CONSERVATIVE COALITION *for* CLIMATE SOLUTIONS

The Case for Reconsidering Renewable Portfolio Standards

Renewable Mandates, Electricity Affordability, and Policy Efficiency

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Introduction

Rising electricity prices in parts of the country have renewed the importance of affordability as a central concern in energy policy. In response, both sides of the political debate have pointed fingers, blaming the other side's preferred technologies and policies for higher household utility bills.[1] But the drivers of electricity price trends are complex, and it is difficult to isolate the effect of any single factor.

Even so, renewable energy and climate policies have come under growing scrutiny, and wind and solar generation have been cast by some as key contributors to rising electricity prices.[2] The available evidence suggests a more nuanced picture.[3] Integrating wind and solar can require additional investment in transmission and reliability resources, especially in places where grid conditions or policy design make integration more complex. But in places with strong renewable resources and fewer additional constraints, those technologies also have the potential to play a useful role by diversifying supply and help put downward pressure on wholesale prices because of their very low marginal operating costs when available.[4] The more important question, therefore, is not whether renewable energy is inherently affordable or unaffordable, but whether policies that mandate its deployment impose costs beyond what market-driven adoption would produce, and whether the resulting benefits justify those costs.

Renewable portfolio standards (RPS) are especially important in this regard. They are among the most widely used climate policies in the United States, with more than half of the states and the District of Columbia having adopted them. In general, RPS policies require a share of electricity sales to come from qualifying renewable sources, though their designs vary substantially across states. They differ in coverage, eligible technologies, credit-trading rules, and the stringency of their targets, with some states requiring very high or even 100 percent renewable electricity within the next decade.

Those differences make RPS difficult to evaluate cleanly. State electricity prices are shaped by many factors, including fuel costs, infrastructure needs, regulatory structures, and preexisting differences in renewable resource quality. Still, the available evidence suggests that RPS policies can place upward pressure on electricity prices while also contributing to emissions reductions. The broader economics literature likewise suggests that they are generally a less efficient means of reducing emissions than alternatives such as carbon taxes or cap-and-trade regimes, which allow reductions to occur through a wider range of lower-cost channels.

Despite their relative inefficiency, RPS have been politically attractive climate policies. They are familiar within state-level utility regulation, but their costs are less transparent than those of more explicit market-based climate policies. But the current affordability concerns and the subsequent focus on renewable energy suggest that the trade-offs are hard to fully obscure. Climate policy inevitably involves present-day costs in exchange for longer-term benefits; the key question is not whether there are tradeoffs, but which policies achieve emissions reductions at the lowest cost and in the most durable form.

The question is not whether renewable energy is inherently affordable or unaffordable, but whether policies that mandate its deployment impose costs beyond what market-driven adoption would produce, and whether the benefits justify those costs.

That question is especially important now. With the repeal of renewable energy tax credits under the Inflation Reduction Act and the increasingly ambitious RPS targets in many states, the tradeoffs of these policies are becoming harder to ignore. RPS policies are a comparatively costly and inflexible way to reduce emissions, and states should reconsider whether mandatory renewable standards remain justified. Where possible, they should repeal binding RPS requirements; where that is not feasible, they should adopt voluntary renewable goals or, at a minimum, freeze further target increases and make existing programs as flexible as possible.

What Are Renewable Portfolio Standards?

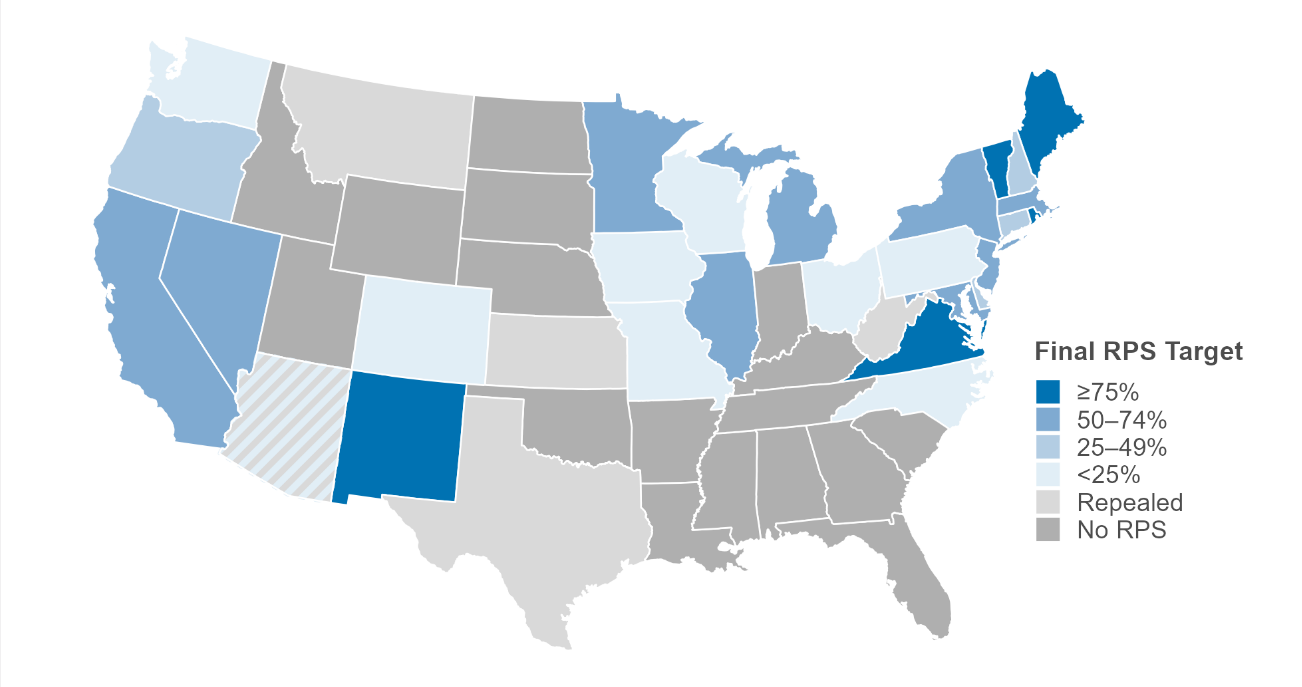
Renewable portfolio standards emerged from two distinct policy motivations. The first grew out of the energy-conservation and fuel-diversification agenda that followed the 1970s energy crisis. Renewable energy benefited from these efforts as policymakers sought to reduce reliance on imported fuels and conserve domestic energy resources. The first RPS in the United States was enacted in Iowa in 1983, but RPS policies did not spread widely until the mid-to-late 1990s, when many states were restructuring electricity markets. In those debates, renewable requirements often served as part of a broader compromise intended to preserve support for renewable energy as states moved toward more market-oriented electricity regimes and away from the earlier regulatory arrangements that had previously supported renewable generation.[5] Early standards in states such as Iowa, Texas, and Minnesota were relatively modest and often satisfied quickly.[6]

As climate change became a more prominent policy concern in the mid-2000s, RPS adoption accelerated. Many of the policies enacted during this period were chiefly motivated by climate change, though cleaner

Figure 1.

The Current Landscape of State Renewable Portfolio Standards

Status and final targets of mandatory RPS in the contiguous U.S.



SOURCE: Lawrence Berkeley National Laboratory. Hawaii additionally has a mandatory RPS with a final target of 100 percent. Arizona's RPS has been repealed, though that repeal is subject to ongoing legal challenges. Final RPS targets reflect Lawrence Berkeley National Laboratory estimates of the share of retail electricity sales ultimately required to be supplied from eligible renewable resources under each state's mandatory standard.

air, job creation, energy security, and fuel diversification remained important considerations in some states.[7] Climate concerns have also continued to drive the expansion and strengthening of many RPS programs over the past two decades.

