Residential Products Net-to-Gross Study (MA20X04-E-PRODNTG)

FINAL REPORT

June 8, 2021

SUBMITTED TO:
Massachusetts Electric Program Administrators

SUBMITTED BY:
NMR Group, Inc.
DNV, Inc.
In preparation for the three-year plan, the Massachusetts Program Administrators (PAs) sought to establish prospective net-to-gross ratios (NTGRs) and retrospective and prospective in-service rates (ISRs) for products supported by the Residential Retail (Retail) or Residential Coordinated Delivery (RCD) Initiatives. The study methods included a consensus process to set retrospective and prospective ISRs and NTGRs for eight products supported through the Retail and RCD initiatives. The Massachusetts Cross-cutting team conducted a literature review on ISR and NTGRs for all eight products, gathered market information, and fielded a web-survey of 186 participants who bought or received advanced power strips (APSs) or dehumidifiers. A panel comprising PAs, EEAC consultants, and evaluators considered the information and current values listed in the Benefit Cost Ratio Models (BCR). The panel then engaged in a consensus process to set the recommended values. The study recommends retrospective ISR estimates to calculate savings claimed for 2020 and 2021 and prospective NTGR and ISR estimates for 2022 to 2024 programs.

Historic (2019) and Recommended ISRs for 2020 to 2024

<table>
<thead>
<tr>
<th>Products</th>
<th>2019 BCR</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online APSs (O, U)</td>
<td>2019: 86%</td>
<td>2020-2024: 83%</td>
</tr>
<tr>
<td>Clothes Dryers (RF)</td>
<td>2019: 97%</td>
<td>2020-2024: 99%</td>
</tr>
<tr>
<td>Dehumidifiers (O, RF, IR)</td>
<td>2019: 96%</td>
<td>2020-2024: 99%</td>
</tr>
<tr>
<td>Pool Pumps (MD)</td>
<td>2019: 100%</td>
<td>2020-2024: 100%</td>
</tr>
<tr>
<td>Air Cleaners (O, RF, IR)</td>
<td>2019: 97%</td>
<td>2020-2024: 97%</td>
</tr>
<tr>
<td>Air Conditioners (O, RF, IR)</td>
<td>2019: 100%</td>
<td>2020-2024: 100%</td>
</tr>
<tr>
<td>TSVs and Low-flow Showerheads with TSVs (O, U)</td>
<td>2019: 78%</td>
<td>2020-2024: 78%</td>
</tr>
</tbody>
</table>
### Historic (2019) and Recommended NTGRs for 2022 to 2024

<table>
<thead>
<tr>
<th></th>
<th>Online APSs (O, U)</th>
<th>Leave Behind APSs (LB) (MK)</th>
<th>Clothes Dryers (RF)</th>
<th>Dehumidifiers (O, RF, IR)</th>
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<tbody>
<tr>
<td><strong>BCR</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2019</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Recommended</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>91%</td>
<td>95%</td>
<td>53%</td>
<td>49%</td>
</tr>
<tr>
<td>Recommended</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2023</td>
<td>90%</td>
<td>95%</td>
<td>52%</td>
<td>47%</td>
</tr>
<tr>
<td>Recommended</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2024</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2024</td>
<td>88%</td>
<td>93%</td>
<td>52%</td>
<td>45%</td>
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<table>
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<th>Pools Pumps (MD)</th>
<th>Air Cleaners (IR)</th>
<th>Air Conditioners (O, RF, IR)</th>
<th>TSVs &amp; Low-flow Showerheads with TSVs (O, U)</th>
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<tr>
<td><strong>BCR</strong></td>
<td></td>
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<tr>
<td>2019</td>
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<td></td>
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</tr>
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<td>2022</td>
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</tr>
<tr>
<td>2022</td>
<td>95%</td>
<td>63%</td>
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<td>2023</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2023</td>
<td>87%</td>
<td>61%</td>
<td>96%</td>
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</tr>
<tr>
<td>Recommended</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2024</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024</td>
<td>84%</td>
<td>60%</td>
<td>96%</td>
<td></td>
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<th>Definition</th>
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<tr>
<td>APS</td>
<td>Advanced Power Strip</td>
</tr>
<tr>
<td>BCR / BCR ID</td>
<td>Benefit Cost Ratio Model / Benefit Cost Ratio Identification Number</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence Interval</td>
</tr>
<tr>
<td>COVID-19</td>
<td>Coronavirus Disease of 2019</td>
</tr>
<tr>
<td>DPU</td>
<td>Department of Public Utilities</td>
</tr>
<tr>
<td>EEAC</td>
<td>Energy Efficiency Advisory Council</td>
</tr>
<tr>
<td>FR</td>
<td>Free rider, Free-ridership</td>
</tr>
<tr>
<td>ISR</td>
<td>In-service Rate</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>MA19X03-B-RSRNTG</td>
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<td>MA20R26-B-VHEA: Residential Coordinated Delivery Virtual Home Energy Assessment Study</td>
</tr>
<tr>
<td>NTGR</td>
<td>Net-to-Gross Ratio</td>
</tr>
<tr>
<td>PA</td>
<td>Program Administrators</td>
</tr>
<tr>
<td>RCD</td>
<td>Residential Coordinated Delivery</td>
</tr>
<tr>
<td>RLPNC 17-3</td>
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<td>RLPNC 17-4 and 17-5: Products Impact Evaluation of In-service and Short-Term Retention Rates Study</td>
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<td>RLPNC 18-4 Products Net-to-Gross Report</td>
</tr>
<tr>
<td>SO</td>
<td>Spillover</td>
</tr>
<tr>
<td>TSV</td>
<td>Thermostatic Shutoff Valve</td>
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Executive Summary

This report presents the results from the Residential Downstream/Upstream Products Net-to-Gross Study (MA20X04-E-PRODNTG). The Cross-Cutting Market Effects/Net-to-Gross evaluation team, led by NMR Group, Inc., with review from DNV, prepared this report for the Massachusetts Program Administrators (PAs). The study goals were to establish retrospective net-to-gross ratios (NTGRs) and in-service rates (ISRs) and develop prospective NTGRs and ISRs for products that are supported through the Residential Retail (Retail) and Residential Coordinated Delivery (RCD) initiatives. These products include purchased advanced power strips (APSSs), clothes dryers, dehumidifiers, pool pumps, room air cleaners, room air conditioners, and thermostat shut-off valves (TSVs) and low-flow showerheads with TSVs. The study also developed NTGRs for APSSs left behind during home energy assessments. These products have multiple delivery methods, as shown in Table 1 and Table 2.

While this study surveyed customers who had received APSSs during home energy assessment about their in-service rates, the MA20R26-B-VHEA Virtual Home Energy Assessment study conducted by Guidehouse also estimated ISRs for APSSs left behind and APSSs that were part of energy saving kits delivered as part of virtual assessments.\(^1\) The PAs have opted to use the MA20R26-B-VHEA results. To avoid any future confusion, we have removed discussion of leave behind APSS ISR from this current study.

The study leveraged a consensus panel approach whereby panelists reviewed evidence from participant web surveys and literature reviews to achieve the following objectives:

- Identify the range of recent ISR (seven products) and NTGR (eight products) results based on 38 studies conducted in Massachusetts and other jurisdictions between 2016 and 2020.
- Examine ENERGY STAR® shipment shares for the five qualified products and the dates of prior and forthcoming changes to federal standards and ENERGY STAR specifications.
- Through primary research, estimate NTGRs and ISRs for APSSs and dehumidifiers purchased or received by 186 participating customers in 2019.

The purpose of the consensus panel was to develop informed estimates based on multiple sources of evidence that limit the bias of any one approach or any single individual’s interpretation of the results. The evaluation team used the panel to assess information and arrive at mutually agreed-upon retrospective ISRs and NTGRs for 2019 and prospective ISRs and NTGRs for 2022 to 2024 for the products studied under various program delivery methods.

The panel ultimately reached consensus on a single retrospective and prospective ISR for each product, but NTGRs for each product varied over time and, for some products, by delivery method. Although the panel did not explicitly consider ISRs for 2020 or 2021, it did agree to use retrospective 2019 ISRs for planning the 2022 to 2024 cycle. Importantly, the consensus panel

\(^1\) The MA20R26-B-VHEA found in-service rates of 78% for APSSs provided to customers during home energy assessments and 70% for APSSs that were mailed after virtual home energy assessments. MA20R26-B-VHEA can be found at [https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf](https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf).
convened prior to the recent decision by the Department of Public Utilities (DPU) to apply both gross impact factors and NTGRs prospectively. Considering these factors, the evaluation team decided to use the consensus derived ISRs and NTGRs as follows:

- ISRs will be used to calculate program savings retrospectively for 2020 and 2021 unless updated by other current or future studies
- ISRs and NTGRs will inform planning for the 2022 to 2024 cycle, but the values will not be locked in for the three-year cycle
- ISRs and NTGRs will be used prospectively starting in 2022 until results of future research or other information suggests changing them

This report also includes information on the types of devices respondents have plugged into their APSs (Section 3.1.2), installation rates for APSs and dehumidifiers (Section 3.1.3), and respondent satisfaction (Section 3.1.4).

**Recommendations**

Table 1 presents the recommended ISRs, including the Benefit Cost Ratio identification number (BCR ID), the program delivery methods, and the ISR currently assumed in the 2019 to 2021 BCR. The evaluation team recommends that the PAs use the recommended ISRs retrospectively for 2020 and 2021 annual reporting and prospectively to plan for the 2022 to 2024 program cycle. The PAs should also use the ISRs prospectively until new research or other information suggests updates to them.

Table 2 presents the recommended prospective NTGRs for planning the 2022 to 2024 program cycle, including the BCR ID, the program delivery methods, and the assumed 2019 NTGR in the 2019 to 2021 BCR. This report defines delivery methods in Section 1.2. The evaluation team recommends that the PAs use these NTGRs for planning the 2022 to 2024 program cycle and prospectively beginning in 2022 until new research or other information suggests updates to the NTGRS. Table 12 in the main report lists the full range of currently assumed NTGRs for 2019 to 2021 BCR.

---

Table 1: Recommended ISRs for 2020 to 2024

<table>
<thead>
<tr>
<th>Product Description</th>
<th>BCR IDs</th>
<th>Delivery Methods¹</th>
<th>2019 BCR</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSs</td>
<td>E19A2c073, E19A2c0744</td>
<td>Online Upstream</td>
<td>86%</td>
<td>83%</td>
</tr>
<tr>
<td>Clothes Dryers</td>
<td>E19A2c077</td>
<td>Rebate Form</td>
<td>97%</td>
<td>99%</td>
</tr>
<tr>
<td>Dehumidifiers</td>
<td>E19A2c075</td>
<td>Online Rebate Form In-store Rebate</td>
<td>96%</td>
<td>99%</td>
</tr>
<tr>
<td>Pool Pumps²</td>
<td>E19A2a001, E19A2a002</td>
<td>Midstream</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Room Air Cleaners</td>
<td>E19A2c072</td>
<td>Online Rebate Form In-store Rebate</td>
<td>97%</td>
<td>97%</td>
</tr>
<tr>
<td>Room Air Conditioners</td>
<td>E19A2c086</td>
<td>Online Rebate Form In-store Rebate</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>TSVs and Low-flow Showerheads with TSVs</td>
<td>E19A2c082 though E19A2c085</td>
<td>Online Upstream</td>
<td>78%</td>
<td>78%</td>
</tr>
</tbody>
</table>

¹ Delivery methods include those currently in use; some methods may not be used in the next program cycle.
² The BCR model assumed pool pump deliver via retail (E19A2a001) and RCD (E19A2a002), but the PAs shifted to a midstream program. The BCR lists a 100% ISR for RCD pool pumps. Therefore, the evaluation team believes that, should the PAs adopt another delivery model, the 100% ISR would still apply.
Table 2: Recommended NTGRs for 2022 to 2024

<table>
<thead>
<tr>
<th>Product</th>
<th>BCR IDs</th>
<th>Delivery Methods¹</th>
<th>2019 BCR²</th>
<th>Recommended 2022</th>
<th>2023</th>
<th>2024</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSs</td>
<td>E19A2c073, E19A2c0744</td>
<td>Online Upstream</td>
<td>100%</td>
<td>91%</td>
<td>90%</td>
<td>88%</td>
</tr>
<tr>
<td>APSs</td>
<td>E19A2a008</td>
<td>Leave Behind</td>
<td>100%</td>
<td>95%</td>
<td>95%</td>
<td>93%</td>
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<tr>
<td>APSs</td>
<td>E19A2a008³</td>
<td>Mailed Kits</td>
<td>100%</td>
<td>93%</td>
<td>92%</td>
<td>91%</td>
</tr>
<tr>
<td>Clothes Dryers</td>
<td>E19A2c077</td>
<td>Rebate Form</td>
<td>57%</td>
<td>53%</td>
<td>52%</td>
<td>52%</td>
</tr>
<tr>
<td>Dehumidifiers</td>
<td>E19A2c075</td>
<td>Online</td>
<td>Rebate Form</td>
<td>61%</td>
<td>49%</td>
<td>47%</td>
</tr>
<tr>
<td>Pool Pumps⁴</td>
<td>E19A2a001, E19A2a002</td>
<td>Midstream</td>
<td>95%</td>
<td>89%</td>
<td>87%</td>
<td>84%</td>
</tr>
<tr>
<td>Room Air Cleaners</td>
<td>E19A2c072</td>
<td>In-store Rebate</td>
<td>71%</td>
<td>63%</td>
<td>61%</td>
<td>60%</td>
</tr>
<tr>
<td>Room Air Cleaners</td>
<td>E19A2c072³</td>
<td>Online Rebate Form</td>
<td>71%</td>
<td>70%</td>
<td>68%</td>
<td>66%</td>
</tr>
<tr>
<td>Room Air Conditioners</td>
<td>E19A2c086</td>
<td>Online</td>
<td>Rebate Form</td>
<td>63%</td>
<td>56%</td>
<td>54%</td>
</tr>
<tr>
<td>TSVs and Low-flow Showerheads with TSVs</td>
<td>E19A2c082, E19A2c085</td>
<td>Online Upstream</td>
<td>100%</td>
<td>97%</td>
<td>96%</td>
<td>96%</td>
</tr>
</tbody>
</table>

¹ Delivery methods include those currently in use; some methods may not be included in the next program cycle.
² Refers to 2019 NTGR. The BCR models assume a decreasing NTGR for some measures in 2020 and 2021.
³ Note that the PAs currently assume the same BCR ID for some measures for which the evaluation team recommends different NTGRs in the next program cycle. This may require that the PAs assign new BCR IDs.
⁴ The BCR model assumed pool pump deliver via retail (E19A2a001) and RCD (E19A2a002), but the PAs shifted to a midstream program. The new NTGRs are recommended for the midstream delivery model only.

**KEY LIMITATIONS AND SOURCES OF UNCERTAINTY**

The evaluation team has identified the following sources of uncertainty:

- The results of this study are based on retrospective research: existing literature reviews, shipment share trends, and surveys of 2019 participants. However, one of the main objectives of this research focused on establishing prospective ISRs and NTGRs for use in planning the 2022 to 2024 program cycle. Despite including foremost experts, the results presented here reflect best estimates. Yet, these best estimates may not reflect actual program performance in the next cycle because of shifts in the market or programmatic changes, such as sales by program delivery method. The decision to move to one-year prospective ISRs and NTGRs will allow the PAs to update these estimates more frequently to align with current market and program conditions.

