TWO BIRDS, ONE STONE

STATE INVESTMENTS THAT PROMOTE BOTH AFFORDABILITY & DECARBONIZATION

Donald Goldberg
Dave Grossman

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Climate Law & Policy Project

Climate Law & Policy Project

Climate Law & Policy Project is a 501(c)(3) non-profit organization. CLPP's mission is to help formulate and advocate environmentally, socially, and scientifically sound policies to reduce emissions and protect communities around the world from the impacts of climate change.

CLPP operates like a think tank – seeking practical and politically viable strategies – while simultaneously advocating for strong responses to avert the increasingly urgent problem of climate change.

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About the Authors

Donald Goldberg is the executive director and founder of CLPP. Previously, he directed the climate program at the Center for International Environmental Law.

Dave Grossman is a senior advisor to CLPP and is the principal and founder of Green Light Consulting, a consulting practice specializing in research, analysis, writing, and strategic guidance on climate change and clean energy issues.

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Introduction

Energy affordability has risen to the forefront of public and political consciousness, including in Maryland. At the same time, the impacts of climate change are increasing — causing harm to Maryland's economy and to people's lives and livelihoods — while greenhouse gas emission reduction targets seem to grow ever further out of reach. These need not be problems with competing solutions.

There are numerous ways that Maryland (and other states) can direct spending — whether from existing budgets or from newly raised revenues (e.g., from an economy-wide cap-and-invest program) — to promote both energy affordability and greenhouse gas emission reductions. This paper, after providing some background on the status of energy affordability and decarbonization in Maryland, provides an overview of potential spending areas where affordability and climate goals overlap. The paper focuses primarily on options that will directly reduce energy expenditures at the household level, though it also reviews options for community-level investments and broader-scale investments that help reduce people's energy expenditures. The options covered in this paper are listed in the table below.

Household Level	Community Level	Broader Level
Energy efficiency and weatherization	Public transit and active transportation	Virtual power plants
Rooftop solar (and storage)	Community solar	Advanced transmission technologies and improved grid utilization
Plug-in ("balcony") solar		Large-scale renewables & storage
Heat pumps / building electrification		
Electric vehicles (EVs)		

Maryland already invests in some of these areas, but there is great potential to boost investments in order to achieve both climate and affordability goals. The decarbonization agenda and the affordability agenda can be one and the same.

Background: Status of Energy Affordability in Maryland

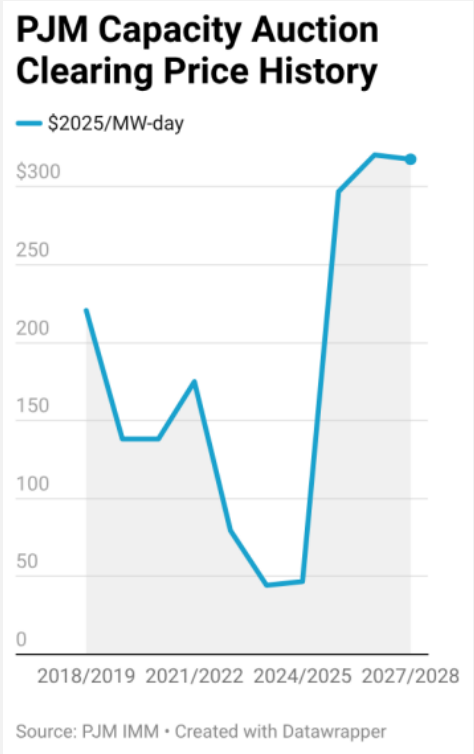
The cost of energy is going up. The electricity system in Maryland, like elsewhere in the United States, is undergoing rapid change. Significant increases in demand (most notably from data centers) have replaced decades of relatively stagnant load growth, with impacts on energy affordability, grid reliability, and greenhouse gas emissions. Simultaneously, global geopolitical events have led transportation fuel prices to head steadily upwards, putting further strain on household budgets.

An October 2025 analysis and a follow-up April 2026 analysis by Lawrence Berkeley National Laboratory (LBNL) and The Brattle Group found that retail electricity prices nationally increased by a third between 2019 and 2025 in nominal dollars. When adjusted for inflation, electricity prices had only gone up a little, but Mid-Atlantic states still experienced price increases in real terms. (Residential natural gas prices rose even faster from 2019 to 2025 than electricity prices.) Looking just at changes from 2024 to 2025, residential electricity prices increased in most states even after adjusting for inflation, and prices continue to climb in 2026.

