



# Status Update:

## Room Heat Pumps Self-Installation Practices Strategy Pilot

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## Introduction

CalMTA's exploration of the Room Heat Pumps market transformation idea (MTI), formerly known as the Portable/Window Heat Pump MTI, identified the need for research into how consumers install, interact with, and utilize this technology. The Room Heat Pumps Self-Installation Practices Program Strategy Pilot was developed to yield greater insight into two primary assumed benefits of the technology, which are key to the customer value proposition, including: 1) its purported "self-installation" potential and 2) the relative portability of systems for tenants who own them.

This Strategy Pilot, designed to inform development of a full MTI Plan and future interventions, is ongoing. A full assessment report on the outcomes, findings, and recommendations will be publicly available in early 2025 and shared through CalMTA's regular news updates. In the meantime, this memo serves to provide a summary of the work undertaken and a status of progress. For the full scope of work for this effort, visit [the CalMTA website](#).

## Background

To implement the Strategy Pilot, CalMTA partnered with three local organizations that (1) have existing connections to environmental and social justice (ESJ) communities and (2) currently support space conditioning upgrades for multifamily and small single-family residences (both renters and homeowners) in those communities. CalMTA provided these partners with room heat pump units at no cost for distribution and installation. These partners recruited participants to self-install the units and share feedback on their experience through surveys distributed at key intervals after product installation to determine their experience with the products.

### Strategy Pilot objectives

As designed by CalMTA, the Room Heat Pumps Self-Installation Practices Program Strategy Pilot targets the following objectives:

- **Verify the opportunity of room heat pump self-installation.** Manufacturers of both portable and window heat pumps claim that the products can be quickly self-installed by customers in multifamily units and homes. The findings from this Strategy Pilot will serve to confirm capability for self-installation and inform manufacturers about any challenges with the various forms for room heat pumps (saddlebag, window, and portable).
- **Verify the consumer value proposition, including value of self-ownership.** Because the technology is relatively new, CalMTA seeks to better understand the benefits that room heat pumps offer consumers, especially renters and homeowners in multifamily and small single-family properties. Confirming that target audiences value this feature will inform the eventual MTI strategies.
- **Understand the impact of technology usage on consumer behavior.** CalMTA seeks to understand how use of a room heat pump inherently affects the way consumers interact with

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functioning wall heaters, central heaters, and window AC units. This work will also provide greater insight into impacts on household energy bills.

- **Build manufacturer engagement and CalMTA understanding of technical and supply-chain barriers.** The Strategy Pilot will allow CalMTA to engage manufacturers as partners and gain a deeper understanding of technical and supply-chain barriers that impact adoption, including product specifications, availability, and installation practices.

### Evaluation objectives and implementation steps

Final evaluation findings are currently under development to be delivered by early 2025. The subsequent report will seek to answer research questions using the metrics described below in alignment with the Strategy Pilot evaluation approach.

**Table 1. Evaluation research objectives**

Strategy Pilot objectives	Evaluation research objectives or metrics
1. Verify opportunity of room heat pump self-installation	<ul style="list-style-type: none"> <li>• Quantify the number of installations that were do-it-yourself (DIY) vs. assisted</li> <li>• Categorize and describe specific installation issues participants encountered to aid informed recommendations on product improvements or enhanced installation instructions</li> <li>• Segment installation findings by participant characteristics</li> </ul>
2. Verify the consumer value proposition, including value of self-ownership	<ul style="list-style-type: none"> <li>• Assess user satisfaction with the room heat pump unit and potential for future use of product</li> <li>• Measure the importance of self-ownership through participant surveys</li> <li>• Among consumers who move during the study period, track moves and measure experience regarding uninstalls (moving the unit) and reinstalls</li> </ul>
3. Understand the impact of technology usage on consumer behavior	<ul style="list-style-type: none"> <li>• Characterize the space conditioning baseline equipment among participating households</li> <li>• Measure use of room heat pumps by:               <ul style="list-style-type: none"> <li>○ Time of use (hours per day)</li> <li>○ Room/whole home</li> <li>○ Function (heating or cooling)</li> <li>○ Primary or secondary</li> <li>○ Use of back-up sources</li> </ul> </li> <li>• Explore and describe participant behavior change in relation to baseline space heating and cooling equipment</li> <li>• Examine the impact of the heat pump on electric load and bills</li> </ul>
4. Build manufacturer engagement and CalMTA understanding of technical and supply chain barriers	<ul style="list-style-type: none"> <li>• Among participating manufacturers, characterize product specifications and feasibilities for improvement</li> <li>• Explore and document manufacturer receptivity, along with technical challenges, to product improvements or affordability and supply chain barriers and opportunities</li> <li>• Identify and document the value proposition for manufacturers to engage with CalMTA during the Strategy Pilot and potential</li> </ul>

