Living with Heat Pumps: Customer Experiences with Hybrid and Cold Climate Heat Pumps in Washington and New Jersey

Geoff Barker, DNV
Jesse Durst, Puget Sound Energy
Nauman Khurshid, New Jersey Natural Gas
Katie Ryder, DNV
David Avenick, DNV
Amber Watkins, DNV

ABSTRACT

To realize the full benefits of heat pumps, it is essential that we move past early adopters and break through the S-curve of adoption. This is particularly important in colder climates where earlier technology, or contractor sentiment, may be steering customers away from heat pumps. This paper will present customer and contractor feedback on hybrid and cold climate heat pump systems collected via online surveys, phone surveys, and in-depth interviews as part of two recent studies completed with customers in Washington and one in New Jersey. This coast-to-coast retrospective provides key insights to help program administrators better understand customer satisfaction and pain points. The benefits of heat pumps are undeniable and corroborated by feedback from customers who took part in rebate programs. Customers are satisfied with the thermal comfort, ease of use, reliability, and system performance of heat pumps. Two notable barriers are the upfront costs of heat pump installations and the energy bill savings associated with heat pumps, particularly in the winter months. Both contractors and customers noted that the installation costs of heat pumps are a significant barrier to their adoption. And while heat pumps are highly efficient, they rely on electricity, and some customers may be surprised by the increase in their winter electric bills if they previously relied on gas furnaces to heat their homes. This paper discusses effective strategies for helping to reduce the affordability barrier in customer messaging, contractor outreach, and program design.

Introduction

Market Context: Rising Rates and Energy Affordability Pressures

Heat pump pilots are unfolding against a backdrop of sustained electricity price increases and growing affordability concerns. National reporting drawing on Lawrence Berkeley National Laboratory research indicates that retail electricity prices have risen faster than inflation in 26 states over the past six years (Wiser et al., 2025), with particularly sharp increases in parts of the Northeast, including New Jersey and New York (Plumer et al., 2025). Importantly, these increases are largely attributed to transmission and distribution investments ("poles and wires"), grid hardening, and infrastructure replacement rather than renewable energy generation. In PJM states, additional pressure from wholesale capacity markets and growing demand, such as from data centers, has contributed to uncertainty around future rate trajectories.

Forward-looking research further suggests that affordability pressures are likely to intensify. Residential electricity prices have already increased 17% over the past five years and are projected to rise an additional 22% above inflation over the next 15 years, driven by demand growth and policy constraints on new generation capacity. At the same time, 16% of Americans

are behind on their utility bills, and arrears are rising alongside rates (Lutz 2026, Sendy 2026, Broughel 2026, Hixson 2026). Together, these trends heighten customer sensitivity to bill impacts and financial risk, shaping perceptions of electrification technologies. In this environment, programs that incentivize hybrid heat pumps must clearly communicate expected bill impacts, optimize system controls such as lockout temperature settings, and integrate rebates and financing strategies to mitigate risk while advancing long-term decarbonization and system efficiency goals. Figure 1 shows price of electricity and its growth compared to inflation-adjusted and actual prices per kWh in New Jersey and Washington since 2021 compared to the United States average electricity price. Even when adjusting for inflation, electricity prices have increased since 2022 in New Jersey and Washington as have average prices across all states in the U.S. This presents a challenge for managers of heat pump programs that are trying to promote heat pump systems in an environment where electricity prices are rising and, in many regions, remain higher than natural gas on a per-BTU basis.

