table 378: Electric Vehicles and Transportation by Utility

(Source: Survey data)

	Statewide	Electric Utilities ACE	JCP&L	PSE&G	RECO	MUNI	Gas Utilities E'TOWN	NJNG	PSE&G	SJG
n (respondents)	*1,251*	*200*	*363*	*398*	*135*	*155*	*127*	*214*	*261*	*649*
Electric-only vehicles	6%	5%	5%	7%	5%	2%	3%	5%	6%	4%
Plug-in hybrid	2%	1%	2%	4%	1%	<1%	2%	2%	2%	<1%
Electric bicycle	2%	3%	2%	2%	3%	<1%	5%	3%	2%	3%
Electric scooter	2%	3%	3%	2%	<1%	<1%	<1%	3%	2%	3%

Table 379: Electric Vehicle Chargers by Utility

(Source: Survey data)

		Electric Utilities					Gas Utilities			
EV Chargers	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (respondents with an EV)	*90*	*12*	*26*	*39*	*9*	*4*	*6*	*15*	*55*	*14*
Level 2 (charger installed)	68%	83%	54%	77%	89%	75%	67%	33%	75%	79%
Level 1 (standard volt outlet)	26%	17%	34%	28%	11%	--	17%	53%	20%	21%
Do not charge EV at home	7%	--	12%	5%	--	--	17%	13%	5%	0%

Table 380: Electric Vehicle Chargers by Utility

(Source: Survey data)

		Electric Utilities					Gas Utilities			
	Statewide	ACE	JCP&L	PSE&G	RECO	MUNI	E'TOWN	NJNG	PSE&G	SJG
n (respondents with an EV)	*90*	*12*	*26*	*39*	*9*	*4*	*6*	*15*	*55*	*14*
Between 8am and 12pm	14%	8%	19%	15%	--	--	17%	13%	13%	21%
Between 12pm and 8pm	27%	8%	34%	28%	--	50%	33%	33%	25%	21%
Between 8pm and 8am	80%	82%	43%	45%	100%	50%	67%	73%	93%	80%
Do not charge EV at home	4%	--	4%	7%	--	--	17%	--	--	5%
Don't know	3%	--	--	5%	--	--	--	--	--	4%

F

Appendix F Results by Program Participation

F.1 Heating

F.1.1 Primary Heating

Table 381: Primary Heating Fuel by Program Participation

(Source: On-site, self-audit, and survey data)

Primary Heating	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Natural gas	70%	83%[a]	66%
Electricity	10%	5%[a]	11%
Oil	8%	6%	9%
Wood or pellet	1%	2%	1%
Propane	1%	0%	1%
No heat/don't know	10%	4%[a]	11%

[a] Significantly different from non-participant households at the 90% confidence level.

Table 382: Primary Heating Type by Program Participation

(Source: On-site, self-audit, and survey data)

Heating Type	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Furnace	59%	68%[a]	56%
Boiler	25%	23%	26%
Electric Baseboard	3%	2%	3%
ASHP/GSHP	2%	2%	2%
MSHP	0%	0%	0%
Electric wall or space heater	2%	2%	2%
Wood fireplace or pellet stove	1%	2%	1%
Gas fireplace or heating stove	1%	0%	2%
No heat/don't know	6%	2%[a]	7%

[a] Significantly different from non-participants at the 90% confidence level.

Table 383: Penetration of Heating Systems by Program Participation

(Source: On-site, self-audit, and survey data)

Heating Type*	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Furnace	63%	72%[a]	60%
Boiler	31%	26%	33%
Electric wall or space heater	10%	8%	11%
Electric Baseboard	8%	5%[a]	9%
Wood fireplace or pellet stove	8%	8%	8%
Gas fireplace or heating stove	6%	9%[a]	5%
ASHP/GSHP	5%	2%	2%
MSHP	2%	2%	2%
No heat/don't know	5%	2%[a]	7%

*Does not sum to 100% because some households have more than one type of heating system.
[a] Significantly different from non-participant households at the 90% confidence level.

F.1.2 Furnaces

Table 384: Furnace Fuel by Program Participation

(Source: Self-audit and on-site data)

Fuel	Statewide	Participants	Non-Participants
n (furnaces)	243	82	161
Natural Gas	92%	97%[a]	89%
Oil	7%	3%	9%
Propane	1%	0%	2%
Electric	0%	0%	1%

[a] Significantly different from non-participant households at the 90% confidence level.

Table 385: Furnace ENERGY STAR Qualification by Program Participation

(Source: Self-audit and on-site data)

	Statewide	Participants	Non-Participants
n (furnaces)	226	78	148
ENERGY STAR-qualified	47%	57%	42%
Certified	*39%*	*50%[a]*	*34%*
Meets minimum qualifications	*8%*	*7%*	*8%*
Non-qualified	53%	44%[a]	58%

[a] Significantly different from non-participant households at the 90% confidence level.

Table 386: Age of Furnaces by Program Participation

(Source: Self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (furnaces)	*156*	*46*	*110*
2021 to 2023	13%	20%	10%
2018 to 2020	16%	22%	13%
2013 to 2017	21%	9%	26%
2008 to 2012	15%	5%	20%
2003 to 2007	17%	17%	16%
1993 to 2002	14%	25%	10%
1992 or earlier	4%	2%	5%

Table 387: Furnace Efficiency by Program Participation

(Source: self-audit and on-site data)

Unit - AFUE	Statewide	Participants	Non-Participants
n (furnaces)	*198*	*64*	*134*
Average	87.8	90.0[a]	86.8
Median	90.5	92.1	81.0
Minimum	66.0	79.0	66.0
Maximum	98.1	98.0	98.1
Standard Deviation	7.5	7.5	7.5

[a] Significantly different from non-participant households at the 90% confidence level.

F.1.3 Boilers

Table 388: Boiler Fuel by Program Participation

(Source: Self-audit and on-site data)

Fuel	Statewide	Participants	Non-Participants
n (boilers)	*146*	*42*	*104*
Natural gas	71%	80%	68%
Oil	27%	18%	31%
Propane	1%	2%	1%

Table 389: ENERGY STAR Qualification of Boilers by Program Participation

(Source: Self-audit and on-site data)

	Statewide	Participants	Non-Participants
n (boilers)	*131*	*36*	*95*
ENERGY STAR-qualified	38%	33%	40%
Certified	*17%*	*23%*	*15%*
Meets minimum qualifications	*21%*	*10%*	*25%*
Non-qualified	61%	67%	59%

Table 390: Age of Boilers by Program Participation

(Source: Self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (boilers)	*75*	*26*	*49*
2021 to 2023	12%	28%[a]	3%
2018 to 2020	4%	0%	6%
2013 to 2017	12%	9%	13%
2008 to 2012	9%	13%	7%
2003 to 2007	17%	23%	13%
1993 to 2002	28%	18%	34%
1992 or earlier	18%	9%	23%

[a] Significantly different from non-participant households at the 90% confidence level.

Table 391: Boiler Efficiency (AFUE) by Program Participation

(Source: Self-audit and on-site data)

Unit - AFUE	Statewide	Participants	Non-Participants
n (boilers)	*106*	*30*	*76*
Average	84.9	85.8	84.5
Median	83.5	84.0	83.2
Minimum	78.0	80.2	78.0
Maximum	96.0	96.0	96.0
Standard Deviation	4.8	5.1	4.7

F.2 COOLING

Table 392: Primary Cooling Type by Program Participation

(Source: On-site, self-audit, and survey data)

Cooling System	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Central AC	68%	78%[a]	65%
Window or room AC	23%	12%[a]	26%
Ceiling fans	2%	2%	3%
ASHP	1%	1%	1%
MSHP	1%	1%	1%
Portable fans	1%	1%	1%
GSHP	0%	0%	0%
Whole house or attic fan	0%	0%	0%
No cooling system/don't know	3%	4%	2%

[a] Significantly different from non-participants at the 90% confidence level.

Table 393: Penetration of Cooling Type by Program Participation

(Source: On-site, self-audit, and survey data)

Cooling System*	Statewide	Participants	Non-Participants
n (households)	1251	306	945
Central AC	69%	79%[a]	67%
Window or room AC	29%	18%[a]	32%
Ceiling fans	28%	28%	28%
ASHP	3%	2%	3%
MSHP	3%	4%	2%
Portable fans	12%	15%	12%
GSHP	0%	–	0%
Whole house or attic fan	3%	4%	3%
No cooling system/don't know	2%	3%	2%

*Does not sum to 100% because some households have more than one type of heating system.
[a] Significantly different from non-participants at the 90% confidence level.

F.2.1 Permanent Cooling

Table 394: ENERGY STAR Qualification – Permanent Cooling[1] by Program Participation

(Source: Self-audit and on-site data)

	Statewide	Participants	Non-Participants
n (cooling equipment)	*272*	*91*	*181*
ENERGY STAR-qualified	42%	56%	35%
Certified	*20%*	*27%[a]*	*18%*
Meets minimum qualifications	*21%*	*29%[a]*	*17%*
Non-qualified	58%	44%[a]	65%

[a] Significantly different than cooling equipment in non-participant households at the 90% confidence level.

	Statewide	Participants	Non-Participants

[1] Permanent cooling systems refer to equipment that cannot be easily removed, and excludes equipment such as room ACs and other portable AC units.

Table 395: Age of Permanent Cooling Equipment[1] by Program Participation

(Source: Self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (cooling equipment)	312	110	202
2021 to 2023	14%	18%	13%
2018 to 2020	32%	23%	35%
2013 to 2017	15%	17%	15%
2008 to 2012	14%	17%	12%
2003 to 2007	11%	13%	10%
1993 to 2002	12%	12%	12%
1992 or earlier	2%	0%	3%

[a] Statistically significantly different than cooling equipment in non-participant households at the 90% confidence level.
[1] Permanent cooling systems refer to equipment that cannot be easily removed, and excludes equipment such as room ACs and other portable AC units.

Table 396: Permanent Cooling Efficiency (SEER)[1] by Program Participation

(Source: Self-audit and on-site data)

Unit - SEER	Statewide	Participants	Non-Participants
n (units)	*265*	*87*	*178*
Average	13.8	14.0	13.7
Median	14.0	14.0	13.8
Minimum	8.2	9.0	8.2
Maximum	29.4	29.4	28.9
Standard Deviation	3.2	3.3	3.2

[1] Permanent cooling systems refer to equipment that cannot be easily removed, and excludes equipment such as room ACs and other portable AC units.

F.2.2 Central AC

Table 397: ENERGY STAR Qualification of Central ACs by Program Participation

(Source: Self-audit and on-site data)

Qualification Status	Statewide	Participants	Non-Participants
n (units)	*236*	*84*	*152*
ENERGY STAR-qualified	38%	54%	31%
Certified	*19%*	*27%[a]*	*15%*
Meets minimum qualifications	*19%*	*27%[a]*	*16%*
Non-qualified	62%	46%[a]	69%

[a] Statistically significantly different than cooling equipment in non-participant households at the 90% confidence level.

Table 398: Age of Central AC Equipment by Program Participation

(Source: Self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (units)	218	86	132
2021 to 2023	15%	22%	11%
2018 to 2020	24%	22%	26%
2013 to 2017	11%	13%	10%
2008 to 2012	15%	15%	16%
2003 to 2007	12%	13%	11%
1993 to 2002	19%	15%	22%
1992 or earlier	3%	0%	5%

Table 399: Efficiency of Central AC Equipment by Program Participation

(Source: Self-audit and on-site data)

Unit - SEER	Statewide	Participants	Non-Participants
n (equipment)	*230*	*79*	*151*
Average	13.2	13.6[b]	13.0
Median	13.4	14.0	13.0
Minimum	8.2	9.0	8.2
Maximum	23.0	17.7	23.0
Standard Deviation	2.1	1.8	2.3

F.2.3 Room Air Conditioner

Table 400: ENERGY STAR Qualification of Room Air Conditioners by Program Participation

(Source: Self-audit and on-site data)

Qualification Status	Statewide	Participants	Non-Participants
n (RAC units)	*112*	*25*	*87*
ENERGY STAR-qualified	32%	47%	29%
Certified	31%	47%	28%
Meets minimum qualifications	1%	0%	1%
Non-qualified	69%	53%	71%

[a] Statistically significantly different from RAC units in non-OBC households at the 90% confidence level.

Table 401: Age of Room Air Conditioners by Program Participation

(Source: Self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (RAC units)	75	19	56
2021 to 2023	14%	2%	16%
2018 to 2020	42%	12%	47%
2013 to 2017	23%	43%	19%
2008 to 2012	11%	36%[b]	7%
2003 to 2007	9%	6%	10%
1993 to 2002	1%	0%	1%
1992 or earlier	75	19	56

Table 402: Efficiency of Room Air Conditioners by Program Participation

(Source: Self-audit and on-site data)

Unit - CEER	Statewide	Participants	Non-Participants
n (RAC units)	*106*	*23*	*83*
Average	11.1	10.8	11.1
Median	11.0	10.7	11.0
Minimum	6.2	9.7	6.2
Maximum	15.0	14.7	15.0
Standard Deviation	1.4	1.1	1.4

F.3 Heat Pumps

Table 403: Agreement with Statements About Heat Pumps by Program Participation

(Source: Survey respondents who have a heat pump or had heard of them before survey)

Agreement with statements:	Statewide	Participants	Non-Participants
n (respondents)	*452*	*136*	*316*
Heat pumps are better for the environment than other heating or cooling systems.	31%	43%[a]	26%
Heat pumps can save money on my energy bills.	35%	38%[a]	32%
A heat pump can provide enough heat, even on the coldest days.	32%	36%	30%
A heat pump cools as well as or better than other cooling systems.	26%	29%[a]	23%
Heat pumps are less expensive to install than other heating and cooling systems.	12%	8%[a]	13%
Heat pumps are more reliable than other heating and cooling systems.	21%	21%	20%
Heat pumps are quieter than other heating and cooling systems.	19%	22%	18%
Heat pumps have lower maintenance costs than other heating and cooling systems.	18%	17%	20%

[a] Significantly different from non-participants at the 90% confidence level.

Table 404: Energy Conservation Statements by Program Participation

(Source: Self-audit and on-site data)

Agreement with statement	Statewide	Participants	Non-Participants
n (respondents)	*1,251*	*223*	*476*
Everything I can think of..	11%	10%	12%
Most things	33%	42%	30%
A few things	46%	44%	46%
Nothing	5%	<1%[a]	5%
I'm not sure	5%	3%	5%

[a] Significantly different from non-participants at the 90% confidence level.

