

Memorandum

To: Massachusetts Program Administrators

From: Residential Evaluation Team (Guidehouse and Cadeo)

Date: July 7, 2022

Re: MA21R40-B-VHEA Follow-up – Task 5 Findings Memo

Introduction

In March 2021, Guidehouse and Cadeo (the residential evaluation team) completed a study of the virtual home energy assessments (VHEAs) that the Massachusetts Program Administrators (PAs) launched in response to COVID-19.¹ The study found that though VHEAs were imperfect, they provided a viable delivery method and a meaningful opportunity to streamline and diversify the PAs' Residential Coordinated Delivery (RCD) initiative. However, the previous study focused exclusively on the PAs' immediate response to COVID-19. This included the PAs' initial VHEA rollout and the period (March through September 2020) when, due to social distancing requirements, VHEAs were the PA's primary method for delivering RCD.

Because of these constraints, the previous study was unable to offer insight into the persistence of VHEAs after social distancing requirements were relaxed (i.e., in-person assessments were readily available to customers) and the temporarily elevated incentive levels expired (i.e., the 100% incentive for weatherization,² which ended September 30, 2020). This study supplements the original study by providing long-term insights into VHEAs.

As part of this study, our team:

1. **Examined more recent participation trends**, particularly after the PAs' temporary 100% incentive for weatherization ended.
2. **Explored the mix of customers** that opted for a traditional, in-person home energy assessment (HEAs) versus a VHEA.
3. **Quantified the travel mileage and vehicle emissions** saved by offering VHEAs.

¹ The Electric and Gas Program Administrators of Massachusetts, *Residential Coordinated Delivery Virtual Home Energy Assessment Study*, by Guidehouse Inc., and Cadeo, Boulder: Guidehouse, 2021. https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf.

² To encourage participation and aid potential mis-scoped VHEA weatherization jobs, the PAs covered 100% of weatherization costs, up to \$10,000—up from the typical 75% cost coverage. This offer started in March 2020 and lasted through the end of September 2020.

4. Identified lessons learned from the PAs' experiences with VHEAs, as well as experiences from other PAs around the country.

Please note that this memo, as well other sources included our literature review, uses “virtual” and “remote” interchangeably to describe assessments delivered via teleconferencing technology (e.g., smart phone, usually using Zoom, Google Meet, FaceTime, or similar application).

Evaluation Activities

This study sought to expand insights related to VHEAs by examining more recent RCD tracking data and following up with key stakeholder groups interviewed as part of the previous study. Specifically, our team completed the following tasks.

Task 1 | Participation Analysis

The residential evaluation team analyzed RCD participation trends using data from October 2020 to September 2021—the year following the PAs' return to the standard 75% incentive for weatherization—and using detailed program tracking data provided by each RCD Lead Vendor (LV).³ We compared metrics for VHEAs and HEAs, including total assessments completed, instant savings measure order/install rates, recommendation rates, close rates (i.e., how often customers installed recommended measures), and change orders. In addition, we estimated the environmental benefits of VHEAs (e.g., avoided mileage and emissions) and analyzed American Community Survey (ACS) data to explore the potential differences in the mix of customers who choose VHEAs and HEAs.

Task 2 | Program Manager Interviews

Our team completed seven interviews with PA implementation managers and RCD LVs. These interviews provided managerial perspectives regarding the impact of switching weatherization incentives from 100% to 75%, the continued customer and assessor interest in VHEAs, and the role of VHEAs in the long term.

Task 3 | Contractor Interviews

The team also completed 11 follow-up interviews with contractors who we originally spoke with in late 2020 as part of the previous VHEA assessment. Seven of the interviewees were independent insulation contractors (IICs) and four were home performance contractors (HPCs), including representatives from the largest and most active HPC companies. We focused our interviews on contractors' experiences completing weatherization scopes generated during VHEAs and how those experiences may have changed over the past year (i.e., as assessors gained experience with VHEAs and as incentive levels returned to the customary 75%).

Task 4 | Literature Review

We found that publicly available reports and data from other PAs offering VHEAs were relatively limited. However, our team collected what information was available via online sources (from eight sources in total) and conducted two informational interviews⁴ with identified organizations about their experience implementing VHEAs.

³ Data from Abode, Center for EcoTechnology, and RISE included participation data from October 2020 to August 2021; CLEAResult went through September 2021.

⁴ We spoke with a representative from the Tennessee Valley Authority (TVA) regarding the EnergyRight program and the Center for Energy and Environment's manager of Xcel Energy and CenterPoint Energy's Home Energy Squad program in Minnesota.