This has clearly been the case in Maryland. According to a March 2026 report released by the minority members of the U.S. Congress Joint Economic Committee (and drawing on data from the U.S. Energy Information Administration), electricity expenses for the average household in Maryland increased 11.6% ($230) from 2024 to 2025. Maryland's Office of People's Counsel warned Marylanders that electric bills would be increasing further in the fall of 2025 and spring of 2026 due to a range of factors related to PJM (the regional grid that Maryland is part of), increasing distribution rates, extreme weather, and supply volatility.

A lot of attention has fallen on data centers in discussions about rising electricity bills. PJM's 2026 Load Forecast Report, released in January, projects that net energy load growth — driven by data centers and electrification of vehicles, buildings, and industry — will average 5.3% per year over the next 10 years, with increases projected for both winter peak load (around 4% per year) and summer peak load (around 3.6% per year). While higher levels of demand can reduce prices in places with extra capacity or where new generation can easily come online (because it can spread fixed costs across a larger pool of demand), neither of those appears to be the case in PJM. Prices in PJM's December 2025 capacity auction hit a record high for the third consecutive auction (*see Figure 1*), with 40% of those costs driven by data centers, primarily ones that have not yet been built. (Some may never get built, but their potential load must be taken into consideration.) Capacity costs are typically a small part of electric bills, but these increases have contributed to climbing costs for consumers. Data center load additions have led to higher transmission costs and energy market prices as well.

Figure 1



Source: LBNL & Brattle, 2026

Although data centers and the PJM capacity auctions are important parts of the affordability challenge, there are other factors at play as well. According to the LBNL and Brattle analyses, transmission and distribution (T&D) expenditures are a key driver of the price increases, given aging infrastructure, supply chain constraints, and investments to respond to natural disasters — although there is starting to be more

emphasis on T&D expansion to meet load growth as well. Prices for all types of T&D equipment, from wires to transformers to wood poles, have been increasing much faster than inflation. Natural gas price increases have played a key role too, with the national average price of natural gas delivered to electric generators rising by more than a third between 2024 and 2025.

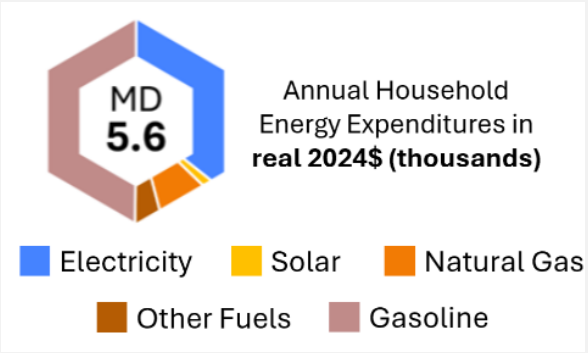
Some have suggested renewables may have contributed to higher electricity prices, but LBNL and Brattle found that market-driven utility-scale wind and solar have not driven price increases (and may drive price decreases). They found that renewable portfolio standards (RPSs) contributed to price increases in some states and price decreases in others; in Maryland, the study estimated an increase in RPS compliance costs from 2019-2025 of around 0.9 cents / kWh of retail sales. (A 2025 MIT analysis, in contrast, found that RPS policies have "virtually zero impact on prices.")

LBNL and Brattle found that the Regional Greenhouse Gas Initiative (RGGI), a multi-state cap-and-invest program in which Maryland participates that covers just the electric power sector, has led to very modest increases in wholesale electricity prices in PJM. They note, however, that this may not lead to retail price and bill increases in part because of how states invest RGGI revenues in customer energy efficiency and in bill rebates and discounts (as discussed later in this paper and as CLPP has described in detail elsewhere).

Energy affordability is not just about electric bills. According to the U.S. Bureau of Labor Statistics, transportation is the second-largest household expenditure, behind only housing, with the average U.S. household in 2024 spending more than $2,400 on gasoline. According to the American Petroleum Institute, gasoline accounts for the largest portion of U.S. consumer energy expenditures at 52%, followed by electricity at 36%. The remainder is for home heating fuels. Maryland household expenditures generally track the national averages, as shown in *Figure 2*. Gasoline prices can be very volatile, affected by demand levels, supply disruptions, and geopolitics.