- This study only provided primary research for APSs and dehumidifiers. The consensus panel had to rely on secondary sources and older primary research conducted in
Massachusetts\textsuperscript{3} to set the ISRs and NTGRs for all other products. Again, the DPU decision will provide additional opportunities to update ISRs and NTGRs on a more frequent basis.

- The leave behind APSs survey had a low response rate (12\% compared to 23\% for purchased APSs and dehumidifiers). In addition, the study completed only 44 of the desired 70 completions with recipients of leave behind APSs. The low response rate and small number of completions may have resulted in a biased survey estimate of the NTGR. However, the evaluation team does not believe the recommended NTGRs are biased because the consensus panel considered additional factors when setting NTGRs.

Section 1  Introduction

This report presents the results from *the Residential Downstream/Upstream Products Net-to-Gross Study (MA20X04-E-PRODNTG)*. The Cross-Cutting Market Effects/Net-to-Gross evaluation team, led by NMR Group, Inc., with DNV’s and Tetra Tech’s support, prepared this report for the Massachusetts Program Administrators (PAs). The study updates net-to-gross ratios (NTGRs) and in-service rates (ISRs) for selected products supported by the PAs’ Residential Retail (Retail) or Residential Coordinated Delivery (RCD) Initiatives.

The PAs last updated ISRs and NTGRs for these products in 2018 as part of the *RLPNC 17-4 and 17-5: Products Impact Evaluation of In-service and Short-Term Retention Rates Study* and the *RLPNC 18-4 Products Net-to-Gross Report*. The evaluation team planned and implemented this study under prior regulatory guidelines that applied ISRs and other gross impact factors retrospectively but locked NTGRs prospectively for the next three-year cycle. The evaluation team’s intention was to provide retrospective ISRs to estimate program savings for annual reporting needs and prospective ISRs and NTGRs to inform program planning for the 2022 to 2024 cycle and lock NTGRs for that same cycle. However, on May 3, 2021, the Department of Public Utilities (DPU) updated guidance to apply both ISR and NTGR. The evaluation team believes that the PAs can still use the results of this study to inform energy savings estimation and planning under the new guidance.

1.1 STUDY GOALS AND OBJECTIVES

The study goals were to establish retrospective NTGRs and ISRs for 2019 and develop prospective NTGRs and ISRs for 2022 to 2024 for the following eight products that are supported through the Retail and RCD initiatives:

1. APSs – Tier 1 Leave Behind and Mailed Kits (RCD; NTGRs only)
2. APSs – Tier 1 and Tier 2 Purchased
3. Clothes Dryers
4. Dehumidifiers
5. Pool Pumps
6. Room Air Cleaners
7. Room Air Conditioners
8. Thermostatic Shut-off Valves (TSVs) and Low-flow Showerheads with TSVs

---

Tier 1 APSs power off attached devices when the controlled device is switched off. Tier 2 APSs power off attached devices when they are no longer in use, relying on sensor technology and/or motion detectors to determine use. The PAs and Energy Efficiency Advisory Council (EEAC) representatives directed the evaluation team to combine purchased Tier 1 and Tier 2 APSs in this study.

To achieve the study goals, the study met the following objectives:

- Identified the range of recent ISR and NTGR results based on studies conducted in Massachusetts and other jurisdictions between 2016 and 2020
- Examined trends in the shipment share of ENERGY STAR® qualified products and the dates of prior and forthcoming changes to federal standards and ENERGY STAR specifications
- Through primary research, estimated NTGRs and ISRs for APSs and dehumidifiers purchased or received by participating customers in 2019
- Convened a consensus panel to arrive at mutually agreed-upon ISRs and NTGRs for 2019 and for 2022 to 2024 for all eight products’ various program delivery methods

The consensus panel estimated the ISRs for 2019, which usually differed from the ISRs currently assumed in the BCR for 2019. The panel then recommended that the PAs apply the new ISRs for planning the 2022 through 2024 program cycle. Given that the consensus panel set ISRs for 2019 and then suggested the use of the same ISRs for the next cycle, the evaluation team made the assumption that the retrospective ISR estimates could also be included in the Annual Reports for the 2020 and 2021 program years. All ISRs, including those for 2020 and 2021, could change pending future research or other information that suggests a change.

In contrast, the prospective NTGRs should be used for planning the 2022 to 2024 program cycle. They should also serve as the prospective NTGRs pending future research or other information that suggests a change.

For each product, Table 3 lists the products’ Benefit Cost Ratio model identification numbers (BCR IDs), the percentage of planned residential electric portfolio lifetime savings they represent, their actual electric program sales (or distribution) in 2019, and the current BCR NTGR and ISR assumptions. As noted, purchased Tier 1 and Tier 2 APSs are combined in this study, although the BCR model treats them as separate measures.

The study did not address programmatic changes made in 2020 in response to the international health crisis. Likewise, the study did not include measures obtained through Income-eligible, Multifamily, or High-rise programs, and the results only apply to the Retail and RCD initiatives.

---

6 Early generation Tier 2 power strips relied on occupancy sensing (OS) and infrared technology (IR), but newer models have expanded sensing capabilities to track Bluetooth, WiFi, and other remote devices.
Table 3: Products Included in Study

| Product                                      | BCR IDs               | % of Planned Residential Electric (2019-2021) | Electric Program Unit Sales 2019 | 2019 BCR NTGR | 2019 BCR ISR
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>APSs – Tier 1</td>
<td>E19A2c073</td>
<td>0.5%</td>
<td>46,618</td>
<td>100%</td>
<td>86%</td>
</tr>
<tr>
<td>APSs – Tier 1 Leave Behind (RCD)</td>
<td>E19A2a008</td>
<td>3.6%</td>
<td>152,774</td>
<td>100%</td>
<td>76%</td>
</tr>
<tr>
<td>APSs – Tier 2</td>
<td>E19A2c074&lt;sup&gt;5&lt;/sup&gt;</td>
<td>0.5%</td>
<td>9,954</td>
<td>100%</td>
<td>2&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Clothes Dryers</td>
<td>E19A2c077</td>
<td>0.3%</td>
<td>5,416</td>
<td>57%</td>
<td>97%</td>
</tr>
<tr>
<td>Dehumidifiers</td>
<td>E19A2c075</td>
<td>1.1%</td>
<td>9,734</td>
<td>61%</td>
<td>96%</td>
</tr>
<tr>
<td>Pool Pumps</td>
<td>E19A2a001 E19A2a002</td>
<td>0.9%</td>
<td>2,200</td>
<td>95% Retail</td>
<td>100%</td>
</tr>
<tr>
<td>Room Air Cleaners</td>
<td>E19A2c072</td>
<td>0.5%</td>
<td>3,593</td>
<td>71%</td>
<td>97%</td>
</tr>
<tr>
<td>Room Air Conditioners</td>
<td>E19A2c086</td>
<td>0.4%</td>
<td>6,785</td>
<td>63%</td>
<td>100%</td>
</tr>
<tr>
<td>TSVs and Low-flow</td>
<td>E19A2c082</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Showerheads with TSVs</td>
<td>E19A2c085</td>
<td>0.6%</td>
<td>2,767</td>
<td>100%</td>
<td>78%</td>
</tr>
<tr>
<td>Total % of Residential Electric Portfolio Lifetime Savings</td>
<td></td>
<td>8.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> Percent of Planned Residential Electric Portfolio Lifetime Savings.
<sup>2</sup> The BCR currently has different ISR assumptions for Tier 2 InfraRed and Tier 2 InfraRed + Occupancy Sensing APSs. Tier 2 IR = 70% Retail; 76% RCD; Tier 2 IR/OS = 78% Retail; 76% RCD.
<sup>3</sup> TSVs are the only measures with gas savings, representing 0.3% of the planned portfolio savings, excluding low-income multifamily and high-rise initiatives, which are not addressed in this study.
<sup>4</sup> Inclusive of ISR and short-term persistence.
<sup>5</sup> The BCR ID for RCD Tier 2 APSs is E19A2a009, but no measures with this ID were in the tracking data.
1.2 PROGRAM DESCRIPTIONS

The Massachusetts PAs supported the eight products included in this study through a variety of approaches in 2019 and 2020. We map each product to its delivery method in Table 4 and describe each delivery method below the table.

Table 4: Products Delivery Methods – 2019 and 2020

<table>
<thead>
<tr>
<th>Product</th>
<th>Leave Behind</th>
<th>Mailed</th>
<th>Online</th>
<th>Rebate Form</th>
<th>In-store Rebate</th>
<th>Upstream</th>
<th>Midstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1 APS</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Tier 2 APS</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clothes Dryers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Dehumidifiers</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pool Pumps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>RoomAir Cleaners</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RoomAir Conditioners</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSVs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

Leave behind. A home energy specialist leaves products at the customer’s home after completing a home energy assessment.

Mailed kits. The PAs introduced mailed kits in 2020 when they temporarily suspended in-home assessments. At the end of a virtual home energy assessment, the program implementer offers the participant a no-cost kit of energy-saving products. The participant’s responses during the audit determines if they are eligible for an APS. If so, the implementer asks the participant if they prefer a kit with or without an APS. The implementer then mails the no-cost kit – with or without an APS – to the participant.

Online. Participants buy discounted products directly from a PA-sponsored online store.

Rebate form. Participants mail / email / submit online proof of product purchase and account qualification.

In-store rebate. Participants access coupons instantly in the store by scanning a quick response (QR) code or entering a rebate code listed on program displays.

Upstream. The PAs pay incentives to retailers and manufacturers to reduce the shelf price that participants pay when purchasing products.

Midstream. The PAs pay incentives to distributors, dealers, and installers to carry energy-efficient products and / or discount their prices, increasing availability and making them a more attractive choice for installers and end-users.
Section 2  Research Methods

The evaluation team used three research methods to develop the recommended ISRs and NTGRs: literature and market information reviews, participant web-surveys, and a consensus process. We describe each of the research methods below.

2.1 LITERATURE AND MARKET INFORMATION REVIEW

The evaluation team conducted a literature review of NTGRs and ISRs from studies completed between 2016 and 2020. The literature provided insights into recent ISRs and NTGRs from Massachusetts and other jurisdictions. It allowed the consensus panel (Section 4) to benchmark the survey results (Section 3) for APSs and dehumidifiers and to gain an understanding of recent ISRs and NTGRs for products not addressed in the participant surveys. We identified the literature through web searches, direct outreach to other PAs and evaluation teams, and our own knowledge of existing research. The evaluation team reviewed 173 reports; 38 of them included findings on ISRs, NTGRs, or both. For each study reviewed, we documented its source, the delivery method, and the findings for ISRs and NTGR (including free-ridership [FR] and spillover [SO], where available). The literature review included the Massachusetts survey results from the RLPNC 18-4 NTG and RLPNC 17-4 and 17-5 ISR Reports completed in 2018. Appendix B lists citations for the studies and provides links when available.

The evaluation team also obtained ENERGY STAR shipment data from 2016 through 2019 for the subset of products for which the data are available. We combined these with earlier shipment data collected for the RLPNC 18-4 NTG Report. Finally, we gathered information on recent or planned standards and ENERGY STAR specification changes from the Appliance Standards Awareness Project, Office of Energy Efficiency and Renewable Energy, and ENERGY STAR.

7 The evaluation team identified many of the literature sources on the ESource DSM Library.
8 As of May 22, 2021, ENERGY STAR had not released the 2020 shipment data.
2.2 PARTICIPANT SURVEY

The NTGR planning process of early 2020 provided guidance to focus primary research on products with larger contributions to overall planned savings or that have recently had federal standards and ENERGY STAR specification changes. Following this guidance, we fielded a web survey with participants in the RCD and Retail initiatives who had received APSs, purchased APSs online, or purchased dehumidifiers using a rebate. Specifically, the evaluation team included APSs because they provide one of the larger product shares of planned residential savings, with APSs distributed as part of home energy assessments accounting for most of these planned savings. We were unable to survey participants who purchased APSs via the upstream delivery method as the PAs do not collect contact information from upstream purchasers. The evaluation team surveyed dehumidifiers purchasers because the products experienced an increase in federal energy standards and ENERGY STAR specifications in 2019, which could have affected the NTGR.

The evaluation team developed the sample frame from 2019 participants of the RCD and Retail Initiatives who had purchased or obtained the APSs and dehumidifiers. We recruited survey respondents by mailing physical advance letters to randomly selected participants for each product. The letters included a description of the study and instructions on how to access the web survey. The letters also explained that respondents would receive a $10 digital gift card via email after completing the survey. We sent reminder emails to letter recipients who did not respond to the survey. We also sent a second round of letters to increase the number of responses for all three products.

Table 5 summarizes the number of letters and emails sent and the final response rates. We present confidence intervals (CIs) for survey-derived ISRs and NTGRs for each product in Section 3. We secured fewer completions (n=44) from leave behind APS recipients compared to APS (n=72) and dehumidifiers (n=70) purchasers. The lower response rate for leave behind APS recipients likely reflects that these participants received the devices free after a home energy assessment rather than making the choice to buy them. Some of these recipients may not have remembered receiving them since the assessments took place in 2019. Alternatively, leave behind APS recipients may not have been as invested in the products as those who decided to purchase them.

Table 5: Survey Response Rates

<table>
<thead>
<tr>
<th>Product</th>
<th>Mailings</th>
<th>Email Reminder</th>
<th>Final Sample</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First</td>
<td>Second</td>
<td></td>
<td></td>
</tr>
<tr>
<td>APS leave behind</td>
<td>280</td>
<td>100</td>
<td>113</td>
<td>44</td>
</tr>
<tr>
<td>APS purchased</td>
<td>280</td>
<td>50</td>
<td>90</td>
<td>72</td>
</tr>
<tr>
<td>Dehumidifiers</td>
<td>280</td>
<td>50</td>
<td>75</td>
<td>70</td>
</tr>
</tbody>
</table>

1 Number of respondents.

2 Response rate = Sample size ÷ (Number mailed – Number returned). We based the response rate on the numbers of letters mailed, not emails.

The evaluation team worked with DNV and Guidehouse to allocate RCD participants in a manner that ensured that each study had a sample frame that provided adequate and non-biased records from which to draw sample.
The survey questionnaires addressed the following topics:

- **ISRs**: The survey sought to understand how many units were installed, why some units were not currently installed, and if respondents planned to install them in the future.
- **NTGRs**: The questions on NTGRs followed the approach presented in the Consistent Methodology for Self-Reported Residential Net-to-Gross Measurement (MA19X03-B-RSRNTG).\(^{10}\) The surveys established the following:
  - FR and SO for APSs purchased online and rebated dehumidifiers
  - FR for leave behind APSs as SO would likely reflect the home energy assessment experience and be captured in RCD evaluations
- Types of devices respondents have plugged into APSs
- Likelihood to recommend the APS or dehumidifier
- Whether respondents believe they would have made a different purchase decision had they been considering the purchase after March 2020. The surveys included this question to examine any effects of the COVID-19 pandemic on purchases.\(^{11}\)

The survey questionnaire also included questions about APSs included in energy-saving kits purchased online. These are different from the mailed kits associated with remote audits. The survey included a question designed to tease out whether any of the respondents had bought their APSs as part of one of these kits. Unfortunately, the question confused respondents, leading many respondents to report that their simultaneous purchase of APSs, light bulbs, and showerheads was a *kit* even though these products were not bundled as a packaged deal.\(^{12}\) Therefore, we have not analyzed the data on self-reported APS kit purchases separately from other APSs purchased online. Appendix C contains copies of the surveys. We provide most survey questions as italicized footnotes with tables and figures.