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Strategy Pilot objectives	Evaluation research objectives or metrics
	future MTI deployment (e.g., customer insights, bulk volume/sales, industry leadership, financial support) <ul style="list-style-type: none"> <li>• Capture lessons learned from manufacturer engagement that can be applied to future MTI interventions</li> </ul>

Evaluation activities being conducted before, during, and after the Strategy Pilot to support the evaluation objectives in Table 1 include:

- Development of data collection tools and instruments for use during and after the study, in accordance with best practices, to map back to evaluation objectives
- Collaboration between the CalMTA MTI strategy manager, MTI program manager, and partner organizations on protocols for observing installations and gathering ongoing participant feedback (e.g., text message surveys)
- Interviews with partner organizations to gather pilot feedback
- Interim evaluation of participant survey results.

Findings will be shared via a public webinar, to which CalMTA will invite key stakeholders such as the Market Transformation Advisory Board (MTAB), California Public Utilities Commission (CPUC), Program Administrators (PAs), and community-based organizations.

### Status of activities

The Strategy Pilot statement of work describes activities and specific deliverables, which officially kicked off in April 2024 and are ongoing. The field work activities with the partners listed below were completed in November 2024. Below is a summary of those activities.

#### Identify community-based organization (CBO) implementation partners

CalMTA worked with local partners and manufacturers to finalize agreements on scope, including identification of target buildings/participants, featured products, timelines, and budget. CalMTA also provided end-to-end project management to ensure study success and value to participants. Local partners who recruited qualified participants and facilitated the installations include:

- **The U.S. Green Building Council California** (USGBC-California, formerly USGBC-LA) is a member-based nonprofit advocating for a sustainable, resilient, and equitable built environment in California.
- **El Concilio of San Mateo County** is a nonprofit, community-based organization committed to increasing education, employment, and access to services that improve the quality of life for underserved communities in San Mateo County.

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- **Redwood Energy** is an all-electric and zero net energy specialist in multifamily housing. It is a certified microbusiness specializing in the design of all-electric, solar-powered apartment complexes.

### Engage manufacturers on targeted products

CalMTA partnered with manufacturers offering room heat pumps to secure approximately 150 units of different makes and models for installation. Manufacturer engagement resulted in the inclusion of the following products, with the cost of the product reduced through bulk purchasing agreements:



“Saddlebag” units from Gradient and Midea, which saddle over the windowsill of double-hung window



Conventional window units from Midea, which are held in place by brackets



Portable products from Whynter, which are ducted to a window

The three manufacturers provided installation instructions and marketing materials to ensure participants received consistent, product-appropriate information.

### Recruitment and installation

The Strategy Pilot provided training for partner organizations on best practices for product installation and sharing instructions with participants via on-site “demonstration days” in late June/early July 2024. With support from CalMTA, partners created materials explaining the opportunity to receive a no-cost room heat pump in exchange for installing and using the product and for providing feedback about their experience.