Table 405: ENERGY STAR Qualification – Heat Pumps

(Source: Self-audit and on-site data)

	Statewide	Participants	Non-Participants
n (heat pumps)	*29*	*6*	*23*
ENERGY STAR-qualified	70%	87%	64%
Certified	38%	29%	42%
Meets minimum qualifications	32%	58%	22%
Non-qualified	30%	13%	36%

Table 406: Age of Heat Pumps

(Source: Self-audit and on-site data)

Age of Heat Pumps	Statewide	Participants	Non-Participants
n (heat pumps)	*15*	*4*	*11*
2021 to 2023	4%	0%	7%
2018 to 2020	70%	75%	67%
2013 to 2017	11%	0%	16%
2008 to 2012	9%	6%	10%
2003 to 2007	7%	19%	0%
1993 or earlier	0%	0%	0%

Table 407: Heat Pump Efficiency (HPSF)

(Source: Self-audit and on-site data)

Unit - HSPF	Statewide	Participants	Non-Participants
n (heat pumps)	*26*	*6*	*20*
Average	10.1	10.3	10.1
Median	7.7	7.7	8.2
Minimum	13.8	13.8	12.6
Maximum	10.0	11.6	10.0
Standard Deviation	1.8	2.7	1.4

Table 408: Heat Pump Efficiency (SEER)

(Source: Self-audit and on-site data)

Unit - SEER	Statewide	Participants	Non-Participants
n (equipment)	*30*	*6*	*24*
Average	19.0	19.3	18.9
Median	19.0	21.8	18.7
Minimum	13.0	13.0	14.0
Maximum	29.4	29.4	28.9
Standard Deviation	4.6	7.1	3.7

F.4 Controls

Table 409: Thermostat Penetration by Program Participation

(Source: Survey, self-audit and on-site data)

Type	Statewide	Participants	Non-Participants
n (thermostats)	*1,251*	*306*	*945*
Programmable	49%	44%	51%
Smart/Learning	31%	50%	26%[a]
Manual	40%	25%	44%[a]

[a] Significantly different from participant households at the 90% confidence level.

Table 410: Programmable Feature Use by Program Participation

(Source: Survey data)

Type	Statewide	Participants	Non-Participants
n (households with programmable or smart/learning thermostats)	*558*	*176*	*382*
Use programmable features *often*	24%	25%	23%
Use programmable features *sometimes*	44%	49%	41%
Use programmable features *rarely*	31%	24%	34%[a]
Use programmable features *never*	2%	2%	2%

[a] Significantly different from participant households at the 90% confidence level.

Table 411: Average Thermostat Set Point for Heating by Program Participation

(Source: Survey data)

Unit - Fahrenheit	Statewide	Participants	Non-Participants
n (households)	*1,171*	*293*	*878*
Morning (6am – 9am)	67.6	67.9	67.6
Day (9am – 5pm)	67.2	67.5	67.1
Evening (5pm – 9pm)	68.3	68.8[a]	68.2
Night (9pm – 6am)	66.2	65.9	66.3

[a] Significantly different from participant households at the 90% confidence level.

Table 412: Average Thermostat Set Point for Cooling by Program Participation

(Source: Survey data)

Unit - Fahrenheit	Statewide	Participants	Non-Participants
n (households)	*1,104*	*272*	*832*
Morning (6am – 9am)	71.3	72.4[a]	70.9
Day (9am – 5pm)	71.8	72.8[a]	71.5
Evening (5pm – 9pm)	71.2	72.5[a]	70.8
Night (9pm – 6am)	71.1	72.3[a]	70.7

[a] Significantly different from participant households at the 90% confidence level.

F.5 Water Heating

Table 413: Water Heater Fuel by Program Participation

(Source: On-site, self-audit, and survey)

Fuel	Statewide	Participants	Non-Participants
n (water heaters)	*542*	*160*	*382*
Natural Gas	84%	91%[a]	80%
Electric	13%	7%[a]	16%
Propane	2%	1%	2%
Oil	1%	–	2%
Solar	0%	1%	–

[a] Significantly different from non-participant households at the 90% confidence level

Table 414: Water Heater Fuel and Type by Program Participation

(Source: On-site, self-audit, and survey)

Type	Statewide	Participants	Non-Participants
n (water heaters)	*560*	*162*	*398*
Storage, Stand-alone	**88%**	**84%**	**89%**
Natural Gas	85%	92%[b]	82%
Electric	14%	6%[b]	17%
Propane	1%	1%	1%
Instantaneous	**8%**	**10%**	**7%**
Natural Gas	88%	91%	86%
Propane	9%	–	14%
Electric	4%	9%	–
Storage, Indirect heat	**3%**	**4%**	**3%**
Natural Gas	60%	100%	36%
Oil	39%	–	61%
Electric	2%	–	2%
Storage, Heat pump	**1%**	**1%**	**0%**
Combi Boiler (Natural Gas)	**0%**	**--**	**0%**
Storage, Solar (Other)	**0%**	**1%**	**--**

[a] Significantly different from non-participant households at the 90% confidence level

Table 415: Water Heater Age by Program Participation

(Source: On-site, self-audit, and survey)

Equipment Age	Statewide	Participants	Non-Participants
n (water heaters)	*560*	*162*	*398*
2021 or later	14%	27%	8%
2018 to 2020	21%	17%	23%
2013 to 2017	32%	28%	34%
2008 to 2012	12%	11%	12%
2003 to 2007	13%	8%	15%
1993 to 2002	7%	9%	6%
1992 or earlier	1%	1%	1%

Table 416: Water Heater Efficiency by Program Participation(Source: On-site, self-audit, and survey)

Efficiency (UEF)	Statewide	Participants	Non-Participants
n (water heaters)	*505*	*148*	*357*
Mean	0.70	0.72	0.69
Min	0.41	0.41	0.45
Max	3.88	3.88	2.48
Median	0.62	0.64	0.62
Standard Deviation	0.27	0.39	0.19

Table 417: Water Heater Capacity by Program Participation

(Source: On-site, self-audit, and survey)

Capacity (Gallons)	Statewide	Participants	Non-Participants
n (water heaters)	*481*	*133*	*334*
<40	479	2%	5%
40 to 55	4%	89%	87%
55 to 75	88%	9%	6%
>75	7%	1%	2%

Table 418: Water Heater ENERGY STAR Status by Program Participation

(Source: On-site, self-audit, and survey)

ENERGY STAR	Statewide	Participants	Non-Participants
n (water heaters)	*532*	*155*	*377*
ENERGY STAR Qualified	27%	31%	26%
ENERGY STAR Certified	*19%*	*24%*	*17%*
Meets minimum qualifications	*8%*	*7%*	*8%*
Non-qualified	73%	69%	74%

F.6 Appliances

F.6.1 Kitchen Appliances

Table 419: Kitchen Appliance Penetration by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Refrigerator	97%	98%	97%
Oven/range	98%	100%	98%
Microwave	91%	94%	90%
Dishwasher	79%	86%	76%
Stand-alone Freezer	31%	30%	36%
Beverage cooler or wine fridge	15%	17%	14%

Table 420: Average Number of Kitchen Appliances per Household by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Refrigerator	1.28	1.33[a]	1.26
Microwave	0.97	0.99	0.96
Dishwasher	0.82	0.87[a]	0.80
Stand-alone Freezer	0.36	0.38	0.35
Beverage cooler or wine fridge	0.17	0.20	0.15

[a] Significantly different from non-program participants at the 90% confidence level.

Table 421: Households with Multiple Kitchen Appliances by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Two or more refrigerators	28%	32%	27%
Two or more dishwashers	2%	1%	2%
Two or more stand-alone freezers	3%	1%[a]	3%

[a] Significantly different from non-program participant households at the 90% confidence level.

F.6.1.2 Refrigerators

Table 422: Refrigerators per Household by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Average	1.28	1.33[a]	1.26
Median	1.00	1.00	1.00
Minimum	0.00	0.00	0.00
Maximum	4.00	3.00	4.00
Standard Deviation	0.55	0.55	0.55

[a] Significantly different from non-program participant households at the 90% confidence level.

Table 423: Refrigerator Door Configuration by Program Participation

(Source: Self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (refrigerators)	*773*	*221*	*552*
Bottom Freezer	43%	51%[a]	40%
Top Freezer	31%	24%[a]	33%
Side by Side	24%	22%	24%
Single Door	2%	2%	2%
Internal Freezer	<1%	--	<1%
Mini-fridge	<1%	--	<1%

[a] Significantly different from non-participants at the 90% confidence level.

Table 424: Refrigerator ENERGY STAR Status by Program Participation

(Source: Self-audit and on-site data)

Status	Statewide	Participants	Non-Participants
n (refrigerators)	*754*	*218*	*536*
ENERGY STAR Qualified	62%	67%	59%
Certified	*46%*	*48%*	*46%*
Meets minimum qualifications	*15%*	*19%*	*14%*
Non-qualified	38%	33%	41%

Table 425: Age of Refrigerators by Program Participation

(Source: Self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (refrigerators)	*705*	*206*	*499*
2021 to 2023	14%	16%	13%
2018 to 2020	24%	25%	23%
2013 to 2017	23%	20%	25%
2008 to 2012	21%	21%	20%
2003 to 2007	10%	11%	10%
1993 to 2002	7%	4%	8%
1992 or earlier	1%	1%	1%

Table 426: Average Refrigerator Volume by Program Participation

(Source: Self-audit and on-site data)

Unit – cubic feet	Statewide	Participants	Non-Participants
n (refrigerators)	*754*	*219*	*535*
Average	22.1	22.7[a]	21.9
Median	22.4	23.1	22.1
Minimum	1.6	1.7	1.6
Maximum	36.7	34.8	36.7
Standard Deviation	5.3	5.3	5.3

[a] Significantly different from non-participants at the 90% confidence level.

Table 427: Average Refrigerator Consumption by Program Participation

(Source: Self-audit and on-site data)

Unit – kWh/yr	Statewide	Participants	Non-Participants
n (refrigerators)	*760*	*219*	*541*
Average	584.6	591.9	581.7
Median	587.0	608.0	583.2
Minimum	180.0	218.0	180.0
Maximum	1,887.0	1,187.0	1,887.0
Standard Deviation	149.2	134.7	154.8

F.6.1.3 Freezers

Table 428: Freezers per Household by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Average	0.36	0.38	0.35
Median	0.00	0.00	0.00
Minimum	0.00	0.00	0.00
Maximum	4.00	3.00	4.00
Standard Deviation	0.53	0.55	0.53

Table 429: Freezer ENERGY STAR Status by Program Participation

(Source: Self-audit and on-site data)

Status	Statewide	Participants	Non-Participants
n (freezers)	*121*	*30*	*91*
ENERGY STAR Qualified	35%	61%	27%[a]
Certified	*21%*	*42%*	*15%*[a]
Meets minimum qualifications	*13%*	*19%*	*12%*
Non-qualified	65%	39%	73%[a]

[a] Significantly different from participant households at the 90% confidence level.

Table 430: Freezer Door Configuration by Program Participation

(Source: Self-audit and on-site data)

Configuration	Statewide	Participants	Non-Participants
n (freezers)	*127*	*32*	*95*
Chest	66%	59%	68%
Upright	34%	41%	32%

Table 431: Age of Freezers by Program Participation

(Source: Self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (freezers)	*99*	*26*	*73*
2021 to 2023	11%	23%	8%
2018 to 2020	33%	33%	32%
2013 to 2017	17%	8%	20%
2008 to 2012	9%	10%	9%
2003 to 2007	15%	8%	18%
1993 to 2002	11%	17%	9%
1992 or earlier	3%	0%	4%

Table 432: Average Freezer Volume by Program Participation

(Source: Self-audit and on-site data)

Unit – cubic feet	Statewide	Participants	Non-Participants
n (freezers)	*121*	*29*	*92*
Average	10.3	11.4	9.9
Median	7.2	7.2	7.2
Minimum	3.5	4.9	3.5
Maximum	30.0	22.0	30.0
Standard Deviation	5.9	5.6	6.0

Table 433: Average Freezer Efficiency (Annual kWh) by Program Participation

(Source: Self-audit and on-site data)

Unit – Annual kWh	Statewide	Participants	Non-Participants
n (freezers)	*122*	*31*	*91*
Average	360.9	362.5	360.4
Median	284.5	277.0	296.0
Minimum	193.0	216.0	193.0
Maximum	1,302.0	885.0	1,302.0
Standard Deviation	205.5	164.8	218.1

F.6.1.4 Dishwashers

Table 434: Dishwashers per Household by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Average	0.82	0.87[a]	0.80
Median	1.00	1.00	1.00
Minimum	0.00	0.00	0.00
Maximum	4.00	4.00	4.00
Standard Deviation	0.40	0.39	0.41

[a] Significantly different from non-program participant households at the 90% confidence level.

Table 435: Age of Dishwashers by Program Participation

(Source: Self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (dishwashers)	*431*	*128*	*303*
2021 to 2023	13%	11%	13%
2018 to 2020	22%	30%[a]	19%
2013 to 2017	25%	19%	27%
2008 to 2012	18%	22%	16%
2003 to 2007	16%	13%	17%
1993 to 2002	4%	5%	4%
1992 or earlier	3%	--	4%

[a] Significantly different from the non-Participant sample at the 90% confidence level.

Table 436: Average Dishwasher Efficiency by Program Participation

(Source: Self-audit and on-site data)

Unit – Annual kWh	Statewide	Participants	Non-Participants
n (dishwashers)	*476*	*147*	*329*
Average	299.1	292.8	301.9
Median	270.0	270.0	270.0
Minimum	85.0	85.0	206.0
Maximum	680.0	574.0	680.0
Standard Deviation	63.6	60.6	65.0

Table 437: Dishwasher ENERGY STAR Status by Program Participation

(Source: self-audit and on-site data)

Status	Statewide	Participants	Non-Participants
n (dishwashers)	*492*	*151*	*341*
ENERGY STAR Qualified	74%	81%	71%[a]
Certified	*66%*	*74%*	*62%*[a]
Meets minimum qualifications	*8%*	*7%*	*9%*
Non-qualified	26%	19%	29%[a]

[a] Significantly different from participant households at the 90% confidence level.

F.6.1.5 Cooking

Table 438: Oven Fuel Type by Program Participation

(Source: self-audit and on-site data)

Configuration	Statewide	Participants	Non-Participants
n (ovens)	*181*	*55*	*126*
Natural Gas	71%	72%	70%
Electric	19%	28%	17%
Propane	1%	--	1%
Unknown (natural gas or propane)	9%	0%	12%[a]

[a] Significantly different from participant households at the 90% confidence level.

Table 439: Range Fuel Type by Program Participation

(Source: Self-audit and on-site data)

Configuration	Statewide	Participants	Non-Participants
n (ranges)	*176*	*52*	*124*
Natural Gas	72%	80%	70%
Resistance Electric	16%	18%	15%
Unknown gas	10%	--	12%
Induction Electric	2%	2%	2%
Propane	1%	--	1%

F.6.2 Laundry

Table 440: Laundry Appliance Penetration by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Clothes Washers	93%	97%	92%
Clothes Dryers	92%	96%	91%

Table 441: Average Number of Laundry Appliances per Household by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Clothes Washers	0.95	0.99[a]	0.94
Clothes Dryers	0.95	0.89[a]	0.99

[a] Significantly different from non-program participants at the 90% confidence level.

Table 442: Households with Multiple Laundry Appliances by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Two or more clothes washers	2%	1%	2%
Two or more clothes dryers	2%	2%	2%

[a] Significantly different from non-program participants at the 90% confidence level.

