Getting the Price Signals Right:
Aligning Rate Design With Heat Pump Usage



NOVEMBER 2026

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Acknowledgements

This report reflects the invaluable contributions of multiple individuals.

We would like to recognize the report's lead authors, Erin Cosgrove, Director of Policy and Programs, Abigail Brown, Manager of Codes and Standards, Luke Miller, former Senior Associate of Policy and Programs, and Amaris Greene, Associate of Policy and Programs at NEEP. Several NEEP staff served key roles in the development of the report, including Maggie Molina, Executive Director, Lauren Ross, Senior Director of Research and Strategy, and David Smedick, Manager of Technology and Market Transformation. Analysis was provided by Ranal Tudawe and Molly Garcia of Center for Energy and Environment. Formatting and edits were provided by Owl Eye Edits and designMind.

NEEP would like to recognize and thank members of its Rates Working Group for their participation in reviewing this report and providing input into the creation of this document. Participation in the Rates Working Group does not imply endorsement of the report's findings. These individuals include:

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About NEEP

NEEP was founded in 1996 as a non-profit whose mission is to serve the Northeast and Mid-Atlantic to accelerate regional collaboration to promote advanced energy efficiency and related solutions in homes, buildings, industry, and communities. Our vision is that the region's homes, buildings, and communities are transformed into efficient, affordable, low-carbon, resilient places to live, work, and play.

Disclaimer: NEEP verified the data used for this white paper to the best of our ability. This paper reflects the opinion and judgments of the NEEP staff and does not necessarily reflect those of NEEP Board members, NEEP Sponsors, or project participants and funders.

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Acronyms and Definitions

AMI: advanced metering infrastructure
ccASHP: cold climate air source heat pump
CEE: Center for Energy and Environment
CLCPA: Climate Leadership and Community Protection Act
CMP: Central Maine Power
CPP: critical peak pricing
ET: electric technology (rate)
EV: electric vehicle
FERC: Federal Energy Regulatory Commission
GHG: greenhouse gas
HHER: Home Heating Eco Rate
HPWH: heat pump water heater
HVAC: heating, ventilation, and air conditioning
IGFC: income graduated fixed charge
IOU: investor-owned utility
IRWG: Interagency Rates Working Group
ISO: Independent System Operator
kW: kilowatt
kWh: kilowatt-hour
LIDR: low-income discount rate
LIHEAP: Low-Income Heating Energy Assistance Program
LMI: low- and moderate-income
MA DOER: Massachusetts Department of Energy Resources
MPUC: Maine Public Utilities Commission
NARUC: National Association of Regulatory Utility Commissioners
NEEP: Northeast Energy Efficiency Partnerships
OPR: off-peak rebate
PIPP: percentage of income payment plan
PSC: Public Service Commission
PTR: peak time rebate
PUC: Public Utility Commission
RTP: real-time pricing
SEO: state energy office
SHP: seasonal heat pump (rate)
T&D: transmission and distribution
TOD: time of day (rate)
TOU: time of use (rate)
TVR: time varying rate
U.S. EIA: U.S. Energy Information Administration

Definitions

Cold climate air source heat pump: A cold climate variable speed air-source heat pump designed to maintain heating capacity and efficiency at low outdoor temperatures (5°F and below)**.**

Cost causation: Ratepayers are responsible for the costs utilities incur to provide electric service to them.

Cost of service: Costs of supplying and delivering energy to a particular customer.

Critical peak pricing: An event-based pricing structure that increases prices during a select few annual peak load periods. Volumetric rates remain lower the remainder of the year.

Cross-subsidization: A pricing outcome that inflates rates above one customer class's cost of service, while undercharging another customer class. Studies have found heat pump customers cross-subsidize oil and natural gas heating customers.

Demand charge: A usage-based charge that reflects a customer's highest level of electricity used, measured in kilowatts (kW) over a certain interval. Demand charge rates are denominated in $/kW.

Fixed charge: A portion of a customer's bill that is a flat fee and represents a portion of all fixed fees incurred by the utility.

Income graduated fixed charge: A fixed monthly charge that varies in accordance with a customer's income level.

Low-income discount rate: An affordability tool that discounts utility rates for income eligible customers.

Spark gap: The price ratio of electricity compared to gas. It is calculated in terms of cost per MMBtu of electricity divided by the cost per MMBtu of gas.

Standard two-part tariff: The most common type of rate design in the United States. It includes both fixed and volumetric charges. Often, the fixed costs for utilities will be embedded in both the fixed and volumetric parts of a customer's bill to ensure that volumetric rates are high enough to incentivize customers to use energy efficiently.

Volumetric charge: A usage-based charge calculated on the basis of electricity consumed, measured in kilowatt-hours (kWh). Volumetric charge rates are denominated in $/kWh.

Executive Summary

Winter heating costs are a growing policy concern as electricity, oil, and gas rates rise and states pursue heat pump adoption to meet affordability, energy, and climate goals. While heat pumps can reduce a household's overall energy usage, they can result in higher electric bills for many customers and customers paying more than their fair share of electric system costs. Current traditional two-part rate structures are priced to cover the costs of a summer-peaking grid, but heat pumps increase usage in the winter, where there is room for increased energy usage (Chen et al. 2026). This misalignment can result in cross-subsidization among customer classes and utilities overcharging heat pumps customers. In response, regulators and utilities have turned to rate design reforms to reduce operational costs of heat pumps and better align customer bills with the costs they impose on the grid. Properly designed rates could improve grid utilization while lowering electricity costs for households that rely on heat pumps for winter heating.

This paper examines how modern electric rate design, both technology-specific and technology-neutral, can improve affordability for heat pump customers and better align customer bills with grid costs. We compare energy costs for homes converting from heating with fuel (gas, oil, and propane) to heating with a heat pump, analyze real-world rate designs from around the region to see how they lower operational costs, and present an illustrative seasonal rate designed for heat pump users.

Our analysis finds that modern rate designs can significantly reduce heating costs for households using heat pumps. The greatest savings occur under rates designed specifically for heat pump customers, although well designed technology-neutral rates can also produce meaningful savings. For the purposes of this paper, we refer to these technology-neutral rates that produce savings for heat pump customers as heat pump friendly rates. We examine six state case studies and conclude with guidance for regulators and utilities looking to deploy modern rate reforms to address unintended cost shifts between customers due to heat pump usage.

An Analysis of Heat Pump Operating Costs Compared to Gas and Delivered Fuels

Our analysis examined operating costs for customers switching to whole-home cold climate air source heat pumps from gas and delivered fuels, using current rate structures and an illustrative heat pump specific seasonal rate. These results are modeled estimates based on average rates and household energy use. Additionally, the results reflect energy bill savings only and do not include equipment or installation costs. Individual households' results will vary.

Key findings from this section include:

- **Oil and propane homes save right away.** Under existing electric rates, switching to a whole-home heat pump saves the average household $1,027 per year compared to fuel oil and $2,237 compared with propane, and the average household saves money in every state.
- **Results for gas homes are mixed and track the spark gap.** Under existing rates, switching from gas to a whole-home heat pump raises bills by $103 a year on average. Seven jurisdictions see costs increase

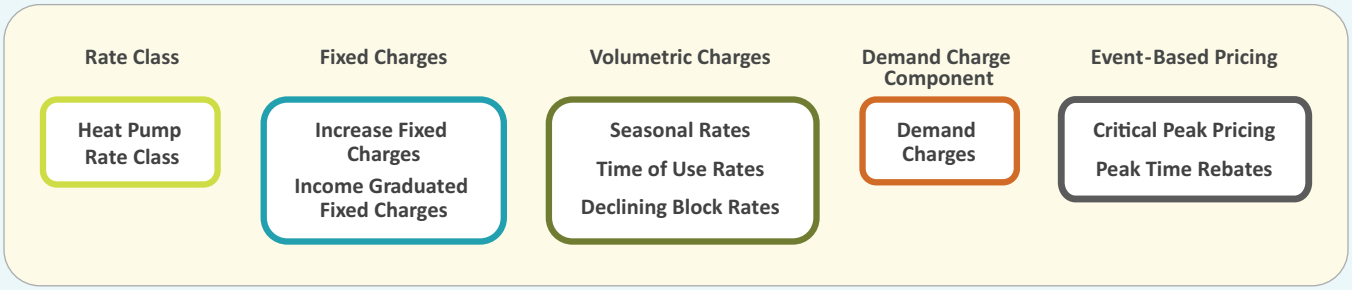
and six see cost savings. Delaware and Maryland see the highest average savings at about $300, and the states with the highest spark gaps (Connecticut, New York, and Rhode Island) see average increases of roughly $500 to $700.

- **A hypothetical seasonal heat pump rate brings the average household that converts from gas to a heat pump to cost parity in all Northeast and Mid-Atlantic states.** A 37 percent lower winter volumetric rate yields annual savings compared with gas in all 13 jurisdictions, with an average savings of $603 per year across the region. The savings range from an average of $199 in Connecticut to an average of $951 in Massachusetts.
- **Technology-neutral rates that better align bills with grid costs can deliver savings too.** Time of use rates and demand charges lower average operating costs for customers converting from gas to heat pumps. Our analysis of three rates currently offered to all customers in the BGE and Con Edison territory found heat pump customers can save an average of $400 to over $1,000 on operating costs compared with gas, with the largest savings coming from Con Edison's demand-based Steady Use Rate.

Modern Rate Design Options That Better Align Heat Pump and Grid Costs

Regulators and utilities can bring heat pump customers' bills closer to the grid costs they impose in several ways: adding a heat pump rate class, adjusting fixed customer charges, modernizing volumetric charges, introducing a demand charge component, and providing event-based pricing (see Figure ES-1). Section 2 summarizes these options and provides the benefits and tradeoffs for each.

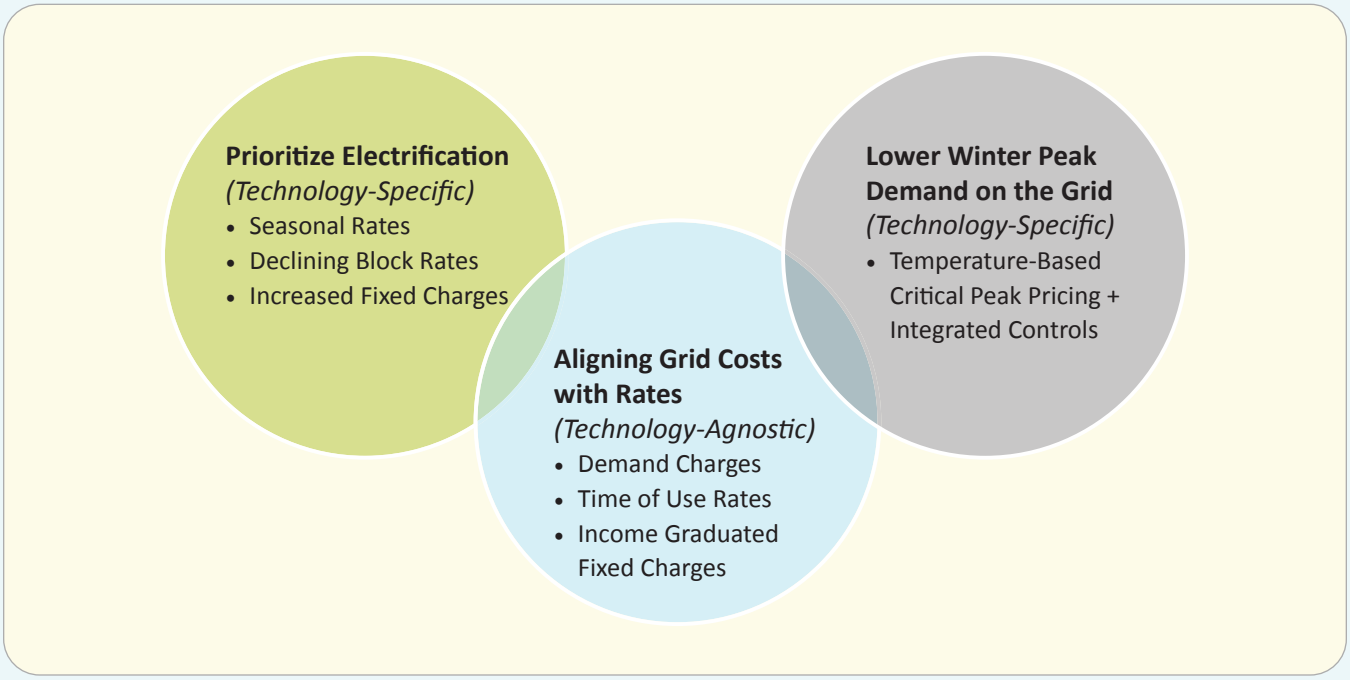
Figure ES-1. ***Possible Heat Pump-Friendly Rate Design Elements***



Case Studies of Rates in Action

Section 3 examines six case studies that illustrate the range of rate designs utilities can offer to better align bills with grid costs. Although each state takes a different approach, three common themes, shown in Figure ES-2, emerge: prioritizing electrification by targeting heat pump customers, aligning rates with grid costs through modern rate design, and reducing peak demand.

Figure ES-2. *Summary of Rates for Selected Case Studies*



Identifying the Right Rate Design

Section 4 outlines key considerations for aligning rate design with heat pump use, to help regulators, utilities, and other stakeholders design a modernized rate that fits their near- and long-term goals. The first decision is whether to adopt a technology-specific rate, available only to heat pump or electric heating customers, or a technology-neutral rate, open to all customers. States that choose a technology-specific rate face additional implementation decisions around enrollment, what bill components the rate impacts, and a long-term transition strategy. Whether a state pursues a technology-specific or technology-neutral approach, several considerations apply to every rate design, including customer education, enrollment, and alignment with programs that reduce energy burden.

Introduction

Heat pump adoption is growing in the Mid-Atlantic and Northeast, driven by state climate goals and the efficiencies of the heating equipment (RMI 2026; McKenna, Shah, and Silberg 2020). Various market influences have driven this growth, including technological improvements, increased customer and contractor awareness, expansion of energy efficiency programs, and shifts in state-level energy and climate policies (NEEP 2022). Additionally, states throughout the region are implementing programs that incentivize participants to install heat pumps as the main heating source for a home (EMT 2024b; MA DPU 2025e; NYS DPS 2025).[1]

While electric heating technology has advanced, electricity rate design has yet to keep pace. Not only have electric rates continued to increase but the standard two-part tariff has been shown to overcharge heat pump customers. This weakens the affordability case for heat pumps just as political momentum is building behind heating electrification, driven by high and volatile fuel oil prices. Further, without changes to rate design, households converting from gas to heat pumps can see a steep rise in winter electric bills that isn't tied to the real cost of serving them. These trends have led to a robust discourse around how to design rates to make heat pumps more affordable with some states looking to prioritize heat pump specific rates, others modernizing rates to be more reflective of grid costs, and others looking to address peak demand.

Homes That Heat With Heat Pumps Are Overcharged

Customer electric bills commonly use a standard two-part tariff, which comprises both fixed and volumetric charges. The fixed charge, or customer charge, portion of a customer's bill is a flat fee each billing period that is meant to represent basic customer costs incurred by the utility like billing and metering. The volumetric bill charge recovers the costs to supply and deliver the energy used, which includes some portion of the transmission and distribution (T&D) system costs (Lazar 2016). Homes heating with heat pumps lower or eliminate onsite fossil fuel costs but significantly increase electric usage in the winter. This added usage increases the customers' contribution to T&D costs. However, because the Northeast grid is summer peaking, existing T&D infrastructure can absorb additional winter usage from heat pumps. As a result, heat pump customers pay more toward T&D than the costs they actually impose on the grid, resulting in them overpaying and cross-subsidizing other ratepayers.

For example, Massachusetts heat pump customers are estimated to pay 23 percent more than their fair share of the electricity system's costs per heating season (Murray and

When rates for one customer group are higher than their cost of service, resulting in undercharging another customer group, there is a **cross-subsidy.** Studies have found heat pump customers cross-subsidize oil and natural gas heating customers. As a result, non-heat pump customers are paying less than their **fair share**.

[1] Maine requires that all customers participating in their heat pump programs install whole-home systems (EMT 2024b). New York and Massachusetts provide additional incentives to encourage customers to do a whole-home installation (MA DPU 2025e; NYS DPS 2025).

Velez 2025). In New York, a recent study found that heat pump customers make up 2.7 percent of residential electrical customers but contribute 4.9 percent of delivery revenue with the average heat pump customer overpaying their cost of service by an average of $855 (Lee et al. 2026). Similarly, testimony out of a Rhode Island proceeding shows heat pump customers make up 2 percent of residential customers but contribute 4.4 percent of delivery revenue (Velez 2026).

Rate Reform Can Align Affordability and Grid Costs

Modernizing rates can address the issue of cross subsidization between customer classes and better align bills with grid costs through lowering the volumetric charge through tools such as seasonal rates, TOU rates, and demand charges. Implementing these rate designs can alleviate the issue of cross subsidization and ensure customer bills better reflect costs for the grid. This is not the first time rates have been deployed to accommodate higher energy use in the winter. Rates that reduce volumetric costs for homes that have electric resistant heat have been used since the early 1960s (Luzerne Electric Division 1963). Today, rates for heat pump customers can take many forms and address both the fairness concern for heat pump customers and better align bills with grid costs. These rates can include:

- Increasing the fixed charge to better reflect fixed costs, which allows a lower volumetric charge
- Adopting a seasonal rate with a lower winter volumetric charge, reflecting lower winter distribution costs and higher winter usage from heat pumps
- Implementing time of use rates, which charge more at peak hours of the day but otherwise provide a lower volumetric rate
- Adding a demand or critical peak pricing component that recovers peak-driven costs directly and allows a lower volumetric rate

Scope of This Paper

In this paper, we first analyze the impacts to electric bills if households convert to a whole-home cold climate air source heat pump system (ccASHP) on an existing, standard two-part tariff rate structure. We then provide an overview of rate design options that look to better align customer costs with costs to the grid and ultimately lower costs for heat pump customers. Next, we introduce case studies that highlight examples of these rates in action for states looking to prioritize electrification, align rates with grid costs, and lower winter peak through demand flexibility. Finally, we offer key considerations for regulators, state agencies, utilities, and advocates looking to deploy heat pump friendly rates to help design and deploy a modern rate design that aligns most with their goals.

Section 1: Analysis of Heat Pumps on Energy Bills

To assess the impacts on energy bills of converting from heating with fuel to heating with a whole-home ccASHP, we conducted a comprehensive, multi-component analysis, relying on modeling of expected energy bill fluctuations to identify yearly operating costs for heat pumps compared to gas, oil, and propane systems. We provide estimates of how various rate options can impact these costs. Specifically, we analyze the bill impacts of a technology-specific seasonal rate, time of use rate, and demand charges to identify potential customer savings under these rates.

Methodology

For our analysis, we modeled annual HVAC operational costs for an all-electric ccASHP system fully replacing a gas, propane, and fuel oil furnace heating system and air conditioner. The baseline home assumes a furnace efficiency of 80 percent, which is characteristic of the current National Laboratory of the Rockies ResStock Northeastern building stock (ResStock n.d., Energy Star n.d.).[2] This modeling accounts for both the increase in winter electricity usage and increase in usage due to air conditioning in the summer. Appendix A provides more detail on the data and methodology used for this report.

Three scenarios are modeled:

1. Existing electric rate structures in each state compared to gas, oil, and propane. We obtained electric utility data for the largest utility in each state using the Arcadia Genability database (June 2024 to May 2025) and took gas, oil, and propane price data from the U.S. Energy Information Administration (EIA) (Arcadia n.d.; U.S. EIA n.d. a; n.d. b).
2. A hypothetical seasonal heat pump rate that provides a 37 percent lower volumetric rate during the winter season, defined as November through April, and with no changes to summer volumetric rates. This 37 percent lower rate is based on the proposed rate design put forward by the Massachusetts Interagency Rates Working Group. Appendix A provides further details around this calculation.
3. Three real-world examples, two from Con Edison in New York and one from BGE in Maryland, that model how technology-neutral demand charges and time of use rates affect heat pump customers' bills. Appendix A provides further details on these calculations.

We also preset the spark gap for the utility territories modeled to show how different rate designs might close it. The spark gap reflects the ratio of electric to gas prices to provide insight into the cost differentials between the

Spark Gap: Ratio of costs for electric compared to gas. A higher spark gap means customers with gas are more likely to see increases in their energy bills when converting to heat pumps.

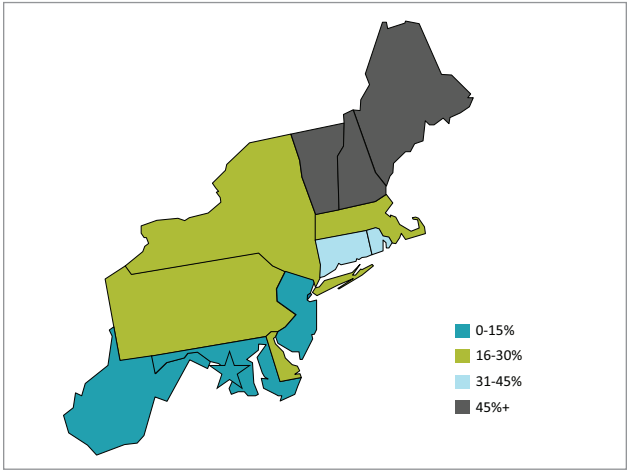
[2] Furnaces currently being sold on the market average at a higher efficiency. For example, ENERGY STAR certified gas furnaces must achieve an AFUE between 90 to 95 percent, depending on where in the country they are sold (Energy Star n.d.).

two types of energy (Murray and Velez 2025). For example, a spark gap of 3.1 indicates that electric prices are 3.1 times higher than gas prices. This measure does not reflect whether both electric and gas prices are high or low, just the difference between them. To establish the spark gap, all values were brought into the units $/MMBtu. Appendix A provides further details on the spark gap calculation.

Key Caveats

There are some key caveats in the data that are important to note. First, the analysis focuses on operational costs, i.e., utility bills, and therefore does not model the initial upfront costs of heat pump installation. These costs for whole-house equipment and installations can range from $12,000 to $23,000 (Booth et al. 2024). Some states in the Northeast offer significant incentives including financing options and rebates that can reduce upfront costs for market-rate customers and provide heat pumps at no cost for income-qualified residents (e.g., Massachusetts) (MA EEAC n.d.). Additionally, the team did not model bill impacts of switching from electric resistance heat to heat pumps because heat pumps always cost less to operate than electric resistance heating, as they use the same fuel source much more efficiently. A recent study found savings of $1,200 to $7,000 per year for electric resistance customers in the Northeast (Booth et al. 2024). Further studies have found that air source heat pumps can reduce electricity use for heating by up to 75 percent compared to electric resistance heating systems (U.S. DOE n.d. a). Finally, the heat pump modeled in this analysis is a ducted, cold climate variable speed air source heat pump (HSPF2 9.2 and SEER2 21). This model exceeds the baseline standard for the NEEP Cold Climate Air Source Heat Pump Specification for ducted systems (HSPF2 ≥ 7.7; SEER2 ≥ 14.3) (NEEP 2023). While we did not model ductless heat pumps, the same data can apply to both ducted and ductless systems as these systems can reach similar levels of efficiency.