Currently, 27 states and the District of Columbia have mandatory Renewable Portfolio Standards, while several other states have adopted nonbinding renewable portfolio "goals."[8] Most states structure RPS requirements as a percentage of retail electricity sales that must be supplied from renewable resources, though the resources that qualify as "renewable" differ across states. Some states limit eligibility to traditional renewables, such as wind, solar, geothermal, certain hydropower, and biomass, while others more broadly credit alternative energy technologies, such as municipal solid waste-to-energy and high-efficiency combined heat and power.[9]

Target years, phase-in schedules, and final targets also vary substantially. As shown in Figure 1, some states have relatively modest targets, often reflecting older RPS programs originally justified in terms of fuel diversification and conservation. Others have adopted much more ambitious standards. Fifteen states, plus DC, will require more than 50 percent of their electricity to be generated by renewable energy by 2050. Rhode Island has the most aggressive RPS, requiring 100 percent renewable energy by 2033.

Along with differences in targets, RPS programs vary substantially in scope and design. Some apply primarily to investor-owned utilities, while others extend more broadly to additional load-serving entities, including electric cooperatives and municipally owned utilities. States also differ in whether they include technology-specific carve-outs, such as requirements for distributed generation or rooftop solar.

RPS policies are generally implemented and enforced through renewable energy certificates (RECs). Eligible renewable generators receive one REC for each megawatt-hour (MWh) of qualifying electricity generated and delivered to the grid. Utilities or other load-serving entities subject to an RPS must demonstrate compliance by retiring a sufficient number of RECs, which they may either obtain by generating renewable electricity themselves or by purchasing RECs from other eligible generators. If they do not, they typically must make an alternative compliance payment (ACP) instead. In practice, the ACP functions as an effective price cap on REC markets.

Compliance may occur either through bundled renewable contracts, such as power purchase agreements that include both power and RECs, or through purchases of unbundled RECs separate from electricity supply. Retail-choice states typically rely on unbundled RECs, while vertically integrated states rely more on bundled power purchase agreements.[10]

REC markets are often regional rather than purely in-state. Many states allow at least some RECs from out-of-state generators, and as a result, common REC markets have developed in places such as New England and the Mid-Atlantic. However, the price of RECs typically depends on each state's eligibility rules. For example, New England RECs in 2025 were roughly $40 per MWh (or 4 cents per kilowatt-hour [kWh]), while prices for most mid-Atlantic states declined to below $30 per MWh.[11]

In recent years, some states have also adopted clean electricity standards (CES), which require 100 percent of electricity to come from a broader set of "clean" energy technologies. In practice, this means that qualifying resources may include technologies beyond traditional renewables, such as nuclear power and, in some cases, fossil-fuel generation paired with carbon capture. These policies are often layered on top of existing RPS programs. California, for example, requires 60 percent renewable electricity by 2030 and 100 percent clean electricity by 2045.[12]

In the meantime, although many states have adopted clean electricity standards or increased their renewable portfolio standard targets, a few states have moved in the opposite direction by repealing RPS programs, converting them into voluntary goals, or allowing them to phase down. West Virginia was the first state to repeal its RPS outright in 2015.[13] Kansas followed suit that same year, replacing its standard with a voluntary renewable energy goal.[14] Montana repealed its RPS in 2021, while Texas repealed the mandatory portion of its renewable credit program, with the remaining mandatory requirements ending September 1, 2025.[15] Most recently, the Arizona Corporation Commission voted in March 2026 to repeal the state's Renewable Energy Standard and Tariff rules, though that action is now being challenged by the state attorney general, so its ultimate status remains unsettled.[16] Ohio has not repealed its RPS, but its standard effectively expires after 2026, though the law remains on the books.[17]

The Economic Effects of Renewable Portfolio Standards

Since their introduction, RPS have faced questions about their impact on electricity prices and distortionary effects on markets. Given the recent prominence of energy affordability as a cost-of-living concern for American families and, consequently, a policy concern, that relationship deserves even more scrutiny. As shown in Figure 2, average electricity prices have risen sharply in nominal terms over the past several years. In inflation-adjusted terms, national average electricity prices have been more stable, though they still rose modestly between 2024 and 2025.[18]

National averages, however, mask substantial variation across states. The left panel of Figure 3 illustrates this variation by showing the five-year change in average retail electricity prices by state.[19] While many states experienced little change or even had declines, others, notably California and several northeastern states, saw substantial price increases over the same period. As shown in the right panel of Figure 3, many of these states also experienced large increases in their RPS requirements.[20]

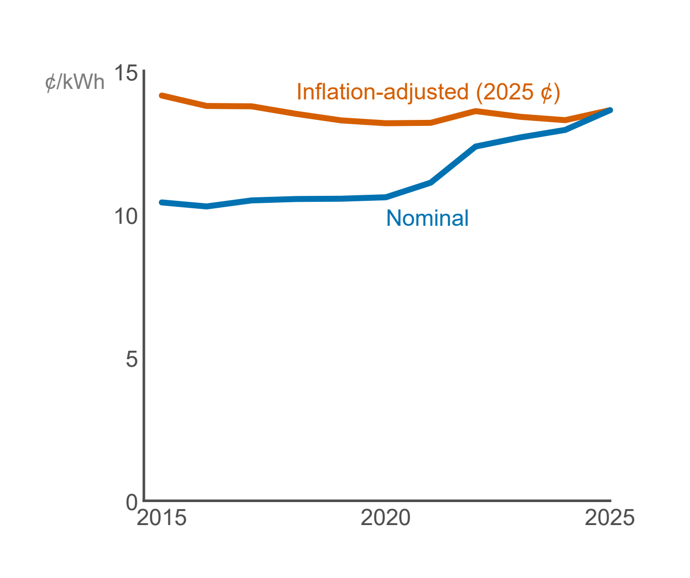
Of course, many factors shape electricity prices, and it is difficult to attribute changes to any single policy. Recent price increases in many states have been driven in large part by rising transmission and distribution expenditures, especially for replacing and modernizing aging infrastructure. In some states, sharper price increases have also reflected the costs of storm recovery, wildfire mitigation, and other resilience measures aimed at reducing future damage from extreme weather and natural disasters. Some evidence, however, suggests that RPS policies may have contributed to higher retail electricity prices in several states.[21]

At the same time, supporters of RPS often argue that these policies should have little effect on prices, or may even reduce them, because renewable energy sources have near-zero marginal operating costs.[22] Given price concerns in many parts of the country, evaluating these competing claims is essential.

Figure 2.

Retail Electricity Prices Nationwide Have Kept Pace with Inflation

U.S. annual average retail electricity rates, all sectors



SOURCE: U.S. Energy Information Administration

WHY RPS CAN RAISE ELECTRICITY PRICES

Standard economic intuition suggests that RPS would tend to raise electricity prices. Mandates requiring generation from a specific class of technologies, which have historically been more costly than conventional sources, should increase both generation and compliance costs. Some economic theory, however, suggests that the relationship is more complicated.

Carolyn Fischer, an economist at Resources for the Future, modeled the relationship between RPS and electricity prices and showed that, depending on the circumstances, RPS policies can either raise or lower prices.[23] In her framework, an RPS acts both as a subsidy to renewable energy, by providing renewable generators with an REC they can sell, and as an implicit tax on fossil fuel generation, by requiring conventional suppliers to purchase RECs to comply with the mandate. The net price effect depends on which of these two forces is stronger.