Partners recruited participating households leveraging their established connections to the communities. Recruitment included engagement of property managers/owners in addition to residents, with feedback collected regarding motivation to participate or reasons for not wanting to participate. Measuring the windows of interested prospective participants allowed the teams to determine the right product to install and ultimately which product type would be distributed to each partner. The prevalence of slider windows in the California housing stock presented a challenge to some of the installations. This finding has been relayed to manufacturers, resulting in

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an exploration of product form factors that fit the slider window profile and an intervention strategy for the MTI.

Each partner was responsible for identifying approximately 50 participants to receive the installed room heat pump. Some procurement delays occurred due to out-of-stock products and challenges placing orders with supply chain partners. Despite these challenges, as of December 13, 2024, a total of 147 participants received heat pump units:

- El Concilio completed 46 of 51 installations. The remaining installations were delayed due to participants withdrawing from the pilot or to products being held by El Concilio to resolve future warranty issues by pilot participants.
- USGBC-California completed 46 of 46 installations.
- Redwood Energy completed 55 of 56 installations. Their final unit is being held for lab testing.

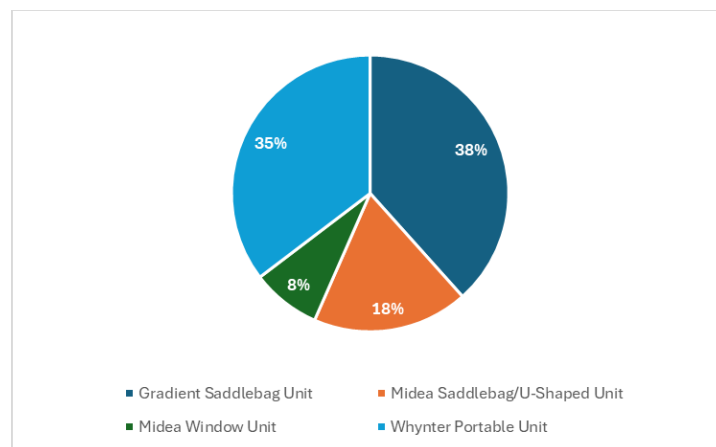
## Initial findings

Initial findings from the surveys completed directly after installation and the user experience surveys completed 30 days or more after installation are outlined in the following sections.

### Post-installation survey findings

Gradient saddlebag units were the most installed (38%, 48 of 125), followed by Whynter portable units (35%, 44 of 125). Midea units were the least frequently installed, with both the saddlebag/U-shaped units and conventional window units accounting for 26% of installations (33 of 125). *Note: All counts will be updated in the final assessment.*

**Figure 1. Distribution of unit brands and types**



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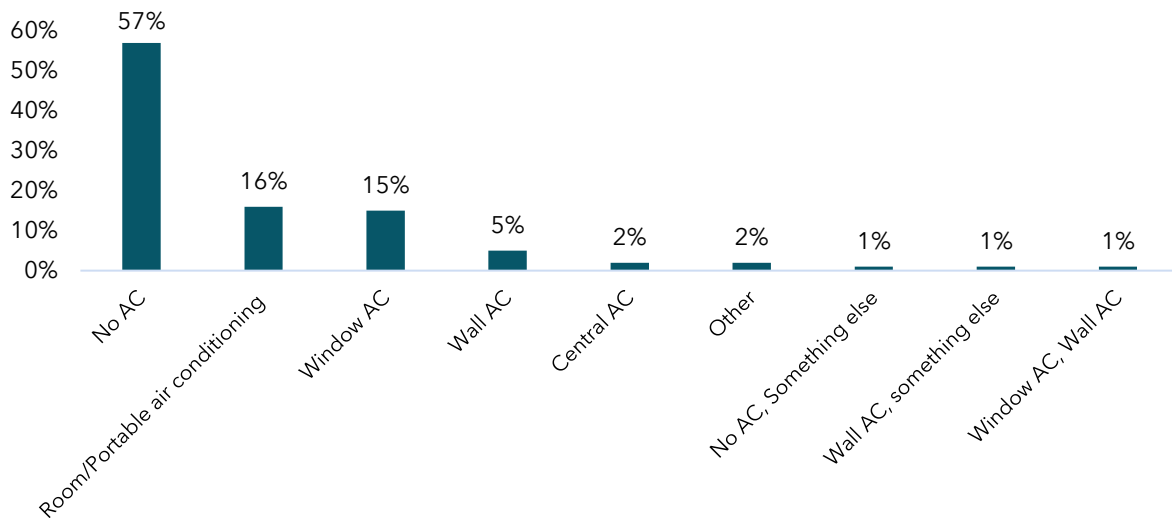


