A Window of Opportunity: Consumer Insights for Room Heat Pump Market Development

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ABSTRACT

Room heat pumps (RHPs) represent an emerging opportunity to extend efficient heating and cooling to underserved market segments, particularly renters and multifamily residents who lack access to whole-house heat pump systems. This paper presents findings from a 2025 probability-based consumer survey of 501 California residents without central air conditioning. The survey examined awareness, purchase intent, price sensitivity, and feature preferences using MaxDiff analysis. Key findings challenge conventional program assumptions: demographics predict adoption interest more reliably than climate zone; renters show higher purchase intent than homeowners; and preferred pricing aligns around $700. The research identifies a substantial "persuadable middle" segment (43% of respondents) whose primary barriers are information gaps and cost concerns, representing clear opportunities for program intervention. These insights can inform incentive calibration, marketing strategies, and product development priorities for energy efficiency programs nationwide.

Introduction

Heat pump programs have proliferated across the United States, driven by state and utility efficiency efforts and policies that encourage decarbonization. While the emergence of extended-capacity, cold-climate heat pumps opened new opportunities, renters and multifamily occupants remain difficult to reach. Typical heat pump programs focus on whole-house systems that require professional installation, ductwork, and homeownership—conditions that exclude roughly half of California households without central air conditioning.

Room heat pumps offer an accessible pathway to efficient heating and cooling for consumers who cannot or prefer not to install permanent systems. RHPs are portable or window-mounted units that provide both heating and cooling using heat pump technology, require no certified technician for installation, and plug into standard 120V outlets. These products serve small spaces, require no ductwork, and can be added without reconfiguring walls or electrical service—features that align well with the constraints facing renters and multifamily residents currently excluded from typical heat pump programs.

Despite their potential, RHPs remain an emerging product category with low consumer awareness, inconsistent marketing, and unclear product labeling. Previous research has begun to characterize this market, though most work has focused on technical performance and small-scale pilot programs. Coakley et al. (2024) surveyed the national landscape of micro heat pump development in an ACEEE Summer Study paper, documenting CalNext's lab performance testing of RHPs and flagging the growing complexity consumers and programs face as products continue to evolve. On the economics side, Nadel (2025) found that window heat pumps represent the lowest-cost decarbonization option for large multifamily buildings, though that analysis focused on building-level cost modeling rather than consumer purchase motivations.

Field research and pilot programs round out the current evidence base. In the Pacific Northwest, NEEA (2023) field-tested 12 micro heat pump units in Oregon and Washington residential households and found that while participants responded enthusiastically to the product, window incompatibility presented challenges for study recruitment and participants expressed concern about product effectiveness in cold temperatures (below 40°F) and dissatisfaction with ease of installation, aesthetics, and noise. A pilot program through the New York City Housing Authority tested real-world performance of window heat pumps in 24 apartments, focusing on technical viability in that specific setting rather than characterizing the product for the broader consumer market (NYSERDA 2024). In California, the Market Transformation Administrator (CalMTA) has launched a Room Heat Pump Market Transformation Initiative. This research supports that effort, building on CalMTA's Market Characterization Report (CalMTA 2024), which draws on qualitative interviews with property managers and consumer focus groups and shaped the survey hypotheses presented here. That report identifies many of the same barriers this survey confirms: window incompatibility, low awareness, cost concerns, and unclear product labeling.

The gap in the current literature is the absence of large-scale, quantitative consumer preference data. No prior study has examined how purchase intentions and adoption barriers vary by demographic and geographic segments, nor how consumers prioritize product features when forced to make tradeoffs. To generate the consumer preference data needed to design and target RHP programs at scale, this study investigated five research questions:

- What is the current awareness of RHP products among target consumers?
- How does purchase intent vary by demographic characteristics and housing situation?
- What product features most strongly influence consumer preference?
- How does price affect stated purchase intent?
- What barriers prevent adoption, and which consumer segments are most persuadable?