The relative strength of these offsetting effects depends on several factors, especially the stringency of the standard and the relative responsiveness of renewable and nonrenewable electricity supply. When the standard is modest (less than 10 percent renewable generation required), and renewable supply can expand easily, the subsidy effect can dominate, allowing additional low-marginal-cost renewable generation to put downward pressure on wholesale electricity prices. As the standard becomes more stringent, however, compliance costs rise, REC prices increase, and the implicit tax on fossil fuel generation becomes more significant. In those cases, the tax effect is more likely to dominate, pushing prices upward. Fischer's framework, therefore, suggests that RPS policies can lower prices under limited conditions.

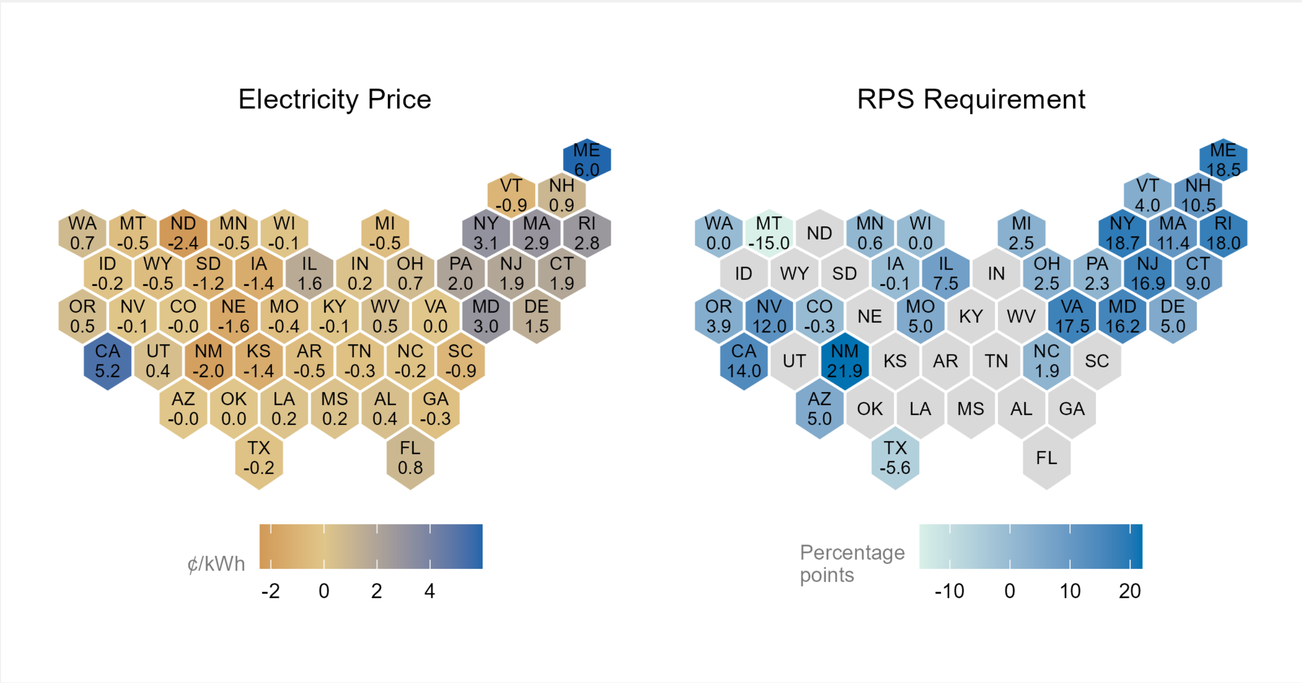
Most state RPS policies, however, are well above the relatively modest 10 percent renewables mandate under which those price-reducing effects are most likely to occur. Other long-run models reach a similar conclusion: while short-run price effects may be ambiguous, tighter RPS requirements are more likely to raise long-run electricity prices unless declining renewable costs offset the added compliance burden.[24]

Additional research also suggests that tighter RPS requirements tend to raise electricity prices, but emphasizes that the effect on the actual amount of renewable generation deployed is less clear.[25] Because

Figure 3.

Electricity Price and RPS Policy Changes Vary Widely Across States

Change from 2020 to 2025



SOURCE: Author calculations based on data from U.S. Energy Information Administration and Lawrence Berkeley National Laboratory.

higher electricity prices reduce demand, an RPS may result in either more renewable generation or lower overall electricity consumption. The balance between these effects depends on state-specific characteristics, including renewable resource endowments, transmission conditions, and the degree of intermittency. Where available renewable resources are highly intermittent, such as wind and solar, adding more renewable generation can require backup generation and other system adjustments to maintain reliability. Those added costs can push electricity prices higher while also limiting the amount of additional renewable generation the policy ultimately adds to the system.

Taken together, the theoretical literature suggests that RPS policies, especially at the levels of stringency now common in many states, are likely to put upward pressure on electricity prices. However, the magnitude of that effect varies across markets and policy designs.

WHAT THE EVIDENCE SHOWS ABOUT PRICE EFFECTS

In practice, estimating the effect of renewable portfolio standards on price is not straightforward. States differ in their existing resource mix, renewable energy potential, regulatory structure, and electricity demand, and RPS policies themselves vary widely in design and stringency. At the same time, renewable deployment has been supported by a range of federal and state subsidies, meaning some of the costs associated with these mandates may be shifted from utility bills to taxpayers. However, the empirical literature does suggest that RPS policies have, on balance, put upward pressure on electricity prices over time.

Looking only at direct compliance costs, the most recent Lawrence Berkeley National Laboratory assessment finds that, among states with available data, RPS compliance costs averaged 4.3 percent of retail electricity bills in 2024.[26] However, there is substantial variation across states. Some had relatively low costs, such as Colorado at about 0.6 percent, while others were much higher, such as New Jersey at nearly 12 percent. Washington, D.C. is not included in the reported average, but its compliance costs exceeded 15 percent. These costs have also increased over time: LBNL estimated the national average at 2.2 percent in 2015, roughly half the 2024 level.

Compliance costs, however, do not fully capture the effect of renewable mandates on retail electricity prices. On the one hand, they do not include broader system costs that can accompany greater reliance on renewable generation, such as transmission investment, backup generation, and other integration costs to maintain reliability. On the other hand, they also do not capture the possibility that renewable generation with very low marginal operating costs can put downward pressure on wholesale electricity prices. They are therefore a useful measure of the direct cost of meeting the standard, but not of the policy's full effect on retail rates.

A 2025 study by researchers at LBNL takes a broader view of recent electricity price trends and seeks to identify the main drivers of price change differences across states.[27] After accounting for factors such as changes in customer load, behind-the-meter solar growth, utility-scale wind and solar deployment, natural gas price exposure, reliability disruptions, and California-specific conditions, the study finds that growing RPS requirements were an important driver of price increases from 2019 to 2024. It also points to rising investment in transmission and distribution, driven in part by efforts to repair and reduce future damage from wildfires and storms, as well as policies that incentivize behind-the-meter solar, which can shift a larger share of fixed utility costs onto customers who do not generate their own electricity.[28]

Importantly, the researchers also find that utility-scale wind and solar do not, on their own, appear to be associated with higher prices. In fact, outside of states with RPS policies, their analysis suggests weak evidence that growth in wind and solar was associated with retail price decreases during the study period.

That study provides a broader and more useful account of recent price trends than simple compliance-cost estimates, but it does not fully resolve whether RPS policies themselves caused the observed price increases. There is a correlation between growth in RPS requirements and changes in retail electricity prices, but much of that simple correlation may be explained by preexisting differences across states and common shocks over time.