While everyone is affected by higher energy costs, the burden falls most heavily on low- and moderate-income households. Looking at electricity, for instance, LBNL and Brattle found that residential bills as a fraction of income nationally has generally been declining over time, but the fraction is still significantly higher for lower-income households (more than 5% of income) than for higher-income households (less than 3% of income).

Figure 2



Source: adapted from EPRI, 2025

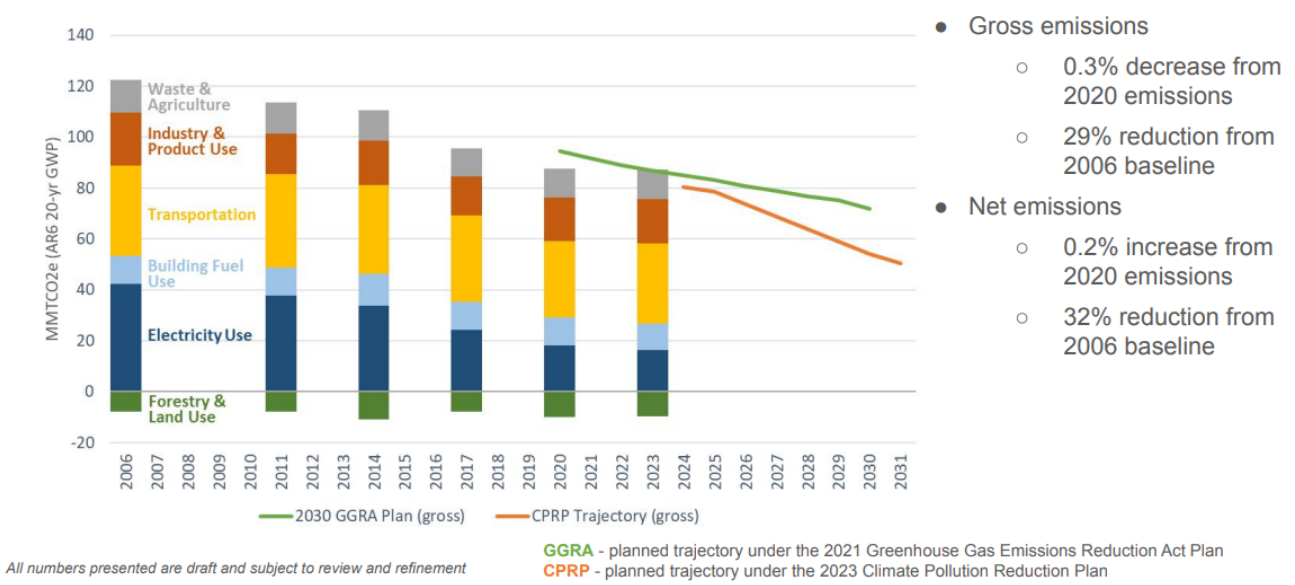
Background: Status of Decarbonization in Maryland

Maryland's *Climate Pollution Reduction Plan* (December 2023) laid out policies and strategies to achieve 60% reductions in gross greenhouse gas emissions from 2006

levels by 2031 and net-zero emissions by 2045. The state is not on track to meet those targets.

According to a January 2026 presentation from the Maryland Department of the Environment (MDE) on the state's 2023 greenhouse gas emissions inventory, the state has achieved a 29% reduction in gross emissions from the 2006 baseline, and only a 0.3% decrease from 2020. In terms of net emissions, the state has achieved a 32% reduction from the 2006 level. (*See Figure 3*) Modeling from the University of Maryland suggests that, after federal rollbacks under the Trump Administration, current policies in Maryland will achieve a 42% reduction in gross emissions by 2031 and a 64% reduction in net emissions by 2045 — well short of Maryland's targets.[1]

