

## **Heat Pumps Can Lower Energy Bills In Maryland Today**

*Incentives from the federal, state, and utility levels can make for a rapid payback period — and long term savings.*

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Last year, the State of Maryland released its [Climate Pathway report](#), highlighting both significant progress and important gaps yet to be filled in achieving the state's climate goals that are [enshrined into law](#). Yesterday, Governor Wes Moore issued an Executive Order calling for significant actions to fill those gaps and meet the state's target for a 60 percent reduction in greenhouse gases from 2006 levels by 2031. As Maryland prepares to answer the call to reduce climate pollution, create new jobs, and increase household cost savings, there's one technology that promises to help do all three: heat pumps. Notably, the first two policy solutions named in the Executive Order clean up Maryland's heating equipment: [a zero-emission heating equipment standard](#) and a [clean heat standard](#). Both policies help end reliance on fossil fuels and bring more energy-efficient and cleaner sources of heating like heat pumps to people's homes, schools, and workplaces. This is critical, as fossil fuel use in buildings currently makes up [16 percent of Maryland's earth-warming emissions](#) and more than [three times as much health-harming nitrogen oxides](#) as the state's power plants.

We already know that all-electric new construction is [cheaper](#) than construction with fossil fuel heating, but how affordable will electrification *retrofits* be in Maryland? The following analysis offers a look at the current affordability for retrofitting *existing* single-family homes, and where state investment is most needed to improve access for low-income households in Maryland who are overburdened by high energy costs and pollution.

### **Heat pumps can lower energy bills in Maryland today**

Most Marylanders use gas, electric resistance, or oil appliances to heat their homes today, and a comparable set of fuels for water heating. Modern air-source [heat pumps](#) are 2-4 times more energy efficient than traditional technologies like gas furnaces, and their specific benefits to household energy bills can vary based on several factors including the housing type and how well sealed and insulated it is, fuel prices (electricity, gas, oil, propane), and local climate.

In Maryland, the moderate climate and relatively expensive fossil fuel prices mean that heat pumps for space and water heating can save all residents money on their annual energy bills today. RMI analysis shows:

- ✓ Residents upgrading to a heat pump for space heating and cooling could save \$740 per year on average, ranging from \$400 for gas customers to \$1,800 for electric resistance customers.

- ✓ Similarly, residents upgrading to a heat pump for water heating could save \$380 per year on average, ranging from \$200 for gas customers to \$500 for electric resistance customers.

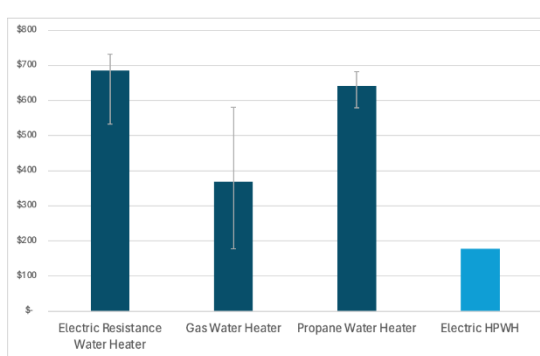
Low-income households spend [six times more](#) of their annual income on energy bills than Marylanders as a whole. These households overburdened by high energy costs are key candidates for energy-saving heat pumps.

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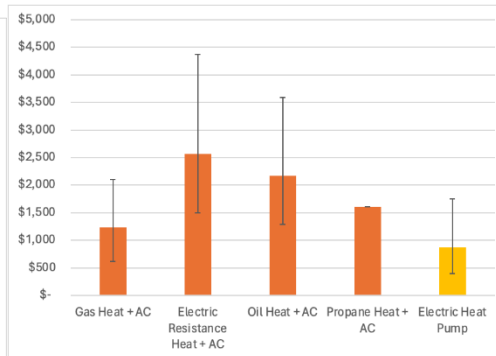
### **Graphic 1. Residents reduce energy bills when upgrading to heat pumps**

First-year heating and cooling or water heating costs after a like-for-like HVAC replacement or a heat pump upgrade

**First-year heating and cooling costs**



**First-year water heating costs**



Source: RMI’s analysis using the [Green Upgrade Calculator v1.3](#). Bars show weighted average results across scenarios using RECS 2020 microdata for weights by prevalence of home typology. Lines indicate maximum and minimum energy bills in year one across scenarios for a given fuel type.