### 2.3 Consensus Process

The consensus process, which occurred prior to the recent DPU decision, tasked a panel of PAs, EEAC representatives, and evaluators with coming to agreement on the following:

- Retrospective ISRs for 2019
- Prospective ISRs to inform 2022 to 2024 program planning (they would not be locked in place for the next cycle)

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\(^{11}\) The survey also asked questions about dehumidifier operation, which we made available to the Residential Retrofit Impact team.

\(^{12}\) Specifically, the kits bundled APSs with light emitting diodes (LEDs), low-flow showerheads, and faucet aerators. The PAs indicated that customers only ordered 62 kits in 2019. However, 29 of the 72 respondents said that they bought the APS as part of a kit. It is extremely unlikely that 29 of the 62 kit purchasers responded to the survey of 72 participants.
• Retrospective NTGRs for 2019 to compare to those currently assumed by the PAs in the BCR models and to anchor the setting of prospective NTGRs
• Prospective NTGRs to be locked into place for the 2022 to 2024 program cycle

The PAs do not routinely use a consensus process to set ISRs for the measures offered across the residential and commercial program portfolios. Instead, they typically use ISRs derived from primary research and apply those values to annual savings calculations until another evaluation study provides updated ISRs. However, the current study relied heavily on secondary research, which only yielded primary ISR estimates for leave behind APSs, APSs purchased online, and rebated dehumidifiers. Lacking primary research for most measures and some delivery modes, the PAs tasked the consensus panel with recommending the ISRs to apply retrospectively and to use in planning the next cycle. The consensus panel did not explicitly set 2020 and 2021 ISRs, but they agreed to the same ISRs for 2019 and for 2022 to 2024. Therefore, the evaluation team also suggests applying 2019 ISRs to 2020 and 2021, unless updated through future research.

The evaluation team recruited the panelists by suggesting individuals to the PAs, EEAC, and evaluators, but each group ultimately decided who would represent their positions during the consensus process. The consensus panel included four PA, two EEAC, and three evaluation representatives. Other evaluation team members attended the calls to answer questions about the research and take notes, but they did not engage in the consensus process.

For the consensus process, the evaluation team prepared a memo that summarized the literature review and survey results and circulated this to the consensus panel members. The evaluation team also provided a spreadsheet for the PAs, EEAC representatives, and evaluators to enter their estimates of retrospective 2019 and prospective 2022 to 2024 ISRs and NTGRs. The evaluation team compiled the submissions from each group into a similar spreadsheet and recirculated it to the panelists.

The evaluation team then held three meetings, during which the panelists engaged in a process to reach consensus on the ISR and NTGR values recommended in this study. The main factors considered in setting these recommended values included the following:
• Self-reported ISR and NTGR estimates based on the participant web-surveys
• Prior results for Massachusetts and other jurisdictions, as identified in the literature review
• ENERGY STAR shipment data, specifically the percentage of units shipped that qualified for the ENERGY STAR label
• Planned changes to federal standards and ENERGY STAR specifications

The initial consensus panel meeting took place on February 17 and focused on setting retrospective and prospective ISRs. The consensus panel met again on March 3 and March 4 to set prospective NTGRs.
Section 3  Primary and Secondary Research

This section summarizes the ISR and NTGR results that the evaluation team derived from the primary and secondary research and presented to the consensus panel. It also provides the market information on ENERGY STAR shipment share, ENERGY STAR specification changes, and federal standard changes for the products.

3.1 ISRs

The evaluation team calculated ISRs from primary research through the participant web surveys for purchased APSs and dehumidifiers. We also examined ISRs through the secondary research using a literature review for all of eight of the products included in this study. The participant surveys also asked respondents how they use APSs, whether the respondents would recommend the APSs or dehumidifiers, and why some products are no longer in use. Because they tie more closely to ISRs than NTGRs, we address those survey results in this ISR section.

3.1.1 ISR Overview

Table 6 provides a summary of the evaluated ISR estimates derived from primary and secondary research. The survey results indicated that participants had 83% of the purchased APSs installed at the time of the survey. Additional APSs had been installed in the past, but respondents had removed them for a variety of reasons (Section 3.1.3). Respondents indicated that some of the APSs not currently installed would be (re)installed in the future. In the prior Massachusetts study, between 81% and 89% of purchased APSs were installed.\(^{13}\) Respondents had 79% of dehumidifiers installed at the time of the survey. All but one respondent who had removed their dehumidifiers from service use them seasonally. Taking seasonal use into account yielded an ISR of 99%.

While this study surveyed customers who had received APSs during home energy assessments about their ISRs, the MA20R26-B-VHEA Virtual Home Energy Assessment Study, conducted by Guidehouse, also estimated ISRs for APSs left behind and APSs included in energy saving kits that were delivered as part of virtual assessments. The PAs have opted to use the MA20R26-B-VHEA results.\(^{14}\)

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\(^{13}\) The RLPNC 17-4 Study differentiated between Tier 1 and Tier 2 APSs and the technology used in Tier 2 APSs.

\(^{14}\) The MA20R26-B-VHEA found in-service rates of 78% for APSs provided to customers during home energy assessments and 70% for APSs that were mailed after virtual home energy assessments. The VHEA report can be found at [https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf](https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf)
Of the 173 documents reviewed by the evaluation team, 24 of them presented ISR values. Some of the studies included ISRs for more than one product. The greatest number of studies addressed APSs. The ISRs for APSs varied considerably, ranging from 29% to 100%. The medians across APS delivery modes ranged from 76% to 87%. The four studies presenting dehumidifier ISRs ranged from 79% to 99%, with a median of 94%. Although we found fewer studies for most of the other products, the ISRs were generally high, at 86% to 100%.

---

15 Some of the studies designated as direct install may also have involved leave behind kits, but the studies did not explicitly differentiate these ISRs.
### Table 6: ISR Overview

<table>
<thead>
<tr>
<th>Product Name</th>
<th>MA Survey Results ISR (CI)¹</th>
<th>Literature Review</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ISR Range</td>
<td>Median</td>
</tr>
<tr>
<td>Direct Install APSs</td>
<td>NA</td>
<td>29% - 100%</td>
</tr>
<tr>
<td>Mailed Kit APSs</td>
<td>NA</td>
<td>69% - 82%</td>
</tr>
<tr>
<td>Purchased APSs</td>
<td>83% (76%, 90%)</td>
<td>75% - 89%</td>
</tr>
<tr>
<td>Dehumidifiers Currently in Use</td>
<td>79% (70%, 89%)</td>
<td>79% - 99%</td>
</tr>
<tr>
<td>Dehumidifiers Used Seasonally</td>
<td>99% (96%, 100%)</td>
<td>NA</td>
</tr>
<tr>
<td>Clothes Dryers</td>
<td>NA</td>
<td>98% - 100%</td>
</tr>
<tr>
<td>Pool Pumps</td>
<td>NA</td>
<td>93% - 100%</td>
</tr>
<tr>
<td>Room Air Cleaners</td>
<td>NA</td>
<td>100%</td>
</tr>
<tr>
<td>Room Air Conditioners</td>
<td>NA</td>
<td>100% -100%</td>
</tr>
<tr>
<td>TSVs and Low-flow Showerheads with TSVs</td>
<td>NA</td>
<td>86% -100%</td>
</tr>
</tbody>
</table>

¹Results from a survey of 2019 program participants, conducted in January and February. CI shown in parentheses.

²Please refer to Appendix B for full citations of these sources.
3.1.2 Use of APSs by Survey Respondents

Survey respondents, including those who received leave behind APSs, listed numerous types of equipment and devices controlled by APSs. As shown in Table 7, the APSs obtained through PA programs most frequently control televisions, followed by laptop computers and desktop computers.16

Table 7: Equipment Controlled by APSs
(Purchased APS sample size = 104; Leave Behind sample size = 63; excludes don’t know / refused to answer)

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Purchased APS</th>
<th>Leave Behind APS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Televisions</td>
<td>22%</td>
<td>19%</td>
</tr>
<tr>
<td>Laptop Computers</td>
<td>9%</td>
<td>17%</td>
</tr>
<tr>
<td>Desktop Computers</td>
<td>10%</td>
<td>14%</td>
</tr>
<tr>
<td>DVD/Blu-Ray Players</td>
<td>12%</td>
<td>7%</td>
</tr>
<tr>
<td>Set Top Boxes</td>
<td>9%</td>
<td>7%</td>
</tr>
<tr>
<td>Modems/ Routers</td>
<td>8%</td>
<td>7%</td>
</tr>
<tr>
<td>Surround Sound Systems</td>
<td>9%</td>
<td>4%</td>
</tr>
<tr>
<td>Lighting</td>
<td>4%</td>
<td>11%</td>
</tr>
<tr>
<td>Gaming Systems</td>
<td>8%</td>
<td>1%</td>
</tr>
<tr>
<td>Chargers</td>
<td>1%</td>
<td>6%</td>
</tr>
<tr>
<td>Printers</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
<td>5%</td>
</tr>
</tbody>
</table>

1 What devices are controlled by this advanced power strip? Select all that apply.

16 To avoid respondent fatigue, the survey did not ask respondents to specify which devices they had plugged into the control, controlled, or always-on outlets. The RLNPC 17-4 study cited above (see Section 2.1.1.) and the NMR Group, Inc., 2019 Advanced Power Strip Metering Study (RLNPC 17-3) https://ma-eeac.org/wp-content/uploads/RLNPC_173_APSMeteringReport_Revised_18March2019.pdf#page=5&zoom=100.92.142 (see Sections 2.1.2, 2.2.2, and Appendix C.3) addressed the question of the types of devices plugged into each type of outlet, the correctness of the set up, and the impact on energy savings.
3.1.3 Installation Behavior for APSs and Dehumidifiers

As mentioned in Section 3.1.1, most of the APSs and dehumidifiers obtained through the PA program were in use at the time of the survey. All but one dehumidifier not in use at the time of the survey is expected to be used later (e.g., during the appropriate season). Not surprisingly, nearly all respondents who were not using their dehumidifier during the survey, which was fielded in January, planned to use it during the more humid spring and summer months (Figure 1). In contrast, APS respondents were split in their intentions to use the idle devices. Ten percent of respondents who purchased an online APS said they planned to use the device in the future or did not need it, while 5% reported that the APS did not function properly, they did not like it, or they did not know how to use it (Figure 2). The survey respondents installed and then removed 8% of purchased APSs, all of whom are captured among the categories of “do not need it,” “does not function properly,” and “do not understand how to use it.”

Figure 1: Installation Patterns, Dehumidifiers\(^1\)

(Sample size = 70)

\(^1\) Is the dehumidifier you purchased in 2019 currently plugged in? (If no or don’t know) Why is the dehumidifier not plugged in? Do you plan to use the dehumidifier again?
Figure 2: Installation Rates, Purchased APSs
(Sample size = 115)

1 Is the advanced power strip you purchased in 2019 currently plugged in with devices connected? (If no) Why is this advanced power strip not in use? Do you plan to use this advanced power strip in the future?

3.1.4 Likelihood of Recommending APSs and Dehumidifiers

Although this study does not address ISRs for leave-behind APSs, the evaluation team believes that the PAs may still find the results presented to be useful.

Participants were more likely to recommend the products they sought out (dehumidifiers and purchased APSs) than the products (APSs) that were left behind. Participants who were less likely to recommend APSs were most likely to say that the equipment did not work properly. The web surveys asked respondents how likely they would be to recommend APSs or dehumidifiers to a friend using a scale of zero to ten, where zero was “extremely unlikely” and ten was “extremely likely,” and why they gave these ratings. The evaluation team uses this rating to calculate the Net Promoter Score (NPS), a well-established measure of customer loyalty. With the NPS, respondents are grouped as promoters (score 9-10), passives (7-8), and detractors (0-6). The NPS is calculated by subtracting the percentage of detractors from the percentage of promoters.

As shown in Table 8, the NPS for dehumidifiers was 38%. The evaluation team found that forty-five percent of dehumidifier respondents were promoters (indicated by ratings of nine to ten). They explained that the dehumidifiers reduced moisture and mold in basements. Of the few respondents who would not recommend dehumidifiers (indicated by ratings of zero to two), three indicated that they did not make product recommendations. Another three respondents noted their dehumidifiers were difficult to use, not effective, or had stopped working.

The NPSs for both purchased (24%) and leave behind APSs (8%) differed substantially. Respondents across APS delivery modes were equally likely be promoters – 45% for purchased APSs and 46% for leave behind APSs. However, 38% of leave behind respondents were
detractors (indicated by a zero to six rating), resulting in a lower NPS for leave behind APSs. Respondents who recommended APSs cited energy savings and saving money. Those not recommending APSs were most likely to note that they did not work properly.

The survey only hints at the reasons for the difference in likelihood to recommend APSs between the two delivery modes. Unlike online purchasers, leave behind recipients did not seek out or do research on their product. The leave behind recipients may not like the device because they did not really know how to use it properly. Yet, purchased APS respondents also include both Tier 1 and Tier 2 type units. The difference in how this technology works may also have something to do with satisfaction. The evaluation team did not investigate this possibility due to the desire of the PAs and EEAC to treat both tiers as a single group. Appendix A contains detailed tables with reasons for product satisfaction ratings.

**Table 8: Likelihood of Recommending Product**
(Base = respondents not indicating don’t know / refusal to answer)

<table>
<thead>
<tr>
<th>Recommendation Likelihood</th>
<th>Purchased APSs</th>
<th>Leave Behind APSs</th>
<th>Dehumidifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>67</td>
<td>37</td>
<td>62</td>
</tr>
<tr>
<td>9 to 10 (Promoters)</td>
<td>45%</td>
<td>46%</td>
<td>55%</td>
</tr>
<tr>
<td>7 to 8 (Passives)</td>
<td>34%</td>
<td>16%</td>
<td>26%</td>
</tr>
<tr>
<td>0 to 6 (Detractors)</td>
<td>21%</td>
<td>38%</td>
<td>19%</td>
</tr>
<tr>
<td>NPS</td>
<td>24%</td>
<td>8%</td>
<td>36%</td>
</tr>
</tbody>
</table>

1 Using a scale of 0 to 10, where 0 is “extremely unlikely” and 10 is “extremely likely,” how likely are you to recommend [product] to a friend?

### 3.2 Net-to-Gross Ratios

The study estimated NTGRs from primary research through the web surveys for leave behind APSs, purchased APSs, and dehumidifiers, supplemented with data from a secondary literature review. The NTGR results for the remainder of the products are based solely on the literature review. Twenty-four of the 173 studies reviewed included NTGR results. The web surveys used a battery of survey questions to determine FR and SO. To assess the possible impacts of the international health crisis on NTGRs, we also asked respondents who bought APSs and dehumidifiers if they would have made the same purchase decisions after March of 2020.