Methodology

Survey Design and Sample

Evergreen Economics contracted with NORC at the University of Chicago to access AmeriSpeak, a probability-based panel designed to represent the U.S. household population (NORC 2025). The survey targeted California adults aged 18 and older without central air conditioning and used quota controls for owner/renter status and single-family/multifamily housing type to ensure adequate representation of key subgroups.[1] The survey was fielded in 2025, yielding a final analytic sample of 501 qualified respondents.

NORC applied a three-stage weighting approach to produce representative estimates for the target population. The process combined AmeriSpeak panel weights (accounting for selection probability and nonresponse), study-specific base weights (adjusting for stratified sampling across 48 strata), and final study weights incorporating raking adjustments to align the sample with population benchmarks from the American Community Survey (2023) and the 2019 California Residential Appliance Saturation Study (RASS). Table 1 summarizes the resulting sample characteristics.

[1] Quota controls did not include income levels.

Table 1. Sample Characteristics

Characteristic	Unweighted %	Weighted %	Population benchmark
Housing tenure			
Owner	44%	50%	51%
Renter	51%	49%	48%
Housing type			
Single-family	55%	61%	62%
Multifamily	41%	37%	36%
Age group			
18–29	9%	16%	19%
30–44	22%	22%	22%
45–59	30%	30%	27%
60+	35%	31%	30%

Source: Evergreen Economics survey (2025); American Community Survey; California RASS (2019).

Survey Analysis Methods

The survey covered four topic areas: existing heating and cooling strategies, RHP awareness, product feature preferences (via MaxDiff analysis), and purchase intent including price sensitivity. The survey included a MaxDiff module. MaxDiff (Maximum Difference) is an advanced survey technique that asks respondents to select "best" and "worst" features from a randomized set of product features. The resulting analysis reveals the relative importance of different features likely to drive consumer preference for a given product. The scores represent "utility" values (the proportion of total preference each feature captures when consumers are forced to make trade-offs). Higher scores reflect stronger positive influence on purchase preference. For RHP customer research, the team used product literature to identify a set of 14 product attributes and the MaxDiff module tested 14 product attributes across 11 choice sets, with respondents identifying the most and least preferred features from sets of five randomly selected attributes. Results are expressed as utility scores representing the proportion of total consumer preference captured by each feature.

The analysis used weighted data for population estimates and descriptive statistics and unweighted data for statistical tests to preserve validity. Categorical comparisons (housing tenure, age groups) used Pearson's chi-square tests. Ordinal outcomes across multiple groups used Kruskal-Wallis tests, followed by post-hoc pairwise comparisons with Bonferroni correction. MaxDiff utility scores remained unweighted to preserve choice pattern accuracy, with weights applied only for demographic comparisons and population inference.

Findings

The 2025 survey revealed a market defined by low awareness, addressable barriers, and demographic patterns that inform our understanding of the market's potential acceptance of these products. Prior to considering a purchase, most consumers indicated a need for more information, particularly regarding price.

Existing Heating and Cooling Strategies

California adults without central air conditioning rely heavily on ceiling or portable fans (72%) for cooling, followed by portable AC units (26%) and window AC units (24%). For heating, the most common strategies are portable space heaters (33%), furnaces (27%), and wall or baseboard heat (26%). Approximately equal shares use natural gas (53%) and electricity (51%) for heating, with many households using both fuel types.

Thirty percent of respondents reported investigating new heating or cooling equipment in the past 12 months, with the strongest interest in cooling equipment (17%) or combined heating and cooling solutions (10%). The top reasons for seeking new equipment were thermal discomfort (60%), current equipment underperforming (37%), and high energy costs (30%).

RHP Awareness

RHP awareness among the target population is low. Only 20 percent of respondents reported unaided awareness of portable or window heat pumps.[2] After receiving a brief product description, an additional 14 percent acknowledged prior awareness, bringing total awareness to approximately 31 percent of the sample. This low awareness is consistent across demographic groups, indicating a market-wide information deficit rather than a segment-specific problem.

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[2] Unaided awareness question text: "Before today had you heard of portable or window heat pumps?"

