Clean Heating Pathways

Acadia Center

The Costs of Fossil Fuel Heating and the Benefits of Heat Pumps

About 80% of homes and 75% of commercial buildings in New England and New York rely on fossil fuels for heating, including heating oil, propane, and fossil gas.[1] While fuel costs have been historically low in recent years, the average home in the Northeast spends roughly $1,000-$2,600 on heating every winter.[2] Because the Northeast imports an overwhelming proportion of its fossil fuels, this money flows out of local economies to other states and countries, and the region is beholden to price fluctuations out of its control. Fossil fuel heating is also a leading contributor to climate change and poses health and safety dangers.

One solution to these issues is switching to clean, efficient electric heat pumps. These commercially available heating systems can save residents money. Because they don't burn fossil fuels, they reduce health risks such as gas leaks or carbon monoxide poisoning, avoid fluctuating winter fuel costs, and reduce greenhouse gas emissions.

What is a Heat Pump?

A heat pump is an electric heating and cooling technology for buildings that extracts heat from the air, the ground, or a body of water outside of a building and uses it to heat the inside. A standard air conditioner is a type of heat pump that moves heat from the inside of a building to the outside. A heat pump uses the same process in the summer, and it is able to reverse the process in the winter for heating.

Because heat pumps move heat rather than generate heat, they are highly efficient—more than three times as efficient as the best fossil gas units. This means that heat pumps consume less energy to produce the same amount of heat. Heat pump options are available that fit the needs of many types of homes and buildings and can serve as the primary heating system or as a supplementary heating system. For many homes, installing a single air source heat pump, commonly called a "ductless mini-split," for supplemental heat in a heavily used area like a living room can improve comfort and reduce costs by providing heat where residents spend most of their time. In different configurations, heat pumps can be used as the primary heat source and some models can be integrated with existing ducts.

Heat Pumps Are:

- Commercially available and widely used globally
- Effective even in cold New England winters
- Cost effective, with the potential to save consumers hundreds of dollars annually
- Chimney-free with zero on-site emissions
- Available in whole-home or partial-home options
- Able to efficiently heat and cool

[1] "Fossil gas" is used herein rather than "natural gas" to better reflect the harmful environmental attributes of this fuel. Fossil gas is distinct from delivered fuels, such as heating oil and propane that are also fossil fuels, because it reaches a building as a gas through pipes in a distribution system rather than being delivered as a liquid by truck. [2] Data for this report was drawn primarily from the U.S. Energy Information Agency, ISO New England, NY ISO, the U.S. Census American Community Survey, and state efficiency program data. A full citation of information sources is available at https://acadiacenter.org/document/clean-heating-pathways/.

Where Are Heat Pumps Being Used Today?

Heat pump adoption is growing nationally and internationally, and there are lessons to be learned from jurisdictions that have prioritized deployment of clean heating.

RURAL & SUBURBAN NORTHEAST

Heat pumps designed for use in low temperatures are seeing accelerated adoption in the Northeast. For example, Maine, the coldest state in the Northeast, has installed over 46,000 heat pumps over the last seven years. Vermont, the region's second coldest state, has installed heat pumps in about 1% of its homes per year since 2015. Both states offer rebates to customers who install heat pumps through their energy efficiency programs, and Vermont further offers a bonus rebate to low- and moderate-income customers. Other states across the Northeast are following the lead of Vermont and Maine and have adopted heat pump incentives in their energy efficiency programs.

CITIES

Several U.S. cities have made commitments to transition to clean heating, and many more are considering similar policies. In 2019, New York City enacted Local Law 97, which requires large buildings over 25,000 square feet to reduce greenhouse gas emissions 40% by 2030. Brookline, MA has taken a different approach to accelerate clean heating and voted to ban gas and oil heating in all new construction and major renovations. Other municipalities in the Northeast and across the country have passed or are pursuing similar policies. Heat pumps are one of the most efficient and cost-effective ways to transition away from fossil fuels and reduce emissions in buildings and will be part of the solution to meeting these city commitments.