Key Findings

Participation Trends

- 1. Most assessments happen in person.** From October 2020 to September 2021, the proportion of HEAs steadily increased, nearly doubling in-person assessments from 40% to 70%. Over the entire year-long period, nearly two-thirds (62%) of assessments occurred in person. The return to in-person assessments was particularly pronounced for HPCs (77% compared to 50% for LVs) over the same period. Interviewed stakeholders, especially HPCs, said that customer preference drove the return to in-person assessments.
- 2. Assessors recommended weatherization less often after the 100% weatherization incentive expired—and once they got back into customer homes.** When the incentive level temporarily increased to 100%⁵, assessors recommended weatherization following 75% of assessments. When the incentive returned to the standard level, the recommendation rate dropped to 64%. However, the change in the incentive level coincided with assessors returning to customer's homes, which enabled them to better assess existing insulation levels and increase the certainty of their recommendations. The clear decrease in weatherization recommendation rates is likely due to both the lesser incentive level and the fact that assessors more accurately evaluate the opportunities within a home through physical inspection.
- 3. Stakeholder concerns regarding customer frustration from inaccurate VHEA work scopes did not materialize.** During our interviews in late 2020, contractors consistently criticized the inaccuracy of virtually generated weatherization scopes, which they said adversely impacted their bottom line. Program managers and assessors also expressed concern that customers would get frustrated if their out-of-pocket contribution changed, specifically increased, due to change orders between their VHEA and installation. These same stakeholders shared that their concerns had not materialized because fewer assessments were virtual now and because assessors had become better at performing VHEAs.

Customer Mix

- 4. There do not appear to be meaningful differences between the customers who choose a VHEA and those who choose an HEA.** We found they were nearly identical for the following ACS metrics: age, race, English speaking, education, and veteran status. We did see that VHEA participants are slightly more likely than HEA participants to live in census block groups with a higher average income.

Environmental Benefits

- 5. Virtual assessments helped assessors avoid purchasing and consuming nearly 50,000 gallons of gasoline, which saved ~600 metric tons of carbon.** According to an LV that tracks assessor mileage, assessors drive an average of 36 miles for each HEA assessment. This means every VHEA avoids approximately 1.2 gallons of gas consumption and its associated negative impacts on the environment. Applying this per-VHEA value to the 35,355 VHEAs completed by LVs and HPCs between October 2020 and September 2021 means virtual assessments had a substantial positive environmental impact.

⁵ Available to all customers that scheduled their assessment before October 1, 2020. The increase to 100% (usually 75%) was a temporary offer aimed to maintain participation levels during 2020, encourage customers to overcome any misgivings about virtual assessments, and to avoid potential changes to participants' out-of-pocket contribution in the event a change order for a weatherization scope of work generated remotely adversely impacted them.

Lessons Learned

- 6. LVs and HPCs have not changed how they conduct VHEAs, but they have gotten better at developing more accurate scopes of work.** Greater experience delivering VHEA has taught stakeholders useful tricks—like leaning on veteran assessors for VHEAs and knowing when to pivot from virtual to in person mid-assessment—that have collectively produced more accurate VHEA outputs, which, in turn, ease contractor anxiety and buoy customer satisfaction.
- 7. LVs and HPCs are also applying lessons learned from VHEAs to improve HEAs.** Several practices adopted as part of virtual assessments, such as preassessment research (i.e., using Google Maps to preview participating homes) and virtual communication (i.e., brief pre-visit meetings with participants) have become standard practices for HEA. These activities can allow assessors to be more efficient during their time in the home and spend more time engaging directly with customers.
- 8. Information on lessons learned outside of Massachusetts is limited but largely corroborates PAs' experience.** Like the Massachusetts PAs, other program administrators have found that VHEAs benefits including shorter wait and assessment times, greater cost effectiveness, and ability to reach for select customers (younger, tech savvy, rural, etc.)

Detailed Findings

In this section, we provide supporting information for each of the key findings in the previous section.

Participation Trends

1. Most assessments happen in person.

Between October 2020 and September 2021, the LVs and HPCs completed 94,190 assessments. Over this time, the proportion of assessments steadily shifted from mostly VHEAs to mostly HEAs. As shown in Figure 1, the proportion of in-person assessments nearly doubled over the course of the year. The increase in HEAs over time was consistent for all LVs and HPCs.⁶

⁶ This includes HPCs managed by Abode (that assess National Grid customers), as well as HPCs managed by CLEARresult and RISE.

Figure 1. Proportion of In-Person Assessments (HEAs) by Month (October 2020 – September 2021)