#### 3.2.1 NTGR Overview

Table 9 provides a summary of the evaluated NTGR values derived from primary and secondary research. Participant responses to the web surveys indicated a NTGR of 91% for leave behind APSs and 89% for purchased APSs. These fall below the estimates from the RLPNC 18-4 Study, which were 95% for leave behind and 91% to 102% for purchased APSs. Estimates of APS NTGR varied greatly in the literature, ranging from 67% to 171%, with a median of 95%.

---

17 The MA20R26-B-VHEA Study did not address NTGR for APSs distributed through the RCD program.
The current participant survey yielded a NTGR of 59% for dehumidifiers, slightly below the Massachusetts estimate of 61% from the prior study. The NTGRs in the literature review ranged from 22% to 68%, with a median of 42%.

The NTGRs identified in the literature for clothes washers, pool pumps, and room air conditioners also showed wide variation, but the NTGRs for room air cleaners and TSVs were relatively similar across studies.
<table>
<thead>
<tr>
<th>Product Name</th>
<th>MA Survey Results</th>
<th>NTGR Overview</th>
<th>MA Survey Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FR</td>
<td>SO</td>
<td>NTGR (CI)²</td>
</tr>
<tr>
<td>Leave Behind APSs</td>
<td>9%</td>
<td>0%</td>
<td>91% (84%, 98%)</td>
</tr>
<tr>
<td>Purchased APSs</td>
<td>15%</td>
<td>4%</td>
<td>89% (83%, 95%)</td>
</tr>
<tr>
<td>Combined APSs</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Dehumidifiers</td>
<td>42%</td>
<td>1%</td>
<td>59% (49%, 68%)</td>
</tr>
<tr>
<td>Clothes Dryers</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Pool Pumps</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Room Air Cleaners</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Room Air Conditioners</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>TSVs and Low-flow Showerheads</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

¹Results from a survey of 2019 program participants conducted in January and February.
²Confidence interval shown in parentheses.
³Please refer to Appendix B for full citations of these sources.
3.2.2 Purchase Behavior after March of 2020

Due to the possibility that changes brought about by the COVID-19 pandemic – such as increases in working from home – could affect NTGRs for selected products, the survey asked respondents the following question, “Understanding our habits and daily activities have changed since March 2020, had you been shopping for the [product] after March of 2020, do you believe you would have made the same purchase decision?” Most respondents (86% of those that bought dehumidifiers and 60% of those that bought APSs) said they would have made the same purchase decisions had they been shopping after March of 2020. However, the evaluation team cautions that the responses to a follow-up question from those who said they would have made a different decision suggests that respondents did not really understand that this question was intended to get them to think about how the COVID-19 pandemic might have impacted their decision making. Only five of the 39 respondents who answered this question mentioned that they would have made a different purchase decision after March 2020 to save money, that they were staying home more, or that they were dealing with more important issues (Table 10).

Table 10: Why Respondents Would Have Made a Different Purchase Decision
(Base = Respondents who would have made a different decision; Multiple responses allowed)

<table>
<thead>
<tr>
<th>Cons</th>
<th>Purchased APSs</th>
<th>Dehumidifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>29</td>
<td>10</td>
</tr>
<tr>
<td>Not satisfied with product</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>To save money on the cost</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Staying home more / dealing with more important issues</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Would buy more products / more efficient product</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other reasons</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Do not know / did not answer</td>
<td>13</td>
<td>4</td>
</tr>
</tbody>
</table>

1 Please tell us how your purchase decision would differ and why.
3.3 Standards / Specifications Changes and ENERGY STAR Shipment Data

To provide context for setting prospective NTGRs, the consensus panel reviewed the following:

- Available ENERGY STAR shipment data, which can serve as a proxy for market penetration\(^{18}\)
- Specification changes for dehumidifiers, electric and gas clothes dryers, pool pumps, room air cleaners, and room air conditioners\(^ {19}\)

ENERGY STAR market penetration is defined as the percentage of ENERGY STAR shipments within a certain product market. In the figures that follow (Figure 3 through Figure 8), the light green bars indicate when federal standards were implemented, and the dark green bars indicate when ENERGY STAR specifications were implemented. Please note that these figures show national shipment data, which includes states with and without programs that promote ENERGY STAR appliances and equipment. Figure 9 offers a different presentation of the years in which federal standards and ENERGY STAR specifications were implemented, including standards and specification revisions through 2030. Note that while there is an expectation that changes in standards and specifications lead to a short-term drop in ENERGY STAR market shares followed by a gradual increase, this may vary by the type of appliance or equipment.

**Figure 3: ENERGY STAR Shipment Data for Dehumidifiers, with Standards and Specifications Changes**

![Energy STAR shipment data graph](https://www.energystar.gov/partner_resources/products_partner_resources/brand_owner_resources/unit_shipment_data/archives)

\(^{18}\)See [https://www.energystar.gov/partner_resources/products_partner_resources/brand_owner_resources/unit_shipment_data/archives](https://www.energystar.gov/partner_resources/products_partner_resources/brand_owner_resources/unit_shipment_data/archives)

Figure 4: ENERGY STAR Shipment Data for Electric Clothes Dryers, with Standards and Specifications Changes

Bars indicate Federal standard and ENERGY STAR specification changes

Figure 5: ENERGY STAR Shipment Data for Gas Clothes Dryers, with Standards and Specifications Changes

Bars indicate Federal standard and ENERGY STAR specification changes
Figure 6: ENERGY STAR Shipment Data for Pool Pumps, with Standards and Specifications Changes

Bars indicate Federal standard and ENERGY STAR specification changes

Figure 7: ENERGY STAR Shipment Data for Room Air Cleaners, with Standards and Specification Changes

Bars indicate Federal standard and ENERGY STAR specification changes
Figure 8: ENERGY STAR Shipment Data for Room Air Conditioners, with Standards and Specification Changes

Bars indicate Federal standard and ENERGY STAR specification changes.

Figure 9: Dates of Federal Standards and ENERGY STAR Specification Changes
Section 4  Consensus Panel Recommendations

The choice of a consensus process to set the ISR and NTGR estimates rests on the assumption that a team of experts who review the available evidence, consider market trends and sources of uncertainty, and have an open conversation about the strengths and weaknesses of the estimation approaches and market intelligence will yield thoughtful, informed estimates that limit the bias of any one approach or any single individual’s interpretation of the results. This section summarizes the main points of the discussion during the consensus meetings and explains the final reasoning behind the recommendations. The consensus process preceded the recent DPU decision to drop the three-year NTGR lock and to adopt one-year prospective impact factors and NTGRs. The evaluation team believes that the PAs should still use the panel’s recommended ISR and NTG values, but they will need to adjust the application period. We provide guidance for this adjustment in the sections that follow.

4.1 Consensus Panel Recommended ISRs

As noted in Section 1, the consensus panel first focused on setting retrospective and prospective ISRs as the PAs required the retrospective estimates for filing their 2020 Annual Report. During a meeting on February 17, 2021, the panel examined the primary and secondary research and reached consensus about what they believed the ISR was in 2019, which usually differed from the ISR currently assumed in the BCR for 2019 (Table 11). The panel then recommended that the PAs use retrospective 2019 ISRs for prospective planning for the 2022 through 2024 period. Given the recommended stability in recommended ISRs, the evaluation team did not lead an explicit discussion of 2020 or 2021 ISRs. Instead, the evaluation team recommends using the 2019 ISRs for 2020 and 2021 Annual Reports, unless other research or information suggest different values. Likewise, the evaluation team recommends that the PAs use the ISRs in Table 11 prospectively for Annual Reports until other research or information updates the values.
Table 11: Consensus Panel Recommended ISRs

<table>
<thead>
<tr>
<th>Product</th>
<th>BCR IDs</th>
<th>2019 to 2021 BCR ISR</th>
<th>Recommended ISR 2020 to 2024¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSs – Purchased</td>
<td>E19A2c073, E19A2c0744</td>
<td>70% to 86%</td>
<td>83%</td>
</tr>
<tr>
<td>Dehumidifiers</td>
<td>E19A2c075</td>
<td>96%</td>
<td>99%</td>
</tr>
<tr>
<td>Clothes Dryers</td>
<td>E19A2c077</td>
<td>97%</td>
<td>99%</td>
</tr>
<tr>
<td>Pool Pumps</td>
<td>E19A2a001, E19A2a002</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Room Air Cleaners</td>
<td>E19A2c072</td>
<td>97%</td>
<td>97%</td>
</tr>
<tr>
<td>Room Air Conditioners</td>
<td>E19A2c086</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>TSVs and Low-flow Showerheads with TSVs²</td>
<td>E19A2c082 to E19A2c085</td>
<td>78%</td>
<td>78%</td>
</tr>
</tbody>
</table>

¹ Given current (May 2021) DPU guidance, the PAs would apply these ISRs until future research or other information suggests updated values.

When reviewing the primary and secondary research prior to the consensus meeting, the PAs, EEAC, and evaluators had predicted similar values for most ISRs. During the meeting, the panel discussed these values and findings from the web survey, literature review, and an earlier Massachusetts study from 2018 (RLPNC 18-4), as appropriate for each product. Below, we present brief summaries of the ISR discussions for each product, first for the products included in both the participant survey and literature review and then those addressed through the literature review only.

4.1.1 ISRs for Products with Primary Participant Survey Estimates

In keeping with typical practice, the consensus panel relied on primary research when recommending the ISRs for purchased APSs and dehumidifiers.

**Purchased APSs.** The web survey of 72 participants who purchased 116 APSs online found that 83% of APSs were currently in use. The panel had put the consensus number at 81% based on preliminary survey results, but the later survey analysis showed the ISR to be 83%. **The panel agreed via email to raise the ISR to 83% and to apply it to APSs purchased through the upstream delivery mode.**

**Dehumidifiers.** The web survey of 70 participants who purchased 73 dehumidifiers using program rebates found that 99% of the dehumidifiers were either in use at the time of the survey or are used on a seasonal basis (the survey was fielded in the dry winter months). **The panel agreed on an ISR of 99% across all dehumidifier delivery modes.**
4.1.2 ISRs for Products Addressed in Literature Review Only

The consensus panel recommended ISRs for the products that the evaluation team only addressed through secondary research. They considered the results of earlier primary Massachusetts research (RLPNC 17-4/5) and the literature review during the consensus process.

**Clothes Dryers.** The current BCR ISR of 97% was based on the 2018 Massachusetts study, while the literature review had a median of 99%. The panel agreed on 99%.

**Pool Pumps.** Pool pumps are offered midstream. The PAs, EEAC, and evaluators had all estimated the ISR at 100% since it is very likely that any customer or pool service company who buys a pool pump would have it installed. The panel agreed to an ISR of 100% to the midstream program.

**Room Air Cleaners.** The PAs and evaluators had placed the ISR at the current BCR of 97%, again based on Massachusetts surveys from 2018. The EEAC had set it at 100% based on the literature review. The EEAC ultimately came to agree with the PAs and evaluators, and the panel kept the ISR at 97%.

**Room Air Conditioners.** The PAs put the ISR at 100%. The EEAC and evaluators had both set rates of 97%. The only study found by the literature review was the 2018 Massachusetts study (which did not include a customer survey) with an ISR of 100%. Based on this, the panel agreed to 100%.

**TSVs.** The literature review had provided a median value of 93%, which was used by the EEAC in their initial estimate. However, the PAs and evaluators both placed their estimates at the current BCR of 78% since that was based on surveys of Massachusetts customers conducted in 2018. The EEAC came to agree with the PAs and evaluators, and the panel kept the ISR at 78%.

4.2 **Consensus Panel Recommended Net-to-Gross Ratios**

The consensus panel agreed on recommended prospective NTGRs for the 2022 to 2024 program cycle at meetings held on March 3 and March 4 (Table 12). The discussion centered on two topics: (1) how easily consumers can access comparable products outside of PA programs and (2) what trends in ENERGY STAR shipment share – particularly before and after changes in federal standards and ENERGY STAR specifications – suggest about likely NTGRs between 2022 and 2024. Both when developing their group estimates and in the conversation during the consensus meetings, the panelists considered the results of the literature review (especially prior Massachusetts survey results for a wider range of products) and information on federal standards and ENERGY STAR specifications and shipments. For APSs and dehumidifiers, the panel also considered the results of the current participant web surveys, including questions that provided context for the NTGR estimates. The NTGRs recommended by the consensus panel tend to decrease over time for most measures. This assumes that naturally occurring market adoption will continue to rise, increasing FR. The consensus panel met and made these recommendations prior to the recent DPU decision to drop the three-year lock on NTGRs. The evaluation team recommends that the PAs use these values for 2022 to 2024 program planning and prospectively until future research or other information suggest updates. The remainder of this section describes the panel’s discussion for each product.
### Table 12: Consensus Panel Recommended NTGRs for 2022 - 2024

<table>
<thead>
<tr>
<th>Product</th>
<th>BCR IDs</th>
<th>Delivery Methods¹</th>
<th>BCR NTGRs</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2019</td>
<td>2020</td>
</tr>
<tr>
<td>APSs</td>
<td>E19A2c073, E19A2c0744</td>
<td>Online, Upstream</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>APSs</td>
<td>E19A2a008</td>
<td>Leave Behind</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>APSs</td>
<td>E19A2a008²</td>
<td>Mailed Kits</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Clothes Dryers</td>
<td>E19A2c077</td>
<td>Rebate Form</td>
<td>57%</td>
<td>54%</td>
</tr>
<tr>
<td>Dehumidifiers</td>
<td>E19A2c075</td>
<td>Online, Rebate Form</td>
<td>61%</td>
<td>58%</td>
</tr>
<tr>
<td>Pool Pumps³</td>
<td>E19A2a001, E19A2a002</td>
<td>Midstream</td>
<td>95%</td>
<td>93%</td>
</tr>
<tr>
<td>Room Air Cleaners</td>
<td>E19A2c072</td>
<td>In-store Rebate</td>
<td>71%</td>
<td>68%</td>
</tr>
<tr>
<td>Room Air Cleaners</td>
<td>E19A2c072³</td>
<td>Online, Rebate Form</td>
<td>71%</td>
<td>68%</td>
</tr>
<tr>
<td>Room Air Conditioners</td>
<td>E19A2c086</td>
<td>Online, Rebate Form</td>
<td>63%</td>
<td>63%</td>
</tr>
<tr>
<td>TSVs and Low-flow Showerheads with TSVs</td>
<td>E19A2c082, E19A2c085</td>
<td>Online, Upstream</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

¹ Delivery methods include those currently in use; some methods may not be included in the next program cycle.

² Note that the PAs currently assume the same BCR ID for some measures for which the evaluation team recommends different NTGRs in the next program cycle. This may require that the PAs assign new BCR IDs.