Figure 1. ***Regional delivered fuels penetration for the Northeast.***



Source: EIA RECS 2020

States may interpret these findings differently because home heating systems and fuel sources vary across the NEEP region. For example, in New England, states have a higher penetration of delivered fuels than gas. Figure 1 shows states in the region by the percent of households using delivered fuels. In Maine, Vermont, and New Hampshire, more than 45 percent of homes heat with delivered fuels. In the Mid-Atlantic, by contrast, New Jersey (75 percent), Pennsylvania (52 percent), Maryland (49 percent), and New York (61 percent) have about half or more homes heating with gas.

Scenario 1: Existing Electricity Rate Structures

This scenario analyzes the operational costs of heat pumps compared to gas, fuel oil, and propane under representative existing rate structures. We calculated average annual bill impacts for residential electric customers using rates for the largest utilities in each state (Table 1). Gas, oil, and propane prices were gathered from the EIA database.

Table 1. ***Average Annual Bill Impacts from Converting to a Whole-Home Heat Pump System From Gas, Oil, and Propane Under Existing Electricity Rate Structures***

State	Utility Used for Representative Electric Rates*	$/kWh*	Spark Gap Electric-Gas Price Ratio**	vs. Gas	vs. Fuel Oil	vs. Propane
CT	Eversource (CT Light & Power)	$0.3034	6.0	($723)	$428	$2,236
DE	Delmarva Power	$0.1394	2.9	$359	$1,570	$2,614
DC	Potomac Electric Power Co (PEPCO)	$0.2018	4.0	$126	$1,174	$2,164
ME	Central Maine Power Co	$0.2186	4.1	($212)	$1,214	$2,505
MD	Baltimore Gas & Electric Co	$0.1776	3.3	$283	$1,260	$2,250
MA	Eversource (NSTAR)	$0.3313	4.2	($50)	$377	$1,670
NH	Eversource (PSC NH)	$0.2145	3.6	$30	$1,508	$3,154
NJ	Public Service Elec & Gas Co	$0.2136	4.9	($138)	$1,282	$2,435
NY	Consolidated Edison Co-NY Inc	$0.3079	5.9	($501)	$711	$1,601
PA	PECO Energy Co	$0.1873	4.2	$31	$974	$1,629
RI	Rhode Island Energy	$0.3012	5.0	($493)	$473	$1,865
VT	Green Mountain Power Corp	$0.2174	3.9	($140)	$1,276	$3,195
WV	Appalachian Power Co	$0.1626	3.9	$92	$1,109	$1,763
Average			**4.3**	**($103)**	**$1,027**	**$2,237**

*Note that these are considered representative rates because they are taken from the Arcadia Genability (Arcadia n.d.); current rates offered to residential customers by the utility may differ. See Appendix A for more details on the rate selection process.
** Appendix A, Table A3 provides additional information on how the Spark Gap was derived.

TAKEAWAY: Oil and propane homes see operational savings immediately.

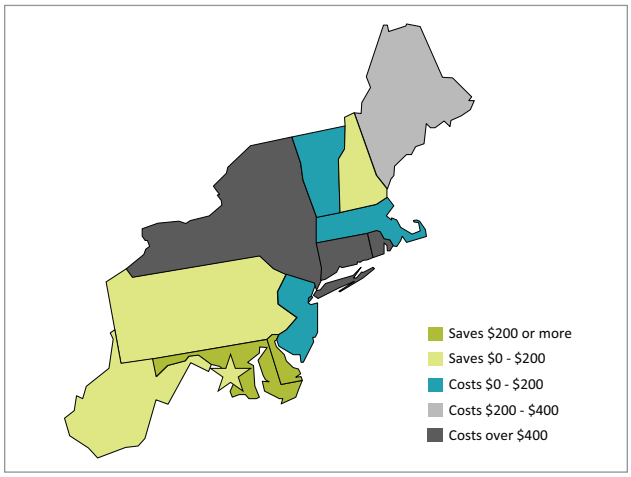
Transitioning from a propane heating system to a whole-home ccASHP yields the most significant financial benefits of the fuel-switching scenarios using existing electricity rate structures, with average positive bill savings realized in every state across the region. Our modeling indicates that the minimum average expected savings for a household making this transition can be $1,600 per year, with a regional average of $2,237 per year. New Hampshire and Vermont both see operational savings of over $3,000.

Transitioning from a fuel oil heating system to a heat pump system also delivers positive annual savings in every state across the region. The financial benefits range from $377 per year in Massachusetts to over $1,500 per year in Delaware and New Hampshire, averaging $1,027 across the region. Even in jurisdictions with high electricity rates, there are operational cost savings due to the efficiency gains from a heat pump. For instance, in Connecticut, New York, and Rhode Island homeowners are expected to see annual bill savings of over $400.

TAKEAWAY: Gas to heat pump operational savings vary.

The financial case for transitioning from natural gas to a whole-home ccASHP system under existing default rate structures varies across the region (see Figure 2), with outcomes largely driven by local electricity rates. Seven of the 13 jurisdictions see prices increase an average of over $300 dollars. Connecticut sees the highest increase at $723 followed by New York and Rhode Island, both of which see increases around $500. Meanwhile, New Hampshire and Pennsylvania see only increases of $30, close to breaking even.

Figure 2. ***Yearly Gas to Heat Pump Conversion Bill Impacts***



Six jurisdictions see savings, with an average of $154 dollars. Delaware and Maryland see the most savings with Delaware experiencing $359 in savings and Maryland seeing $283. Every jurisdiction with a spark gap of 3.6 or lower saves money; while every jurisdiction with a spark gap of 4.9 or higher sees an increase. Further patterns can be seen when looking at electric rates; in states with higher electricity rates such as Connecticut, Rhode Island, and New York, converting from gas to heat pumps can increase bills $500-$700 annually.

Without additional policy interventions, such as electricity rate reform, households switching from gas to heat pumps in these states are likely to see energy bills rise.

Scenario 2: Heat Pump Seasonal Rates Impact on Operational Costs

A seasonal heat pump rate tackles the core issue of current rates—heat pumps pay more than their fair share in the winter months because states have a summer peaking grid and room exists to grow electricity usage in the winter. To examine the impacts of heat pump specific seasonal rates on the ability to lower operational

costs, we modeled a seasonal rate that resulted in a 37 percent lower volumetric rate during winter, while the summer volumetric rate remains unchanged. This value is derived from the Massachusetts Interagency Rates Working Group (MA IRWG) proposed rate. The MA IRWG found this rate to better reflect the cost to serve heat pump owners and could make heat pumps cost less than gas. Appendix A provides further details on how we calculated this value.

This 37 percent figure is slightly higher than what is currently offered and is meant for illustrative purposes. For example, Xcel Energy's electric space heating rate in Minnesota lowers the effective winter rate by 22 percent on its flat rate and 31 percent during on-peak hours on its time of use rate (Malinowski, Sussman et al. 2025). Updated seasonal heat pump rates in Massachusetts lower winter rates by 23 percent for Unitil customers and 39 percent for Eversource. Each state will need to determine the appropriate difference between summer and winter rates if they choose to implement seasonal heat pump rates. Additional details about how we conducted this calculation can be found in Appendix A.

Table 2. ***Seasonal Rate Impact on Gas to Heat Pump Annual Operating Costs***

State and Electric Utility	$/kWh*	Operational Costs Gas to Heat Pump, Standard Rate	Operational Costs Gas to Heat Pump, Seasonal Electric Rates*	Additional Savings
Connecticut, Eversource	$0.3034	($723)	$199	$922
Delaware, Delmarva Power	$0.1394	$359	$703	$344
Washington, D.C., PEPCO	$0.2018	$126	$609	$483
Maine, CMP	$0.2186	($212)	$727	$939
Maryland, BGE	$0.1776	$283	$727	$444
Massachusetts, Eversource	$0.3313	($50)	$951	$1,001
New Hampshire, Eversource	$0.2145	$30	$950	$920
New Jersey, PSE&G	$0.2136	($138)	$431	$569
New York, Con Edison	$0.3079	($501)	$321	$822
Pennsylvania, PECO	$0.1873	$31	$495	$464
Rhode Island, RIE	$0.3012	($493)	$443	$936
Vermont, GMP	$0.2174	($140)	$794	$934
West Virginia, Appalachian Power Co	$0.1626	$92	$494	$402
Average	$/kWh*	**($103)**	**$603**	**$706**

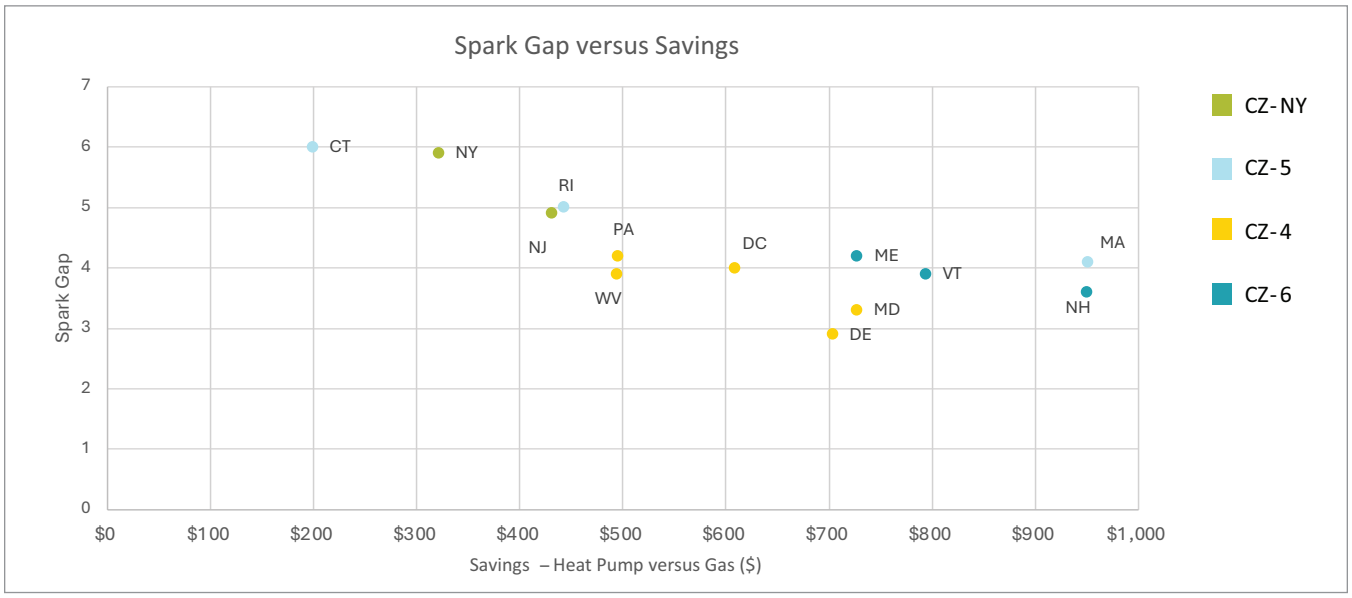
*This seasonal rate analysis is illustrative and does not reflect on-the-ground conditions across the region.

TAKEAWAY: Heat pump specific seasonal rates lower operational costs compared to gas.

As shown in Table 2, a modeled seasonal rate produces average savings in every state and D.C. for households switching from a gas heating system to a whole-home ccASHP. The regional average was $603, although the range of savings varies depending on electricity prices, gas prices, and winter temperatures. Connecticut sees the smallest amount of savings at $199 per year, while the average home could see savings of over $900 in New Hampshire and $951 in Massachusetts.

States with the highest electricity rates see some of the largest savings when deploying a seasonal heat pump rate (Massachusetts, Rhode Island, Connecticut, and New York, at $822 to $1,001), as do Maine, New Hampshire, and Vermont (over $900). The reduction exceeds $900 average savings in every state of New England and ranges from about $340 to $570 in the Mid-Atlantic. Colder winters in New England likely contribute to this pattern by increasing electricity consumption during the months when seasonal rates are lower.

Figure 3. ***Spark Gap and Average Operational Cost Savings When Switching from Gas to Cold Climate Heat Pump with a Seasonal Rate****



*This seasonal rate analysis is illustrative and does not reflect all individual utility or customer conditions across the region.

TAKEAWAY: Heat pump specific rates impact depends on the spark gap, gas costs, electricity costs, and winter weather when comparing to gas.

Figure 3 shows how the savings from switching from gas to a ccASHP system on a seasonal rate vary across the region, looking specifically at spark gaps and climate zones. Generally, the higher the spark gap, the smaller the savings with the modeled seasonal heat pump rate. The four states with the highest spark gaps (Connecticut, New York, Rhode Island, and New Jersey) see the lowest savings, ranging from $199 to $443. In the Mid-Atlantic, (NY, NJ, PA, WV, DC, MD, and DE) savings range from about $300-$750 with the most savings

in states with the lowest spark gaps, Maryland and Delaware. Most New England states (Maine, Vermont, and New Hampshire) follow a similar pattern, though they see higher savings due to their colder winter weather. Massachusetts sees savings similar to New Hampshire despite a slightly milder winter because its electricity prices are the highest, resulting in the seasonal rate having a bigger impact on customer bills.

Scenario 3: Impacts of Heat Pump Friendly Rates on Gas Operational Costs

The rates modeled in this section are technology-agnostic, available as opt-in options to all customers, and capable of delivering savings to heat pump users. Time of use (TOU) rates and demand charges, for example, can enable lower volumetric electricity rates, benefitting heat pump users whose systems draw electricity at relatively consistent levels over time (Malinowski, Sussman et al. 2025).

We selected two utility service territories to conduct a deeper dive into how technology-neutral rate designs can impact operational costs of heat pumps. These rates include TOU rates and demand charges. The two territories are: Con Edison in New York (Climate Zone 4) and Baltimore Gas and Electric in Maryland (Climate Zone 4). Data on the impacts these rates have on operational costs of heat pumps compared to gas is in Table 3. The analysis also used current customer gas bill information and electricity costs from each territory to better reflect on-the-ground bill savings (Con Edison 2026a; 2026b; BG&E 2024). Additional information on how the analysis was conducted can be found in Appendix A.

Table 3 shows that a customer switching from gas to a ccASHP system on the Steady Use Rate would save $1,560 annually. The same customer using the Con Edison TOU rate would see $748 annual savings in Zone J and $953 in annual savings in Zones H&I.

Table 3. **Operational Cost Comparison for a Customer Converting from Gas to Heat Pumps on Heat Pump Friendly Rates**[3]

State	Operational Cost Savings
Con Edison – TOU with Super Peak Pricing*[4]	Zone J: $748; Zone H&I: $953
Con Edison – Steady Use Rate (Demand Charge)[5]	$1,560
BGE TOU	$410

*Con Edison bills vary based on location. Zones H and I divide Westchester County, and Zone J includes service to New York City.

[3] Data assumes gas customers have electric air conditioning.

[4] Modeled statewide weighted average gas rate ($1.54/therm) is significantly lower than the weighted average Con Edison gas rate ($2.47/therm), which accounts for a portion of this difference in savings estimates.

[5] Modeled statewide weighted average gas rate ($1.54/therm) is significantly lower than the weighted average Con Edison gas rate ($2.47/therm), which accounts for a portion of this difference in savings estimates.

TAKEAWAY: TOU rates and demand charges can lower operational costs for customers converting from gas

TOU and demand charges both offer savings when comparing operational costs of heat pumps to gas with demand charges providing the most savings. In Maryland, a BGE customer converting from gas to whole-home heat pumps with the opt-in TOU rate would save $410 annually. In New York, Con Edison offers two technology-agnostic, opt-in rates: a volumetric TOU rate and a demand-based rate. Our analysis found that both types of rates can lower operational costs, with the demand charge providing significantly more savings.

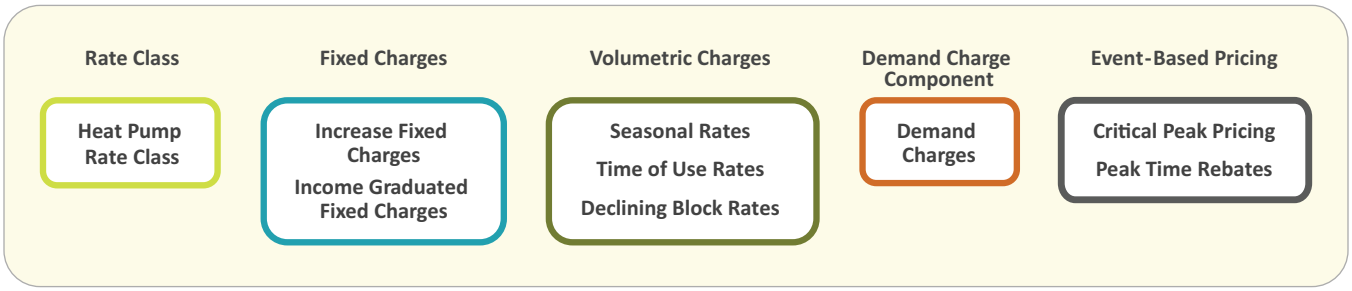
Section 2: Rate Design Options Favorable to Customers with Heat Pumps

Many types of modern rate structures can better align heat pump customers' bills with their costs to the grid and correct the overpayment issues under the standard two-part rate. Both heat pump specific rates and broader, modern technology-neutral rates can correct this by bringing bills closer to representing the actual costs customers place on the grid.

Regulators and utilities have several options for aligning rate design with heat pump adoption, as shown in Figure 4. These include establishing a dedicated rate class for heat pump or electric heating customers, adjusting fixed or volumetric charges, and introducing demand charges or event-based pricing. These approaches can be implemented individually or in combination, depending on local market conditions and policy objectives. One important limitation applies across all the options. In restructured states, which include many in the Northeast and Mid-Atlantic, regulators and utilities can directly influence transmission and distribution rates, but changes to supply rates require greater coordination with third party suppliers (Brown, Cosgrove, and Miller 2025).

This section describes each option and its trade-offs. Section 3 then examines how states have applied them in practice.

Figure 4. ***Possible Heat Pump Favorable Rate Design Elements***



Customer Rate Class

Utilities and regulators use cost of service studies to allocate costs among customer classes (residential, commercial, and industrial), on the theory that customers with similar usage patterns cost the same to serve (Akhmetov, Popov, and Primbet 2023). One option is to establish heat pump as their own class, conduct a cost of service study to identify what it costs to serve them, and then choose how to collect those costs through fixed charges, seasonal rates, TOU rates, or another design (Lee et al. 2026; Chernick et al. 2020). This approach differs from creating a subclass within the existing residential class—the approach examined in the remainder of this section—which does not require a separate cost of service study.

While customers that use heat pumps may have a different load pattern than current residential customers, there are some barriers to this approach. Some states may not yet have enough heat pump customers to justify one. Defining a narrower class also means revisiting class composition and eligibility, keeping bills transparent and understandable, deciding how to classify customers with hybrid heating systems, and tracking new installations and equipment changes as technologies emerge (NYS DPS n.d.; Bowen and Simeone 2025). These steps take time and can prove complex.

A separate class also has a limit. Switchbox finds that a dedicated heat pump delivery charge would address the overpayment heat pump customers experience under New York's current rate structure (Lee et al. 2026). But because a technology-specific rate changes how costs are allocated and not when customers use electricity, it does little on its own to encourage load shifting (Bertrand et al. 2023).

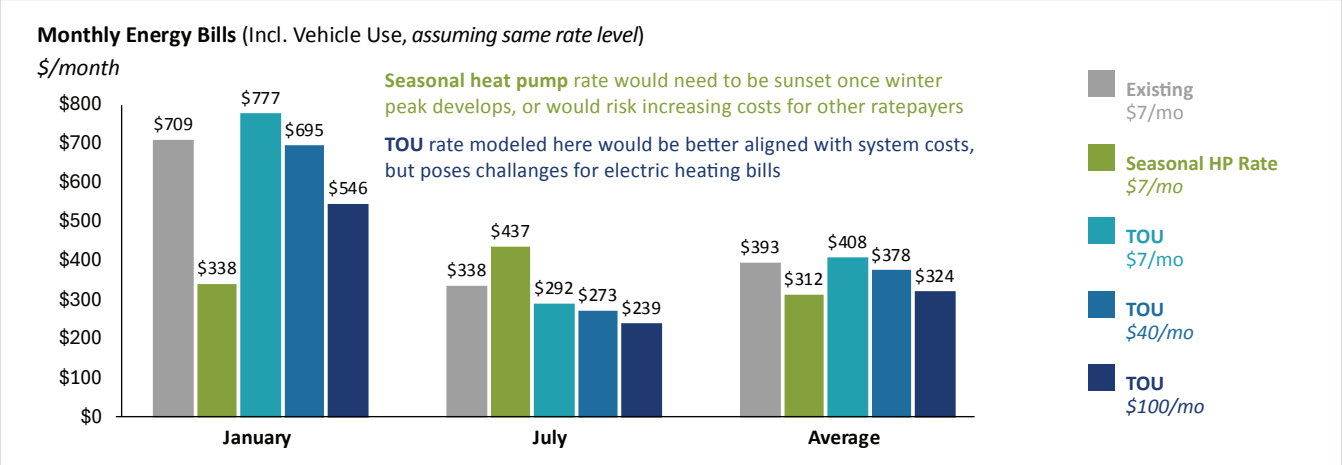
Fixed Charges

The fixed charge portion of a customer's bill is a flat fee for each billing period that is meant to represent all fixed fees incurred by the utility. Experts, regulators, and utilities have debated extensively what components of a bill to include in the fixed charge (Lazar and Gonzalez 2015). Most often, fixed charges are set to cover both the costs of customer service and maintenance of grid infrastructure as regulators and utilities find a balance between these two ideologies in utility regulatory proceedings (Borden et al. 2023).

Increasing Customer Fixed Charges

Increasing customer fixed charges, i.e., customer fees, would move more of the cost recovery from the volumetric charge into the fixed charge, lowering per-kWh prices and benefiting heat pump customers (Dammel, Henchen, and Shah 2024). Figure 5 shows that Massachusetts's Long-Term Ratemaking Study found that pairing a TOU rate with a higher fixed charge, $40 to $100 per month instead of $7, lowers monthly bills for fully electrified homes, making full-home electrification more cost-competitive (MA IRWG 2025).

Figure 5. ***Monthly Electric Bills for a Fulle Electric Residential Customer in 2030 under Varying Rate Structures*** *(monthly fixed costs shown in legend)*



Source: Energy and Environmental Economics (E3). 2025. "Long-Term Ratemaking for a Decarbonizing Commonwealth." Prepared for the Massachusetts Interagency Rates Working Group. https://www.mass.gov/doc/irwg-long-term-ratemaking-study/download.