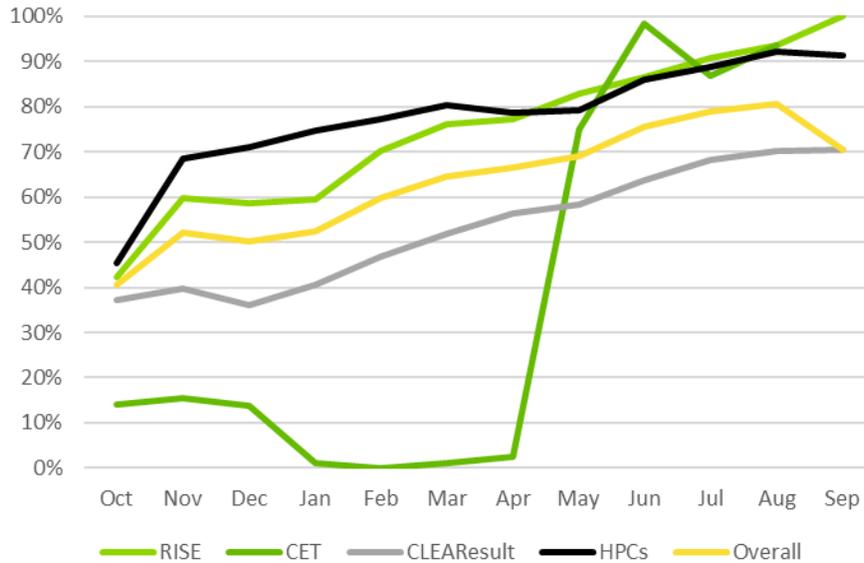
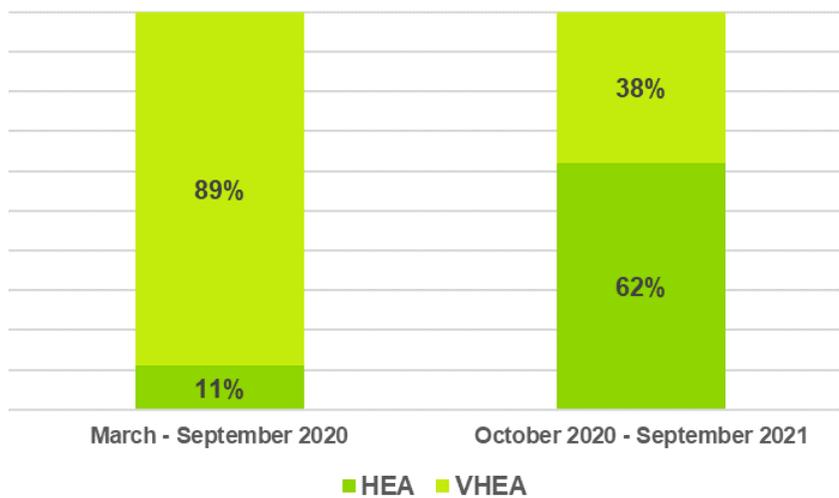


Figure 2 aggregates the information above, which shows that almost two-thirds (62%) of the assessments between October 2020 and September 2021 were traditional HEAs. It also compares the more recent rate to the 11% of in-person assessments that occurred between March 2020 and September 2020 (i.e., when the PAs first relaunched RCD and faced far more restrictive social distancing requirements). When asked about this change, many of the interviewed program stakeholders and contractors characterized the shift back to HEAs by saying their delivery of RCD had largely “returned to normal.”

Figure 2. Mix of HEAs and VHEAs



Interviewed stakeholders also consistently said that customer preference drove the return of HEAs. Most said that customers perceive in-person assessment as “more thorough” and, with the

widespread availability of COVID-19 vaccines, most customer no longer viewed having assessors in their home as a significant health risk.⁷

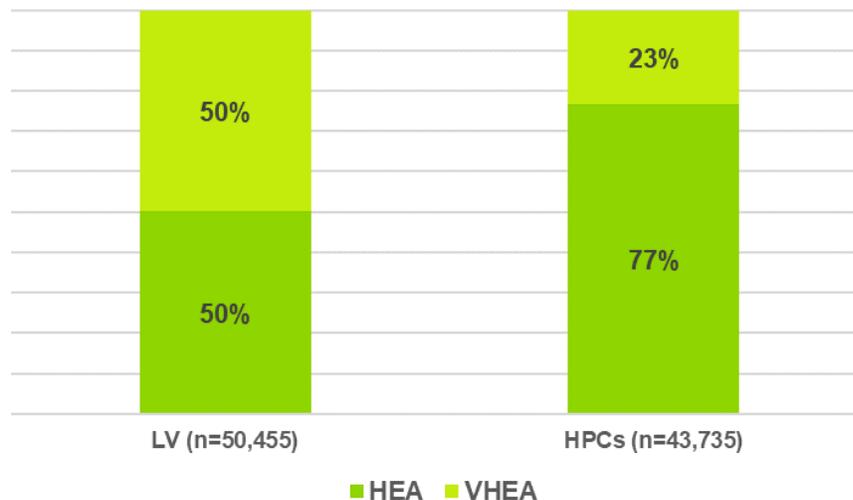
Interviewed stakeholders also acknowledged their role in the increase in HEAs. They often cited familiarity (“that’s how we’re used to doing it”) as a reason that most assessments are again in person. There was a general sentiment, particularly among assessors, that VHEAs were a “temporary Band-Aid” that were only truly necessary at the onset of the pandemic. In fact, most interviewed assessors explicitly expressed a preference for HEAs, commonly citing the following benefits:

- Easier to connect with and develop a meaningful relationship with customers
- Enables more thorough assessments and, therefore, more accurate weatherization scopes (when relevant)
- Ability to run pre-weatherization tests and more readily identify pre-weatherization barriers

As shown in Figure 1, tracking data from October 2020 to September 2021 also revealed a clear difference in HEAs and VHEAs between LVs and HPCs. Over the course of the year, statewide LVs assessments were split evenly between HEAs and VHEAs, whereas HPCs completed more than three HEAs for each VHEA.