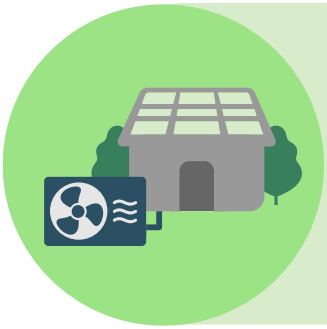
WESTERN U.S.

Western U.S. states are looking to heat pumps as part of their decarbonization strategies. In 2019, California enabled its energy efficiency programs to support customers in switching from gas to heat pumps. The Sacramento Municipal Utility District now offers customers a $4,000 rebate to replace their gas furnace and air conditioner with an efficient heat pump. The Energy Trust of Oregon has offered heat pump rebates for several years, and the program includes incentives for smart controls that ensure persistent energy savings.

INTERNATIONAL

Successful efforts have also been implemented internationally to deploy heat pumps. Canada has adopted them at an accelerated rate, especially in Ontario and Quebec, adding over 350,000 heat pumps in residential homes between 2000 and 2016, so that over 7% of single family, detached homes now use heat pumps in the country. Denmark has also taken several steps to phase out fossil fuels, including banning the use of fossil fuel in new construction starting in 2013. Norway's ban on the use of oil for heating came into effect at the beginning of 2020.

Switching entirely from oil heat to heat pumps is the equivalent of taking 12 cars off the road for one year.



- 3x more efficient than the best fossil gas units
- Not affected by fossil fuel price fluctuations
- Free from toxic pollutants

What are the Benefits of Heat Pumps?

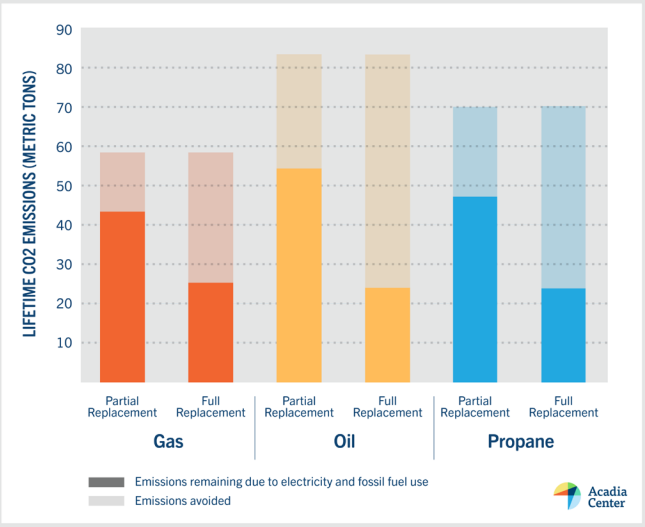
Heat pumps have many benefits compared to fossil fuel heating systems. They reduce greenhouse gases; reduce health and safety risks; cut winter fuel costs; and can prevent costly expansion of gas utility infrastructure.

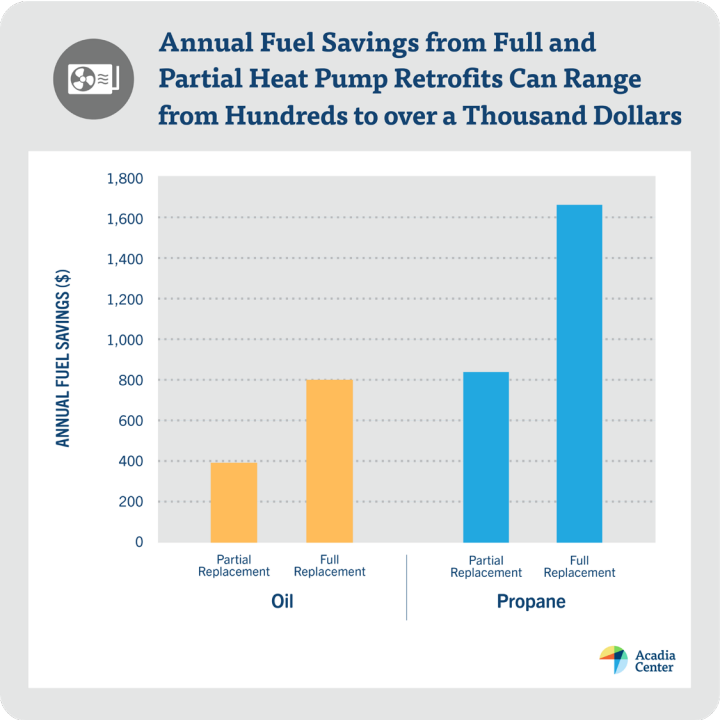
POLLUTION REDUCTION AND IMPROVED HEALTH AND SAFETY