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### **Heat pump water heaters can be affordable for all with incentives**

While the energy bill savings are significant, to understand the overall economics of heat pump water heaters, we also need to quantify upfront costs versus like-for-like replacements of traditional equipment.

Before accounting for incentives, we find that transitioning to a heat pump water heater today comes at an upfront cost premium but pays back within two years for more than half of Maryland single-family homes and within 7 years for all homes (depending primarily on the prior water heater system used). Homes that can upgrade stand to save thousands of dollars over the lifetime of their water heaters, given the new Federal tax credit from the Inflation Reduction Act (IRA) and annual energy bill savings.

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**Graphic 2. Upgrading to a heat pump water heater pays back within three years for majority of Maryland homes**

HPWH simple payback period without incentives	% of homes analyzed*
1-2 year	55%
3-7 years	45%

\*Results include use of the Federal Tax Credit and energy bill savings, but do not incorporate state-based utility incentives or new Home Electrification and Appliance Rebates.

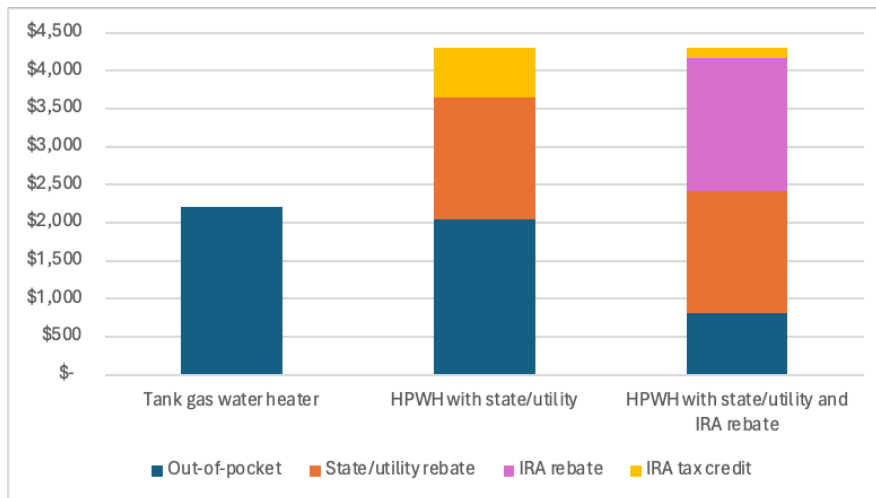
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Second, incentives can make heat pump water heaters cheaper than like-for-like replacements. The soon-to-be-available federal [Home Electrification and Appliance Rebates \(HEAR\)](#) from the IRA will help heat pump water heaters become the lowest-cost option for low- and moderate-income households that leverage this incentive. This is set to build on the progress of Maryland’s EmPOWER program, which already includes attractive rebates for households that use electricity for water heating (electric resistance), but limited incentives for households with gas or propane water heating. Recently passed state legislation [reforms](#) the program scope to allow and encourage electrification incentives.

We modeled the impact of an illustrative \$1600 utility rebate (which is [Pepco's current rebate](#)) for heat pump water heaters on affordability, and find that such an incentive, combined with federal tax incentives or federal rebates, would mean lower upfront costs for heat pump water heaters relative to traditional gas or propane water heaters as well. State and utility rebates are important — they should become increasingly available for all households to access, and they should be able to [stack](#) on one another so residents can maximize savings. Additional subsidies or financing may be required for households with significant potential savings but limited means to pay.