This disparity is highlighted in Figure 3 and matches what we heard during interviews with LVs and HPCs. During our interviews, LVs focused more on the benefits and value of VHEAs and discussed positioning VHEAs as the default option (i.e., their initial offer that customers could opt out of). HPCs cited many of the same benefits of VHEAs, but they tended to express a stronger our-customers-want-in-person-assessments sentiment, which they felt compelled to meet.

Figure 3. Mix of HEAs and VHEAs by Delivery Channel (October 2020 to September 2021)



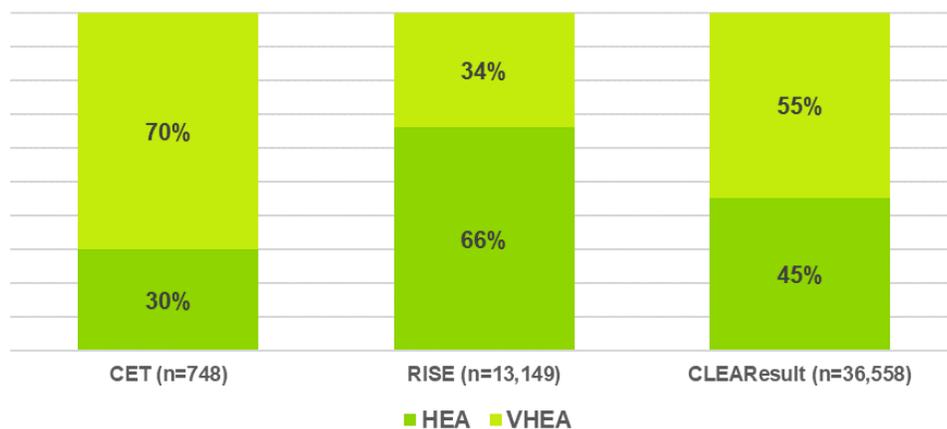
We also observed differences among LVs.⁸ As shown in Figure 4, two-thirds of RISE Engineering’s (RISE) assessments between October 2020 and September 2021 were in person, while less than half (45%) of CLEARResults’ were. Although there were far fewer total assessments to review, the Center

⁷ As a reminder, this follow-up study did not include a participant survey, so our team cannot compare managers, assessors, and/or contractors’ opinions against participant responses.

⁸ Does not include Abode, which does not have its own assessors and exclusively manages the HPCs that assess National Grid customers.

for EcoTechnology (CET) showed the highest rate of VHEAs, likely because of their more rural service territory and the smaller number of assessors.

Figure 4. Mix of HEAs & VHEAs by LV (October to September 2021)⁹



Despite the clear movement toward in-person assessments for all providers and the meaningful differences between LVs and HPCs, all interviewed stakeholders acknowledged that there is a “role for” VHEAs as part of future RCD offerings.

When asked to elaborate, stakeholders said VHEAs work best for:

- **Busier people.** For busy customers, VHEAs offer a shorter assessment that can (typically) happen at an earlier date than an in-person assessment. LV assessors and HPCs noted they are better able to squeeze in VHEAs at the margins of their day (i.e., earlier or later in their workday than they could a HEA). They said their increased availability to complete VHEAs allowed them to better meet the needs of customers with less flexible schedules.
- **Simpler home construction types.** With simpler homes (assessors often cited ranch houses), the straightforward and consistent construction style allow assessors to easily identify potential pre-weatherization barriers and/or develop accurate weatherization scopes in a virtual format.
- **Newer homes.** Similarly, assessors shared that they can confidently assess newer homes virtually. This is because newer homes typically have fewer pre-weatherization and/or health and safety barriers. They also noted that because newer homes are, well, new, homeowners have had less time to modify or customize the original building shell, which can complicate the assessment.
- **More recent participants.** Since RCD is a mature initiative, some customers participated previously. According to assessors, additional in-person assessments are unnecessary if the customer can confirm they have not made any major changes to the home and/or are contacting RCD for assistance with a specific energy issue.
- **Rural participants.** VHEAs are more effective for more quickly scheduling customers in rural areas that, without the option, would likely need to wait until a LV or HPC could bundle their assessment with others in that rural area.