³ The BCR model assumed pool pump delivery via retail (E19A2a001) and RCD (E19A2a002), but the PAs shifted to a midstream program. The BCR lists a 100% NTGR for RCD pool pumps.
4.2.1 NTRGs for Products with Primary Participant Survey Estimates

APSs: The consensus panel’s discussion about APSs primarily focused on how readily available these products were outside of the PA Retail and RCD initiatives. The evaluation team provided the following information:

- Thirty-seven APS respondents (four leave behind and 33 online purchasers) said they would have bought an APS outside the initiatives if it had not been available through the initiatives.
- Most of these (27) said they would have bought the units online. Tier 1 and Tier 2 APSs are available on Amazon and from manufacturer websites. However, in 2018, the manufacturers indicated that the vast majority of sales occurred through energy-efficiency programs, and they planned to continue that program-based market strategy.
- Respondents who said that they would have bought the APS in a retail store named both stores that sell program-supported APSs (Ace, Home Depot, and Walmart) and those that do not (Best Buy, Costco, Jordan’s, and Target). A quick online search by the evaluation team did not reveal any evidence that the non-participating stores sold Tier 1 or Tier 2 APSs.

The consensus panel discussed whether the market for APSs had matured over the past few years, which would mean that sales were increasingly viable outside of energy-efficiency programs. However, the study scope did not include research to answer this question. The EEAC took the position that the natural adoption of APSs was likely growing, while the PAs disagreed. The evaluators largely conceded that online availability appeared to be growing, but they also did not see strong evidence of a viable market outside of programs. We discuss the resolution for each APS delivery method below.

**Leave Behind.** When setting the NTGRs, the panelists in all groups believed that this delivery method probably had low levels of FR. They reasoned that it is likely that many Home Energy Services participants are unaware of APSs until the Energy Specialist conducting the assessment offers the units to the household.

- **Consensus Prospective NTGRs:** 2022 = 95%; 2023 = 95%; 2024 = 93%
**Mailed Kit APSs.** The panel set placeholder values for APSs included with mailed kits that fell between purchased APSs (see below) and leave behind APSs. However, they recognized that questions remained about how much control consumers had in selecting the kits and the likelihood that the PAs would continue to offer kits associated with remote audits in the future. Post-meeting, the evaluators reviewed the implementer algorithm and found that participants eligible to receive an APS (because they had entertainment systems) could indicate whether they wanted a package with or without one. This level of choice indicates a fair amount of consumer control, which may have NTGR implications. However, the consensus panel should only reopen the discussion on this measure if the PAs plan to offer APSs in mailed kits tied to remote audits in the future.

- **Placeholder Prospective NTGRs:** 2022 = 93%; 2023 = 92%; 2024 = 91%

**Purchased APSs.** The conversation about purchased APSs – both online and in-store – centered on the question of availability, described above. In the end, the panel decided to apply the average of the three groups’ estimates. They assigned the same NTGR to APSs offered by the PAs online and in-store.

- **Consensus Prospective NTGRs:** 2022 = 91%; 2023 = 90%; 2024 = 88%

**Dehumidifiers:** The consensus panel’s conversation about dehumidifier NTGR focused on how to factor in ENERGY STAR shipment data, particularly in light of the recent increases in federal standards and ENERGY STAR specifications for energy savings.\(^\text{20}\)

The EEAC representatives argued that the shipment shares should be considered as an estimate of FR. Therefore, when submitting their prospective FR rates, the EEAC averaged the 2019 ENERGY STAR dehumidifiers shipment share (80%) with the preliminary participant survey estimate of FR (42%), yielding a 2019 FR of 61% and NTG of 39%. The PAs and the evaluators voiced concerns about this approach, namely that the shipment data represent the nation and include shipments of program-supported units. The PAs and evaluators believed that the shipment share should only be used for context. The EEAC representatives offered the counterpoint that Massachusetts tends to be among the national leaders in adoption of energy-efficient measures, which would explain their shipment share being as high or above the national share, so using the national value was conservative.

The conversation also touched on the relationship between shipment shares and changes in federal standards and ENERGY STAR specifications. As Figure 3 in Section 3.3 shows, shipments of ENERGY STAR qualified units tend to rise and fall in concert with changes in specifications. With some variation – which may reflect how many manufacturers reported shipments in a given year or the characteristics of the appliance or equipment type – ENERGY STAR shipment shares tend to decrease when a new specification goes into effect and then increase the following year. Shipment shares then gradually decrease before the next fall-off associated with the new specification change. Yet for the entire reporting period, ENERGY STAR shipments have been 58% or higher. The EEAC representatives argued that this high share, coupled with the quick recovery after an ENERGY STAR specification change, would lead to high

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\(^\text{20}\) This discussion includes the correction of a cell-reference error in the estimates of one of the group of panelists.
FR rates. The PAs and evaluators did not disagree, but they also did not believe the nature of the shipment data allowed them to say what these trends meant for Massachusetts specifically. The PAs also noted that ENERGY STAR shipment data includes program effects, boosting its share. The panel was unable to resolve their differences in how to interpret and use the shipment share data, so they ultimately decided to use the average of the NTGR submitted by the three groups prior to the consensus meetings. They applied these NTGR to all dehumidifier delivery methods.

- Consensus Prospective NTGRs: 2022 = 49%; 2023 = 47%; 2024 = 45%

### 4.2.2 NTGRs for Products Addressed in Literature Review Only

Having established positions about product availability and shipment data when discussing APSs and dehumidifiers, the panel quickly came to consensus in setting prospective NTGRs for the products addressed solely through the literature review. The panelists considered the results of the literature review, prioritizing the prior primary Massachusetts research when possible, as well as the shipment, standards, and specification data. They also factored in current or expected changes to program delivery methods. In all cases, the panel reached consensus by agreeing to adopt the average prospective NTGR estimates submitted by each group. We touch briefly on product-specific considerations below.

**Clothes Dryers:** A new federal specification for dryers will go into effect in 2022. All groups turned to the prior Massachusetts results as the basis for their estimates, but the EEAC representatives and evaluators assumed that the NTGR had decreased since the prior study. The EEAC representatives expected it to continue to decrease. The PAs assumed that the new federal specification would boost NTGR to the same levels as the prior study and remain at that value for the next cycle.

- Consensus Prospective NTGRs: 2022 = 53%; 2023 = 52%; 2024 = 52%

**Pool Pumps:** A new federal standard for pool pumps went into effect in 2019. The stringency of this standard led the PAs to move pool pumps midstream, with incentives going to distributors and installation contractors. Given this change, the evaluators declined providing prospective NTGR estimates as the literature review and prior Massachusetts had focused on upstream and customer rebate programs. The PAs placed the NTGR at 95%, arguing that the new federal standard would lower FR. The EEAC representatives took the average of the median found in the literature and 2019 market share and made further adjustments to account for the 2021 federal pool pump standard.

- Consensus Prospective NTGRs: 2022 = 89%; 2023 = 87%; 2024 = 84%
Room Air Cleaners: The three groups took different approaches to room air cleaners. The PAs applied the results of the prior research. The evaluators took a similar approach, but they assumed that the recent health crisis had increased concerns about indoor air quality enough to increase FR a small amount. The EEAC representatives took the average of the ENERGY STAR shipments for 2019 and the median from the literature review for in-store rebates. They boosted NTG by 20% for online and submitted rebate sales. Both the EEAC and the evaluators assumed NTGR would continue to decline over time.

- Consensus Prospective NTGRs In-store Rebates: 2022 = 63%; 2023 = 61%; 2024 = 60%
- Consensus Prospective NTGRs Online and Rebate Form: 2022 = 70%; 2023 = 68%; 2024 = 66%

Room Air Conditioners: Massachusetts did not conduct primary research on room air conditioners in either the RLPNC 18-4 study or the current study. A new federal specification for room air conditioners will go into effect in 2022. The PAs and the EEAC representatives both looked to shipment data to anchor their values. However, the PAs assumed that the specification change would boost NTGRs, while the EEAC representatives assumed NTGR would continue to fall. The EEAC representatives also factored the literature median into their estimates. The evaluators based their estimates on the current BCR values but assumed that the NTGR would remain stable in the next cycle.

- Consensus Prospective NTGRs: 2022 = 56%; 2023 = 54%; 2024 = 52%

TSVs: The panel discussion about TSVs focused on their availability and adoption outside of energy-efficiency programs. All three groups turned to the prior Massachusetts results on TSVs to guide their estimates. While the PAs and evaluators both assumed the NTGR for TSVs would remain 100% for the next cycle, the EEAC representatives assumed they would decrease by 2% each year. There are no federal standards or ENERGY STAR specifications for TSVs.

- Consensus Prospective NTGRs: 2022 = 97%; 2023 = 96%; 2024 = 96%

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21 The PAs expect that the program will cease offering upstream and submitted (email or mail) rebates for room air cleaners in the next program cycle.
Appendix A  Web Survey Frequency Tables

The evaluation team fielded participant web surveys with 44 households who received 75 leave behind APSs after a home energy assessment, 72 households who purchased 115 APSs online, and 70 households who purchased 73 rebated dehumidifiers. The surveys covered numerous topics, including satisfaction with the products and economic and demographic characteristics. This section contains detailed tables on these topics.

A.1 Likelihood of Recommendation

As noted in Section 3.1.3, the surveys asked those rating the recommendation likelihood an eight to ten why they would be likely to recommend the products. In the case of APSs, most respondents who would recommend them mentioned energy savings, followed by saving money and the products working properly (Table 13). Respondents who received APSs as part of home energy assessments were most likely to recommend them because the products worked properly. The next most likely reason was the energy savings they provided.

<table>
<thead>
<tr>
<th>Pros</th>
<th>Purchased APSs</th>
<th>Leave Behind APSs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents (multiple response)</td>
<td>35</td>
<td>18</td>
</tr>
<tr>
<td>Energy savings</td>
<td>54%</td>
<td>44%</td>
</tr>
<tr>
<td>Money savings</td>
<td>31%</td>
<td>6%</td>
</tr>
<tr>
<td>Work as expected; easy to use</td>
<td>29%</td>
<td>50%</td>
</tr>
<tr>
<td>Prevent damage to equipment</td>
<td>14%</td>
<td>16%</td>
</tr>
<tr>
<td>Help the environment</td>
<td>3%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 13: Why Respondents Recommend APSs
(Base = Respondents indicating likelihood to recommend with eight or higher)

1 Why would you be likely to recommend advanced power strips?
Respondents who would not recommend APSs (indicated by a zero to two rating) claimed they did not work properly; in some cases, respondents said the APSs turned off equipment they wanted to keep powered (Table 14). Respondents with leave behind APSs were also more likely to note that the instructions were unclear.

**Table 14: Why Respondents Do Not Recommend APSs**
(Base = respondents indicating likelihood to recommend with two or lower)

<table>
<thead>
<tr>
<th>Cons</th>
<th>Purchased APSs</th>
<th>Leave Behind APSs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>(multiple response)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not work properly</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Instructions are unclear</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Cover only two outlets</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Do not know if save money</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

*Why would you be unlikely to recommend advanced power strips?*

Most respondents recommend dehumidifiers to reduce moisture and mold in basements (Table 15). Of the six respondents who would not recommend dehumidifiers, three indicated that they do not make product recommendations. The other three respondents noted their dehumidifiers were difficult to use, were not effective, or had stopped working.

**Table 15: Why Respondents Recommend Dehumidifiers**
(Base = respondents indicating likelihood to recommend with eight or higher)

<table>
<thead>
<tr>
<th>Pros</th>
<th>Dehumidifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents (multiple response)</td>
<td>44</td>
</tr>
<tr>
<td>Reduce moisture and mold</td>
<td>64%</td>
</tr>
<tr>
<td>Work well</td>
<td>25%</td>
</tr>
<tr>
<td>Increase indoor air quality and comfort</td>
<td>14%</td>
</tr>
<tr>
<td>Easy to use</td>
<td>11%</td>
</tr>
<tr>
<td>Quiet operation</td>
<td>9%</td>
</tr>
<tr>
<td>Energy efficient</td>
<td>7%</td>
</tr>
</tbody>
</table>

*Why would you be likely to recommend dehumidifiers?*
A.2 Economic and Demographic Characteristics

The surveys asked respondents about the type of home they live in, whether they own or rent their home, their age, their level of education, the size of their household, and their income level. Table 16 through Table 21 provide the responses to the economic/demographic questions.

Table 16: Type of House

<table>
<thead>
<tr>
<th></th>
<th>Purchased APSs</th>
<th>Leave Behind APSs</th>
<th>Dehumidifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>72</td>
<td>44</td>
<td>70</td>
</tr>
<tr>
<td>Single-family</td>
<td>58%</td>
<td>80%</td>
<td>87%</td>
</tr>
<tr>
<td>Apartment/condo in a 2–4-unit building</td>
<td>24%</td>
<td>11%</td>
<td>3%</td>
</tr>
<tr>
<td>Duplex</td>
<td>8%</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>Townhouse</td>
<td>7%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Triple decker</td>
<td>3%</td>
<td>2%</td>
<td>3%</td>
</tr>
</tbody>
</table>

What type of home do you live in?

Table 17: Whether Own or Rent

<table>
<thead>
<tr>
<th></th>
<th>Purchased APSs</th>
<th>Leave Behind APSs</th>
<th>Dehumidifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>72</td>
<td>44</td>
<td>70</td>
</tr>
<tr>
<td>Own</td>
<td>83%</td>
<td>93%</td>
<td>100%</td>
</tr>
<tr>
<td>Rent</td>
<td>17%</td>
<td>7%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Do you own or rent this residence?

Table 18: Respondent Age

<table>
<thead>
<tr>
<th></th>
<th>Purchased APSs</th>
<th>Leave Behind APSs</th>
<th>Dehumidifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>68</td>
<td>42</td>
<td>65</td>
</tr>
<tr>
<td>18-24</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>25-29</td>
<td>5%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>30-39</td>
<td>18%</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>40-49</td>
<td>24%</td>
<td>14%</td>
<td>17%</td>
</tr>
<tr>
<td>50-59</td>
<td>16%</td>
<td>22%</td>
<td>18%</td>
</tr>
<tr>
<td>60-69</td>
<td>24%</td>
<td>19%</td>
<td>31%</td>
</tr>
<tr>
<td>70+</td>
<td>13%</td>
<td>17%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Which of the following best describes your age?
Table 19: Respondent Level of Education

<table>
<thead>
<tr>
<th></th>
<th>Purchased APSs</th>
<th>Leave Behind APSs</th>
<th>Dehumidifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>70</td>
<td>43</td>
<td>68</td>
</tr>
<tr>
<td>High school graduate</td>
<td>3%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Some college, no degree</td>
<td>14%</td>
<td>5%</td>
<td>12%</td>
</tr>
<tr>
<td>Associates degree</td>
<td>9%</td>
<td>16%</td>
<td>12%</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>27%</td>
<td>42%</td>
<td>32%</td>
</tr>
<tr>
<td>Graduate or professional degree</td>
<td>47%</td>
<td>35%</td>
<td>41%</td>
</tr>
</tbody>
</table>

What is the highest level of education that you have completed so far?

Table 20: Household Size

<table>
<thead>
<tr>
<th></th>
<th>Purchased APSs</th>
<th>Leave Behind APSs</th>
<th>Dehumidifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>72</td>
<td>44</td>
<td>70</td>
</tr>
<tr>
<td>One</td>
<td>10%</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>Two</td>
<td>50%</td>
<td>36%</td>
<td>46%</td>
</tr>
<tr>
<td>Three</td>
<td>22%</td>
<td>27%</td>
<td>14%</td>
</tr>
<tr>
<td>Four</td>
<td>11%</td>
<td>21%</td>
<td>23%</td>
</tr>
<tr>
<td>Five</td>
<td>6%</td>
<td>7%</td>
<td>1%</td>
</tr>
<tr>
<td>Six or more</td>
<td>1%</td>
<td>0%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Counting yourself, how many individuals typically occupy this home?