Figure 3



Source: MDE, 2026

At the same time, the impacts of climate change on the state are increasing. According to the state Department of Natural Resources, climate change has already had numerous effects on the state and is projected to have even more. For instance, temperatures in the state have risen an average of 2.5°F since the start of the 20th century, intensifying heat waves and droughts, reducing habitat in the Chesapeake Bay, and hurting agriculture and outdoor activity. In addition, flooding has increased in Annapolis and elsewhere, sea levels are expected to rise more than 1.5 feet between 2000 and 2050, and storms have grown more intense. The Comptroller's office, which is beginning a study to thoroughly calculate the cost of climate impacts on Maryland, conservatively estimates that it will take

[1] Maryland no longer has a 2031 target in statute, though it remains part of the *Climate Pollution Reduction Plan*. The 2031 target had been codified in the Environment Code at §2–1204.1, but that provision was only effective through the end of 2023.

more than $27 billion just to safeguard communities and infrastructure from chronic flooding by 2040, not to mention a range of other costs from extreme weather events.

Approaches to Promote Both Affordability & Decarbonization: Household Level

There are several types of measures that both reduce household energy burdens and reduce greenhouse gas emissions, including the examples in this section. These measures often have upfront costs, which state investments can partially or fully offset.

Energy Efficiency & Weatherization

Even as electricity and fuel rates increase, it is important to remember that customers do not pay rates; they pay bills, which multiply those rates by actual usage. That means consumption levels matter a lot. Energy efficiency and weatherization can help reduce household energy consumption, reducing customer bills and the amount of electricity that needs to be generated (often by fossil fuels). System-wide, energy efficiency can help avoid the need for some investments in T&D infrastructure and generation capacity.

According to RMI, energy efficiency already saves the average American over $1,000 per year — and **the average Marylander more than $1,500 per year**. Repairing a home's air leaks can **reduce energy bills by 10-20%**, and adding insulation and upgrading lights, thermostats, and HVAC systems can save even more.

Rooftop Solar (& Storage)

According to Permit Power, the average household in Maryland that installs rooftop solar can expect to **cut energy bills by 88%, saving more than $2,000 a year** (and more than $75,000 over the life of the system). Others have other estimates — more than $100 per month, around $73,000 over 25 years, around $34,000 after recouping the cost of the panels. Estimates vary depending on how they are calculated, and individual savings will depend on the size of the system, electricity bills, and more. Regardless, the savings for a household clearly can be substantial. Storage (i.e., batteries) can help maximize the savings, but adding storage also increases the upfront costs of the system.

A 2024 study suggests that rooftop solar can meaningfully reduce Americans' energy burden, particularly for low- and moderate-income households. On average, customers can see bill savings of almost $2,000 a year, or almost $700 a year when factoring in costs and other off-bill impacts (e.g., loan or lease payments). A 2025 study found that a rooftop solar and battery storage system could provide long-term bill relief to low-income households, providing more than 50% or 60% bill savings in some regions. Most residential solar, however, is not installed on the homes that might benefit the most. For instance, in 2021, Maryland households making $50,000 or less per year made up less than 8% of state residential solar installations.

Plug-In ("Balcony") Solar

Among the numerous provisions of the Utility RELIEF Act passed in Maryland in 2026 was language authorizing portable solar (often referred to as "balcony solar" or "plug-in solar") in the state. Such systems are still relatively novel in the United States but are quite common in parts of Europe. Balcony solar generally involves one or a few solar panels (connected to an inverter) that can be plugged into a regular electrical outlet to offset some of a household's electricity use. The 2026 Act authorized one balcony solar system per residential energy meter, with a maximum output of 1,200 watts. A utility cannot require approval, permits, or fees for such systems, though customers have to let the utility know about the installation. Unlike rooftop solar, customers can generally install plug-in solar systems themselves and take the systems with them if they move.

Plug-in solar could cut electricity bills by hundreds of dollars per year (estimated **savings are between $280 and $400 per year in Maryland** for a 1,200-watt system). The costs for such systems should decline substantially as more states enable their use. The amount of savings is larger with bigger systems, and the savings increase as electricity rates go up.

Heat Pumps / Building Electrification

Households and buildings that electrify are less exposed to fossil fuel price volatility. Heat pumps are also far more efficient than electric resistance or fossil fuel appliances.