Some of the most important benefits of clean heating are the improvements to comfort and safety and reduction in pollution. Unlike fossil fuel heating, heat pumps emit no toxic pollutants in the home that exacerbate asthma and allergies. Risk of carbon monoxide (CO) poisoning and fires are also reduced, while ailments from thermal stress, like hypo- and hyperthermia, are avoided and comfort is improved. A study in Massachusetts found that **HVAC improvements in low income homes led to $265 in annual health and safety savings per household.** The same study found that **coupling HVAC improvements with weatherization would nearly triple these benefits.** While this study looked at HVAC improvements broadly, heat pumps would be the only heating system upgrade to fully eliminate the dangers of CO poisoning and poor indoor air quality. They are the only technology that can provide heating and cooling with a single unit, reducing thermal stress with fewer retrofits.

Greenhouse gas emissions are also significantly reduced by converting to heat pumps, even in cases where the heat pump meets only part of a building's heating needs. **Switching completely from oil heat to heat pumps would reduce an average home's emissions by 58 tons over the equipment life**—equivalent to taking about 12 cars off the road for 1 year. Emissions attributable to the electric use from heat pumps will decline as states continue to shift electricity generation to renewable and cleaner sources. Installing heat pumps today creates a "renewable-ready" infrastructure that will take advantage of a cleaner grid as more renewables come online.

Significant Reductions in Greenhouse Gas Emissions Can Be Achieved with both Full and Partial Heat Pump Retrofits





WINTER FUEL SAVINGS

Homes that heat with oil or propane stand to reduce their winter fuel costs by adding a heat pump to their home. These savings vary, depending on the configuration and fossil fuel being displaced. For example, **an average home that fully converts from propane to heat pumps could save $1,650 annually on fuel.**

The annual fuel savings from converting to a heat pump will pay for the cost of installation in 5-11 years, and rebates from state or utility programs can increase fuel cost savings and reduce the payback period. Importantly, **consumer savings are maximized by coupling heat pump installations with other energy efficiency measures** that better insulate the home and reduce drafts. Another benefit of heat pumps is that they can efficiently cool a home, so **summer electricity bill savings can also be achieved by displacing less efficient AC units.**

AVOIDED FOSSIL GAS INFRASTRUCTURE COSTS

Clean heating faces unique challenges when it comes to fossil gas, which is often in direct competition with efforts to convert customers to clean, electric heat pumps. However, **customers can access greater fuel cost savings and cut pollution more by converting to heat pumps rather than fossil gas**. Plus, converting homes to heat pumps does not require addition of new gas pipes or upkeep of the existing system, which lock in higher greenhouse gas emissions for decades and increase costs for all gas customers because the utility passes on these infrastructure costs. Current gas customers can decrease fuel costs by switching to heat pumps, too; however, the payback period for the retrofit investment can be long without purchase rebates or deeper home weatherization that allows for installation of a smaller, lower-cost heat pump system.

Clearing the Path for Clean Heating

No state or city can reach its climate and clean energy goals if fossil fuel heating continues. With their significant pollution and consumer benefits, heat pumps deserve to be more widely adopted in the Northeast. While there are barriers to heat pump adoption, there are key Clean Heating Pathways at the municipal, state, and regional level that overcome these challenges:

- Educate consumers and vendors
- Couple heat pumps with home weatherization
- Install only clean electric heating in new homes
- Decrease operating costs through smart electricity pricing
- Stop fossil gas companies from expanding
- Align energy efficiency program incentives with state policy objectives
- Establish state clean heating requirements

This suite of policy solutions provides a coherent strategy for stakeholders and policymakers to reduce building emissions while lowering consumer heating costs and improving health outcomes.

