FACT SHEET

Room Heat Pumps

Space conditioning represents the largest energy consumption end-use for homes in California, with more than 3 million Californians using individual air conditioning (AC) units.[1] Room heat pumps are self-contained consumer products that provide efficient replacements for window air conditioners and offer space heating for a single room or modest apartment.

CalMTA is investigating a potential market transformation initiative (MTI) that seeks to bring to market these efficient and affordable alternatives to AC window units in the summer and small-space electric resistance or gas heating in the winter. We seek to achieve a market where an improved version of this technology dominates product sales over separate window AC-only units, portable electric resistance heaters, and possibly air purifiers.

The opportunity

California has roughly 3.7 million primary residences without any form of air conditioning.[2] As temperatures rise, more and more of the people living in those homes are seeking to meet their cooling needs with window AC units. California's Energy Code Ace program estimates that Californians purchase 165,000 units per year for homes and apartments.[3] It is a crucial moment for ensuring those units are as efficient and environmentally friendly as possible.

This growing need is especially true for existing multifamily and smaller, single-family households that have not been retrofitted with central air conditioning. Renters and owners of

Photo credit: Gradient

[1]Highlights for air conditioning in U.S. homes by state, 2020. Energy Information Agency. Released March 2023. https://www.eia.gov/consumption/residential/data/2020/state/pdf/State%20Air%20Conditioning.pdf

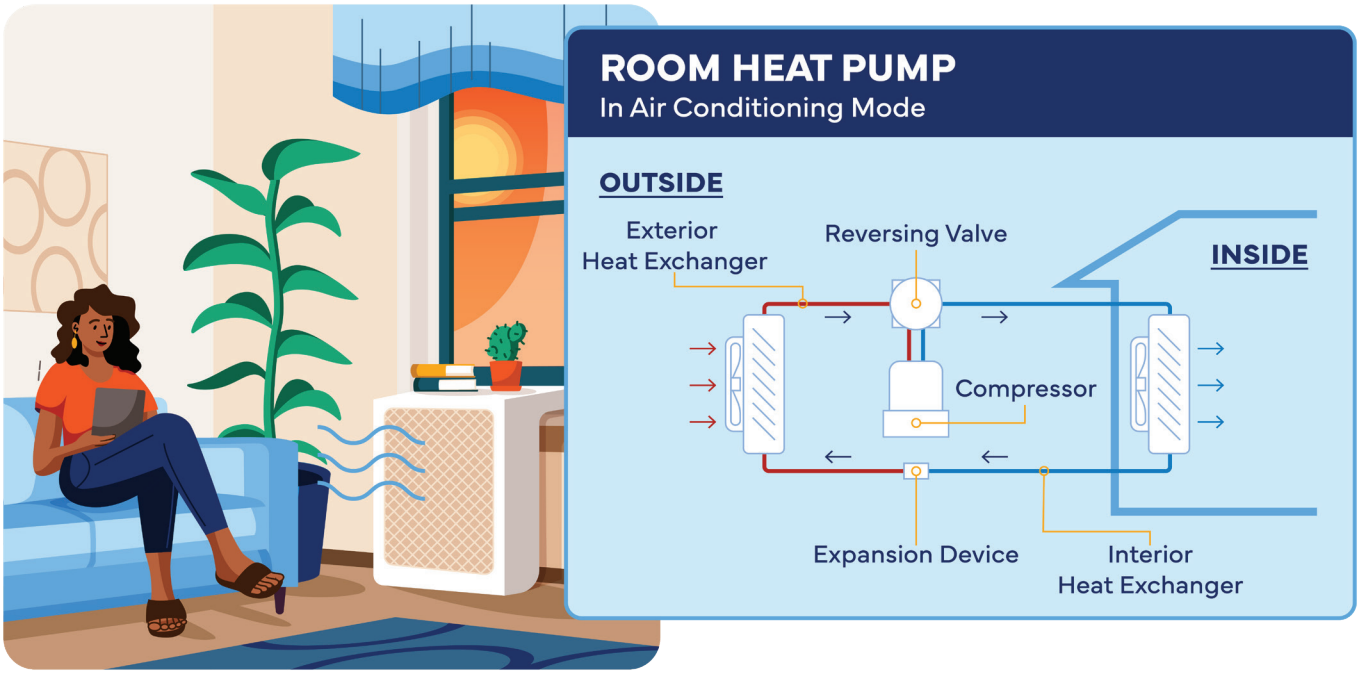
[2]Davis, Lucas. How Many U.S. Households Don't Have Air Conditioning? UC Berkeley Energy Institute Blog. August 15, 2022.