Utilities may also favor increasing fixed charges because it reduces the risk that lower sales will result in reduced revenue (Whited, Woolf, and Daniel 2016). However, higher fixed charges can have some drawbacks. Because increasing fixed charges results in lower volumetric prices, it can reduce customers' ability to cut their bills through efficiency and weaken the price signal to conserve energy. These rates can also disproportionally burden low-income customers who tend to consume less energy (Whited, Woolf, and Daniel 2016).[6]

Income Graduated Fixed Charges

Instead of raising fixed charges on all customers, regulators could consider the more equitable choice of an income graduated fixed charge (IGFC). An IGFC creates customer tiers where the fixed charge increases as income increases. California recently implemented an IGFC with tiers based on income and whether a customer lives in deed-restricted housing (California PUC 2024a).

Volumetric Rate Modifications

The volumetric charge portion of the bill, which charges customers in cents per kWh, increases with higher usage—setting the price signal for economically efficient electricity use (Baatz 2017). A portion of transmission and distribution charges are often included in the volumetric portion of a customer's bill. This implies that the more energy a customer uses, the higher their volumetric rate, and the more they are contributing to grid infrastructure costs. This is not fully reflective of actual costs to provide the energy as timing of usage also plays into how customers place costs on the grid. Additionally, costs to provide energy change seasonally, with states in the Northeast and Mid-Atlantic having grids that cost less to provide energy in the winter compared to the summer. This section identifies alternative volumetric rate structures that could better align heat pump customer bills with the costs that they place onto the grid.

Seasonal Rates

Seasonal rates are cost reflective because they charge different volumetric prices in the winter and summer months to better align cost of service in those months. In the Northeast, seasonal rates would result in lower winter rates because the grid is summer peaking and there is lower cost to serve customers in the winter. This lowers overall operational costs of heat pumps and better aligns customer bills with grid costs (Malinowski, Sussman et al. 2025).

Seasonal rates do not require advanced metering infrastructure (AMI) use or require additional behavioral changes by customers. Further, seasonal rates can apply to either all customers, electric heating customers, or just heat pump users. Additionally, if regulators deploy seasonal rates for all electric heating customers, this lowers bills for electric resistance customers, who are overwhelmingly low-income and overpaying into the grid like heat pump customers (Lee et al. 2026).

6 The Energy Information Administration's 2020 Residential Energy Consumption Survey (RECS) shows that lower-income customers in the Northeast and Mid-Atlantic tend to consume less energy than higher-income customers (EIA 2024).

A seasonal rate might be a temporary rather than a permanent solution. As heat pump adoption increases, states throughout the region are expected to shift to winter peaking. So, any deployment of seasonal rates should include a way to monitor grid conditions and update rates as this shift occurs. Massachusetts is one state that has recognized technology-specific seasonal rates for heat pumps as a near-term solution and is now considering TOU rates as a next step (MA DPU 2026c).

Declining Block Rates

Block rates charge a different per-kWh rate based on the amount (kWh) of electricity a customer consumes during a billing period. Declining block rates decrease the volumetric rate as consumption increases and inclining block rates increase the volumetric rate as consumption increases (Brown, Cosgrove, and Miller 2025). Declining block rates are a heat pump friendly rate as they can lower operational costs for homes that use higher amounts of electricity. However, declining block rates can lower the efficiency signal in volumetric rates by encouraging usage instead of deterring it.

Some of the benefits of block rates are similar to those of seasonal rates. First, they can be deployed without AMI. Additionally, they are easier for consumers to understand and benefit from, as block rates will lower rates for customers without additional steps or any changes in behavior. Finally, block rates can be designed for only heat pump customers or for all electric customers, depending on the priorities of the state.

Time of Use Rates

Time of use (TOU) rates change the volumetric charge to increase it during daily peak periods and decrease it during the rest of the day. While the main purpose for creating TOU rates is incentivizing load shifting away from daily peak periods, heat pump users benefit as well. Because heat pumps have a consistent energy usage pattern, their total cost to operate is averaged out over peak and off-peak periods. This can be particularly advantageous for winter heating, when nighttime temperatures (and heating demand) are often lowest, coinciding with off-peak periods under many TOU rate structures (Sergici, Ramakrishnan et al. 2023).

TOU rates better align customer price signals with costs on the grid, but they do require AMI and customer engagement to be successful. It is important to ensure that consumers know when and how to shift their load to avoid peak periods. Technology and advances in AI can help shift load for customers as an alternative or in addition to AMI. TOU rates also benefit customers aside from those that use heat pumps and can be deployed as a broader initiative to modernize rates (Brown, Cosgrove, and Miller 2025). As loads grow and utilities seek ways to accommodate them, TOU rates offer a way to shift loads to off peak periods, leading to more efficient usage of existing transmission and distribution infrastructure and lower costs for all ratepayers.

Demand Charges

Demand charges look to replace volumetric rates (measured in kWh) with charges for customers' demand (measured in kW). They typically apply to a customer's maximum demand for any 15- to 60-minute interval period over the course of the month (Sergici, Ramakrishnan et al. 2023). A demand charge can be based on a customer's demand during set peak periods that are the same for all customers (coincident peak) or on the customer's own highest demand whenever it occurs (non-coincident peak) (Lazar 2016).

Demand charges aim to align rates with the cost of the resources needed to meet peak demand. They address some of the pitfalls of volumetric charges, specifically that increased usage does not correlate with higher costs to the distribution and transmission systems. While not widely implemented, research has shown that demand charges can lead to lower bills for heat pump users because of the lower volumetric charge that results from reallocation of costs into demand charges (Sergici, Ramakrishnan et al. 2023).

There are some considerations for states looking to implement demand charges because demand charges require AMI, a customer outreach and engagement plan, and potentially modifications or additional rates to tackle grid peak (Brown, Cosgrove, and Miller 2025). Demand charges remain relatively uncommon for residential customers in the United States, in part because they are unfamiliar to many customers and require substantial educational efforts to explain (Sergici, Ramakrishnan et al. 2023). If implemented, it will be important to provide timely alerts to customers (Whited, Woolf, and Daniel 2016). In addition, a standard demand charge is based on a customer's peak usage and not system peaks. To better reflect grid costs, jurisdictions can align peak windows with system peak or pair a demand charge with TOU rates (LeBel and Weston 2020).

Event-Based Pricing

Event-based pricing encourages customers to shift load at times of peak demand during the year. While not important for Northeast and Mid-Atlantic states now, as the grid shifts to winter peaking, these rates can be used to enable demand flexibility and drive down grid costs. Unlike standard rates, which set prices in advance for fixed periods, event-based pricing is triggered only on a limited number of days when the grid is most strained, such as during times of extreme heat or cold. For heat pumps, these rates have been applied in situations where there is back up fuel and a need to reduce strain on the electric grid.

Critical Peak Pricing

Critical peak pricing (CPP) is an event-based pricing structure that increases prices during a few annual peak load periods with lower volumetric rates throughout the rest of the year (Brown, Cosgrove, and Miller 2025). Similar to TOU rates and demand charges, CPP can provide savings for heat pump customers because it provides lower volumetric rates throughout the rest of the year while increasing costs at peak times. CPP also aligns with drivers of grid costs, making rates more cost reflective. Deploying CPP can require investment in infrastructure such as AMI and potentially other advanced technology to respond to peak events.

In addition to potentially lower rates for heat pumps, CPP enables demand flexibility with heat pumps as they can serve as a price signal for customers to switch to a backup system during times of peak demand. While CPP programs lend themselves well to hybrid heating systems, they may not be good options for heat pump customers without backup fossil fuel heating systems. Customers with only heat pumps would have to turn off their system during peak pricing, which can be unsafe in extreme weather.

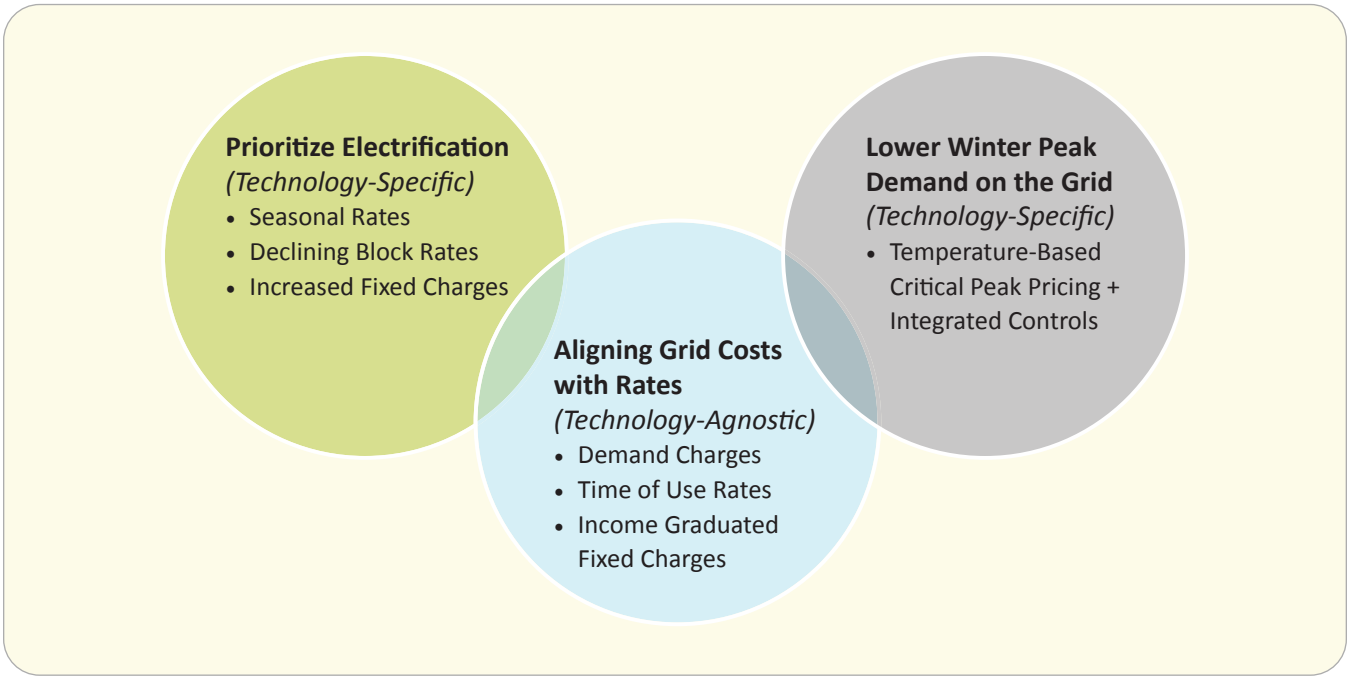
Peak Time Rebates

Peak time rebates (PTR) are an event-based pricing structure that provides a rebate to customers for decreasing their electricity usage during a select few annual peak periods (Brown, Cosgrove, and Miller 2025). While this strategy has not yet expressly been utilized for heat pumps by any Northeastern utility, it would work similarly to existing CPP programs and provides a less punitive option that could forgo the requirement of a backup heating system as there is no penalty associated with continued electricity use during peak periods under a PTR.

Section 3: Case Studies: Rates in Action

This section delves into case studies from six states and provinces with new rates in action. As Figure 6 shows, the case studies show three general ways that states can approach deploying heat pump friendly rates: 1) prioritizing electrification with technology-specific rates that focus on heat pump customers; 2) aligning rates with grid costs through modern rate design that is technology-neutral; and 3) focusing on lowering peak demand on the grid. A detailed summary of the rates discussed in this section is provided in Appendix B.

Figure 6. ***Heat Pump Friendly Rate Design Options in Case Studies***



Technology-Specific Rates That Prioritize Heat Pumps to Achieve Climate and Affordability

Technology-specific rates apply only to customers with heat pumps, or in some cases to all electric heating customers. For states that have climate goals and targets for heat pump adoptions, they can offer a quicker route to bring heat pump rates more in line with customers' cost to the grid through lowering winter bills right away and providing operational cost parity with gas, which can help encourage more customers to adopt heat pumps. The rate designs currently used to achieve these goals are seasonal rates and declining block rates. By only applying these rates to customers with heat pumps, regulators and utilities can offer a deeper discount but other factors come into play, such as equity considerations, complexity in design, and enrollment. The case studies, summarized in Table 4, from Massachusetts and Maine show how two states have approached these choices.

Table 4. *Summary of Technology-Specific Rates*

State	Rate	Utility	Rate Attributes	Customer
MA	Residential Heat Pump Rate	Eversource, National Grid, Unitil	Decreased Seasonal Rate	Only Heat Pump Customers
ME	Seasonal Heat Pump Rate	CMP	Decreased Seasonal Rate + Increased Fixed Charge	Only Heat Pump Customers
ME	Electric Technology Rate	CMP	Decreased Volumetric Charge + Increased Fixed Charge	All Electric Heating Customers
ME	Home Heating Eco Rate	Versant	Seasonal Declining Block Rate	Customers with >50% Electric Heating

MASSACHUSETTS, Seasonal Heat Pump Rates

Massachusetts currently offers statewide seasonal heat pump specific rates, driven largely by the state's climate goals and by affordability and rate design principles of cost causation and cost-reflectivity (MA DPU 2026b; MA IRWG 2024). Passed in 2021, Massachusetts state law requires a 50 percent reduction in greenhouse gas emissions by 2030 and for the state to be net zero by 2050. The law also directs the Department of Public Utilities (DPU) to prioritize greenhouse gas reductions to meet these climate goals (MA State Legislature 2021). The state's utilities implement Mass Save, a nation-leading energy efficiency program that provides robust heat pump incentives to meet the program's greenhouse gas reduction goals and heat pump targets (Miller 2025). Massachusetts also established an Interagency Rates Working Group, which included members from various government agencies, including the Executive Office of Energy and Environmental Affairs, Department of Energy Resources (DOER), the Massachusetts Clean Energy Center and the Attorney General's Office (MA DOER 2025d). This working group held public-facing meetings to discuss the state's key rate design challenges and identify short- and long-term recommendations. Based on its findings, the state decided to prioritize heat pump specific rates in the short-term and time of use rates in the long-term.

Heat Pump Rate 1.0

Massachusetts' heat pump rates began as proposals in separate rate cases for two of the state's electric utilities, and the rates were enacted statewide due to leadership from the DPU. First, in June 2024 under Docket 23-80, Unitil proposed and was approved to offer a seasonal heat pump distribution rate for residential and income-eligible customers (MA DPU 2024c). In September 2024, in Docket DPU 23150, National Grid proposed an Electrification Rate that that moved distribution charges to the fixed portion of the bill. The DPU rejected this proposal, finding that a flat distribution rate would disincentive efficiency and benefit both electric resistance and heat pump customers, which did not align with the state climate and beneficial electrification goals (MA DPU 2024a). Instead, the DPU ordered National Grid to develop a seasonal heat pump distribution rate similar to Unitil's (MA DPU 2024a).

In January 2025, DOER petitioned the DPU to investigate whether all electric utilities in the state should offer a seasonal heat pump rate (MA DPU 2025f). As a result, DPU required Eversource to file a heat pump rate for the 2025-2026 heating season and began an investigation into a "Heat Pump Rate 2.0" to be implemented in the 2026-2027 heating season to better align with state policy priorities (MA DPU 2024b; 2025a). As a response to this order, in April 2025, Eversource filed a proposed seasonal heat pump rate that adjusted both transmission and distribution volumetric charges in the winter and summer months (MA DPU 2025b). In July 2025, the DPU approved the proposed decrease in winter transmission and distribution rates but rejected the proposed increase in summer rates. The DPU determined it was acceptable to also reduce transmission rates because transmission costs are usually determined in relation to system peak demand, which typically occurs in the summer. Therefore, lowering transmission rates mitigates the cost of increased electric usage while remaining cost-reflective (MA DPU 2025d). The DPU also required that Eversource maintain their current electric heating rate, to ensure existing and new customers with electric heat are paying a discounted distribution charge that aligns with their grid costs. With this approval, all electric distribution customers could enroll in a seasonal heat pump rate for the 2025-2026 heating season. See Table 5 below for details on the Heat Pump Rate 1.0, which shows the difference between the base distribution rate and seasonal heat pump distribution rate of 64-66 percent and the transmission rate for Eversource, which was also altered 66 percent. DOER estimates these rates could save customers roughly $70 million (MA DOER 2026b).

A final important feature of this process was the fact that customers were automatically enrolled and all customers, whether heat pumps provided partial or whole-home heat, were able to enroll. Because the rates simply provide a winter discount, all customers who enroll will pay less compared to their standard bill. Additionally, because there was no requirement that the heat pump provide whole-home heat, all customers who had received a heat pump rebate from the state were likely eligible. This enabled the state to automatically enroll customers that participated in their energy efficiency program, Mass Save. Customers who purchased heat pumps without Mass Save rebates may self-attest that they have a heat pump to enroll in the rate. Any customer that received a heat pump rebate through Mass Save was automatically enrolled. In the first year, this led to more than 100,000 residents enrolling in the rate (Driscoll and Healey 2025). This approach is administratively simple for both utilities and customers.

Table 5. *Massachusetts Heat Pump Rates 1.0*[7]

Company	Base Distribution Rate	Distribution Rate Seasonal Heat Pump Rate (Winter)	Difference Between Distribution Rates (%)	Base Transmission Rate	Transmission Seasonal Heat Pump Rate	Transmission Discount
Eversource	$0.063 per kWh	$0.021 per kWh	66.7%	$0.045 per kWh	$0.015 per kWh	66.7%
National Grid	$0.067 per kWh	$0.024 per kWh	64.2%	*N/A*	*N/A*	*N/A*
Unitil	$0.102 per kWh	$0.036 per kWh	64.7%	*N/A*	*N/A*	*N/A*

Source: Executive Office of Energy and Environmental Affairs. 2025. Residential Electric Seasonal Heat Pump Rates. October 31. https://www.mass.gov/info-details/residential-electric-seasonal-heat-pump-rates.

Heat Pump Rate 2.0

A Heat Pump Rate 2.0 was first proposed in Docket 25-08, DOER's petition to investigate whether all utilities in the state should offer heat pump rates. To improve on the Heat Pump 1.0 rates and better align heating costs for heat pumps with heating costs for gas. To reduce electric heating bills more, DOER proposed that all utilities lower transmission rates and reconciling mechanism rates during winter months (MA IRWG 2024; Murray and Velez 2025; MA DPU 2025c).[8] In Massachusetts, reconciling mechanisms recover costs associated with implementation of policies, such as energy efficiency and solar. Compared with the current rate, the proposed DOER rate could save households $300 more per year in operational costs (Murray and Velez 2025). However, in June 2026, the DPU declined to adopt the Heat Pump Rate 2.0 proposed from DOER and instead directed National Grid and Unitil to offer lower transmission charges as part of their heat pump rate (MA DPU 2026b). The DPU rejected the originally proposed reductions to reconciling mechanisms because these mechanisms are not tied to grid costs but pay for other programs. Reducing them may not be consistent with cost causation in the way that reductions to transmission and distribution charges are. Unitil and National Grid will deploy the new heat pump rates that alter both the transmission and distribution charge starting November 1, 2026 (MA DPU 2025g; MA DPU 2025b). These updated rates are reflected in Table 6 below.

[7] For the purpose of this report, we rounded the per kWh charge. This may result in different percentages than other documents that reference the rate.

[8] The Heat Pump Rate 2.0 would increase the differentiation between non-winter and winter rates—from a summer versus winter rate differential of approximately $0.065/kWh (for Unitil) or approximately $0.042/kWh (for Eversource and National Grid) to $0.165/kWh in the proposed version (Commonwealth of Massachusetts 2025; MA IRWG 2024).

Table 6. *Heat Pump Rates 2.0*[9]

Company	Base Distribution Rate	Base Distribution Seasonal Heat Pump Rate	Distribution Discount (%)	Base Transmission Rate	Transmission Seasonal Heat Pump Rate	Transmission Discount
Eversource	$0.098 per kWh	$0.098 per kWh	66.7%	$0.047 per kWh	$0.015 per kWh	66.7%
National Grid	$0.067 per kWh	$0.024 per kWh	64.2%	$0.055 per kWh	$0.02 per kWh	63.6%
Unitil	$0.102 per kWh	$0.036 per kWh	64.7%	$0.042 per kWh	$0.015 per kWh	64.3%

Source: Shemkus, Sarah. 2026. "Massachusetts Ups Winter Energy Discounts for Homes With Heat Pumps." Canary Media. September 17. Accessed October 8, 2026. https://www.canarymedia.com/articles/heat-pumps/massachusetts-increase-winter-heat-pump-rates.

Low-Income Customer Considerations

Massachusetts offers their heat pump rates to low-income customers and provides low-income assistance programs. These programs include low-income discount rates, payment plans, arrearage management plans, and the Home Energy Assistance Program (HEAP) (DPU Consumer Information n.d.). Massachusetts also recently implemented a statewide five-tier discount rate structure for customers of electric and gas utilities (Commonwealth of Massachusetts n.d.). Each tier has a unique discount designed to target a specific energy burden for customers. Coupled with the seasonal heat pump rate, a tiered discount rate can serve to eliminate some of the disincentives for low-income customers who want to adopt heat pumps as it can lower the energy burden for customers.

Long-term Transition to Default TOU Rates

For Massachusetts, the work of the Interagency Rates Working Group helped to identify heat pump rates as a near-term solution and TOU rates as a viable long-term solution once deployment of AMI has taken place statewide (MA IRWG 2024; MA IRWG 2025). In ordering seasonal heat pump rates, Massachusetts DPU also recognized that a seasonal heat pump rate might not be preferable in the long run as grid shifts to winter peaking and more customers adopt heat pumps. In April 2026, the Massachusetts Department of Energy Resources (DOER) filed a petition asking the DPU to investigate implementation of statewide electric default TOU rates by 2028 so that the state can consider the implementation and pathway to TOU rates, alongside implementation of heat pump rates (MA DPU 2026f).

Takeaways

- **Regulatory leadership can drive adoption of seasonal heat pump rates.** Strong regulatory leadership and mandates can create quick, impactful changes. Seasonal heat pump specific rates are relatively quick to enact if they use a revenue-neutral design and do not require a cost allocation study. In

[9] For the purpose of this report, we rounded the per kWh charge. This may result in different percentages than other documents that reference the rate.

Massachusetts, the DPU identified the policy need for seasonal heat pump rates and implemented them through rate cases for Unitil and National Grid and then mandated Eversource file a proposal within a year. This action from the DPU enabled quick enactment of a statewide seasonal heat pump rate that lowered bills for all heat pump customers the very next winter.

