Residential Coordinated Delivery
Virtual Home Energy Assessment Study
(MA20R26-B-VHEA)
Final Report

Provided to:
The Electric and Gas Program Administrators of Massachusetts
Part of the Residential Evaluation Program Area

Provided by:
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Residential Coordinated Delivery
Virtual Home Energy Assessment Study
(MA20R26-B-VHEA)

STUDY CONTEXT

In March 2020, in response to COVID-19 social distancing requirements, the Massachusetts Program Administrators (the PAs) temporarily replaced the Residential Coordinated Delivery (RCD) initiative’s customary in-person home energy assessments (HEA) with virtual (i.e., remote home energy assessments (VHEA). As part of a VHEA, RCD assessors:

- Virtually complete the basic functions of the in-person HEA using common communication software like Zoom and Google Meet/Duo.
- Mail the participant a customized package of instant savings measures (ISMs) for self-installation.
- Develop a scope of work to address any identified air sealing and insulation opportunities and/or mechanical system upgrades.

The PAs expanded the RCD assessment repertoire in July 2020 to include “hybrids”. Hybrids, which combined VHEA elements with a shorter follow-up in-person visit, typically occurred for customers with physical limitations, complex properties, those who expressed a strong preference for in-person engagement, or when a VHEA findings were inconclusive (i.e., assessors needed more information to develop recommendations or work scopes).

After nearly a year and more than 20,000 VHEAs, the PAs and Energy Efficiency Advisory Council (EEAC) want to identify lessons learned from the transition to VHEAs and determine how best to interact virtually with customers as part of future initiative cycles.

<table>
<thead>
<tr>
<th>VHEA</th>
<th>Hybrid HEA</th>
<th>In-person HEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer submits photos of their home prior to assessment</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Customer submits instant savings measure order (e.g., LED bulbs) prior to assessment</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Assessor researches home (e.g., public data) prior to assessment</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Assessor calls customer via video conferencing call to complete whole-home assessment</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Assessor visits customers' home to complete whole-home assessment</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Assessor or technician installs instant savings measures directly in home</td>
<td></td>
<td>If customer need assistance, assessor will schedule installation</td>
</tr>
<tr>
<td>Assessor or technician complete combustion safety testing during HEA</td>
<td>Contractor completes tests prior to insulation installation</td>
<td>✓</td>
</tr>
<tr>
<td>Assessor reviews recommended energy savings measures with customer at their home</td>
<td>Assessor reviews recommendations over the phone/virtually</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>If customer feels comfortable</td>
<td></td>
</tr>
</tbody>
</table>
The timeline below documents the RCD transition to VHEAs over the past year, including participation levels and key delivery changes. VHEA participation steadily increased day by day after the initial suspension of in-person HEAs. In July, PAs had restarted offering traditional in-person HEAs as well as hybrid assessments on a limited basis, and by August, RCD was assessing as many customers as the program had in Summer 2019. Also, to encourage participation and aid potential mis-scoped VHEA weatherization jobs, the PAs covered 100% of insulation costs, up to $10,000—up from the typical 75% cost coverage. This offer lasted through the end of September 2020. The incentive increase also means that most VHEA participants faced a different value proposition (i.e., no out-of-pocket cost) than HEA participants when deciding to act on weatherization recommendations.
RESEARCH QUESTIONS

The Stage 3 evaluation plan for this study included more than a dozen specific research questions. While numerous, all the identified research questions related to a single, overarching goals for the study:

Identify lessons learned from VHEAs so the PAs can apply them to future RCD cycles and maximize the value of this new delivery mechanism.

For simplicity, our team has organized the 13 research questions into three research themes that collectively address this overarching research goal:

1) How are VHEAs different than HEAs?
2) How well do VHEAs work?
3) How can the PAs make the best use of VHEAs in the future?

EVALUATION ACTIVITIES

Task 1  Program Manager Interviews (n=11)
Our team used these initial interviews to gain program managers’ perspectives on the lessons they learned launching VHEAs, as well as their thoughts about the potential role of VHEAs (or other forms of virtual customer interaction) as part of future program delivery.

Task 2  Assessor Interviews (n=22)
Our interviews—10 with LV Energy Specialists and 12 with HPCs—focused on their experience completing VHEAs, the advantages and disadvantages of the approach, technological difficulties, and customer feedback.

Task 3  Participant Surveys (n=332)
Customer’s experience with VHEAs was central to this study. The web-based survey focused on participants’ experience conducting the VHEA, their interaction with their ES/HPC, and installation rates for mailed self-install measures.

Task 4  Nonparticipant Surveys (n=77)
To understand why some customers decided not to proceed with the VHEA, our team surveyed customers that declined to have a virtual assessment when their in-person assessment was cancelled.

Task 5  Contractor Interviews (n=20)
Our team interviewed 20 contractors (14 independent installation contractors [IICs] and 6 HPCs) to determine the accuracy of weatherization scopes based on VHEAs and how, if at all, their businesses were impacted by the transition to virtual assessments.

Task 6  Program Data Analysis
To complement these interviews and surveys, our team also analyzed 2019 (HEA only) and 2020 (most VHEA) program tracking data. We explored for potential differences in recommendation rates by measure, participating building types, and renter/landlord participation.
KEY FINDINGS

1. Most VHEA participants were satisfied with their virtual experience.

Overall, we found that participants had a positive virtual experience. **89% of VHEA participants expressed satisfaction** with their virtual assessment process. Of those that indicated that their perception of VHEAs changed after their experience, **nearly 90% said it changed favorably**. Perhaps most telling, the majority (93%) would recommend VHEAs to their family and friends.

Participant satisfaction is not the lone criteria for assessing VHEAs, but it is a required element for continued and long-term adoption.

2. VHEA-based scopes of work are less accurate, which has adverse implications for contractors.

Contractors estimated that 1 out of 4 VHEA-based weatherization scopes was problematically inaccurate or overlooked an existing pre-weatherization barrier.

According to contractors, **~15% of VHEA-based work scopes required a “major” change** (i.e., the job required fewer or more days than originally scoped, which impacts their scheduling and staffing). They noted this marked an increase relative to the rate of “major” changes following HEAs, which they estimated as closer to ~5%. They often cited wall insulation as the primary cause of major changes since assessors—unable to definitively conclude whether walls are already insulated remotely—default to including them in a scope. Once in the home, contractors reported they often found that the walls were already insulated.

Analysis of the program data supports contractors’ anecdotes. We found that 22% of all jobs following a VHEA were subject to change orders greater than $1,500, which is approximately 1/3 of the average scoped cost and a proxy for a “major” change. This compares to only 12% for HEAs. As suggested by the contractors, most of the major changes (18% of the 22%) were a decrease from the scoped to final cost.

While these major decreases are not problematic from a customer perspective (i.e., their co-pay—when incentives are not 100%—would go down, not up), contractors were clear that the change complicates their job and staff planning. Some
contractors have adapted to this recurring problem by increasing the frequency of their “scope checks” (i.e., in-person visits to participating homes to confirm the proposed scope prior to the customer’s official installation date), particularly when the scope includes wall insulation.

Contractors also estimated that they completely walk away from another 5-10% of VHEA jobs due to a pre-weatherization barrier—either an unidentified health and safety issue (often mold) or a failed, pre-job combustion safety test. Walk-aways are not unique to VHEAs; assessors and contractors alike were quick to note that, whether part of an HEA or VHEA, “you never know what’s behind a wall until you open it up”. However, contractors were generally consistent that the rate of walk-aways following VHEAs was higher.

Our review of the program data corroborated the contractor claim of an increase, although on the lower end of the suggested range. We found an increase of 4.2% with 16.9% of VHEAs identifying pre-weatherization barriers in 2020 compared to a rate of 21.1% for HEAs in 2019. Assuming homes receiving an HEA in 2019 and a VHEA in 2020 are equally likely to have a pre-weatherization barrier, this decrease represents overlooked pre-weatherization barriers due to the remote nature of VHEAs. It also reflects a partial shift in the responsibility of identifying pre-weatherization barriers from assessors to contractors. PAs and LVs are aware of the inherent limitations of VHEAs related to pre-weatherization barriers and at work on mitigation strategies.

3. In-service rates are much lower for self-installed measures.

As part of a VHEA, a participant is responsible for self-installing the instant savings measures (or ISMs—LEDs, showerheads, etc.) that assessors had previously installed for them while in their home. The PAs worried this could result in lower in-service rates (ISR) and realized energy savings. Our survey revealed that the PAs concerns were well founded.

VHEA participants self-reported ISRs well below the 100% assumed for in-person HEAs for lighting, hot water measures and thermostats (per the Technical Reference Manual). Smart strips, which assessors previously left behind at HEAs for self-install, were relatively similar (70% for VHEAs vs. 76% for HEAs). These values reflect ISRs at the time of the survey, which were, on average, three months after a participant’s VHEA. It is possible participants will install measures later. It is also possible participants will remove currently installed measures.
We also found lower ISRs—for every ISM—if a participant received their VHEA from an HPC (relative to a LV Energy Specialist). The survey did not reveal any direct insights into the cause of the disparity, which was pronounced for LEDs, showerheads, and smart strips. However, the results suggest a fundamental difference between how HPCs and Energy Specialists are communicating with participants about ISMs.

Working with HPCs to reduce this disparity will generate more savings for RCD program and avoid future impact evaluations finding lower savings that jeopardize the cost-effectiveness of certain measures.