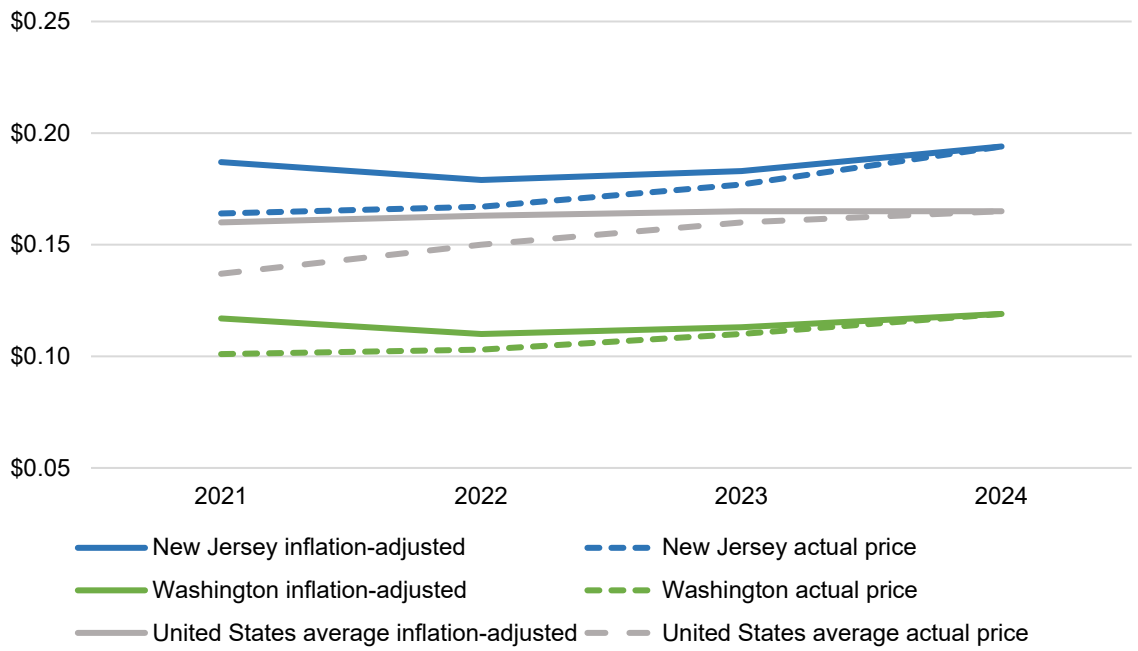

Figure 1. Real and nominal electricity prices, cents per kWh 2021-2024. *Source*: U.S. Energy Information Administration.

Programs Overview

In 2023, Puget Sound Energy (PSE) in the Seattle metro region, Avista in eastern Washington and northern Idaho, and New Jersey Natural Gas (NJNG) launched pilot programs to advance residential heat pump adoption, with distinct but complementary approaches (DNV 2024, DNV 2025a, DNV 2025b). PSE collaborated with distributors, contractors, and customers to design rebate offerings for single-family retrofit applications, providing incentives for both hybrid heat pump systems and fully electric cold climate heat pumps. Its offerings targeted customers with existing natural gas furnaces for hybrid heat pump conversions, as well as customers with gas and electric forced-air systems for conversions to cold climate heat pumps. Similarly, NJNG introduced a hybrid heat pump program focused on providing incentives for

hybrid systems that pair an electric air-source heat pump with a high-efficiency natural gas furnace, primarily targeting single-family customers seeking to upgrade from existing gas furnaces without fully electrifying. Avista's pilot heat pump program provided high-efficiency cold climate hybrid heat pump systems as well has standard efficiency hybrid heat pump systems to customers with existing air conditioning systems and aging HVAC equipment, with the goal of evaluating system performance, customer acceptance, and grid impacts. As part of the program, Avista covered all equipment and installation costs for their small pool of program participants. Together, these pilot programs reflect varied utility strategies, ranging from hybrid pathways to full electrification, designed to test technology performance, customer response, and market readiness across different fuel mixes and regional contexts.

Evaluation Methods and Objectives

Data Collection Methods

The PSE, Avista, and NJNG evaluations used a combination of billing analysis, field measurement, customer, and contractor research. The PSE and NJNG studies conducted impact analyses using utility consumption data and weather-normalized regression models to estimate changes in gas and electric use. All three studies included field inspections and submetering of a subset of homes to collect operational data, including equipment performance and thermostat settings such as compressor lockout temperatures.

Each evaluation also incorporated qualitative and survey research. The Avista study conducted quarterly customer telephone surveys with the first phone surveys taking place shortly after the installation of the systems in the fall of 2024. For the studies, methods included interviews with program staff and contractors, participant surveys, and, for the NJNG study, a nonparticipant market survey. Together, these activities supported assessment of system performance, customer experience, contractor engagement, and market barriers. Table 1 shows the participant population by study and system type as well as the number of homes selected for submetering (Ibid).