F.6.2.1 Clothes Washers

Table 443: Clothes Washers per Household by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,240*	*305*	*935*
Top-loading	66%	62%	67%
Front-loading	34%	38%	32%
Don’t know	1%	0%	1%

Table 444: Number of Clothes Washers per Household by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Average	0.95	0.98[a]	0.94
Median	1.00	1.00	1.00
Minimum	0.00	0.00	0.00
Maximum	2.00	2.00	2.00
Standard Deviation	0.20	0.15	0.21

[a] Significantly different from non-program participants at the 90% confidence level.

Table 445: Clothes Washer ENERGY STAR Status by Program Participation

(Source: Self-audit and on-site data)

Status	Statewide	Participants	Non-Participants
n (clothes washers)	*459*	*135*	*324*
ENERGY STAR Qualified	63%	70%[a]	60%
Certified	*56%*	*66%[a]*	*51%*
Meets minimum qualifications	*7%*	*3%[a]*	*9%*
Non-qualified	37%	30%[a]	40%

[a] Significantly different from the non-participants at the 90% confidence level.

Table 446: Age of Clothes Washers by Program Participation

(Source: self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (clothes washers)	*403*	*120*	*283*
2021 to 2023	12%	14%	12%
2018 to 2020	27%	32%	25%
2013 to 2017	27%	21%	30%
2008 to 2012	16%	15%	16%
2003 to 2007	9%	9%	9%
1993 to 2002	8%	7%	8%
1992 or earlier	1%	2%	1%

Table 447: Clothes Washer Capacity (Ft^3) by Program Participation

(Source: self-audit and on-site data)

Ft^3 Volume	Statewide	Participants	Non-Participants
n (clothes washers)	*458*	*136*	*322*
Average	4.0	4.1	4.0
Median	4.3	4.3	4.2
Minimum	0.8	0.8	2.0
Maximum	6.5	5.5	6.5
Standard Deviation	0.8	0.8	0.7

Table 448: Clothes Washer Efficiency (IMEF) by Program Participation

(Source: Self-audit and on-site data)

Efficiency (IMEF)	Statewide	Participants	Non-Participants
n (clothes washers)	*368*	*112*	*256*
Average	2.0	2.2	1.9[a]
Median	2.1	2.2	2.1
Minimum	0.5	0.5	0.5
Maximum	3.3	3.1	3.3
Standard Deviation	0.7	0.7	0.7

[a] Significantly different from the participant sample at the 90% confidence level.

F.6.2.3 Clothes Dryers

Table 449: Number of Clothes Dryers per Household by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Average	0.95	0.99[a]	0.94
Median	1.00	1.00	1.00
Minimum	0.00	0.00	0.00
Maximum	6.00	5.00	6.00
Standard Deviation	0.28	0.29	0.28

[a] Significantly different from non-program participants at the 90% confidence level.

Table 450: Clothes Dryer Fuel Type by Program Participation

(Source: Self-audit and on-site data)

Configuration	Statewide	Participants	Non-Participants
n (clothes dryers)	*454*	*128*	*326*
Natural Gas	69%	70%	68%
Electric	31%	30%	32%

Table 451: Clothes Dryer ENERGY STAR Status by Program Participation

(Source: Self-audit and on-site data)

Status	Statewide	Participants	Non-Participants
n (clothes dryers)	*438*	*126*	*312*
ENERGY STAR Qualified	42%	50%[a]	38%
Certified	*26%*	*36%[a]*	*21%*
Meets minimum qualifications	*16%*	*14%*	*17%*
Non-qualified	58%	50%[a]	62%

[a] Significantly different from non-participants at the 90% confidence level.

Table 452: Age of Clothes Dryers by Program Participation

(Source: Self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (clothes dryers)	*426*	*124*	*302*
2021 to 2023	13%	16%	12%
2018 to 2020	24%	32%[a]	21%
2013 to 2017	28%	20%[a]	31%
2008 to 2012	17%	12%	19%
2003 to 2007	11%	10%	11%
1993 to 2002	6%	10%	5%
1992 or earlier	1%	1%	1%

[a] Significantly different from non-participants at the 90% confidence level.

Table 453: Clothes Dryer Moisture Sensing Feature by Program Participation

(Source: Self-audit and on-site data)

Configuration	Statewide	Participants	Non-Participants
n (clothes dryers)	*341*	*93*	*248*
Yes	96%	95%	97%
No	4%	5%	3%

Table 454: Clothes Dryer Efficiency (CEF) by Program Participation

(Source: Self-audit and on-site data)

Efficiency (CEF)	Statewide	Participants	Non-Participants
n (clothes dryers)	*346*	*103*	*243*
Average	3.1	3.2[a]	3.1
Median	3.3	3.3	3.3
Minimum	2.0	2.3	2.0
Maximum	5.8	5.8	5.2
Standard Deviation	0.5	0.6	0.5

[a] Significantly different from the non-Participant sample at the 90% confidence level.

F.6.3 Air Quality Appliances

Table 455: Air Quality Appliance Penetration by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Dehumidifiers	38%	33%	35%
Humidifiers	27%	30%	26%
Air Purifiers	29%	33%	28%

Table 456: Average Number of Air Quality Appliances per Household by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,251*	*306*	*945*
Dehumidifiers	0.44	0.43	0.45
Humidifiers	0.35	0.41[a]	0.33
Air Purifiers	0.41	0.44	0.41

[a] Significantly different from non-program participants at the 90% confidence level.

F.6.3.1 Dehumidifiers

Table 457: Number of Dehumidifiers per Household by Program Participation

(Source: Survey, self-audit, and on-site data)

	Statewide	Participants	Non-Participants
n (households)	*1,232*	*306*	*931*
Average	0.44	0.43	0.45
Median	0.00	0.00	0.00
Minimum	0.00	0.00	0.00
Maximum	6.00	3.00	6.00
Standard Deviation	0.63	0.56	0.65

Table 458: Dehumidifier Usage

(Source: Survey data)

Usage	Statewide	Participants	Non-Participants
n (households with dehumidifier)	*544*	*404*	*140*
Only during summer months	34%	33%	35%
Year-round	34%	31%	35%
About half of the year	17%	22%	15%
Occasional use	15%	14%	15%
Never	0.4%	0.0%	0.5%

Table 459: Dehumidifier ENERGY STAR Status by Program Participation

(Source: self-audit and on-site data)

Status	Statewide	Participants	Non-Participants
n (dehumidifiers)	*129*	*37*	*92*
ENERGY STAR-qualified	90%	83%	92%
Certified	*87%*	*83%*	*88%*
Meets minimum qualifications	*2%*	*0%*	*3%*
Non-qualified	10%	17%	8%

Table 460: Age of Dehumidifiers by Program Participation

(Source: self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (dehumidifiers)	*106*	*30*	*76*
2021 to 2023	20%	39%[a]	14%
2018 to 2020	43%	39%	44%
2013 to 2017	24%	22%	24%
2008 to 2012	7%	--	9%
2003 to 2007	1%	--	1%
1993 to 2002	6%	--	8%
1992 or earlier	--	--	--

[a] Significantly different from non-participants sample at the 90% confidence level.

Table 461: Dehumidifier Capacity (Pints/Day) by Program Participation

(Source: Self-audit and on-site data)

Capacity	Statewide	Participants	Non-Participants
n (dehumidifiers)	*136*	*38*	*98*
Average	43.9	45.5	43.4
Median	50.0	50.0	50.0
Minimum	1.9	1.9	2.0
Maximum	109.0	90.0	109.0
Standard Deviation	18.4	19.0	18.2

Table 462: Dehumidifier Efficiency (IEF) by Program Participation

(Source: Self-audit and on-site data)

Efficiency (IEF)	Statewide	Participants	Non-Participants
n (dehumidifiers)	*57*	*19*	*38*
Average	1.7	1.8[a]	1.7
Median	1.8	1.8	1.8
Minimum	1.3	1.4	1.3
Maximum	2.0	2.0	2.0
Standard Deviation	0.1	0.1	0.1

[a] Significantly different from non-participants at the 90% confidence level.

Table 463: Dehumidifier Efficiency (EF) by Program Participation

(Source: Self-audit and on-site data)

Capacity (EF)	Statewide	Participants	Non-Participants
n (dehumidifiers)	67	16	51
Average	1.8	1.8	1.8
Median	2.0	2.0	2.0
Minimum	0.8	0.8	1.3
Maximum	2.7	2.0	2.7
Standard Deviation	0.3	0.3	0.3

F.6.3.2 Humidifiers

Table 464: Number of Humidifiers per Household by Program Participation

(Source: Survey data)

	Statewide	Participants	Non-Participants
n (households)	*1,229*	*302*	*927*
Average	0.35	0.41[a]	0.33
Median	0.00	0.00	0.00
Minimum	0.00	0.00	0.00
Maximum	6.00	6.00	6.00
Standard Deviation	0.76	0.83	0.74

[a] Significantly different from non-program participants at the 90% confidence level.

F.6.3.3 Air Purifiers

Table 465: Number of Air Purifiers per Household by Program Participation
(Source: Survey data)

	Statewide	Participants	Non-Participants
n (households)	*1,233*	*301*	*932*
Average	0.41	0.44	0.41
Median	0.00	0.00	0.00
Minimum	0.00	0.00	0.00
Maximum	6.00	5.00	6.00
Standard Deviation	0.79	0.73	0.81

Table 466: Air Purifier ENERGY STAR Status by Program Participation
(Source: Self-audit and on-site data)

Status	Statewide	Participants	Non-Participants
n (air purifiers)	*44*	*22*	*22*
ENERGY STAR-qualified	77%	74%	80%
Certified	*64%*	*61%*	*68%*
Meets minimum qualifications	*13%*	*13%*	*12%*
Non-qualified	23%	26%	20%

Table 467: Age of Air Purifiers by Program Participation
(Source: Self-audit and on-site data)

Age	Statewide	Participants	Non-Participants
n (air purifiers)	*20*	*6*	*14*
2021 to 2023	55%	90%[a]	30%
2018 to 2020	23%	10%	32%
2013 to 2017	9%	--	15%
2008 to 2012	4%	--	8%
2003 to 2007	4%	--	8%
1993 to 2002	--	--	--
1992 or earlier	4%	--	7%

[a] Significantly different from non-program participants at the 90% confidence level.

Table 468: Air Purifier Efficiency (kWh/Yr) by Program Participation

(Source: Self-audit and on-site data)

Capacity	Statewide	Participants	Non-Participants
n (air purifiers)	*29*	*14*	*15*
Average	298.6	216.2[a]	420.5
Median	309.5	221.5	361.0
Minimum	2.2	2.2	2.5
Maximum	1,095.0	393.0	1,095.0
Standard Deviation	228.2	126.0	265.3

[a] Significantly different from non-participants at the 90% confidence level.

F.7 Lighting

Table 469: Lighting Purchases in the Past Year by Program Participation

(Source: Survey data)

Bulb Type	Statewide	Participants	Non-Participants
n (respondents)	*1,251*	*306*	*945*
Purchased bulbs in the past year	*72%*	*76%*	*71%*
LEDs	63%	67%	62%
Fluorescent	6%	6%	6%
Incandescent	5%	7%	5%
Halogen	4%	2%	4%
CFLs	3%	2%	3%
I'm not sure	5%	5%	5%

*Multiple responses permitted; may not sum to 100%.

F.8 CONSUMER ELECTRONICS

Table 470: Penetration of Consumer Electronics by Program Participation

(Source: Survey data)

Type	Statewide	Participants	Non-Participants
n (respondents)	*1,251*	*306*	*945*
Cell phones	99%	99%	99%
Televisions	97%	97%	97%
Laptop computers	88%	87%	89%
Printers	85%	90%	83%
Tablets	72%	79%	70%
Computer Monitors	64%	68%	62%
Stand-alone sound systems (e.g., stereos or Bluetooth speakers)	56%	58%	55%
Game Consoles	46%	44%	46%
TV-Sound systems	43%	51%	41%
Copier/scanner	17%	16%	17%
Fax Machine	9%	8%	9%

Table 471: Saturation of Consumer Electronics by Program Participation

(Source: Survey data)

Type	Statewide	Participants	Non-Participants
n (respondents)	*1,251*	*306*	*945*
Televisions	2.60	2.64	2.58
Cell phones	2.58	2.55	2.59
Laptop Computers (excluding tablets)	1.85	2.03	1.80
Tablets	1.35	1.43	1.32
Computer Monitors	1.33	1.48	1.28
Printers	1.08	1.12	1.06
Stand-alone sound systems (e.g., stereos or Bluetooth speakers)	1.07	1.14	1.04
Game Consoles	0.80	0.78	0.80
Desktop Computer	0.78	0.82	0.76
TV-Sound systems	0.59	0.70	0.56
Copier/scanner	0.26	0.23	0.27
Fax Machine	0.15	0.12	0.16

F.9 OTHER

F.9.1 Renewable Energy

Table 472: Presence of PV System by Program Participation

(Source: On-site and survey data)

Type	Statewide	Participants	Non-Participants
n (respondents)	*1,251*	*306*	*945*
Yes	11%	10%	11%
No	87%	90%	86%
I'm not sure	2%	0%[a]	3%

[a] Significantly different than non-participant households at the 90% confidence level.

Table 473: Capacity of PV Systems by Program Participation

(Source: On-site and survey data)

Capacity (kW)	Statewide	Participants	Non-Participants
n (respondents with PV)	*111*	*31*	*80*
Average	7.64	6.75[a]	7.98
Median	7.10	6.00[a]	7.20
Minimum	0.30	0.90[a]	0.30
Maximum	21.9	17.0[a]	21.9
Standard Deviation	4.5	3.5	4.8

[a] Significantly different than non-participant households at the 90% confidence level.