Strategy Pilot participants most frequently completed their installation in two hours or less, with an average time of 66 minutes. Participants most frequently had one additional person assist with the installation process.

The survey completed by participants included demographic questions. Initial information provided by participants, which will be updated in the full assessment report, found that:

- A majority (69%) of respondents rent their home compared to those who own their home (31%).
- The most common housing type among respondents was split between multifamily (46%) and single-family detached homes (46%). The next most common housing type was single-family attached homes (8%).
- Over two-thirds of respondents reported their language preference as English (68%) with about one-third reporting a Spanish language preference (32%).
- Prior to the installation of a room heat pump, most (57%) respondents did not have a form of air conditioning in their home. Figure 2 shows the distribution of air conditioning system types pre-installation.

**Figure 2. Participant air conditioning system pre-installation**



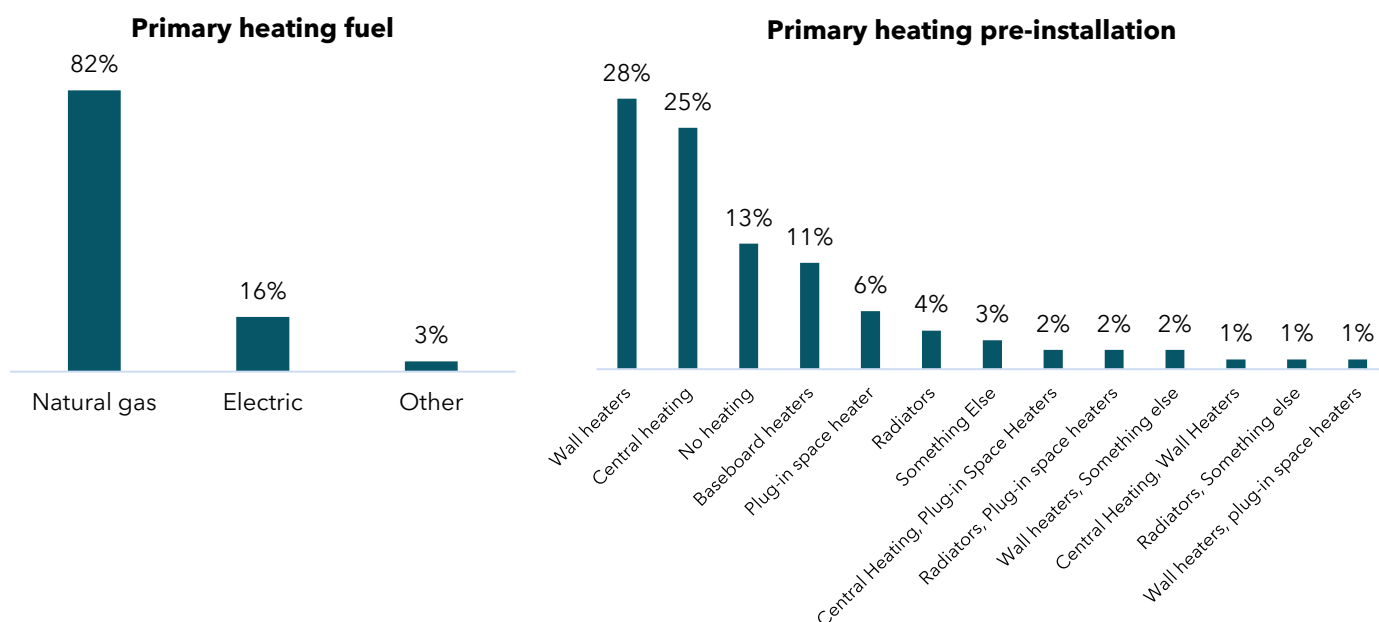
- Respondents were asked about the type of heating system in their homes prior to the room heat pump installation. Most respondents had wall heaters (28%) or central heating (25%). Additionally, most respondents (82%) reported natural gas was the primary heating fuel in their home. Figure 3 displays all survey responses.