Table 1. Participant population, system type, and submeter installs by study

Study	Participant population	System type	Submeter installs*
PSE	1,063	EFAF to CCHP (132) GFAF to CCHP (691) Hybrid HP (240)	27
Avista	12	Hybrid CCHP (6) Hybrid Standard HP (6)	12
NJNG	71	Hybrid HP	16
Total	**1,075**	-	**55**

*The 27 homes that were submetered for the PSE study were all hybrid systems with a standard efficiency heat pump.

Process Evaluation Objectives

In addition to conducting end-use metering on a sample of homes in the three pilot programs, DNV conducted process evaluations across the populations of program participants. The process evaluations were designed to assess how effectively the programs were implemented and whether they were positioned to achieve their intended objectives, which included evaluating program design, delivery mechanisms, contractor engagement, customer experience, and incentive structures. For NJNG, the evaluation also identified operational barriers and implementation challenges and assessed whether the program was reaching its intended customer segments.

Study Results

This section synthesizes process evaluation findings from hybrid heat pump programs implemented by PSE, Avista, and NJNG. Together, these pilots provide insight into customer satisfaction, contractor engagement, operational performance of the heat pump systems, and barriers to broader market adoption of hybrid heat pump systems.

Customer Satisfaction and Perceived Benefits

Across programs, customer satisfaction with hybrid heat pump systems is high (Ibid). Table 2 shows participant satisfaction ratings with comfort with the new systems, contractor experience, and overall experience with the systems. Across programs, participants reported very high satisfaction with hybrid heat pump systems. Satisfaction with comfort following installation was consistently high, with average ratings ranging from 4.5 (NJNG) to 4.8 (Avista). Contractor experience was also rated highly across all programs, with average scores between 4.4 (NJNG) and 4.9 (Avista), indicating broadly positive installation and interaction experiences. Finally, overall program experience received similarly high scores across programs, with all three programs reporting average satisfaction ratings of 4.6 out of 5. Together, these findings indicate consistently positive customer experience across multiple program dimensions. Surveyed participants for the NJNG study were also asked whether they would recommend hybrid heat pump systems to others and 95% reported that they would recommend the systems, and nearly all reported that systems were easy to use.

Table 2. Participant satisfaction with various program elements

Study	Comfort since HP upgrade	Experience with Contractor	Experience overall
PSE	4.6	4.7	4.6
Avista	4.8	4.9	4.6
NJNG	4.5	4.4	4.6

Customers consistently cited improved comfort, quiet operation, and the added benefit of air conditioning as key advantages. Hybrid systems were valued for their perceived reliability and flexibility, specifically the ability to switch between electric heat pump operation and gas

auxiliary heat provided reassurance to customers, particularly in colder climates. The Avista quarterly surveys provided additional insight and nuance into perceived benefits related to customer comfort. A large majority of respondents (82%) reported that they were more comfortable with their new heat pump than with their previous system, while the remaining participants indicated that comfort was about the same (DNV 2025a). No respondents reported decreased comfort following installation. Customers who experienced improved comfort commonly cited more consistent heating and cooling throughout the home, faster system response, and improved ability to maintain set temperatures.

Cooling benefits also contributed to customer satisfaction. For all participants in the Avista program and many in NJNG program, the heat pump installation replaced older, less efficient air conditioning equipment, resulting in improved summer comfort, quieter operation, and, and lower cooling costs. For some of the PSE participants, the heat pump provided central air conditioning for the first time. These customers viewed cooling capability as an added benefit, particularly during warmer summers, enhancing overall system value even when the perception of winter bill savings was mixed. In PSE service territory, AC adoption has rapidly increased in the past decade. Figure 2 shows the percentage of households in the Seattle metro area with air conditioning since 2013. As shown, adoption of air conditioning grew from less than one-third of homes in the region in 2013 to nearly two-thirds of homes in 2023.