The surveys asked respondents if their income in 2019 fell above or below a certain amount based on their household size. The evaluation team calculated this based on 60% of the state median income, which qualifies households for the Low-income Home Energy Assistance Program. Table 21 presents the results.
Table 21: Income

<table>
<thead>
<tr>
<th></th>
<th>Purchased APSs</th>
<th>Leave Behind APSs</th>
<th>Dehumidifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>56</td>
<td>31</td>
<td>51</td>
</tr>
<tr>
<td>Above 60% of state median</td>
<td>91%</td>
<td>90%</td>
<td>86%</td>
</tr>
<tr>
<td>Below 60% of state median</td>
<td>9%</td>
<td>10%</td>
<td>14%</td>
</tr>
</tbody>
</table>

\footnote{Which of these categories best describes your total household income in 2019 before taxes — counting everyone living in your house?}
Appendix B  Literature Review Bibliography

The evaluation team reviewed 173 reports; 38 of them included findings on ISRs, NTGRs, or both. Table 22 lists the sources and values derived from each source for ISRs. Table 23 lists the sources and values derived from each source for FR and SO, where available, and net-to-gross rates. Many of these sources require an ESource DSM Library login to access.
### Table 22: ISR Values and Literature Review Sources

<table>
<thead>
<tr>
<th>Year Publ.</th>
<th>Year Eval.</th>
<th>State or Prov.</th>
<th>Title</th>
<th>Delivery</th>
<th>Measure</th>
<th>APS Type</th>
<th>ISR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>2019</td>
<td>IL</td>
<td>Memo to Ameren IL: Income Qualified Initiative Single Family Site Visit Findings (July 10, 2020)</td>
<td>direct install</td>
<td>APS</td>
<td>Tier 1</td>
<td>29%</td>
</tr>
<tr>
<td>2020</td>
<td>2019</td>
<td>ON</td>
<td>PY2019 Interim Framework Evaluation Report Home Assistance Program</td>
<td>direct install</td>
<td>APS</td>
<td>not specified</td>
<td>89%</td>
</tr>
<tr>
<td>2019</td>
<td>2018</td>
<td>IN</td>
<td>2018 Vectren Demand-Side Management Portfolio Process and Electric Impacts Evaluation</td>
<td>direct install</td>
<td>APS</td>
<td>Tier 1</td>
<td>93%</td>
</tr>
<tr>
<td>2019</td>
<td>2018</td>
<td>WI</td>
<td>Focus on Energy Calendar Year 2018 Evaluation Report</td>
<td>mailed kits</td>
<td>APS</td>
<td>not specified</td>
<td>69%</td>
</tr>
<tr>
<td>2019</td>
<td>2018</td>
<td>WI</td>
<td>Focus on Energy Calendar Year 2018 Evaluation Report</td>
<td>mailed kits</td>
<td>APS</td>
<td>not specified</td>
<td>74%</td>
</tr>
<tr>
<td>2019</td>
<td>2018</td>
<td>WI</td>
<td>Focus on Energy Calendar Year 2018 Evaluation Report</td>
<td>mailed kits</td>
<td>APS</td>
<td>not specified</td>
<td>78%</td>
</tr>
<tr>
<td>2019</td>
<td>2018</td>
<td>WI</td>
<td>Focus on Energy Calendar Year 2018 Evaluation Report</td>
<td>POS</td>
<td>APS</td>
<td>Tier 1</td>
<td>81%</td>
</tr>
<tr>
<td>2019</td>
<td>2018</td>
<td>OK</td>
<td>Oklahoma Gas &amp; Electric (OG&amp;E) Oklahoma Demand Program Evaluation for PY2018</td>
<td>direct install</td>
<td>APS</td>
<td>not specified</td>
<td>100%</td>
</tr>
<tr>
<td>2018</td>
<td>2017</td>
<td>NS</td>
<td>2017 DSM Evaluation Reports</td>
<td>direct install</td>
<td>APS</td>
<td>not specified</td>
<td>57%</td>
</tr>
<tr>
<td>2018</td>
<td>2017</td>
<td>CA</td>
<td>Do Touch That Dial! How Satisfied Were You With That Tier II Power Strip?</td>
<td>POS</td>
<td>APS</td>
<td>Tier 2</td>
<td>75%</td>
</tr>
<tr>
<td>2018</td>
<td>2017</td>
<td>ON</td>
<td>Evaluation of 2017 Save on Energy Residential Province Wide Programs (no longer available online)</td>
<td>POS</td>
<td>APS</td>
<td>Tier 1</td>
<td>89%</td>
</tr>
<tr>
<td>2018</td>
<td>2017</td>
<td>WI</td>
<td>Focus on Energy Calendar Year 2017 Evaluation Report</td>
<td>mailed kits</td>
<td>APS</td>
<td>not specified</td>
<td>82%</td>
</tr>
<tr>
<td>2018</td>
<td>2017</td>
<td>WI</td>
<td>Focus on Energy Calendar Year 2017 Evaluation Report</td>
<td>mailed kits</td>
<td>APS</td>
<td>not specified</td>
<td>78%</td>
</tr>
<tr>
<td>2018</td>
<td>2017</td>
<td>ON</td>
<td>Home Energy Assessment and Retrofit Pilot Impact and Process Evaluation</td>
<td>direct install</td>
<td>APS</td>
<td>Tier 1</td>
<td>94%</td>
</tr>
<tr>
<td>2018</td>
<td>2017</td>
<td>MA</td>
<td>RLPNC 17-4 and 17-5: Products Impact Evaluation of In-service and Short-Term Retention Rates Study</td>
<td>leave behind</td>
<td>APS</td>
<td>Tier 1</td>
<td>81%</td>
</tr>
<tr>
<td>Year Publ.</td>
<td>Year Eval.</td>
<td>State or Prov.</td>
<td>Title</td>
<td>Delivery</td>
<td>Measure</td>
<td>APS Type</td>
<td>ISR</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td>----------------</td>
<td>-------</td>
<td>----------</td>
<td>---------</td>
<td>----------</td>
<td>-----</td>
</tr>
<tr>
<td>2018</td>
<td>2017</td>
<td>MA</td>
<td>RLPNC 17-4 and 17-5: Products Impact Evaluation of In-service and Short-Term Retention Rates Study</td>
<td>POS</td>
<td>APS</td>
<td>Tier 1</td>
<td>89%</td>
</tr>
<tr>
<td>2018</td>
<td>2017</td>
<td>MA</td>
<td>RLPNC 17-4 and 17-5: Products Impact Evaluation of In-service and Short-Term Retention Rates Study</td>
<td>POS</td>
<td>APS</td>
<td>Tier 2</td>
<td>82%</td>
</tr>
<tr>
<td>2017</td>
<td>2016</td>
<td>WI</td>
<td>Focus on Energy Calendar Year 2016 Evaluation Report Volume II</td>
<td>mailed kits</td>
<td>APS</td>
<td>not specified</td>
<td>71%</td>
</tr>
<tr>
<td>2017</td>
<td>2016</td>
<td>ON</td>
<td>PY2016 Home Assistance Program Evaluation</td>
<td>direct install</td>
<td>APS</td>
<td>Tier 1</td>
<td>88%</td>
</tr>
<tr>
<td>2017</td>
<td>2016</td>
<td>ON</td>
<td>Westario Power: Residential Direct Install Final Evaluation</td>
<td>direct install</td>
<td>APS</td>
<td>Tier 2</td>
<td>67%</td>
</tr>
<tr>
<td>2016</td>
<td>2015</td>
<td>ON</td>
<td>Final Report 2015 Consumer Program Evaluation Volume 1: Report (no longer available online)</td>
<td>POS</td>
<td>APS</td>
<td>Tier 1</td>
<td>76%</td>
</tr>
<tr>
<td>2020</td>
<td>2019</td>
<td>MI</td>
<td>DTE PY 2019 Evaluation Report</td>
<td>downstream</td>
<td>Dehumidifier</td>
<td>Tier 1</td>
<td>94%</td>
</tr>
<tr>
<td>2020</td>
<td>2019</td>
<td>ON</td>
<td>PY2019 Interim Framework Evaluation Report Home Assistance Program</td>
<td>direct install</td>
<td>Dehumidifier</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>2017</td>
<td>MA</td>
<td>RLPNC 17-4 and 17-5: Products Impact Evaluation of In-service and Short-Term Retention Rates Study</td>
<td>downstream</td>
<td>Dehumidifier</td>
<td>99%</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>2016</td>
<td>ON</td>
<td>PY2016 Home Assistance Program Evaluation</td>
<td>direct install</td>
<td>Dehumidifier</td>
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### Table 23: NTGR Values and Literature Review Sources

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Appendix C  Survey Questionnaires

C.1  ADVANCED POWER STRIP SURVEY

MA20X04 PRODNTG Products Web Survey for APSs

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<td>Free-ridership</td>
<td>5 through 10</td>
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<td>Spillover</td>
<td>11 through 15</td>
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<td>Satisfaction</td>
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<td>Perceived changes after March 2020</td>
<td>17</td>
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<tr>
<td>Economic/demographic factors</td>
<td>18 through 30</td>
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<td>Approximate time for survey completion</td>
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Introduction

Thank you for taking the time to complete this survey for the sponsors of Mass Save®. Berkshire Gas, Cape Light Compact, Eversource, Liberty Utilities, National Grid and Unitil work together as Mass Save® to help residents and businesses across Massachusetts save money and energy, providing energy efficiency programs and services while simultaneously leading the state to a clean and energy efficient future.

The sponsors of Mass Save® would like to know about your experience with the advanced power strip(s) you [IF PRODUCT = PURCHASED APS DISPLAY “purchased” / IF PRODUCT = LEAVE BEHIND APS DISPLAY “received”] in 2019. Please have the person who [IF PRODUCT = PURCHASED APS DISPLAY “made the decision to purchase” / IF PRODUCT = LEAVE BEHIND APS DISPLAY “is most familiar with”] the advanced power strip(s) complete the survey. Answer the questions to the best of your ability. All your responses will remain confidential. The survey should take about 10 minutes to complete. You can stop the survey at any time and return to it later. Your earlier responses will be saved. In appreciation of your time, we will send a digital $10 Amazon gift card to the email address you provide at the end of the survey within a few days of completion.

The sponsors of Mass Save have partnered with NMR Group to administer this survey. If you have any technical questions about the survey, or you wish to receive the survey link at a different email address, please contact [removed contact information for this report].
Examples of advanced power strips—your products may look slightly different. Advanced power strips look like ordinary power strips, but they have built-in features designed to reduce the amount of energy used by consumer electronics by shutting off the power supply to devices that are not in use.
Screening

1. Just to confirm, are you the person who [IF PRODUCT = PURCHASED APS DISPLAY “made the decision to purchase” / IF PRODUCT = LEAVE BEHIND APS DISPLAY “is most familiar with”] the advanced power strips?
   a. Yes
   b. No, I am not the decision maker [DISPLAY “Please ask the decision maker to answer the survey when they are available using the link and ID number we provided. Thank you for your time.” TERMINATE]
   c. No, do not recall participating [DISPLAY “You do not qualify for this survey; thank you for your time” TERMINATE]
   d. Don’t know [DISPLAY “You do not qualify for this survey; thank you for your time” TERMINATE]

2. [IF PRODUCT = PURCHASED APS] Can you confirm that your household purchased [INSERT NUMBER] advanced power [IF NUMBER = 1 DISPLAY “strip” / IF NUMBER > 1 DISPLAY “strips”] through Mass Save or [INSERT PA]?

   [IF PRODUCT = LEAVE BEHIND APS DISPLAY] Can you confirm that your household received [INSERT NUMBER] advanced power [IF NUMBER = 1 DISPLAY “strip” / IF NUMBER > 1 DISPLAY “strips”] during a home energy assessment through Mass Save or [INSERT PA]?

   a. Yes [GO TO Q4]
   b. No, different quantity [GO TO Q3]
   c. Don’t know [DISPLAY “You do not qualify for this survey; thank you for your time” TERMINATE]

3. [IF Q2 = b] How many advanced power strips do you recall [IF PRODUCT = PURCHASED APS DISPLAY “purchasing” / IF PRODUCT = LEAVE BEHIND APS DISPLAY “receiving”]?
   [INSERT QUANTITY]

   [IF Q3 = 0 DISPLAY “You do not qualify for this survey; thank you for your time” TERMINATE]

   [IF Q3 > 0 REASSIGN “NUMBER” = Q3 QUANTITY, CONTINUE TO 4]
In-Service Rate and Use

[PROGRAM A TABLE FOR ONE OR TWO APS BASED ON FOLLOWING].

[IF NUMBER = 1, PROGRAM TABLE FOR ONE APS, DISPLAY “Please answer the questions in the table below.”]

[IF NUMBER ≥ 2, PROGRAM TABLE FOR TWO APSs]

[IF NUMBER = 2, DISPLAY “Please answer the set of questions in the table below for EACH advanced power strip you got through Mass Save.”]

IF NUMBER > 2, DISPLAY “Please answer the set of questions for ONLY two of the advanced power strips you got through Mass Save”]

4. 4a Is the advanced power strip you [IF PRODUCT = PURCHASED APS DISPLAY “purchased” / IF PRODUCT = LEAVE BEHIND APS DISPLAY “received”] in 2019 currently plugged in with devices connected?
   a. Yes [GO TO Q4b]
   b. No [GO TO Q4c]
   c. Don’t know [GO TO Q5]

4b. [IF Q4a = a “Yes”] “What devices are controlled by this advanced power strip?

   Select all that apply… [RANDOMIZE]

   a. Television
   b. Desktop computer
   c. Laptop computer
   d. Set Top Box (Cable/Satellite)
   e. DVD or Blu-ray Player
   f. Gaming system (Xbox, Playstation, Wii, etc.)
   g. Surround Sound System/Speaker
   h. Modem/router
   i. Other, please specify: [OPEN END]

4c [IF Q4a = b “No”] Did you ever have this advanced power strip plugged in with devices connected to it?

   a. Yes [GO TO Q4d]
   b. No [GO TO Q4d]
   c. Don’t know [GO TO Q5]
4d. [IF Q4a = b “No”] Why is this advanced power strip not in use? [select all that apply]

   a. Do not like it
   b. Do not need it
   c. Do not function properly
   d. Other, please specify: [OPEN END]
   e. Don’t know

4e. [IF Q4a = b “No”] Do you plan to use this advanced power strip in the future?

   a. Yes
   b. No
   c. Don’t know

Free-ridership

[IF PRODUCT = LEAVE BEHIND APS GO TO Q8]

5. [IF PRODUCT DOES NOT = LEAVE-BEHIND APS] Please consider how influential the following elements were on your decision to purchase the advanced power strip(s). On a scale of 0 to 10, where 0 is “not at all influential” and 10 is “very influential”, how influential were the elements listed below in your decision to purchase the advanced power strip(s)?

