

ENERGY FINDINGS

Trialability as a Lever for Heat Pump Adoption: Insights from a Review of Field Initiatives

Sarah Outcault, Ph.D.¹, Eli Alston-Stepnitz, Ph.D.¹, Angela Sanguinetti, Ph.D.¹, Ellian Eorwyn¹¹ Market Transformation Research Program, University of California, Davis

Keywords: heat pumps, trialability, technology adoption, barriers

<https://doi.org/10.32866/001c.168131>

Findings

Heat pumps for space conditioning are a keystone technology for residential decarbonization, but their permanent installation and high upfront costs make them difficult to try out on a limited basis, hindering adoption. We reviewed 413 sources on initiatives promoting residential heat pumps to find a small minority (N = 11) that address the technology’s low trialability. By analyzing online materials for these initiatives, we identified five approaches to enhance the trialability of heat pumps— incidental exposure, virtual experience, demonstration, tour, and trial—giving consumers the opportunity to experience heat pumps before making a purchase.

1. Questions

Air-source heat pumps for space conditioning (hereafter “heat pumps”) are a keystone technology for residential decarbonization in many regions, but their adoption has been slower than anticipated in several markets that have prioritized them (e.g., UK: Ahmad 2023, Gao et al. 2026; Germany: Manske et al. 2025; Massachusetts: Commonwealth of Massachusetts 2025, Francis 2024; California: Takemura 2025, Building Decarbonization Coalition 2024). Well-known barriers to heat pump adoption exist (e.g., high upfront costs, sparse installer networks), which are complicated by the inherent difficulty for customers to test the technology on a limited basis before purchase. Low “trialability,” as Rogers’ (2003) Diffusion of Innovation theory suggests, makes it difficult for consumers to learn about and gain confidence in unfamiliar technologies (Outcault et al. 2022). In this research, we ask: how, and how often, do residential heat pump initiatives address low trialability?

2. Methods

We sought to identify initiatives that promote residential heat pumps through means other than, or in addition to, providing financial support (e.g., incentives, rebates) by searching programs and press. To identify US utility- and government-led heat pump programs, we searched two comprehensive databases on incentives and policies that support renewables and energy efficiency in the United States: North Carolina Clean Energy Technology

Center’s Database of State Incentives for Renewables & Efficiency (DSIRE)¹ and American Council for an Energy-Efficient Economy’s (ACEEE) databases.² To identify non-program initiatives, we searched NewsBank’s databases for English-language news articles³ published in the previous five years (2019-2023) that mentioned heat pumps. The latter captured international and US initiatives. Program and press searches were conducted in 2023. Program descriptions and news articles were downloaded using web scraping and then subject to keyword searches using MaxQDA and Python. We retained all programs and articles that related to initiatives promoting residential heat pumps and included any form (i.e., using lemmatization and stemming) of the following sets of keywords: 1) *related to initiatives*: incentive, program, subsidy, rebate, adoption, program, government, initiative, tax credit, grant, scheme, energy-saving program, adoption, incentive, promotional campaign, financial assistance, implementation strategy, OR 2) *related to trialability*: trial, test, pilot, experiment, temporary, sample. These filtering methods resulted in 111 programs from the policy and program databases and 302 news articles. These 413 sources were then screened by manually reviewing excerpts (including preceding and subsequent sentences containing the keywords) to identify initiatives that included heat-pump-promotive elements other than, or in addition to, financial incentives. We reviewed the consumer-facing web pages of the resulting 55 initiatives, prioritizing those created by the initiative or its administrator. We classified initiatives as addressing trialability when they offered consumers the opportunity to test heat pumps on a limited basis, though that did not have to be the express purpose of the initiative. Eleven initiatives met these criteria, as outlined in [Figure 1](#). We qualitatively analyzed associated web pages to identify approach typologies. Each initiative’s trialability-related activities were then summarized. These eleven web pages are archived in the attached Supplemental Materials.