A 2024 analysis by RMI found that Maryland residents upgrading to a heat pump for space heating and cooling (replacing gas, electric resistance, or oil appliances) could, on average, **save more than $700 a year**, with savings lower for gas customers (around $360/year) and higher for electric resistance customers (around $1,670/year). Upgrading to a heat pump for water heating could, on average, **save around $350 a year**, with savings ranging from $150 for gas customers to $510 for electric resistance customers. Those savings translate to thousands of dollars over the life of the systems.

Similarly, a 2025 analysis from Sierra Club Maryland and the Center for Progressive Reform (assessing Zero-Emission Heating Equipment Standards) found that replacing 14,000 space heaters and 21,000 water heaters in low-income Maryland households each year with heat pumps would yield $350 million in energy savings a year by 2050 (along with substantial health and climate benefits); weatherization would add an additional $45 million per year in savings. The analysis estimated savings of more than $1,300 a year for households upgrading from electric resistance space and water heating, while those upgrading from heating oil and propane could save $865 to almost $1,500 a year. Constellation estimates heat pump savings for households at $250-550 per year.

Taking a broader look at electrification, a 2025 RFF analysis found that New York households that electrify their transportation and home heating could save hundreds of dollars a year in operating costs compared to ones that rely on fossil fuels, across income groups. The savings were even higher if New York were to adopt a cap-and-invest program. A 2026 RFF analysis for Maryland likewise found substantial savings for households that switch to electricity for transportation and home heating.

Electric Vehicles (EVs)

Electric vehicles can provide significant operational savings to drivers, with lower fuel and maintenance costs compared to internal combustion engine vehicles. With respect to fuel, according to the Union of Concerned Scientists, an EV could **save the average Maryland driver more than $900 a year** (depending on the price of gas). A driver filling with gasoline versus powering with electricity will generally pay 2.5 to 3 times more. (Pepco provides an online calculator where one can identify specific fuel savings for any given EV, gas vehicle it is replacing, miles driven, the price of gas, and more.) With respect to maintenance, EVs have far fewer moving parts and fluids and less brake wear, leading to maintenance costs that are about half as much as for a gasoline car — which can translate to savings of more than $4,500 over the life of the vehicle. According to the Maryland EV site, "the average EV driver will **spend 60% less to power their vehicle and spend half as much to repair and maintain** their EV than owners of gas-powered vehicles."

Approaches to Promote Both Affordability & Decarbonization: Community Level

There are approaches that require investment and deployment at a community level that can directly reduce households' energy burdens while also reducing greenhouse gas emissions, including the examples below.

Public Transit & Active Transportation

Investing in public transit and active transportation options (e.g., walking, biking) can get people where they want to go at a much lower cost than driving. Transit riders do not have to pay for cars, gas, parking, tolls, and more. According to WMATA, households that ride Metro save $10,500 a year, since it costs about $12,000 a year to own a car and only about $1,500 a year to ride Metro. The American Public Transportation Association puts the average savings from using public transit instead of driving in a range of cities (including Baltimore) at **more than $13,000 a year**.

RMI analysis indicates that investing in non-car options to reduce per-capita vehicle-miles traveled by 20% could save the average Maryland household more than $2,700 annually through reductions in fuel, parking, vehicle maintenance, and vehicle depreciation costs.

Community Solar

Community solar provides those who cannot or do not have rooftop solar with the option to take a share of a local solar farm and get paid for the electricity it generates, thereby offsetting their household electricity bill. Maryland community solar subscribers generally **save anywhere between 5% and 25%** a year on their electric bills. Unlike rooftop solar and some of the other options described in this paper, there is no upfront cost, installation, or equipment needed by a household.

Approaches to Promote Both Affordability & Decarbonization: Broader Level

In addition to efforts to directly reduce households' energy expenditures, there are investments that can be made to address some of the broader drivers of rising energy prices, including the examples in this section. Such measures reduce the overall costs of the electricity system, translating into reduced costs for households.

Virtual Power Plants

It is very challenging to build new generation within the PJM grid, given obstacles including permitting, financing, regulations, supply chain bottlenecks, and the backlog in the PJM interconnection queue. At a time of surging demand, the result is rising electricity prices, as noted earlier. That suggests a need to accelerate deployment and utilization of distributed resources that can help reduce demand, such as through virtual power plants (VPPs), which can be deployed quickly and inexpensively. VPPs — which use software to aggregate distributed grid-integrated devices such as batteries, electric vehicles, water heaters, and smart thermostats to collectively provide power (e.g., from batteries) and reduce demand — could be a powerful tool.