Acadia Center is a non-profit organization committed to advancing the clean energy future. Through research and advocacy, it works to empower consumers and offer real-world solutions to the climate crisis for all. Clean Heating Pathways was produced by Acadia Center staff, with primary contributions from Emily Lewis O'Brien and Matt Rusteika. Thanks to David Lis (NEEP), Mark Kresowik (Sierra Club), and Glenn Reed (Energy Futures Group) for their thoughtful reviews and Visual Aid Society for visualizations and design. The views expressed here are Acadia Center's alone.

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Clean Heating Pathways:

Educate Consumers and Vendors

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CHALLENGE

Many homes and businesses that are good candidates for heat pump conversions don't switch because of lack of knowledge about the benefits or misconceptions about the technology.

SOLUTION

Develop educational campaigns for both consumers and HVAC professionals to grow their heat pump expertise.

Since many building owners don't think about their heating until it fails, one of the best ways to educate consumers about heat pumps is through an informed HVAC workforce. HVAC professionals often have the first opportunity to inform a consumer about heat pumps and their benefits. Currently, many HVAC professionals are unfamiliar with heat pumps and are not trained to recommend them, so a broad effort to educate the workforce is necessary.

Familiarizing more HVAC professionals with heat pump installation, options for integrating heat pumps with existing systems through thermostats or other controls, as well as design changes for new homes to be efficiently heated with heat pumps, will help reduce the costs of installation through learning and increased market competition. These trainings will also help transition a primarily fossil fuel-focused industry to more sustainable technologies in light of state policy objectives, while making heat pump installers more competitive in the HVAC marketplace. Currently, the wait time for heat pump installation often exceeds that of a fossil fuel system installation because there are fewer installers. Growing an informed workforce will help increase the availability of skilled workers and keep heat pump installation times, as well as costs, competitive with other fuels.

Direct outreach to consumers could also help grow demand for heat pumps. State efficiency programs are already conducting this type of outreach for energy efficiency products and could be expanded to provide information about heat pumps. State agencies or manufacturers could also run complementary educational programs. Any educational campaign should also include tips for consumers on how to best integrate heat pumps with their existing heating system.

CONSUMER AND VENDOR EDUCATION PROGRAMS

	MA	RI	CT	NH	ME	VT	NY
Vendor Education Programs	🟡	🟢	🟡	🔴	🟢	🟢	🟡
Consumer Outreach through EE Programs	🟢	🟡	🟡	🔴	🟢	🟢	🟡
Consumer Education on Heat Pump Integration	🟡	🟡	🔴	🔴	🟢	🟢	🔴
Consumer Outreach through State or Quasi-Governmental Venues	🟢	🟢	🟡	🔴	🟢	🟢	🟡

🟢 Fully operating program or policy
🟡 Program or policy exists as a pilot or needs to be expanded/improved
🔴 No program/policy exists, barriers may be preventing program adoption

How are Northeast states addressing consumer and vendor education?

Several northeast states have programs in place to educate consumers and vendors about heat pumps, including through their energy efficiency programs and other venues, such as state webpages, traditional media, and outreach events. By educating consumers on integrating a heat pump with their existing heating system, Maine and Vermont are working to ensure customers have a positive heat pump experience. At this time, New Hampshire does not offer incentives to install heat pumps to displace fossil fuel heating.

Clean Heating Pathways:

Couple Heat Pumps with Home Weatherization and Integrated Controls

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CHALLENGE

Customers can maximize energy savings by installing heat pumps in efficient homes with integrated controls, but this opportunity is often left untapped.

SOLUTION

Couple heat pumps with home weatherization and integrated controls.

Home weatherization upgrades like insulation and air sealing save customers money all on their own, but an underappreciated side effect of these upgrades is that they can allow for heating system downsizing, where consumers purchase heat pumps sized to their home's actual heating needs. In situations where a heat pump is used to meet part of the home's heating needs, integrated controls facilitate the most efficient operation of the two heating systems. Delivered together, these upgrades can lead to immense energy bill savings.

The efficient heating and cooling provided by a heat pump, combined with efficiency measures that reduce drafts, moisture problems, and mold, can have significant health and safety benefits, especially for vulnerable populations like children and the elderly, who suffer during increasingly frequent extreme weather events. Some customers can also leverage participation in efficiency programs to obtain assistance in remediating asbestos or lead problems, maximizing safety while minimizing cost.

How are Northeast states working to couple heat pumps with home efficiency?