- **Automatic enrollment strategies can enable access to affordable rates.** Massachusetts deployed automatic enrollment by enrolling all customers that had received a heat pump rebate through the Mass Save program. Leveraging the Mass Save program and using automatic enrollment helped accelerate adoption, unlocking savings for over 100,000 customers. Automatic enrollment works well with this rate design where there is no downside for the customer and no requirement that heat pumps be whole-home, but it must be used with caution when there is potential for bills to increase on a new rate design.
- **Seasonal heat pump rates might not be a long-term solution.** These rates align with near-term climate and affordability goals but might not be a long-term solution as the grid shifts to winter peaking. With evolving grid conditions, state regulators may begin transitioning towards more cost-reflective rate designs that encourage flexibility and peak-load management. Massachusetts has opened a time-varying rates proceeding to plan the state's next phase of rates (MA DPU 2026f). Other states adopting technology-specific rates should plan a similar path, which could be TOU rates or another modern rate structure.

MAINE, Block Rates, Seasonal Rates, and Increased Fixed Charges

Maine has ambitious climate and heat pump deployment goals. In 2019, Maine established mandatory greenhouse gas emissions reduction targets for the state of 45 percent reduction by 2030, carbon neutrality by 2045, and 80 percent reduction by 2050 (Maine State Legislature 2019b). In 2019, An Act to Transform Maine's Heat Pump Market established the goals of installing 100,000 heat pumps in Maine by 2025 (Maine State Legislature 2019a). Efficiency Maine Trust (EMT) met this goal two years ahead of schedule and now aims for the higher goal of an additional 175,000 by 2027 pursuant to a new goal set by the governor in 2024. In 2023, Maine passed the Beneficial Electrification Policy Act: this law directs EMT to develop beneficial electrification plans in their statewide energy efficiency plans. The state defines beneficial electrification as a program that reduces or replaces fossil fuel usage; provides a benefit to a utility, ratepayer, or the environment; does not cause harm to utilities, ratepayers, or the environment; and improves the efficiency of the electric grid or reduces consumer costs or emission, including carbon (Maine State Legislature 2026). This includes measures that increase electricity consumption while avoiding growth in peak

What Is Beneficial Electrification?

When electrification measures increase electricity sales without adding to the peak demand that drives new infrastructure investment, those fixed costs are spread across more kilowatt-hours, putting downward pressure on rates for all customers.

load, thereby distributing fixed transmission and distribution costs across a larger volume of sales and exerting downward pressure on rates without necessitating additional infrastructure investment (EMT 2025a; Chen et al. 2026).

Maine utilities offer a variety of rates designed to reduce costs for heat pump customers, customers that electrify, and customers that can shift their load. Additionally, like Massachusetts, the state has an open docket on deploying default TOU rates (MPUC 2024). This case study focuses on the design and impacts of the state's recent heat pump and electric heating rates: Central Maine Power (CMP)'s Electric Technology (ET) Rate, Seasonal Heat Pump (SHP) Rate, and Versant's Home Heating Eco Rate (HHER) (CMP n.d.; Donenfeld 2023; Versant Power 2026).

Central Maine Power—Seasonal Heat Pump and Electric Technology Rates

For Central Maine Power, the impetus for creating and testing out new rate structures started in 2021 when legislation (P.L. 2021 ch. 298 §7 and P.L. 2021, ch. 244 §2) directed the MPUC to open an inquiry (Case 2021-00198) to explore the role that policy goals might play in influencing modern rate design (Maine State Legislature 2021a; 2021b; 2022). Later in the year, the Commission opened Case 2021-00325 to investigate T&D rate design to promote state policies (MPUC 2021). This investigation eventually led to CMP piloting both their Residential Electric Technology (ET) Rate and their Residential Seasonal Heat Pump Rate (SHP) Rate in 2023. These rates were implemented as two years pilots, but were both extended. The SHP rate ended at the end of 2025 and the current ET rate has a termination date of January 31, 2027, "unless otherwise renewed or modified by the Company and approved by the Commission." The commission's consideration of these issues is ongoing and will continue through two open proceedings, Docket Nos. 2026-00264 and 2026-00248 (CMP 2026b; MPUC 2026).

- The ET rate provides a reduced delivery rate for customers that use more electricity because of electric technologies (heat pumps, EVs, and batteries). While it provides a lower distribution rate of 3 cents, or 25.9 percent, the ET rate has a monthly fixed charge significantly higher than the default electric rate ($41.24 versus $27.37) (CMP n.d.).
- The SHP rate had a fixed charge of around $40, over $13 higher than the default electric rate, and changed the volumetric rates in the winter and summer: almost 10 cents lower in the winter (November-April) and 17 cents higher in the summer (May-October). This is a key difference between the SHP rate and the heat pump rates in Massachusetts. The Massachusetts rates did not raise the summertime volumetric charges, so customers were guaranteed to benefit. However, for the SHP rate customers had no such guarantee.

CMP contracted Demand Side Analytics to evaluate the impact of the ET and SHP rates during pilot periods. It found that 1) customers on the ET rate did not increase or decrease their annual consumption, but those on the SHP rate increased electric consumption by about 1.4 percent in the heating season and 1.1 percent in the cooling season; 2) neither rate increased or decreased demand during summer or winter peaking periods; 3) ET customers paid an average of $200 less annually than default rate customers and SHP customers paid an

average of $100 more annually than default rate customers (CMP 2025). A customer satisfaction survey found that customers on the ET and SHP rates are more satisfied with their rate than those on the standard rate (Demand Side Analytics 2026).

Versant – Home Heating Eco Rate

Versant has been offering electric heating rates for years (Donenfeld 2023). The Home Heating Eco Rate (HHER) is a seasonal declining block rate, which provides a lower volumetric rate on electricity usage over 700 kWh during winter months only (Versant Power 2026). Under the HHER rate, all energy usage above 700 kWh receives a volumetric rate discount of 6.6 cents less than usage below 700 kWh ($0.115 versus $0.04.99 per kWh), representing 57 percent in savings (Versant Power 2026). The monthly fixed charge remains the same for both seasons at $11.54 and includes the first 100 kWh of usage. In the summer, all electricity is billed at the same volumetric rate.

This rate is available to customers with electric resistance space heating, heat pumps, heat pump water heaters, or electric storage space heating that can provide 50 percent or more of the home's heating load. In filings, Versant discusses the decision to include all types of electric thermal heating, including electric resistance heat, as eligible measures for the HHER to promote equitable access to modern rate structures (Versant Power 2026). Versant notes that electric resistance heating may be more common in low- and moderate-income households. They explain that it is more equitable to offer the same seasonal rate to both heat pump customers and to customers with less efficient electric resistance systems who cannot overcome the upfront cost barrier of switching to heat pumps (MPUC 2021).

Customer Enrollment

At most recent reporting, CMP had approximately 5,900 customers enrolled in the ET rate and 2,800 customers enrolled in the SHP rate pilots. These numbers represent approximately 1 percent and 0.5 percent of the residential customer base, respectively. The customer participation rate in Versant's HHER is not publicly available. The ET and SHP rate low participation levels are in line with LBNL's research that found participation rates in opt-in utility rates ranged from 3 to 30 percent (Carvallo and Schwartz 2023). This trend suggests that even when favorable rates exist, like the ET rate, they can fail to gain traction without a marketing campaign to inform and enroll customers. Without a comprehensive marketing, education, and outreach plan to translate technical rate design into actionable customer signals, it will be more difficult to drive significant customer adoption. Moving forward, the focus must shift toward ensuring that rate design is not only technically sound but also paired with an authorized communication strategy that bypasses these historical legal limitations to effectively reach customers (Reardon 2026).

Takeaways

- **If pursuing heat pump rates, design rates that provide a clear benefit to heat pump customers.** Maine utilities have tried several approaches to lowering operating costs for heat pump customers, with mixed results: declining block rates, seasonal rates that are lower in winter and higher in summer, and higher fixed charges paired with lower distribution rates. Versant has long offered a declining block electric heating rate that discounts distribution charges by 57 percent, giving immediate savings

to homes heating with either electric resistance or heat pumps. CMP, by contrast, piloted two rate designs that raised some bill components while lowering others. Studies found the ET rate lowered bills by $200, while the SHP rate raised them by $100. Heat pump rates work best when customers can clearly see the savings, as with Versant's rate, which directly lowers volumetric charges without increasing other parts of the bill.

- **Heat pump rates might counteract electrification's potential to put downward pressure on rates.** Maine law recognizes that beneficial electrification, when it doesn't add to peak demand, can lower rates for all customers by spreading transmission and distribution (T&D) costs over more electricity sales. Technology-specific heat pump rates aim to correct heat pump customers' overpayment of T&D costs by lowering their rates to better reflect what it actually costs to serve them. However, because these rates direct the savings only to heat pump customers, they forgo the opportunity for beneficial electrification to lower rates for everyone (Chen et al. 2026).
- **Heat pump favorable rates can also help electric resistance customers.** Versant's heat pump rate began as an electric heating rate and has expanded to include heat pumps. Unlike Massachusetts, it offers the same discount to both electric resistance and heat pump heating customers. This is an equitable approach because it enables residents with electric heating to have the same benefit as those that have heat pumps. Extending the discount to all electric heating customers can also ease energy burden for those who can't easily switch to heat pumps, such as low-income residents and renters, who are more likely to rely on electric resistance heat.

Technology-Neutral Rates: Blending Heating Electrification Goals With Maintaining Availability to All Customers

For some states, a technology-specific rate design might not align with regulatory precedent or policy goals. These states can turn to technology-neutral rates, which are open to all customers and bring bills closer to grid costs. The options include higher fixed charges, seasonal rates, TOU rates, demand charges, critical peak pricing, and peak time rebates. Because these designs lower volumetric charges or reward steady, off-peak usage, they benefit heat pump customers along with other ratepayers. Which rate design to choose depends on the technology available to the state, when the grid is peaking, how regulators want to allocate costs, and ease of customer usage. As summarized in Table 7 below, case studies from New York, Maryland, and California show three approaches: a demand charge, a time of use rate, and an income graduated fixed charge.

Table 7. *Summary of Technology-Neutral Rates*

State	Rate	Utility	Rate Attributes	Customer
NY	Steady Use Rate	Con Edison	Increased Fixed Charge + Seasonal Demand Delivery Charge + TOU Supply Rate	No Eligibility Restrictions
MD	Energy Time of Use Rate	BGE	TOU Rate	No Eligibility Restrictions
CA	Income Graduated Fixed Charge	All CA Customers	Income Graduated Fixed Charge	Eligibility Based on Income

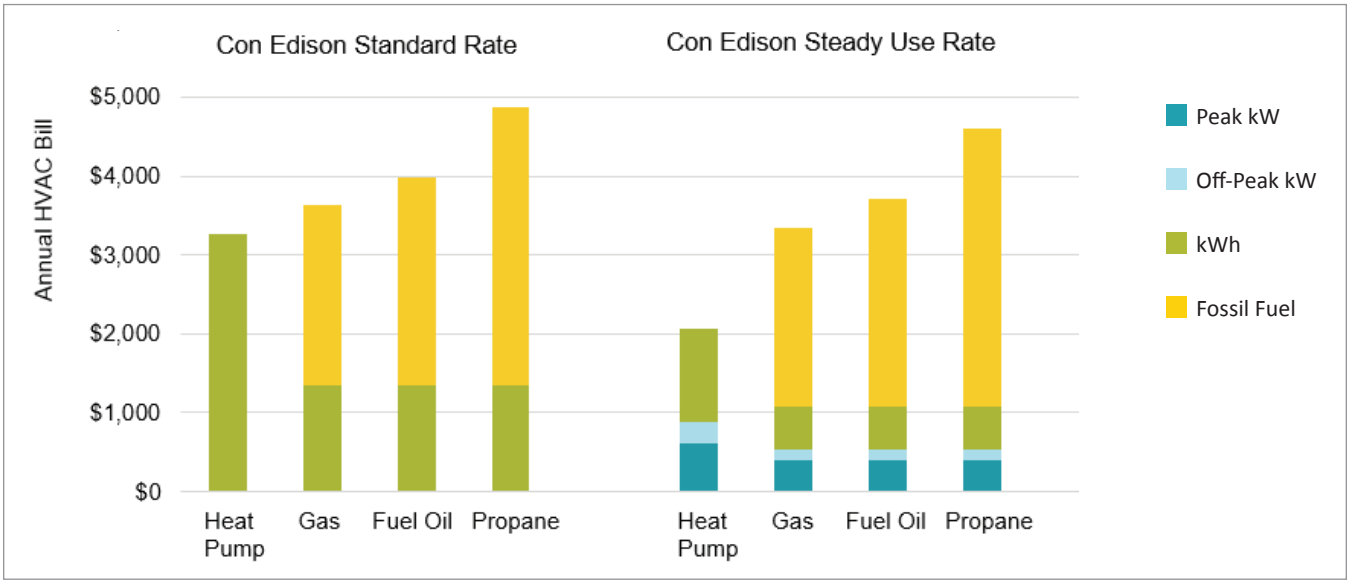
NEW YORK: A Closer Look at Demand Charges

New York is another state that has both climate goals and heat pump adoption goals. New York's Climate Leadership and Community Protection Act (CLCPA), enacted in 2019, mandates a 40 percent reduction in greenhouse gas emissions by 2030 and at least 85 percent by 2050 (relative to 1990 levels) as well as a requirement for 100 percent zero-emission electricity by 2040. New York is also committed to driving heat pump adoption. New York's Clean Heat Program is a program targeted at accelerating heat pump deployment in the state. It sets targets for heat pump deployment for each utility and establishes a statewide platform where customers can find available financial incentives, connect with participating contractors, and learn more about heat pump technologies. Unlike Massachusetts and Maine, New York Department of Public Services has chosen to not prioritize technology-specific rates, finding that rate design should remain technology-agnostic and centered on long-term value (NYS DPS n.d.). Con Edison, a utility that serves New York City and the surrounding area, has deployed a demand charge rate that provides significant discounts for homes that heat with heat pumps.

Con Edison Steady Use Rate

In keeping with the principle of technology-agnostic rates, Con Edison created a technology-agnostic demand charge rate known as the Steady Use Rate. The rate is available to all customers and provides significant savings to heat pump users as the rate charges customer per kW, increasing during peak times of the day. This technology-neutral, cost-reflective structure lets Con Edison charge customers accurately for their electricity usage regardless of the technology they use (Attanasio et al. 2026). This provides substantial savings to customers with stable load profiles and relatively high volumetric consumption.

Figure 7. ***Bill Comparison Between Con Edison's Standard Rate and Steady Use Rate for Different Heating Systems*** [10]



As shown in Figure 7 and the analysis in Section 1, although the Steady Use Rate is not a technology-specific heat pump rate, it significantly lowers bills for heat pump customers. As its demand-based structure and volumetric supply charges favor the efficient, steady demand of a heat pump system. Figure 7 shows the actual bill comparison for ASHPs, gas, fuel oil, and propane. As the heat pump customer moves from the Standard Rate to the Steady Use Rate, their bill decreases significantly, even though they are billed more for peak kW than other customers.

Customer Enrollment and Outreach

Despite the rate providing savings, enrollment has been slow. In 2020, Con Edison initially offered this rate only to geothermal heat pump customers and up to 5,000 other residential/religious customers in 2020 (NYS DPS 2026). Despite the bill guarantee provisions, enrollment remains relatively low, consistent with NEEP's findings for opt-in rates generally (Brown, Cosgrove, and Miller 2025). As of August 2026, 1,337 total customers were enrolled in the Steady Use Rate, 952 of whom were heat pump customers (Levine 2026b).

Con Edison has recently increased its efforts to educate customers about the rate and provide protections for customers who enroll in the rate. In 2023, Con Edison began to offer a one-year bill guarantee, so customers would be refunded if their bill was higher on the Steady Use Rate than the standard rate (NYS DPS 2026; Con Edison n.d. b). Con Edison has also started to provide information about the rate to customers that receive a

[10] Unlike the analysis in Section 1, this graphic shows that natural gas customers pay more than heat pump customers even on the standard rate. This is due to a difference between the statewide estimate for gas data used in Section 1 ($1.54/therm) versus the actual bill amount used in this analysis ($2.47/therm). More information on this analysis is included in Appendix A.

heat pump incentive from their program and is looking to make it easier to enroll at the time of the incentive. In addition to benefitting the customer, this method also gives contractors another selling point they can use to market heat pumps as a money-saving measure (Attanasio et al. 2026).

Low-Income Considerations

Additionally, low-income customers are also able to enroll in this rate. New York's Energy Affordability Program (EAP), which provides discounts to income-qualified customers with the intent of limiting energy burdens to six percent, may be layered on top of Con Edison's Steady Use Rate (Attanasio et al. 2026). This allows low-income customers to enroll in modernized rates with a guarantee that their energy burden will not increase.

Takeaways

- **Demand charges can be complicated for customers but result in significant savings. Demand charges can be seen as a fairer, more accurate way to distribute costs instead of increasing fixed charges for all customers, regardless of size** (Attanasio et al. 2026). However, it can be difficult to introduce a new unit of measurement (kW) and new way of billing customers (LeBel 2026). If states pursue demand charges, it is important to consider significant customer education and marketing to increase adoption and ensure the benefits of the rate are seen by customers.

- **Offering customer protections, such as a price guarantee, can help to grow enrollment.** To encourage heat pump customers to try demand-based pricing, Con Edison offers a 12-month price guarantee under the Steady Use Rate. If a customer ends up paying more on their monthly bill than they would have on the standard volumetric rate, the difference is refunded as a monthly bill credit (Con Edison n.d. b). This enables customers to enroll in the rate as it guarantees that if the rate goes higher than current monthly bills, ratepayers will be compensated the difference. This can help customers who are hesitant to try new rates, and it puts a mechanism in place to see if new rate designs increase bills.

MARYLAND: Time of Use Rates That Benefit Heat Pump Users

Maryland's climate strategy is anchored by the Climate Solutions Now Act of 2022, which sets near-term climate targets of a 60 percent reduction in greenhouse gas emissions by 2031 and net zero by 2045 (Maryland General Assembly 2022). In 2024, the state passed the Distributed Renewable Integration and Vehicle Electrification (DRIVE) Act. This law required Maryland utilities to develop vehicle-to-grid charging, virtual power plants, and time of use rates. In 2025, the PSC issued an order directing utilities to file opt-in TOU rates. The PSC was looking to enact rates that helped clean energy technology across the utility portfolio and promote load shifting, peak flattening, and customer bill savings (MD PSC 2017).

Similar to Con Edison, BGE offers a technology-neutral rate that provides additional savings for heat pump customers. As a result of the DRIVE Act and PUC mandate, Baltimore Gas and Electric (BGE) offers an opt-in time of use (TOU) rate. The current BGE Seasonal TOU Rate offers peak and off-peak volumetric rates, and the peak times change by season. As shown in Section 1, this rate is projected to lower operational costs for

heat pump users by an additional $650 per year. As of 2025, this rate had relatively low customer uptake—approximately 6.5 percent of residential customers used the rate (MD PSC 2025). This low uptake rate is consistent with NEEP's findings for opt-in rate participation (Brown, Cosgrove, and Miller 2025).

Takeaways

- **Heat pump friendly rates can align with grid flexibility goals.** BGE's rate was designed as a response to legislation that looked to enable grid flexibility and prioritize energy reduction during times of peak load. Similar to New York, the benefits to heat pump customers were not a priority in design. Yet heat pump customers benefit because of the rates alignment with actual grid costs. Heat pump friendly rates do not need to prioritize heat pump deployment, most modern rate structures look to align ratepayer charges with actual grid costs, increasing costs at time of peak usage or demand and reducing it for other times of the day, which can benefit heat pump users.
- **Rate design can be driven by legislation.** Passage of the DRIVE Act triggered the proceeding to design and implement TOU rates. While rates ultimately have to be implemented by regulators, legislation can trigger action as opportunities to change rates typically only occur when a utility files a rate case or a commission opens its own investigation. Legislation can spur action by regulators and utilities through providing a clear mandate and timeline.

CALIFORNIA: Income Graduated Fixed Charge

Like the Northeast, in California rates have increased faster than inflation and are among the highest electricity rates throughout the country. Researchers cite wildfire mitigation, liability insurance, shrinking demand, and higher utility return on equity (ROE) than national averages as drivers of these high costs (Barbose et al. 2025; Chhabra 2025; Brinn and Chhabra 2024). Additionally, the state has strong climate goals, which drive electrification programs offered throughout the state. To align with these goals, the California State Legislature passed Assembly Bill 205 in 2022, which authorized the California Public Utilities Commission (CPUC) to create fixed charges "to be established on an income-graduated basis" (CA State Legislature 2022). Similar to Maryland, legislation drove this rate change.

The CPUC approved an income graduated fixed charge (IGFC) that took effect for SCE and SDG&E customers in late 2025 and for PG&E customers in early 2026 (Christopher 2024). Prior to this proceeding, California IOUs largely did not utilize fixed charges for residential customers. The establishment of a fixed charge allowed for a decrease in volumetric rates of by 5-7 cents per kWh for all residential customers (CA PUC 2024a), benefitting heat pump and EV customers. The CPUC estimated these new rates could save electrified customers $28 to $44 a month. California also embedded equity in the design of the fixed charges. The resulting structure includes a fixed charge for non-low-income customers of $24.15 per month and $12 per month for low-

income customers.[11] Further, if a customer is enrolled in the California Alternate Rates for Energy low-income assistance program, this fee is discounted to $6 per month. This ensures that low-income households and households with a higher energy burden do not pay disproportionally more into the energy grid (Brown, Cosgrove, and Miller 2025).

Takeaways

- **IGFC will advance heat pump adoption while preserving volumetric rates' energy efficiency incentives.** While the impetus for the CPUC to create the IGFC was not explicitly related to heat pumps, electrification goals were part of the discussion (Walton 2024). Increasing funding collected through the fixed charge, is one tool available to utility regulators seeking to lower volumetric rates. Additionally, an income graduated fixed charge does not eliminate the efficiency incentive embedded in volumetric electricity rates.
- **IGFC can address inequities inherent in rate design.** Establishing an income graduated fixed charge bases the fixed charge of consumers' bills on their income. This makes bills more equitable by attempting to remedy the disproportionately higher percentage of income that lower-income customers pay into the grid (Chhabra et al. 2024). One of the reasons for this adoption was that current rate-adjacent programs do not tackle core issues of high energy costs and the regressive nature of energy bills (CA PUC 2024b).

Rates to Tackle Winter Peak

One final policy that can drive adoption of heat pump friendly rates is preparing the grid for high winter demand by lowering peak demand and complementing low gas prices as states look to electrify homes. Dual-fuel rates do this by pairing a heat pump with a backup fuel system: The heat pump runs at a low electric rate in mild weather, when it is most efficient, and a high price signals a switch to the backup system on the coldest days, when the grid is most constrained. As noted in Table 8 below, in Québec and Minnesota, these rates are available to balance electrification goals of the state with cold winters and limited grid capacity (Xcel Energy n.d. a). See Appendix B for more details on the Xcel relevant rates. The case study from Québec, which already has a higher winter peak due to prevalence of electric resistance heating, shows how one utility has applied this approach in partnership with a gas utility.