PAs, LV managers, and HPCs, cited a few other benefits of VHEAs:

- **Screening Tool.** Interviewees commonly stated that VHEAs were less comprehensive and accurate than HEA. However, they often acknowledged that virtual interactions, which they

⁹ Values reflect assessments completed by LV assessors (i.e., not any HPCs managed by the LV).

differentiated from an official VHEA, had become more commonplace. They said these virtual interactions, either as an initial screening tool to understand what the customer's situation was before scheduling an in-person assessment or as a first interaction with the customer to set expectations, were effective.

- **Conducting HEAT loan qualification questions.** Massachusetts PAs currently require customers interested in financing efficiency improvement through the HEAT loan¹⁰ program to undergo an energy assessment. However, these customers are also often looking for financial support for a specific improvement (e.g., a new high efficiency heating system) and, according to interviewed stakeholders, uninterested in a comprehensive assessment. Interviewed stakeholder believe interactions for customers with specific HEAT loan objectives could be easily asked virtually, which would save assessors significant time and allow them to focus on other customers.
- **Hiring is no longer location based.** One HPC said that VHEAs enabled them to hire experienced employees in other parts of the country since the physical distance between assessors and customers is a non-factor for virtual interactions. While the high proportion of HEAs limits the overall value of non-local assessors, the HPC noted that they'd been able to bring on experienced staff that they otherwise would have not been able to.

2. Assessors recommended weatherization less often after the 100% weatherization incentive expired—and once they got back into customer homes.

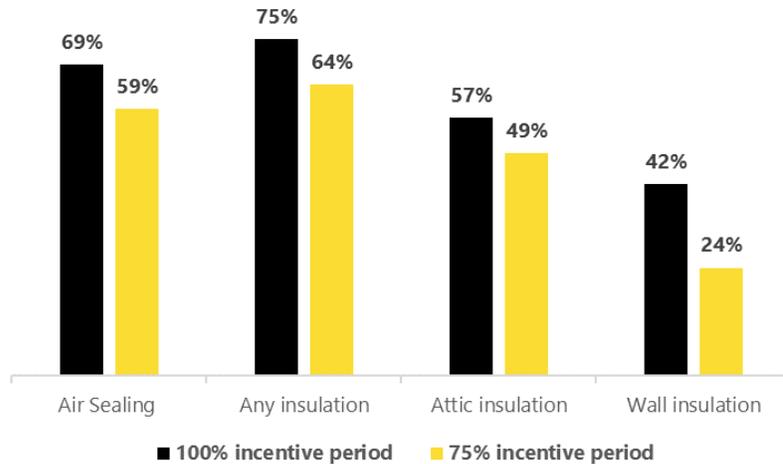
During the previous VHEA assessment, stakeholders wondered what effect the expiration of the elevated 100% weatherization incentive would have on weatherization recommendation and installation rates.

As shown in Figure 5, we found that once the incentive returned to 75%, assessors recommended all types of weatherization (air sealing, attic insulation, and wall insulation) less frequently (relative to the 100% incentive period).¹¹ The drop was most pronounced for wall insulation, which was almost cut in half (from 42% to 24%) and was consistent with input from interviewed LV assessors and HPCs. Many told us that, during the 100% incentive period, they generated more robust weatherization scopes since the elevated incentive eliminated the higher customer co-pays typically associated with larger scopes of work. As one assessor summarized it: "Why not go after all the opportunities when it's free?"

¹⁰ Mass Save, "Mass Save@ HEAT Loan," <https://www.masssave.com/saving/residential-rebates/heat-loan-program>.

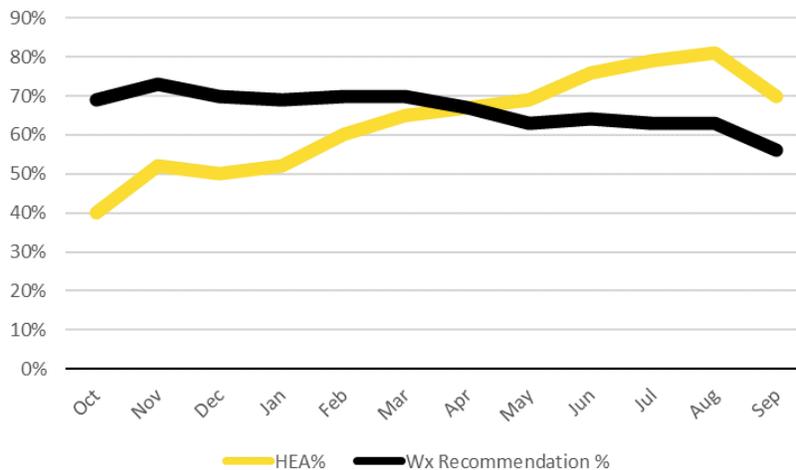
¹¹ The 100% weatherization incentive was available to all customers that who up for an assessment before October 1, 2020—even if their assessment occurred after that date. The data available to our team included each customer's assessment date, which we've used for this figure, but it did not include the customer's sign-up date (or the incentive received), which would have indicated the incentive level for which the customer was eligible. Per interviewees, the 100% incentive created a substantial backlog of assessment for LVs and HPCs alike, so it is likely many of the participants that had assessment in late 2020 and even early 2021 were eligible to receive the 100% incentive. This may mean that the disparity between recommendations rates in Figure 5 are understated.