Table 474: Battery Back-up by Program Participation

(Source: On-site and survey data)

Type	Statewide	Participants	Non-Participants
n (respondents)	*154*	*36*	*118*
Yes	5%	9%	4%
No	87%	91%	86%
I'm not sure	8%	---	10%

F.9.3 Electric Vehicles

Table 475: Electric Vehicles and Transportation by Program Participation

(Source: Survey data)

Type	Statewide	Participants	Non-participants
n (respondents)	*1,251*	*306*	*945*
Electric-only vehicles	6%	9%	3%
Plug-in hybrid	2%	3%	1%
Electric bicycle	2%	3%	1%
Electric scooter	2%	2%	1%

Table 476: Electric Vehicle Chargers by Program Participation

(Source: Survey data)

Type	Statewide	Participants	Non-participants
n (respondents with an EV)	*90*	*37*	*53*
Level 2 (charger installed)	68%	62%	72%
Level 1 (standard volt outlet)	26%	38%	17%
Do not charge EV at home	7%	--	11%

Table 477: Electric Vehicle Charging Behavior by Program Participation

(Source: Survey data)

Type	Statewide	Participants	Non-participants
n (respondents with an EV)	*90*	*37*	*53*
Between 8am and 12pm	14%	14%	15%
Between 12pm and 8pm	27%	32%	23%
Between 8pm and 8am	80%	86%	75%
Do not charge EV at home	4%	0%	8%
Don’t know	3%	2%	0%

F.9.4 Other Energy-Using Appliances

Table 478: Types of Miscellaneous Equipment by Program Participation
(Source: survey data)

Type	Statewide	Participants	Non-Participants
n (respondents)	*1251*	*306*	*945*
Sump Pump	32%	36%	31%
Electric lawn equipment	32%	39%	30%
Home gym	25%	32%	23%
Workshop with power tools	23%	30%	21%
Swimming pool	14%	15%	13%
Well pump	12%	10%	13%
Whole-house generator	8%	9%	8%
Spa (e.g., Jacuzzi)	8%	9%	7%
Medical device(s) (e.g., ventilators, CPCP, dialysis)	7%	7%	7%
Pool heater	4%	6%	4%
Sauna	1%	1%	1%
None of the above	25%	18%	28%

Table 479: Spa/Jacuzzi Fuel by Program Participation

(Source: Survey data)

Type	Statewide	Participants	Non-participants
n (respondents with a spa/jacuzzi)	*98*	*28*	*70*
Electricity	80%	71%	83%
Natural gas from utility	14%	25%	10%
Propane or LPG	1%	0%	1%
Don't know	5%	4%	6%

Table 480: Pool Heater Fuel by Program Participation

(Source: Survey data)

Type	Statewide	Participants	Non-participants
n (respondents with a pool)	*53*	*17*	*36*
Natural gas from utility	64%	71%	61%
Electricity	25%	18%	28%
Propane or LPG	9%	12%	8%
Solar	2%	0%	3%

Table 481: Sauna Fuel by Program Participation

(Source: Survey data)

Type	Statewide	Participants	Non-participants
n (respondents with a sauna)	*11*	*4*	*7*
Electricity	82%	75%	86
Natural gas from utility	9%	25%	--
Don't know	9%	--	14%

Table 482: Whole House Generator by Program Participation

(Source: Survey data)

Type	Statewide	Participants	Non-participants
n (respondents with a whole house generator)	*99*	*28*	*71*
Natural gas from utility	66%	79%	61%
Fuel oil or kerosene	21%	14%	24%
Propane or LPG	9%	7%	10%
Electricity	2%	--	3%
Don't know	2%	--	3%

F.10 HOUSEHOLD CHARACTERISTICS

Table 483: Years at Address by Program Participation

(Source: Survey data)

Years at Address	Statewide	Participants	Non-participants
n (respondents with PV)	*1251*	*306*	*945*
Average	14.7	14.3	15.2
Median	12.0	12.0	13.0
Minimum	0.0	0.0	0.0
Maximum	30.0	30.0	30.0
Standard Deviation	10.4	10.2	10.7

Table 484: Tenure by Program Participation

(Source: Survey data)

Household Status	Statewide	Participants	Non-participants
n (households)	*1,251*	*306*	*945*
Own	95%	98%	94%
Rent	5%	2%	6%
Don’t Know	<1%	--	<1%

G

Appendix G Results by Climate Zone

This appendix provides data for the two climate zones in New Jersey. The data is provided for heating and cooling measures. While the state of New Jersey is adapting to a five-climate zone model, the data is provided for climate zones 4A and 5A, which align with current building codes.[66]

G.1 Heating

G.1.1 Primary Heating

Table 485: Primary Heating Fuel by Climate Zone

(Source: On-site, self-audit, and survey data)

Primary Heating	Statewide	4A	5A
n (households)	*1,251*	*761*	*490*
Natural gas	70%	74%	63%[a]
Electricity	10%	11%	7%
Oil	8%	5%	14%[a]
Wood or pellet	1%	1%	2%
Propane	1%	<1%	3%[a]
No heat/don't know	10%	9%	12%

[a] Significantly different from the 4A climate zone at the 90% confidence level.

Table 486: Primary Heating Type by Climate Zone

(Source: On-site, self-audit, and survey data)

Heating Type	Statewide	4A	5A
n (households)	*1,251*	*761*	*490*
Furnace	59%	59%	58%
Boiler	25%	25%	27%
Electric Baseboard	3%	3%	2%
ASHP/GSHP	2%	2%	2%
MSHP	0%	0%	0%
Electric wall or space heater	2%	3%	1%
Wood fireplace or pellet stove	1%	1%	2%
Gas fireplace or heating stove	1%	2%	0%
No heat/don't know	6%	5%	6%

[66] https://www.nj.gov/dca/codes/publications/pdf_bulletins/b.15_4.pdf

Table 487: Penetration of Heating Systems by Climate Zone

(Source: On-site, self-audit, and survey data)

Heating Type*	Statewide	4A	5A
n (households)	*1,251*	*761*	*490*
Furnace	63%	64%	61%[a]
Boiler	31%	29%	35%
Electric wall or space heater	10%	11%	9%
Electric Baseboard	8%	6%	12%[a]
Wood fireplace or pellet stove	8%	6%	12%[a]
Gas fireplace or heating stove	6%	7%	5%
ASHP/GSHP	5%	4%	7%
MSHP	2%	1%	2%
No heat/don't know	5%	5%	6%

*Does not sum to 100% because some households have more than one type of heating system.
[a] Significantly different from 4A climate zone at the 90% confidence level.

G.1.2 Furnaces

Table 488: Furnace Fuel by Climate Zone

(Source: Self-audit and on-site data)

Fuel	Statewide	4A	5A
n (furnaces)	*243*	*173*	*70*
Natural Gas	92%	97%[a]	78%
Oil	7%	3%[a]	17%
Propane	1%	0%[a]	5%
Electric	0%	1%	0%

[a] Significantly different from 5A climate zone at the 90% confidence level.

Table 489: ENERGY STAR Qualification of Furnaces by Climate Zone

(Source: Self-audit and on-site data)

	Statewide	4A	5A
n (furnaces)	*226*	*78*	*148*
ENERGY STAR-qualified	47%	50%	40%
Certified	*39%*	41%	35%
Meets minimum qualifications	*8%*	9%	5%
Non-qualified	53%	50%	60%

Table 490: Age of Furnace by Climate Zone

(Source: Self-audit and on-site data)

Age	Statewide	4A	5A
n (furnaces)	*156*	*111*	*45*
2021 to 2023	13%	13%	13%
2018 to 2020	16%	19%	6%
2013 to 2017	21%	18%	29%
2008 to 2012	15%	15%	17%
2003 to 2007	17%	19%	9%
1993 to 2002	14%	11%	24%
1992 or earlier	4%	5%	3%

Table 491: Furnace Efficiency by Climate Zone

(Source: Self-audit and on-site data)

Unit - AFUE	Statewide	4A	5A
n (furnaces)	*198*	*137*	*61*
Average	87.8	88.7[a]	85.8
Median	90.5	92.0	81.0
Minimum	66.0	66.0	68.0
Maximum	98.1	98.1	98.0
Standard Deviation	7.5	7.5	7.2

[a] Significantly different from the 5A climate zone at the 90% confidence level.

G.1.3 Boilers

Table 492: Boiler Fuel by Climate Zone

(Source: self-audit and on-site data)

Fuel	Statewide	4A	5A
n (boilers)	*146*	*60*	*86*
Natural gas	71%	79%	65%
Oil	27%	20%	34%
Propane	1%	1%	1%

Table 493: ENERGY STAR Qualification – Boilers

(Source: Self-audit and on-site data)

	Statewide	4A	5A
n (boilers)	*131*	*56*	*75*
ENERGY STAR-qualified	38%	42%	35%
Certified	*17%*	9%[a]	26%
Meets minimum qualifications	*21%*	33%[a]	9%
Non-qualified	61%	58%	64%

[a] Statistically significantly different from the 5A climate zone at the 90% confidence level.

Table 494: Age of Boilers by Climate Zone

(Source: Self-audit and on-site data)

Age	Statewide	4A	5A
n (boilers)	*75*	*31*	*44*
2021 to 2023	12%	9%	15%
2018 to 2020	4%	7%	0%
2013 to 2017	12%	12%	11%
2008 to 2012	9%	9%	9%
2003 to 2007	17%	18%	16%
1993 to 2002	28%	23%	33%
1992 or earlier	18%	22%	15%

Table 495: Boiler Efficiency (AFUE) by Climate Zone

(Source: Self-audit and on-site data)

Unit - AFUE	Statewide	4A	5A
n (boilers)	*106*	*46*	*60*
Average	84.9	85.2	84.6
Median	83.5	82.8	83.6
Minimum	78.0	78.0	78.0
Maximum	96.0	96.0	96.0
Standard Deviation	4.8	4.9	4.8

G.2 COOLING

Table 496: Primary Cooling Type by Climate Zone

(Source: On-site, self-audit, and survey data)

Cooling System	Statewide	4A	5A
n (households)	*1,251*	*761*	*490*
Central AC	68%	69%	66%
Window or room AC	23%	22%	24%
Ceiling fans	2%	2%	3%
ASHP	1%	1%	1%
MSHP	1%	1%	0%
Portable fans	1%	1%	2%
GSHP	0%	0%	0%
Whole house or attic fan	0%	0%	1%
No cooling system/don't know	3%	3%	3%

[a] Significantly different from non-participants at the 90% confidence level.

Table 497: Penetration of Cooling Type by Climate Zone

(Source: On-site, self-audit, and survey data)

Cooling System*	Statewide	4A	5A
n (households)	1251	*761*	*490*
Central AC	69%	62%	57%
Window or room AC	29%	24%	27%
Ceiling fans	28%	24%	23%
ASHP	3%	2%	3%
MSHP	3%	2%	2%
Portable fans	12%	9%	14%
GSHP	0%	0%	0%
Whole house or attic fan	3%	2%	5%[a]
No cooling system/don't know	2%	2%	2%

*Does not sum to 100% because some households have more than one type of heating system.

[a] Significantly different from 4A climate zone at the 90% confidence level.

G.2.1 Permanent Cooling

Table 498: ENERGY STAR Qualification of Permanent Cooling Equipment[1] by Climate Zone

(Source: Self-audit and on-site data)

	Statewide	4A	5A
n (cooling equipment)	*272*	*91*	*181*
ENERGY STAR-qualified	42%	45%	35%
Certified	*20%*	25%	14%
Meets minimum qualifications	*21%*	20%	21%
Non-qualified	58%	55%	65%

[1] Permanent cooling systems refer to equipment that cannot be easily removed and exclude equipment such as room ACs and other portable AC units.

Table 499: Age of Permanent Cooling Equipment[1] by Climate Zone

(Source: self-audit and on-site data)

Age	Statewide	4A	5A
n (cooling equipment)	*312*	*219*	*93*
2021 to 2023	14%	15%	14%
2018 to 2020	32%	37%	17%[a]
2013 to 2017	15%	14%	20%
2008 to 2012	14%	14%	11%
2003 to 2007	11%	9%	16%
1993 to 2002	12%	8%	23%[a]
1992 or earlier	2%	2%	0%

[1] Permanent cooling systems refer to equipment that cannot be easily removed and exclude equipment such as room ACs and other portable AC units.
[a] Statistically significantly different than cooling equipment in 4A climate zone at the 90% confidence level.

Table 500: Permanent Cooling Efficiency (SEER)[1] by Climate Zone

(Source: Self-audit and on-site data)

Unit - SEER	Statewide	4A	5A
n (units)	*265*	*171*	*94*
Average	13.8	14.0	13.4
Median	14.0	14.0	13.0
Minimum	8.2	9.0	8.2
Maximum	29.4	29.4	29.3
Standard Deviation	3.2	2.9	3.8

[1] Permanent cooling systems refer to equipment that cannot be easily removed and exclude equipment such as room ACs and other portable AC units.

G.2.2 Central AC

Table 501: ENERGY STAR Qualification of Central ACs by Climate Zone

(Source: Self-audit and on-site data)

Qualification Status	Statewide	4A	5A
n (units)	*236*	*160*	*76*
ENERGY STAR-qualified	38%	54%	31%
Certified	*19%*	20%	16%
Meets minimum qualifications	*19%*	24%[a]	10%
Non-qualified	62%	56%[a]	74%

[a] Statistically significantly different than cooling equipment in the 5A climate zone at the 90% confidence level.

Table 502: Age of Central AC Equipment by Climate Zone

(Source: Self-audit and on-site data)

Age	Statewide	4A	5A
n (units)	*218*	*161*	*57*
2021 to 2023	15%	17%	12%
2018 to 2020	24%	27%	18%
2013 to 2017	11%	12%	9%
2008 to 2012	15%	18%	9%
2003 to 2007	12%	11%	15%
1993 to 2002	19%	12%[a]	38%
1992 or earlier	3%	4%	0%

[a] Statistically significantly different than cooling equipment in the 5A climate zone at the 90% confidence level.

Table 503: Efficiency of Central AC Equipment by Climate Zone

(Source: Self-audit and on-site data)

Unit - SEER	Statewide	4A	5A
n (equipment)	*230*	*153*	*77*
Average	13.2	13.6[a]	12.3
Median	13.4	14.0	13.0
Minimum	8.2	9.0	8.2
Maximum	23.0	23.0	17.7
Standard Deviation	2.1	2.1	2.1

[a] Statistically significantly different than cooling equipment in 5A climate zone at the 90% confidence level.

G.2.3 Room Air Conditioner

Table 504: ENERGY STAR Qualification of Room Air Conditioners by Climate Zone

(Source: Self-audit and on-site data)

Qualification Status	Statewide	4A	5A
n (RAC units)	*112*	*72*	*40*
ENERGY STAR-qualified	32%	25%	48%
Certified	31%	24%	48%[a]
Meets minimum qualifications	1%	1%	0%
Non-qualified	69%	75%	52%[a]

[a] Statistically significantly different from RAC units in climate zone 4A at the 90% confidence level.

Table 505: Age of Room Air Conditioners by Climate Zone

(Source: Self-audit and on-site data)

Age	Statewide	4A	5A
n (RAC units)	*75*	*47*	*28*
2021 to 2023	14%	12%	20%
2018 to 2020	42%	57%	2%[a]
2013 to 2017	23%	17%	38%
2008 to 2012	11%	8%	18%
2003 to 2007	9%	5%	21%
1993 to 2002	1%	1%	0%
1992 or earlier	75	47	28

[a] Statistically significantly different from RAC units in climate zone 4A at the 90% confidence level.

Table 506: Efficiency of Room Air Conditioners by Climate Zone

(Source: Self-audit and on-site data)

Unit - CEER	Statewide	4A	5A
n (RAC units)	*106*	*74*	*32*
Average	11.1	10.9	11.4
Median	11.0	11.0	11.0
Minimum	6.2	6.2	7.2
Maximum	15.0	15.0	15.0
Standard Deviation	1.4	1.4	1.2

G.3 HEAT PUMPS

Table 507: ENERGY STAR Qualification of Heat Pumps by Climate Zone

(Source: Self-audit and on-site data)

	Statewide	4A	5A
n (heat pumps)	*29*	*14*	*15*
ENERGY STAR-qualified	70%	60%	82%
Certified	38%	20%	60%[a]
Meets minimum qualifications	32%	40%	22%
Non-qualified	30%	40%	18%

[a] Statistically significantly different from RAC units in climate zone 4A at the 90% confidence level.