[11] The $12 a month fixed rate is open to qualifying customers that: 1) are enrolled in the Family Electric Rate Assistance Program, 2) reside in deed-restricted affordable housing, and 3) have a household income at or below 80 percent of the area median income.

Table 8. *Summary of Winter Peak-Related Rates*

State	Rate	Utility	Rate Attributes	Customer
Québec	Dual Energy Rate	Hydro-Québec	Temperature-Based Critical Peak Pricing + Demand Charge	All Electric Heating Customers + Require Integrated Controls
Minnesota	Back-Up Relief Program: Energy Controlled Rate	Xcel	Lower Volumetric Rate	Max 50 kW of Interruptible Load, Electric Primary Heat Source With Back-up Fossil Fuel Heat Source

HYDRO-QUÉBEC: Hybrid Electric and Gas Heating Rate

Québec's government has committed to reducing greenhouse gas emissions by 37.5 percent by 2035 and to being carbon neutral by 2050 (Gouvernement du Québec 2026). Additionally, the province has strong climate goals. But unlike states in the Northeast and Mid-Atlantic, Quebec currently experiences a winter peaking grid, and their heat pump focused rates looks to reduce this peak demand through a dual fuel strategy. Rate DT was driven by the unique challenge of managing a winter-peaking utility where winter load is already twice as high as summer load.

Hydro-Québec—Rate DT

Hydro-Québec, an electric utility serving Québec, Canada, offers Rate DT, an electric rate for residential and commercial dual-fuel customers. This rate is designed to benefit both customers and the utilities by prioritizing heat pumps during times of mild weather and lowering electric consumption during times of extreme weather events. This works to reduce strain on the grid and prioritize reduction of greenhouse gas emissions during milder weather (Harvey 2026). Because over two-thirds of homes in Québec currently rely on electric resistance heating and the province is prioritizing heat pump adoption, there is significant pressure to limit electric peaks (Statistics Canada 2023).

Rate DT offers customers a significantly lower electricity price[12] (approximately $0.05 CAD/kWh) when the outdoor temperature is above 10°F or 5°F, depending on location. When temperatures drop below the threshold, the rate increases to roughly $0.29 CAD/kWh to signal the automatic switch to an auxiliary fuel system, such as a gas furnace. Hydro-Québec projects that average customers who heat with gas or oil can expect to save approximately $500 CAD per year upon switching to Rate DT (Hydro Québec n.d. b).

Rather than focusing exclusively on heat pumps, the rate is available to customers who use any electric heating technology, which is important as approximately 54 percent of Québec households heat with electric resistance baseboard heating and only 16 percent use heat pumps (Statistics Canada 2025). This is because

[12] Unlike most utilities in the Northeast U.S., Hydro-Quebec is a vertically integrated utility, so they do not separate out their transmission, distribution, and generation charges.

electric resistance is already driving up grid usage and states can take advantage of existing natural gas networks. Switching these electric resistance homes onto heat pumps will lower overall baseload and lower peak demand. This enables heat pump technology to be used at times when it is most efficient and limits the use of fossil fuel-powered systems.

Hydro-Québec offers this rate in partnership with Énergir, a gas utility. By integrating both the gas utility (Énergir) and the electric utility (Hydro-Québec), this rate has successfully reduced gas consumption among participants by 70 percent and allowed the electric utility to reduce peak load potentially deterring additional infrastructure investments. This arrangement effectively transforms the gas utility into a peak-shaving service provider, where Hydro-Québec compensates Énergir for lost revenue, creating a win-win scenario that prioritizes reduced electric cost, maximizing societal benefits and emissions reductions (Faraon Chaul Corona and Fraser 2024; Harvey 2026).

Additionally, rather than requiring widespread adoption of heat pumps, the model leverages the value of reducing electricity consumption during the most system-constrained periods by shifting customers to gas or another auxiliary heating source. In this way, Rate DT demonstrates how coordinated pricing and utility partnerships can use dual-fuel systems to manage winter electricity peaks while simultaneously reducing customer costs and supporting emissions-reduction goals.

Takeaways

- **Critical considerations for customer savings. There are additional installation costs incurred by the customer for participating in a dual**-fuel rate. A similar rate quotes additional equipment costs ranging from $1,000 to $2,000 per install (Xcel Energy n.d. a). Additionally, because these rates have high critical peak pricing, if customers do not shift load, they could see their bills go higher at times when the energy is most needed, especially during extreme cold snaps. States and utilities can consider the role of technology, such as automated controls, smart thermostats, and emerging AI-enabled technologies, to make load shifting easier and more reliable for customers, reducing the risk that customers are exposed to high prices when they need energy most.
- **Create opportunities for electric and gas utilities to work together to deploy heat pumps.** Rate DT demonstrates how coordination between electric and gas utilities can facilitate greater heat pump adoption while aligning utility incentives and reducing grid infrastructure costs. This model also compensates the gas utility for peak shaving, providing another way for gas utilities to earn funding during the transition to more heat pump adoption and managing electric system peaks.

Section 4: Identifying the Right Rate Design

Section 2 explains how different rate designs work and Section 3 looks at how they have been implemented. This section will focus on key considerations for aligning rate design with heat pump use to help regulators, utilities, and other stakeholders choose a rate design that fits their near- and long-term goals. We begin with the first decision regulators and utilities face: whether to pursue a technology-specific or technology-neutral rate. We then cover design and implementation considerations that apply only to technology-specific rates, and close with considerations that apply to any heat pump friendly rate design.

Technology-Specific or Technology-Neutral Rate

As our analysis shows, both technology-specific and technology-neutral rates can lower heat pump operating costs and better align customer bills with grid costs. Technology-specific rates, such as seasonal heat pump rates, deliver immediate savings without behavior change, can be implemented on a faster timeline, and align with climate and heat pump adoption goals. They are also justified because heat pumps have a usage pattern that current rate design does not accommodate, i.e., increased load in the winter season, when the grid has excess capacity. Technology-neutral rates, such as time of use rates and demand charges, are open to all customers and stay aligned with grid costs as conditions change.

Considerations for Technology-Specific Rates

States that choose a technology-specific rate, available only to heat pump or electric heating customers, face several additional decisions around eligibility, what bill components the rate affects, and a long-term transition strategy. These choices determine which customers qualify and how much their bills change.

- **Bill Components Affected by the Rate:** Seasonal rates and declining block winter rates can apply different parts of a customer's bill, including transmission, distribution, and policy charges. In Massachusetts, the seasonal heat pump rate for National Grid and Unitil initially only applied to the distribution charge. For the 2026-2027 winter season, the DPU ordered that all utilities adjust both transmission and distribution charges (MA DPU 2026b). While Massachusetts chose not to lower policy charges, such as energy efficiency and net metering programs, regulators and utilities can extend the rate to them as well (Murray and Velez 2025). Because these charges are currently a flat volumetric rate, the added electricity use from heat pumps can lead to customers paying disproportionally more into these programs (Murray and Velez 2025).
- **Customer Eligibility:** Implementing technology-specific rates involved considerations on eligibility: whether the rate applies to all electric heating customers or only heat pump customers, whether the whole home or only part of it must be heated with the device, and whether the rate applies to all energy used in the home or just the technology.
    - **Heat Pump Only Rates or Electric Heating Rates:** While heat pump specific rates can help accelerate heat pump adoption and provide a deeper discount, electric heating rates, which

apply to both heat pumps and electric resistance heating, can also be part of this strategy. Rates that apply to all customers that heat with electric heat also address the issues of cost reflectivity and cost causation, ensuring customers' bills align with the cost to serve. Utilities have offered seasonal rates for electric heating since the 1960s because of this fact (Luzerne Electric Division 1963). Electric heating rates can also address a significant equity concern—that heat pumps are not viable for all customers, both because of their high upfront costs and for renters, who have no control of their heating sources.

- **Whole or Partial Home Heating Required:** Technology-specific rates must also specify whether a home needs to be fully or only partially heated by heat pumps, a decision that affects how many customers are eligible and how they enroll. A whole-home requirement means the utility will need a way to determine and verify eligible customers. Expanding eligibility to customers who partially heat with heat pumps can, depending on the definition used, streamline enrollment. In Massachusetts, the DPU made any customers with a heat pump eligible to streamline adoption and encourage adoption of heat pumps (MA DPU 2024c, 407). This allowed utilities to automatically enroll customers who received rebates through Mass Save, resulting in 140,000 customers enrolling in the first year (Wasser 2026). Rates with a threshold for eligibility, such as the 50 percent requirement for Versant's Home Heating Eco Rate, can require extra steps to verify eligibility, such as reviewing past customer bills or electric usage (Gold-Parker, Malkani, and Picciano 2026).
- **Heat Pump Usage Only or Whole-Home Usage:** A rate can apply to all of a home's electricity or only to what the heat pump uses. Limiting it to heat pump usage allows a deeper discount, but many utilities cannot separate that usage from the rest of the home. Tracking heat pump usage alone could also require significant upfront investment in metering technology, which might undermine the goals of easy enrollment and lower costs (MNCEE 2023).

- **Identifying a Transition Strategy:** Technology-specific rates fit current conditions (a summer-peaking grid and heat pump customers who overpay in the winter), but they are a temporary tool for growing the heat pump market. As adoption spreads across the Northeast and Mid-Atlantic, winter electricity use is expected to grow, creating a new winter peak and higher net electricity usage in the winter (Gold-Parker, Malkani, and Picciano 2026). As a result, the cost to supply electricity in the winter will rise and rates will need to change. By signaling that heat pump rates are temporary and opening a proceeding to plan a transition to different rates, states can set customer expectations and give utilities certainty. Massachusetts has opened a time-varying rates proceeding to plan the state's next phase of rates (MA DPU 2026f). Other states adopting technology-specific rates should plan a similar path, which could be TOU rates or another modern rate structure.

Considerations for Both Technology-Specific and Technology-Neutral Rates

Whether a state pursues a technology-specific or technology-neutral approach, several considerations apply to every rate design. These factors shape how many customers enroll, how easily they can benefit, and whether the savings reach the households that need them most.

- **Ease of Use of Selected Rate Structure:** The more complicated or unfamiliar a rate design is, the harder it can be to enroll customers. Some rate designs discussed in this paper require ongoing reminders for customers to change their behavior to avoid costly bills (CPP, TOU rates, demand charges) while others require less customer interaction (seasonal rates, block rates, and IGFC). For rates that require ongoing customer action, communicating, socializing, and reinforcing the needed behavior shifts will be important to the success of the rate and ability for customers to save money.
- **Enrollment and Marketing Strategies:** Enrollment strategies determine who enrolls a rate and, therefore, who is able to take advantage of the benefits the rate can provide. A heat pump specific rate often carries no downside for heat pump owners, as it is a discount on volumetric charges, which means states can consider automatic enrollment, as with the Massachusetts seasonal heat pump rate. For opt-in rate, a robust marketing, education, and outreach plan becomes the primary way to enroll customers with materials explaining what the rate is and how it benefits customers (Brown, Cosgrove, and Miller 2025).
- **Alignment With Low-Income Assistance Programs:** As states deploy heat pump or heat pump friendly rates, proceedings should consider how rates can lower energy burden for customers that need it the most. Massachusetts and California have both adopted low-income protections that direct the greatest savings to customers that need it the most. California's income graduated fixed charge (IGFC), adopted by the California Public Utilities Commission in 2024, sets three levels of fixed charges, automatically assigning lower charges to customers based on their participation in state programs (CA PUC 2024a). Massachusetts DPU approved a low-income discount rate (LIDR), which offers five tiers of discounts depending on household income (Commonwealth of Massachusetts n.d.). Both approaches aim to reduce energy burden and remedy the disproportionately higher percentage of income that lower-income customers pay into the grid (Chhabra et al. 2024). They differ in two key ways. First, an IGFC only applies to the fixed charge, where the LIDR applies to the whole bill. Second, in some jurisdictions, low-income programs cap annual bill relief, after which customers pay the full rate for the rest of the year (RMI 2025; Commonwealth of Pennsylvania n.d.).

Conclusion

As the data and case studies above demonstrate, heat pump friendly rates can take many forms. Options range from technology-specific rates designed to better reflect the costs of serving heat pump customers to technology-neutral rates that align bills more closely with grid costs while helping manage winter peak demand. The most effective approach depends on each state's policy objectives, electricity system needs, and customer priorities.

Under current flat volumetric rates, homes that convert to heating with heat pumps from gas, oil, or propane pay more than their fair share of grid costs. Despite this rate design issue, our analysis shows that homes switching from propane or fuel oil save immediately, but homes that switch from gas see bills rise by about $100 a year on average, and by $500 or more where the spark gap is highest. Rate design can close this gap. A seasonal heat pump rate results in operational savings compared to gas in every state in the Northeast and Mid-Atlantic, averaging about $600 a year. Technology-neutral time of use and demand-based rates saved an average of $410 to $1,560 annually.

The case studies show there is no single approach. Massachusetts and Maine adopted technology-specific seasonal and block rates while New York and Maryland rely on technology-neutral rates. California adopted a fixed charge to lower volumetric rates, and Québec uses a dual-fuel rate to manage its winter peak. The right choice depends on a state's policy goals around heat pumps, the grid, and equity. One universal lesson that does emerge is the need for consistent marketing, engagement, and enrollment practices. Opt-in rates have reached only a small share of eligible customers, while automatic enrollment in Massachusetts reached more than 140,000 as of spring 2026.

Implementing effective rate designs requires coordinated action by regulators, legislators, and utilities. Massachusetts regulators established a statewide seasonal heat pump rate, while legislation in Maryland helped drive the development of time of use rates that now benefit heat pump customers. These examples illustrate how both regulatory action and legislative initiatives can help align electricity prices with the need to electrify homes. This paper serves as a resource to help states navigate how to identify a heat pump friendly rate that best aligns with their policy goals and grid needs.

Appendices

Appendix A—Rate Analysis Methodology

The rate analysis includes baseline scenarios modeled for each state plus detailed real-world examples modeled for New York and Maryland. Each scenario presents the annual HVAC cost impacts of a new all-electric heat pump system replacing a natural gas, propane, or fuel oil furnace with a paired air conditioner. Baseline scenarios pair the most common residential electric rates from each state with statewide estimates for natural gas, propane, and fuel oil prices. Real-world scenarios investigate special electric rate classes that are of particular interest to heat pump customers, comparing these to natural gas rates estimated from historical utility bills applying to the same service areas. Statewide averages for propane and fuel oil prices still apply in these real-world scenarios. Where possible, these real-world examples also model the scenarios in which these special electric rates may apply to the comparative furnace and air conditioner.

Baseline Rates

Baseline electricity, natural gas, propane, and fuel oil rates are intended to represent the most common standard rate scenarios for customers in these states. Baseline electricity rates are the residential electric rate classes serving the most customers from the largest utility in each state. Electricity rates were collected for the time period June 2024 through May 2025 from the Arcadia Genability database (Arcadia n.d.). This database provides a history of nearly all electric utility tariffs nationwide, allowing us to request 12-month historical electric rate estimates at an hourly time interval. These hourly estimates include all volumetric ($/kWh) rate components for the selected tariffs. The hourly rate profiles are then applied to hourly load shapes for each of the modeled HVAC systems. The resulting rate classes and example load-weighted values representing each state's baseline scenario are provided in Table A1.

Table A1. ***Volumetric Baseline Electric Rates by State, Utility, Tariff, and Utility Rate Code***

State	Utility	Tariff	Rate Code	$/kWh*
CT	Eversource (CT Light & Power)	Residential	1	$0.3034
DC	Potomac Electric Power Co (PEPCO)	Residential	R	$0.2018
DE	Delmarva Power	Residential	R	$0.1394
MA	Eversource (NSTAR)	Residential	R-1 (A1)	$0.3313
MD	Baltimore Gas & Electric Co	Residential	R	$0.1776
ME	Central Maine Power Co	Residential	A	$0.2186
NH	Eversource (PSC NH)	Residential	R	$0.2145
NJ	Public Service Elec & Gas Co	Residential	RS	$0.2136
NY	Consolidated Edison Co-NY Inc	Residential and Religious	EL1 Rate I	$0.3079
PA	PECO Energy Co	Residential	R	$0.1873
RI	Rhode Island Energy	Residential	A-16	$0.3012
VT	Green Mountain Power Corp	Residential	01	$0.2174
WV	Appalachian Power Co	Residential	RS	$0.1626

*Electric rates are applied to load shapes on an hourly basis. $/kWh shown weighted by degree days (base 65°F) for comparison against other fuel prices.

Residential natural gas prices are estimated from data published for each state by the U.S. Energy Information Administration (EIA) with a monthly time interval (U.S. EIA n.d. a). Similarly, propane and heating oil prices are published by the EIA with a weekly cadence (U.S. EIA n.d. b). Historical residential price estimates are compiled for each state from these time series, using values from the most recent 12-month period. These are then load-weighted using historical weather data for each state's most populous metropolitan area. Total monthly heating degree day summaries using a reference temperature of 65°F (HDD65) are collected for each state for the same 12-month period for which the most recent fuel prices are available (National Weather Service n.d.). Monthly HDD65 estimates are used as an analog for heating load to obtain a load-weighted average price for each fuel, provided in Table A2.

Table A2. ***Weather Data Summaries and Volumetric Fuel Prices by State***

State	Weather Station	Annual HDD65	Heating Oil $/gal*	Propane $/gal*	Natural Gas $/Mcf*
CT	Bridgeport	4,708	$3.59	$3.96	$15.44
DC	DC Area	3,285	$3.83	$3.65	$15.29
DE	Wilmington	4,247	$3.98	$3.81	$14.35
MA	Boston	5,086	$3.76	$3.62	$23.89
MD	Baltimore	4,098	$3.83	$3.65	$16.19
ME	Portland	6,226	$3.63	$3.25	$16.36
NH	Concord	6,567	$3.89	$3.66	$17.92
NJ	Newark	4,084	$3.91	$3.72	$13.34
NY	LaGuardia	4,046	$3.95	$3.49	$15.97
PA	Philadelphia	4,030	$3.42	$2.99	$13.54
RI	Providence	5,181	$3.71	$3.68	$18.12
VT	Burlington	6,297	$3.68	$3.71	$16.86
WV	Charleston	4,011	$3.42	$2.99	$12.59

* Volumetric fuel prices shown weighted by heating degree days (base 65°F).

Spark Gap Calculation

The spark gap is the ratio of costs to use electric energy compared to gas energy. It is calculated by converting electric from kWh to MMBtu and gas from Mcf to MMBtu and comparing the two prices. The values in Tables A1 and A2 were used to calculate the spark gap for each state as shown in Table A3.

Table A3. ***Spark Gap Calculation***

State	Utility	Electric Pricing ($/kWh*)	Electric Pricing ($/MMBtu equivalent)	Natural Gas $/Mcf*	Natural Gas ($/MMBtu equivalent)	Spark Gap (Elec Price in MMBtu/Gas Price in MMBtu)
CT	Eversource (CT Light & Power)	$0.3034	$88.92	$15.44	$14.90	6.0
DC	Potomac Electric Power Co (PEPCO)	$0.2018	$59.14	$15.29	$14.76	4.0
DE	Delmarva Power	$0.1394	$40.85	$14.35	$13.85	2.9
MA	Eversource (NSTAR)	$0.3313	$97.09	$23.89	$23.06	4.2
MD	Baltimore Gas & Electric Co	$0.1776	$52.05	$16.19	$15.63	3.3
ME	Central Maine Power Co	$0.2186	$64.07	$16.36	$15.79	4.1
NH	Eversource (PSC NH)	$0.2145	$62.86	$17.92	$17.30	3.6
NJ	Public Service Elec & Gas Co	$0.2136	$62.60	$13.34	$12.88	4.9
NY	Consolidated Edison Co-NY Inc	$0.3079	$90.24	$15.97	$15.42	5.9
PA	PECO Energy Co	$0.1873	$54.89	$13.54	$13.07	4.2
RI	Rhode Island Energy	$0.3012	$88.27	$18.12	$17.49	5.0
VT	Green Mountain Power Corp	$0.2174	$63.71	$16.86	$16.27	3.9
WV	Appalachian Power Co	$0.1626	$47.65	$12.59	$12.15	3.9

Real-World Example Rates

Two states were selected for further analysis, including a deeper dive into natural gas billing data and an investigation of special electric rate structures. Natural gas bills were collected from Baltimore Gas & Electric (BGE) and Consolidated Edison (Con Edison), representative of gas prices in the same utility territories as the selected real-world example electric rates.

The research team sourced monthly billing data from gas heating customers at BGE. To maintain a 12-month averaging period, this analysis used historical values from September 2024 through the most recent available bill from August 2025. The billing data included start and end dates for each billing period, total gas usage in therms, and total cost. It was therefore necessary to disaggregate these costs into variable and fixed fees to avoid artificially inflating volumetric price estimates. A linear regression of total bill amount vs. total therms (R2 = 0.998) resulted in an estimated fixed fee of $15.85 per month over the 12-month period, using the intercept of the regression line at 0 therms. Subtracting this fixed fee estimate from the total bills from this period separates the portion of the total cost attributed solely to gas usage, which can then be divided by total therms to estimate a monthly $/therm price. These monthly volumetric cost estimates were then weighted by HDD65 from the same weather data used to weigh baseline rates, resulting in a single 12-month average of $1.70/therm, 9 percent higher than the baseline estimate from EIA residential pricing data.

For Con Edison, the team sourced monthly values from the Con Edison Gas Rates Summary document and current gas tariff (Con Edison 2026a; 2026b). Historical Con Edison gas bills were estimated from October 2024 through September 2025. Con Edison's gas price history included a relatively high distribution charge of $1.92/therm applied in addition to their supply charges. By comparison, recent New York State Electric and Gas (NYSEG) and National Grid (Long Island) distribution charges were estimated at $0.80/therm and $2.05/therm, respectively, demonstrating a significant disparity in gas prices across the state. An HDD65-weighted 12-month average of total volumetric gas prices resulted in an estimate of $2.47/therm using Con Edison billing data. This estimate is 60 percent higher than the baseline average calculated from EIA data. As the EIA price history represents a statewide average, this can be attributed to the difference in gas prices between utilities serving the greater New York City metro area and those further outstate. Table A4 compares these final real-world weather-weighted gas prices against real-world baseline estimates for these states.

Table A4. ***Real-World Baseline and Weather-Weighted Natural Gas Prices by State***

State	Utility	Real-World Baseline ($/therm)	Real-World Weather-Weighted ($/therm)	Percent Difference
MD	BGE	$1.56	$1.70	9%
NY	Con Edison	$1.54	$2.47	60%

Actual electric rates were selected to represent special rate structures relevant to heat pump customers in these three states. Each rate is modeled for a calendar year as an hourly profile (8,760 hours) of prices organized by $/kWh and $/kW components, where relevant. Analysis for Maryland was performed using BGE's residential delivery and energy time of use (TOU) rate schedule RD (BG&E 2024). This rate includes peak and off-peak periods defined separately for summer (June 1 through September 30) and non-summer (October 1 through May 31) periods. Summer peak periods are between 3 pm and 8 pm on weekdays, excluding holidays. Non-summer peak periods are between 6 am and 9 am, and between 5 pm and 9 pm, also

excluding holidays. All other times of year are off-peak periods, including up to nine holidays listed in the rate book. The modeled electric rates are $0.39655/kWh in peak periods and $0.11885/kWh in off-peak periods.