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**Graphic 3. HPWH becomes lower cost than a gas water heater with additional incentives**



Source: RMI’s analysis using the [Green Upgrade Calculator v1.3](#). Recommended rate/utility rebate is \$1600. IRA tax credit is 25c, which applies to 30% of the post-rebate project costs for all residents. IRA rebate is HEAR, which provides up to \$1,750 to eligible households with less than 150% of the Area Median Income.

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### **Affordability is within reach for air-source heat pumps**

On the space heating side, air source heat pumps are poised for step-change as well. [One in five](#) Maryland households already use an air-source heat pump for space heating, meaning demand is growing and the technology is familiar.

Retrofitting older HVAC systems to modern air source heat pumps in single-family homes involves a higher upfront cost outlay than water heating, and in some cases requires complementary electrical, weatherization, or health and safety upgrades. However, we find that nearly all Maryland households stand to save money over the 15-year appliance lifetime for similar reasons to heat pump water heaters (lower energy bills and Federal tax credits) plus one additional benefit: replacing an aging air conditioner (AC) since heat pumps provide double duty as new heating and cooling systems.

Upfront costs and payback periods are poised to get even better. Maryland’s aforementioned EmPOWER program has historically offered limited air source heat pump incentives. Recent reform legislation is expected to result in higher heat pump rebates and expanded incentive eligibility to help customers go electric. We analyzed the affordability impacts of prospective new heat pump incentives, in line with levels already offered in

other climate leader states like [Maine](#), [New York](#), and [Massachusetts](#): for example, if Maryland offers a \$3,000 incentive for a ducted central air-source heat pump and \$4,500 for a ductless mini-split in combination with the Federal tax credit. The results show payback periods within four years for large segments of Maryland homes: homes with aging electric resistance or oil heating systems, as well as homes facing pending replacement of both gas-heated and aging AC systems.

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**Graphic 4. Heat pumps can pay back near-term for many homes with incentives and bill savings**

Payback period on a heat pump’s cost premium for a mid-sized home built in 1980-2000 with annual bill savings.

*[graphic under development using the following data]*

	Oil heating	Electric resistance heating	Gas heating	Gas heating and aging AC unit
Years to pay back upfront cost premium	4 years	3 years	7 years	0 years

Source: RMI’s analysis using the [Green Upgrade Calculator v1.3](#). Breakeven analysis includes heat pump cost premium, including \$3,000 state/utility incentive and federal tax credit, and annual bill impacts. It does not include panel costs or weatherization.

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Plus, low- and moderate-income households at less than 150% Area Median Income can access federal [HEAR rebates](#) of up to \$8,000, which will make heat pumps more affordable for those most in need of economic relief, especially when stacked with state incentives.

**Support for low-income residents must be prioritized**

As affordability improves, access for Maryland’s [450,000 low-income households](#) should be a top priority for the state. Low-income residents often live in older homes that need health, safety, and weatherization upgrades. Importantly, many low-income residents are [renters](#) who lack the decision-making power to choose a heat pump upgrade. They are also at risk of displacement or increased costs if the building owner pursues extensive energy efficiency upgrades.

To advance building decarbonization equitably, Maryland must ensure that its regulations are paired with sufficient funding and equity-focused policies to support tenants, low-income residents, and historically disadvantaged communities. This includes additional rebates that [stack with federal incentives](#), [protections for tenants](#) from displacement or eviction, and [whole-home retrofit programs](#) before these heating regulations take effect. Prior research has identified more than [\\$2 billion](#) in Federal, State, and Local funds that could be mobilized to this end.

### **Heat pumps offer residents energy bill savings and are becoming more affordable**

Governor Moore's Executive Order urges the state to develop clear, long-term policies, such as zero-emission heating equipment standards and clean heat standards, and the timing couldn't be better. Scaling building decarbonization in Maryland requires transformation from many stakeholders — installers, manufacturers, utilities, and communities — and clear policy direction provides stakeholders the clarity needed to invest in the energy transition and ensure no one is left behind.

For more information on the analysis methodology, [click here](#).