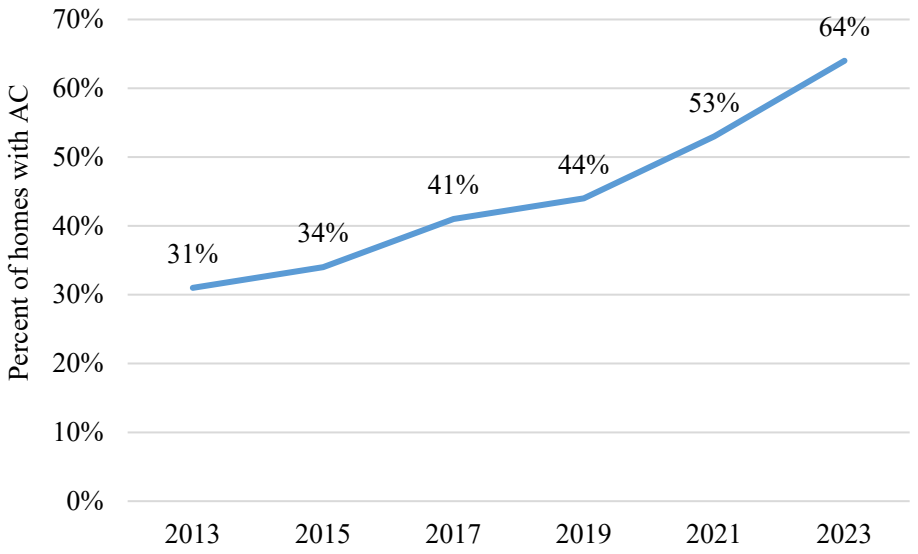

Figure 2. Percent of homes in Seattle with air conditioning 2013-2023. *Source*: United States Census American Housing Survey

Opportunities for Improvement

While customers are satisfied with most aspects of their participation in their respective heat pump programs and with their new systems overall, satisfaction with energy savings and operating costs was somewhat lower than other aspects associated with their systems and program experience. At PSE, hybrid participants rated energy savings and operating costs 3.9 out of 5, the lowest-rated aspect of the program (DNV 2024). Avista participants reported similar patterns, with energy savings ratings of 3.8 for standard heat pump hybrid systems and 3.3 for cold-climate hybrid heat pump systems, and a combined average of 3.5 (DNV 2025a).

Participant quotes from the Avista evaluation help contextualize these ratings and highlight the wide range of post-installation bill experiences. It is important to note that customers often conflated energy savings with bill savings, as there is not a simple way for participants, particularly those with hybrid systems, to directly quantify changes in their overall energy savings. Instead, customers primarily rely on changes in the charges on their utility bills, which reflect both usage and broader rate dynamics. Some Avista participants also reported modest or seasonal savings (e.g., "*Energy bill amount has decreased by $6*" and "*Seems to be less than last summer; don't have exact numbers though*"), while others perceived little change ("*Undecided, it seems about the same*") (Ibid). A subset of participants expressed concern about higher overall bills following installation, noting that "*My energy bill has increased to over $200*" or that "*Energy bills are high. It may be the rates and not the heat pump.*" Together, these comments suggest that while gas usage declined after installation, increases in electric usage partially offset expected bill savings for some customers.[1] The variability in customer experiences—and the difficulty some participants had attributing bill changes specifically to the heat pump versus broader rate effects—underscores the importance of setting realistic expectations regarding fuel switching, seasonal impacts, and total bill outcomes when promoting and implementing the program.

Role of Contractors and Program Delivery

Contractors emerged as the primary drivers of hybrid heat adoption in the programs, indicating the importance of contractors acting as informed advocates for heat pump technologies with thorough knowledge of available program incentives. Participants relied heavily on contractor recommendations when selecting equipment and understanding system functionality, highlighting contractors' influence on customer decision making.

Across programs, contractors universally agreed that rebates "move the needle" by improving the value proposition of heat pumps and hybrid systems. Program design, however, varied substantially across jurisdictions. While Avista pilot participants were directly recruited into the program and received their entire hybrid heat pump systems at no cost through a single contractor, participants in the PSE and NJNG programs received rebates or financing assistance for qualifying systems. For PSE and NJNG, contractors reported that rebates were critical to making hybrid systems financially attractive and often described incentives as essential to closing sales (DNV 2024, DNV 2025b). At NJNG, contractors praised program staff responsiveness and the availability of 0% financing, describing financing as a "game changer" for overcoming upfront cost barriers (DNV 2025b). This finding is consistent with prior research, including the Sonoma Clean Power Lead Locally Emergency Technology evaluation of program participants in Sonoma and Mendocino counties (northern California), which similarly found that customers viewed 0% financing as highly influential in their adoption decisions (Simonson et al., 2024). Together, these results suggest that pairing rebates with accessible 0% financing can substantially enhance program impact.