Aided awareness question text: "Portable or window heat pumps can also be called room heat pumps (RHPs). They are portable air conditioning units that provide supplemental heating using heat pump technology. These products come in three forms: window mounted, saddle mounted, and portable. Prior to this survey have you seen or heard of this equipment?"

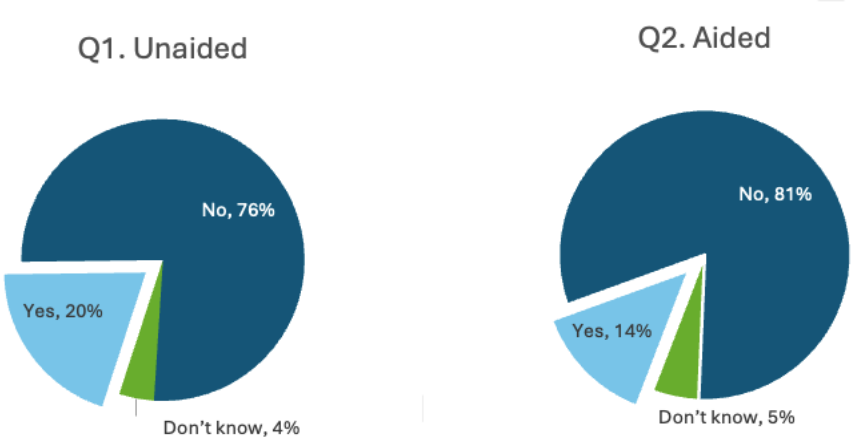

Figure 1. Unaided awareness (n=501) and aided awareness (n=418)

Among those aware of RHPs (n=145), 8 percent reported already owning one and an additional 28 percent had considered purchasing one. Approximately two-thirds (66%) of aware consumers indicated they knew where to purchase an RHP, though this likely reflects an expectation that the products would be sold at major retail outlets that also carry conventional room air conditioners.

Product Feature Preferences

The MaxDiff analysis identified three features that together account for nearly half (47%) of total product utility among respondents: energy-efficient heating and cooling from a single device (19%), efficient cooling for homes without central air conditioning (17%), and air filtration and indoor air quality improvements (11%).

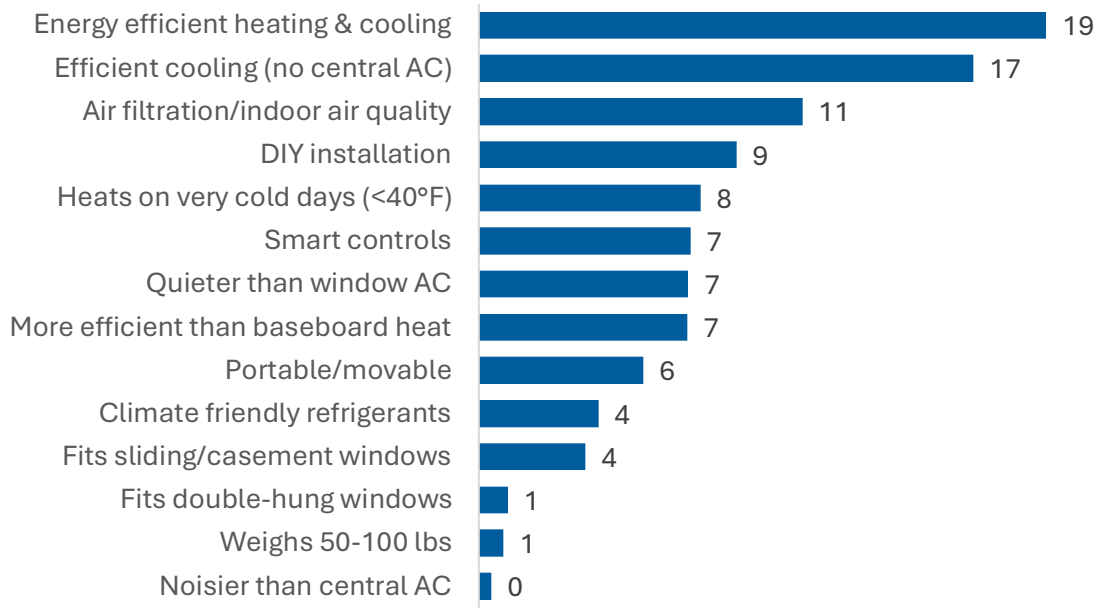

Figure 2. Distribution of utility values driving consumer preferences for heating and cooling equipment (n=501)