In other words, states with more ambitious RPS policies tend to have higher electricity prices, but that does not necessarily mean the policies themselves are responsible for those higher prices. Some states have persistent characteristics that affect retail rates, such as geography, climate, legacy generation mix, and regulatory environment. Those characteristics may or may not be related to a state's willingness to adopt more ambitious renewable targets. States are also exposed to common year-to-year shocks, such as fuel-price volatility and broader macroeconomic conditions.

States with more ambitious RPS policies tend to have higher electricity prices

In a 2025 working paper for the MIT Center for Energy and Environmental Policy Research, Fischer Argosino and Christopher Knittel examine the relationship between RPS stringency and electricity prices using an approach that controls for persistent differences across states and common shocks by comparing each state to itself over time, rather than relying on simple cross-state comparisons.[29] Once they do so, they no longer find a statistically meaningful relationship between RPS policies and prices, suggesting that the raw correlation reflects other confounding factors. They also find a weak negative relationship between utility-scale wind and solar deployment and electricity prices, and argue that much of the price variation often attributed to RPS is more plausibly explained by associated behind-the-meter solar policies and by rising infrastructure investment needed to respond to and prepare for natural disasters.

Even so, RPS may still affect prices through channels that emerge gradually as standards tighten and new generation and infrastructure are added to the system. Other empirical work is consistent with that possibility. One study finds that the clearest price effects appear not simply when an RPS is enacted or made more stringent, but when its requirements become binding, and utilities are required to comply in practice.[30] Another finds that utilities subject to an RPS charged higher rates on average, while marginal increases in the standard did not necessarily lead to proportionally higher rates, suggesting that some of the costs may be fixed rather than increasing smoothly with each additional increment of the mandate.[31]

Longer-run studies also tend to find increased price effects. Gregory Upton and Brian Snyder compare states that adopted RPS policies to carefully constructed non-RPS comparison states and find that RPS states have roughly 11 percent higher electricity prices, along with lower electricity demand, no clear increase in renewable generation, and only weak evidence of emissions reductions relative to those comparison states.[32]

A series of working papers by Michael Greenstone and Ishan Nath likewise compares states before and after they adopt RPS policies to other states over the same period, while controlling for many other policies and market conditions that could affect electricity prices.[33] They find larger long-run effects, with electricity prices about 11 percent higher seven years after adoption and 17 percent higher twelve years after adoption. By accounting for spillovers and out-of-state emissions, they also find substantially larger emissions reductions associated with RPS policies.

These studies provide valuable evidence on the effect of RPS policies, but they too have limitations. Both depend on the suitability of their comparison states and on whether those comparisons accurately capture what would have happened in the absence of an RPS. More importantly, later research suggests that when policy effects differ across states or build gradually over time, conventional comparisons of outcomes before and after policy adoption may provide a misleading estimate of RPS impacts.[34]

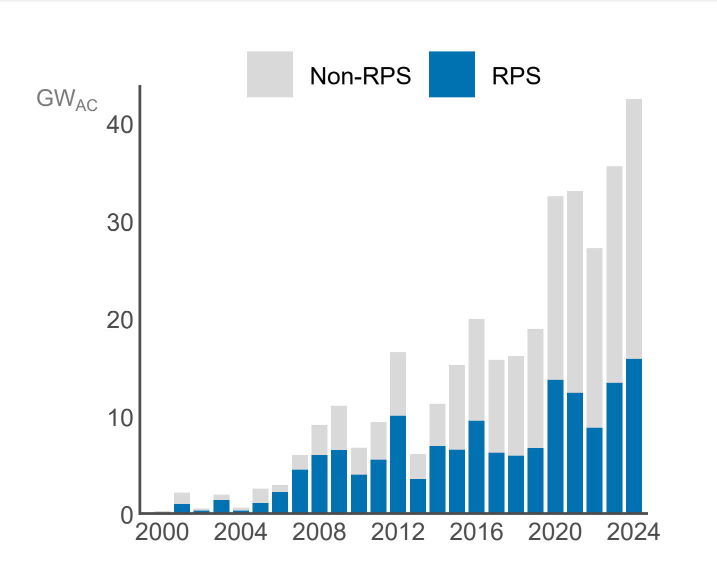
On balance, however, the empirical literature does suggest that RPS has tended to put upward pressure on electricity prices. But the more important question is not simply whether costs of RPS appear on utility bills, but what broader costs RPS and related climate policies impose.

To the extent that an RPS changes behavior, it does so by pushing the electricity sector towards a compliance path that commits resources to renewable generation, REC purchases, transmission, and other adjustments that would not have otherwise occurred. Those costs may be borne directly by ratepayers through higher electricity prices, or less visibly through subsidies, tax credits, or other fiscal and regulatory mechanisms that shift part of the burden to taxpayers. But regardless of where they appear, RPS policies impose real costs by requiring the sector to pursue a different and often more expensive path than the counterfactual.

Figure 4.

The Majority of Renewable Capacity Additions Now Occur Outside RPS Programs

Annual U.S. renewable electricity capacity additions



SOURCE: Lawrence Berkeley National Laboratory.

HOW MUCH RENEWABLE DEPLOYMENT DO RPS ACTUALLY CAUSE?

A separate question is how much RPS policies have actually increased renewable generation, rather than reducing emissions indirectly by raising electricity prices and lowering demand.

Evaluating the effect of RPS on renewable generation requires more than simply observing renewable growth in states with the policy. The relevant question is how much additional renewable generation RPS caused beyond what would have occurred anyway. That requires accounting for spillover generation from other states and for the renewable capacity that would likely have been developed even in the absence of RPS mandates.

Figure 5 illustrates why this distinction matters. It shows renewable capacity additions classified as "RPS-related," meaning that the projects' output or RECs were used, or could plausibly be used, to satisfy RPS compliance, depending on the off-taker and region, according to LBNL.[35] In the early years of renewable deployment, a large share of new capacity appears to have been tied to RPS compliance. Over the past decade, however, most new renewable capacity has been built outside that framework, by entities or in settings not directly subject to RPS requirements. In 2024, more than 60 percent of newly added renewable capacity was classified as non-RPS-related.

As LBNL notes, this classification is broad. It includes all renewable capacity that could plausibly be used to satisfy RPS requirements, including projects whose RECs may be sold across state lines or whose output serves load-serving entities with compliance obligations elsewhere. In that sense, the figure can be understood as an upper-bound estimate of the renewable capacity associated with RPS markets.

However, the figure does not tell us the counterfactual, namely, how much of this capacity would have been built even in the absence of RPS policies. The same market conditions and policy incentives that encouraged renewable investment, including federal tax credits and falling technology costs, also motivated many renewable projects outside of RPS compliance. The fact that a project is classified as RPS-related does not mean that RPS policies caused its development. The large share of renewable capacity built outside RPS frameworks suggests that at least some of the capacity used for RPS compliance would likely have been built even without those mandates.

That said, RPS mandates have probably promoted some renewable deployment. The harder question is how much additional renewable generation they caused beyond what would have happened anyway. Relatedly, have associated emissions reductions been caused by increased renewable generation or increased prices?

Many of the most prominent studies illustrate the distinction between increases in renewable generation and reductions in emissions. Upton and Snyder find higher electricity prices and lower electricity demand in RPS states, but no clear increase in renewable generation relative to their comparison states, and only weak evidence of emissions reductions.[36] Greenstone and Nath likewise find higher electricity prices and lower emissions after RPS adoption, but do not find comparably strong evidence of large increases in renewable generation.[37] Taken together, these studies suggest that at least part of the emissions effect of RPS may operate through reduced electricity consumption rather than through large increases in renewable output.