At PSE, contractors viewed the rebate process as generally workable but recommended clearer communication and streamlined paperwork to reduce customer confusion. Both PSE and NJNG programs identified confusion around rebate disbursement (DNV 2024, DNV 2025b). Some customers expected a direct payment rather than a point-of-sale reduction applied through

[1] A comparison of customer perceptions of their bills to actual bills will be provided in the forthcoming Avista Hybrid Heat Pump Evaluation report (expected January 2027).

the contractor invoice. This suggests that clearer communication about incentive structure and payment flow would improve transparency and participant understanding.

Lockout Temperatures and Commissioning Practices

Findings from both the PSE and NJNG hybrid heat pump pilots indicate that heat pump compressor lockout temperature settings are a critical determinant of system performance,[2] fuel switching, and customer value. Preliminary review of lockout data collected for Avista's pilot similarly shows meaningful variation in commissioning practices, and forthcoming analysis will assess how those settings influence runtime, peak impacts, and fuel switching outcomes (DNV 2024, DNV 2025a, DNV 2025b).

At PSE, submetering revealed substantial variation in heat pump lockout settings, ranging from disabled to well above 35°F, with at least one home set as high as 50°F. A high heat pump lockout temperature forces the system to revert to gas backup heat at relatively mild outdoor temperatures, significantly limiting heat pump runtime. In practice, this means customers are not receiving the full efficiency and emissions benefits of their installed heat pump system. In extreme cases, a high lockout temperature effectively reduces the heat pump to a shoulder-season technology—undermining both bill savings potential and decarbonization benefits. The evaluation identified the heat pump lockout (rather than the auxiliary gas heat lockout) as a highly influential commissioning parameter shaping electric load and overall system performance. Contractors more commonly set heat pump lockout settings, while auxiliary lockouts are not always consistently configured. However, both parameters can affect system operation.

Similarly, NJNG found that contractors frequently relied on generic temperature thresholds (e.g., 40–45°F) instead of calculating home-specific balance points. Limited familiarity with balance point economics and lockout optimization suggests that hybrid systems may not consistently operate in a manner that maximizes customer savings or emissions reductions. Without site-specific analysis, systems may default to conservative settings that prioritize short-term comfort over long-term performance, energy savings, and bill savings.[3]

Figure 3 shows the distribution of heat pump lockout set points across participants by study. As shown, hybrid heat pump systems in the PSE study had the widest range of lockout set points, ranging from 15–50°F, followed by systems in the NJNG study, which ranged from 20–45°F. The cold climate and standard hybrid heat pump systems in the Avista studies had the narrowest range in lockout set points (0–15°F). The average lockout temperatures of the systems in the PSE and NJNG studies were just above freezing (33.9°F and 34.8°F, respectively), while the average for the Avista systems was much lower at 5.5°F. Notably, a small number of systems in all studies had the heat pump lockout set point disabled (5 systems in the PSE study, 3 for NJNG, and 1 for Avista).

[2] The compressor lockout temperature refers to the outdoor temperature below which the heat pump does not operate, and the system relies on backup gas heating.

[3] Further details on balance point economics will be available in the forthcoming Avista and NJNG Hybrid Heat Pump Evaluation reports (expected January 2027).