Environmental messaging, specifically, the use of climate-friendly refrigerants, ranked just higher than window compatibility features. This finding suggests programs should lead with practical, immediate consumer benefits rather than environmental framing.

Feature preferences varied by housing situation in statistically significant ways. Owners placed higher value on DIY installation and efficient cooling, likely reflecting awareness of utility costs and greater freedom to modify their homes. Renters preferred portability and movability, consistent with a population that may relocate and cannot make modifications to their space. Air quality improvements also mattered more to renters (12% vs. 10% of utility), who may have less control over building ventilation systems.

Comparing single-family and multifamily residents revealed complementary patterns. Single-family respondents valued efficiency features across heating, cooling, and combined operation. Multifamily respondents valued portability and air quality improvements, and were more sensitive to unit weight, a practical concern for residents in upper floors or who must navigate hallways.

Purchase Intent: Demographics Matter More Than Geography

After completing the MaxDiff module and receiving a detailed product description, respondents rated their likelihood of purchasing an RHP in the next 12 months, without any prior exposure to RHP pricing in the survey. (Figure 3)

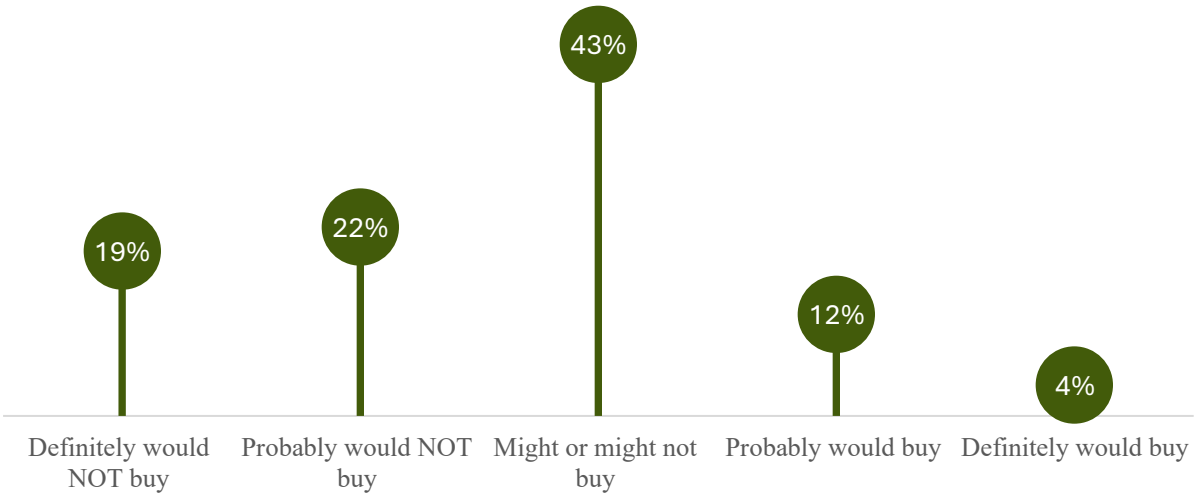

Figure 3. Respondent Ratings on Likelihood of Purchasing and RHP within a Year

Owners expressed significantly more purchase resistance than renters ($p < 0.001$). Specifically, owners were significantly more likely to report “definitely would NOT buy” and “probably would NOT buy.” However, when the two negative categories are combined, the overall difference between owners and renters is not significant. This indicates difference in the *intensity* of resistance rather than general difference in purchase intent.