Analysis for New York included two different rate classes offered by Con Edison: a seasonal TOU rate and a demand-based rate (Con Edison n.d. a; Con Edison n.d. b). The seasonal TOU rate includes a summer (June 1 through September 30) and non-summer (October 1 through May 31) season. Peak delivery and supply rates apply between 8 am and midnight year-round. Super-peak pricing applies for supply only in summer, raising prices between 2 pm and 6 pm on weekdays throughout the season. Off-peak delivery and supply pricing applies at all other hours. An additional supply charge is added to all hours outside of super peak periods, estimated from public data on average Con Edison bills (Con Edison 2025b). While the delivery rates vary seasonally, supply rates may change and differ among customers served across New York Independent System Operator (NYISO) load zones H, I, and J (NYISO n.d.). Zones H and I divide Westchester County, and Zone J includes service to New York City. Super peak supply pricing is estimated by load zone using recent historical data available from Con Edison, describing super peak pricing applied during recent periods (Con Edison n.d. c). The modeled rates include both supply and delivery charges, but do not include taxes or surcharges. Rates modeled for these TOU periods are shown in Table A5.

Table A5. ***Volumetric Electricity Rates Modeled for Con Edison TOU Periods***

Season	Period	Rate ($/kWh)
Summer	Off-Peak	0.14629
	Peak	0.47369
	Super Peak	0.37336* or 0.78779**
Non-Summer	Off-Peak	0.14629
	Peak	0.25189

* Zones H and I
** Zone J

Con Edison's demand-based rate is modeled using definitions provided by the Con Edison rates team. Peak periods occur on non-holiday weekdays from 12 pm to 8 pm, while off-peak periods include all other hours. This schedule applies year-round. Con Edison measures the highest demand 60-minute peak and off-peak period each day of the billing period. At the end of the billing period, the highest three peak periods and off-peak periods are averaged to calculate the peak and off-peak kW demand applied to demand charges. Demand charges were set at $25.36/kW in summer, and $19.50/kW in non-summer seasons for the study period. Supply charges are also billed on a per-kWh basis, with peak and off-peak rates that are also based on wholesale energy markets for load zones H, I, and J. This analysis used an average of data from September 2024 through August 2025: $0.2423/kWh and $0.0747/kWh for summer and non-summer seasons, respectively. Rates were applied to modeled home HVAC electricity usage as detailed in the following section.

Slipstream Modeling System Definitions:

We modeled a 2,030 square-foot single-family home, which is the average single-family square footage according to the Northeast ResStock dataset. The modeling assumes this same "basic home" across the board, preserving the same assumed levels of weatherization and home vintage. Variances in load and cost outcomes are thus due to varying climates, baseline furnace fuel type, and heat pump type. Weatherization levels were calibrated by comparing model output to the annual peak heating and cooling loads of ResStock homes with similar square footage in similar locations. For context, the average vintage of these ResStock homes is 1970.

We modeled a furnace efficiency of 80 percent, which is characteristic of the current ResStock Northeastern building stock, though furnaces currently being sold on the market average at a higher efficiency. We assumed the specified furnace's Annual Fuel Utilization Efficiency (AFUE) remained constant across all temperatures, which is consistent with standard energy-modeling tools and furnace rating procedures.

The model used in this paper is built and run in the R programming language. Model inputs include weather, home, and HVAC system attributes. It then runs heat transfer and energy use calculations for each hour of the year and outputs hourly data and graphics. Key functions and underlying assumptions of this model are outlined in Table A6 below.

Table A6. ***Key Functions and Underlying Assumptions of Hourly Thermal Model***

Function	Underlying Assumptions
Imports hourly weather file (e.g. T, RH, solar heat), selects/cleans variables, converts units, calculates solar gains per ft^2 of façade.	• Weather data is representative of modeled conditions. • Hourly resolution captures all meaningful thermal variation. • Solar radiation is uniformly distributed across each façade (no absorption or shading dynamics).
Uses building geometry (e.g., levels, ceiling height, wall/window ratios), R-values (e.g., walls, ceiling, floor), and infiltration inputs to compute façade areas and UA values.	• Heat transfer is steady-state ($UA \times \Delta T$). • No dynamic thermal mass, thermal bridging, thermal storage, or time lag. • Infiltration is constant per hour. • Window and wall areas are uniformly distributed. • Provided components fully define the building's thermal behavior.
Builds hourly internal gains from occupancy, appliances, and lighting schedules for weekdays and weekends.	• Internal gains follow deterministic schedules. • Gains do not vary with holidays or weather.
Takes HVAC COP and max capacity values at three to five temperature datapoints and converts them into temperature-dependent performance curves for each stage.	• COP and capacity curves accurately reflect real equipment behavior across temperatures. • HVAC stages operate as discrete on/off levels (no modulation or short-cycling). • Outdoor temperature alone determines performance variation.

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Calculates solar and internal gains, determines active heating/cooling stage per hour, precomputes hourly metadata before the thermal simulation.	• Stage selection relies solely on system controls, outdoor temperature, stage capacities, and setpoints.
Simulates each hour: calculates thermal gains/losses, determines whether HVAC systems can meet the load, computes energy use and runtime of primary and backup HVAC systems and fans, computes resulting indoor temperature.	• Fan performance is linked to the enthalpy of the conditioned air stream; fan power increases with required sensible and latent heat delivery and heat delivery is capped at the equipment's specified maximum CFM. • Home setpoint is maintained unless capacity is insufficient.
Computes fuel/energy use from thermal model outputs and multiplies by hourly fuel/electricity rates.	• Hourly cost is dependent on an inputted TOU rate schedule or a fixed rate, and is assumed to be volumetric.

The loads represent a common ccASHP (HSPF2 9.2 and SEER2 21). This is above the baseline standard for the NEEP Cold Climate Air Source Heat Pump Specification for ducted systems (HSPF2 ≥ 7.7; SEER2 ≥ 14.3) (NEEP 2023). The air conditioning unit is a model with a SEER of 15. We have derated COPs by 25 percent for ACs, and 15 percent for the variable speed heat pump, based on the assumption that inverter-driven modulation decreases cycling, providing part-load efficiency boosts that support better real-world performance. These derates are based on field testing literature, which consistently shows field performance lagging behind manufacturer specified performance (i.e., system performance under laboratory testing procedures). For example, NEEP's recent Residential Heat Pump Efficiency Rating Representativeness Project found that laboratory ratings overestimated field performance by 10 to 36 percent (Jaiswal, McWilliams, and Lis 2024).

Note that the deviation between manufacturer specifications and field performance varies. In high-quality installations the gap may be small, whereas systems with poor sizing, ductwork limitations, or suboptimal controls may underperform significantly. A recent field study of 12 variable-speed heat pumps illustrates this range, showing both close alignment and substantial divergence between measured and rated COP depending on site conditions. Our modeling approach is therefore designed to represent the typical direction and magnitude of underperformance observed across field studies, while acknowledging that real-world outcomes depend heavily on installation quality and system conditions.

Additionally, while the model used a ducted system, the results can be applied to ductless systems as these systems can reach similar levels of efficiency.

Seasonal Heat Pump Rate Calculation

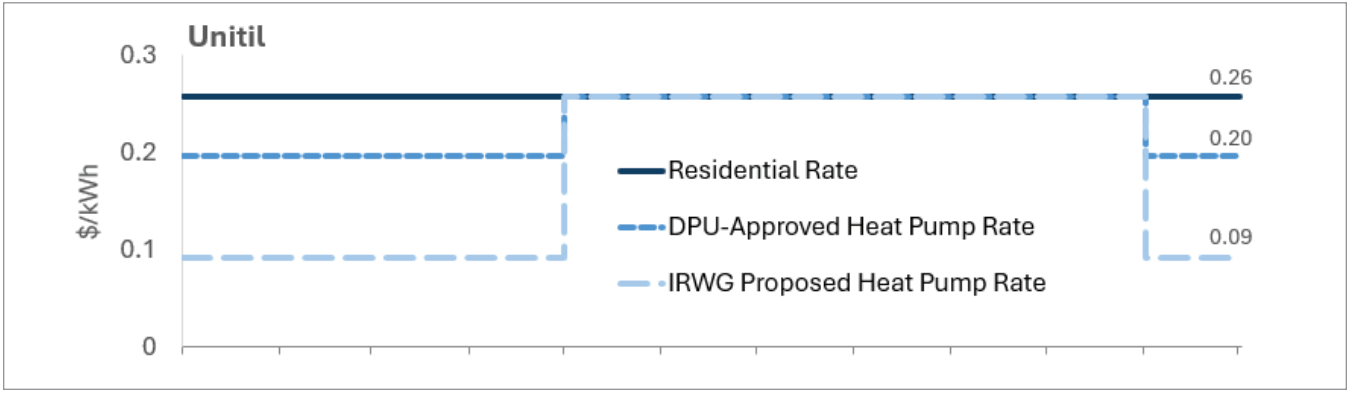
This section describes how we calculated the 37 percent reduction used to illustrate a seasonal heat pump rate based on the Massachusetts Interagency Rates Working Group Near-Term Strategies Report. The heat pump rates in Massachusetts for the 2025-2026 winter season discounted distribution and provided an overall discount of 13.7 percent (using the example of Unitil below). The rate model by the Interagency Rates Working Group looks to lower transmission, distribution, and reconciliation charges resulting in a reduction of 37 percent in per kWh charges overall. The working group chose this lower discount to ensure rates are cost-based and able to compete with gas prices. Table 2 below from this report shows how the working group's recommended heat pump rate compared to what DPU approved for Unitil's Seasonal Heat Pump Rate in 2025-2026.

Table 2. *Illustrative Comparison of Unitil's Seasonal Heat Pump Rate*

	DPU-Approved Seasonal Heat Pump Rate ($/kWh)		Working Group Recommendation ($/kWh)	
	Summer	**Winter**	**Summer**	**Winter**
Supply	0.19304	0.19304	0.19304	0.19304
Distribution	**0.09576**	**0.03419**	**0.09576**	**0.03419**
Transmission	0.03501	0.03501	**0.03501**	**0.01250**
Other	0.12686	0.12686	**0.12686**	**0.04530**
Total	0.45067	0.38910	*0.45067*	*0.28503*
Differentiation	-	0.06157	-	0.16564

Our calculation is based on comparing $0.45067/kWh to $0.28503/kWh. We confirmed that the summer rate ($0.45067/kWh) is in line with the baseline residential rate based on the following sentence from the report: "The Unitil heat pump rate design lowers the base distribution charge from $0.09576 per kWh to approximately $0.03419 per kWh providing a savings of $0.06157 per kWh off of a total residential retail rate of over $0.45 per kWh" and Figure A1, below:

Figure A1. ***Comparison of Total Delivery Rate for Standard Residential Customers, the DPU-Approved Seasonal Heat Pump Rate, and the IRWG Proposed Seasonal Heat Pump Rate***



Source: MA Interagency Rates Working Group, 2024. "Near-Term Rate Strategy Recommendations." MA Interagency Rates Working Group. December. Accessed June 8, 2026. https://www.mass.gov/doc/irwg-near-term-rate-strategy-recommendations/download.

Appendix B—Details of Selected Heat Pump Friendly Rates

Rate[13]	Utility	State	Fixed Charge ($)	Season	Delivery Charge ($/kWh)	Notes
Residential Heat Pump Rate	Eversource	MA	$10.00	May-October	$0.23768	
				November-April	$0.19217	
Residential Heat Pump Rate	National Grid	MA	$10.00	May-October	$0.22327	
				November-April	$0.1809	
Residential Heat Pump Rate	Unitil	MA	$8.50	May-October	$0.27798	
				November-April	$0.18287	
Energy Time of Use Rate	BGE	MD	$10.00	June-September	On-peak usage - $0.0.08874 Off-peak usage - $0.03736	June-September: On-Peak 3-8 PM October-May: On-Peak 6-9 AM and 5-9 PM M-F, excluding holidays
				October-May		
Seasonal Heat Pump Pilot Rate	CMP	ME	$40.55	May-October	$0.278592	This pilot program ran through 2025 and is now closed. Does not include the first 50 kWh.
				November-April	$0.011226	
Electric Technology Rate	CMP	ME	$41.24	Year-round	$0.088638	642 kWh of usage per month is the breakeven point between the Electric Technology Rate and Rate A.
Home Heating Eco Rate	Versant	ME	$22.41	May-September	First 100 kWh - $11.54/ month Next 600 kWh - $0.115445 All kWh above 600 kWh - $0.115445	Declining block in heating season, flat rate in non-heating season. Fixed charge includes $11.54 which covers first 100kWh of usage and $10.87 public policy charge.
				October-April	First 100 kWh - $11.54/ month Next 600 kWh - $0.115445 All kWh above 600 kWh - $0.049883	
Xcel Energy Electric Space Heating Rate	Xcel	MN	$6.00	June-September	$.13069	Home's primary heating source is electric
				October-May	$0.06537	

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[13] Rate details collected on September 30, 2026. In the case of closed pilot programs, most recent rate information is noted.

Rate	Utility	State	Fixed Charge ($)	Season	Delivery Charge ($/kWh)	Notes
Back-Up Relief Program - Energy Controlled Rate	Xcel	MN	$6.00	Year-round	$0.05933	Requires a duplex meter socket and control switch for an estimated cost of $1,500-$2,000.
Back-Up Relief Program - Optional Energy Controlled Rate	Xcel	MN	$6.00	June-September	$0.13069	Xcel recommends this rate for HP customers who will use their HP during the summer months for cooling.
				October-May	$0.05933	
Steady Use Rate	Con Edison	NY	$31.00	June-September	On-peak usage - $27.35 **per kW** Off-peak usage - $7.17 **per kW**	Demand charges are determined by: Averaging the three highest points of use during off peak and three highest points during peak times. Each average is then multiplied by the corresponding peak and off-peak rates. On-peak hours are 12 PM-8 PM M-F
				October-May	On-peak usage - $21.04 **per kW** Off-peak usage - $7.17 **per kW**	
Residential Home Heating Rate	PSEG LI	NY	Service Charge per day - $0.56	June-September	First 250 kWh - $0.1064 Next 150 kWh - $0.1348 Over 400 kWh - $0.1348	Inclining block in summer months, declining block in non-summer months.
				October-May	First 250 kWh - $0.1064 Next 150 kWh - $0.1064 Over 400 kWh - $0.0585	
Residential Geothermal & Heat Pump Rate	JCP&L	NJ	$8.07	June-September	On-peak usage - $0.060029 Off-peak usage - $0.028041	On-peak hours are 8 AM-8 PM M-F
				October-May	$0.033061	
Residential Heating Rate	PSE&G	NJ	$5.63	June-September	First 600 kWh - $0.087094 Excess of 600 kWh - $0.091994	This rate schedule is closed and is in the process of elimination.
				October-May	First 600 kWh - $0.044536 Excess of 600 kWh - $0.026936	

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Rate	Utility	State	Fixed Charge ($)	Season	Delivery Charge ($/kWh)	Notes
Residential Time-of-Day Heating Rate	RECO	NJ	$9.00	June-September	Peak: $0.09961 Off-Peak: $0.03006	On-Peak hours are 12 PM-8 PM M-F
				October-May	Peak: $0.05258 Off-Peak: $0.05258	
Residential Service Add-On Heat Pump Rate	Duquesne Power & Light	PA	$13.00	May-October	$0.082479	Effective January 1, 2025, Rate RA will no longer be available to new customers or applicants, or to new installations for existing customers.
				November-April	$0.034662	
Residential Heating Rate	PECO	PA	$11.29	June-September	$0.10208	
				October-May	$0.07855	
Dual Energy Rate	Hydro-Québec	Quebec	In most cases, $C0.46154 system access charge per day	Temperature based rather than time based	$C0.05131 when temperatures are **above** -12C or -15C depending on climate zone $C0.30001 when temperatures are **below** -12C or -15C depending on climate zone	Includes demand charge of $C7.266 per kilowatt of billing demand in excess of the base billing demand, generally greater than 50 kW. Note: -12C = 10.4F, -15C=5F

Source: Eversource, Electric Delivery Rates. (Eversource n.d.); National Grid, Heat Pump Rate (National Grid n.d.). Unitil Corporation, Heat Pump Rate (Unitil Corporation n.d.). Central Maine Power Company, Docket No. 2022-00152, Optional TOU Rate A-Seasonal Residential Service (Central Maine Power Company 2026). Versant Power, Home Heating Eco Rate (Docket 2025-00, ER20-2054-000) (Versant Power 2026). Con Edison (b), "Steady Use Rate (formerly the 'Select Pricing Plan')" (Con Edison (b) n.d.). Jersey Central Power and Light Company, Tariff for Service: Part III Service Classifications and Riders (Jersey Central Power and Light Company 2024). Duquesne Light Company, Docket No. M-2025-3059457, Distribution System Improvement Charge (DSIC) Quarterly Filing (Duquesne Light Company 2025). Xcel Energy (a) "Back-up Relief Program" (Xcel Energy (a) n.d.). Hydro-Quebec, Electric Rates 2026: Net Metering for Customer-Generators - Option I (Hydro-Québec 2026). BG&E, "Residential Delivery and Energy Time-of-Use-Electric Schedule RD" (BG&E 2024). PECO Energy Company, Electric Service Tariff (PECO Energy Company 2025). Rockland Electric Company, Schedule for Electric Service (Rockland Electric Company 2010). PSEG, Tariff for Electric Service (PSEG 2024).

Bibliography

Akhmetov, Timur, Valeriy Popov, and Daniyar Primbet. 2023. "Module III: Guidelines on Determining the Process for Allocating Costs Among Customer Classes." National Association of Regulatory Utility Commissioners. July. Accessed August 12, 2026. https://pubs.naruc.org/pub/EAEB019A-9F87-8CF2-D6C9-E531092D0C85.

Arcadia. n.d. Arcadia Power, Inc. Accessed May 27, 2026. https://www.arcadia.com/platform?utm_source=genability.

Ashford, Sylvie, and Mohit Chhabra. 2024. We're All in This Together: Progressive Rate Structures Can Balance Signals for Energy Efficiency, Electrification, and Load Flexibility. Summer Study, ACEEE. https://www.aceee.org/sites/default/files/proceedings/ssb24/assets/attachments/20240722163146031_b8271c02-a62c-4144-98ef-e6cc34fe8f48.pdf.

Attanasio, Leanne, Christina Cho, Yan Flishenbaum, Andrea Gopaulsingh, Elizabeth Hunter, Toby Hyde, and Maggie Tishman, interview by Northeast Energy Efficiency Partnerships. 2026. Consolidated Edison Company of New York (February 18).

Baatz, Brendon. 2017. Rate Design Matters: The Intersection of Residential Rate Design and Energy Efficiency. District of Columbia: American Council for an Energy-Efficient Economy.

Barbose, Galen, Peter Cappers, Will Gorman, Eric O'Shaughnessy, and Ryan Wiser. 2025. "Factors influencing recent trends in retail electricity prices in the United States." October 10. https://eta-publications.lbl.gov/sites/default/files/2025-10/full_summary_retail_price_trends_drivers.pdf.

Bernard, Louise, Andy Hackett, Robert Metcalfe, and Andrew R. Schein. 2025. Decarbonizing Heat: The Impact of Heat Pumps and a Time-of-Use Heat Pump Tariff on Energy Demand. Centre for Net Zero. https://cdn.sanity.io/files/lrxd4jqj/production/70c132aeeb97e9d127046b8f12f6277f9f84b68d.pdf.

Bertrand, Lindsay, Eric Cutter, Aryeh Gold-Parker, Arne Olson, Sierra Spencer, Vignesh Venugopal, and Karl Walter. 2023. "Rate Design for the Energy Transition: Getting the Most Out of Flexible Loads on a Changing Grid." Energy and Environmental Economics, E3. March. Accessed September 23, 2026. https://www.esig.energy/wp-content/uploads/2023/04/ESIG-Retail-Pricing-dynamic-rates-E3-wp-2023.pdf.

BG&E. 2024. "Residential Delivery and Energy Time-of-Use-Electric Schedule RD." Baltimore Gas & Electric Company. August 29. Accessed July 23, 2026. https://azure-na-assets.contentstack.com/v3/assets/blt71bfe6e8a1c2d265/bltd9617a8f40ce427f/P3_SCH_RD.pdf.

Bonbright, James C. 1961. "Principles of Public Utilities." Powell Goldstein. Accessed September 15, 2026. https://www.raponline.org/wp-content/uploads/2023/09/powellgoldstein-bonbright-principlesofpublicutilityrates-1960-10-10.pdf.

Booth, Kyle, George Chapman, Caitlyn Fosberg, Scott Honegger, and Claire Miziolek. 2024. "Heat Pumps in the Northeast and Mid-Atlantic: Costs and Market Trends." Northeast States for Coordinated Air Use Management. October 30. Accessed May 27, 2026. https://www.nescaum.org/documents/Heat-Pumps-in-the-Northeast-and-Mid-Atlantic---Costs-and-Market-Trends.pdf.

Borenstein, Severin, and James B. Bushnell. 2022. Do Two Electricity Pricing Wrongs Make a Right? Cost Recovery, Externalities, and Efficiency. American Economic Journal: Economic Policy, 14 (4): 80–110. https://www.aeaweb.org/articles?id=10.1257/pol.20190758.

Borenstein, Severin, and James B. Bushnell. 2021. Headwinds and Tailwinds: Implications of Inefficient Retail Energy Pricing for Energy Substitution. Cambridge, MA: National Bureau of Economic Research. https://www.nber.org/system/files/working_papers/w29118/w29118.pdf.

Borenstein, Sevrin. 2026. Locating the Electricity Affordability Crisis. January 26. https://energyathaas.wordpress.com/2026/01/26/locating-the-electricity-affordability-crisis/.

Bowen, Thomas, and Christina Simeone. 2025. Utility and Grid Operator Resources for Future Power Systems Webinar Series: Customer Rate and Tarriff Design. July 17. Accessed August 10, 2026. https://docs.nlr.gov/docs/fy25osti/95307.pdf.

Bradley-Wright, Forest, Brian Fadie, Archibald Fraser, Davie Ghosh, Mark Kresowik, Joanna Mauer, Paul Mooney, Stephanie Sosa-Kalter, Mike Specian, and Sagarika Subramanian. 2025. "2025 State Energy Efficiency Scorecard." American Council for an Energy-Efficient Economy. March 18. https://www.aceee.org/research-report/u2502.