4. VHEAs are a viable, yet imperfect, delivery method.

While imperfect (see Findings #2 and #3), VHEAs offer a myriad of benefits that, alongside other complementary delivery approaches, will allow the PAs to increase the reach and efficiency of future RCD program cycles. These benefits include:

- **Less travel time.** Eliminating “windshield time” removes direct (labor) and indirect costs (mileage) and avoids historical scheduling inefficiencies caused by weather, traffic delays, and customer no shows. Also, replacing windshield time with other activities like customer follow-ups, timely call backs, and returning weatherization scopes sooner improve the overall participation experience.

- **Reaching more customers.** Historically, assessors completed 2 or 3 HEAs per day. However, due to reduced travel time, shorter total assessments times, and the ability to start assessments later in the day, assessors can do 4 to 5 VHEAs per day.

- **Ability to diversify and customize.** All interviewed stakeholders viewed the flexibility inherent in VHEAs as an opportunity to act on the PAs long-standing goal of moving away from the initiative’s historical “everyone gets an assessment” default approach and offering customized experiences and participation pathways to customers based on their interests, home types, and needs.

- **Potential for staff specialization.** RCD’s current one-size-fits-all assessment approach requires a one-size-fits-all assessor. However, if the initiative diversifies its delivery methods as described above, it could also revisit its staffing. This could mean separating assessment and sales roles to leverage the comparative advantages of each or providing customers with increased access to technology experts.
After almost a year delivering VHEAs and considering these benefits, interviewees did not express concerns about their long-term viability and were unequivocal that VHEAs, and other forms of virtual customer interactions, would be part of future RCD offerings.

Interviewed stakeholders were also clear that VHEAs would need to continue to evolve and improve. They specifically pointed to the challenge of channeling participants into the most appropriate assessment format should RCD move toward a more diversified offering. They acknowledged the tension between customized and comprehensive offerings, as well as the significant changes to the program administrative and contracting structure that would need to accompany such a shift in delivery.

Lastly, interviews noted that the 100% weatherization incentive temporarily insulated RCD from the shortcomings of VHEAs. First, it avoided potential customer dissatisfaction due to mis-scoped VHEA weatherization jobs that might result in a higher out-of-pocket cost at the time of installation. Second, the increased incentive produced a robust backlog of weatherization jobs that, so far, has mitigated contractor frustration (about scoping accuracies and missed pre-weatherization barriers) and enabled contractors to quickly pivot to a new job when issues arise. However, with the return to the standard 75% incentive, the PAs will need to work with stakeholders to develop programmatic mechanisms to avoid or offset these potential issues.
## RESEARCH QUESTIONS ANSWERED

In addition to these key findings, our team also answered each of the specific research questions identified for this study.

<table>
<thead>
<tr>
<th>Research Themes and Questions</th>
<th>Answer</th>
<th>Details</th>
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<tbody>
<tr>
<td><strong>#1. How are VHEAs different than HEAs?</strong></td>
<td></td>
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<tr>
<td>How prepared are assessors to deliver VHEAs?</td>
<td>Assessors were trained/prepared</td>
<td>Assessors self-reported that they were sufficiently trained and prepared to deliver VHEAs and did not request any additional training. High marks from participants on assessors’ performance and communication, coupled with minimal technology issues, supports the assessors’ self-assessment.</td>
</tr>
<tr>
<td>How does the VHEA customer mix differ from HEA customer mix? Do VHEAs improve or exacerbate equity issues? Do VHEAs extend the reach of the PAs (i.e., bring in customers that would not have signed up for a HEA)?</td>
<td>Inconclusive</td>
<td>Demographic data on both HEA and VHEA participants is limited, but all available suggests the transition to VHEAs has not materially changed the profile of RCD participants. However, it remains possible that certain customer segments – disabled, elderly, or limited English proficiency – are more likely to avoid a VHEA versus a HEA.</td>
</tr>
<tr>
<td>Are VHEAs more appropriate, better suited, or better received by certain customers or customers in specific types of homes?</td>
<td>Yes, VHEAs work better in certain situations</td>
<td>Contractors and assessors agreed that VHEAs are more accurate for simpler home constructions (e.g., ranches and colonials), which could inform PA’s future decisions about customer targeting or segmentation related to VHEAs. They also agreed VHEAs worked best for able-bodied customers that were willing to access all parts of their home and/or when the house previously had a HEA.</td>
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<tr>
<td>What are the installation rates for instant savings measures (ISMs), which VHEA participants self-install?</td>
<td>Installations rates are much lower for all previously direct installed measures</td>
<td>Surveys found self-reported lighting (75%), showerheads (44%), aerators (56%), and programmable/wi-fi thermostat (56%) ISRs well below the 100% assumed for in-person direct install ISMs. Smart strips, previously left behind at HEA, were similar (75% for VHEAs vs. 76% for HEAs).</td>
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<tr>
<td><strong>#2. How well do VHEAs work?</strong></td>
<td></td>
<td></td>
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<tr>
<td>How well do the current VHEA software platforms work? Are there opportunities for improvement?</td>
<td>Existing virtual software works fine</td>
<td>Assessors cited their willingness to use whatever software was best for the customer as an essential part of their VHEA customer engagement strategy. Neither assessors nor participants cited any concerns or shortcomings with the current mix of software or expressed a desire for more specialized software.</td>
</tr>
<tr>
<td>How accurate are the VHEA-based weatherization scopes of work developed? What are installation contractors finding when they go into homes to implement these scopes?</td>
<td>VHEA weatherization scopes are less accurate. Contractors are more frequently finding pre-weatherization barriers not identified during assessment.</td>
<td>Contractors estimated, on average, that 15% of VHEA-based jobs required a “major” change (a change that results in more or fewer days added to job). Contractors cited wall insulation changes as the primary cause of these major changes as assessors—unable to definitively conclude whether walls are already insulated—default to including them in a scope. Contractors also estimated that they completely walk away from another 5-10% of VHEA jobs due to a pre-weatherization barrier – most commonly an unidentified health and safety (like mold) issues or a failed, pre-job combustion safety test.</td>
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<tr>
<td><strong>#3. How can the PAs make the best use of VHEAs in the future?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the most effective role for VHEAs in future RCD program years? Are there new, creative ways to virtually interact with customers that will bring flexibility and value to the PAs? Can the PAs use virtual customer interactions to improve, streamline, or expedite any other aspects of their traditional residential efficiency programs?</td>
<td>Though imperfect, VHEAs are a viable delivery method. VHEAs streamline day-to-day operations and diversify RCD toolkit.</td>
<td>Assessors, program managers, and contractors agreed that they see a place for virtual assessments in RCD’s future. VHEAs streamline travel time and paperwork for assessors allowing RCD to serve more customers per day. Further, virtual engagements are an important mechanism for diversifying delivery and transitioning away from RCD’s historical “one size fits all” approach. For example, VHEAs may enhance screening for weatherization opportunities, advance real-time customer engagement opportunities, or otherwise be adapted to meet customers’ diverse needs. In addition, the PAs are already using virtual interactions to support programmatic elements, such as QA &amp; QC, outside of the core delivery of RCD.</td>
</tr>
<tr>
<td>Are there measures that are currently not cost-effective but, coupled with a less expensive virtual delivery method, become a viable option?</td>
<td>Inconclusive</td>
<td>Our team asked PA and LV managers re: additional measures suited for virtual delivery, but our evaluation activities did not include a systemic review of potential new measures nor a revisiting of measures the PAs previously determined not to be cost-effective.</td>
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</table>
Table of Contents

1. Introduction ............................................................................................................... 1
   1.1 Research Questions .............................................................................................. 2
   1.2 About VHEAs ........................................................................................................ 4

2. Methodology .............................................................................................................. 8

3. Key Findings .............................................................................................................. 9
   3.1 How are VHEAs different than HEAs? ................................................................. 9
       3.1.1 Program Delivery ......................................................................................... 9
       3.1.2 ISM In-Service Rates .................................................................................. 11
       3.1.3 Wx Recommendation Rates ....................................................................... 15
       3.1.4 HVAC and Water Heating Recommendation Rates .................................. 16
       3.1.5 Types of Participants ................................................................................. 16
   3.2 Do VHEAs work? .................................................................................................. 17
       3.2.1 Customer Experience ............................................................................... 17
       3.2.2 Software .................................................................................................... 21
       3.2.3 Accuracy .................................................................................................... 23
   3.3 How can the PAs make the best use of VHEAs in the future? .............................. 25

4. Appendices .............................................................................................................. 31
   4.1 Participant Survey – Completed Surveys and Analysis Weights ....................... 31
   4.2 Nonparticipant Survey – Completed Surveys and Analysis Weights ............... 31
1. Introduction

In response to COVID-19 social distancing requirements, the Massachusetts Program Administrators (the PAs) transitioned the Residential Coordinated Delivery (RCD) initiative’s in-person home energy assessments (HEA) to virtual (i.e., remote) home energy assessments (VHEA).¹

Starting in late March 2020, RCD assessors², either Lead Vendor³ (LV) Energy Specialists (ES) or Home Performance Contractors (HPCs), virtually completed the basic functions of the traditional HEA. Using information collected during the VHEA, as well as publicly available information about the home online, the ES and HPCs would:

- Mail the participant a customized package of instant savings measures (ISMs) including, but not limited to, LED bulbs, showerheads, and advanced power strips, to self-install.⁴
- Develop a scope of work to address any identified weatherization (i.e., air sealing and insulation) improvement opportunities and/or mechanical system upgrades.