[3] Ace Resources Title 20 Fact Sheet. Energy Code Ace. October 10, 2020. https://energycodeace.com/download/33997/file_path/fieldList/T20%20Portable%20ACs%20Fact%20Sheet

these homes often suffer from higher energy burdens, impacts from increasingly frequent climate extremes, and exposure to poor air quality. These room units could potentially add air filtration functionality, which will improve indoor air quality (IAQ) during fire season or poor outdoor air quality events without the need to buy separate air filtration products.

The technology

Room heat pumps are similar in shape and size to typical AC window units or portable products. They fall into roughly three groups: portable products that are ducted to a window, units that saddle over the windowsill of double-hung windows, and conventional window units held in place by brackets (in either standard or U-shaped configurations). This potential MTI targets inverter technology that allows for variable speed operations providing more efficient cooling in the summer and heating in the winter.



These products can be self-installed and plugged into a 120V outlet. They offer a cooling capacity of up to 18,000 BTUs and a similar heating capacity in most California climate zones, allowing them to heat or cool spaces up to 1,000 square feet. They offer features CalMTA seeks to make more prevalent, such as the use of ultra-low global warming potential (GWP) refrigerants and dual ducting.

By eliminating the need for expert installation or electrical panel upgrades, the technology can significantly improve comfort, remove reliance on inefficient AC units, and create space-heating flexibility for single- and multifamily homes. Additionally, as this product improves, room heat pumps could offer significant additional benefits. In addition to increased IAQ through filtration, they could also be grid-enabled to offer peak grid energy reductions or drive increased use of ultra-low GWP refrigerants.

MT strategy

Room heat pumps face barriers related to consumer awareness, higher upfront costs compared to separate window AC and space heater units, and product availability. However, this technology fills a gap for renters and owners in multifamily and smaller spaces, especially for residents of environmental and social justice (ESJ) communities. CalMTA is pursuing strategic market interventions to overcome barriers on several fronts.

Identified market barriers

- Need for product improvements on cold climate capability, condensate management, noise abatement, and standards for the use of ultra-low GWP refrigerants
- Lack of product differentiation from non-heat pump options, including no ENERGY STAR® designation
- Low consumer awareness of products and benefits
- Higher cost than other options and limited availability in retail stores
- Lack of inclusion in utility incentive programs

Market interventions and leverage opportunities

- Leverage research and manufacturer engagement efforts by entities such as the California Codes and Standards Advocacy team and from other regional energy efficiency organizations.
- Coordinate and build upon product research work that the CalNEXT program has already completed.
- Forge partnerships with manufacturers to pursue technical improvements suitable for the California market.
- Pursue new Department of Energy test procedures with the California Codes and Standards Advocacy team, as well as new national specifications and ENERGY STAR certification with the Consortium for Energy Efficiency.
- Partner with multiple existing California programs to align on efficient, high-quality standards for qualifying products and to ensure room heat pumps are included as a measure in relevant programs, especially for those targeting ESJ consumers.
- Couple proper recycling of older AC units that pose risk for refrigerant leakage and long-term disposal with interventions for room heat pump products.

Applying an equity lens

This potential MTI could provide a significant opportunity to deliver benefits to ESJ communities, including enhanced household occupant comfort by combining cooling and heating options in a single product. Because they are more affordable than central or mini-split heat pumps and are portable, they are primed for adoption by renters, who represent nearly half of all households in California.[4] They can also be easily purchased during climate events when supplemental heating or cooling is needed.

[4]McGhee, Eric et al. California's Renters. Public Policy Institute of California. February 27, 2024.

About CalMTA

CalMTA works to deliver cost-effective energy efficiency and decarbonization benefits to Californians through a unique approach called market transformation. CalMTA-developed market transformation initiatives also aim to advance state goals on demand flexibility, workforce development, and equity.

Learn more: calmta.org Follow us: showcase/calmta

CalMTA is a program of the California Public Utilities Commission (CPUC) and is administered by Resource Innovations