Table 508: Age of Heat Pumps by Climate Zone

(Source: Self-audit and on-site data)

Age of Heat Pumps	Statewide	4A	5A
n (heat pumps)	*15*	*7*	*8*
2021 to 2023	4%	8%	0%
2018 to 2020	70%	68%	72%
2013 to 2017	11%	0%	23%
2008 to 2012	9%	12%	5%
2003 to 2007	7%	12%	0%
1993 or earlier	0%	0%	0%

Table 509: Heat Pump Efficiency (HPSF) by Climate Zone

(Source: Self-audit and on-site data)

Unit - HSPF	Statewide	4A	5A
n (heat pumps)	*26*	*12*	*14*
Average	10.1	10.3	10.0
Median	10.0	7.7	8.2
Minimum	7.7	13.8	13.8
Maximum	13.8	11.0	10.0
Standard Deviation	1.8	2.1	1.5

[a] Statistically significantly different from non-OBC households at the 90% confidence level.

Table 510: Heat Pump Efficiency (SEER) by Climate Zone

(Source: Self-audit and on-site data)

Unit - SEER	Statewide	4A	5A
n (equipment)	*30*	*14*	*16*
Average	19.0	18.8	19.3
Median	19.0	19.2	18.7
Minimum	13.0	13.0	14.0
Maximum	29.4	29.4	29.3
Standard Deviation	4.6	4.8	4.5

G.4 Building Shell

Table 511: Above-Grade Wall Insulation Type by Climate Zone

(Source: On-site data)

Insulation Type	Statewide	4A	5A
n (households)	*69*	*54*	*15*
No Insulation	22%	18%	30%
Fiberglass Batt	74%	79%	60%
Blown-in Cellulose	3%	--	10%
Fiberglass Batt + Rigid Foam	1%	2%	--
Closed-cell Spray Foam + Rigid Foam	0%	1%	--

Table 512: Above-Grade Wall Insulation R-Value by Climate Zone

(Source: On-site data)

R-Value	Statewide	4A	5A
n (households)	*69*	*54*	*15*
Mean	11.0	10.9	11.4
Minimum	0.0	0.0	0.0
Maximum	33.0	33.0	27.7
Median	13.0	13.0	13.0
Standard Deviation	6.2	6.1	6.8

Table 513: Flat Ceiling Insulation Type by Climate Zone

(Source: On-site data)

Insulation Type(s)	Statewide	4A	5A
n (households)	*55*	*44*	*10*
No Insulation	12%	4%	--
Fiberglass Batt	60%	62%	80%
Blown-in Cellulose	9%	7%	20%
Blown-in Fiberglass	8%	11%	--
Blown-in Cellulose + Fiberglass Batt	6%	8%	--
Blown-in Fiberglass + Fiberglass Batt	5%	8%	--
Rock Wool Batt	0%	1%	--

Table 514: Flat Ceiling Insulation R-Value by Climate Zone

(Source: On-site data)

R-Value	Statewide	4A	5A
n (households)	*55*	*44*	*10*
Mean	23.7	27.0	22.7
Minimum	0.0	0.0	11.9
Maximum	60.0	60.0	41.7
Median	30.0	30.0	24.5
Standard Deviation	13.0	13.0	10.3

Table 515: Vaulted Ceiling Insulation Type by Climate Zone

(Source: On-site data)

Insulation Type	Statewide	4A	5A
n (households)	*8*	*5*	*3*
No Insulation	21%	34%	--
Fiberglass Batt	79%	66%	100%

Table 516: Vaulted Ceiling Insulation R-Value by Climate Zone

(Source: On-site data)

R-Value	Statewide	4A	5A
n (households)	*8*	*5*	*3*
Mean	18.1	17.5	19.0
Minimum	0.0	0.0	19.0
Maximum	38.7	38.7	19.0
Median	19.0	19.0	19.0
Standard Deviation	11.1	14.6	0.0

Table 517: Foundation Type by Climate Zone

(Source: On-site data)

Foundation Type	Statewide	4A	5A
n (households)	*70*	*55*	*15*
Apt. over Enclosed Space	3%	--	13%
Cond./Uncond. Mix	4%	4%	7%
Conditioned Basement	10%	11%	7%
Enclosed Crawlspace	10%	13%	--
Slab	27%	31%	13%
Unconditioned Basement	46%	42%	60%

Table 518: Framed Floor over Unconditioned Space Insulation Type by Climate Zone

(Source: On-site data)

Insulation Type	Statewide	4A	5A
n (households)	*43*	*32*	*11*
No Insulation	93%	90%	100%
Fiberglass Batt	7%	10%	--

Table 519: Framed Floor over Unconditioned Space Insulation R-Value by Climate Zone

(Source: On-site data)

R-Value	Statewide	4A	5A
n (households)	*43*	*32*	*11*
Mean	1.7	2.3	0.0
Minimum	0.0	0.0	0.0
Maximum	30.0	30.0	0.0
Median	0.0	0.0	0.0

R-Value	Statewide	4A	5A
Standard Deviation	9.8	11.0	0.0

Table 520: Glazing Type (Percentage of Total Window Area) by Climate Zone

(Source: On-site data)

Glazing Type	Statewide	4A	5A
Window area, ft^2	*12,118*	*4,151*	*7,967*
Double Pane, Low-E	18%	28%	23%
Double Pane, No Low-E	72%	66%	75%
Single Pane	11%	6%	2%

H

Appendix H Benchmarking

This appendix presents the statewide results from the data collection conducted in this study and benchmarks those results to the state-level 2020 Residential Energy Consumption Survey (2020 RECS)[67] results and the 2023 Pennsylvania Residential Baseline Study results.[68]

H.1 HEATING

H.1.1 Primary Heating

Table 521: Primary Heating Fuel Benchmarking

Heating Type	NJ (Statewide)	NJ (RECS)	PA
n (households)	*1,251*	--	*414*
Natural gas	70%	83%	50%
Electricity	10%	8%	36%
Oil	8%	7%	12%
Wood or pellet	1%	--	<1%
Propane	1%	1%	2%
No heat/don't know	10%	--	--

Table 522: Primary Heating Type Benchmarking

Heating Type	NJ (Statewide)	NJ (RECS)	PA[1]
n (households)	*1,251*	--	*414*
Furnace	59%	65%	44%
Boiler	25%	28%	21%
ASHP/GSHP	2%	1%	22%
Electric Baseboard	3%	3%	10%
Electric wall or space heater	2%	1%	<1%
Wood fireplace or pellet stove	1%	--	--
Gas fireplace or heating stove	1%	2%	--
No heat/don't know	6%	--	--

[1] The total does not sum to 100% as there were data categories for PA that were not included in this report.

H.1.2 Furnaces

[67] https://www.eia.gov/consumption/residential/data/2020/index.php?view=microdata
[68] https://www.puc.pa.gov/media/2883/2023_pa_residential_baseline_study.pdf

Table 523: Furnace Fuels Benchmarking

Fuel	NJ (Statewide)	NJ (RECS)	PA
n (furnaces)	*243*	--	*414*
Natural Gas	92%	88%	83%
Oil	7%	6%	11%
Propane	1%	2%	3%
Electric	0%	4%	3%
Wood	--	--	<1%

Table 524: Furnace Age Benchmarking

Age	NJ (Statewide)	NJ (RECS)
n (furnaces)	*156*	--
2021 to 2023	13%	8%
2018 to 2020	16%	12%
2013 to 2017	21%	19%
2008 to 2012	15%	22%
2003 to 2007	17%	17%
1993 to 2002	14%	22%
1992 or earlier	4%	--

Table 525: Furnace Efficiency Benchmarking

Unit - AFUE	NJ (Statewide)	PA
n (furnaces)	*198*	*185*
Average	87.8	89.1
Median	90.5	92.1
Minimum	66.0	64.0
Maximum	98.1	98.0
Standard Deviation	7.5	6.7

H.1.3 Boilers

Table 526: Boiler Fuels Benchmarking

Fuel	NJ (Statewide)	NJ (RECS)	PA
n (boilers)	*146*	--	*170*
Natural Gas	71%	85%	61%
Oil	27%	12%	36%
Propane	1%	--	3%
Electric	*146*	3%	--

Table 527: Boiler Age Benchmarking

Age	NJ (Statewide)	NJ (RECS)
n (boilers)	*75*	--
2021 to 2023	12%	6%
2018 to 2020	4%	5%
2013 to 2017	12%	30%
2008 to 2012	9%	22%
2003 to 2007	17%	8%
1993 to 2002	28%	28%
1992 or earlier	18%	--

Table 528: Boiler Efficiency

Unit - AFUE	NJ (Statewide)	PA
n (boilers)	*106*	*49*
Average	84.9	85.4
Median	83.5	84.0
Minimum	78.0	79.0
Maximum	96.0	96.0
Standard Deviation	4.8	4.8

H.2 Cooling

H.2.1 Primary Cooling

Table 529: Primary Cooling Type

Cooling Type	NJ (Statewide)	NJ (RECS)
n (households)	*1,251*	--
Central AC	68%	66%
Window or Room AC	23%	28%
Ceiling fans	2%	--
ASHP	1%	--
MSHP	1%	1%
Portable fans	1%	--
GSHP	0%	--
Whole house or attic fan	0%	1%
No cooling/don’t know	3%	3%

H.2.3 Permanent Cooling

Table 530: ENERGY STAR Qualification of Permanent Cooling Equipment (Benchmarking)

	NJ (Statewide)	PA
n (cooling equipment)	*272*	*307*
ENERGY STAR-qualified	42%	51%
Certified	20%	--
Meets minimum qualifications	21%	--
Non-qualified	58%	49%

Table 531: Permanent Cooling Equipment Age Benchmarking

Age	NJ (Statewide)	NJ (RECS)
n (cooling equipment)	*312*	--
2021 to 2023	14%	15%
2018 to 2020	32%	20%
2013 to 2017	15%	23%
2008 to 2012	14%	21%
2003 to 2007	11%	9%
1993 to 2002	12%	9%
1992 or earlier	2%	--
Not applicable	--	3%

Table 532: Age of Central AC Equipment

Age	NJ (Statewide)	NJ (RECS)
n (units)	*218*	--
2021 to 2023	15%	12%
2018 to 2020	24%	15%
2013 to 2017	11%	25%
2008 to 2012	15%	22%
2003 to 2007	12%	12%
1993 to 2002	19%	13%
1992 or earlier	3%	--

H.2.5 Room Air Conditioner

Table 533: ENERGY STAR Qualification of Room Air Conditioners (Benchmarking)

	NJ (Statewide)	PA
n (units)	*112*	*139*
ENERGY STAR-qualified	31%	32%
Certified	*31%*	--
Meets minimum qualifications	*1%*	--
Non-qualified	69%	68%

H.3 WATER HEATING

Table 534: Primary Water Heating Fuel Benchmarking

Fuel	NJ (Statewide)	NJ (RECS)	PA
n (households)	*542*	--	*465*
Natural Gas	84%	76%	48%
Electric	13%	19%	47%
Propane	2%	2%	2%
Oil	1%	3%	3%

Table 535: Primary Water Heating Fuel by Type (Benchmarking)

Type	NJ (Statewide)	PA
n (water heaters)	*560*	*465*
Storage, Stand-alone	**88%**	**87%**
Natural Gas	85%	48%
Electric	14%	50%
Propane	1%	2%
Instantaneous	**8%**	**3%**
Natural Gas	88%	91%
Propane	9%	1%
Electric	4%	8%
Storage, Indirect heat	**3%**	**3%**
Natural Gas	60%	66%
Oil	39%	14%
Electric	2%	15%
Propane	**--**	5%
Tankless Coil	**1%**	**3%**
Oil	**0%**	100%
Storage, Heat pump	**0%**	**2%**
Combi Boiler	*560*	**1%**
Natural Gas	**88%**	82%
Propane	85%	18%

Table 536: Primary Water Heating Age Benchmarking

Equipment Age	NJ (Statewide)	NJ (RECS)
n (water heaters)	*560*	--
2021 to 2023	14%	17%
2018 to 2020	21%	18%
2013 to 2017	32%	34%
2008 to 2012	12%	15%
2003 to 2007	13%	9%
1993 to 2002	7%	7%
1992 or earlier	1%	--

Table 537: Water Heater Efficiency (UEF) Benchmarking

Efficiency (UEF)	NJ (Statewide)	PA
n (water heaters)	*505*	*418*
Mean	0.70	0.82
Min	0.41	0.53
Median	3.88	*0.87*
Max	0.62	3.88
Std. Dev.	0.27	0.41

Table 538: Water Heater Capacity Benchmarking

Capacity (Gallons)	NJ (Statewide)	PA
n	*480*	*402*
<40	5%	10%
40 to 55	87%	79%
55 to 75	7%	4%
>75	1%	7%

Table 539: ENERGY STAR Qualification of Water Heaters (Benchmarking)

	NJ (Statewide)	PA
n (units)	*532*	*433*
ENERGY STAR-qualified	27%	13%
Certified	*19%*	--
Meets minimum qualifications	*8%*	--
Non-qualified	73%	87%

H.4 Appliances

H.4.1 Kitchen Appliances

Table 540: Average Number of Kitchen Appliances per Household (Benchmarking)

Appliance	NJ (Statewide)	NJ (RECS)
n (households)	*1,251*	--
Refrigerator	1.28	1.63
Microwave	0.97	1.02
Dishwasher	0.82	--
Stand-alone Freezer	0.36	0.28
Beverage cooler or wine fridge	0.17	--

Table 541: Households with Multiple Kitchen Appliances (Benchmarking)

Appliance	NJ (Statewide)	NJ (RECS)	PA
n (households)	*1,251*	--	*283*
Two or more refrigerators	28%	46%	30%
Two or more dishwashers	2%	--	
Two or more standalone freezers	3%	2%	5%

H.4.2 Refrigerators

Table 542: Refrigerator Door Configuration Benchmarking

Configuration	NJ (Statewide)	NJ (RECS)	PA
n (refrigerators)	*773*	--	*381*
Bottom Freezer	43%	23%	35%
Top Freezer	31%	38%	43%
Side by Side	24%	23%	18%
Single Door	2%	16%	2%
Internal Freezer	<1%	--	1%
Mini-fridge	<1%	--	--

Table 543: Refrigerator ENERGY STAR Status Benchmarking

ENERGY STAR	NJ (Statewide)	PA
n (refrigerators)	*754*	*560*
ENERGY STAR-qualified	62%	49%
Non-qualified	38%	51%

Table 544: Refrigerator Age Benchmarking

Vintage	NJ (Statewide)	RECS
n (refrigerators)	*705*	--
2021 to 2023	14%	13%
2018 to 2020	24%	19%
2013 to 2017	23%	29%
2008 to 2012	21%	21%
2003 to 2007	10%	11%
1993 to 2002	7%	7%
1992 or earlier	1%	--