In some instances—and when permitted by the state’s current social distance requirements—assessors would supplement VHEAs with a shorter, more limited in-person visit to the participant’s home. This combination of virtual and in-person assessments, referred to as a “hybrid”, typically occurred when a participant was unable or unwilling to complete portions of the virtual-only assessment themselves. It also occurred when the findings of the virtual assessment were inconclusive (i.e., assessors needed more information to develop a scope of work).

In fewer instances, assessors would forgo the virtual assessment entirely and complete a traditional in-person assessment. This typically occurred when, during the intake process, the LV or HPC determined that the participant was disabled or otherwise unable or unwilling to have a VHEA.

Exceptions aside, VHEA has been the primary and default mechanism for delivering RCD since March 2020. Now, after nearly a year and more than 20,000 VHEAs, the PAs and Energy Efficiency Advisory Council (EEAC) want to take stock of the transition from in-person to virtual delivery. Specifically, the PAs commissioned this study to identify lessons learned from this recent experience that will enable the PAs to maximize the value of virtual program delivery in the future – even after social distancing requirements relax.

The Massachusetts Residential Retrofit Research Area team led by Guidehouse and Cadeo (referred to as “the evaluation team” throughout this document) completed this study on behalf of the PAs and EEAC consultants. Cadeo led this specific study, including all primary data collection, analysis, and reporting.

¹ Technically, the PAs fund the home energy assessment portion (whether in-person or remote) of the RCD initiative through the Residential Conservations Services (RCS) initiative, while the measures themselves are funded through RCD. However, for simplicity, this report refers to the collective services that the PAs provide residential customers (i.e., the assessment, instant savings measures, and incentives for recommended measures) as “RCD”.
² All references to “assessors” in this report refer, collectively, to LV Energy Specialist and HPCs. When a finding is specific to LV Energy Specialist or HPC, we refer to them separately.
³ Currently, the PAs work with four LVs: Abode, CET, CLEAResult, and RISE Engineering.
⁴ Some PAs also offer to directly install these measures once on-site activities resumed.
This study focused on the single family (i.e., 1-4 unit) and market rate (i.e., not income eligible) residential customers participating in RCD. However, some of the VHEA findings contained in this report may be applicable to multifamily and/or income eligible customers and therefore merits consideration by the PAs during any future VHEA planning for those customer segments.

1.1 Research Questions

The Stage 3 evaluation plan for this study included more than a dozen specific research questions. While numerous, all the identified research questions related to a single, overarching goal for the study:

Identify lessons learned from VHEAs so the PAs can apply them to future RCD cycles and maximize the value of this new delivery mechanism.

For simplicity, our team has organized the 13 research questions in the Stage 3 plan into three research themes. Collectively, these three themes address the overarching research goal above.

4) How are VHEAs different than HEAs?
5) How well do VHEAs work?
6) How can the PAs make the best use of VHEAs in the future?

Figure 1 visually maps the hierarchy of research goals, themes, and questions described above.
## Figure 1. Study Research Goal, Themes, and Questions

**GOAL:** Identify lessons learned from VHEAs so the PAs can apply them to future RCD cycles and maximize the value of this new delivery mechanism.

**THEMES:**

1. How are VHEAs different than HEAs?

2. How well do VHEAs work?

3. How can the PAs make the best use of VHEAs in the future?

**QUESTIONS:**

### Delivery
- How prepared are traditional Energy Specialists and HPCs to deliver VHEAs? Would additional training and/or assessor specialization maximize the effectiveness of the virtual approach?

### Participation
- Which customer segments are signing up for VHEAs? How, if at all, does the VHEA customer mix differ from the traditional in-person assessment customer mix? Do VHEAs improve or exacerbate equity issues related to renter, moderate income, and non-English speaking customers?
- Do VHEAs extend the reach of the PAs? Can VHEAs bring in customers that would not have signed up for a traditional HEA?
- Are VHEAs more appropriate, better suited, or better received by certain customers or customers that live in specific types of homes? If so, which customers/home types? Conversely, are there certain customers or home types that do not lend themselves to VHEAs?

### Installation Rates
- What are the installation rates for instant savings measures that are part of in-person assessments, are directly installed by Energy Specialists and Home Performance Contractors (HPCs)?

### Software
- How well do the current VHEA software platforms work? Are there opportunities to adapt platforms to improve the customer or assessor experience and/or accuracy of the assessment findings? Does any specific existing platform work particularly well? What are the advantages and disadvantages of each platform?

### The Bottom Line
- What is the most effective role for VHEAs as a delivery mechanism in future RCD program years? Do VHEA work best on their own, as a screening tool, and/or in tandem with a subsequent in-person visit?
- Are there measures that are currently not cost-effective but, coupled with a less expensive virtual delivery method, become a viable option?

### Innovations and Implications for RCD
- Are there new, creative ways to make use of VHEAs—or, more generally, to virtually interact with customers—that will bring flexibility and value to the PAs and customers (as part of RCD or, more generally, the PAs’ broader residential portfolio)?
- Can the PAs use virtual customer interactions to improve, streamline, or expedite any other aspects of their traditional residential efficiency programs, whether part of RCD or another residential initiative?
- For example, can VHEAs help the program eliminate non-productive onsite visits by remotely identifying homes that do not need work or have existing pre-weatherization issues?
1.2 About VHEAs

As noted above, RCD, which combined the PAs’ previous Home Energy Services and Multifamily initiatives, transitioned from in-person (HEA) to virtual (VHEA) home energy assessments in late-March 2020.

Many program managers were proud of how PAs and LVs collaborated to launch virtual assessments quickly and safely. Within days of suspending in-person assessments, PAs and LVs shared helpful resources and began testing a process for VHEAs. For example, CLEAResult ramped up development of an already in-progress virtual assessment-specific software (Stream) and, by May, offered it to HPCs across the state at no cost.

The PAs and LVs designed the VHEA process to mimic the core elements of HEAs. Based on our interviews with assessors and customers, VHEAs typically followed these basic steps:

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<tr>
<th>Before</th>
<th>During</th>
<th>After</th>
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<tbody>
<tr>
<td>1. Once VHEA is scheduled, customer service or the assessor contacts the customer to explain and set expectations for the VHEA process, request pictures of their home to review prior to the assessment, and to provide and explain the ISM order form</td>
<td>5. Assessor directs the customer through a whole-home assessment over a video call; Usually using their phone or tablet, customers are required to walk room to room from basement to attic displaying their home as the assessor remotely evaluates energy systems to collaboratively complete the assessment</td>
<td>6. Assessor meets with customer to discuss recommendations for energy saving upgrades for their home (e.g., insulation or heating system upgrades)</td>
</tr>
<tr>
<td>2. Assessors research the customer’s home online using publicly available sites such as tax assessor databases (provided online by cities and counties), Google Maps and Street View, and real estate websites (Zillow, Redfin, etc.) as well as customer-submitted photos (Step 1)*</td>
<td>6. Assessor reviews ISM order and discusses potential modifications with customer</td>
<td>7. Assessor submits identified ISM order for processing and mailing to customer for self-installation</td>
</tr>
<tr>
<td>3. Customers submit an ISM order prior to assessment</td>
<td></td>
<td>8. Assessor develops a weatherization work scope and contract (for customers who elected to install insulation)</td>
</tr>
<tr>
<td>4. Assessor connects with the customers to determine the best videoconferencing option (e.g., Zoom, FaceTime)</td>
<td></td>
<td>9. If relevant, customer signs weatherization contract virtually with DocuSign</td>
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*Note: Assessors used available data including home layout, square footage of different areas of the home, visuals of home exterior, as well as characteristics such as home style, year built, and fuel or heating type to aid their spatial awareness of the home for the VHEA and anticipate energy needs.

“Lead Vendors really stepped up – worked collaboratively. Very intense, meeting after meeting after meeting from early morning to late at night”
- PA Program Manager
The PAs also increased the incentive for insulation when they launched VHEAs. Through the end of September, the PAs covered 100% of insulation costs, up to $10,000—up from the typical 75% cost coverage. According to interviewed PA and LV managers, the rationale for the incentive increase was two-fold:

- To encourage customers, who might be reticent about a virtual program experience, to take part in a VHEA.
- To avoid potential customer dissatisfaction due to mis-scoped VHEA weatherization jobs that might result in a higher out-of-pocket cost for customers at the time of installation.

Implications of the 100% incentive

This study examined the initial effectiveness of VHEAs, which included when the PAs were offering enhanced incentives for insulation (i.e., 100%, up from 75%). It is important to note that findings contained in this report reflect a snapshot in time where assessor, contractor, participant experiences and opinions of VHEAS were tied to the more generous incentive. Further research of VHEAs under RCD’s standard 75% incentive may yield different insights.

Though the timing varies by PA, VHEAs started as early as March 30th, 2020. LVs furloughed 50% of their staff at the time in-person assessments were suspended, retaining several experienced field staff to support and pilot the first VHEAs. Many HPCs shuttered their operations as well. In fact, Abode program managers estimate that, of the nearly 800 individuals employed by HPCs in the beginning of March, only 50 were still active by the end of the month. Thankfully, as shown in Figure 2 (on the next page), VHEA participation steadily increased day by day after April. By the summer, RCD was assessing as many customers as the program had in Summer 2019.