But other studies help explain why the generation effects may be less clear. In particular, they suggest that aggregate results may mask important differences across states. The effect of tighter RPS requirements depends heavily on state-specific conditions, including renewable resource endowments, intermittency, and integration costs.[38] In states where renewable expansion is more costly or more constrained, stricter RPS requirements may raise electricity prices without producing large gains in renewable generation. In those cases, the policy may reduce emissions more by lowering electricity demand than by adding substantial new renewable capacity. In states with more cost-effective renewable resources, by contrast, RPS policies may be more likely to promote additional renewable generation.

Other empirical work reaches a similar conclusion from a different direction. When accounting for interstate REC trading, preexisting renewable generation, and the possibility that states with stronger renewable potential were more likely to adopt ambitious RPS requirements in the first place, Rachel Feldman and Arik Levinson conclude that RPS may increase wind and solar generation and reduce emissions, but that these effects are generally small.[39] In their telling, RPS does not appear to account for much of the overall growth in renewable electricity sources.

At the same time, more recent work suggests that the effects of RPS on renewable deployment may differ substantially across technologies and over time. Olivier Deschenes, Christopher Malloy, and Gavin

McDonald argue that earlier studies may miss these differences because they pool together states with very different policies and resource conditions and often fail to distinguish between wind and solar.[40] Using a longer dataset and methods designed to better handle policies adopted at different times, they find that RPS significantly increased wind capacity and wind generation, but had no statistically significant effect on solar. They also show that these wind effects emerged gradually, with much of the increase appearing five or more years after adoption.

In all, the literature suggests that the effect of RPS on renewable generation is real in some settings, but far from uniform. Results depend on technology, timing, state resource conditions, interstate REC markets, and the extent to which renewable growth would have occurred even in the absence of the policy. The evidence for emissions reductions is somewhat stronger, but even there, the mechanism is not always the same. In some cases, emissions appear to decline as more renewable generation is added; in others, they may decline because higher electricity prices reduce overall electricity demand.

DO THE BENEFITS OF RPS JUSTIFY THE COSTS?

The key policy question is whether the benefits of RPS justify its costs. For those who place little value on emissions reductions, RPSs are unlikely to appear worthwhile. Although RPS have long been defended on grounds such as fuel diversification, energy security, and economic development, the strongest modern argument for them is that they reduce emissions by shifting generation toward renewable sources.[41]

Even for those who view emission reductions as important, however, the relevant question is whether RPS policies deliver those benefits at an acceptable cost. This is where the social cost of carbon becomes relevant, but also where the analysis becomes highly sensitive to underlying assumptions.

Greenstone and Nath's working papers illustrate this problem. Earlier versions of their analysis reached a different judgment about the cost-effectiveness of the electricity price increases associated with RPS relative to the climate benefits of the associated emissions reductions. In 2019, they concluded that the "current costs of RPS programs exceed their benefits."[42] Their updated 2024 analysis concluded that "RPS policies may have social benefits…that exceed their costs."[43] The change partly reflects refinements in their emissions estimates, with abatement costs narrowing from $130 to $460 per metric ton of CO2 abated in the 2019 paper to $80 to $210

per metric ton in the 2024 update. But it also reflects a sharp increase in the assumed social cost of carbon, from an interim value of $51 per ton in 2019 to $216 per ton in 2024.

That shift largely reflects differences in normative assumptions when estimating the social cost of carbon, such as the chosen discount rate, and underscores how judgments about cost-effectiveness can depend heavily on contested estimates of climate damages.[44] For that reason, climate policies are better evaluated in relative rather than absolute terms. The relevant question is not whether RPSs reduce emissions at all, but whether they do so more efficiently than the available alternatives.

WHY RPS ARE USUALLY COSTLIER THAN ALTERNATIVE CLIMATE POLICIES

On that comparative question, the economics literature is much clearer: renewable portfolio standards are generally a relatively costly way to reduce emissions. Most studies find that market-based policies, especially carbon taxes or cap-and-trade programs, can achieve a given reduction in emissions at lower overall cost.[45]

To be clear, there are important reasons why carbon pricing or cap-and-trade policies remain politically and practically contentious, and why they may not always be the preferred approach in real-world climate policymaking. Most importantly, these policies are subject to the same uncertainties that affect estimates of the social cost of carbon, and setting the “right” carbon price or emissions cap requires difficult judgments about scientific uncertainty, economic damages, and intergenerational trade-offs.[46] Those uncertainties make it hard to determine the socially optimal level of policy with precision.

Even so, emissions pricing remains an important benchmark because it rewards emissions reductions wherever they can be achieved at the lowest cost, rather than steering compliance through a particular technology or regulatory pathway. That allows firms and consumers to respond along multiple margins, including fuel switching, reduced electricity consumption, and investment in cleaner generation.[47] Under some assumptions, other policies can approach the cost-effectiveness of carbon pricing. In particular, emissions-intensity standards reward generators according to their relative greenhouse gas emissions and can therefore preserve some of the flexibility that makes carbon pricing attractive.[48] Some modeling finds that, under specific conditions, such standards can compare favorably with a carbon tax or cap-and-trade.[49]

RPS-style policies, however, do not operate in that way. Instead, they distinguish between qualifying and non-qualifying generation sources, rewarding renewable generation while treating all nonrenewable sources alike.

There are important reasons why carbon pricing or cap-and-trade policies remain politically and practically contentious, and why they may not always be the preferred approach in real-world climate policymaking.

Most state clean electricity standards are somewhat broader because they include a wider set of qualifying technologies. However, rather than crediting generators continuously based on actual emissions rates, they typically still create a binary distinction between "clean" and "dirty" generation and are therefore subject to many of the same efficiency criticisms as RPS.

In contrast to emissions pricing, RPS policies are less efficient because they rely on renewable deployment as the primary channel for emissions reductions. That narrower design can miss lower-cost opportunities for emissions abatement, such as shifting from coal to natural gas. David Young and John Bistline of the Electric Power Research Institute find that the least-cost way to achieve a given emissions target often does not rely on renewable generation alone, but instead involves a broader portfolio of adjustments across the electricity sector, including substantial coal-to-gas substitution.[50] In their modeling, renewable portfolio standards are, in most cases, roughly twice as costly as the equivalent least-cost portfolio. They also find that, depending on future natural gas prices, renewable mandates may displace non-coal generation on the margin rather than coal generation. As a result, RPS can produce a generation mix that is more costly and less effective at reducing emissions than one shaped by direct emissions pricing.

A further limitation of RPS is that emissions pricing works through both the supply and demand sides of the electricity market. A carbon tax changes the relative costs of different generation sources while also raising electricity prices for final consumers, thereby encouraging cleaner generation and lower electricity consumption. By contrast, an RPS primarily shifts the generation mix and influences electricity demand only indirectly, to the extent that its costs are passed through to retail prices. Much of the difference in cost-effectiveness across electricity policies arises from these demand side effects.[51] Evidence from a California-based model finds that a carbon tax is the most efficient policy, but that RPS policies become more cost-effective the more their costs are fully reflected in retail prices.[52] The more those costs are passed through to consumers, the stronger the incentive to reduce electricity consumption. Even then, however, RPS remains less cost-effective than a direct carbon price.