A 2023 analysis by RMI found that by 2030, VPPs could reduce U.S. peak demand by 60 GW and reduce annual power sector expenditures by $17 billion. Brattle produced a similar analysis. For a household, participating in a VPP means customers get paid for helping the grid.

Advanced Transmission Technologies & Improved Grid Utilization

As noted earlier in this paper, expenditures on transmission and distribution infrastructure are another factor helping to drive up electricity costs. Advanced transmission technologies (ATTs), including advanced conductors and other grid-enhancing technologies (GETs) such as dynamic line ratings, power flow controls, and topology optimization, can create more capacity within the existing grid more quickly and cheaply than building new or replacement T&D infrastructure. A 2024 RMI study found that GETs could enable more than 6 GW of new capacity from the PJM queue to come online within three years; by reducing line congestion and allowing cheaper generation to come online faster, energy production costs could be cut by roughly $1 billion per year.

Similarly, there is surplus interconnection capacity on the grid that could be put to better use. Power plants and the grid are generally built to meet peak demand, which rarely occurs; that means there is a significant amount of excess interconnection capacity on the system most of the time. Surplus interconnection service (SIS) helps maximize the use of existing infrastructure by adding new clean generation near the site of existing generation plants (which continue operating). SIS can be a fast, low-cost way to add new clean energy resources on the grid. A 2025 UC Berkeley study found that PJM could add more than 150 GW of clean energy capacity through SIS in 1-2 years while saving more than $31 billion in interconnection costs and transmission upgrades. Unfortunately, SIS appears to have gained less traction in PJM than in the territories of some other grid operators.

Large-Scale Renewables & Storage

Although building new generation within PJM is difficult, and building new renewable generation is even more so due to active obstruction by the Trump Administration, it is important to recognize that solar, wind, and batteries are the cheapest (and fastest) options for adding power to the grid. The fact that renewables are the most cost-competitive generation and the quickest to deploy is still somewhat underappreciated by many.

Even without tax credits, the levelized cost of electricity from solar is lower than from natural gas combined-cycle (NGCC) on average and in most regions; adding storage to wind or solar makes their levelized costs about the same as NGCC. As for coal, power from a new plant would be almost twice as expensive as solar or wind and would take much longer to build. The market has responded accordingly. Across the country, 92% of new power additions to the grid in 2025 were solar, wind, or batteries, just a shade under their 93% share in 2024. Where more power is needed, renewables are now the least-cost option.

Additional Discussion

The approaches described above are generally recognized as ones that can reduce the emissions driving climate change. They are less widely recognized as ways to address energy affordability concerns. As such, there may be some nuances and debates regarding costs that are worth digging into a little deeper.

For example, as noted sometimes earlier, there are upfront costs for many of these approaches. Someone has to pay to weatherize a home, put solar panels on a building or in a community, install a heat pump, procure an electric vehicle, or build out public transit. Some of these costs are traditionally borne by the home or building owner, while others are typically borne by a utility or a government (perhaps making their way, at least in part, back to the consumer through bills or taxes). All of the measures described in this paper can produce net savings, depending on policy and implementation details. Net savings, however, are not the primary focus of this paper, because net benefits are primarily relevant when the party receiving the benefits and the party making the investment are the same. If consumers are buying an EV instead of a gasoline car to save money, then those consumers need to know if they will save more over time than any additional amount they might spend upfront. This paper, however, is exploring ways that *government* investment can yield savings for Marylanders. Cost-effectiveness is still incredibly important, of course, but the focus here is on how much that investment can reduce energy expenditures for Maryland residents.