Table 545: Refrigerator Volume Benchmarking

Volume	NJ (Statewide)	PA
n (refrigerators)	*754*	*603*
Mean	22.1	21.0
Median	22.4	21.6
Minimum	1.6	1.3
Maximum	36.7	34.3
Standard Deviation	5.3	5.6

Table 546: Refrigerator Efficiency Benchmarking

kWh/yr	NJ (Statewide)	PA
n (refrigerators)	*588*	*603*
Mean	575.7	565.2
Median	583.1	570.0
Minimum	180.0	208.0
Maximum	1,887.0	1,323.0
Standard Deviation	151.6	159.5

H.4.3 Freezers

Table 547: Freezer Door Configuration

Configuration	Statewide	RECS	PA
n (freezers)	*127*	--	*117*
Chest	66%	60%	55%
Upright	34%	40%	45%

Table 548: Freezer ENERGY STAR Qualification Benchmarking

ENERGY STAR	NJ (Statewide)	PA
n (freezers)	*121*	*155*
ENERGY STAR-qualified	35%	22%
Certified	*21%*	--
Meets minimum qualifications	*13%*	--
Non-qualified	65%	78%

Table 549: Freezer Age Benchmarking

Vintage	NJ (Statewide)	RECS
n (freezers)	*99*	--
2021 to 2023	11%	15%
2018 to 2020	33%	13%
2013 to 2017	17%	21%
2008 to 2012	9%	23%
2003 to 2007	15%	15%
1993 to 2002	11%	13%
1992 or earlier	3%	--

Table 550: Freezer Volume Benchmarking

Volume	NJ (Statewide)	PA
n (freezers)	*121*	*166*
Mean	10.3	10.9
Median	7.2	10.6
Minimum	3.5	1.2
Maximum	30.0	25.0
Standard Deviation	5.9	5.9

Table 551: Freezer Efficiency Benchmarking

kWh/yr	NJ (Statewide)	PA
n (freezers)	*122*	*164*
Mean	360.9	407.1
Median	284.5	379.5
Minimum	193.0	144.0
Maximum	1,302.0	1,104.0
Standard Deviation	205.5	192.4

H.4.4 Dishwashers

Table 552: Dishwasher ENERGY STAR Status (Benchmarking)

Qualification Status	NJ (Statewide)	PA
n (dishwashers)	*492*	*326*
ENERGY STAR Qualified	74%	75%
Certified	*66%*	--
Meets minimum qualifications	*6%*	--
Non-qualified	26%	25%

Table 553: Dishwasher Age Benchmarking

Vintage	Statewide	RECS
n (dishwashers)	*431*	--
2021 to 2023	13%	14%
2018 to 2020	22%	21%
2013 to 2017	25%	31%
2008 to 2012	18%	19%
2003 to 2007	16%	10%
1993 to 2002	4%	5%
1992 or earlier	3%	--

Table 554: Dishwasher Efficiency Benchmarking

Units - kWh/yr	NJ (Statewide)	PA
n (dishwashers)	*476*	*323*
Mean	299.1	293.2
Median	270.0	270.0
Minimum	85.0	70.0
Maximum	680.0	717.0
Standard Deviation	63.6	64.0

H.4.5 Cooking

Table 555: Oven and Range Fuel Type

Fuel	NJ (Statewide)	NJ (RECS)	PA
n (ovens and ranges)	*162*	--	*462*
Natural Gas	76%	62%	37%
Electric	23%	36%	61%
Propane	1%	2%	2%
Don’t know	<1%	--	--

H.4.6 Laundry

H.4.6.1 Clothes Washers

Table 556: Clothes Washer Configuration Benchmarking

	NJ (Statewide)	NJ (RECS)	PA
n (clothes washers)	*1,240*	--	*343*
Top-loading	66%	72%	61%
Front-loading	34%	28%	39%
Don’t know	1%	--	--

Table 557: Clothes Washer ENERGY STAR Qualification (Benchmarking)

ENERGY STAR	NJ (Statewide)	PA
n (clothes washers)	*459*	*324*
ENERGY STAR Qualified	63%	56%
Certified	*56%*	--
Meets minimum qualifications	*7%*	--
Non-qualified	37%	44%

Table 558: Clothes Washer Age Benchmarking

Vintage	NJ (Statewide)	RECS
n (clothes washers)	*127*	--
2021 to 2023	9%	16%
2018 to 2020	25%	25%
2013 to 2017	31%	36%
2008 to 2012	16%	15%
2003 to 2007	11%	6%
1993 to 2002	6%	2%
1992 or earlier	1%	--

Table 559: Clothes Washer Capacity Benchmarking

Ft^3	NJ (Statewide)	PA
n (clothes washers)	*458*	*318*
Mean	4.0	4.0
Median	4.3	4.2
Minimum	0.8	1.5
Maximum	6.5	5.8
Standard Deviation	0.8	0.7

Table 560: Clothes Washer Efficiency (IMEF)

IMEF	Statewide	PA
n (clothes washers)	*368*	*297*
Mean	2.0	2.2
Median	2.1	2.1
Minimum	0.5	0.7
Maximum	3.3	3.8
Standard Deviation	0.7	0.7

H.4.6.3 Clothes Dryers

Table 561: Clothes Dryer Fuel Benchmarking

Fuel	Statewide	RECS	PA
n (clothes dryers)	*454*	--	*330*
Natural Gas	69%	57%	17%
Electric	31%	43%	82%
Propane	--	--	1%

Table 562: Clothes Dryer ENERGY STAR Qualification (Benchmarking)

ENERGY STAR	NJ (Statewide)	PA
n (clothes dryers)	*438*	*312*
ENERGY STAR Qualified	42%	32%
Certified	*26%*	--
Meets minimum qualifications	*16%*	--
Non-qualified	58%	68%

Table 563: Clothes Dryer Age Benchmarking

Vintage	NJ (Statewide)	RECS
n (clothes dryers)	426	--
2021 to 2023	13%	13%
2018 to 2020	24%	21%
2013 to 2017	28%	34%
2008 to 2012	17%	19%
2003 to 2007	11%	8%
1993 to 2002	6%	5%
1992 or earlier	1%	--

Table 564: Clothes Dryer Moisture Sensing Benchmarking

Configuration	NJ (Statewide)	PA
n (clothes dryers)	*341*	*309*
Moisture Sensor	96%	93%
No Moisture Sensor	4%	7%

Table 565: Clothes Dryer Efficiency (CEF) Benchmarking

CEF	NJ (Statewide)	PA
n (clothes dryers)	*346*	*258*
Mean	3.1	3.4
Median	3.3	3.7
Minimum	2.0	2.3
Maximum	5.8	3.9
Standard Deviation	0.5	0.5

H.4.7 Air Quality Appliances

H.4.7.1 Dehumidifiers

Table 566: Number of Dehumidifiers per Household Benchmarking

	NJ (Statewide)	NJ (RECS)
n (households)	*1,232*	--
Average	0.44	0.38
Median	0.00	0.00
Minimum	0.00	0.00
Maximum	6.00	3.00
Standard Deviation	0.63	0.60

Table 567: Dehumidifier Capacity Benchmarking

Capacity (pints/day)	NJ (Statewide)	PA
n (dehumidifiers)	*136*	*115*
Mean	43.9	51.2
Median	50.0	50.0
Minimum	1.9	9.0
Maximum	109.0	136.0
Standard Deviation	18.4	18.9

Table 568: Dehumidifier ENERGY STAR Qualification Benchmarking

ENERGY STAR	NJ (Statewide)	PA
n (dehumidifier)	*129*	*116*
ENERGY STAR Qualified	90%	87%
Certified	*87%*	--
Meets minimum qualifications	*2%*	--
Non-qualified	10%	13%

Table 569: Dehumidifier Efficiency (IEF) Benchmarking

IEF	NJ (Statewide)	PA
n (dehumidifiers)	*57*	*42*
Mean	1.7	1.8
Median	1.8	1.8
Minimum	1.3	1.3
Maximum	2.0	2.0
Standard Deviation	0.1	0.2

Table 570: Dehumidifier Efficiency (EF) Benchmarking

EF	NJ (Statewide)	PA
n (dehumidifiers)	*67*	*61*
Mean	1.8	1.8
Median	2.0	2.0
Minimum	0.8	1.2
Maximum	2.7	2.9
Standard Deviation	0.3	0.3

H.4.7.2 Humidifiers

Table 571: Number of Humidifiers per Household Benchmarking

	NJ (Statewide)	NJ (RECS)
n (households)	*1,229*	--
Average	0.35	0.29
Median	0.00	0.00
Minimum	0.00	0.00
Maximum	6.00	3.00
Standard Deviation	0.76	0.62

H.5 Consumer Electronics

Table 572: Consumer Electronics Saturation Benchmarking

Type	NJ (Statewide)	NJ (RECS)
n (respondents)	*1,251*	--
Televisions	2.59	2.69
Cell phones	2.57	1.00
Laptop Computers (exclude tablets)	1.85	1.66
Tablets	1.35	1.28
Computer Monitors	1.33	--
Printers	1.08	--
Stand-alone sound systems (e.g., stereos or Bluetooth speakers)	0.97	--
Desktop Computer	0.78	0.67
Game Consoles	0.72	0.54
Copier/scanner	0.26	--
TV-Sound systems	0.51	0.34
Fax Machine	0.15	--

H.7 OTHER

H.7.1 Electric Vehicles

Table 573: Electric Vehicles and Transportation Benchmarking

Type	NJ (Statewide)	NJ (RECS)
n (respondents)	*1,251*	--
Electric-only vehicles	6%	2%
Plug-in hybrid	2%	--
Electric bicycle	2%	--
Electric scooter	2%	--

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Appendix I Data Collection Instruments

NMR Group, Inc.

NJ Residential Appliance Saturation Study (RASS) Survey

[BLUE] = Instructions for programmer

[Green] = Read-in variable

INTRODUCTION

Welcome to the virtual home energy audit. On behalf of Rutgers University and the NJ Board of Public Utilities (BPU), NMR is collecting information about appliances and other equipment to study energy use in New Jersey homes. This information will be used to improve energy efficiency programs and services for New Jersey residents.

The survey should take approximately 30 to 40 minutes and can be completed in multiple sessions. We request that you complete the survey while at home.

You will receive at least $25 for completing the survey and could receive an additional $25 for taking photos of your appliances. You will also be entered in a raffle to win a $500 gift card.

Your responses to this survey will be confidential and anonymized. If you have any questions about the study, please contact [Rutgers study lead] of Rutgers at [EMAIL]. For technical difficulties or assistance with the survey, please contact [NMR EMAIL].

Customer Info

Please enter your contact information below, which will be required to issue your reward for completing the survey. In rare cases we may also contact you to ask for help deciphering an unclear photo.

Enter your full name [TEXT ENTRY]

Enter your email address [TEXT ENTRY]

Verify your email address [TEXT ENTRY]

[DISPLAY TEXT] For best results, please do not use your browser's back button while taking the survey.

ZIP. Enter your ZIP Code [REQUIRE 5-DIGIT NUMERIC ENTRY]

SCREENING

S1. First, let's make sure you're eligible to respond. Do you still live at [ADDRESS]?

1. Yes
2. No

[IF S1 = 2] Unfortunately, you are ineligible to complete this survey. Thank you for your time. [TERMINATE]

S2. Which of the following best describes your home or building at [ADDRESS]?

1. A free-standing, single-family home
2. Duplex
3. Triple decker (e.g., three-story house with each floor being a separate unit)
4. A townhouse or rowhouse sharing at least one side with another building, but with no units above or below
5. Mobile home
6. Apartment or condo in a 2-to-4-unit building
7. Apartment or condo in a building with 5 or more units
98. I'm not sure

[IF S2 = 7 OR 98] Unfortunately, you are ineligible to complete this survey. Thank you for your time. [TERMINATE]

[COMPUTE MF = 0; MF =1 IF S2 = 6]

S3. Is the home at [ADDRESS] your primary residence?

1. Yes
2. No, it is a secondary residence or vacation home
3. No, it is a rental property
4. Other
98. I'm not sure

[IF S3 = 2, 3, 4, OR 98] Unfortunately, you are ineligible to complete this survey. Thank you for your time. [TERMINATE]

Unit. [IF S2 = 2, 3, OR 6] To confirm, which unit or apartment at [ADDRESS] do you live in? [TEXT ENTRY]

BUILDING CHARACTERISTICS, OCCUPANCY, AND TENURE

B1. [ASK IF S2 = 1] How many years have you lived at [ADDRESS]?

00. Less than one year
[OPEN END NUMERIC; WHOLE NUMBERS; RANGE 1-100]

B2. Do you own or rent the home at [ADDRESS]?

1. Own
2. Rent
97. Other; please specify: [REQUIRE TEXT ENTRY]

[COMPUTE NEW VARIABLE: OWNER = 0; IF B2 = 1, OWNER = 1]

[DISPLAY TEXT] For the remainder of the survey, please think about your home at [ADDRESS] when answering the questions.

B3. Are you responsible for paying the utility bills in your household?

1. Yes, I pay the utility bills
2. I share the utility bills with someone else in my household
3. Someone else in my household pays the utility bills
4. [IF B2 = 2] My landlord or property manager pays the utility bills
97. Other; please specify: [REQUIRE TEXT RESPONSE]
98. I'm not sure

B4a. [IF YEAR_BUILT IS AVAILABLE] Property records indicate your home was built in [YEAR_BUILT]. Is this correct?

1. Yes
2. No; it was built in: [REQUIRE TEXT ENTRY]
98. I'm not sure

B4b. [IF B5a = 98 OR YEAR_BUILT IS UNAVAILABLE] In what year was your home built? Do your best to estimate.

1. Before 1960
2. 1960 to 1979
3. 1980 to 1999
4. 2000 to 2009
5. 2010 or later
98. I'm not sure

B5. How many fully ***above-ground*** floors does your [IF MF = 0, "home"; IF MF = 1 "building"] have? Do not include basements (finished or unfinished) or unheated attics.

1. 1 floor or ranch-style
2. 2
3. 3
4. 4
5. 5 or more floors
6. [DISPLAY IF S4=1] Split-level home
98. I'm not sure

B6. How many rooms of the following types does your home have? Enter whole numbers only.

[SLIDER WITH THE OPTION OF N/A]

a. Bedrooms
b. Full bathrooms
c. Half bathrooms
d. Offices
e. Other rooms not listed above (excluding closets and hallways)

B7a. [DISPLAY IF AREA IS AVAILABLE AND MF = 0] Property records indicate your home is [AREA] square feet. Considering **only** spaces that are heated or cooled, is this correct?

1. Yes
2. No; my home is [OPEN-END NUMERIC; ALLOW 100 TO 15,000] square feet
98. I'm not sure

B7a1 [DISPLAY IF SQF_EXISTS = 0 AND MF = 0] Approximately, how large is the area of your home? Only think of spaces that are heated or cooled; unfinished spaces in basements should be excluded. If you don't know, use your best estimate.