One reason for the rapid recovery of participation could be related to an increase in daily assessments made possible by virtual engagement. Reducing, or in most cases, eliminating travel time allowed assessors to complete more VHEAs per day. For example, some LVs scheduled five VHEAs per assessor per day, nearly double the customary two or three for HEAs.
Residential Coordinated Delivery
Virtual Home Energy Assessment Timeline

- HEA Assessments
- VHEA Assessments
- Hybrid Assessments
- Total Assessments

Figure 2. Timeline
As evident in Figure 2, PAs added another HEA alternative in July 2020 – “hybrid” assessments. Made possible by updated social distancing requirements, hybrid assessments—as the name suggests—was a VHEA followed by a scaled-back in-person visit to the participant’s home. Figure 3. Assessment Comparison shows how hybrid assessments compared to VHEAs, as well as traditional HEAs. While the PAs did not actively market hybrids, they were made available on a case-by-case basis when the type of home or customer required an in-person presence. According to some program managers, hybrids were generally used more often with HPCs. The independent installation contractors (IICs) that install weatherization upgrades following LV-led VHEA also frequently conduct “scope checks”, which provide some of the same in-person opportunities as hybrid assessments. Scope checks are in-person visits to participating homes to confirm the proposed scope of work prior to a customer’s official installation date. However, unlike the hybrid visits, the scope checks do not include the installation of any ISMs and focus exclusively on double-checking for pre-weatherization barriers and ensuring the accuracy of the scoped work.

### Figure 3. Assessment Comparison

<table>
<thead>
<tr>
<th></th>
<th>VHEA</th>
<th>Hybrid HEA</th>
<th>In-person HEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer submits photos of their home prior to assessment</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Customer submits instant savings measure order (e.g., LED bulbs) prior to assessment</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Assessor researches home (e.g., public data) prior to assessment</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessor calls customer via video conferencing call to complete whole-home assessment</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessor visits customers’ home to complete whole-home assessment</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Assessor or technician installs instant savings measures directly in home</td>
<td></td>
<td>If customer needs assistance, assessor will schedule installation</td>
<td>✔</td>
</tr>
<tr>
<td>Assessor or technician complete combustion safety testing during HEA</td>
<td>Contractor completes tests prior to insulation installation</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Assessor reviews recommended energy savings measures with customer at their home</td>
<td>Assessor reviews recommendations over the phone/virtually</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

More information about RCD in general is available at MassSave.com.5

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2. Methodology

This sought to provide the PAs with insights on VHEAs from a variety of perspectives. To provide this, we completed the following tasks.

**Task 1 | Program Manager Interviews (n=11)**
Our team began by interviewing the PA and LV managers that oversee RCD. Our team used these initial interviews to gain program managers’ perspectives on the lessons they learned launching VHEAs, as well as their thoughts about the potential role of VHEAs (or other forms of virtual customer interaction) as part of future program delivery. We spoke with representatives from each PA and LV, in addition to EEAC implementation consultants.

**Task 2 | Assessor Interviews (n=22)**
Next, our team conducted 22 interviews—10 with LV Energy Specialists and 12 with HPCs, including HPC technicians and management. The interviews focused on their experience completing VHEAs, the advantages and disadvantages of the approach, technological difficulties, and customer feedback. As with the program manager interviews, we asked for their perspective on the long-term role for VHEAs in RCD and what, if anything, could be done to streamline VHEA delivery, increase effectiveness, or add value for participating customers.

**Task 3 | Participant Surveys (n=332)**
Customer’s experience with VHEAs was central to this study. To gain this, we surveyed 332 participants who completed a virtual assessment between May and September 2020. The web-based survey focused on participants’ experience conducting the VHEA, their interaction with their ES/HPC, and installation rates for mailed self-install measures. See Appendix A for a list of respondents by PA and the analysis weights our team applied to estimate statewide values.

**Task 4 | Nonparticipant Surveys (n=77)**
To understand why some customers decided not to proceed with the VHEA, our team surveyed 77 customers—henceforth referred to as “nonparticipants”—that declined to have a virtual assessment when their in-person assessment was cancelled. We used the web-based survey to ask nonparticipants why they declined the VHEA, their concerns about the VHEA, and their awareness of the increased insulation incentive.

**Task 5 | Contractor Interviews (n=20)**
Our team interviewed 20 contractors (14 IICs and 6 HPCs) to determine the accuracy of weatherization scopes based on VHEAs and how, if at all, their business has been impacted by the transition to virtual assessments.

**Task 6 | Program Data Analysis**
To complement and support Tasks 1-5, our team also analyzed 2019 (HEA only) and 2020 (mostly VHEA) program tracking data. We explored for potential differences in recommendation rates by measure, participating building types, and renter/landlord participation.
3. Key Findings

We have organized our key findings around the three research themes supporting our overarching research goal of identifying the lessons learned from VHEAs that the PAs can apply prospectively. Again, these three themes are:

1) How are VHEAs different than HEAs?
2) How well do VHEAs work?
3) How can the PAs make the best use of VHEAs in the future?

In each subsection below, we investigate each theme, summarize key findings and share supporting evidence.

3.1 How are VHEAs different than HEAs?

**Key Insights:** Assessors shifted quickly and effectively to VHEAs and were roundly praised by participating customers. In-service rates for ISMs, now self-installed by participants, are markedly lower as part of VHEAs. Facing greater uncertainty about the need for insulation (especially in walls), many assessors have defaulted to recommending insulation in their weatherization scopes (i.e., just in case), which has downstream implications for contractors.

Our team explored how VHEAs may differ from HEAs in terms of program delivery, ISM installation and weatherization recommendation rates, and the characteristics and perceptions of the participants themselves.

**3.1.1 Program Delivery**

Assessors described a learning curve at the outset of VHEAs; however, they drew on their experience with traditional in-person HEAs and adjusted their previous practices to suit the new virtual interaction. In general, assessors aimed to make the VHEA as close to an in-person experience as possible. For example, assessors often kept their similar routine either starting in the basement and moving to the attic (or vice versa) – only now they were directing the customer as they progressed through their home rather than independently assessing the home. While there were adjustments, the transition to VHEA was described by assessors as smooth. When asked, assessors expressed that increasing or modifying the program’s existing VHEA training tactics was unnecessary.

HPCs had additional challenges in their transition to VHEAs. In general, LVs brought HPCs onboard within a few weeks of launching their first VHEAs. Learning from their early experience, LVs trained HPCs on their VHEA delivery processes. Program managers noted that HPCs had limited staff and experienced a slow start to offering VHEAs which underscored some challenges, including buy-in regarding using virtual communication software (e.g., Zoom, FaceTime, Stream, or similar communication product) (e.g., preferring a phone call rather than using a video call) and increased reliance on electronic paperwork. However, support from LVs
as well as the 100% incentive was important in their acceptance of VHEAs. Before long, HPCs quickly found value in VHEAs and PA program managers note that most HPCs now “fully embrace” VHEAs.

Whether HEA or VHEA, the relationship between participants and assessors is central to RCD’s design and success. As evident in Figure 4, participants generally had positive interactions with their assessors prior to, during, and after their VHEA.

Participants provided the highest ratings (Strongly or Somewhat Agree) for assessors’ ability to answer questions (94%) and provide clear instructions (95%) during the VHEA. They offered slightly lower scores for interactions before (e.g., 84% said their assessor provided helpful information prior to VHEA) and after (e.g., 85% said assessor was easy to get in touch with following assessment) the VHEA. While these ratings are still largely positive, the relative difference in ratings suggests that some opportunity for improved participant/assessor communication outside the VHEA itself.

“Keep up the good work! It's important to have patient, knowledgeable assessment people, which we certainly did. Their calm demeanor and expertise really carried the day!”
- Participant
3.1.2 ISM In-Service Rates

One of the most significant differences between an HEA and VHEA is that, following the VHEA, the program mailed participants a package of ISM to install themselves. Given that ISMs (except smart strips) were historically directly installed by assessors—thereby ensuring an installation rate of 100%—the PAs worried that participants would not complete the self-installation process, which would result in lower realized energy savings.

Our team investigated this concern as part of the participant survey. Specifically, we asked responding VHEA participants to:

- Confirm the quantity of ISM they received via mail
- Report the quantity of each ISM that they self-installed, and
- Report the quantity of each ISM they removed, if any, after initially installing

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Note that RCD asks explicitly participants to commit to installing all ISM before shipping them.

Later removal of installed ISM is not unique to VHEA; it likely occurs, at some level, for ISMs directly installed by assessors during HEAs. Our study focused exclusively on assessing VHEAs, so the participant survey did not include any HEA participants.
The in-service rates reflect the percentage of measures participants confirmed they received and were still installed at the time of the survey (December 2020). Table 1 summarizes ISRs for all five ISMs for LV-led VHEAs, HPC-led VHEAs, and VHEAs overall (weighted by the percent of each ISM installed by LV assessors and HPCs).

As shown in the table, we found higher ISRs for LEDs (72%) and advanced smart strips (70%) and lower rates for showerheads (43%), faucet aerators and thermostats (both 55%). As evident in Table 1, the primary driver of these rates is participants not installing the measures in the first place, not removal.