In theory, tradable RECs make an RPS more flexible than a non-tradable renewable mandate by allowing compliance to occur through the lowest-cost eligible renewable resources. But that market mechanism only partially mitigates the underlying inefficiency of the policy, because the mandate still narrowly rewards renewable generation rather than emissions reductions themselves. Furthermore, in practice, many state RPS programs include provisions that limit those efficiency gains. REC markets are often fragmented, transaction costs can be high, and interstate trading is frequently restricted.[53]

Technology- and location-specific requirements further undermine efficiency. Carve-outs for particular technologies, often distributed solar, reduce the set of eligible compliance options. Likewise, rules requiring some share of compliance to come from in-state resources are intended to support local investment or green-jobs objectives, but they reduce the trading flexibility of RPS programs and raise compliance costs by preventing utilities from sourcing renewable generation wherever it is cheapest.[54]

Taken together, RPS policies are best understood as second-best climate instruments. They can reduce emissions and, in some settings, promote the deployment of renewable energy that would not otherwise occur. But because they target renewable generation rather than emissions directly, and because their real-world design often fragments compliance markets and narrows flexibility further, they usually achieve emissions reductions at a higher cost than broader market-based alternatives.

Policy Implications

RPS policies have nevertheless appealed to policymakers because they are a familiar, state-level regulatory tool that fits comfortably within existing utility regulation and can be enacted when broader federal climate policy has stalled.[55] They spread not because they were the most efficient policy instrument, but because they were politically feasible. Part of their political expediency may also stem from the fact that the costs imposed by RPS policies are less transparent than those of alternative policies with more explicit price effects.[56]

The political appeal of RPS comes with a tradeoff. Climate policy necessarily requires a sacrifice today for a benefit felt by future generations. Making those costs less visible may ease adoption, but it does not eliminate those costs. At best, it obscures them or shifts their burden, making it harder to compare them to their benefits. The risk is that politically convenient policy will ultimately require greater sacrifice than more transparent and efficient alternatives.

From a political perspective, ratepayers and taxpayers are unlikely to remain insulated from these costs indefinitely. Even when the burdens imposed by RPS are less transparent than those of a carbon tax or other explicit pricing policies, they are still likely to become visible over time through higher electricity bills, tax burdens, or, as recent affordability politics suggest, broader concerns about energy costs.

With the repeal of tax credits for renewable energy under the Inflation Reduction Act and continually rising state RPS targets, the cost burdens of RPS may begin to be felt more acutely. A larger share of compliance costs may start to be felt more directly by utilities and ratepayers, and the marginal costs of compliance with increasingly ambitious targets may become harder to ignore.

Given the likelihood that RPS standards will bind more sharply in the coming years, and the evidence that they are a costly and inefficient policy tool, states should reconsider whether mandatory renewable portfolio standards remain justified at all. Where possible, states should repeal binding RPS requirements.

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Short of repeal, states should consider converting mandatory standards into voluntary renewable goals. In a period of intensifying affordability pressures, a voluntary goal would allow states to signal support for renewable energy development without requiring utilities to comply with increasingly costly mandates when renewables are not cost-competitive.

Where repeal or conversion to a voluntary renewable goal is not feasible, states should, at a minimum, freeze further increases in RPS targets and make existing programs as flexible as possible. That means reducing or eliminating technology-specific carve-outs, easing location-specific sourcing requirements, expanding REC trading, and avoiding design features that force compliance through unnecessarily narrow and costly pathways.

RPS programs should also be evaluated within the broader energy and environmental policy framework.[57] Electricity rate design, net metering policy, transmission planning, and permitting rules can all shape the cost of renewable deployment and the extent to which those costs are borne efficiently and transparently.[58]

Conclusion

The broader lesson of RPS policies is that climate-policy tradeoffs cannot be avoided simply by making them less visible. The danger of relying on politically convenient but relatively inefficient tools is not only that they obscure costs, but that they may ultimately impose higher costs than more transparent and cost-effective alternatives.

Part of the appeal of RPS has been that they offer a way to reduce emissions without forcing a direct debate over what climate policy should cost or how much sacrifice the present should bear for the benefit of future generations. For those who view aggressive emissions reductions as urgent, the higher relative costs of RPS may appear acceptable as the price of action.

But recent affordability concerns, backlash against renewable energy, and efforts to repeal or weaken RPS suggest that these costs do not remain hidden forever. Once they become politically salient, policies that never secured broader buy-in for their underlying tradeoffs may be especially vulnerable. That is why RPS policies, and especially increasingly ambitious future targets, deserve renewed scrutiny. A serious climate-policy debate cannot avoid questions of cost, and relying on relatively inefficient tools risks undermining both the benefits and the political durability of climate action.

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ENDNOTES

1 David Kemp, "Energy Price Honesty," C3 News Magazine, October 14, 2025, https://c3newsmag.com/energy-price-honesty/.

2 Christa Marshall, "Trump Revives Attacks on Renewable Energy as Solar Surges," Politico E&E News, August 21, 2025, https://subscriber.politicopro.com/article/eenews/2025/08/21/trump-revives-attacks-on-renewable-energy-as-solar-surges-00517166.

3 Lauren Teixeira, "Do Renewables Lower Electricity Prices?," The Breakthrough Institute, October 29, 2025, https://thebreakthrough.org/issues/energy/do-renewables-lower-electricity-prices.

4 Josiah Neeley, "Why Texas Remains a Clean Energy Leader," R Street Institute, June 4, 2025, https://www.rstreet.org/commentary/why-texas-remains-a-clean-energy-leader/.

5 Michael T. Hogan, "Running in Place: Renewal Portfolio Standards and Climate Change" (Thesis, Massachusetts Institute of Technology, 2008), https://dspace.mit.edu/handle/1721.1/45379.

6 Ryan Wiser et al., "Evaluating Experience with Renewables Portfolio Standards in the United States," Mitigation and Adaptation Strategies for Global Change 10, no. 2 (2005): 237–63, https://doi.org/10.1007/s11027-005-6573-4.

7 Richard Schmalensee, "Evaluating Policies to Increase Electricity Generation from Renewable Energy," Review of Environmental Economics and Policy 6, no. 1 (2012): 45–64, https://doi.org/10.1093/reep/rer020.

8 For state-specific RPS rules, see NC State University Clean Energy Technology Center, Database of State Incentives for Renewables & Efficiency (DSIRE), https://www.dsireusa.org/.

9 See examples of eligible renewable technologies by state in DSIRE. NC State University Clean Energy Technology Center, Database of State Incentives for Renewables & Efficiency (DSIRE), https://www.dsireusa.org/.

10 Galen Barbose, "U.S. State Electricity Resource Standards: 2025 Data Update", August 2025, https://emp.lbl.gov/publications/us-state-electricity-resource.

11 Galen Barbose, "U.S. State Electricity Resource Standards: 2025 Data Update", August 2025, https://emp.lbl.gov/publications/us-state-electricity-resource.

12 Galen Barbose, "U.S. State Electricity Resource Standards: 2025 Data Update", August 2025, https://emp.lbl.gov/publications/us-state-electricity-resource.

13 West Virginia Office of Energy, "Renewable Energy," https://energywv.org/wv-energy-profile/renewable-energy/.

14 Kansas, House Substitute for Senate Bill 91, 2015–2016 Leg., Reg. Sess. (2015), "An Act concerning re-

newable energy; relating to the renewable energy standards act, electric generation standard; relating to property tax; concerning exemptions for property used for renewable energy resources; relating to property tax on public utilities, definitions and exceptions," enacted May 14, 2015, https://www.kslegislature.gov/li_2016/b2015_16/measures/sb91/.