Figure 5. Weatherization Recommendation Rates by Incentive Level¹²



The decline in weatherization recommendation rates after the incentive decreased coincides with the increasing rate of HEAs that occurred after September 2020. As evident in Figure 6, the decline in weatherization recommendations rates by month are inversely correlated with an increasing percentage of assessments happening in person.

Figure 6. Weatherization Recommendation and HEA Rates by Month



This relationship seen in Figure 6 is also consistent with our interviews with LV assessors and HPCs. Many told us that they would likely recommend insulation if there were any uncertainty (i.e., whether the space was already insulated) during a VHEA. They noted this was particularly true for wall

¹² The 100% weatherization incentive was available to all customers that signed up for an assessment before October 1, 2020—even if their assessment occurred after that date. The data available to our team included each customer’s assessment date, which we’ve used for this figure, but it did not include the customer’s sign-up date (or the incentive received), which would have indicated what incentive level the customer was eligible for. Per interviewees, the 100% incentive created a substantial backlog of assessment for LVs and HPCs alike, so it is likely many of the participants that had assessment in late 2020 and even early 2021 were eligible to receive the 100% incentive. This may mean that the disparity between recommendations rates in Figure 5 are understated.

insulation, which they shared was most difficult to assess virtually. Unable to physically assess the walls, assessors said they had to speculate based on the age of the home (i.e., what building code the home was subject to?), the customer's experience living in the home (i.e., was a room or wall always cold?), or the customer's memory (of previously insulating the home or recalling whether it was insulated from a past assessment or home inspection). When uncertain, assessors said they were more likely to include wall insulation—just in case—as part of their recommendations, knowing that installation contractors, once physically in the home, could issue change orders if they determined the wall was already insulated.

During the previous VHEA study, RCD stakeholders also expressed concern about a potential drop in weatherization close rates after the expiration of the 100% incentive. While PA project managers (PMs) and LVs said there was initial dip after the transition back to the 75% incentive, the close rate returned to its pre-COVID historical rate within a few months. This is intuitive as the rate returned to its previous, pre-COVID level, not a reduced level. Specifically, our analysis of the tracking data yielded a weatherization close rate of 40%, similar to the 43% close rate determined in 2018 as part of the most recent RCD process evaluation.^{13,14} More generally, all PMs, LVs, and HPCs reported negligible negative experiences when shifting back to the 75% incentive structure.

3. Stakeholder concerns regarding customer frustration from inaccurate VHEA work scopes did not materialize.

The team's previous VHEA assessment¹⁵ included the following passage in the final report:

...interviewees 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.

As part of this study's follow-up interviews, we asked managers, assessors, and contractors whether their previous concerns about the end of the 100% weatherization incentive came to pass. The answer, from all three RCD stakeholders, was no.

When we asked why these concerns did not materialize, interviewees cited one or both reasons:

- **Renewed access to customer homes.** As discussed at length in the previous sections, the initiative experienced a steady increase in the proportion of the assessment that occurred in person. Through beneficial coincidence, the timing of the return to 75%

¹³ The Electric and Gas Program Administrators of Massachusetts, *Home Energy Services*, 2018, https://ma-eeac.org/wp-content/uploads/MA-RES-35-HES-Process-Evaluation-Comprehensive-Report_FINAL_31MAR2018.pdf

¹⁴ This analysis, consistent with the previous process evaluation, was limited to participants that had their assessment at least six months before the LVs provided our team with the tracking data (i.e., to account for the common lag between when customers have their assessment, when they make the decision to install, and when a contractor installs the recommended insulation).

¹⁵ The Electric and Gas Program Administrators of Massachusetts, *Residential Coordinated Delivery Virtual Home Energy Assessment Study*, by Guidehouse Inc., and Cadeo, Boulder: Guidehouse, 2021. https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf.

aligned with the rise of HEAs, which mitigated concerns about volatile co-pays and related customer dissatisfaction that might occur from less accurate VHEAs.

- **More experience delivering VHEAs.** LV assessors and HPCs acknowledge there was a learning curve for assessing homes virtually and self-reported that they had improved over time. Contractors—the stakeholder most concerned about inaccurate VHEA scopes, overlooked barriers, and lost work during the last assessment’s interviews—corroborated the assessors’ self-assessment. Contractors noted less frequent change orders after October 2020, which was consistent with RCD tracking data (15% after October 2020 compared to 22% between March and September 2020).