   If the element does not apply to your purchase decision, please indicate NA.

   a. The rebate or discount on the price of the advanced power strip(s)
   b. Information from the Mass Save website
   c. Information from [INSERT PA]
   d. Information provided when I first learned about advanced power strip(s)
   e. Recommendation from friends or colleagues
   f. Internet research that I or someone in my household conducted

5a. Did you purchase the advanced power strip as part of a kit that may have included other energy-saving items like LED light bulbs or shower heads?

   a. I purchased the advanced power strip as part of a kit [GO TO Q5b]
   b. I purchased the advanced power strip on its own [GO TO Q6]
   c. Don’t know [GO TO Q6]

5b. On a scale of 0 to 10, where 0 is “not at all influential” and 10 is “very influential”, how influential was the advanced power strip in your decision to purchase the energy-saving kit?
6. If there had been no rebate/discount available through Mass Save, how likely is it that you would have purchased an advanced power strip at the same time? Please recall that advanced power strips look like ordinary power strips, but they have built-in features designed to reduce the amount of energy used by consumer electronics by shutting off the power supply to devices that are not in use.
   a. Not at all likely [GO TO Q7]
   a. Slightly likely
   b. Somewhat likely
   c. Very likely
   d. Don’t know [GO TO Q7]

6a Would you have purchased the advanced power strip online or from a retail store?
   a. Online [GO TO Q6c]
   b. Retail Store
   c. Other
   d. Don’t know [GO TO Q6c]

6b [IF Q6a = b “Retail Store” OR c “Other”] Where would you have purchased it? [SPECIFY]

6c. If there had been no rebate/discount available through Mass Save, when do you think you would have purchased the advanced power strip(s)? Would you say …
   a. Within 6 months of when you did
   b. Between 6 months and 12 months of when you did
   c. More than 1 year after when you did
   d. Don’t know

7. [IF NUMBER >1] If had been no rebate/discount available through Mass Save, how likely is it that you would have purchased the exact same number of advanced power strip(s)?
   a. Not at all likely
   b. Slightly likely [GO TO Q7a]
   c. Somewhat likely [GO TO Q7a]
   d. Very likely
   e. Don’t know

7a. If there had been no rebate/discount available through Mass Save, how many advanced power strip(s) would you have purchased?
   a. Quantity: ______ [OPEN END; NUMERIC]
   b. Don’t know
[IF PRODUCT = PURCHASED APS GO TO Q11 SPILLOVER]

8. [IF PRODUCT = LEAVE BEHIND APS] Had you ever heard of advanced power strips before the home energy assessment when you received them? Please recall that advanced power strips look like ordinary power strips, but they have built-in features designed to reduce the amount of energy used by consumer electronics by shutting off the power supply to devices that are not in use.
   a. Yes [GO TO Q16 SATISFACTION SECTION]
   b. No [GO TO Q16 SATISFACTION SECTION]
   c. Don’t know [GO TO Q16 SATISFACTION SECTION]

9. If you had not received advanced power strip(s) during the home energy assessment, how likely would you have been to have purchased any type of advanced power strip at about the same time?
   a. Not at all likely [GO TO Q10]
   b. Slightly likely
   c. Somewhat likely
   d. Very likely
   e. Don’t know [GO TO Q10]

9a Would you have purchased the advanced power strip online or from a retail store?
   a. Online [GO TO Q9c]
   b. Retail Store
   c. Other
   d. Don’t know [GO TO Q9c]

9b [IF Q9a = b “Retail Store” OR c “Other”] Where would you have purchased it? [SPECIFY]
9c. If you had not received advanced power strip(s) during the home energy assessment, when do you think you would have purchased the advanced power strip(s)? Would you say …
   a. Within 6 months of when you received them
   b. Between 6 months and 12 months of when you received them
   c. More than 1 year after when you received them
   d. Don’t know

10. [IF NUMBER >1 ] If you had not received advanced power strip(s) during the home energy assessment, how likely is it that you would have purchased the exact same number of advanced power strip(s)?
   a. Not at all likely
   b. Slightly likely [GO TO Q10a]
   c. Somewhat likely [GO TO Q10a]
   d. Very likely
   e. Don’t know

10a. If you had not received advanced power strip(s) during the home energy assessment, how many advanced power strip(s) would you have purchased?
   a. Quantity: ______ [OPEN END; NUMERIC]
   b. Don’t know

[IF PRODUCT = LEAVE BEHIND APS GO TO Q16 SATISFACTION SECTION]

Spillover
11. Since you purchased the advanced power [IF NUMBER = 1 DISPLAY “strip” / IF NUMBER > 1 DISPLAY “strips”] have you made any other energy-saving purchases or changes that did not receive a rebate through Mass Save?
   a. Yes
      1. Did your experience with the [IF NUMBER = 1 DISPLAY “advanced power strip” / IF NUMBER > 1 DISPLAY “advanced power strips”] purchased through Mass Save influence your decision to take any of these energy-saving actions?
         i. Yes [GO TO Q12]
         ii. No [GO TO Q16]
b. No [GO TO Q16]
c. Don't know [GO TO Q16]

12. Please describe what you purchased or installed that was not through Mass Save. Select all that apply [RANDOMIZE]

a. LED/Energy-efficient light bulbs [GO TO Q13]
b. Energy-efficient appliance(s); select all that apply
   1. Clothes washer
   2. Clothes dryer
   3. Dehumidifier
   4. Dishwasher
   5. Refrigerator
   6. Room air cleaner
   7. Other; specify [OPEN END]
c. Installed energy efficient heating, ventilation, and/or cooling (HVAC) system; select all that apply
   1. Boiler
   2. Furnace
   3. Central air conditioning
   4. Ductless minisplit heat pump
   5. Central ducted heat pump
   6. Room air conditioner
   7. Other; specify [OPEN END]
d. Attic, wall, or basement insulation
e. Duct sealing or duct insulation
f. Air sealing of leaks
g. Smart thermostat
h. Installed energy efficient water heater
i. Other purchases or changes
j. Don't know [GO TO SATISFACTION SECTION]

12a. Please describe the equipment or changes in more detail. If applicable, include the quantity installed and the efficiency levels. For appliances, please indicate if ENERGY STAR, for air conditioners, please indicate SEER rating, for furnaces or boilers, please indicate AFUE, for heat pumps, please indicate heating season performance factor (HSPF) or SEER. [OPEN END]
13. How do you know this purchase or change is energy-efficient? Select all that apply:

[RANDOMIZE]

- a. ENERGY STAR® label
- b. EnergyGuide label
- c. Salesperson in store
- d. Installation contractor
- e. In store signage
- f. Information on website where made purchase
- g. Product manual
- h. Researched product beforehand
- i. Mass Save Website
- j. Advertisement
- k. Other, please specify: [OPEN END]
- l. Don’t know

14. How important was your experience with the advanced power [IF NUMBER = 1 DISPLAY “strip” / IF NUMBER > 1 DISPLAY “strips”] purchased through Mass Save in your decision to make this purchase or change that did not receive a rebate from Mass Save? Was it:

- a. Not at all important
- b. Slightly important
- c. Somewhat important
- d. Very important
- e. Not important
- f. Don’t know

15. How likely is it that you would still have made this purchase or change if you had not already received a rebate or discount through Mass Save for the advanced power strip(s) you purchased?

- a. Not at all likely
- b. Slightly likely
- c. Somewhat likely
- d. Very likely
- e. Not applicable
- f. Don’t know

15a. Why did you not submit an application for a rebate through the Mass Save program for this additional change or equipment? [OPEN END]
Satisfaction

16. Using a scale of 0 to 10, where 0 is “extremely unlikely” and 10 is “extremely likely,” how likely are you to recommend advanced powers strips to a friend? [RECORD A WHOLE # 0-10; DON’T KNOW = 98; REFUSED = 99.]
   16a. [IF Q16 < 3] Why would you be unlikely to recommend advanced power strips? [OPEN END]

   16b. [IF Q16 > 8] Why would you be likely to recommend advanced power strips? [OPEN END]

Demographic/Economic Factors and COVID-19 Response

We just have a few more questions for you

17. [IF PRODUCT = PURCHASED APS] Understanding our habits and daily activities have changed since March 2020, had you been shopping for the [IF NUMBER = 1 DISPLAY “advanced power strip” / IF NUMBER > 1 DISPLAY “advanced power strips”] after March of 2020, do you believe you would have made the same purchase decision?
   a. Yes [GO TO Q18]
   b. No [GO TO Q17a]

   Q17a. Please tell us how your purchase decision would differ and why. [OPEN END]

Please keep your primary address in mind while answering the remaining survey questions.

18. What type of home do you live in? Please select one.
   a. Single family
   b. Duplex
   c. Triple decker (e.g., three story house with each floor being a separate unit)
   d. Apartment/condo in a 2-4 unit building
   e. Apartment/condo in a 5+ unit building
   f. Townhouse or row house (adjacent walls to another house)
g. Mobile home or trailer
h. Other, please specify: [OPEN END]

19. Do you own or rent this residence?
   a. Own
   b. Rent
   c. Other, please specify: [OPEN END]

20. Counting yourself, how many individuals typically occupy this home? Enter zero if not occupied for at least six months.

<table>
<thead>
<tr>
<th>Occupant Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults, 18 and older</td>
<td>[OPEN END; NUMERIC]</td>
</tr>
<tr>
<td>Children, under 18</td>
<td>[OPEN END; NUMERIC]</td>
</tr>
</tbody>
</table>

21. What is the highest level of education that you have completed so far?
   a. Less than ninth grade
   b. Ninth to twelfth grade, no diploma
   c. High school graduate (includes GED)
   d. Some college, no degree
   e. Associates degree
   f. Bachelor’s degree
   g. Graduate or professional degree
   h. Prefer not to answer

22. Which of the following best describes your age?
   a. 18-24
   b. 25-29
   c. 30-39
   d. 40-49
   e. 50-59
   f. 60-69
   g. 70-79
   h. 80-89
   i. 90 years or older
   j. Prefer not to answer

23. [IF Q20 SUM OF ADULTS AND CHILDREN =1] Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   a. Less than $35,510 OR [GO TO CLOSING]
   b. $35,510 or more [GO TO CLOSING]
   c. Prefer not to answer [GO TO CLOSING]
24. [IF Q20 SUM OF ADULTS AND CHILDREN =2] Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   a. Less than $46,437 OR [GO TO CLOSING]
   b. $46,437 or more [GO TO CLOSING]
   c. Prefer not to answer [GO TO CLOSING]

25. [IF Q20 SUM OF ADULTS AND CHILDREN =3] Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   a. Less than $57,363 OR [GO TO CLOSING]
   b. $57,363 or more [GO TO CLOSING]
   c. Prefer not to answer [GO TO CLOSING]

26. [IF Q20 SUM OF ADULTS AND CHILDREN =4] Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   a. Less than $68,289 OR [GO TO CLOSING]
   b. $68,289 or more [GO TO CLOSING]
   c. Prefer not to answer [GO TO CLOSING]

27. [IF Q20 SUM OF ADULTS AND CHILDREN =5] Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   a. Less than $79,215 OR [GO TO CLOSING]
   b. $79,215 or more [GO TO CLOSING]
   c. Prefer not to answer [GO TO CLOSING]

28. [IF Q20 SUM OF ADULTS AND CHILDREN =6] Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   a. Less than $90,141 OR [GO TO CLOSING]
   b. $90,141 or more [GO TO CLOSING]
   c. Prefer not to answer [GO TO CLOSING]

29. [IF Q20 SUM OF ADULTS AND CHILDREN =7] Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   a. Less than $92,190 OR [GO TO CLOSING]
   b. $92,190 or more [GO TO CLOSING]
   c. Prefer not to answer [GO TO CLOSING]

30. [IF Q20 SUM OF ADULTS AND CHILDREN =8] Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   a. Less than $94,239 OR [GO TO CLOSING]
   b. $94,239 or more [GO TO CLOSING]
   c. Prefer not to answer [GO TO CLOSING]
Closing
Thank you for your participation in this survey. If you wish to receive your Amazon gift card at a different email address than the one used for this survey, or at a mailing address, please enter it here. [OPEN END]
C.2 Dehumidifier Survey

MA20X04 PRODNTG Products Web Survey Dehumidifiers

<table>
<thead>
<tr>
<th>Topic</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>In service rate</td>
<td>8</td>
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<tr>
<td>Dehumidifier features and use</td>
<td>6 through 9</td>
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<tr>
<td>Dehumidifier replacement and recycling</td>
<td>10 through 17</td>
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<tr>
<td>Free-ridership</td>
<td>19 through 22</td>
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<tr>
<td>Spillover</td>
<td>23 through 27</td>
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<tr>
<td>Satisfaction</td>
<td>28</td>
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<tr>
<td>Perceived changes after March 2020</td>
<td>29</td>
</tr>
<tr>
<td>Economic/demographic factors</td>
<td>30 through 42</td>
</tr>
<tr>
<td>Approximate time for survey completion</td>
<td>10 minutes</td>
</tr>
</tbody>
</table>

Introduction

Thank you for taking the time to complete this survey for the sponsors of Mass Save®. Berkshire Gas, Cape Light Compact, Eversource, Liberty Utilities, National Grid and Unitil work together as Mass Save® to help residents and businesses across Massachusetts save money and energy, providing energy efficiency programs and services while simultaneously leading the state to a clean and energy efficient future.

The sponsors of Mass Save® would like to know about your experience purchasing the ENERGY STAR® dehumidifier(s) using a program rebate in 2019. Please have the person who made the decision to purchase the dehumidifier(s) complete the survey. Answer the questions to the best of your ability. All your responses will remain confidential. The survey should take about 10 minutes to complete. You can stop the survey at any time and return to it later. Your earlier responses will be saved. In appreciation of your time, we will send a digital $10 Amazon gift card to the email address you provide at the end of the survey within a few days of completion.

The sponsors of Mass Save have partnered with NMR Group to administer this survey. If you have any technical questions about the survey, or you wish to receive the survey link at a different email address, please contact [removed contact information for this report].
Screening
5. Just to confirm, are you the person who made the decision to purchase at least one ENERGY STAR qualified dehumidifier in 2019?
   a. Yes
   b. No, I am not the decision maker [DISPLAY “Please ask the decision maker to answer the survey when they are available.” TERMINATE.]
   c. No, do not recall participating [DISPLAY “You do not qualify for this survey; thank you for your time” TERMINATE.]
   d. Don’t know [DISPLAY “You do not qualify for this survey; thank you for your time” TERMINATE.]

6. Can you confirm that your household received a rebate from Mass Save or [INSERT PA] for [INSERT NUMBER] [IF NUMBER = 1 DISPLAY “dehumidifier” / IF NUMBER > 1 DISPLAY “dehumidifiers”] purchased in 2019 Please DO NOT include any rebates you may have received for recycling old dehumidifiers.
   a. Yes [GO TO Q4]
   b. No, different quantity [GO TO Q3]
   c. Don’t know [DISPLAY “You do not qualify for this survey; thank you for your time” TERMINATE.]

7. [IF Q2 = b] How many dehumidifiers do you recall purchasing with a Mass Save rebate?
   [INSERT QUANTITY]
   [IF Q3 = 0 DISPLAY “You do not qualify for this survey; thank you for your time” TERMINATE.]
   [IF Q3 > 0 REASSIGN “NUMBER” = Q3 QUANTITY, CONTINUE TO 4]

In-Service Rate and Use
Please answer for the following questions for the dehumidifier(s) you purchased using a Mass Save rebate. [IF NUMBER > 2 DISPLAY “Only answer for two of the dehumidifiers you purchased with a Mass Save rebate.”]