¹ <https://programs.dsireusa.org/system/program>

² <https://database.aceee.org/>

³ <https://infoweb.newsbank.com/>

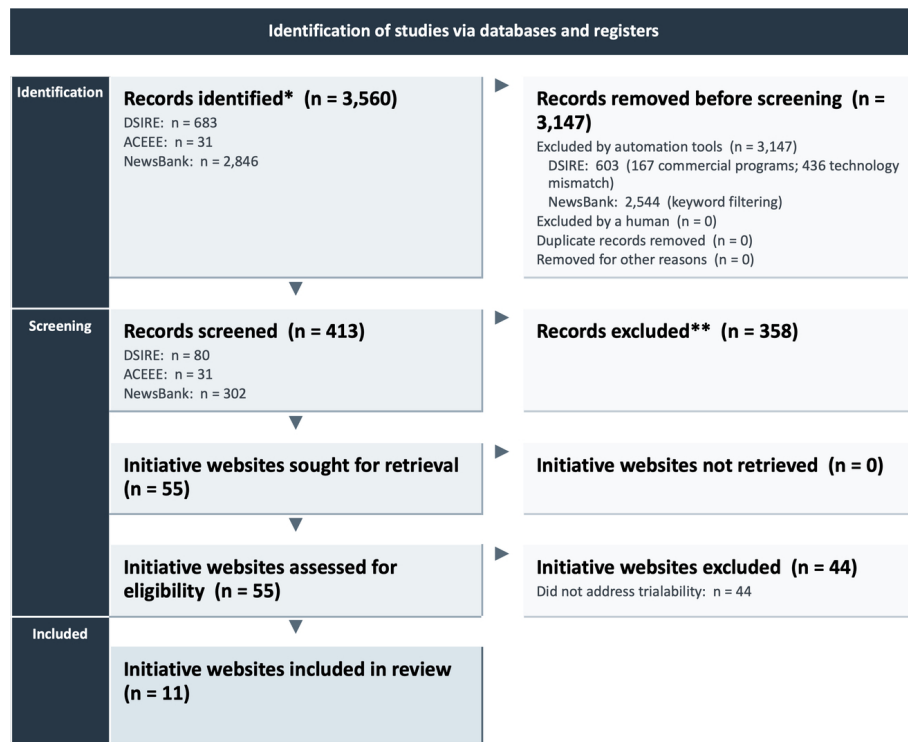


Figure 1. PRISMA flow diagram of information sources

3. Findings

We found 11 initiatives, administered by a range of organizations (e.g., non-profit, HVAC contractor, utility), that engage in activities that address heat pumps' low trialability. Among these, we identified five broad approaches: incidental exposure, virtual experience, demonstration, tour, and trial (see [Table 1](#)).

Table 1. Overview of heat pump promotional initiatives addressing trialability

Initiative name	Location	Administrator	Administrator type
Incidental exposure (n=1)			
Airbnb Sustainable Hosting Program	France, UK, US	Airbnb	Hospitality company
Virtual experience (n=1)			
Wattsmart Homes	Utah (US)	Rocky Mountain Power	Utility
Demonstration (n=1)			
Educational, Interactive Tiny House (EdITH)	Nebraska (US)	Lincoln Electric System	Utility
Tour (n=3)			
Green Homes Network	Scotland (UK)	Energy Saving Trust	Non-profit
Visit a Heat Pump	London and Glasgow (UK)	Nesta	Non-profit
Clean Heat Streets	Oxford, England (UK)	Consortium of universities, private companies, and local government led by Samsung Research UK	Public-private partnership
Trial (n=5)			
Zero30 heat pump rental	Saint John, Canada	Saint John Energy	Utility
Heat pump rental	Ontario, Canada	Solidcare Home Improvements	Home services company
Heat pump rental	Ontario, Canada	The HVAC Service Solutions	HVAC contractor
Heat pump rental	Ontario, Canada	DeMark Home Ontario	Home services company
Cooling Portland	Portland, Oregon (US)	Earth Advantage	Non-profit

With **incidental exposure**, visitors to a space using a heat pump encounter the technology unintentionally. Airbnb’s Sustainable Hosting Program (2022) committed €1 million to fund energy-related renovations, including heat pump retrofits, at host properties in France, the United Kingdom, and the United States. Through implementing partners, the company offered up to €2,200 to qualified hosts, with an opportunity to secure larger financial incentives from government programs, to pursue energy-efficient retrofits. While not the explicit aim, the program creates opportunities for guests to experience heat pumps during their stay at upgraded properties.

Virtual experience involves interfacing with a heat pump and/or vicariously experiencing its impacts in a digital simulation. Rocky Mountain Power’s “Wattsmart Homes” program website invites visitors to “take a modern heat pump for a spin.” Interactive animation gives participants experience with heat pumps by guiding them through simulated engagement with the thermostat and phone applications that control the heat pump settings. The virtual tour also describes technical aspects of heat pumps and the environmental and community benefits they offer.

Demonstrations offer participants purposeful, time-bound experiences with heat pumps in a physical simulation. Lincoln Electric System’s Educational, Interactive Tiny House (EdITH) (see [Figure 2](#)) was designed to educate visitors about heat pumps (and other home energy technologies such as solar power, insulation, LEDs, and heat pump water heaters). Visitors “get hands-

on experience and education” about heat pumps through interactive displays and installed equipment.⁴ The tiny house is transported to sustainability and home design events and schools to provide opportunities for consumers in the local community.



Figure 2. Lincoln Electric System's Educational, Interactive Tiny House (EdITH)

Image source: <https://www.les.com/sustainability/educational-interactive-tiny-house>

Tours allow prospective adopters to experience a heat pump in a real home setting. Scotland's Green Homes Network has compiled detailed case studies from over 300 homes whose owners installed sustainable technologies, some of which offer public tours showcasing their energy features, including heat pumps. Similarly, the Visit a Heat Pump Near You pilot program in London and Glasgow provided hands-on exposure for visitors curious about heat pumps (see [Figure 3](#)). The Clean Heat Streets program, funded by the UK's Heat Pump Ready Programme, included plans to recruit “show homes” to allow neighbors to directly experience the advantages of heat pumps in houses like their own.