Customer Mix

4. There do not appear to be meaningful differences between the customers who choose a VHEA and those who choose an HEA.

The RCD tracking data provided by LVs included limited demographic data about participants.¹⁶ Therefore, the team leveraged available demographic data from the 2020 ACS five-year estimates at the census block group level to assess for potential differences between HEA and VHEA participants. We merged ACS data onto the participants’ account data (provided by LVs) after we geocoded each participant’s address to identify their census block group. The ACS data reflects the proportion of the population within a given census block group associated with a given census characteristic. This does not mean the specific RCD participant living in that census block group has a given characteristic.

When comparing the characteristics of the ACS census block groups that HEA and VHEA participants live in, we see minimal differences (Table 1). Though the differences are modest, the analysis does show VHEA participants tend to live in block groups with higher incomes (~\$5,000 higher than that of HEA customers). Those block groups also show slightly lower rates of nonwhite residents and slightly higher rates of adults with a college degree.

Table 1. Comparison of Census Block Group Characteristics for HEA and VHEA Participants

Block Group Characteristic	HEA	VHEA
Avg. householder's age	54	54
Avg. % of nonwhite residents in their census block group	25%	24%
Avg. % of non-English speaking households in their census block group	5%	5%
Avg. % of adults (25+) with a college degree in their census block group	45%	47%
Avg. % of adults (18+) with veteran status in their census block group	6%	6%
Median household income in their census block group	\$94,397	\$99,870

¹⁶ As documented in the Stage 2 plan for this study, it’s our team’s understanding that the initiative does not currently collect detailed demographic information from participants (versus that it simply was not provided to our team). Therefore, our team proposed using ACS data in the plan.

Environmental Benefits

5. Virtual assessments helped assessors avoid purchasing and consuming nearly 50,000 gallons of gasoline, which saved ~600 metric tons of carbon.

The team leveraged RCD tracking data, LV travel data, and a methodology developed by the US Environmental Protection Agency (EPA) to estimate the environmental benefit of an individual VHEA. We also used the collective set of VHEAs completed by LV assessors and HPCs between October 2020 and September 2021. The virtual assessments that were completed between October 2020 to September 2021 helped avoid nearly 601 metric tons of carbon emissions. Table 2 summarizes metrics of avoided mileage and environmental benefits associated with VHEAs.

Table 2. Estimated Environmental Benefits – Per VHEA

Metric	Value	Source
Average miles per HEA (round trip)	36	CLEARResult ¹⁷
Average miles per gallon of a typical car ¹⁸	25	EPA
Gallons of gas consumed per HEA	1.4	Calculated
Kilograms of avoided CO₂ per HEA	17	Carbon Footprint¹⁹

Table 3. Estimated Environmental Benefits – Total from October 2020 and September 2021

Metric	Value	Source
Total VHEAs	35,355	RCD Tracking Data
Total avoided miles	1,272,780	Calculated
Total avoided gallons of gas	49,497	Calculated
Total avoided CO₂ (metric tons)	601	Calculated

It is important to remember the following two considerations:

- This analysis does not include the precheck visits or additional visits to conduct blower door testing or ensure that the weatherization scope is accurate prior to starting insulation work.
- The annualized environmental savings summarized in Table 3 (October 2020 to September 2021) reflects the specific number of VHEAs that occurred during those 12 months. As noted previously, the percentage of assessments happening virtually has steadily declined, meaning that future estimates of the total annual environmental savings will likely be less.

¹⁷ Other LVs were unable to share this information, so our team used CLEARResult's value for all HEAs in the state.

¹⁸ Assumes gasoline van or truck weighing approximately 1.305 tons.

¹⁹ <https://calculator.carbonfootprint.com/calculator.aspx?tab=4>

Lessons Learned

6. LVs and HPCs have not changed how they conduct VHEAs, but they have gotten better at developing more accurate scopes of work.

When asked whether they made changes in how they deliver VHEAs since our previous interview in Fall 2020, most LV assessors and HPCs provided the same response: not really.

Despite the process of delivering VHEAs remaining largely unchanged since the previous research study, interviewees generally shared that the ability to successfully complete VHEAs and accurately develop weatherization scopes had improved over time. Contractors specifically reported fewer walkaways and more accurate scopes than a year ago (Finding 3 supports this anecdotal finding). The improvements were important for contractors as their ability to do their work suffers most directly from scope accuracy issues.

VHEAs will likely never be as accurate as HEAs, but interviewees shared the ways they have learned to minimize the shortcomings and improve outputs:

- **Using seasoned assessors for VHEAs** can significantly avoid accuracy issues and improve customer satisfaction. One LV noted that only assessors with five or more years of experience could conduct full-scale VHEAs with their organization because less experienced assessors struggle. Requiring an advanced level of field experience prior to conducting the VHEAs, can increase stakeholder confidence in the accuracy of the assessors' scopes. Respondents across the board agree that conducting a VHEA with little or no field experience typically results in myriad avoidable errors in scope.
- **Knowing when to pivot to an in-person (or hybrid) visit** was also mentioned as an important assessor skill. If a home turns out to be more complicated than anticipated, completing a partial assessment virtually and then finishing the rest of the assessment inside the home makes the most sense. In this case, the VHEA still holds significant value as it reduces the time assessors spend in the customer's home. In some other cases, a customer may request a VHEA, but the assessor can tell ahead of time the home will be too complicated for a VHEA only.