POLICIES TO COUPLE HEAT PUMP RETROFITS WITH WEATHERIZATION

	MA	RI	CT	NH	ME	VT	NY
Greater Incentives for Coupling Electrification with Weatherization	🟠	🟠	🟠	🟠	🟠	🟡	🟠
Incentives for Integrated Controls	🟢	🟡	🟡	🟠	🟢	🟠	🟡

- 🟢 Fully operating program or policy
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Coupling heat pumps with home weatherization is an area where most states need improvement. While most states offer weatherization incentives, the only entity that offers a greater incentive to customers that weatherize their home at the time of heat pump installation is Vermont Public Power Supply Authority, which does not operate statewide.

Massachusetts and Maine both offer incentives to customers for integrated heating controls with heat pump installations through their primary programs, while Connecticut and Rhode Island only offer these incentives in pilot form.

Clean Heating Pathways:
Install Only Clean Electric Heating in New Homes

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CHALLENGE

New fossil fuel heated homes lock in future emissions that will put the region over its carbon budget and leave ratepayers paying for stranded infrastructure assets.

SOLUTION

Only build efficient or Passive House new residences with clean electric heating.

Installing heat pumps in new construction is generally easier and more cost-effective than retrofitting existing buildings, and building efficient or Passive House new residences reduces the total heating and cooling need of the building. By targeting this low-hanging fruit for market transformation, building owners and buyers will become more familiar with heat pumps as they become the norm in new construction.

Two potential ways to accelerate electrification in the new construction market are:

- **Provide incentives to builders for installing heat pumps in new buildings.** State energy efficiency programs, state agencies, or manufacturers could offer these incentives to increase heat pump adoption.

- **Require new construction to use heat pumps through state and building codes.** Prohibiting fossil fuels in new construction—either through equipment fuel requirements or a ban on fossil fuels—would push the market toward heat pumps.

If policies were put in place so that new homes in the Northeast were only built with clean electric heat pumps, it would contribute about a quarter of the reductions needed for this sector to reduce emissions 50% from 1990 levels by 2030.

What steps are the Northeast states taking to install only clean electric heating in new homes?

POLICIES REQUIRING OR INCENTIVIZING CLEAN HEATING IN NEW HOMES

	MA	RI	CT	NH	ME	VT	NY
Building Codes that Require Heat Pumps	🔴	🔴	🔴	🔴	🔴	🔴	🔴
Heat Pumps in Residential New Construction Programs in EE Programs	🟢	🟢	🟢	🔴	🟡	🟡	🟡
Bans on New Fossil Gas Hookups	🟡	🔴	🔴	🔴	🔴	🔴	🔴

🟢 Fully operating program or policy
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Three states are currently incentivizing heat pumps in residential new construction through their energy efficiency programs. In November 2019, Brookline, Massachusetts voted to ban fossil fuel heating in new construction or significant renovations, and several towns in the region are considering municipal bans on new fossil gas hookups, a policy that could be considered at the statewide level.

Clean Heating Pathways:

Decrease Operating Costs through Smart Electricity Pricing

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CHALLENGE

While consumers will save money on heating and cooling by using heat pumps, those savings may not be great enough to overcome initial barriers to adoption, such as retrofit costs or the perceived risk of an unfamiliar system.

SOLUTION

If operating costs are reduced, consumers can save even more from heat pumps, encouraging more homeowners to consider clean heat options in their existing or new homes while minimizing grid impacts from electrification.

Since heat pumps use electricity as their fuel, the cost of electricity dictates the operating cost of a heat pump. Changes in electricity rates can improve the economics of heat pumps if they reduce the cost of electricity during times of heat pump usage. Acadia Center's UtilityVision describes electricity rate improvements that both reflect the real cost of delivering electricity to customers and incentivize customers to minimize their impact on the grid. These same rate design principles can also benefit heat pumps by creating low-cost electricity hours that customers can take advantage of when heating their homes.