[SLIDER WITH OPTIONS FROM 0 TO 4,000+]

B7a2 [DISPLAY IF SQF_EXISTS = 0 AND MF = 1] In square feet, how large is the area of your home? Think of spaces that are heated or cooled in your unit **only**, not common areas of your building. If you don't know, please give your best estimate.

[SLIDER WITH OPTIONS FROM 0 TO 4,000+]

B9. [DISPLAY IF S2=1] Do you have any other living quarters on your property, such as a converted garage, separate guest house, or accessory dwelling unit (ADU)?

1. Yes
2. No
3. Other; please specify: [REQUIRE TEXT ENTRY]
98. I'm not sure

B10. How many months per year is your home occupied by at least one person?

[SLIDER WITH OPTIONS 1-12, OPTION FOR "I'M NOT SURE"]

B11a. Does anyone in your household work from home or work in a home office?

1. Yes
2. No
98. I'd rather not say

B11b. During an average week, how many hours per week do you or a household member work from home?
[SLIDER WITH OPTIONS 0 to 50+]

B12. On a typical weekday, how often is your home occupied during these time periods?

[ONE RESPONSE PER COLUMN]		a	b	c
		9am to 12pm	12pm to 5pm	5pm to 9pm
1	No one is at home			
2	At least one person is at home			
99	I'd rather not say			

Photo Uploads

SelfAudit. Would you like to submit photos of some appliances and other parts of your home for $5 per item (for a combined total of up to $50 in gift cards)? It will also save time on the rest of the survey.

1. Yes, I would like to take photos now and earn more money [SKIP TO PHOTO UPLOADS]
2. Maybe, remind me later [RECEIVE PROMPT TO UPLOAD PHOTOS AT END OF SURVEY]
3. Not now, I would like to continue with the survey [SKIP TO H0]

[INSTRUCTIONS FOR SELF AUDIT PHOTO UPLOADS]

HVAC and Water Heating

Heating System

H0. [DISPLAY IF HEATING SYSTEM PHOTOS WERE UPLOADED] Any heating systems you uploaded photos for have been pre-selected for you. If you have other systems, please add them below:

H1. Which type(s) of system(s) do you use to heat your home? Please select all that apply. [ALLOW MULTIPLE RESPONSES; DISPLAY HELP BUTTON WITH HEATING SYSTEM PHOTOS AND DESCRIPTIONS; SYSTEM TYPE(S) WITH A PHOTO UPLOAD ARE PRE-SELECTED]

1. Furnace
2. Boiler
3. Air source heat pump (ducted)
4. Ductless mini-split heat pump
5. Ground source or geothermal heat pump
6. Electric baseboard heat
7. Electric space heater
8. Electric coil
9. Electric wall heater
10. Electric radiant floors or wall panels
11. Gas fireplace or heating stove
12. Wood fireplace or heating stove
13. Pellet stove
14. Solar heater
15. Other; please specify: [REQUIRE TEXT ENTRY]
16. I do not have a heating system
98. I'm not sure

H2. [IF MORE THAN ONE OPTION SELECTED IN H1a] Which of the following systems do you consider to be your ***primary*** heating system? By primary, we mean the system you rely on for most of your home's heating needs. [PIPE IN ALL OPTIONS AND INCLUDE AN OPTION FOR "I'm not sure."]

H3a. [DISPLAY IF FURNACE SELECTED IN H1] What fuel does your furnace use?

1. Electricity
2. Natural gas
3. Propane
4. Oil
98. I'm not sure

H3b. [DISPLAY IF BOILER SELECTED IN H1] What fuel does your boiler use?

1. Electricity
2. Natural gas
3. Propane
4. Oil
98. I'm not sure

H4. [ASK IF RESPONDENT SELECTED BOILER IN H1] How is the heat from your boiler delivered to the rest of the house?

1. Ducts
2. Wall or baseboard radiators
3. Radiant floor heating
98. I'm not sure

H5. [IF AIR SOURCE HEAT PUMP SELECTED IN H1] Does your air source heat pump have a back-up system that automatically comes on when the outdoor temperature is too low?

1. Yes; the back-up system comes on automatically
2. No; I manually switch to a different heat source
3. I do not have a back-up heat source
98. I'm not sure

H6. Do any of the rooms in your home have an electric radiant floor heating system? These are usually installed in bathrooms.

1. Yes
2. No
98. I'm not sure

H7. [IF PHOTO WAS NOT UPLOADED AND IF HEATING SYSTEM IS A FURNACE] Is your furnace a condensing furnace? Condensing furnaces tend to have plastic or PVC exhaust pipes.

1. Yes
2. No
98. I'm not sure

H8. [IF PHOTO WAS NOT UPLOADED AND HEATING SYSTEM IS A BOILER] Is your boiler a condensing boiler? Condensing boilers tend to have plastic or PVC exhaust pipes.

1. Yes
2. No
98. I'm not sure

Cooling System

C_HPa. [DISPLAY IF H1 = AIR SOURCE HEAT PUMP] You indicated you use an air source heat pump for heating. Do you also use this system for cooling?

1. Yes
2. No
98. I'm not sure

C_HPb. [DISPLAY IF H1 = GROUND SOURCE HEAT PUMP] You indicated you use a ground source or geothermal heat pump for heating. Do you also use this system for cooling?

1. Yes
2. No
98. I'm not sure

C_HPc. [DISPLAY IF H1 = DUCTLESS MINI SPLIT HEAT PUMP] You indicated you use ductless mini-split heat pump(s) for heating. Do you also use this system for cooling?

1. Yes
2. No
98. I'm not sure

C1a. [DISPLAY IF ANY COOLING SYSTEM PHOTOS HAVE BEEN UPLOADED] Any cooling systems you uploaded photos for have been pre-selected for you. If you have any other systems, please add them below:

C1. What cooling system(s) do you primarily use to in your home? Please select all that apply [SHOW INFO BUTTON WITH SYSTEM PHOTOS AND DESCRIPTION; ANY ITEMS THAT HAVE BEEN UPLOADED ARE PRE-SELECTED]

1. Central air conditioner
2. Air source heat pump
3. Ground Source or geothermal heat pump
4. Ductless mini split heat pump(s)
5. Window or room air conditioner
6. Whole house fan
7. Ceiling fan(s)
8. Portable fan(s)
9. Other; please specify: [REQUIRE TEXT ENTRY]
10. I do not have any cooling system
98. I'm not sure

C2. [IF MORE THAN ONE OPTION SELECTED IN C1] Which of these cooling systems is your primary cooling system; that is, you rely on it for cooling most often? [PIPE IN ANY OPTION SELECTED IN C1]

C3. Did you install any of these cooling system(s) in the past three years? Please select all that apply. [DISPLAY OPTIONS SELECTED IN C1 AS MATRIX]

1. Installed in 2020 or later
2. Installed in 2019 or before
98. I'm not sure

C4. [DISPLAY FOR EACH WHERE C3 = 1] Did the [PIPE IN COOLING SYSTEM] installed in 2020 or later replace a cooling system that was previously installed or was it installed to cool an area of your home that was **not** previously cooled?

1. Replaced a previously installed cooling system
2. Installed to provide cooling to an area of the home **not** previously cooled
98. I'm not sure

C5. [DISPLAY FOR EACH SELECTED IN C1 IF NUMBER OF ROOMS > 1] How much of your home is cooled by the [COOLING SYSTEM]

1. All of the rooms in my home
2. More than half of the rooms
3. Less than half of the rooms
4. Other; please describe: [REQUIRE TEXT ENTRY]
98. I'm not sure

Thermostat

T1. [IF THERMOSTAT PHOTO(S) WERE NOT UPLOADED] How many of the following types of thermostats are currently connected to the heating and/or cooling system(s) in your home? [SHOW HELP BUTTON FOR THERMOSTAT TYPES]

[SLIDER; RANGE 0-6 WITH AN OPTION FOR “DON'T KNOW”]

a. Standard manually adjustable
b. Basic programmable
c. Wireless-connected or smart learning thermostat

T2. [ASK IF (T1b OR T1c ≥ 1) OR PHOTO UPLOAD INCLUDES AT LEAST ONE PROGRAMMABLE OR SMART THERMOSTAT] Do you use any of the programmable features on the thermostat? (For example, setting the thermostat to automatically change the temperature at night or while you are at work?)

1. Yes
2. No
98. I'm not sure

T6. [ASK IF T1b OR T1c > 0] How often do you change or review the settings on your programmable thermostat?

1. Often
2. Sometimes
3. Rarely
4. Never
98. I'm not sure

T7. [ASK IF T1c > = 1 AND PHOTO WAS NOT UPLOADED] Which type of wireless-connected or smart thermostat is installed?

1. Ecobee
2. Google Nest
3. Honeywell
4. Emerson Sensi
5. Amazon
6. Mysa
7. Other [SPECIFY; INCLUDE OPEN END BOX]
98. I'm not sure

T9. On a typical day in the winter, what is the temperature setting (in degrees Fahrenheit) on the thermostat controlling your **primary heating system**? If you have multiple heating zones, do your best to think of the average setting across zones.

[SLIDER FROM 50 TO 80 WITH AN OPTION FOR "DON'T KNOW"]

a. Morning (6am – 9am)
b. Day (9am – 5pm
c. Evening (5pm – 9pm)
d. Night (9pm – 6am)

T10. [IF C1 < 7 OR PHOTO UPLOADS INCLUDE CAC, HEAT PUMP(S), RAC, OR PORTABLE AC] On a typical day in the summer, what is the temperature setting (in degrees Fahrenheit) on the thermostat controlling your **primary cooling system**? If you have multiple cooling zones, do your best to think of the average setting across zones.

[SLIDER FROM 60 TO 90 WITH AN OPTION FOR "DON'T KNOW"]

a. Morning (6am – 9am)
b. Day (9am – 5pm
c. Evening (5pm – 9pm)
d. Night (9pm – 6am)

Water Heater

W1. [IF RESPONDENT HAS NOT UPLOADED PHOTO(S) OF WATER HEATER(S)] Which of the following best describes your home's water heating system? [DISPLAY DHW TYPE INFO BUTTON WITH PICTURES & DESCRIPTION; RANDOMIZE RESPONSES 1-5]

1. Stand-alone storage water heater
2. Heat pump or electric hybrid water heater
3. Instantaneous or tankless water heater
4. Indirect water heater
5. Solar water heater
98. I'm not sure

W2. [IF RESPONDENT HAS NOT UPLOADED WATER HEATER PHOTOS] What fuel does your water heater use?

1. Electricity
2. Natural gas
3. Propane
3. Oil
4. Another fuel type: [REQUIRE TEXT ENTRY]
98. I'm not sure

W3. [IF PHOTO WAS NOT UPLOADED AND IF WATER HEATER IS NATURAL GAS (W2 = 2)] Is your water heater a condensing water heater? Condensing water heaters tend to have plastic or PVC exhaust pipes.

1. Yes
2. No
98. I'm not sure

APPLIANCES

A1. How many of each of these appliances do you have in your home? [APPLIANCES ACCOUNTED FOR IN SELF-AUDIT ARE PRE-SELECTED IN THE SLIDER]

[OPEN-END NUMERIC FOR EACH; RANGE: 0-4]

a. Dishwasher
b. Refrigerator
c. Stand-alone freezer
d. Beverage cooler or wine fridge
e. Microwave

A2a. [IF NO REFRIGERATOR PHOTO SUBMITTED AND A1a = 1] Which of the following best describes the refrigerator in your kitchen (or the one you use the most)?

1. Two doors, freezer next to the refrigerator
2. Two doors, freezer above refrigerator
3. Two doors, freezer below refrigerator
4. Three or more doors
5. Refrigerator only; no freezer
6. Mini-fridge
7. Other, please describe: [REQUIRE TEXT ENTRY]

A2b-1. [IF NO REFRIGERATOR PHOTO SUBMITTED AND A1a > 1] Which of the following best describes the refrigerator you use second most often?

1. Two doors, freezer next to the refrigerator
2. Two doors, freezer above refrigerator
3. Two doors, freezer below refrigerator
4. Three or more doors
5. Refrigerator only; no freezer
6. Mini-fridge
7. Other, please describe: [REQUIRE TEXT ENTRY]
8. I only have one refrigerator

A2b-2. [IF NO REFRIGERATOR PHOTO SUBMITTED AND A1a > 1 AND A2-b1 ≠ 8] Is this refrigerator located in a space that is either heated or cooled?

1. Yes, heated and/or cooled
2. No, neither heated nor cooled

98. I'm not sure

A2c-1. [IF NO REFRIGERATOR PHOTO SUBMITTED AND A1a > 2] Which of the following best describes your third refrigerator?

1. Two doors, freezer next to the refrigerator
2. Two doors, freezer above refrigerator
3. Two doors, freezer below refrigerator
4. Three or more doors
5. Refrigerator only; no freezer
6. Mini-fridge
7. Other, please describe: [REQUIRE TEXT ENTRY]
8. I don't have a third refrigerator

A2c-2. [IF NO REFRIGERATOR PHOTO SUBMITTED AND A1a > 1 AND A2c-1 ≠ 8] Is this refrigerator located in a space that is either heated or cooled?

1. Yes, heated and/or cooled
2. No, neither heated nor cooled
98. I'm not sure

A2d-1. [IF NO REFRIGERATOR PHOTO SUBMITTED AND A1a > 1] Which of the following best describes your fourth refrigerator?

1. Two doors, freezer <u>next</u> to the refrigerator
2. Two doors, freezer <u>above</u> refrigerator
3. Two doors, freezer <u>below</u> refrigerator
4. Three or more doors
5. Refrigerator only; <u>no</u> freezer
6. Mini-fridge
7. Other, please describe: [REQUIRE TEXT ENTRY]
8. I don't have a fourth refrigerator

A2d-2. [IF NO REFRIGERATOR PHOTO SUBMITTED AND A1a > 1 AND A2-b1 ≠ 8] Is this refrigerator located in a space that is either heated or cooled?

1. Yes, heated and/or cooled
2. No, neither heated nor cooled
98. I'm not sure

A3. How many of the following appliances do you have in your home? [DISPLAY HELP BUTTON WITH DESCRIPTIONS; ANY APPLIANCES PHOTOGRAPHED IN SELF-AUDIT ARE PRE-SELECTED]

[OPEN-END NUMERIC FOR EACH; RANGE: 0-6 WITH AN OPTION FOR DON'T KNOW]

a. Clothes washer
b. Clothes dryer
c. Dehumidifier (portable or whole-home)
d. Humidifier
e. Air purifier or cleaner

A4 [IF A3c > 0] Which of the following best describes how your household uses the dehumidifier(s)?

1. Use only during summer months
2. Use about half of the year
3. Use all or almost all of the year
4. Other, please specify: [REQUIRE TEXT ENTRY]
98. I'm not sure

A6. What fuel does the stove in your kitchen use?

1. Electricity
2. Natural gas
3. Propane
4. Other; please specify: [REQUIRE TEXT ENTRY]
5. I don't have a stove
98. I'm not sure

A5. Is your clothes washer front-loading or top-loading?