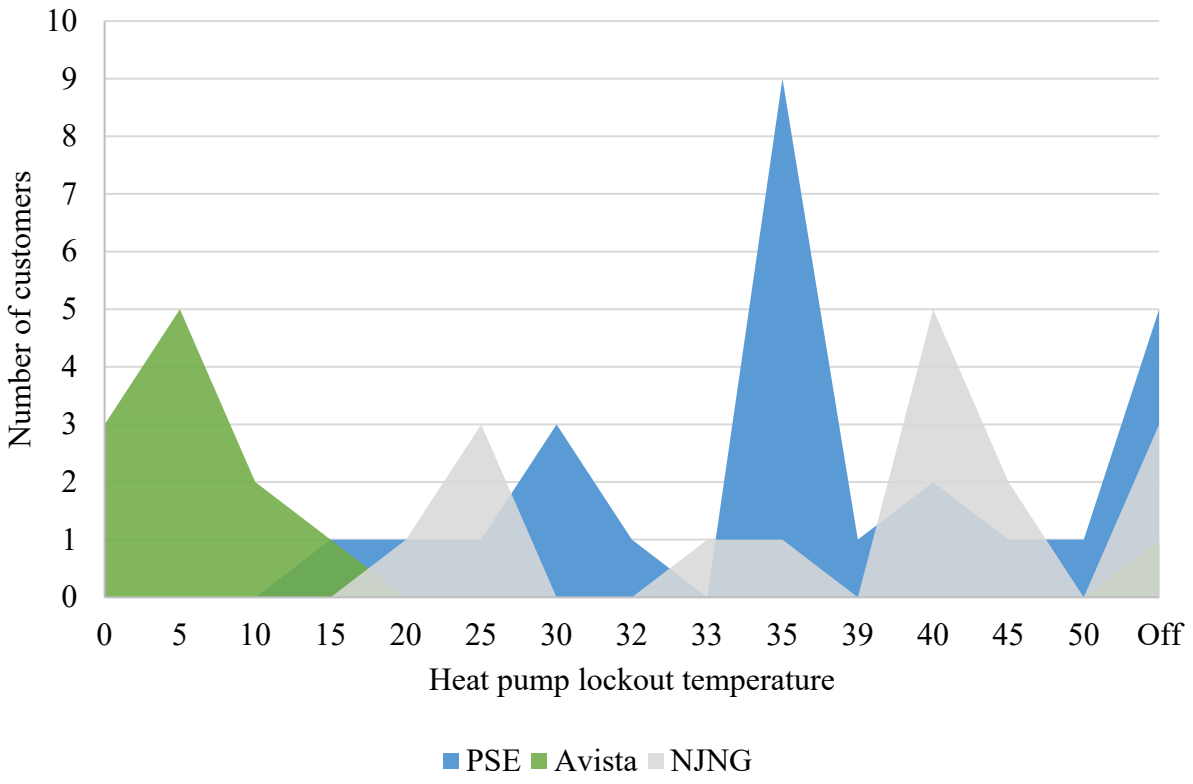

Figure 3. Distribution of heat pump lockout set points by utility

Qualitative findings suggest that contractor motivations can play an important role in commissioning. Contractors are often highly motivated to minimize callbacks and customer complaints, particularly from customers accustomed to the hotter blast of supply air from gas furnaces. To reduce perceived comfort risk, some contractors may oversize systems or set higher lockout temperatures to ensure that gas heating engages sooner. While this approach may reduce callbacks, it can come at the expense of system efficiency, electrification goals, peak demand management, and reducing greenhouse gas emissions. In effect, conservative lockout practices designed to reduce callbacks and customer complaints may inadvertently be a disservice to customers and program goals. Together, these findings indicate that hybrid heat pump program outcomes depend heavily on clear, consistent guidance and verification of compressor lockout temperatures. Narrower lockout ranges, required documentation of balance point calculations, enhanced contractor training on hybrid optimization, and post-installation verification could help better align real-world system operation with program objectives for emissions reductions, energy savings, electrification, and customer benefits.

Barriers to Adoption

Despite high satisfaction with hybrid heat pump systems among participants, the evaluations identified significant barriers to broader market uptake.

- **Upfront costs remain a primary barrier.** Even with rebates, hybrid systems are typically more expensive than standard air conditioning replacements. NJNG

surveys found that 57% of respondents were concerned about upfront costs, and contractors similarly reported that higher equipment costs remain a difficult sell.