### Table 1. VHEA ISRs by ISM (Overall and By Delivery Channel)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Delivery Channel</th>
<th>% of ISM</th>
<th>Received</th>
<th>Installed</th>
<th>Removed</th>
<th>In-Service</th>
<th>Delivery Channel ISR</th>
<th>Overall VHEA ISR</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED lightbulbs</td>
<td>HPC</td>
<td>56%</td>
<td>1,334</td>
<td>923</td>
<td>77</td>
<td>846</td>
<td>63%</td>
<td>72%</td>
</tr>
<tr>
<td></td>
<td>LV</td>
<td>44%</td>
<td>1,901</td>
<td>1,620</td>
<td>46</td>
<td>1,574</td>
<td>83%</td>
<td></td>
</tr>
<tr>
<td>Showerheads</td>
<td>HPC</td>
<td>65%</td>
<td>103</td>
<td>47</td>
<td>8</td>
<td>39</td>
<td>38%</td>
<td>43%</td>
</tr>
<tr>
<td></td>
<td>LV</td>
<td>35%</td>
<td>72</td>
<td>42</td>
<td>3</td>
<td>39</td>
<td>53%</td>
<td></td>
</tr>
<tr>
<td>Faucet Aerators</td>
<td>HPC</td>
<td>71%</td>
<td>110</td>
<td>63</td>
<td>3</td>
<td>60</td>
<td>54%</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>LV</td>
<td>29%</td>
<td>49</td>
<td>29</td>
<td>-</td>
<td>29</td>
<td>59%</td>
<td></td>
</tr>
<tr>
<td>Smart power strip</td>
<td>HPC</td>
<td>61%</td>
<td>54</td>
<td>41</td>
<td>6</td>
<td>35</td>
<td>65%</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>LV</td>
<td>39%</td>
<td>149</td>
<td>123</td>
<td>6</td>
<td>117</td>
<td>78%</td>
<td></td>
</tr>
<tr>
<td>Thermostats</td>
<td>HPC</td>
<td>61%</td>
<td>32</td>
<td>17</td>
<td>-</td>
<td>17</td>
<td>53%</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>LV</td>
<td>39%</td>
<td>25</td>
<td>15</td>
<td>-</td>
<td>15</td>
<td>59%</td>
<td></td>
</tr>
</tbody>
</table>

Except for smart power strips, which has always been a leave-behind ISM, the self-reported ISRs for ISMs mailed to participants following VHEA are noticeably lower than the 100% ISR assumed in the current Technical Reference Manual for direct installed measures.

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8 The scope of this study did not include assessing whether the smart strip was “correctly” installed (i.e., set up in a way that generated energy savings).

9 Unless otherwise stated, all references to thermostats in this report is inclusive of standard programmable and Wi-Fi or smart thermostats.
As evident in Table 1, ISRs are noticeably lower for HPCs across all measures. Neither the participant survey nor the assessor interviews revealed clear differences between LV and HPC treatment of ISMs that would drive this disparity.

Figure 6 summarizes this disparity graphically. We considered whether a difference in the number of ISMs mailed to participants by LVs and HPCs could be driving this disparity. Perhaps, participants served by LVs and HPCs were installing a similar number of each ISM, but HPC-served participants were sending, on average, more to their participants. However, we found that LV and HPC were sending ISMs to VHEA participants at very similar rates.\textsuperscript{10}

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\textsuperscript{10} The average number of ISMs sent to VHEA participants from HPCs: 21.1 LEDs, 1.8 showerheads, 2.8 aerators, 2.1 smart strips, 1.7 thermostats. The average number of ISMs sent to VHEA participants from LV assessors: 21.0 LEDs, 1.5 showerheads, 2.2 aerators, 1.8 smart strips, 1.7 thermostats.
Also, according to interviewed program managers, the PAs initially sent ISMs to participants with little or no instructions for installing them. However, the PAs identified this shortcoming and created ISM-specific guidance to send along with the measures themselves. The ISRs shown in Table 1 reflect a wide range of VHEA participants (April-September) and, therefore reflect a mix of VHEA participants that did and did not receive the program’s updated ISM materials. To test for different ISRs over time (i.e., higher ISRs later in the period resulting from the materials), our team estimated ISRs for three time-based VHEA cohorts: April-May, June-July, and August-September. We did not find any meaningful differences in ISR results for any cohort or ISM.

We looked at ISRs at the participant-level. For example, we examined the proportion of participants who installed all, some, or none of the LED bulbs that they received. The results were consistent: most of participants installed at least some of their LEDs or smart strips (both relatively simple to self-install), while ∼1/3 of participants did not install any of their showerheads and faucet aerators (which can be tricky) or thermostats (which can require more expertise).

### Table 2. Participant Installation Rates

<table>
<thead>
<tr>
<th>Measure</th>
<th>All</th>
<th>Some</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED lightbulbs (n=133)</td>
<td>53%</td>
<td>44%</td>
<td>3%</td>
</tr>
<tr>
<td>Showerheads (n=65)</td>
<td>52%</td>
<td>13%</td>
<td>35%</td>
</tr>
<tr>
<td>Faucet aerators (n=47)</td>
<td>51%</td>
<td>16%</td>
<td>33%</td>
</tr>
<tr>
<td>Smart power strip (n=79)</td>
<td>75%</td>
<td>17%</td>
<td>8%</td>
</tr>
<tr>
<td>Thermostats (n=28)</td>
<td>57%</td>
<td>14%</td>
<td>29%</td>
</tr>
</tbody>
</table>
When asked, the most common reasons for non-installation included:\(^{11}\):

- Waiting for a better time to install (25%)
- Waiting for their current equipment to stop working (15%)
- Not needing all the units that they received (16%)
- Had trouble installing and preferred a professional to install them (10%)

Some uninstalled measures, particularly lighting and thermostats, likely go into storage and may eventually get installed, although the timing of that install is unknown.

### 3.1.3 Weatherization Recommendation Rates

ISMs are a meaningful source of savings, but the PAs’ larger goal with RCD is to encourage long-term improvements to residential customer’s building shell through air sealing and attic, wall, and basement/floor insulation. To assess for a potential difference in weatherization recommendation rates between HEAs and VHEAs, our team compared program data from April-October 2019 (all HEAs) and April-October 2020 all VHEAs).

We found that assessors recommended air sealing (+11%) and at least one type of insulation (+14%) more often following VHEAs than HEAs. However, a closer look at recommendation rates by insulation type (Table 3) reveals that the primary of this change is a marked increase (+33%) in wall insulation recommendations.

Unlike attic floors and rim joists where insulation is typically visible and apparent to non-professionals, it is more difficult to determine whether a wall is insulated. Assessors use a variety of techniques to assess for existing wall insulation when on-site (peek inside electrical outlets, use infrared cameras, and drill small pilot holes), but the average customer will likely struggle to make this determination. Assessors said as much during our interviews with them. They noted that, when in doubt, they defaulted to including wall insulation in their initial scope given the 100% incentive rate and knowing that the contractor could verify the necessity of the insulation once at the participant’s home.

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\(^{11}\) The non-installation reasons are based on the open-ended question, “Why didn’t you install?” and were qualitatively coded into major themes which we used to yield the percentages of respondents who responded endorsing each theme.
Table 3. Weatherization Recommendation Rates

<table>
<thead>
<tr>
<th>Measure Category</th>
<th>HEAs (n=34,977)</th>
<th>%</th>
<th>VHEA (n=19,699)</th>
<th>%</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Sealing</td>
<td>23,182</td>
<td>66%</td>
<td>14,519</td>
<td>74%</td>
<td>11%</td>
</tr>
<tr>
<td>Insulation (of any kind)</td>
<td>24,849</td>
<td>71%</td>
<td>15,947</td>
<td>81%</td>
<td>14%</td>
</tr>
<tr>
<td>- Attic</td>
<td>19,543</td>
<td>56%</td>
<td>11,740</td>
<td>60%</td>
<td>7%</td>
</tr>
<tr>
<td>- Wall</td>
<td>13,277</td>
<td>38%</td>
<td>9,913</td>
<td>50%</td>
<td>33%</td>
</tr>
</tbody>
</table>

3.1.4 HVAC and Water Heating Recommendation Rates

In addition to recommending weatherization improvements, the PAs use RCD to identify opportunities for space heating and cooling (HVAC) and water heating upgrades. We compared HEA and VHEA recommendations rates for these measure categories and found a sizable increase in the frequency of HVAC upgrade recommendations: 37% for VHEAs in 2020 compared to 24% as part of HEAs in 2019. None of the interviewed program managers or assessors noted this increase or provided a theory for the increased recommendation rate. Unlike HVAC equipment, the program data showed a modest decline in water heating recommendations (36% for HEAs in 2019 and 34% for VHEAs in 2020).

3.1.5 Types of Participants

Our team analyzed program data provided by LVs to investigate how program activity may differ for VHEA and HEA customers. We contrasted program data on nearly 20,000 VHEAs completed between April 1st and October 15th, 2020 with nearly 35,000 HEAs completed during the same part of the year in 2019.

While program administrators do not uniformly collect traditional demographic data for Mass Save participants (e.g., income, ethnicity, age), home ownership and building types were collected. According to program data, participation mix based on these indicators was similar between 2019 HEAs and 2020 VHEA and noticeable differences arose in expected patterns:

- **Building Type.** We saw a marginal increase in the percent of VHEA participants living in multi-unit homes (17.4%) compared to 2019 HEA participants (16.1%).

- **Renter vs. Owner.** Renter participation decreased slightly from 2019 (8.2%) to 2020 (7.6%) with the transition to VHEA.

While these data indicate an uptick in multi-unit VHEA participants, this should be interpreted cautiously since differences in participant characteristics may be related to multiple factors, including the increased incentive offer.
3.2 Do VHEAs work?