1. Front-loading
2. Top-loading
98. I'm not sure

Consumer Electronics

CE1. How many of the following do you have in your home? Please only count equipment that you regularly use.

[SLIDER 0 TO 6+; DO NOT REQUIRE RESPONDENT ENTER 0]

a. Desktop computers
b. Laptop computers (excludes tablets)
c. Tablets
d. Computer monitors
e. Printers
f. Copier/scanner (if separate from printer)
g. Fax machine

CE2. How many of the following do you have in your home? Please only count equipment that you regularly use.

[OPEN-END NUMERIC FOR EACH; WHOLE NUMBER ONLY; DO NOT REQUIRE RESPONDENT ENTER 0]

a. Cell phones
b. Televisions
c. Game consoles
d. TV-sound systems
e. Stand-alone sound systems (e.g., stereos or Bluetooth speakers)

CE3. [ASK IF CE1a, CE1b, OR CE1c > = 1] About what percentage of the time are the computer(s) plugged in, even if not in use? [IF CE1a OR b = > 3] [SLIDER FOR EACH QUESTION; 0 TO 100]

a. [SHOW IF CE1a > = 1] Desktop computer(s)
b. [SHOW IF CE1b > = 1] Laptop computer(s)
d. [SHOW IF CE1d > = 1] Computer monitor(s)

CE4. Do you have any smart controls or automation devices in your home?

This could include thermostat controls, voice control services like Amazon Alexa/Echo, Google Home, or Siri, as well as other smart home devices like smart switches, outlets, and light bulbs, security systems, smoke detectors, or home monitors.

1. Yes
2. No
98. I'm not sure

CE5. [ASK IF CE4 = 1] Which of the following equipment are controlled by your automation device(s)? Select all that apply. [MULTIPLE RESPONSES]

1. Thermostat
2. Audio or Bluetooth devices
3. Televisions
5. Kitchen appliances
6. Clothes washer or dryer
7. Portable heating or cooling equipment
8. Water heater
9. Lights
10. Garage door
11. Dehumidifiers or air purifiers
12. Pool pumps
55. Other [SPECIFY; INCLUDE OPEN END BOX]
97. I'm not sure

MISCELLANEOUS MEASURES

M1. Do you have any of the following items at your home? Please select all that apply. [ALLOW MULTIPLE RESPONSE]

1. Electric-only vehicle
2. Plug-in hybrid vehicle
3. Dedicated electric vehicle charging station
4. Electric scooter or E-scooter
5. Electric bicycle or E-bike
6. None of the above

M2a. [ASK IF M1 = 1 OR 2] What is the make and/or model of the electric-only or plug-in hybrid vehicle(s) at your home? If you have more than one, please list them all here.

[OPEN END]

M2b. [ASK IF M1d > 0] What is the brand and/or model of electric scooter(s) at your home? If you have more than one, please list them all here.

[OPEN END]

M2c. [ASK IF M1d > 0] What is the brand and/or model of electric bicycle(s) at your home? If you have more than one, please list them all here.

[OPEN END]

M3. [ASK IF M1 = 1 OR 2] When charging your electric-only or plug-in hybrid vehicle at home, do you plug it into a Level 1 or Level 2 power charger? [DISPLAY EV HELP BUTTON WITH DESCRIPTIONS OF CHARGER TYPES]

1. Level 1 (standard volt outlet)
2. Level 2 (charger installed)
3. I do not charge my vehicle at home

98. I'm not sure

M3a. [IF M3 ≠ 3] What time(s) of day do you charge your electric-only or plug-in hybrid vehicle at home? Please select all that apply. [ALLOW MULTIPLE RESPONSES]

1. In the morning (between 8am and 12pm)
2. During the day (between 12pm and 8pm)
3. Overnight (between 8pm and 8am)
4. I do not charge my vehicle at home

98. I'm not sure

M4. Do you have any photovoltaic ("PV") solar panels connected to your home? They are often installed on your roof.

1. Yes
2. No

98. I'm not sure

M5. [ASK IF M4 = 1] In terms of kilowatts (kW), what is the total installed capacity of your PV solar panels?

[OPEN-END NUMERIC]

998. I'm not sure

M6. [ASK IF M5 = 998] How many solar PV panels are installed on your home?

[OPEN-END NUMERIC]

998. I'm not sure

M7. [ASK IF M4 = 1] Do you have an energy-storage battery or whole home battery back-up? [PROVIDE INFO BUTTON WITH BATTERY SYSTEM PICTURE & DESCRIPTION]

1. Yes
2. No
98. I'm not sure

M10. Which of the following equipment do you have in or at your home? [MULTIPLE RESPONSES; RANDOMIZE 1 THROUGH 11]

1. Sump pump
2. Well pump
3. Swimming pool
4. Spa (e.g., Jacuzzi)
5. Pool heater
6. Whole-house generator
7. Medical device(s) (e.g., ventilators, CPAP, dialysis)
8. Workshop with power tools
9. Home gym (e.g., treadmill, indoor cycling trainer)
10. Sauna
11. Electric lawn equipment (e.g., mower, leaf blower)
97. None of the above

M11a. What type of fuel is used to heat the spa (i.e., hot tub/Jacuzzi)?

1. Electricity
2. Natural gas from utility
3. Bottled gas (propane. LPG)
4. Fuel oil or kerosene
5. Wood
6. Wood pellets
7. Other, please specify: [REQUIRE TEXT ENTRY]
98. I'm not sure

M11b. What type of fuel does your pool heater use?

1. Electricity
2. Natural gas from utility
3. Bottled gas (propane or LPG)
4. Fuel oil or kerosene
5. Wood
6. Wood pellets
7. Other, please specify: [REQUIRE TEXT ENTRY]
98. I'm not sure

M11c. What type of fuel does your sauna use?

1. Electricity
2. Natural gas from utility
3. Bottled gas (propane or LPG)
4. Fuel oil or kerosene
5. Wood
6. Wood pellets
7. Other, please specify: [REQUIRE TEXT ENTRY]
98. I'm not sure

M11d. What type of fuel does your whole-house generator use?

1. Electricity
2. Natural gas from utility
3. Bottled gas (propane. LPG)
4. Fuel oil or kerosene
5. Wood
6. Wood pellets
7. Other, please specify: [REQUIRE TEXT ENTRY]
98. I'm not sure

M12. Have you purchased any light bulbs in the last year?

1. Yes
2. No
98. I'm not sure

M13. [IF M12 = 1] Which of the following types of light bulbs did you purchase? Select all that apply. [ALLOW MULTIPLE RESPONSES; ROTATE RESPONSES 1 to 4]

1. Incandescent
2. Halogen
3. Fluorescent
3. CFLs
4. LEDs
98. I'm not sure

M14. Aside from lighting, including seasonal decorations, and the equipment that we have already asked about, are there any other equipment in your home that use a great deal of energy?

[OPEN-END]
97. No

PARTICIPATION AND AWARENESS

P1. [IF MUNI = 0] Are you aware that your utility offers programs and rebates to help you save on home upgrades and energy-saving equipment?

1. Yes
2. No
98. I'm not sure

P2. Have you heard of the New Jersey Clean Energy Program?

1. Yes
2. No
98. I'm not sure

P3. [IF P1 = 1 OR P2 = 1] In the past two years, have you taken part in a New Jersey Clean Energy Program or utility-sponsored program to save on home upgrades and/or energy-saving equipment? If so, which have you done? Select all that apply. [RANDOMIZE 1 TO 7; ALLOW MULTIPLE RESPONSES]

1. A home energy inspection or home energy "check-up"
2. Home Performance with ENERGY STAR® assessment
3. Received rebate(s) for installing energy-efficient appliances
4. Received rebate(s) for heating or cooling (HVAC) equipment
5. Received a credit for recycling old appliance(s) (refrigerators, freezers, dehumidifiers, room air conditioners)
6. Purchased energy-saving equipment through my utility's online marketplace
7. Financed energy-efficiency upgrades with a 0% interest loan or on-bill financing
8. Other, please specify: [REQUIRE TEXT ENTRY]
8. None of the above
98. I'm not sure

P4. In the past two years, have you [DISPLAY IF B2 = 2 “or your landlord”] made any of the following changes to weatherize your home? Select all that apply. [RANDOMIZE 1 TO 3; ALLOW MULTIPLE RESPONSES]

1. Added insulation (to walls, attic, and/or basement)
2. Installed weatherstripping on windows or doors
3. Upgraded windows or doors
4. Other [SPECIFY; INCLUDE OPEN END BOX]
97. None of the above
98. I’m not sure

P5. [DISPLAY IF HEAT PUMPS NOT SELECTED IN HEATING/COOLING SECTIONS] Before today, had you heard of heat pumps for your home?

1. Yes
2. No
98. I’m not sure

Heat Pump Knowledge & Attitudes

HP2. [IF P4 = 1 OR HEAT PUMP INSTALLED IN HOME] Please assess your agreement with the following statements:

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

[RANDOMLY ASSIGN APRROXIMATELY HALF OF RESPONDENTS TO A/B MODULES; RANDOMIZE STATEMENTS]

A	B
Heat pumps are better for the environment than other heating or cooling systems.	Heat pumps are no better for the environment than other heating or cooling systems.
Heat pumps can save money on my energy bills.	Heat pumps will increase my energy bills.
A heat pump can provide enough heat, even on the coldest days.	A heat pump cannot provide enough heat on the coldest days.
A heat pump cools as well as or better than other cooling systems.	A heat pump does not cool as well as other cooling systems.
Heat pumps are more expensive to install than other heating and cooling systems.	Heat pumps are less expensive to install than other heating and cooling systems.
Heat pumps are less reliable than other heating and cooling systems.	Heat pumps are more reliable than other heating and cooling systems.
Heat pumps are noisier than other heating and cooling systems.	Heat pumps are quieter than other heating and cooling systems.
Heat pumps have higher maintenance costs than other heating and cooling systems.	Heat pumps have lower maintenance costs than other heating and cooling systems.

AT1. Thinking about all the things you could do in your household to conserve energy, would you say you have done...

1. Everything I can think of
2. Most things
3. A few things
4. Nothing
98. I'm not sure

DEMOGRAPHICS

D2. Including yourself, how many people within each age group live in this home most of the year? [DISPLAY SCALE FROM 0 TO 9]

a. 5 and under
b. 6 to 18
c. 19 to 34
d. 35 to 54
e. 55 to 64
f. 65 and over

D1. What is the highest level of education that you have completed?

1. Less than high school
2. High school graduate/GED
3. Some college or associated degree
4. Bachelor's degree or higher
98. I'd rather not say

IF	D3 READ-IN		
Number of occupants (D2)	LIHEAP	ARP/USF	PAGE
1	$41,569	$54,360	$69,282
2	$54,360	$73,240	$90,600
3	$67,151	$92,120	$111,918
4	$79,942	$111,000	$133,237
5	$92,732	$129,880	$154,553
6	$105,523	$148,760	$175,872
7	$107,922	$167,640	$179,970
8 or more	$110,320	$186,520	$183,867

https://www.nj.gov/bpu/assistance/programs/

D3a. Before taxes, was your total annual household income in 2022 less than [PAGE LIMIT] or more?

1. Less than or equal to [PAGE LIMIT]
2. More than [PAGE LIMIT]
99. I'd rather not say

D3b. Before taxes, which of the following categories applies to your total household income in 2022?

1. Less than or equal to [LIHEAP LIMIT]
2. More than [LIHEAP LIMIT] but less than or equal to [ARP/USF LIMIT]
3. More than [ARP/USF LIMIT]
99. I'd rather not say

D4. How would you describe yourself? Please select all that apply. [ALLOW MULTIPLE RESPONSES]

1. Black or African American
2. Hispanic or Latino/Latina
3. American Indian or Alaska Native
4. Asian
5. Middle Eastern or North African
6. Native American or Other Pacific Islander
7. White
97. Not listed; please specify: [REQUIRE TEXT RESPONSE]
99. I'd rather not say

D5. What language do you primarily speak at home?

1. English
2. Spanish
3. Chinese
4. Hindi
5. Gujarathi
6. Portuguese
7. Russian
8. Tagalog
9. Arabic
10. Korean
11. Polish
97. Other; please specify: [REQUIRE TEXT RESPONSE]
99. I'd rather not say

D6. How would you describe yourself?

1. Male
2. Female
97. Prefer to self-identify: [REQUIRE TEXT RESPONSE]
99. I'd rather not say

Self-Audit Deferred Upload Opportunity

[IF SelfAudit = 2]
MAYBE. Are you ready to begin taking photos? You will be eligible for up an additional $25 (for a total of $50 in gift cards).

1. Yes, I would like to take photos now and earn more money
2. No, thank you, I'd like to finish the last few questions

Recruitment

R1. Those are all our questions. Before we conclude, we would like to offer you the opportunity to receive an additional gift card of **up to $150.**

Rutgers University is offering you the opportunity to take part in an important study. It would involve trained technicians either visiting your home or conducting a virtual video audit to gather additional information about energy use in your home.

The visit should take less than 2 hours. **There will be no attempt to sell you anything**. The information gathered will be used to evaluate and improve the energy-efficiency programs offered by your utility. You will receive the gift card on the day of the visit. Would you like to participate?

1. Yes; I am interested in a home visit
2. Yes; I am interested in a virtual video audit only
3. Yes; I am interested in either an in-home visit OR virtual video audit
2. No [SKIP TO END]
3. Maybe

R2. [ASK IF R1 = 3] We understand you are unsure about the home visit. You do not have to decide now. Would it be okay if someone calls you when visits are being scheduled to talk more about what would be involved?

1. Yes
2. No [SKIP TO R5]

R3. We will contact you within the next several months to schedule the visit if you qualify. Please complete the following information. [SINGLE SCREEN]

[OPEN END FOR EACH]

a. First name
b. Last name
c. Primary phone
d. Secondary phone (optional)

[SINGLE RESPONSE]

e. What is your preferred form of contact?
   1. Phone
   2. Email

R4. [ASK IF R3 = 1] When we call to schedule, your caller ID will most likely say “NMR Group” and will have a 617 area code. What are the best times of day for us to call? [MULTIPLE RESPONSES]

1. Morning
2. Afternoon
3. Evening
4. Anytime

Incentive Delivery

GC1. To what email address should we send your gift card as a thank you for completing today's survey? Please allow four to six weeks for delivery.

[OPEN-END; FORCE EMAIL RESPONSE]

2. I do not have an email address

97. I do not want the gift card

GC2. [ASK IF R5 = 2] If you prefer, we can mail your gift card. Please enter your preferred mailing address, and allow up to six to eight weeks for delivery.

1. [REQUIRE ADDRESS RESPONSE]

97. I do not want the gift card

On behalf of Rutgers University and the NJ Board of Public Utilities (BPU), we thank you for completing our survey.

Please visit your utility's website for information about ways to make your home more energy-efficient and save money on your energy bill. Find more information at: https://njcleanenergy.com/transition.