- **Operating costs are generally perceived as high.** In the Avista evaluation, satisfaction with energy savings following installation was the lowest-rated program dimension, averaging 3.5 out of 5. This finding suggests that participants tend to conflate energy savings with expected savings on their energy bills, even though energy savings for hybrid systems are often difficult for customers to calculate. Most participants reported no noticeable change in their energy bills, while two participants noted bill decreases after operating the new system for two full winters. Consistent with these findings, NJNG surveys indicated that 50% of respondents expressed concern about combined operating costs, contributing to mixed perceptions of ongoing cost impacts.
- **Awareness and understanding gaps are substantial.** The NJNG study found that while roughly 70% of customers had heard of heat pumps, only 29% had heard of hybrid heat systems. Many customers did not understand how hybrid systems operate or what installation entails. Contractors confirmed that initial customer understanding is typically low and requires significant education during the sales process.
- **Familiarity bias and skepticism persist.** Many customers prefer conventional gas systems due to familiarity and past experiences. NJNG findings showed that 68% of surveyed customers believed gas systems to be more efficient than electric systems, indicating that perceptions and established preferences continue to influence adoption decisions.
- **Cost and performance concerns remain barriers.** Customers frequently cited uncertainty regarding cold-weather performance and potential increases in electricity costs. These concerns may reflect both perceptions about electrification technologies and economic considerations, as operating cost competitiveness can vary by climate and local energy prices.
- **Bill savings in increasing electricity rate environments:** Hybrid heat pump adoption is occurring in an environment of rising and uncertain electricity rates, which amplifies customer sensitivity to bill impacts.
- **Technical commissioning and system settings influence outcomes.** PSE and NJNG evaluations revealed wide variation in heat pump lockout settings and thermostat programming. The compressor lockout temperature, which determines when systems switch from electric to gas heating, was identified as a critical parameter affecting both energy savings and peak demand impacts. Inconsistent settings may undermine both customer expectations and program objectives.
- **Misalignment between system design, customer expectations, and cost premium.** Hybrid and cold-climate heat pumps often carry a higher upfront cost based on their advanced efficiency capabilities. However, findings from our metering studies show that high compressor lockout settings can significantly limit heat pump operation during colder weather, reducing gas displacement and diminishing the benefits associated with high efficiency equipment. When actual performance does not align with the incremental cost, customers may perceive that the system does not deliver proportional savings. Programs that emphasize high-performance equipment without aligning lockout guidance and bill

expectations may inadvertently constrain market uptake. In some cases, promoting lower-cost systems with optimized lockout strategies could still achieve meaningful gas offsets while expanding market reach and increasing familiarity with modern heat pump technology.

Recommendations

Findings from PSE, Avista, and NJNG studies point to several cross-cutting recommendations for hybrid heat pump program design:

1. **Emphasize proper sizing and commissioning.** Ensuring systems are correctly sized and programmed (e.g., appropriate lockout temperatures and modest thermostat setbacks) can improve comfort, optimize fuel switching, and better balance decarbonization and peak demand goals. For many utilities, managing winter peak demand is a growing priority as electrification increases heating loads and drives infrastructure planning and capacity costs. Hybrid heat pumps can support these objectives by shifting heating between electric and gas sources depending on outdoor temperatures and system settings. Clear guidance and verification around heat pump lockout temperatures and control settings are essential to managing customer bill impacts. Standardized commissioning protocols can help ensure hybrid systems operate in a way that balances comfort, decarbonization, peak demand objectives, and cost containment. Without this alignment, inconsistent settings may undermine affordability perceptions and customer satisfaction.
2. **Strengthen contractor engagement and technical guidance.** Contractors are central to program success and are often the primary influence on customer decision-making. Their ability to clearly articulate the benefits of heat pumps and hybrid systems, and to advocate for them confidently relative to conventional gas equipment, directly affects adoption. Programs should invest in targeted contractor education to ensure installers fully understand system performance, fuel-switching dynamics, bill impacts, and the long-term value proposition of hybrid and cold-climate heat pumps. In addition, contractors should receive structured training on proper system sizing, commissioning, thermostat staging, and compressor lockout settings to ensure installations align with program objectives for comfort, cost management, decarbonization, and peak demand. Recognition programs (e.g., “preferred contractor” designation, tiered “heat pump champion” status, public recognition on utility websites, co-branded marketing materials, or annual performance awards), technical support resources, and performance-based incentives may further strengthen contractor advocacy and participation.
3. **Enhance customer education and post-installation support.** Customer education should explicitly address bill impacts in an environment of rising electricity rates. Messaging should set realistic expectations about fuel switching (e.g., higher winter electric use paired with lower gas use), highlight total annual cost considerations, and emphasize added value such as improved cooling, comfort, and system flexibility. Post-installation tools, such as bill impact calculators, seasonal check-ins, and simple operating guides, can reinforce proper system use and reduce customer anxiety over their energy bills.
4. **Pair robust rebates with accessible financing.** Upfront cost remains the primary barrier to adoption. Strong incentives combined with low- or zero-interest financing, as offered in the NJNG program, can help reduce affordability constraints. Programs should also streamline rebate communication, clarify payment flow, and consider point-of-sale

incentive structures to reduce customer confusion and perceived financial risk. PSE is beginning to pair electrification programs with supportive rate designs, such as electrification rates, bill assistance, or bill discount rates for income-qualified households, to help mitigate bill impacts and improve affordability for customers adopting electric technologies.