[FOR THIS SERIES PROGRAM A TABLE FOR UP TO TWO DEHUMIDIFIERS BASED ON “NUMBER”]

8. Is the dehumidifier you purchased in 2019 currently plugged in?
   a. Yes
   b. No
   c. Don’t know
4a. [IF Q4 = NO OR DON’T KNOW] Why is the dehumidifier not plugged in?
   a. Use it seasonally / when needed
   b. Do not like it
   c. Do not need it; have it as a spare
   d. Does not function properly
   e. Other, please specify: [OPEN END]
   f. Don’t know

4i. Do you plan to use the dehumidifier again [IF Q4a = a DISPLAY “in a different season”]?
   d. Yes [GO TO Q5]
   e. No [GO TO Q9]
   f. Don’t know [GO TO Q9]

6. When you use the dehumidifier, is there a hose that drains the system (picture on the right), or do you have to empty the recovered water bucket (picture on the left)?
   a. A hose drains the system
   b. Need to empty the recovered water bucket
   c. Don’t know
7. Is your dehumidifier plugged in all of the time?
   a. Yes [GO TO Q7]
   b. No
   c. Don’t know

6a. How many months in the year is your dehumidifier plugged in? [ALLOW WHOLE NUMBER BETWEEN 0 AND 12]

8. When it’s plugged in, how many hours in the day is the dehumidifier turned on? [ALLOW WHOLE NUMBER BETWEEN 0 AND 24]

9. When it’s plugged in and turned on, is your dehumidifier running all the time, or do you set controls to shut it off when the humidity drops below a certain level?
   a. It is running all the time
   b. It is set to shut off when humidity drops below a certain level
   c. I unplug it / turn it off when the humidity drops below a certain level
   d. Don’t know

Product Replacement

[IF NUMBER > 2 DISPLAY “Please continue to answer for only the same two dehumidifiers you purchased with a Mass Save rebate.”]

[FOR THIS SERIES PROGRAM A TABLE FOR UP TO TWO DEHUMIDIFIERS BASED ON “NUMBER”]

10. Did this dehumidifier replace a dehumidifier already in your home or was it new equipment?
    a. Replaced existing dehumidifier
    b. New equipment [GO TO Q18 FREE-RIDERSHIP]

11. Which of the following best describes the condition of your old dehumidifier?
    a. It was working with no need of repair
    b. It was working with need of minor repair
    c. It was working with need of major repair [GO TO Q12]
    d. It was no longer working [GO TO Q12]
    e. Don’t know

12. [IF Q10 = a, b, or e] Do you believe your old dehumidifier would have lasted another two years?
    a. Yes
    b. No
    c. Don’t know
13. When you used the old dehumidifier that you replaced, was there a hose that drained the system or did you have to empty the recovered water bucket?
   a. There was a hose to drain the system
   b. Needed to empty the recovered water bucket
   c. Don’t know

14. Was the old dehumidifier that you replaced plugged in all of the time?
   a. Yes [GO TO Q14]
   b. No
   c. Don’t know

13a. How many months in the year was your old dehumidifier plugged in? [ALLOW WHOLE NUMBER BETWEEN 0 AND 12]

15. When it was plugged in, how many hours in the day was your old dehumidifier turned on? [ALLOW WHOLE NUMBER BETWEEN 0 AND 24]

16. When it was plugged in and turned on, was your old dehumidifier that you replaced running all the time, or did you set controls to shut it off when the humidity dropped below a certain level?
   a. It was running all the time
   b. It was set to shut off when humidity drops below a certain level
   c. I unplugged it / turned it off when the humidity dropped below a certain level
   d. Don’t know

[PROGRAMMER, Q16 AND Q17 DOES NOT GO INTO THE TABLE]

17. In total, how many functioning dehumidifiers did you have in your home BEFORE buying the new one(s) with a rebate? [INSERT QUANTITY]

18. In total, how many functioning dehumidifiers do you have in your home now? [INSERT QUANTITY]
Free-ridership

19. Please consider how influential the following elements were on your decision to purchase the dehumidifier(s). On a scale of 0 to 10, where 0 is “not at all influential” and 10 is “very influential”, how influential were the elements listed below in your decision to purchase the dehumidifier(s)? If the element does not apply to your purchase decision, please indicate NA.
   a. The rebate or discount on the price of the dehumidifier
   b. The Mass Save rebate available for recycling my old dehumidifier
   c. The Mass Save website
   d. Information from [INSERT PA]
   e. Information provided when I first learned of the dehumidifier
   f. Recommendation from friends or colleagues
   g. Internet research that I or someone in my household conducted

20. If there had been no rebate or discount available through Mass Save, how likely is it that you would have purchased any type of dehumidifier at the same time?
   a. Not at all likely
   b. Slightly likely [GO TO 19a]
   c. Somewhat likely [GO TO 19a]
   d. Very likely
   e. Don’t know

19a. [IF Q19 = b OR c] If there had been no rebate or discount available through Mass Save, when do you think you would have purchased the dehumidifier? Would you say …
   e. Within 6 months of when you did
   f. Between 6 months and 12 months of when you did
   g. More than 1 year after when you did
   h. Don’t know

19b. [IF RECYLER = 1 “YES”] Our records indicate that you also received a $30 incentive for recycling a dehumidifier at a Mass Save turn-in event. Do you recall recycling a dehumidifier at a turn-in event?
   a. Yes [GO TO Q19c]
   b. No [GO TO Q20]
   c. Don’t know [GO TO Q20]
19c. If there had been no rebate available for recycling your old dehumidifier, how likely is it that you would have purchased any type of new dehumidifier at the same time?
   a. Not at all likely
   b. Slightly likely [GO TO Q19d]
   c. Somewhat likely [GO TO Q19d]
   d. Very likely
   e. Don't know

19d. [IF Q19c= b OR c] If there had been no rebate available for recycling your old dehumidifier, when do you think you would have purchased a new dehumidifier? Would you say …
   a. Within 6 months of when you did
   b. Between 6 months and 12 months of when you did
   c. More than 1 year after when you did
   d. Don't know

21. [IF RESPONDENT PURCHASED MORE THAN ONE DEHUMIDIFIER] If there had been no rebate or discount available through Mass Save for the [IF RECYLER = 1 DISPLAY “new”] dehumidifier, how likely is it that you would have purchased the exact same number of dehumidifiers?
   a. Not at all likely
   b. Slightly likely [GO TO Q20a]
   c. Somewhat likely [GO TO Q20a]
   d. Very likely
   e. Don't know

20a. If there had been no rebate or discount available through Mass Save for the [IF RECYLER = 1 DISPLAY “new”] dehumidifier, how many dehumidifiers would you have purchased?
   c. Quantity: ______ [OPEN END; NUMERIC]
   d. Don't know
22. If there had been no rebate or discount available through Mass Save for the [IF RECYLER = 1 DISPLAY “new”] dehumidifier, how likely is it that you would have purchased an ENERGY STAR qualified dehumidifier instead of a less efficient dehumidifier?
   a. Not at all likely
   b. Slightly likely
   c. Somewhat likely
   d. Very likely
   e. Don’t know

21a. [IF Q19b = 1 “YES”] If there had been no rebate available for recycling your old dehumidifier, how likely is it that you would have purchased an ENERGY STAR qualified dehumidifier instead of a less efficient dehumidifier?
   a. Not at all likely
   b. Slightly likely
   c. Somewhat likely
   d. Very likely
   e. Don’t know

Spillover

23. Since you purchased the dehumidifier have you made any other energy-saving purchases or changes that did not receive a rebate through Mass Save?
   a. Yes
      2. Did your experience with the [IF NUMBER = 1 DISPLAY “dehumidifier” / IF NUMBER > 1 DISPLAY “dehumidifiers”] purchased through Mass Save influence your decision to take any of these energy-saving actions?
         i. Yes [GO TO Q23]
         ii. No [GO TO SATISFACTION SECTION]
   b. No [GO TO SATISFACTION SECTION]
   c. Don’t know [GO TO SATISFACTION SECTION]
24. What purchases or changes have you made? Select all that apply
   a. LED/Energy-efficient light bulbs [GO TO Q24]
   b. Energy-efficient appliance(s); select all that apply
      8. Clothes washer
      9. Clothes dryer
     10. Dishwasher
     11. Refrigerator
     12. Room air cleaner
     13. Other; specify [OPEN END]
   c. Installed energy efficient heating, ventilation, and/or cooling (HVAC) system; select all that apply
      8. Boiler
      9. Furnace
     10. Central air conditioning
     11. Ductless minisplit heat pump
     12. Central ducted heat pump
     13. Room air conditioner
     14. Other; specify [OPEN END]
   d. Attic, wall, or basement insulation
   e. Duct sealing or duct insulation
   f. Air sealing of leaks
   g. Smart thermostat
   h. Installed energy efficient water heater
   i. Other purchases or changes
   j. Don’t know [GO TO SATISFACTION SECTION]

23a. Please describe the equipment or changes in more detail. If applicable, include the quantity installed, and the efficiency levels. For appliances, please indicate if ENERGY STAR, for air conditioners, please indicate SEER rating, for furnaces or boilers, please indicate AFUE, for heat pumps, please indicate heating season performance factor (HSPF) or SEER. [OPEN END]
25. How do you know this purchase or change is energy-efficient? Select all that apply
   m. ENERGY STAR® label
   n. EnergyGuide label
   o. Salesperson in store
   p. Installation contractor
   q. In store signage
   r. Information on website where made purchase
   s. Product manual
   t. Researched product beforehand
   u. Mass Save Website
   v. Advertisement
   w. Other, please specify: [OPEN END]
   x. Don’t know

26. How important was your experience with the [IF NUMBER = 1 DISPLAY “dehumidifier” / IF NUMBER > 1 DISPLAY “dehumidifiers”] purchased through Mass Save to your decision to make this purchase or change that did not receive a rebate from Mass Save? Was it
   g. Not at all important
   h. Slightly important
   i. Somewhat important
   j. Very important
   k. Not applicable
   l. Don’t know

27. How likely is it that you would still have made this purchase or change if you had not already received a rebate or discount through Mass Save for your dehumidifier(s)?
   g. Not at all likely
   h. Slightly likely
   i. Somewhat likely
   j. Very likely
   k. Not applicable
   l. Don’t know

26a. Why did you not submit an application for a rebate through the Mass Save program for this additional change or equipment? [OPEN END]
Satisfaction

28. Using a scale of 0 to 10, where 0 is “extremely unlikely” and 10 is “extremely likely,” how likely are you to recommend the dehumidifier(s) you bought through Mass Save to a friend? [RECORD A WHOLE # 0-10; DON’T KNOW = 98; REFUSED = 99.]

27a. [IF Q27 < 3] Why would you be unlikely to recommend dehumidifiers? [OPEN END]

27b. [IF Q27 > 8] Why would you be likely to recommend dehumidifiers? [OPEN END]

Demographic/Economic Factors and COVID-19 Response

We just have a few more questions for you

29. Understanding our habits and daily activities have changed since March of 2020, had you been shopping for the [IF NUMBER = 1 DISPLAY “dehumidifier” / IF NUMBER > 1 DISPLAY “dehumidifiers”] after March of 2020, do you believe you would have made the same purchase decision?
   a. Yes [GO TO Q29]
   b. No [GO TO Q28a]

Q28a. Please tell us how your purchase decision would differ and why. [OPEN END]

Please keep your primary address in mind while answering the remaining survey questions.

30. What type of home do you live in? Please select one.
   i. Single family
   j. Duplex
   k. Triple decker (e.g., three story house with each floor being a separate unit)
   l. Apartment/condo in a 2-4 unit building
   m. Apartment/condo in a 5+ unit building
   n. Townhouse or row house (adjacent walls to another house)
   o. Mobile home or trailer
   p. Other, please specify: [OPEN END]
31. Do you own or rent this residence?
   a. Own
   b. Rent
   c. Other, please specify: [OPEN END]

32. Counting yourself, how many individuals typically occupy this home? Enter zero if not occupied for at least six months.

<table>
<thead>
<tr>
<th>Occupant Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults, 18 and older</td>
<td>[OPEN END; NUMERIC]</td>
</tr>
<tr>
<td>Children, under 18</td>
<td>[OPEN END; NUMERIC]</td>
</tr>
</tbody>
</table>

33. What is the highest level of education that you have completed so far?
   i. Less than ninth grade
   j. Ninth to twelfth grade, no diploma
   k. High school graduate (includes GED)
   l. Some college, no degree
   m. Associates degree
   n. Bachelor’s degree
   o. Graduate or professional degree
   p. Prefer not to answer

34. Which of the following best describes your age?
   k. 18-24
   l. 25-29
   m. 30-39
   n. 40-49
   o. 50-59
   p. 60-69
   q. 70-79
   r. 80-89
   s. 90 years or older
   t. Prefer not to answer

35. [IF Q31 SUM OF ADULTS AND CHILDREN =1] Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   d. Less than $35,510 [GO TO CLOSING]
   e. $35,510 or more [GO TO CLOSING]
   f. Prefer not to answer [GO TO CLOSING]
36. **[IF Q31 SUM OF ADULTS AND CHILDREN =2]** Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   d. Less than $46,437  **[GO TO CLOSING]**
   e. $46,437 or more  **[GO TO CLOSING]**
   f. Prefer not to answer  **[GO TO CLOSING]**

37. **[IF Q31 SUM OF ADULTS AND CHILDREN =3]** Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   d. Less than $57,363  **[GO TO CLOSING]**
   e. $57,363 or more  **[GO TO CLOSING]**
   f. Prefer not to answer  **[GO TO CLOSING]**

38. **[IF Q31 SUM OF ADULTS AND CHILDREN =4]** Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   d. Less than $68,289  **[GO TO CLOSING]**
   e. $68,289 or more  **[GO TO CLOSING]**
   f. Prefer not to answer  **[GO TO CLOSING]**

39. **[IF Q31 SUM OF ADULTS AND CHILDREN =5]** Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   d. Less than $79,215  **[GO TO CLOSING]**
   e. $79,215 or more  **[GO TO CLOSING]**
   f. Prefer not to answer  **[GO TO CLOSING]**

40. **[IF Q31 SUM OF ADULTS AND CHILDREN =6]** Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   d. Less than $90,141  **[GO TO CLOSING]**
   e. $90,141 or more  **[GO TO CLOSING]**
   f. Prefer not to answer  **[GO TO CLOSING]**

41. **[IF Q31 SUM OF ADULTS AND CHILDREN =7]** Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?
   d. Less than $92,190  **[GO TO CLOSING]**
   e. $92,190 or more  **[GO TO CLOSING]**
   f. Prefer not to answer  **[GO TO CLOSING]**
42. [IF Q31 SUM OF ADULTS AND CHILDREN =8] Which of these categories best describes your total household income in 2019 before taxes—counting everyone living in your house?

d. Less than $94,239  [GO TO CLOSING]
e. $94,239 or more    [GO TO CLOSING]
f. Prefer not to answer  [GO TO CLOSING]

Closing
Thank you for your participation in this survey. If you wish to receive your Amazon gift card at a different email address than the one used for this survey, or at a mailing address, please enter it here. [OPEN END]