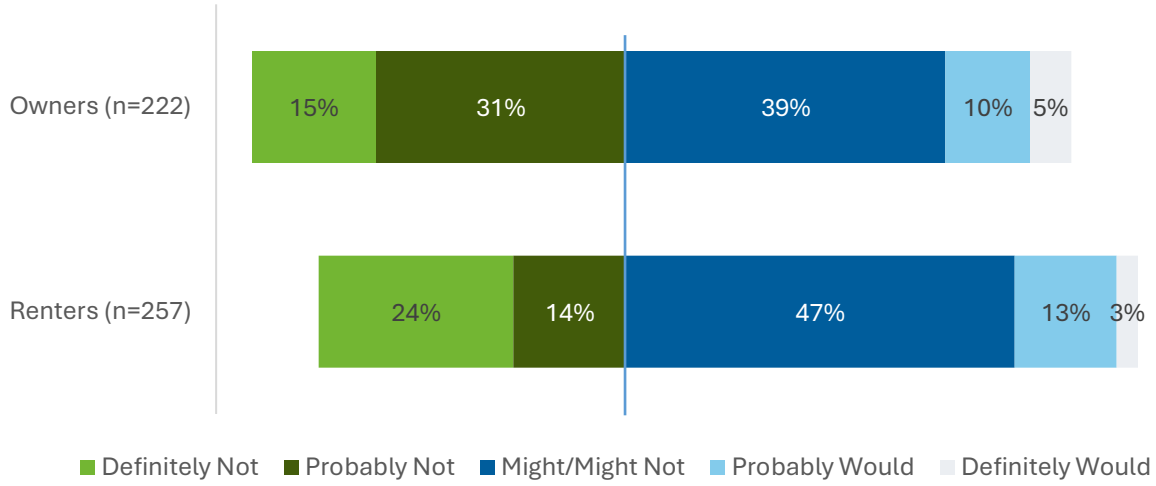

Figure 4. Comparing purchase intent by housing status. (Excludes "other" housing category.)

Purchase likelihood differed significantly across age groups. Specifically, those aged 60 plus gave significantly lower ratings (less likely to purchase) than those aged 30-44.

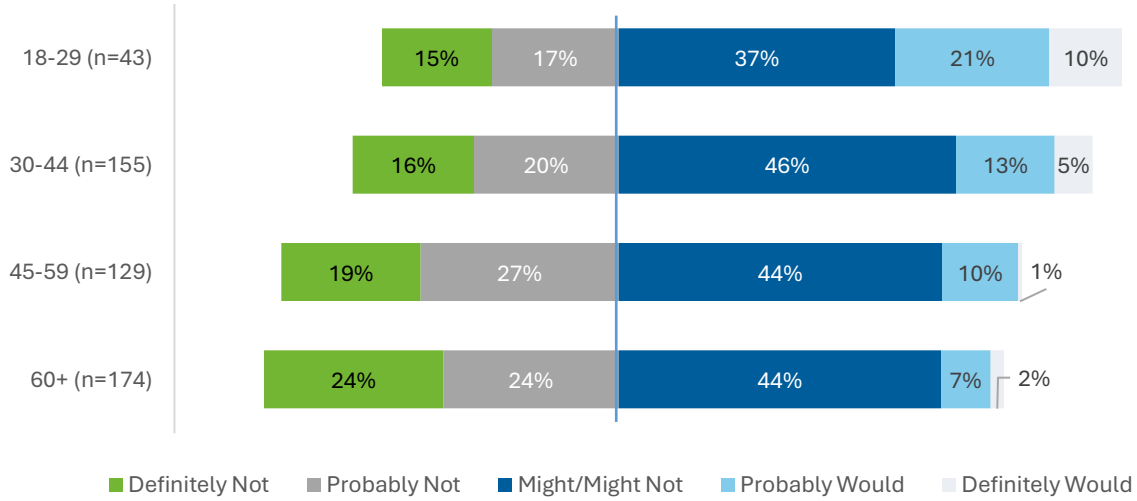

Figure 5. Comparing Purchase Intent by Respondent Age

The analysis also examined differences by climate zone using both California Energy Commission (CEC) regional groupings and Evergreen-assigned heating/cooling load-based regional designations.[3] Neither approach produced meaningful differences in purchase intent,