Conclusion

Across PSE, Avista, and NJNG pilot programs, customers who installed hybrid or cold-climate heat pumps report consistently high satisfaction with their new systems. Comfort, quiet operation, ease of use, and system reliability are clear strengths, and many participants indicate they would recommend the technology to others. The hybrid configuration, in particular, provides reassurance in colder climates by having gas backup with high efficiency electric heating in less extreme cold temperatures. These findings suggest that once installed, heat pumps generally meet or exceed customer expectations for performance and comfort.

However, broader market expansion faces persistent structural barriers. Upfront installation cost remains the most significant barrier, even with rebates, and concerns about winter electric bill impacts temper perceptions of financial benefits. Awareness gaps—especially regarding how hybrid systems operate—combined with familiarity bias toward conventional gas systems, further limit adoption. In addition, field research highlights that commissioning practices, particularly compressor lockout temperature settings, can have significant influence on energy savings, bill impacts, peak demand performance, and greenhouse gas emissions reductions. Together, these results indicate that scaling hybrid heat pump adoption will require not only strong financial incentives and accessible financing, but also clearer customer education, enhanced contractor training, and more consistent guidance on system sizing and control settings to align real-world performance with program objectives.

References

Broughel, A. 2026. “3 Reasons Your Electricity Is Becoming More Expensive”. Forbes. January 31. https://www.forbes.com/sites/annabroughel/2026/01/31/3-reasons-your-electricity-is-becoming-more-expensive/

DNV. 2024. *Puget Sound Energy Dual Fuel and Cold Climate Heat Pump Pilot Programs Final Report: Impact and Process Evaluation.* Prepared for Puget Sound Energy.

DNV. 2025a. “Avista Dual Fuel Heat Pump Pilot Program: Preliminary Results.” Presentation Prepared for Avista Corporation.

DNV. 2025b. “New Jersey Natural Gas Evaluation of PY4 Building Decarbonization – Start Up – Hybrid Heat Pump Subprogram.” Presentation Prepared for New Jersey Natural Gas.

Energy Information Administration (EIA). 2025. Electric Sales, Revenue, and Average Price. https://www.eia.gov/electricity/data/browser/

Hixson, A. 2026. “America’s energy bills are soaring. The pain is no longer just for the poor.” MS Now. February 21. https://www.ms.now/news/energy-bills-heating-electricity-politics

Lutz, A. 2026. “Americans are shocked by utility bills as high as $1,000: They’re paying the price for aging grids, fuel-price whiplash, and extreme weather”. Fortune. February 10. https://fortune.com/2026/02/10/american-electric-bills-skyrocketing-extreme-weather-data-centers-inflation/

Plumer, B, H. Stevens, and R. Elliott. 2025. “Why the Price of Electricity Is Spiking Around the Country?” *New York Times.* October 30. https://www.nytimes.com/2025/10/30/climate/electricity-prices.html

Sendy, A. 2026. “What's Driving Your Rising Electric Bill?” SolarReviews. https://www.solarreviews.com/blog/whats-driving-your-rising-electric-bill

Simonson, R., S. Salyer, R. Hendron, C. Pingatore, C. Moar, G. Barker, A. Kanungo, D. Avenick, C. Williams, and Y. Liang. 2024. *Lead Locally, an Innovative Program Designed to Increase the Number of Energy Efficiency and Electrification Retrofits in Sonoma and Mendocino Counties.* California Energy Commission. Publication Number: CEC-500-2024-100.

United States Census. 2023. American Housing Survey (AHS). https://www.census.gov/programs-surveys/ahs/data/interactive/ahstablecreator.html

Wiser, R., E. O'Shaughnessy, G. Barbose, P. Cappers, and W. Gorman. 2025. “Factors Influencing Recent Trends in Retail Electricity Prices in the United States.” *The Electricity Journal.* Volume 38: Issue 4. https://emp.lbl.gov/publications/factors-influencing-recent-trends