Brinn, Jordan, and Mohit Chhabra. 2024. EVs Already Reduce Electricity Rates—and They Can Do Even More. September 9. https://www.nrdc.org/bio/jordan-brinn/evs-already-reduce-electricity-rates-and-they-can-do-even-more.

Brown, Abigail, Erin Cosgrove, and Luke Miller. 2025. "Modern Rate Design in the Northeast: Unlocking Efficiency, Affordability, and Electrification." December. Accessed May 18, 2026. https://neep.org/sites/default/files/media-files/neep_modern_rate_design.pdf.

CA PUC. 2024a. "CPUC Approves A New Billing Structure That Will Cut Residential Electricity Prices and Accelerate Electrification." California Public Utilities Commission. 9 May. Accessed June 9, 2026. https://www.cpuc.ca.gov/news-and-updates/all-news/cut-residential-electricity-prices.

CA PUC. 2024b. "Fixed charge Q&A." CA PUC Public Advocates Office. February 7. Accessed October 15, 2026.

CA State Legislature. 2022. "California Assembly Bill No. 205, CA AB205, Chapter 61." LegiScan. June 30. https://legiscan.com/CA/text/AB205/id/2600089.

Cappers, Peter, Andrew Satchwell, Max Dupuy, and Carl Linvill. 2021. The Distribution of U.S. Electric Utility Revenue Decoupling Rate Impacts from 2005 to 2017. Lawrence Berkley National Laboratory. https://eta-publications.lbl.gov/sites/default/files/electricutilitydecouplingmechanismsintheunitedstates_brief_final.pdf.

Caretto, Theo, Alexis Sutterman, Akhilesh Ramakrishnan, Sanem Sergici, and Sarah Moskowitz. 2024. Equitable & Affordable Rate Reform. February 29. https://buildingdecarb.org/wp-content/uploads/BDC-Presents-Rate-Reform.pdf.

Carvallo, Juan Pablo, and Lisa Schwartz. 2023. "The use of price-based demand response as a resource in electricity system planning." Lawrence Berkeley National Laboratory. November. Accessed October 9, 2026. https://eta-publications.lbl.gov/sites/default/files/price-based_dr_as_a_resource_in_electricity_system_planning_-_final_11082023.pdf.

Central Maine Power Company. 2026. Docket No. 2022-00152, Optional TOU Rate A-Seasonal Residential Service. February 1. https://www.cmpco.com/documents/d/cmp/a-seasonal.

Chen, Xing, Cameron Reaves, Ryan Shea, and Brett Webster. 2026. "The Opportunity for Heat Pumps to Put Downward Pressure on Electricity Rates." RMI. October 15. Accessed October 19, 2026. https://rmi.org/resources/the-opportunity-for-heat-pumps-to-put-downward-pressure-on-electricity-rates/#h-1-electric-grid-winter-headroom.

Chernick, Paul, Jim Lazar, Mark LeBel, and William Marcus. 2020. "Electric Cost Allocation For a New Era: A Manual." Regulatory Assistance Project. January. Accessed July 29, 2026. https://rapstaging.wpengine.com/wp-content/uploads/2020/01/rap-lazar-chernick-marcus-lebel-electric-cost-allocation-new-era-2020-january.pdf.

Chhabra, Mohit. 2025. Powering Change: Understanding California's Electric Rate Challenge and Affordability Solutions.

NRDC. https://www.nrdc.org/sites/default/files/2025-03/PGE_Rates_Report_R_25-03-A_03.pdf.

Christopher, Ben. 2024. “Californians will see lower electricity rates and a new fee that won’t vary with power use.” Cal Matters. May 9. Accessed June 9, 2026. https://calmatters.org/housing/2024/05/californians-electricity-rates/.

CMP. 2025. Docket No. 2022-00152 (Item No. 322) Final Report. Central Maine Power, 18-112. https://mpuc-cms.maine.gov/CQM.Public.WebUI/Common/CaseMaster.aspx?CaseNumber=2022-00152.

—. 2026a. Docket No. 2026-00011 and 2025-00139 Final Report. July 1. Accessed September 29, 2026. https://www.cmpco.com/documents/d/cmp/aelectech.

—. 2026b. “Docket No. 2026-00264 Request for Approval Regarding A-Electric Rate Termination Date Pertaining to Central Maine Power Company.” Central Maine Power. September 8. Accessed September 30, 2026. https://mpuc-cms.maine.gov/CQM.Public.WebUI/Common/CaseMaster.aspx?CaseNumber=2026-00264&FRM=0.

—. n.d. Electric Technology Rate. Accessed June 9, 2026. https://www.cmpco.com/w/new-electric-technology-rate.

Colorado General Assembly. 2025. “Colorado Revised Statute §40-3.2-110.” Revised Statute.

Commonwealth of Massachusetts. n.d. Energy Burden Inquiry, D.P.U. 24-15. Accessed October 8, 2026. https://www.mass.gov/info-details/energy-burden-inquiry.

—. 2025. “Residential electric seasonal heat pump rates.” Commonwealth of Massachusetts. October 31. Accessed June 9, 2026. https://www.mass.gov/info-details/residential-electric-seasonal-heat-pump-rates.

Commonwealth of Pennsylvania. n.d. “Title 52, Chapter 69, 52 Pa. Code § 69.265. CAP design elements.” Pennsylvania Code. Accessed May 19, 2026. https://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/052/chapter69/s69.265.html.

Con Edison (a). n.d. “Time-of-Use Rates.” Consolidated Edison Company of New York. Accessed July 23, 2026. https://www.coned.com/en/accounts-billing/your-bill/time-of-use.

Con Edison (b). n.d. “Steady Use Rate (formerly the ‘Select Pricing Plan’).” Consolidated Edison Company of New York, Inc. Accessed June 8, 2026. https://www.coned.com/en/accounts-billing/steady-use-rate.

Con Edison (c). n.d. “Market Supply Charge Calculator.” Consolidated Edison Company of New York. Accessed July 23, 2026. https://www.coned.com/en/accounts-billing/your-bill/rate-calculators/market-supply-charge.

Con Edison. 2025a. Case 22-E-0064. Case Proceeding, Albany: Consolidated Edison Company of New York. Inc.

—. 2025b. “Consolidated Edison Company of New York.” https://cdnc-dcxprod2-sitecore.azureedge.net/-/media/files/coned/documents/rates/electric/average-monthly-electric-bills.pdf?rev=5994c53353064d3e990fb8a8f7a4be09. Accessed July 23, 2026. https://cdnc-dcxprod2-sitecore.azureedge.net/-/media/files/coned/documents/rates/electric/average-monthly-electric-bills.pdf?rev=5994c53353064d3e990fb8a8f7a4be09.

—. 2026a. “Consolidated Edison Company of New York, Inc., Schedule for Gas Service.” Consolidated Edison Company of New York. February 1. Accessed July 30, 2026. https://cdnc-dcxprod2-sitecore.azureedge.net/-/media/files/coned/documents/rates/gas/schedule-for-gas-service.pdf?rev=5833e59b9759479f9dc53bf3370471a7&hash=A419903B30F8BBF6117CF9B5F0E57C33.

—. 2026b. “Rates Index.” Consolidated Edison Company of New York. February 1. Accessed July 30, 2026. https://cdne-dcxprod-sitecore.azureedge.net/-/media/files/coned/documents/rates/gas/allrates.

pdf?rev=3b0cc621f6ed4cc2899b001e290c965b&hash=3301CE533FF1B422A672C7FEEA00FDF2.

Craft, Josh, and Jeff Aslan. 2012. Revenue Decoupling in the Northeast. Northeast Energy Efficiency Partnerships. https://www.all4energy.org/wp-content/uploads/2024/07/revenue_decoupling_brief-final_version_1.30.12.pdf.

Dammel, Joe, Mike Henchen, and Amar Shah. 2024. Electric Rates Can Help or Hinder Heat Pump Progress. December 5. https://rmi.org/electric-rates-can-help-or-hinder-heat-pump-progress/.

Dawson, Austin, and Mike Giovanniello. 2025. Policy Fixed Charges and Heat Pump Rates. April 16. https://ma-eeac.org/wp-content/uploads/EEAC-Fixed-Charge-Heat-Pump-Rate-04162025-Dawson-Giovanniello-1.pdf.

Demand Side Analytics. 2026. Final Report: Findings from Central Maine Power's Customer Survey. January. Accessed October 8, 2026.

Donenfeld, June. 2023. Central Maine Power offers lower rates to encourage electrification. Accessed June 9, 2026. https://greenmainehomes.com/blog/central-maine-power-lower-rates-encourage-electrification.

DPU Consumer Information. n.d. Information on Winter Bills. Accessed September 29, 2026. https://www.mass.gov/info-details/information-on-winter-bills.

Driscoll, Kim, and Maura Healey. 2025. "Press Release: Reduced Heat Pump Electricity Rates Available for Households Across Massachusetts." November 4. Accessed June 8, 2026. https://www.mass.gov/news/reduced-heat-pump-electricity-rates-available-for-households-across-massachusetts.

Duquesne Light Company. 2025. Docket No. M-2025-3059457, Distribution System Improvement Charge (DSIC) Quarterly Filing. December 29. Accessed October 1, 2026. https://www.puc.pa.gov/docket/M-2025-3059457.

E3. 2024. "New CPUC Proposed Decision on an "Income-Graduated Fixed Charge" draws on E3's Publicly-Available Electric Rate Design Tool." Energy and Environmental Economics, Inc. (E3). May 28. Accessed June 9, 2026. https://www.ethree.com/cpuc-income-graduated-fixed-charge-electric-rate-design-tool/.

Eberle, Louise, and David Farnsworth. 2025. Education and Coordination: Heat Pump Adoption in the Northeast. January 23. https://www.raponline.org/blog/education-and-coordination-heat-pump-adoption-in-the-northeast/.

EMT. Technical Reference Manual. Efficiency Maine Trust. October 1, 2025. Accessed October 19, 2026. https://www.efficiencymaine.com/docs/EMT-TRM_Retail_Residential_v2026.2.pdf.

EMT. 2026. "Assessment of Heat Pumps in Maine Homes." Efficiency Maine. January. Accessed June 8, 2026. https://www.efficiencymaine.com/docs/Efficiency_Maine_Whole_Home_Heat_Pump_Study_2026.pdf.

—. 2024a. "Beneficial Electrification Plan for Maine: Fiscal Years 2026 – 2028, Appendix H-1." Efficiency Maine Trust. August 22. Accessed June 9, 2026. https://www.efficiencymaine.com/docs/TPVI_Appendix-H_Beneficial-Electrification-Plan.pdf.

—. 2025a. "Beneficial Electrification Planning Report." Efficiency Maine Trust. February 1. Accessed October 8, 2026. https://www.efficiencymaine.com/docs/EMT_Beneficial-Electrification_Planning_Report_01_2025.pdf.

—. 2024b. "Triennial Plan for Fiscal Years 2026-2028." Efficiency Maine Trust. November 5. Accessed June 8, 2026. https://www.efficiencymaine.com/docs/Triennial_Plan_VI_2024_11_5.pdf.

—. 2025b. "Whole Home Heat pump Rebate — 2025 Survey: Summary Results." Efficiency Maine Trust. November. Accessed May 27, 2026. https://www.efficiencymaine.com/docs/WHHP_Participant_Survey_Findings_2025.pdf.

Energy Star. n.d. “Furnaces Key Product Criteria.” U.S. Environmental Protection Agency. Accessed June 8, 2026. https://www.energystar.gov/products/furnaces/key_product_criteria.

Eversource. n.d. Electric Delivery Rates. Accessed October 1, 2026. https://www.eversource.com/residential/account-billing/manage-bill/about-your-bill/rates-tariffs/electric-delivery-rates.

Executive Office of Energy and Environmental Affairs. 2025. Residential Electric Seasonal Heat Pump Rates. October 31. https://www.mass.gov/info-details/residential-electric-seasonal-heat-pump-rates.

Faraon Chaul Corona, Poullette, and Peter Fraser. 2024. “Elevating the Priority of Decarbonization in Energy Regulators’ Decision Making.” Regulatory Assistance Project. Accessed June 9, 2026. https://www.raponline.org/wp-content/uploads/2024/03/RAP-RETA-Hernandez-Fraser-Elevating-the-Priority-of-Decarbonization-in-Energy-Regulators-Decision-Making-Mar-2024.pdf.

Gabriel, Noah. 2023. “Fuel Oil and Propane Space Heating Across the United States.” Atlas Buildings Hub. April 3. Accessed September 30, 2026. https://atlasbuildingshub.com/2023/04/03/fuel-oil-and-propane-space-heating-across-the-united-states/.

Gold, Rachel, and Jessica Shipley. 2020. With the Shift toward Electrification, Decoupling Remains Key for Driving Decarbonization. August 17. https://www.aceee.org/blog-post/2020/08/shift-toward-electrification-decoupling-remains-key-driving-decarbonization.

Gold, Rachel, Corri Waters, and Dan York. 2020. “Leveraging Advanced Metering Infrastructure.” American Council for an Energy-Efficient Economy. January 27. Accessed August 12, 2026. https://www.aceee.org/sites/default/files/publications/researchreports/u2001.pdf.

Gold-Parker, Aryeh, Vivan Malkani, and Paul Picciano. 2026. “The Winter of Our Discontent – The Promise and Perils of Seasonal Heat Pump Rates.” American Council for an Energy-Efficient Economy. Accessed October 19, 2026. https://www.aceee.org/proceedings/the-winter-of-our-discontent-the-promise-and-perils-of-seasonal-heat-pump-rates/.

Gouvernement du Québec. 2026. Québec’s commitments in respect of the climate. February 10. Accessed October 8, 2026. https://www.quebec.ca/en/government/policies-orientations/plan-green-economy/understand-climate-change/quebec-commitments.

Grant, Peter, Marius Stübs, Bruce Nordman, and Christoph Gehbauer. 2023. Stabilizing the Grid and Reducing Utility Bills Through Price-Responsive Controls for Heat Pump Water Heaters. Berkeley, CA: Lawrence Berkeley National Laboratory. https://eta-publications.lbl.gov/sites/default/files/stabilizing_the_grid_and_reducing_utility_bills_0.pdf.

Harvey, William, interview by Northeast Energy Efficiency Partnerships. 2026. Senior Consultant, Dunsky Energy and Climate Advisors (March 3).

Hydro Québec. (a). n.d. LogisVert Program: Financial assistance for residential customers. Accessed June 9, 2026. https://www.hydroquebec.com/residential/energy-wise/financial-assistance/logisvert/residential.html.

—. (b). n.d. Rate DT – Dual Energy for residential and agricultural customers. Accessed June 9, 2026. https://www.hydroquebec.com/residential/customer-space/rates/rate-dt.html.

Hydro-Québec. 2026. Electric Rates 2026: Net Metering for Customer-Generators - Option I. April 1. Accessed October 1, 2026. https://www.hydroquebec.com/data/documents-donnees/pdf/electricity-rates.pdf#page=25?v=HT-2025-v2.

ISO NE. n.d. “New England’s Electricity Use.” ISO New England. Accessed May 27, 2026. https://www.iso-ne.com/about/

key-stats/electricity-use.

Jacobson, Dan. 2025. "National Grid Crosses One Millionth Meter Mark." Landis+Gyr. September 26. Accessed August 12, 2026. https://www.landisgyr.com/nam/en/home/knowledge/blog/2025/National-Grid-Crosses-One-Millionth-Meter-Mark.

Jaiswal, Vivek, Jennifer McWilliams, and Dave Lis. 2024. "Residential Heat Pump Efficiency Rating Representativeness Project: Phase Two." Northeast Energy Efficiency Partnerships. November 25. Accessed July 23, 2026. https://neep.org/sites/default/files/media-files/neep_heatpump_rating_representativeness_study-phase2_final.pdf.

Jersey Central Power and Light Company. 2024. Tariff for Service: Part III Service Classifications and Riders. May 28. Accessed October 1, 2026. https://www.firstenergycorp.com/content/dam/customer/Customer%20Choice/Files/New%20Jersey/tariffs/BPU-14-Part-III-Eff-12-1-2025.pdf.

Kresowik, Mark. 2024. New Electricity Rates Are Needed to Support Equitable Heat Pump Adoption. July 11. https://www.aceee.org/blog-post/2024/07/new-electricity-rates-are-needed-support-equitable-heat-pump-adoption.

Landsman, Jared. 2025. Considerations for Hybrid Heating Program & Rate Design in MN. May 27. https://mn.gov/puc-stat/documents/pdf_files/E3%20Presentation%205-27-25%20-%20Considerations%20for%20Hybrid%20Heating%20Program%20%26%20Rate%20Design.pdf.

Lazar, Jim. 2016. "Use Great Caution in Design of Residential Demand Charge." Regulatory Assistance Project. February. Accessed October 9, 2026. https://www.raponline.org/wp-content/uploads/2023/09/lazar-demandcharges-ngejournal-2015-dec.pdf.

LeBel, Mark. 2026. Modern Rate Design: Affordability, Efficiency, & Electrification. January 27. Accessed August 10, 2026. https://neep.org/event/ready-set-scale-neep-webinar-series-11.

LeBel, Mark, and Frederick Weston. 2020. "Demand Charges: What Are They Good For? An Examination of Cost Causation." Regulatory Assistance Project. November. Accessed July 23, 2026. https://www.raponline.org/wp-content/uploads/2023/09/rap-lebel-weston-sandoval-demand-charges-what-are-they-good-for-2020-november.pdf.

Lee, Alex Hyunmin, Max Shron, Alex Smith, Juan-Pablo Velez, and Sherry Zuo. 2026. "Heat Pump Rates in New York State." Switchbox. April 28. Accessed July 17, 2026. https://www.switch.box/nyhprates.

Levine, Alexandra, interview by Northeast Energy Efficiency Partnerships. 2026. Strategy Manager, Consolidated Edison Company of New York (May 5).

Levine, Alexandra, interview by Northeast Energy Efficiency Partnerships. 2026b. Strategy Manager, Consolidated Edison Company of New York (August 27).

LIHEAP. n.d. "Massachusetts Ratepayer Funded Programs." Low Income Home Energy Assistance Program. Accessed July 17, 2026. https://liheapch.acf.gov/dereg/states/masnapshot.htm.

Long Island Power Authority. 2026. Tariff for Electric Service. January 1. Accessed October 1, 2026. https://www.lipower.org/wp-content/uploads/2026/01/LIPA-Tariff-January-2026.pdf.

—. n.d. Time-of-Day Rates. Accessed August 11, 2026. https://www.lipower.org/time-of-day/.

Luoma, Jeff, Jon Koliner, Justin Margolies, and Sophia Seol. 2025. Northeast High-Performance HVAC Market Assessment Report. Northeast Energy Efficiency Partnerships. https://neep.org/sites/default/files/media-files/neep_ne_high_performance_hvac_market_assessment_final__0.pdf.

Luzerne Electric Division. 1963. “Electric Rates Reduced Again.” The Dallas Post. Dallas, Texas: Pennsylvania Newspaper Archive, September 12. Section B — Page 5.

MA DOER. 2026b. “2026 Town Hall Questions and Answers.” Massachusetts Department of Energy Resources. Accessed October 7, 2026. https://www.mass.gov/doc/2026-doer-town-hall-qa/download.

—. 2025a. “Decoupling & Capital Recovery Expert Presentation Series.” Massachusetts Department of Energy Resources. October 22. https://www.mass.gov/doc/topic-4-decoupling-and-capital-recovery-expert-presentations/download.

—. 2025d. “Interagency Rates Working Group.” Massachusetts Department of Energy Resources. October 19. Accessed May 18, 2026. https://www.mass.gov/info-details/interagency-rates-working-group.

—. 2025b. “Ratemaking Straw Proposal: Massachusetts Electric Rate Task Force (Task Force).” Massachusetts Department of Energy Resources. November 24. Accessed June 8, 2026. https://www.mass.gov/doc/rate-task-force-ratemaking-straw-proposal/download.

—. 2026a. “Time-of-Use Rate Proposal: Prepared for DOER’s Petition for an Investigation into Time-Varying Rates.” Massachusetts Department of Energy Resources. April. Accessed July 23, 2026. https://www.mass.gov/doc/doers-time-of-use-rate-proposal/download.

—. 2025c. “Tools of Utility Regulation.” Massachusetts Department of Energy Resources. September 17. Accessed June 8, 2026. https://www.mass.gov/doc/topic-2-tools-of-cost-of-service-regulation-targeted-conversation/download.

MA DPU. 2024c. “D.P.U. 23-80 and 23-81, Residential Heat Pump Service and Low-Income Residential Heat Pump Service Tariff.” Massachusetts Department of Public Utilities. June 28. Accessed October 7, 2026. https://d3i1pf1zzeh4ol.cloudfront.net/251e52c2-e3f1-4b06-a22a-f1a1f5b77b2a.pdf.

—. 2026b. “D.P.U. 25-08-A.” Massachusetts Department of Public Utilities. June 1. Accessed September 24, 2026. https://d3i1pf1zzeh4ol.cloudfront.net/1bd60b62-2a4c-40f9-8867-878e52831f46.pdf.

—. 2026e. D.P.U. 26-62, Petition of the Massachusetts Department of Energy Resources Requesting that the DPU Open an Investigation into Time Varying Rates. April 8. Accessed October 8, 2026. https://www.mass.gov/doc/doer-tvr-rates-petition/download.

—. 2024a. “D.P.U. Docket 23-150.” MA Energy Efficiency Advisory Council. Accessed June 8, 2026. https://eeaonline.eea.state.ma.us/dpu/fileroom/#/dockets/docket/11094.

—. 2024b. “D.P.U. Docket 23-80.” Massachusetts Executive Office of Energy and Environmental Affairs. Accessed June 8, 2026. https://eeaonline.eea.state.ma.us/dpu/fileroom/#/dockets/docket/11052.

—. 2025e. “D.P.U. Docket 24-140 through 24-149.” MA Energy Efficiency Advisory Council. February 28. Accessed June 8, 2026. https://ma-eeac.org/wp-content/uploads/DPU-24-140-through-DPU-24-149-2025-2027-Three-Year-Plans-Order-FINAL-2.28.25.pdf.

—. 2026a. D.P.U. Docket 24-15. February 17. Accessed September 15, 2026. https://www.mass.gov/info-details/energy-burden-inquiry.

MA DPU. 2025a. D.P.U. Docket 25-08. Massachusetts Department of Public Utilities.

—. 2025c. “D.P.U. Docket 25-08: Inquiry into a Seasonal Heat-Pump Rate.” MA Executive Office of Energy and Environmental Affairs. June 2. Accessed June 8, 2026. https://eeaonline.eea.state.ma.us/dpu/fileroom/#/dockets/docket/11542.

MA DPU. 2025b. D.P.U. Docket No. 25-55, Petition of Nstar Electric Company, D/B/A Eversource Energy for Approval of Residential Seasonal Heat Pump Rates. Massachusetts Executive Office of Energy and Environmental Affairs.