15 Montana House Bill 576, 67th Leg., Reg. Sess. (2021), "Repeal the renewable portfolio standard," passed May 14, 2021, https://legiscan.com/MT/text/HB576/id/2388337; Texas House Bill 1500, 88th Leg., Reg. Sess. (2023), "Relating to the continuation and functions of the Public Utility Commission of Texas and the Office of Public Utility Counsel, and the functions of the independent organization certified for the ERCOT power region; increasing an administrative penalty," effective September 1, 2023, https://legiscan.com/TX/text/HB1500/id/2820169

16 Nicole Garcia, "ACC Votes to Eliminate Renewable Energy Standard and Tariff (REST) Rules," Arizona Corporation Commission, March 4, 2026, https://azcc.gov/news/home/2026/03/05/acc-votes-to-eliminate-renewable-energy-standard-and-tariff-%28rest%29-rules;
Arizona Attorney General's Office, "Attorney General Mayes Challenges Corporation Commission's Repeal of Renewable Energy Standards," press release, March 30, 2026, https://www.azag.gov/press-release/attorney-general-mayes-challenges-corporation-commissions-repeal-renewable-energy.

17 Terrence O'Donnell, Christine M. T. Pirik, and William V. Vorys, "Ohio Enacts Sweeping Energy Legislation: HB 6 Bails Out Nuclear, Coal; Rolls Back Renewables and Energy Efficiency," Dickinson Wright, September 2019, https://www.dickinson-wright.com/news-alerts/ohio-enacts-sweeping-energy-legislation.

18 Author calculations based on price data from EIA and BLS regional consumer price index. U.S. Energy Information Administration, "Average Retail Price of Electricity, Annual," Electricity Data Browser, https://www.eia.gov/electricity/data/browser/; and Bureau of Labor Statistics, "Consumer Price Index, Regional Resources," https://www.bls.gov/cpi/regional-resources.htm.

19 Author calculations based on price data from EIA and BLS regional consumer price index. U.S. Energy Information Administration, "Average Retail Price of Electricity, Annual," Electricity Data Browser, https://www.eia.gov/electricity/data/browser/; and Bureau of Labor Statistics, "Consumer Price Index, Regional Resources," https://www.bls.gov/cpi/regional-resources.htm.

20 Galen Barbose, "U.S. State Electricity Resource Standards: 2025 Data Update," August 2025, https://emp.lbl.gov/publications/us-state-electricity-resource.

21 Ryan Wiser et al., "Factors Influencing Recent Trends in Retail Electricity Prices in the United States: What Do We Know? Where Are the Gaps?," Lawrence Berkeley National Laboratory and the Brattle Group, October 2025, https://eta-publications.lbl.gov/sites/default/files/2025-10/full_summary_retail_price_trends_drivers.pdf.

22 For example, see Dylan Sullivan, "New Study: 50% Renewables Would Save AZ More than $4 Billion," NRDC, June 14, 2018, https://www.nrdc.org/bio/dylan-sullivan/new-study-50-renewables-would-save-az-more-4-billion.

23 Carolyn Fischer, “Renewable Portfolio Standards: When Do They Lower Energy Prices?,” The Energy Journal 31, no. 1 (2010): 101–20, https://doi.org/10.5547/ISSN0195-6574-EJ-Vol31-No1-5.

24 Kangoh Lee, “Renewable Portfolio Standards and Electricity Prices,” Energy Economics 126 (October 2023): 106959, https://doi.org/10.1016/j.eneco.2023.106959.

25 Don Fullerton and Chi L. Ta, “What Determines Effectiveness of Renewable Energy Standards? General Equilibrium Analytical Model and Empirical Analysis,” NBER Working Paper no. 29783, February 2022, https://doi.org/10.3386/w29783.

26 Galen Barbose, “U.S. State Electricity Resource Standards: 2025 Data Update,” August 2025, https://emp.lbl.gov/publications/us-state-electricity-resource.

27 Ryan Wiser et al., “Factors Influencing Recent Trends in Retail Electricity Prices in the United States,” The Electricity Journal 38, no. 4 (2025): 107516, https://doi.org/10.1016/j.tej.2025.107516.

28 Ryan Wiser et al., “Factors Influencing Recent Trends in Retail Electricity Prices in the United States: What Do We Know? Where Are the Gaps?” Lawrence Berkeley National Laboratory and the Brattle Group, October 2025, https://eta-publications.lbl.gov/sites/default/files/2025-10/full_summary_retail_price_trends_drivers.pdf.

29 Fischer J. Espiritu Argosino and Christopher R. Knittel, “Renewables and Electricity Affordability: Untangling Correlation from Causation,” MIT Center for Energy and Environmental Policy Research Working Paper No. 2025-22, December 2025, https://ceepr.mit.edu/wp-content/uploads/2025/12/MIT-CEEPR-WP-2025-22.pdf.

30 Hongbo Wang, “Do Mandatory U.S. State Renewable Portfolio Standards Increase Electricity Prices?,” Growth and Change 47, no. 2 (2016): 157–74, https://doi.org/10.1111/grow.12118.

31 Constant I. Tra, “Have Renewable Portfolio Standards Raised Electricity Rates? Evidence from U.S. Electric Utilities,” Contemporary Economic Policy, ahead of print, 2015, https://doi.org/10.1111/coep.12110.

32 Gregory B. Upton Jr. and Brian F. Snyder, “Funding Renewable Energy: An Analysis of Renewable Portfolio Standards,” Energy Economics 66 (August 2017): 205–16, https://doi.org/10.1016/j.eneco.2017.06.003.

33 Michael Greenstone et al., “Do Renewable Portfolio Standards Deliver?,” University of Chicago, Becker Friedman Institute for Economics Working Paper no. 2019–62 (April 2019), https://bfi.uchicago.edu/wp-content/uploads/BFIEPIC_WP_201962_v4.pdf; Michael Greenstone and Ishan Nath, Do Renewable Portfolio Standards Deliver Cost-Effective Carbon Abatement?, November 12, 2021, https://static1.squarespace.com/static/5cd333a4421adb0001ce2d8a/t/6192739200591f52fb78e435/1636987796971/RPS_11_11_2021.pdf; Michael Greenstone and Ishan Nath, “Do Renewable Portfolio Standards Deliver Cost Effective Carbon Abatement?,” SSRN Electronic Journal, July 2024, https://doi.org/10.2139/ssrn.3374942.

34 Olivier Deschenes et al., “Causal Effects of Renewable Portfolio Standards on Renewable Investments and Generation: The Role of Heterogeneity and Dynamics,” NBER Working Paper no. 31568, August 2023, https://doi.org/10.3386/w31568.

35 Galen Barbose, “U.S. State Electricity Resource Standards: 2025 Data Update,” August 2025, https://emp.lbl.gov/publications/us-state-electricity-resource.

36 Gregory B. Upton Jr. and Brian F. Snyder, “Funding Renewable Energy: An Analysis of Renewable Portfolio Standards,” Energy Economics 66 (August 2017): 205–16, https://doi.org/10.1016/j.eneco.2017.06.003.

37 Michael Greenstone et al., “Do Renewable Portfolio Standards Deliver?,” University of Chicago, Becker Friedman Institute for Economics Working Paper no. 2019–62 (April 2019), https://bfi.uchicago.edu/wp-content/uploads/BFIEPIC_WP_201962_v4.pdf; Michael Greenstone and Ishan Nath, Do Renewable Portfolio Standards Deliver Cost-Effective Carbon Abatement?, November 12, 2021, https://static1.squarespace.com/static/5cd333a4421adb0001ce2d8a/t/6192739200591f52fb78e435/1636987796971/RPS_11_11_2021.pdf; Michael Greenstone and Ishan Nath, “Do Renewable Portfolio Standards Deliver Cost Effective Carbon Abatement?,” SSRN Electronic Journal, July 2024, https://doi.org/10.2139/ssrn.3374942.