A key issue to consider regarding government investment in such measures is whether the savings that accrue to consumers increase costs for other consumers. This “cost-shifting” concern has surfaced most notably in debates about rooftop solar and EVs, and there is not a clear conclusion to those debates. A 2025 working paper by researchers at the University of Maryland, Princeton University, and Resources for the Future found that technologies that reduce consumption from the grid, such as rooftop solar, raise average retail rates by a small amount for non-adopters in the short term (because the fixed costs of the system are spread over fewer kilowatt-hours), while technologies that increase

consumption, such as EVs, reduce average electricity prices by a small amount in the short term, benefitting non-adopters. (Utility-managed EV charging, in particular, can help lower electricity rates.) Critiques of the working paper point out that it focuses on the short-term, whereas rooftop solar can avoid or defer costly infrastructure investments and energy supply contracts over the longer term; the short-term cost-shifts found by the working paper are also quite small compared to the rate increases and cost drivers explained earlier in the energy affordability background section. There are numerous other studies and papers that have come down on one side of the issue or the other, finding either that rooftop solar shifts costs to non-adopters or that it brings benefits to non-adopters. A 2024 analysis by the California Public Advocates Office, for instance, found that California's net metering program for rooftop solar would cost non-adopters $8.5 billion in 2024, while a rebuttal analysis using the same data found that rooftop solar in the state had instead saved customers $2.3 billion. The result in any given location may well depend on net-metering policy details, infrastructure needs, levels of electricity demand, and other considerations.

There is a different cost-shifting concern as well, namely that increasing building electrification (e.g., heat pump adoption) leaves the costs of maintaining the natural gas system to be borne by a smaller and smaller base of customers, often low- and moderate-income ones, thereby significantly increasing their energy burdens. This challenge can be addressed by prioritizing equitable building electrification, encouraging gas utility transitions to thermal energy networks, and otherwise pursuing intentional planning about the future of gas in a state.

What It Means for Maryland

Maryland already has programs, incentives, and initiatives to support several of the measures described in this paper. Budgets for these items should be protected and, where possible, increased. If the state had additional money to invest (such as by adopting an economy-wide cap-and-invest program), it could do even more to enhance energy affordability for Marylanders while driving down greenhouse gas emissions.

Maryland is investing in some of these areas, including with revenues from the Regional Greenhouse Gas Initiative (RGGI), a multi-state cap-and-invest program for the electric power sector. For instance, in 2023, Maryland investments of RGGI revenues included low- and moderate-income energy efficiency programs, clean transportation, building electrification, and more. Maryland has incentives for heat pumps, and the Maryland Energy Administration also has a suite of energy efficiency grant and loan programs. The expected savings from the EmPOWER energy efficiency programs run by Maryland utilities over the life of the installed measures is almost $16 billion, and in 2023, the Maryland Department of Housing and Community Development (which runs the limited-income EmPOWER programs for single-family homes and multifamily properties) weatherized around 8,000 homes and almost 4,000 properties, saving participants, on average, almost 800kWh. Maryland has also been working to expand community solar, including $17 million in grants announced in October 2025 to develop more solar projects on landfills and brownfields, all of which must be subscribed to low-income Marylanders.

If the state secured additional revenues for climate-related investments (such as by adopting an economy-wide cap-and-invest program, as called for in the Maryland Department of the Environment's *Climate Pollution Reduction Plan*), the state could do more in these and other areas to achieve both climate and affordability goals. Other states have directed economy-wide cap-and-invest revenues to such measures. For instance, over the last decade, California has invested $13 billion of cap-and-invest revenues in projects to address climate change and pollution, including investments in programs to provide rebates for clean vehicles, develop high-speed rail, expand low-emission transit and mobility in underserved low-income communities, deploy clean heating and electrification, and support low-income home solar and weatherization. Likewise, across 2023-2025 budgets, Washington estimates that of the $1.4 billion in cap-and-invest investments already made, 42% are directed to benefit overburdened communities, including investments in rebates for high-efficiency electric equipment (e.g., heat pumps), weatherization, bike and pedestrian grants, vehicle electrification, transit, and more.

Reducing energy bills by pursuing such approaches, particularly for low-income households, has the added benefit of reducing the amount of energy bill assistance the state has to provide.

Conclusion

There was a time when clean technologies were more expensive, but that time has passed. Affordability and reducing climate pollution can go hand in hand. There is no need to sacrifice one for the other.

A range of technologies and approaches can be implemented in households, in communities, and across the electricity system to achieve these dual goals. The Regional Greenhouse Gas Initiative has been an excellent source of funds for Maryland to invest in affordability and emissions reduction. If Maryland expanded on RGGI to create an economy-wide cap-and-invest system, that would generate even more money to invest in reducing people's energy bills and meeting Maryland's climate goals.