**Key Insight:** VHEAs are a viable, yet imperfect, delivery method. Customers reported having positive experience, although much is required of them (i.e., physically leading the virtual tour of their home, installing ISMs after). VHEAs also miss pre-weatherization barriers more often and produce less accurate weatherization scopes. Contractors have adapted, but the shortcomings of the virtual process have adverse impacts on contractors and—without the temporary 100% incentive—could also cause customer frustration.

One of the main areas of interest in this evaluation is the effectiveness of the VHEAs, in terms of their accuracy and logistics. Our team explored the performance of the virtual assessment software and the accuracy of the weatherization scopes.

### 3.2.1 Customer Experience

One of the most straightforward ways to assess the viability of a new program element is to ask participants about their experience. We found that, overall, participants had a positive VHEA experience and view VHEAs as a feasible alternative. Almost 89% of surveyed VHEA participants were moderately, very, or extremely satisfied with the virtual assessment process. Of the respondents whose indicated that their perception of virtual home energy assessment changed after their experience, nearly 90% said it changed favorably. Further, the majority (93%) of respondents would recommend VHEAs to their family and friends.

![Figure 7. Participant Satisfaction](image)

While general reactions to VHEAs are favorable, it is important to examine customer experience from multiple customer perspectives. Specifically, we wanted to understand how typical participant experiences may compare to those who had a previous HEA as well as those who chose not to get a VHEA at all. Because RCD is a long-standing offering, nearly half of the VHEA participants we surveyed reported they had also previously experienced an HEA either at the same or different/previous home. We leveraged the presence of these “repeat” participants...
in our sample by asking them to directly compare their HEA and VHEAs experiences. Lastly, while nonparticipants cannot provide insight into the VHEA customer experience, our surveys with nonparticipants helped us understand why they declined their VHEA invitation and offered insight into how the PAs might overcome barriers to virtual customer engagement.

Participants
The participant survey, which included first time RCD participants and the customers that had received an HEA previously, yielded these insights into the VHEA experience for participating customers:

- **Scheduling is easy and fast.** Surveyed VHEA participants were nearly unanimous that signing up for a VHEA was easy (95%) and that the VHEA fit conveniently into their schedule (also 95%). Participants provided a slightly lower, yet positive, assessment of the wait time between when they signed up and when their virtual assessment occurred with 88% agreeing (strongly or somewhat) that the wait time was reasonable.

- **Participants were generally comfortable and physically able to meet the increased demands of a VHEA.** 89% participants were comfortable accessing the different parts of their home and felt the VHEA took a reasonable about of time.

- **While able, it was more work than some participants realized.** Given participants’ essential role executing VHEAs, it is important that participants are aware of their central role in the process and not surprised by the assessor’s requests during the assessment. When asked about this, a quarter of participants (26%) indicated the VHEA required more work than they realized. Whether this value is higher or low—considering how many things the customer has to do during a VHEA—is subjective but it does indicate that there is some room for improvement regarding setting expectations with soon-to-be participants.

Figure 8 provides supporting details for these findings.
As mentioned above, nearly half of the participating respondents (46%) had received an in-person assessment in the past at the same or a different/previous residence. Our team asked these “repeat” participants to compare their experiences and learned:

- **Largely indifferent.** Interestingly, most participants selected the survey’s neutral response (“Neither Agree or Disagree”) for three of the five comparison statements shown in Figure 9. These included: “The virtual assessment was streamlined compared to the in-person home assessment”, “I preferred when the Energy Specialist installed measures (like LEDs) for me” and, most importantly, “I prefer a virtual assessment to an in-person home energy assessment”.
- **But VHEAs are more convenient.** More participants did indicate their VHEA was more convenient than their HEA.
- **And HEAs are more thorough.** Forty three percent of participants indicated that they did not feel (“Strongly” and “Somewhat disagree”) that the virtual assessment was as thorough as their previous in-person home assessment. However, these data also indicate that 39% of respondents thought the VHEA was as thorough as their HEA.
Figure 9. Repeat Participant Feedback

![Bar chart showing feedback preferences.]

Nonparticipants
When asked, most nonparticipants cited their preference for an in-home assessment as a reason they did not move forward with a VHEA when their HEA was cancelled. Almost 61% indicated that wanting to wait for an in-person assessment was extremely important.

Figure 10 offers a deeper dive in customer's stated reasons for nonparticipation. Most nonparticipants cited their preference for an in-home assessment as a reason they did not move forward with a VHEA when their HEA was cancelled. Almost 61% indicated that wanting to wait for an in-person assessment was extremely important.

- 51% were concerned about being physically able to complete VHEA
- 52% believed the layout or condition of their home was problematic
- 56% thought VHEA would be a hassle to complete

---

12 These data represent a combined percentage of nonparticipants who answered moderately important, very important, or extremely important to questions about their reasons for opting out the VHEA.
Increased awareness of the 100% incentive offer may have helped non-participants overcome these barriers. About 61% of nonparticipants were not aware of 100% incentive. Of those, 58% said that knowing about the incentive would have changed their mind about moving forward with the virtual assessment.

### 3.2.2 Software

The success of any virtual interaction depends on the reliability of and user familiarity with the technology being used. Naturally, PAs were concerned that the increased reliance on technology required for a VHEA—especially for an interaction as complex as a home energy assessment—could be problematic for assessors and participants alike.

However, interviewed assessors and surveyed participants both reported minimal technical issues or complications regardless of the communication software used (e.g., Zoom, FaceTime, Stream, or comparable software).

“If customers have a preference for a tech, we always try to accommodate them” - HPC
In fact, interviewed assessors made a point to emphasize that the specific software they used did not materially impact the quality of the assessment or their ability to engage with the participant. When pressed, a few assessors mentioned occasional issues with dropped connections or frozen video when using Wi-Fi-based software (i.e., Zoom or Google Meet versus FaceTime, which can run off a cellular network). They said this sometimes occurred when customers moved to the edges of their home Wi-Fi networks to assess basements, attics, or exterior features. However, assessors typically shrugged off these issues, saying they were uncommon and not overly problematic.

In general, assessors were clear in their indifference to the commonly used communication software options, often saying they were “essentially the same”. They were also clear that the only thing that really mattered was using a software that the participant was comfortable and familiar with. For this reason, all interviewed assessors indicated that determining the customer’s preferred software was a critical question during their pre-VHEA outreach.

When asked in the survey, nearly two-thirds (62%) of participants reported using either Zoom or FaceTime video technology software. Further, when asked if they used their phone, laptop, or tablet, 75% reported using their phone to move around the house with the assessor and conduct the VHEA.

Further, most participants appreciated how user-friendly and convenient the virtual software:

- 93% reported the selected software was easy to use.
- 86% noted they were familiar with the software before the assessment.
- 18% indicated that they had technical difficulties during the virtual assessment.

Participants who did have technical difficulties frequently mentioned issues related to having adequate internet connectivity throughout all areas of their homes and photo upload issues. Participants shared that their weak internet connection in their basement or outside their home would sometimes result in dropped virtual calls. Other participants had difficulty uploading the large number of photos into the submission system and had to make multiple tries to upload all necessary photos.

Given the concern about technology as a potential barrier to VHEA participation, we also asked surveyed nonparticipants if worries about technology played a role in their decision to forgo their VHEA. We found nonparticipants’ concerns about technology were split: 44% said the concerns were extremely, very, or somewhat important to their decision not to have a VHEA, while 46% said it was not a concern at all. As shown above, other participation barriers, such as being physically able to complete a VHEA, believing the layout or condition of their home was problematic for a VHEA, or assuming a VHEA would be a hassle to complete, were all cited as more important drivers of nonparticipation. However, the fact that nearly half of nonparticipants

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13 Relatively few of the assessors indicated they had used Stream. Those that had did not express a preference for it relative to the other more common, publicly available software options.

14 These data represent a combined percentage of participants who answered somewhat agree or strongly agree to the questions about their virtual software experiences.
were concerned about technology indicates the program will need to overcome this concern and/or provide more support or opt for an HEA for less technologically savvy customers.

We also asked assessors if they thought any additional features or even software specifically designed for VHEAs would meaningfully improve the VHEA experience or the accuracy of resulting scopes of work. For the most part, assessors said they were software agnostic and could make any software work. Instead of focusing their response on desirable features, assessors typically used the question as an opportunity to reiterate that the biggest influencer to the success of a VHEA was customer engagement and preparation (e.g., sending photos ahead of time).

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“We can get all the information we need - if the homeowner is capable.”
- Energy Specialist

### 3.2.3 Accuracy

Perhaps the greatest question regarding the long-term viability of VHEAs is whether assessors can—without going onsite—develop accurate, contractor-ready weatherization scopes of work. Based on our interviews with twenty contractors that completed work following VHEAs, the answer was consistent: “Yes, but…”.

Interviewed contractors were often quick to mention that there is no substitute for having an expert in the home and, relatedly, that they’ve seen more variability in VHEA scopes than they see for HEA. Specifically, they cited:

- **More “Major” Changes.** Contractors were clear that scopes from in-person assessments are not infallible (“Sometimes you can’t know until you open up the wall”) and noted that they are not strangers to RCD’s change order process. However, they were equally clear that—as a result of the transition to VHEA—they’ve seen a meaningful increase in the percentage of jobs that required a “major” change, which contractors described as jobs that required more or fewer days than initially scoped. Contractors estimated, on average, that 15% of VHEA-based jobs required a major change, up from a rate of 5-10% for HEAs. They often cited wall insulation as the primary cause of major changes since assessors—unable to definitively conclude whether walls are already insulated remotely—default to including them in a scope. Once in the home, contactors reported they often found that the walls were already insulated. Contractors noted that, unlike smaller scope changes, major changes that added or dropped days from the job led to idle or inefficiently routed crews.