[3] The original climate zone assignment was based upon the CEC climate regions identified by the California Public Utilities Commission's Impact Evaluation of Water Heating Measures report (https://www.calmac.org/publications/CPUC_Group_A_Report_Water_Heating_PY_2019_Final_CALMAC.pdf). A major limitation of these climate zones was the low response count in the desert region (n = 7). To address this limitation, Evergreen reassigned climate zones based on regions with higher or lower heating loads, generally corresponding to the northern versus southern regions of the state.

suggesting that climate assignment does not meaningfully predict RHP purchase intent, and that programs can prioritize demographic targeting over geographic targeting.

Price Sensitivity

The survey assessed price sensitivity by randomly assigning one of six price points ($500, $700, $900, $1,200, $1,500, or $1,800) and asking respondents to reassess their purchase intent after seeing that price. The survey design deliberately de-emphasized price: respondents saw only one price point, introduced at the end of the survey after completing the MaxDiff module and initial purchase intent questions. This approach reflects the wide pricing range for RHP products but did not include upper bound outliers (currently $2,000-$3,800).[4]

Purchase intent declined as prices increased, though a substantial portion of respondents remained neutral across all price points. The $700 price point aligns with the entry-level market tier ($400–$800) identified in a literature review and market assessment Evergreen conducted prior to the survey. A persistent group of 10 to 13 percent of respondents maintained interest even at prices above $1,200. Notably, stated interest declined below $500, which may indicate a quality perception threshold, or a situation in which consumers associate low prices with inferior products.

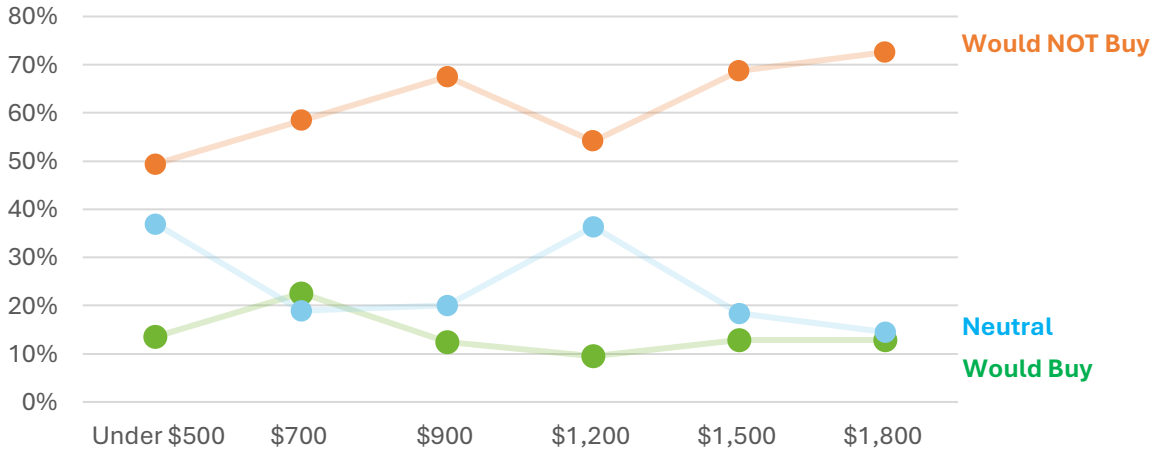

Figure 6. How price point affects purchase intention (n=501)

These patterns suggest that demand for RHPs is relatively insensitive to price in the range most relevant for program design. For energy efficiency programs, this supports a strategy focused on product quality and performance standards rather than deep price subsidies.

[4] The Gradient All-Weather 120V Heat Pump was priced at $3,800 in May 2025.