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**Figure 3. Participant heating system pre-installation**



Next, participants were asked about the installation process:

- Room heat pumps were most commonly installed in the living room (59%) of the house. The next most common location was the bedroom (24%), followed by the dining room (8%), kitchen (4%), studio apartment (3%), main room (2%), back room (1%), and home office (1%).
- Most respondents (78%) reported that they required assistance to complete the installation process. Those who said they needed assistance were prompted to provide a qualitative answer regarding the type of assistance they needed. Of these responses, the most commonly reported assistance was related to lifting the unit (61%).
- When asked how easy it was to install the unit, most respondents said it was somewhat easy (34%) or very easy (33%).
- Most respondents found the instructions “very helpful” (43%) or “somewhat helpful” (25%).
- When asked for ways to improve the instructions, 41% of respondents stated more pictures would be beneficial.
- The most commonly reported tools used during the installation were a screwdriver (29%) followed by a drill (11%) and scissors (10%).
- Almost all (91%) respondents said their unit worked properly after installation. An additional 3% said it worked after troubleshooting. 5% of participants said the unit did not work and 1% said it worked initially but broke later resulting in a replacement.

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Lastly, participants were asked about any changes they had made to the unit post-installation:

- Most (78%) survey respondents did not have to make any adjustments to the mounting since installation. Of those who did make adjustments (22%), the most commonly reported changes were changes to sealing (i.e., adding more foam) (33%) or adjustments related to unit replacement (24%).
- Respondents were largely satisfied with their experience: 81% were very satisfied and 9% were somewhat satisfied.
- Almost all (97%) respondents would recommend the unit to friends or family members.

### User experience surveys

Initial feedback, which will be updated in the full assessment report, found that after at least 30 days of use:

- Respondents are largely satisfied with their heating or cooling performance across brands and types, with 77% reporting that they are very satisfied.
- Respondents are largely satisfied with all aspects of the technology (installation, performance, comfort, and electric bills) across brands and types, with 67% reporting that they are very satisfied and 18% reporting that they are somewhat satisfied.
- Most respondents (57%) find their heat pumps practical, convenient, innovative, and attractive. Very few (7%) find them bulky, unattractive, or noisy.
- Most respondents (84%) use their room heat pump as their primary source of cooling.
- Most respondents (69%) reported that they are very likely to use the room heat pump for heating, with 51% planning to use it as their primary source of heating.
- The highest proportion of respondents use their room heat pump for 1-4 hours a day (48%) or 5-10 hours a day (33%).

### Customer service

Only 6% of survey respondents encountered an issue for which they needed to contact customer service. The issues were as follows:

- Customer was sent a defective unit (n=3)
- App-related issues (n=2)
- No install instructions were sent with the unit (n=1)

All reported issues were resolved but respondents provided the following recommendations about beneficial customer service improvements:

- Provide written installation and operation directions with the unit (n=4)
- Include more information in the instructional video (n=1)

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- Provide more instructions in the app (n=1)

### Moving the unit

Participants were asked what they believe they will do with the room heat pump if they move. The majority of respondents (78%) believed that they would take the unit with them and reinstall it in the new location. Very few respondents believe that they would leave the unit behind (5%) or give it away (1%). The remaining 16% are not sure what they would do.

At the time of the survey, only 7% of respondents had moved the unit from the original location to a new location, usually a different room within the same house. Half of the respondents found this move very easy (50%), about a third of respondents found the move very difficult (33%), and the remaining 17% found the move somewhat difficult.



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