Our analysis of the program data supports contractors’ anecdotes. We found that 22% of all jobs following a VHEA were subject to change order greater than $1,500, which is approximately 1/3 of the average scoped cost and a proxy for a “major” change as described by contractors. This compares to only 12% for HEAs. As suggested by the contractors, most of the major changes (18% of the 22%) were a decrease from the scoped to final cost.
While these major decreases are not problematic from the customer’s perspective (i.e., their co-pay—when incentives are not 100%—would go down, not up), contractors were clear that the change complicates their job and staff planning. Some contractors have adapted to this recurring problem by increasing the frequency of their “scope checks” (i.e., in-person visits to participating homes to confirm the proposed scope prior to the customer’s official installation date), particularly when the scope includes wall insulation.

- **More “Walk-aways”**: Contractors also estimated that they have to completely walk away from another 5-10% of VHEA jobs due to a pre-weatherization barrier – most commonly an unidentified health and safety (like mold) or a failed, pre-job combustion safety test. Walk-aways are not unique to VHEAs; assessors and contractors alike were quick to note that, whether part of an HEA or VHEA, “you never know what’s behind a wall until you open it up”. However, contractors were generally consistent that the rate of walk-aways following VHEAs was higher. Like the “major” changes above, “walk-aways” lead to idle crews that the contractor still has to pay or needs to quickly reroute to a different job.

Again, contractors were clear that pre-weatherization barriers were also missed when assessors were in participant’s homes but that the frequency of walk-aways had increased. This contractor perception is supported by our analysis of the RCD program data: we found the program identified a pre-weatherization barrier in 21% of homes as part of HEAs in 2019 and only 17% of VHEA in 2020. While the raw difference is only 4%, this represents a percentage decrease of almost 20%. This disparity, coupled with the increase weatherization recommendation rate noted earlier, has resulted in a higher
incidence of problematic jobs for participating contractors. It also reflects a partial shift in
the responsibility of identifying pre-weatherization barriers from assessors to contractors.
PAs and LVs are aware of the inherent limitations of VHEA related to pre-weatherization
barriers and at work on mitigation strategies.

- **More Hassle and Less Profit.** For the reasons above, contractors reported
  experiencing increased administrative and lost labor costs, which hurts their bottom-line.
  They did express appreciation for the initiative coming back online and mention that
  problems caused by the increase in major changes and walk-aways was—temporarily—
  offset by the volume of RCD project in their work queue. They did express concern that
  come summer and the expiration of the increased 100% insulation incentive that would
  have a harder time overcoming the increased burden resulting from less accurate
  VHEA-based scopes of work. RCD managers also pointed out the some of the additional
  costs faced by contractors (impacting profitability) were also potentially offset by the
  higher average cost of jobs scoped after VHEAs – even after accounting for the change
  orders described above. The post-change order increase in project costs for VHEAs
  (versus HEA) is likely a result of participants taking advantage of the 100% incentive
  level to weatherize their homes more comprehensively.

We asked what adjustments contractors were making in response to these issues. Contractors
typically cited some combination of these three mitigation attempts.

- **Sending a scout.** When possible, contractors said they increased the frequency with
  which sent someone from their team to confirm the scope of work and assess for pre-
  weatherization barriers before sending a full weatherization crew. These “scope checks”
  also occurred following HEAs, but have become increasingly necessary for VHEAs,
  particularly when the scope includes wall insulation.
- **Doing pre-research and being more selective about the jobs they take.** Contractors
  shared they more frequently research homes before a job—comparing the scope to what
  they see online (e.g., year home built, square footage, fuel type, satellite pictures of the
  property) and trying to anticipate potential issues.
- **Bringing extra materials to every job.** They also noted that since their trucks hold a
  finite amount of material so this proactive approach only works well for small
  adjustments.
- **Reshuffling their job queue on the fly.** Contractors have gotten used to moving their
  schedule around and now plan some contingency into their crew assignments knowing
  that a certain percent of jobs will fall through or take a more/less time than expected.

### 3.3 How can the PAs make the best use of VHEAs in the future?

**Key Insight:** VHEAs are imperfect but offer a myriad of benefits that, alongside other
complementary delivery approaches, will allow the PAs to increase the reach and efficiency
of future RCD program cycles.

The study’s third research theme (“How can the PAs make the best use of VHEAs in the
future?”) was not intended to chart the future course for RCD—that aim is for PA’s three-year
planning efforts. Rather, our intentions with this study and research theme were more modest: to solicit and share ideas regarding the best prospective role of VHEAs and to glean lessons learned from this forced experiment with VHEAs that the PAs can use as part of those larger, on-going planning efforts.

Before diving into ideas for the future, it is worth noting that many of the interviewed PA, LV, and HPC managers shared that they (prior to the RCD’s temporary shutdown) had already been thinking about how to incorporate virtual elements into RCD. These same stakeholders were quick to acknowledge that social distancing requirements imposed in March 2020 dramatically accelerated their timeline for integrating new virtual elements. Regardless, it is important to understand that some form of virtual engagement with RCD customers was actively being explored prior to March 2020.

Across our interviews with PAs, LVs, Energy Specialists, and HPCs, we consistently heard the following:

1. **VHEAs are here to stay.**

   When asked if they envisioned VHEAs as part of RCD’s future, interviewees unanimously responded with a resounding “Yes”.

   Interviewees readily acknowledged that the current delivery was imperfect, citing its newness and the pandemic-expedited rollout. However, overall, they indicated they were pleased with how quickly and effectively the program transitioned to VHEAs. Interviewees often offered qualified endorsements of the VHEA process (i.e., “Largely, we’re finding that it works.”) and expressed mild surprise at the early success of the virtual format. They noted that they saw some initial reticence on the part of customers, but as people were forced to do more things virtually—in all facets of their life—the idea of a VHEA became less foreign and customers warmed to the option.

   After almost a year delivering VHEA, interviewees did not express concerns about their long-term viability and were unequivocal that VHEAs, and other forms of virtual customer interactions, would be part of future RCD offerings.

2. **VHEAs eliminate waste, which creates opportunity.**

   When asked about the advantage of VHEAs, interviewees usually cited one or more of the following efficiencies:

   - **More customers.** Historically, LVs and HPCs completed 2 or 3 HEAs per day per assessor. However, due to shorter assessments, reduced travel time, and the ability to start VHEAs later in the day, LVs and HPCs noted they can assess 4 to 5 participants per day per assessor. Some assessors noted markedly higher rates of “no shows” for VHEAs than HEAs, which one HPC described as a “less sticky appointment” since the assessors is not physically coming to the participant’s home. Still, LVs and HPCs were clear they can reach more customers – and do so faster – using VHEAs.

   "You can get a lot more production out of a day if you aren’t spending two hours in your car.”
   - Assessor
• **Less travel time.** Stakeholders, particularly assessors, pointed out that “windshield time is a big thing” and that eliminating it removes direct (labor) indirect costs (mileage and carbon emissions) and avoids scheduling inefficiencies caused by weather, traffic and customer no shows. They noted that replacing windshield time with customer follow-ups, timely call backs, and returning weatherization scopes to the customer soon improved the customer’s experience and moved customers through the participation process faster.

• **Less paperwork.** By necessity, VHEAs also led to an online and streamlined document signing process (e.g., using DocuSign), which digitized documentation previously completed by hand and helped participants return completed weatherization scopes of work faster.

3. **Virtual engagements are an important mechanism for diversifying delivery and transitioning away from RCD’s historical “one size fits all” approach.** Interviewees, as part of this study and previous HES/RCD-focused studies, have noted that the PAs long-standing interest in moving away from the initiative’s historical “everyone gets an assessment” default approach. While comprehensive, in-person assessments are timely, costly, and in some instances seen as unnecessary (e.g., the home was assessed recently, the customer is very certain of what they want, or simply needs to qualify for a HEAT loan).

PAs, LVs, and assessors alike expressed excitement about VHEAs, describing them as “another tool in the tool-box” that can be used to meet participating customers’ diverse needs. They envision future iterations of RCD deploying a mix of assessment modes (e.g., virtual, hybrid, or traditional in-home assessment) to match the needs of participants. Some suggested a staggered approach or screening process (i.e., start with a VHEA, schedule a HEA if necessary), while others suggested creating topic-focused interactions (e.g., a 15-minute HEAT loan only appointment).

The PAs and LVs acknowledged that customers often do not know what they need when they contact the initiative and that any shifts away from the more comprehensive approach could result is missed opportunities. However, they countered that the assessor time and implementation funds saved with a more diversity delivery approach might offset missed opportunities and result in greater savings for RCD overall.

4. **But making that happen will require evolving RCD’s “infrastructure”**. Interviewees expressing a desire for this diversified approach were also quick to point out that a true shift in the program’s philosophy would need to be accompanied by meaningful changes to RCD’s sizable operations infrastructure (e.g., contracts, performance metrics, and incentive mechanisms), which, understandably, is currently oriented around the program’s customary in-person assessments.
While daunting (one interviewee likened making changes to RCD as “trying to turn three ocean liners at once”), stakeholders were optimistic. They noted that it was critical that the goals and intentions of the three-year planning process are mirrored in the contracting and inventive mechanisms that dictate how LVs and HPCs deliver RCD.