7. LVs and HPCs are also applying lessons learned from VHEAs to improve HEAs.

Although most assessments are again in-person element (or include an in-person element), interviewed assessors note that they are using lessons learned from their experience delivering VHEAs to improve HEAs. Assessors specifically cited three such lessons learned:

- **Conducting Preassessment Research.** When VHEAs were the only option, assessors and contractors relied heavily on Google Maps and Street View and/or country assessor data (or similar) to get a sense of customers' homes without physically visiting them. Many assessors found this preassessment information gathering practice valuable and now consult these sources before HEAs. They carried over this practice to in-person assessments because it makes their time in the home more efficient and allows them to spend more time engaging directly with customers.

- **Increased (Virtual) Communication.**

Assessors also said they often virtually contact customers prior to an in-person assessment to introduce themselves, set expectations, and even get a quick tour of the home. Similar—and complementary—to the preassessment research mentioned in the previous

bullet, these initial interactions reduce the total time spent in the home and make the entire assessment process smoother. Interviewed IICs also mentioned that they now more frequently contact customers before arriving to install insulation than in previous years because the additional contact mitigates the risk of cancellations.

“Many customers do not know what they want, so through the screening call we find that we can change the appointment from in-person to VHEA or vice versa.” –

LV

- **Doing Pre-Weatherization Checks.** Another practice that gained traction because of VHEA accuracy issues was the completion of precheck visits by IICs. This practice saved time and money for contractors by reducing the volume of cancellations from overlooked pre-weatherization barriers during virtual assessments. Although these prechecks existed before VHEAs, they became more popular after the onset of VHEAs because of the perceived increase in scope inaccuracies surrounding pre-weatherization and health and safety barriers. A few IICs said they have continued to do these checks, even after HEAs. Other said they had curtailed the practice after HEAs increased, because the precheck visits add work hours and commuting.

8. Information on lessons learned outside of Massachusetts is limited but largely corroborates PAs’ experience.

During the onset of the COVID-19 pandemic, many energy efficiency programs throughout the United States opted to include a virtual component to their HEA offering rather than shutting down operations completely. The PAs were interested in hearing about what lessons other programs learned during this shared experience of adapting to virtual program offerings during uncontrollable circumstances.

Overall, our literature review and interviews with program administrators outside of Massachusetts corroborated our findings in this follow-up investigation and the initial study from February 2021. Customers and assessors have a generally positive view of VHEAs, but customers tend to prefer in-person HEAs to VHEAs.

One program implementer we interviewed, the Tennessee Valley Authority (TVA), reported several key benefits for VHEAs, including shorter wait times, greater cost effectiveness, and mostly similar quality of service compared to typical in-person assessments. They agreed that VHEAs were best for select customer and home types (e.g., younger, more tech savvy customers and simpler home constructions).

They also shared that those who choose virtual assessment tend to be satisfied with them. TVA supports the notion that both VHEAs and in-person HEAs have an important role in efficiently addressing the diversity of customer circumstances.

“Virtual needs to be a complement to in-person, [and] you really need to offer both.” – TVA

In a report published by the American Council for an Energy-Efficient Economy²⁰, the authors acknowledge the additional advantages of virtual assessments, including increased privacy, saved time and money for both customer and assessor, and increased customer engagement by inherently requiring customer involvement throughout the virtual assessment process. The authors note that this added customer engagement can be leveraged—following behavioral science principles—to increase the effectiveness of virtual assessments. For example, by being more involved in the process of an HEA through virtual interaction, customers may be more easily persuaded to follow through with recommendations, especially with additional support from assessors (e.g., assessors being more empathetic, personalizing advice for customer homes, and using vivid metaphors to describe building science concepts). However, through our discussions with TVA staff, we learned that when given the choice between in-person and virtual assessments, customers tend to choose in-person HEAs. Though TVA does not offer a hybrid option yet, other programs have continued to leverage the advantages of virtual assessments with a hybrid approach.

The Center for Energy and Environment, based in Minnesota, found VHEAs to be particularly helpful for their large rural area. When transportation becomes a prohibitive hurdle, VHEAs can work to breach the distance between assessor and customer. VHEAs can also provide education and engagement to these rural areas outside of the traditional energy assessment model, extending the reach of energy efficiency and adding value for various customers.

²⁰ Cooper, E., R. Sussman, and B. Rosenberg, *Remote Home Energy Assessments*, Washington, DC: American Council for an Energy-Efficient Economy, 2021. <https://www.aceee.org/research-report/b2102>