Time-varying rates (TVR), in particular, could help improve the economics of heat pumps:

- **Time-varying rates** that are well-designed designate higher-cost electricity hours during periods of peak grid usage, and lower-cost hours when the grid is underutilized. These prices better reflect the actual cost of delivering electricity and incentivize customers to minimize their grid impact by shifting their electricity use to off-peak hours. Home heating more heavily coincides with off-peak (generally nighttime) periods and can be further shifted to these periods by pre-heating if the building is weatherized, allowing heat pump customers to further lower their heating costs.
- **Seasonal varying rates** designate both higher-cost peak periods and higher-cost electricity seasons because transmission and distribution costs are dictated by seasonal demands. In the Northeast, the current grid peak is in the summer, although this peak could change over time with widespread adoption of distributed solar and electrification. Seasonal rates positively impact heat pumps for winter heating, since this load occurs in the off-peak season, when rates are lower. A well-designed winter variable rate would reflect the observed morning and evening winter grid peaks, offering customers the best opportunity to heat their homes at a low cost mid-day for pre-heating and overnight.

Importantly, nearly all the components that make up the total rate per kilowatt hour, including transmission, generation, and a portion of distribution charges, vary depending on the time of day. A well-designed time-varying rate should therefore vary all these rate components to reflect the actual cost to provide electricity to the customer.

Which Northeast states offer smart electricity pricing?

SMART ELECTRICITY PRICING

	MA	RI	CT	NH	ME	VT	NY
Time-Varying Rates	🟡	🟠	🟢	🟡	🟡	🟢	🟢

🟢 Largest IOUs offer time-varying rates
🟡 One or more IOUs offer time-varying rates
🟠 No time-varying rates offer by IOUs

The largest investor owned utilities (IOUs) in Connecticut, New York, and Vermont offer optional time varying rates to residential customers. These rates vary significantly in their design and their alignment with system peaks. Other states have limited availability or no time varying rates for residential customers.

Clean Heating Pathways:

Stop Fossil Gas Companies from Expanding

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CHALLENGE

Utilities have an economic incentive to promote gas heat over heat pumps at the expense of customers.

SOLUTION

Align utility incentives with public policy objectives to reduce greenhouse gas emissions by making oil-to-gas conversions and new gas infrastructure less lucrative.

Utilities that own both fossil gas and electric companies face a conflict of interest when it comes to home heating. When a customer converts from oil to gas, a utility will collect a monthly fixed charge from their new customer. But if that same customer were to move from oil to a heat pump, the utility would not collect any additional monthly charges, because the customer already has an electric bill.

The fossil gas utility is also incentivized to push for oil-to-gas conversions in homes that are off the existing gas lines. Fossil gas utilities earn a regulated rate of return on new gas pipes and other infrastructure, which they collect from across their entire customer base. Although electric utilities earn a similar rate of return, the incremental infrastructure needed to serve more heat pumps is far less, because the electric lines already run to that customer. This means a utility makes more money on a new fossil gas customer than an electricity customer.

Gas utilities that are not part of the same corporate entity as an electric company are similarly incentivized, of course, as their entire business model is based on delivering fossil gas.

The increased utility revenue from expanding gas infrastructure occurs at the expense of customers—the new customer who could have saved money by installing a heat pump instead of fossil gas heat, and all gas customers who must pay for new infrastructure that could have been avoided. Acadia Center's "Incentives for Change" examined this conflict and the cost to ratepayers in more detail—in the end, unless the incentives are addressed, both consumers and the environment lose.

There are several near-term policy changes that could make gas expansion less lucrative for utilities and improve the incentive for electrification:

- **Require new gas customers to pay a larger portion of the costs for new gas infrastructure.** As described above, utilities recover a large portion of the cost of new gas infrastructure across their entire customer base. For customers considering switching to gas, the current cost-sharing obscures the full cost of the conversion and can make gas look less expensive for many homes. Requiring new gas customers to pay a larger portion of the infrastructure costs would lower an individual customer's incentive to switch to gas and would put heat pump conversions on a more level playing field, since the full cost of a heat pump is always borne by an individual customer.
- **Shorten the period for utilities to recover new infrastructure costs to align with state greenhouse gas reduction requirements.** When utilities determine whether new gas infrastructure is cost-effective, they are allowed to consider a cost recovery period of 25-80 years, depending on the state. This means the costs to ratepayers is spread out over a long period of time, which minimizes customer bill impacts and subsequently allows for regulatory approval of the project. Reducing this cost recovery period to 10 years or less would better align with state greenhouse gas reduction requirements and dramatically increase monthly customer charges for a project, which would lead to many gas expansion projects becoming rejected.