5. **If assessments change, should assessors change too?**

   Currently, RCD’s one-size-fits-all comprehensive energy assessment approach requires a one-size-fits-all assessor. However, interviewees noted that diversifying delivery methods would also allow the program revisit how it staffs the program.

   Interviewees shared a few potential models. The most suggested was a phased or funnel approach where customers would start with an “Energy Generalist”. The generalist would be responsible for triaging the customer’s situation, moving them through the program themselves, or, if necessary, connecting the customer with the relevant program experts (e.g., a HVAC expert or HEAT loan specialist). These interviewees noted that—in an increasingly complex energy environment (i.e., traditional efficiency blending with electrification, storage, renewables, and distributed energy resources generally)—it was impossible for everyone to be an expert in everything.

   Some further supported this idea by noting that building science expertise and sales acumen do not always come in the same package. They stressed that everyone who engaged with customers would be trained and knowledgeable, but that a phased or funnel approach would allow program staff to specialize and focus on their personal comparative advantages to best serve customers and deliver savings.

6. **Strive for real-time customer engagement.**

   Historically, most customers’ first interaction with RCD is with the call center, which takes their basic information and signs them up for an assessment. At that point, the interaction (other than some confirmation e-mails) is typically idle until the assessor checks in with the customer shortly before their assessment.

   Since one byproduct of VHEAs has been an increase in assessor availability (working from home, shorter assessments, no lost drive time, and increased cancellations), some interviewees suggested that the program should try to serve more customers in real time (i.e., when they call). In fact, one interviewed high-volume HPC shared that their team has able to complete ~20% of their total VHEAs “right away” if the call center determined the customer was available at that time.
This idea, which potentially pairs with the phased/funnel approach above, could be further enabled by one LV’s note about staffing: “If we aren’t going into everyone’s home, then we don’t have to have staff in specific geographic locations. We could diversify our staff; they won’t even necessarily have to be in Massachusetts.”

Staff location aside, the idea of engaging customers more rapidly and/or dynamically is consistent with another thread our team observed in the interviews: it’s not just about the HEA/VHEA, it’s about fostering a trusting and long-term energy partnership with PA customers.

7. **HVAC feels like the next virtual opportunity.**

While interviewees did not offer many specifics, most mentioned HVAC—which is expected to play an increasingly large role in future PA residential programs—when we ask how else the PAs could use leverage virtual interactions with participants. When pressed, they wondered aloud whether short virtual interactions could allow participants to qualify for early replacement incentives or could replace in-person installation verifications.

In addition to the forward-looking findings and idea above, Table 4 summarizes the lessons learned noted in the previous two section and offers thought regarding the implications of each for the PA’s ongoing planning efforts:
Table 4. Summary of Lessons Learned & Potential Future Implications

<table>
<thead>
<tr>
<th>Topic</th>
<th>Lesson Learned</th>
<th>Future Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant Engagement</td>
<td>• Assessors universally cited customer’s effort level (before and during VHEA) as key to success.</td>
<td>• Clearly communicate level of effort and physical requirements of a VHEA (e.g., accessing different parts in the home) to avoid surprising customers.</td>
</tr>
<tr>
<td></td>
<td>• A quarter of participants did not realize how much work would be required of them during VHEA.</td>
<td>• Provide alternatives for customers unable or unwilling to meet those requirements (hybrid or HEAs).</td>
</tr>
<tr>
<td></td>
<td>• Clearly communicate level of effort and physical requirements of a VHEA (e.g., accessing different parts in the home) to avoid surprising customers.</td>
<td>• Emphasize importance of providing clear photos ahead of VHEA, as well as filling out direct install and home surveys in timely manner.</td>
</tr>
<tr>
<td></td>
<td>• Provide alternatives for customers unable or unwilling to meet those requirements (hybrid or HEAs).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Emphasize importance of providing clear photos ahead of VHEA, as well as filling out direct install and home surveys in timely manner.</td>
<td></td>
</tr>
<tr>
<td>Instant Savings Measures</td>
<td>• ISRs were markedly lower for all ISMs after VHEAs (relative to HEA direct install.)</td>
<td>• The PAs course corrected by providing participants with more guidance on installation, but the low ISRs in late summer/early fall suggest more intervention or a different tactic is necessary.</td>
</tr>
<tr>
<td></td>
<td>• HPCs showed lower ISRs than LVs for all ISMs.</td>
<td>• The disparity between HPCs and LVs also suggests specific action is needed to bolster ISRs for HPC-led participants.</td>
</tr>
<tr>
<td>Nonparticipation barriers</td>
<td>• Majority of nonparticipants were unaware of temporary increase in weatherization incentives.</td>
<td>• Focus marketing on ease of VHEA (shorter, convenient, can use familiar tech), citing high levels of VHEA satisfaction, including testimonials from “repeat” (VHEA &amp; HEA) participants as evidence.</td>
</tr>
<tr>
<td></td>
<td>• Nonparticipants expressed strong preference for an in-person HEA and cited concerns about their ability to complete the assessment themselves, the condition of their home, and the VHEA seemingly like a hassle as the primary reasons why.</td>
<td>• Assessors indicated that although VHEA took less time, they were not explicitly marketing the assessments as shorter (in part to dispel concerns about VHEAs being less rigorous). This logic makes sense, but marketing VHEA as faster and more efficient could potentially encourage time-constrained nonparticipants.</td>
</tr>
<tr>
<td></td>
<td>• Focus marketing on ease of VHEA (shorter, convenient, can use familiar tech), citing high levels of VHEA satisfaction, including testimonials from “repeat” (VHEA &amp; HEA) participants as evidence.</td>
<td>• Providing alternative delivery formats for concerns</td>
</tr>
<tr>
<td>Weatherization Scoping</td>
<td>• Unsurprisingly, scopes from VHEAs as less accurate (e.g., missed pre-weatherization barriers, incorrectly specified insulation amounts), which contributes to contractor frustration and could, post-100% incentive, lead to customer frustration.</td>
<td>• The 100% incentive temporarily insulated participants from fluctuations in their contribution to weatherization improvements, but that will not be true at 75%. This could lead to customer frustration/dissatisfaction. The PAs should consider mechanisms for addressing this likely possibility. These could include requiring all weatherization participants to have an in-person visit (i.e., convert to hybrid), provide customers with a range of potential costs, or offering cost “forgiveness” (i.e., the program covers any out-of-pocket costs beyond the 25% of the initial scope that the customer already agreed to pay.</td>
</tr>
<tr>
<td>Scoping Accuracy</td>
<td></td>
<td>• Increased emphasis on visual evidence; the more pictures provided to contractors the better.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Providing IICs with increased autonomy to make as needed adjustments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Facilitating increased direct communications between Energy Specialists and IICs.</td>
</tr>
</tbody>
</table>
4. Appendices

4.1 Participant Survey – Completed Surveys and Analysis Weights

The table provides a summary of the total number of VHEAs by PA, the number of each surveyed, and the corresponding analysis weights used for reporting statewide values as part of this study. As evident below, our team oversampled the PAs with less participation to ensure their representation in the study and to generate sufficient sample sizes for comparing survey results across PAs. Without this oversampling (i.e., using proportional sampling), nearly 92% of the completed surveys would have been with National Grid or Eversource participants.

Table 5. VHEA Participation, Completed Surveys and Analysis Weights by PA

<table>
<thead>
<tr>
<th>PA</th>
<th>Population</th>
<th>Completed Survey</th>
<th>Analysis Weight*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berkshire Gas</td>
<td>303</td>
<td>1.6%</td>
<td>42</td>
</tr>
<tr>
<td>Cape Light Compact</td>
<td>1,066</td>
<td>5.5%</td>
<td>45</td>
</tr>
<tr>
<td>Eversource</td>
<td>6,125</td>
<td>31.6%</td>
<td>71</td>
</tr>
<tr>
<td>Liberty Utilities</td>
<td>19</td>
<td>0.1%</td>
<td>4</td>
</tr>
<tr>
<td>National Grid</td>
<td>11,690</td>
<td>60.3%</td>
<td>130</td>
</tr>
<tr>
<td>Unitil</td>
<td>188</td>
<td>1.0%</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>19,391</td>
<td>100%</td>
<td>332</td>
</tr>
</tbody>
</table>

*Used when reporting statewide values.

4.2 Nonparticipant Survey – Completed Surveys and Analysis Weights

Table 6 provides similar information for the nonparticipant survey, which was weighted by LV due to incomplete information regarding nonparticipant’s PA.

Table 6. VHEA Nonparticipant Population, Completed Surveys and Analysis Weights (by LV)

<table>
<thead>
<tr>
<th>LV</th>
<th>Population</th>
<th>Completed Survey</th>
<th>Analysis Weight*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLEAResult</td>
<td>468</td>
<td>66.6%</td>
<td>49</td>
</tr>
<tr>
<td>CET</td>
<td>78</td>
<td>11.1%</td>
<td>16</td>
</tr>
<tr>
<td>RISE</td>
<td>75</td>
<td>10.7%</td>
<td>12</td>
</tr>
<tr>
<td>Abode</td>
<td>82</td>
<td>11.7%</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>703</td>
<td>100%</td>
<td>77</td>
</tr>
</tbody>
</table>

*Used when reporting statewide values.