—. 2026d. "D.P.U. Docket No. 26-71: National Grid Residential Seasonal Heat Pump Rate Compliance Filing." MA Department of Public Utilities. June 15. Accessed September 30, 2026. https://eeaonline.eea.state.ma.us/dpu/fileroom/#/dockets/docket/13011.

—. 2026f. "D.P.U. Docket No. 26-72: Fitchburg Gas and Electric Light Company d/b/a Unitil Residential Seasonal Heat Pump Rate Compliance Filing." MA Department of Public Utilities. June 15. Accessed September 30, 2026. https://eeaonline.eea.state.ma.us/dpu/fileroom/#/dockets/docket/13017.

—. 2023. "D.P.U. Dockets 23-150." November 16. Accessed August 12, 2026. https://eeaonline.eea.state.ma.us/dpu/fileroom/#/dockets/docket/11094.

—. 2026c. D.P.U. Dockets 26-62. April 8. Accessed September 29, 2026. https://eeaonline.eea.state.ma.us/dpu/fileroom/#/dockets/docket/12951.

—. 2025f. "MA D.P.U 25-08, Petition of Massachusetts Department of Energy Resources for Requesting the Department of Public Utilities Open and Investigation into a Seasonal Heat Pump Rate." Massachusetts Department of Energy Resources. January 31. Accessed October 7, 2026.

—. 2025g. "MA D.P.U. 25-08, Vote and Order Opening Inquiry by Chair Van Nostrand, Commissioner Fraser, and Commissioner Rubin." Massachusetts Department of Public Utilities. March 21. Accessed October 7, 2026.

—. 2025d. "Petition of NSTAR Electric Company d/b/a Eversource Energy Seeking Approval to Offer Seasonal Heat Pump Rates." MA Energy Efficiency Advisory Council. April 17. Accessed June 8, 2026.

MA EEAC. n.d. "Three-Year Electric & Gas Energy Efficiency Plans." MA Energy Efficiency Advisory Council. Accessed June 8, 2026. https://ma-eeac.org/plans-updates/.

MA IRWG. 2025. "Long-Term Ratemaking Recommendations: Accompanying Recommendations to Long-Term Ratemaking." Massachusetts Interagency Rates Working Group. March. Accessed June 8, 2026. https://www.mass.gov/doc/irwg-long-term-ratemaking-recommendations/download.

—. 2024. "Near-Term Rate Strategy Recommendations: Accompanying Recommendations to Near-Term Rate Strategy Report." MA Interagency Rates Working Group. December. Accessed June 8, 2026. https://www.mass.gov/doc/irwg-near-term-rate-strategy-recommendations/download.

MA State Legislature. 2021. "An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy." Massachusetts State Legislature. March 26. Accessed September 6, 2026. https://malegislature.gov/bills/192/S9.

Maine State Legislature. 2023. "35-A §38: Beneficial Electrification Policy Act." Accessed June 9, 2026. https://legislature.maine.gov/statutes/35-a/title35-Asec3801.html.

—. 2026. 35-A, M.R.S. §10102 Efficiency Maine Trust Act. Accessed October 8, 2026. https://legislature.maine.gov/statutes/35-A/title35-Asec10102.html.

—. 2022. "Case 2021-00198, Procedural Order, Item No. 43." Maine Public Utilities Commission. February 15. https://mpuc-cms.maine.gov/CQM.Public.WebUI/MatterManagement/MatterFilingItem.aspx?FilingSeq=113826&CaseNumber=2021-00198.

—. 2021b. P.L. 2021, ch. 244 §2. Accessed June 9, 2026. https://lldc.mainelegislature.org/Open/Laws/2021/2021_PL_c244.pdf.

—. 2021a. P.L. 2021, ch. 298 §7, An Act To Reduce Electricity Costs through Nonwires Alternatives. Accessed June 9, 2026. https://legislature.maine.gov/legis/bills/bills_129th/chapters/PUBLIC298.asp.

—. 2019a. S.P. 0597, L.D. 1766, An Act To Transform Maine's Heat Pump Market To Advance Economic Security and Climate Objectives. June 14. Accessed October 8, 2026. https://www.mainelegislature.org/legis/bills/bills_129th/billtexts/SP059701.asp.

—. 2019b. S.P. 550, L.D. 1679, Chapter 476 An Act to Promote Clean Energy Jobs and to Establish the Maine Climate Council. June 7. Accessed October 8, 2026. https://legislature.maine.gov/legis/bills/bills_129th/chappdfs/PUBLIC476.pdf.

Malinowski, Matt, Reuven Sussman, Paul Mooney, and Grace Lewallen. 2025. Electricity Rates That Keep Bills Down after Electrification of Home Heating. Washington, D.C.: ACEEE. https://www.aceee.org/sites/default/files/pdfs/b2502.pdf.

Malinowski, Matt, Vivian Cox, David Farnsworth, Max Dupuy, Jessica Shipley, Raphael Breit, and Mark LeBel. 2023. Accelerating Heat Pump Adoption Through the Inflation Reduction Act (IRA) and Complementary Policies. CLASP and Regulatory Assistance Project (RAP). https://www.raponline.org/wp-content/uploads/2024/01/rap-clasp-accelerating-heat-pump-adoption-through-IRA-and-complementary-policies-2023-december.pdf.

Malkani, Vivan, Andrew DeBenedictis, Ari Gold-Parker, Paul Picciano, Brendan Mahoney, Morgan Santoni-Colvin, Dyami Andrews, Disha Trivedi, and Troy Clark. 2024. Near-Term Rate Design to Align with the Commonwealth's Decarbonization Goals. Cambridge, MA: Energy and Environmental Economics, Inc. (E3). https://www.mass.gov/doc/irwg-near-term-rate-strategy-report-e3/download.

Maryland General Assembly. 2022. "SB0528, Chapter 38, Climate Solutions Now Act of 2022." June 1. Accessed September 9, 2026. https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/sb0528?ys=2022RS.

Mass Save. 2025. "The Massachusetts 2025-2027 Energy Efficiency and Decarbonization Plan: Executive Summary." Massachusetts Energy Efficiency Advisory Council. April 30. Accessed June 9, 2026. https://ma-eeac.org/wp-content/uploads/Executive-Summary-to-the-2025-2027-Plan-Revised-4-30-255380676.pdf.

Mass Save. Mass Save Technical Reference Manual: 2025 – 2027 Three-Year Plan Version. Mass Save. October 31, 2024. Accessed October 19, 2026.

McKenna, Claire, Amar Shah, and Mark Silberg. 2020. "It's Time to Incentivize Residential Heat Pumps." RMI. June 8. Accessed July 17, 2026. https://rmi.org/resources/its-time-to-incentivize-residential-heat-pumps/.

MD PSC. 2025. "DRIVE Act Implementation." Case No. 9761. Maryland Public Service Commission.

—. 2017. "In the Matter of transforming Maryland's electric distribution systems to ensure that electric service is customer-centered, affordable, reliable, and environmentally sustainable in Maryland." Public Conference 44, Notice - Item No. 64. Baltimore: Maryland Public Service Commission, January 31.

Midgen-Ostrander, Janine, and Richard Sedano. 2016. "Decoupling Design: Customizing Revenue Regulation to Your State's Priorities." Regulatory Assistance Project. November 7. Accessed September 24, 2026. https://www.raponline.org/knowledge-center/decoupling-design-customizing-revenue-regulation-state-priorities/.

Miller, Luke. 2025. "New Mass Save Plan Aims to Reach More Low-Income Customers and Renters and Simplify the Customer Experience." Northeast Energy Efficiency Partnerships. March 31. Accessed October 6, 2026. https://neep.org/blog/new-mass-save-plan-aims-reach-more-low-income-customers-and-renters-and-simplify-customer.

MNCEE. 2023. “Developing Electric Rates for Hybrid Air Source Heat Pumps in the Midwest.” Center for Energy and Environment. April. Accessed May 27, 2026. https://www.mncee.org/sites/default/files/report-files/Developing%20Electric%20Rates%20For%20Hybrid%20Air%20Source%20Heat%20Pumps%20In%20The%20Midwest.pdf.

Moore, Wes. 2025. Building an Affordable and Reliable Energy Future, Executive Order 01.01.2025.27. Executive Order, State of Maryland Executive Department.

Morgan, Pamela. 2012. A Decade of Decoupling for US Energy Utilities: Rate Impacts, Designs, and Observations. Graceful Systems LLC. https://www.aceee.org/files/pdf/collaborative-reports/decade-of-decoupling.pdf.

MPUC. 2021. Case Number: 2021-00325. October 4. Accessed June 9, 2026. https://mpuc-cms.maine.gov/CQM.Public.WebUI/Common/CaseMaster.aspx?CaseNumber=2021-00325&FRM=0.

—. 2026. “Case Number: 2026-00248, Request For Approval Of A-Seasonal Heat Pump Rate (10/1/26) Pertaining to Central Maine Power Company.” Maine Public Utilities Commission. August 25. Accessed September 30, 2026. https://mpuc-cms.maine.gov/CQM.Public.WebUI/Common/CaseMaster.aspx?CaseNumber=2026-00248&FRM=0.

—. 2024. “Commission Initiated Inquiry of Time of Use Rates for Delivery and Standard Offer.” Maine Public Utilities Commission. August 19. Accessed September 24, 2026. https://mpuc-cms.maine.gov/CQM.public.webUI/Common/CaseMaster.aspx?CaseNumber=2024-00231.

Murray, Bryan, and Juan-Pablo Velez. 2025. Heat Pump Rates in Massachusetts. Switchbox.

Mustacich, Peter. 2025. Bill Impacts of Home Electrification. February. Accessed January 26, 2026. https://svcleanenergy.org/wp-content/uploads/Bill-Impacts-of-Home-Electrification-Feb-2025.pdf.

National Grid. n.d. Heat Pump Rate. Accessed October 1, 2026. https://www.nationalgridus.com/MA-Home/Rates/Heat-Pump-Rate.

National Weather Service. n.d. NWS Climate. Accessed July 23, 2026. https://www.weather.gov/wrh/climate.

NEEP. 2023. “Cold Climate Air Source Heat Pump Specification (Version 4.0).” Northeast Energy Efficiency Partnerships. January 1. Accessed July 23, 2026. https://neep.org/sites/default/files/media-files/cold_climate_air_source_heat_pump_specification_-_version_4.0_final_1.pdf.

—. 2022. “Northeast/Mid-Atlantic Heating Electrification Market Transformation Progress Report.” Northeast Energy Efficiency Partnership. September. Accessed May 27, 2026. https://neep.org/sites/default/files/media-files/2022_market_transformation_progress_report.pdf.

NHSaves. Technical Reference Manual for Estimating Savings from Energy Efficiency Measures, 2021 Program Year. NH Saves. Accessed October 19, 2026. https://www.energy.nh.gov/sites/g/files/ehbemt551/files/inline-documents/sonh/eers-committee-2021-2023-draft-plan-att-a-july.pdf.

NEHPA. 2026. New England Heat Pump Accelerator. Accessed September 22, 2026. https://www.nehpa.org/about.

NYISO. n.d. “NYISO Control Area Load Zones.” New York Independent System Operator. Accessed July 23, 2026. https://www.nyiso.com/documents/20142/1397960/nyca_zonemaps.pdf.

—. 2025. “Power Trends: The New York ISO Annual Grid and Markets Report.” New York Independent System Operator, Inc. Accessed May 27, 2026. https://www.nyiso.com/documents/20142/2223020/2025-Power-Trends.pdf.

NYS DPS. 2026. Case 19-E-006, Order Adopting Terms of Joint Proposal and Establishing Electric Rate Plan.

June 1. Accessed July 23, 2026. https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?Mattercaseno=19-E-0065.

—. n.d. Grid of the Future Proceeding 24-E-0165. Accessed August 10, 2026. https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=24-e-0165.

—. 2025. "Order Authorizing Non-Low- to Moderate-Income Energy Efficiency and Building Electrification Portfolios for 2026-2030." New York State Department of Public Service. May 5. Accessed June 8, 2026. https://documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=361544&MatterSeq=55825.

NYS PSC. 2016. Order Adopting a Ratemaking and Utility Revenue Model Policy Framework, Filing 748. May 19. Accessed June 9, 2026. https://documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=160469&MatterSeq=44991.

NYS PSC. 2022. Order Approving Expansion of the Innovative Pricing Pilot and Tariff Amendments with Modification. Tariff Filing, State of New York Public Service Commission.

NYSERDA. 2019. New Efficiency: New York Analysis of Residential Heat Pump Potential and Economics. Albany, NY: NYSERDA.

PECO Energy Company. 2025. Electric Service Tariff. December 29. Accessed October 1, 2026. https://www.peco.com/cdn/assets/v3/assets/blt1b5616c79bacadb4/blt9448ea371fcf175a/695440103369913565ea1e0f/Current_Electric_Tariff_effective_January_1_2026.pdf?branch=prod_alias.

Plummer, Dylan. 2025. "Progressive Rate Reform: A Critical Tool for a Just Transition for Homes and Buildings Off of Fossil Fuels." Sierra Club. January 15. https://www.sierraclub.org/articles/2025/01/progressive-rate-reform-critical-tool-just-transition-homes-and-buildings-fossil.

PSEG Long Island. n.d. New Standard Residential Electric Rate. https://psegli.myenergysites.com/new-standard-residential-electric-rate-march-2025/.

PSEG. 2024. "Tariff for Electric Service." Public Service Electric and Gas Company. October 10. Accessed October 1, 2026. https://nj.pseg.com/-/media/pseg/public-site/documents/current-electric-tariff/electric-tariff-17-ecip-zec-effective-20260201.ashx.

Reardon, Kiera, interview by Northeast Energy Efficiency Partnerships. 2026. Senior Regulatory Analyst, Maine Department of Energy Resources (February 24).

ResStock. n.d. "Highly Granular Modeling of the U.S. Housing Stock ." National Laboratory of the Rockies. Accessed May 27, 2026. https://resstock.nlr.gov/.

Reynolds, Meera, interview by Northeast Energy Efficiency Partnerships. 2026. Economist, Massachusetts Department of Public Utilities (February 12).

RMI. 2025. "Low-Income Discount Rates." Electricity Affordability Toolkit. September 23. Accessed July 22, 2026. https://affordability-toolkit.rmi.org/policies/low-income-discount-rates.

—. 2026. Tracking the Heat Pump & Water Heater Market in the United States. May. Accessed July 17, 2026. https://rmi.org/resources/tracking-the-heat-pump-water-heater-market-in-the-united-states/#tab-trailing-monthly-data.

Rockland Electric Company. 2010. Schedule for Electric Service. May 17. Accessed October 1, 2026. https://cdne-dcxprod-sitecore.azureedge.net/-/media/files/oru/documents/rates/new-jersey/schedule-for-electric-service.pdf?rev=9c31fff4f05a40a687efc28f334e75f3&hash=0773AC55292094AF81619BE54753B89A.

Sergici, Sanem, Ahmad Faruqui, Nicholas Powers, Sai Shetty, and Jiang Jingcheng. 2020. "PC44 Time of Use Pilots: Year One Evaluation." https://www.brattle.com/wp-content/uploads/2021/05/19973_pc44_time_of_use_pilots_-_year_one_evaluation.pdf.

Sergici, Sanem, Akhilesh Ramakrishnan, Goksin Kavlak, Adam Bigelow, and Megan Diehl. 2023. "Heat Pump–Friendly Cost-Based Rate Designs." Reston, VA. https://www.esig.energy/wp-content/uploads/2023/10/Heat-Pump%E2%80%93Friendly-Cost-Based-Rate-Designs.pdf.

Shafiee, Roxana, and Daniel Schrag. 2024. Opportunities for Cost-Effective Residential Heat Pump Adoption in Massachusetts. Cambridge, MA: Harvard Kennedy School Belfer Center for Science and International Affairs. https://www.belfercenter.org/research-analysis/opportunities-cost-effective-residential-heat-pump-adoption-massachusetts.

Shea, Ryan, Joe Dammel, and Francie Fink. 2025. It's Time to Stop Overcharging Heat Pump Customers. Electrified Heating Rates Can Help. February 13. https://rmi.org/its-time-to-stop-overcharging-heat-pump-customers-electrified-heating-rates-can-help/.

Shemkus, Sarah. 2026. "Massachusetts ups winter energy discounts for homes with heat pumps." Canary Media. September 17. Accessed October 8, 2026. https://www.canarymedia.com/articles/heat-pumps/massachusetts-increase-winter-heat-pump-rates.

Sherrill, Mikie. 2026. Executive Order No. 1. Executive Order, New Jersey Office of the Governor. Accessed July 17, 2026. https://www.nj.gov/infobank/eo/057sherrill/pdf/EO-1.pdf.

Smith, Alex, and Juan-Pablo Velez. 2025. Tiered Discount Rates in Massachusetts. Switchbox. https://www.switch.box/ma/tdr.

Statistics Canada. 2025. Primary heating systems and type of energy. September 22. Accessed June 9, 2026. https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=3810028601.

—. 2023. The heat is on: How Canadians heat their home during the winter. January 13. Accessed January 13, 2023. https://www.statcan.gc.ca/o1/en/plus/2717-heat-how-canadians-heat-their-home-during-winter.

Tan, Lacey, and Jack Teener. 2023. "Now Is the Time to Go All in on Heat Pumps." RMI. July 6. Accessed May 27, 2026. https://rmi.org/now-is-the-time-to-go-all-in-on-heat-pumps/.

Toby, Yogev. 2025. Heat pump owners to get a break on electric rates to lower winter costs. August 1. https://www.bostonglobe.com/2025/08/01/business/heat-pumps-department-of-public-utilities-climate-mass-save-eversource-national-grip/.

U.S. DOE (a). n.d. "Heat Pump Systems." U.S. Department of Energy. Accessed June 8, 2026. https://www.energy.gov/energysaver/heat-pump-systems.

U.S. DOE (b). n.d. "Weatherization Assistance Program." U.S. Department of Energy. Accessed May 27, 2026. https://www.energy.gov/cmei/scep/wap/weatherization-assistance-program.

U.S. EIA (a). n.d. "Natural Gas Prices." U.S. Energy Information Administration. Accessed May 27, 2026. https://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PRS_DMcf_m.htm.

U.S. EIA (b). n.d. "Petroleum & Other Liquids." U.S. Energy Information Administration. Accessed May 27, 2026. https://www.eia.gov/dnav/pet/pet_pri_wfr_dcus_nus_w.htm.

U.S. EIA. 2025. "Electricity use is becoming more common for residential heating." U.S. Energy Information Administration. October 10. Accessed May 27, 2026. https://www.eia.gov/todayinenergy/detail.php?id=66324#.

—. n.d. “Residential Energy Consumption Survey (RECS).” U.S. Energy Information Administration. Accessed June 8, 2026. https://www.eia.gov/consumption/residential/.

—. 2023. “Table HC1.7 Fuels used and end uses in homes in the Northeast and Midwest regions, 2020.” U.S. Energy Information Administration. March. Accessed September 30, 2026. https://www.eia.gov/consumption/residential/data/2020/hc/pdf/HC%201.7.pdf.

Unitil Corporation. n.d. Heat Pump Rate. Accessed October 1, 2026. https://unitil.com/ma-heat-pump-rate.

van Benthem, Arthur, Andrew Hinchberger, Christopher Knittel, Mark Jacobsen, and James Sallee. 2024. How Can We Improve the Efficiency of Electricity Pricing Systems? Kleinman Center for Energy Policy, Philadelphia, PA: University of Pennsylvania. https://kleinmanenergy.upenn.edu/wp-content/uploads/2024/07/KCEP-Digest-64-How-Can-We-Improve-the-Efficiency-of-Electricity-Pricing-Systems-1.pdf.

Velez, Juan-Pablo. 2025. “D.P.U. Docket 25-08, Switchbox Public Comment Letter and Memo.” Massachusetts Department of Public Utilities. June 2. Accessed October 6, 2026. https://fileservice.eea.comacloud.net/V3.1.0/FileService.Api/file//aedcecbae?vwHHYDwjesrgyy66lBFF910HnvCcz/sZ6N5VHqqZ7niPcSxI+blU344Khxm+qpOeg0hKFj9M9l/xQR8+/8GqPvdGgrFe6XR6ngIfa80wd3rxFD8G4j981M2Rna9aVTXA.

—. 2026. “Rhode Island Public Utilities Commission Docket No. 25-45-GE, Pre-filed Direct Testimony of Juan-Pablo Velez.” Conservation Law Foundation. April 16. Accessed August 3, 2026. https://ripuc.ri.gov/sites/g/files/xkgbur841/files/2026-04/JPV%20Witness%20Testimony%20FINAL-_0.pdf.

Versant Power. 2026. Home Heating Eco Rate (Docket 2026-0082, 2026-00149). July 1. Accessed June 9, 2026. https://www.versantpower.com/docs/default-source/rates/july-1-2026/rate_a20_resheatd16e483ea89a452db2e8e0709a9124ad.pdf?sfvrsn=99f40dbe_2.

Vilbert, Michael J., Joseph B. Wharton, Charles Gibbons, Melanie Rosenberg, and Yang Wei Neo. 2014. The Impact of Revenue Decoupling on the Cost of Capital for Electric Utilities: An Empirical Investigation. The Brattle Group. https://www.brattle.com/wp-content/uploads/2017/10/6081_effect_of_electric_decoupling_on_the_cost_of_capital.pdf.

Walton, Robert. 2024. “California PUC OKs $24/month fixed charge for IOUs with eye to equity, electrification.” Utility Drive. May 10. Accessed June 9, 2026. https://www.utilitydive.com/news/california-puc-approves-income-based-fixed-charge/715748/.

Wasser, Miriam. 2026. “People with heat pumps get a break on electric bills from new Mass. program.” WBUR. April 21. Accessed October 8, 2026. https://www.wbur.org/news/2026/04/21/massachusetts-seasonal-heat-pump-rate-discout-energy-affordability.

Whited, Melissa, Tim Woolf, and Joseph Daniel. 2016. Caught in A Fix the Problem with Fixed Charges for Electricity. Cambridge, MA: Synapse Energy Economics, Inc. https://www.synapse-energy.com/sites/default/files/Caught-in-a-Fix.pdf.

Wilson, Eric J.H., Prateek Munankarmi, Brennan D. Less, Janet L. Reyna, and Stacey Rothgeb. 2024. Heat pumps for all? Distributions of the costs and benefits of residential air-source heat pumps in the United States. Lawrence Berkley National Laboratory and National Renewable Energy Laboratory, Elsevier, Inc. https://www.osti.gov/biblio/2405069.

Xcel Energy (a). n.d. “Back-up Relief Program.” Xcel Energy. Accessed September 24, 2026. https://mn.my.xcelenergy.com/s/residential/heating-cooling/back-up-relief-program.

Xcel Energy (b). n.d. Residential Rates: Time of Use (TOU). Accessed July 23, 2026. https://co.my.xcelenergy.com/s/billing-payment/residential-rates/time-of-use-pricing.