- **Keep monthly fixed charges low.** Although high monthly fixed charges are attractive to utilities because they make revenue projections easier, keeping monthly fixed charges low, no higher than the cost of keeping customers connected, reduces prices for low-income customers, students, and seniors, who tend to use less energy than average, and will lessen the bonus that fossil gas companies can earn by securing a new customer.
- **Prohibit utilities from selling gas.** In addition to the above near-term changes to existing gas expansion policy, a much stronger longer-term policy would be to prohibit the sale of gas.

Which Northeast states are limiting fossil gas promotion and expansion?

	MA	RI	CT	NH	ME	VT	NY
Sharing of New Customer Costs Limited	●	●	●	●	●	●	●
Cost Recovery Period for New Infrastrucutre Algined with GHG Requirements	●	●	●	●	●	●	●
No Consumer Incentives for Switching to Gas	●	●	●	●	●	●	●

● No action needed, current policies limit gas expansion
● Policy action needed, existing policies favor gas expansion

All states need to take policy action to limit fossil gas expansion: no state aligns gas infrastructure cost recovery periods with greenhouse gas (GHG) requirements.

Most states also incentivize customers to switch to gas by allowing some costs to be shared across the entire customer base and allowing other connection costs to be paid for over extended time periods. Several states offer incentives in their efficiency programs for upgrading to efficient gas units, but Connecticut is the only state that incentivizes customers to switch to gas through their energy efficiency programs and has new customer requirements for its gas utilities. Rhode Island and Vermont are the only states that do not offer any gas expansion incentives; most states offer cost-sharing mechanisms or on bill financing to encourage customers to switch to gas from other fuels.

Clean Heating Pathways:

Align Energy Efficiency Program Incentives with State Policy Objectives

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CHALLENGE

Heat pumps decrease fuel costs for consumers and reduce emissions, but barriers exist to accessing these savings, especially for customers switching from fossil gas.

SOLUTION

Assist customers in accessing bill savings by offering incentives that align with state emissions reduction laws.

Recently, several states have begun to offer incentives for replacing fossil fuel heating equipment with heat pumps. These incentives are provided to consumers in several ways, including through state energy efficiency incentive programs, programs offered by public or quasi-public entities, and by utilities to support compliance with fossil fuel reduction requirements or other targets.

The recent spread of these programs demonstrates a growing acknowledgement among policymakers of the need to electrify buildings to meet climate goals. However, the programs are not currently designed to achieve the rapid electrification necessary to lock in emissions reductions and consumer savings. Specifically, program incentives are often paltry compared to the cost of the equipment, fossil gas homes are sometimes ineligible for participation, and incentives for fossil gas replacements are often in direct competition with heat pump incentives.

Two ways to better provide consumers with the incentives needed to support heat pump conversions are to change the way energy efficiency programs determine whether to offer incentives and to phase out existing incentives for fossil fuel equipment.

Efficiency programs evaluate an incentive based on whether it generates more benefits than costs. Electric efficiency measures receive a thorough accounting of benefits across the electricity system, from the power plant to the end user in the form of fuel price savings. Fossil fuel accounting, in contrast, rarely considers much aside from the price of fuel, to the exclusion of the system impacts like the cost of pipeline expansion, health and safety factors arising from distribution system leaks, and the huge and growing social cost of greenhouse gas emissions. Requiring that programs consider all the benefits of moving away from fossil fuels when they determine eligible measures and incentive amounts will remove a significant impediment to climate goals.

Most states also offer incentives for installing efficient fossil fuel heating equipment. These incentives have historically helped customers replace inefficient equipment with higher efficiency gas options, but they are no longer necessary now that efficient electric heat pumps are available. States should immediately end the use of ratepayer money to expand the fossil gas network. Incentives for existing fossil fuel customers to upgrade their equipment should be phased out on a timeline that prevents backsliding and considers low-income and environmental justice concerns. Cash-for-clunkers incentives should be considered to expedite the retirement of the least efficient equipment.