38 Don Fullerton and Chi L. Ta, “What Determines Effectiveness of Renewable Energy Standards? General Equilibrium Analytical Model and Empirical Analysis,” NBER Working Paper no. 29783, February 2022, https://doi.org/10.3386/w29783.

39 Rachel Feldman and Arik Levinson, “Renewable Portfolio Standards,” The Energy Journal 44, no. 5 (2023): 1–20, https://doi.org/10.5547/01956574.44.4.rfel.

40 Olivier Deschenes et al., “Causal Effects of Renewable Portfolio Standards on Renewable Investments and Generation: The Role of Heterogeneity and Dynamics,” NBER Working Paper no. 31568, August 2023, https://doi.org/10.3386/w31568.

41 Richard Schmalensee, “Evaluating Policies to Increase Electricity Generation from Renewable Energy,” Review of Environmental Economics and Policy 6, no. 1 (2012): 45–64, https://doi.org/10.1093/reep/rer020.

42 Michael Greenstone et al., “Do Renewable Portfolio Standards Deliver?,” University of Chicago, Becker Friedman Institute for Economics Working Paper, nos. 2019–62 (April 2019), p. 23, https://bfi.uchicago.edu/wp-content/uploads/BFIEPIC_WP_201962_v4.pdf.

43 Michael Greenstone and Ishan Nath, “Do Renewable Portfolio Standards Deliver Cost Effective Carbon Abatement?,” SSRN Electronic Journal, July 2024, p. 3, https://doi.org/10.2139/ssrn.3374942.

44 For discussion of normative assumptions involved in the social cost of carbon, see David Kemp and Peter Van Doren, “How Should We Value the Future?,” Regulation 48, no. 4 (2025), https://www.cato.org/regulation/winter-2025-2026/how-should-we-value-future.

45 Severin Borenstein, “The Private and Public Economics of Renewable Electricity Generation,” Journal of Economic Perspectives 26, no. 1 (2012): 67–92, https://doi.org/10.1257/jep.26.1.67.

46 See, for example, David Kemp and Peter Van Doren, “How Should We Value the Future?,” Regulation 48, no. 4 (2025), https://www.cato.org/regulation/winter-2025-2026/how-should-we-value-future.

47 Carolyn Fischer and Richard G. Newell, “Environmental and Technology Policies for Climate Mitiga-

tion," Journal of Environmental Economics and Management 55, no. 2 (2008): 142–62, https://doi.org/10.1016/j.jeem.2007.11.001.

48 Emissions-intensity standards are sometimes referred to as clean energy standards (CES), which can create confusion with state clean electricity standards. In the economics literature, these standards generally credit generators according to relative emissions rates. Most state clean electricity standards, by contrast, do not differentiate continuously based on actual emissions, but instead function as broader clean-energy mandates that expand the set of qualifying technologies.

49 See, for example, Lawrence H. Goulder et al., "General Equilibrium Impacts of a Federal Clean Energy Standard," American Economic Journal: Economic Policy 8, no. 2 (2016): 186–218, https://doi.org/10.1257/pol.20140011; Harrison Fell and Joshua Linn, "Renewable Electricity Policies, Heterogeneity, and Cost Effectiveness," Journal of Environmental Economics and Management 66, no. 3 (2013): 688–707, https://doi.org/10.1016/j.jeem.2013.03.004; Severin Borenstein and Ryan Kellogg, "Carbon Pricing, Clean Electricity Standards, and Clean Electricity Subsidies on the Path to Zero Emissions," Environmental and Energy Policy and the Economy 4 (January 2023): 125–76, https://doi.org/10.1086/722675.

50 David Young and John Bistline, "The Costs and Value of Renewable Portfolio Standards in Meeting Decarbonization Goals," Energy Economics, ahead of print, 2018, https://doi.org/10.1016/j.eneco.2018.04.017.

51 Harrison Fell and Joshua Linn, "Renewable Electricity Policies, Heterogeneity, and Cost Effectiveness," Journal of Environmental Economics and Management 66, no. 3 (2013): 688–707, https://doi.org/10.1016/j.jeem.2013.03.004.

52 Mar Reguant, "The Efficiency and Sectoral Distributional Impacts of Large-Scale Renewable Energy Policies," Journal of the Association of Environmental and Resource Economists 6, no. S1 (2019): S129–68, https://doi.org/10.1086/701190.

53 Richard Schmalensee, "Evaluating Policies to Increase Electricity Generation from Renewable Energy," Review of Environmental Economics and Policy 6, no. 1 (2012): 45–64, https://doi.org/10.1093/reep/rer020.

54 Joel H. Mack et al., "All RECs Are Local: How In-State Generation Requirements Adversely Affect Development of a Robust REC Market," The Electricity Journal 24, no. 4 (2011): 8–25, https://doi.org/10.1016/j.tej.2011.04.007.

55 Jess Chandler, "Trendy Solutions: Why Do States Adopt Sustainable Energy Portfolio Standards?," Energy Policy 37, no. 8 (2009): 3274–81, https://doi.org/10.1016/j.enpol.2009.04.032; Thomas P. Lyon and Haitao Yin, "Why Do States Adopt Renewable Portfolio Standards?: An Empirical Investigation," The Energy Journal 31, no. 3 (2010): 133–58, https://doi.org/10.5547/ISSN0195-6574-EJ-Vol31-No3-7; Ryan P. Thombs and Andrew K. Jorgenson, "The Political Economy of Renewable Portfolio Standards in the United States," Energy Research & Social Science, ahead of print, 2020, https://doi.org/10.1016/j.erss.2019.101379.

56 Richard Schmalensee, "Evaluating Policies to Increase Electricity Generation from Renewable Energy,"

Review of Environmental Economics and Policy 6, no. 1 (2012): 45–64, https://doi.org/10.1093/reep/rer020.

57 Carolyn Fischer and Louis Preonas, "Combining Policies for Renewable Energy: Is the Whole Less than the Sum of Its Parts?," 14th ICABR Conference, June 16-18, 2010, Ravello, Italy, 14th ICABR Conference, June 16-18, 2010, Ravello, Italy, 2010, 188090, https://ideas.repec.org//p/ags/itic10/188090.html; Carolyn Fischer and Richard G. Newell, "Environmental and Technology Policies for Climate Mitigation," Journal of Environmental Economics and Management 55, no. 2 (2008): 142–62, https://doi.org/10.1016/j.jeem.2007.11.001.

58 See, for example, Mar Reguant, "The Efficiency and Sectoral Distributional Impacts of Large-Scale Renewable Energy Policies," Journal of the Association of Environmental and Resource Economists 6, no. S1 (2019): S129–68, https://doi.org/10.1086/701190; Fischer J. Espiritu Argosino and Christopher R. Knittel, "Renewables and Electricity Affordability: Untangling Correlation from Causation," MIT Center for Energy and Environmental Policy Research Working Paper No. 2025-22, December 2025; Travis Fisher and Nick Loris, "Can Expanding Transmission Reduce Electricity Costs?," RTO Insider, December 17, 2025, //www.rtoinsider.com/121771-can-expanding-transmission-reduce-electricity-costs/; C3 Solutions, "Permitting Reform to Meet America's Energy Needs and Environmental Goals," 2022, https://c3solutions.org/policy-paper/the-climate-and-freedom-agenda/chapter-2/.