Figure 3. Visitors on a home tour learning about heat pumps

Image source: <https://www.visitaheatpump.com>

⁴ Press from outreach events suggests the heat pumps are operational: <https://www.klknv.com/lincoln-electric-system-showcases-new-educational-tiny-home/>

Trials involve prolonged personal use of a heat pump without substantial upfront financial commitment. Heat pump rental programs are one type of trial. We found four rental programs with contract terms of up to three years; some of which also included rent-to-own options. Portable heat pump programs offer another means to trial the technology. The Cooling Portland program distributes low-cost, portable heat pump cooling units to reduce heat-related risks among vulnerable households.

We reviewed 55 initiatives that promote residential heat pumps by targeting non-cost barriers to adoption and found just 11 that addressed the technology's low trialability. These initiatives created opportunities for consumers to test the technology on a limited basis using five approaches – incidental exposure, virtual experience, demonstration, tour, and trial – giving consumers the chance to gain experience with an otherwise all-or-nothing home-equipment purchase and addressing a key barrier to adoption. Despite predominantly US-based searches, 8 of the 11 were based outside the US. Further investigation of existing initiatives (e.g., using international databases) could identify more examples of the five approaches we identified to address low trialability of heat pumps, as well as additional types. Future research could also examine the efficacy and cost-effectiveness of various strategies to promote residential heat pump adoption that target trialability.

.....

Acknowledgments

We would like to thank two anonymous reviewers for their comments on an earlier version of this manuscript as well as Cinthia Perea and Emily Searl for their research assistance. This work was supported with funding from CalNEXT grant ET23SWE0053.

Submitted: June 10, 2026 AEST. Accepted: August 22, 2026 AEST. Published: September 12, 2026 AEST.



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY-SA-4.0). View this license's legal deed at <https://creativecommons.org/licenses/by-sa/4.0> and legal code at <https://creativecommons.org/licenses/by-sa/4.0/legalcode> for more information.

REFERENCES

- Ahmad, S. 2023. *Motivations and Barriers Associated with Adopting Domestic Heat Pumps in the UK*. UK Collaborative Centre for Housing Evidence. <https://housingevidence.ac.uk/wp-content/uploads/2024/01/Heat-pumps-report-final.pdf>.
- Building Decarbonization Coalition. 2024. “How California Can Unlock Healthier & More Resilient Homes in 2024.” February 12. <https://buildingdecarb.org/how-california-can-unlock-healthier-more-resilient-homes-in-2024>.
- Commonwealth of Massachusetts. 2025. “2024 Massachusetts Climate Report Card: Buildings Decarbonization.” January 17. <https://www.mass.gov/info-details/2024-massachusetts-climate-report-card-buildings-decarbonization>.
- Francis, J. 2024. “Heat Pumps Slow to Gain Traction: Complexity, Questions Dog Adoption of Key Factor in Net-Zero Goal.” *Daily Hampshire Gazette*, January 3. <https://www.gazettenet.com/Massachusetts-well-behind-its-heat-pump-target-53506629>.
- Gao, L., P. Naylor, A. Hegab, and P. Pilidis. 2026. “Exploring Barriers to Residential Heat Pump Adoption: A UK Case Study of User Behaviour.” *Energies* 19 (10): 2312. <https://doi.org/10.3390/en19102312>.
- Manske, D., R. Lehneis, M. Jordan, and D. Thrän. 2025. “Spatial Dynamics of Residential Heat Pump Integration and Its Potential Role in the Energy Transition of German Municipalities.” *Energy* 332: 136918. <https://doi.org/10.1016/j.energy.2025.136918>.
- Outcalt, S., A. Sanguinetti, and L. Nelson. 2022. “Technology Characteristics That Influence Adoption of Residential Distributed Energy Resources: Adapting Rogers’ Framework.” *Energy Policy* 168: 113153. <https://doi.org/10.1016/j.enpol.2022.113153>.
- Rogers, E. M. 2003. *Diffusion of Innovations*. 5th ed. Free Press.
- Takemura, A. 2025. “Heat Pumps Outsold Gas Furnaces by Their Biggest-Ever Margin in 2024.” Canary Media, February 20. <https://www.canarymedia.com/articles/heat-pumps/heat-pumps-keep-widening-their-lead-on-gas-furnaces>.

SUPPLEMENTARY MATERIALS

Coding scripts

Download: <https://findingspress.org/article/168131-trialability-as-a-lever-for-heat-pump-adoption-insights-from-a-review-of-field-initiatives/attachment/361121.zip>

Spreadsheet of US news articles

Download: <https://findingspress.org/article/168131-trialability-as-a-lever-for-heat-pump-adoption-insights-from-a-review-of-field-initiatives/attachment/361122.csv>

Spreadsheet of global news articles

Download: <https://findingspress.org/article/168131-trialability-as-a-lever-for-heat-pump-adoption-insights-from-a-review-of-field-initiatives/attachment/361123.csv>

Archived source material

Download: <https://findingspress.org/article/168131-trialability-as-a-lever-for-heat-pump-adoption-insights-from-a-review-of-field-initiatives/attachment/361124.pdf>