Barriers and the Persuadable Middle

Open-ended explanations of purchase intent revealed distinct patterns across the three consumer segments. Among the 467 respondents who provided explanations, the three groups represent different barriers and opportunities.

Unlikely buyers (41%). Among the 182 unlikely buyers offering an explanation, the most common rationale (33%) was that they simply did not need the equipment: they live in a mild climate or do not need supplemental heating or cooling. Nineteen percent expressed satisfaction with their current systems, and 13 percent cited financial constraints. These barriers are largely structural and are a limited opportunity for program intervention.

The persuadable middle (43%). The neutral segment, also the largest group at 43 percent, represents the primary opportunity for program intervention. Among the 201 respondents explaining their rating, 30 percent have concerns about price and uncertainty about operating costs. Nineteen percent needed more information about product reliability, quality, and performance before making a purchasing decision. Thirteen percent were uncertain whether their climate conditions warranted the purchase. These are barriers that education campaigns, retail partnerships, and calibrated incentives could address.

Likely buyers (16%). Nearly half of likely buyers cited an active, acknowledged need for the product, particularly related to thermal discomfort or lack of current cooling equipment. An additional 31 percent referenced interest in the efficiency and dual heating/cooling capability.

Table 2. Primary barriers by consumer segment

Segment	Primary barriers	Program opportunity
Unlikely (41%)	No perceived need (33%); current satisfaction (19%); financial constraints (13%)	Limited; focus resources elsewhere
Persuadable (43%)	Cost concerns (30%); information gaps (19%); climate uncertainty (13%)	High: education, incentives, demonstrations
Likely (16%)	Active need acknowledged; interest in efficiency	Facilitate purchase: retail access, clear pathways

Source: Evergreen Economics survey (2025), coded open-ended responses (n=467).

A persistent structural barrier: window compatibility. Window compatibility emerged as a significant structural constraint. Sixty-nine percent of respondents have horizontal sliding windows, which are incompatible with the current fleet of window-mounted RHP products. Only 25 percent have single- or double-hung windows suitable for current product form factor. This incompatibility exists across housing types and tenure, limiting the addressable market regardless of consumer interest. CalMTA (2024) has flagged slider window prevalence as a key market barrier, and this survey adds quantitative context about the scale of the issue in the target consumer population.

Discussion and Implications

Conventional program design often positions homeowners as the primary driver of heat pump adoption, since homeowners typically control major appliance decisions. This survey

confirmed that RHPs are a viable product for renters. Renters show less purchase resistance and slightly higher overall interest than owners. This likely reflects renters' limited control over building-wide systems, combined with RHP characteristics that align well with typical renter constraints: portability with no permanent installation required.

Climate zone produced no statistically significant differences in purchase intent, suggesting that geographic targeting may be less important than demographic targeting for RHP programs. A statewide approach with demographically focused marketing could reach more early adopters and allow programs to extend into mild climate zones where RHP benefits, especially improved indoor air quality and cooling efficiency, remain relevant even where supplemental heating is a lower priority.

Respondents were not highly sensitive to the $700–$1,200 price range, suggesting that consumers may associate higher prices with higher product quality. Incentive programs should calibrate to support quality products at the $700 target price point. The persistence of interest even at higher price points suggests a consumer segment that anticipates premium features and performance at premium prices.

Environmental messaging—in this survey, the feature of "climate-friendly refrigerants"—captured only 4 percent of total utility in the MaxDiff analysis. This does not mean consumers are indifferent to environmental considerations, rather it indicates that environmental messaging is unlikely to drive purchase decisions compared to more practical and immediate benefits like comfort, energy efficiency, and air quality. Programs should lead with these tangible consumer benefits and position environmental advantages as secondary messaging.