When aligned with state policy objectives, incentives through the energy efficiency programs are an effective and cost-efficient way to achieve state greenhouse gas policy objectives.

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Which Northeast states align incentives with policy objectives?

POLICIES THAT ALIGN HEAT PUMP INCENTIVES WITH STATE POLICY OBJECTIVES

	MA	RI	CT	NH	ME	VT	NY
Fuel Switching Incentives for Heat Pumps	🟢	🟡	🟡	🔴	🟢	🟢	🟢
Fuel Switching Incentives Apply to Gas	🔴	🔴	🔴	🔴	🟢	🟢	🟢
Avoided Cost of Carbon Appropriately Valued in EE Programs	🟡	🟢	🔴	🔴	🔴	🟡	🔴
Fossil Gas System Costs Evaluated	🔴	🔴	🔴	🔴	🔴	🔴	🔴

- 🟢 Fully operating program or policy
- 🟡 Program or policy exists as a pilot or needs to be expanded/improved
- 🔴 No program/policy exists, barriers may be preventing program adoption

While most states offer incentives to switch from fossil fuels to heat pumps in either a formal or pilot program, not all states are adequately valuing the carbon benefits of heat pumps—if they are considering them at all. All states need to improve how their efficiency programs evaluate system impacts in the fossil gas system.

Clean Heating Pathways:

Establish State Clean Heating Requirements

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CHALLENGE

Current frameworks leave customers—who have limited time and resources—with the disproportionate responsibility for the clean heating transition, slowing the pace of technology adoption.

SOLUTION

Adopt state targets and accountability mechanisms that require heat pump adoption and share the responsibility for electrification across utilities and state agencies.

Across the Northeast, incentive programs encouraging the use of cleaner, more efficient heating equipment have been in operation for decades. Over the years, these consumer rebates have led to substantial energy savings and helped to reduce the region's energy intensity. However, for consumers, taking advantage of an incentive requires awareness, desire, good timing, and some leg work—all of which can be barriers to uptake.

One powerful, complementary tool to incentive programs and other policies to expand clean heating is a state electrification requirement. A state mandate would still be met through customer adoption of heat pumps; however, a target would require deeper utility and state engagement to ensure the requirements are met. The most effective mandate designs set both long term and annual targets, so that compliance can be evaluated regularly, and the program can be adjusted in real time.

Three states in the Northeast have thermal renewable portfolio standard (TRPS) policies, which require utility companies to invest in thermal resources equivalent to a certain percentage of retail electricity sales. This type of policy ensures an ongoing, stable funding stream for renewable thermal installations—a crucial element of any effort to expand the market for a technology. Importantly, TRPS programs are funded predominantly by electric utilities. A more equitable and effective practice is to subject fossil gas distribution companies and unregulated fuel distributors to the same standard as electric companies.

Which Northeast states have set targets to advance heat pumps?

STATES WITH TARGETS THAT ADVANCE HEAT PUMPS

	MA	RI	CT	NH	ME	VT	NY
Thermal Portfolio Standard Includes Heat Pumps	🟢	🟠	🟠	🟠	🟠	🟢	🟠
Thermal Energy Reduction Targets	🟠	🟠	🟡	🟠	🟠	🟠	🟢
Heat Pump Deployment Target	🟠	🟠	🟠	🟠	🟢	🟠	🟠

🟢 Fully operating program or policy
🟡 Program or policy exists as a pilot or needs to be expanded/improved
🟠 No program/policy exists, barriers may be preventing program adoption

Massachusetts, New Hampshire, and Vermont all have thermal portfolio standard programs in place, all of which use different approaches. Massachusetts includes heat pumps in its TRPS, as well as bio-based fuels and storage technologies. Vermont includes heat pumps, as well as technologies like electric vehicles, in its "Energy Transformation" portfolio standard. While New Hampshire has a thermal portfolio standard in place, heat pumps are not currently eligible.

Outside of TRPS policies, a few states have targets or mandates that are helpful, but lack accountability mechanisms. New York, for example, has a target to reduce consumption by 4.6 TBtu by 2025 through heat pump deployment, while Connecticut has a broader mandate to reduce energy consumption 1.6 MMBtu annually from 2020-2025. Maine has the requirement to install 100,000 heat pumps by 2025.