Comparison with Prior Research

These consumer-centered findings complement existing supply-side and pilot research. CalMTA's 2024 Market Characterization Report identified similar patterns among property managers, who expressed interest in RHPs for multifamily buildings but cited product availability and window compatibility as primary barriers (CalMTA 2024). NEEA's 2023 field study of 12 RHP units in the Pacific Northwest found participants most satisfied with ease of use, heating performance, and noise levels, consistent with our finding that efficiency and practical benefits drive consumer preference (NEEA 2023). Preliminary results from the NYCHA pilot in New York City reported heating energy savings of 85–88 percent compared to gas-powered steam systems, with 100 percent of surveyed residents reporting satisfaction or neutral responses regarding heating performance (NYSERDA 2024). This research contributes large-scale, probability-based consumer preference data for this emerging category.

Limitations

Several limitations apply. The sample is California-specific. Housing stock, climate conditions, and energy costs differ across states, and results may not transfer directly to other markets. The survey captures stated preferences rather than actual purchase behavior, and the gap between intent and action is well documented in consumer research. Low baseline awareness of RHPs (only 31% had heard of the product) means many respondents evaluated a novel concept rather than a familiar product, which may affect the stability of preferences as awareness grows. Finally, this is a rapidly evolving product category: new models, changing price points, and evolving federal specifications mean these findings represent a 2025 snapshot that should be updated as the market develops.

Recommendations for Program Design

Based on these findings, the authors offer five recommendations for energy efficiency programs developing RHP initiatives.

Target the Persuadable Middle

The 43 percent of respondents in the neutral segment represent the highest-value opportunity for program investment. Their barriers, including cost concerns, information gaps, and climate uncertainty are directly addressable through program tools. Educational content that addresses operating costs, reliability, and installation advice should accompany incentives calibrated to the $700 price point. Programs should also consider retail demonstration partnerships, since the gap in understanding about where to purchase RHPs suggests that product visibility is itself a barrier.

Differentiate Messaging by Segment

The differences in feature preferences between owners and renters, and between single-family and multifamily residents, argue against one-size-fits-all marketing. For owners, messaging should emphasize long-term savings, efficient cooling (even in a subset of a larger home), and DIY installation convenience. For renters, messaging should emphasize portability, immediate comfort benefits, and air quality improvements. For the 30–44 age group, the highest-intent segment, digital channels and home improvement contexts are likely the most effective delivery mechanisms.

Prioritize Demographic Targeting

The absence of meaningful climate zone effects on purchase intent could simplifies program design. Rather than restricting eligibility or tailoring outreach by geographic region, programs can offer statewide eligibility and concentrate marketing resources on high-opportunity demographic segments—particularly renters aged 30–44.

Invest in Retail Channel Development

The lack of understanding about where to purchase RHPs indicates nascent market infrastructure, not a segment-specific deficit. Partnerships with major retailers for product visibility, in-store demonstrations, and point-of-purchase education could address this barrier directly. Clear product labeling that distinguishes RHPs from conventional room air conditioners will likely be essential for consumers to identify and evaluate these products at retail.

Support Product Development for Window Compatibility

With 69 percent of respondents having horizontal sliding windows, window compatibility is a fundamental market constraint. Programs and market transformation efforts should encourage manufacturers to develop solutions for sliding windows. New York's Clean Heat for All Challenge demonstrated that technology competitions and bulk purchase commitments can effectively spur product innovation (NYSERDA 2024). Until window-compatible models reach

the market, programs should consider if portable heat pump options are viable as an interim solution.

Conclusions

Room heat pumps represent an opportunity to extend efficient heating and cooling to market segments that heat pump programs have not reached. This research contributes large-scale, probability-based consumer insights for this emerging product category, revealing patterns that should inform program design across jurisdictions.

Several findings—renters more interested than owners, demographics mattering more than climate zone, environmental messaging ranking lowest among tested features—suggest strategies for product positioning. The substantial persuadable middle (43% of consumers) represents a clear opportunity for education and incentive programs to accelerate market development.

As California, New York, and other jurisdictions develop RHP programs, these consumer insights can help ensure that program design reflects actual consumer preferences and barriers. Clear demographic targeting opportunities and identifiable information gaps provide foundational information for emerging market transformation and rebate programs. Future research should track how these patterns evolve as awareness grows and products availability and compatibility improve. These solutions could substantially expand the target market.

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