Ohio River Valley Institute

THE REGIONAL GREENHOUSE GAS INITIATIVE

A Common-Sense Guide To RGGI And What It Will Mean For Pennsylvania

Prepared by
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INTRODUCTION

Pennsylvania Governor Tom Wolf has announced his intention to have the Commonwealth join the Regional Greenhouse Gas Initiative (RGGI), a now 13 year-old project of Northeast states to fight climate change by reducing emissions of carbon dioxide and other pollutants from the electric system.

The governor's efforts have been met by opposition from some in the legislature who argue that joining RGGI and adopting its caps on GHG emissions will result in rising electric bills, job losses, and the destruction of Pennsylvania's fossil fuel industry while doing little to combat climate change. The Wolf administration argues the opposite – that we must all do what we can to fight global warming as its impacts are becoming more severe and costly and, moreover, that far from inflicting costs on Pennsylvanians, participation in RGGI will produce net economic and social benefits in the form of savings on electricity, increased jobs and commerce, and reductions in illness and associated health care costs as pollutants are removed from the air and water.

At present, the question of whether Pennsylvania will or will not join RGGI and the powers of the governor and legislature in making that decision are being debated in Harrisburg. This paper does not attempt to address these legal and legislative questions. Instead, it draws on quantitative studies and the experiences of other states that have either joined RGGI or implemented similar policies to provide an evidence-based assessment of the environmental, economic, and social implications Pennsylvania is likely to experience should it become RGGI's newest member.

The findings are presented as responses to eleven questions about RGGI that frequently arise in conversation and debate and that are the subjects of numerous op-eds and letters to the editor. In the interest of clarity, we have tried to keep the answers brief and comprehensible for non-expert readers. However, if you would like greater detail or have questions regarding the findings presented here, please feel free to contact us at the Ohio River Valley Institute.

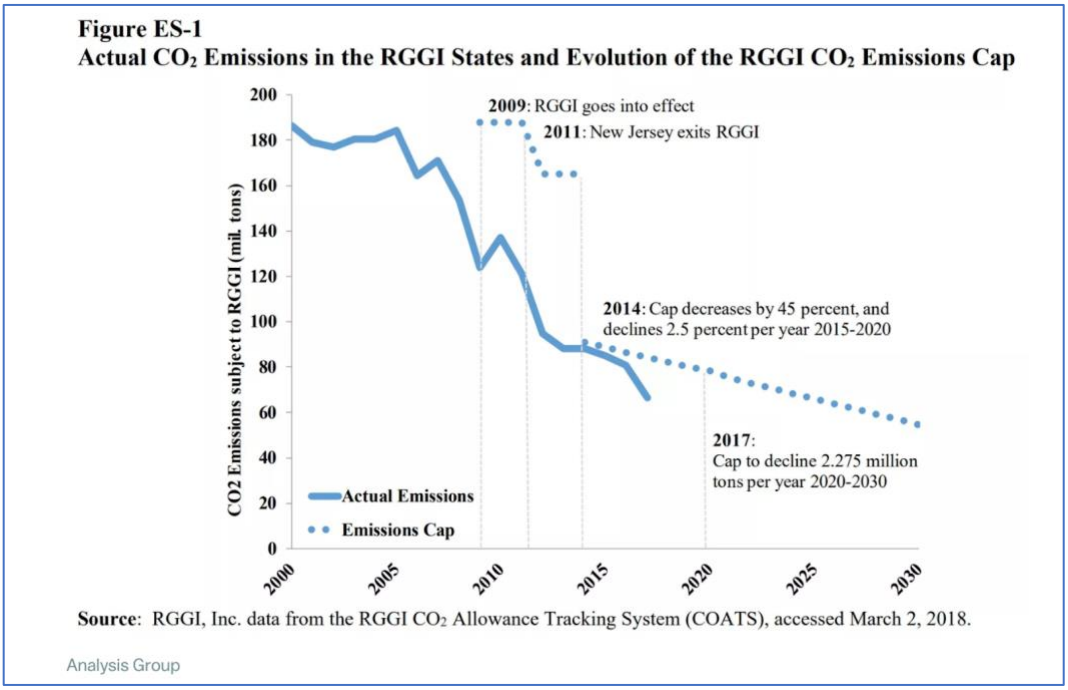
WHAT IS THE REGIONAL GREENHOUSE GAS INITIATIVE AND WHICH STATES BELONG?

The Regional Greenhouse Gas Initiative (RGGI) is an agreement among ten northeast states -- Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont -- to cap and, over time, reduce emissions of carbon dioxide from the power generating sector. The cap is enforced by requiring utility-scale fossil fuel power plants (those with capacities of at least 25 MW) to purchase a CO2 emission allowance for each ton of carbon they emit. The number of available allowances is fixed by a board of directors, which is made up of two agency heads from each participating state. RGGI, Inc. does not have regulatory or enforcement powers. Those powers are reserved to the states.

HOW DOES THE RGGI EMISSIONS TRADING SYSTEM WORK?

RGGI is a "cap and trade" system in which the member states set a regional cap on emissions of carbon dioxide by utility-scale fossil fuel power plants. Qualifying power plants must purchase an allowance for each ton of CO2 they plan to omit at auctions administered by their home states. In the Q3 2020 auction, the price of allowances was $6.82 per short ton. Earlier in 2020, during the economic downturn that accompanied the coronavirus outbreak, the price had dropped to $5.44. Over time, the total number of available allowances is progressively reduced resulting in a corresponding reduction in overall emissions.

This chart from the Analysis Group illustrates the expected caps and the effect on emissions. Note that these figures do not reflect an expanded membership that would include Virginia and Pennsylvania.



By pricing emissions, RGGI gives utilities and other wholesale customers an incentive to seek non-emitting generating resources. The price of the allowances is set by means of quarterly

blind auctions at which power plant owners submit confidential bids. The participating states may also set a minimum reserve price on allowances.

Once they have been purchased, allowances may be used by the buyer, banked for future use, or sold to another buyer. In addition to buying allowances, power plants may also meet up to 3.3% of their emission reduction obligation through the use of offsets -- reductions of emissions from sources that are not covered by the reduction program.

The RGGI allowance trading market includes two additional mechanisms that mitigate against unexpected swings in the price of allowances. The Cost Containment Reserve (CCR) automatically triggers the release of additional allowances in the event prices exceed predefined thresholds. To guard against lower-than-expected prices, starting in 2021 an Emissions Containment Reserve (ECR), will trigger the withholding of some allowances by states should prices fall below prescribed thresholds.

HOW MUCH REVENUE WILL RGGI RAISE AND HOW WILL THE FUNDS BE USED?

A Pennsylvania Department of Environmental Protection study of RGGI finances anticipates that the Commonwealth will collect approximately $300 million from the sale of allowances in the program's first year. The figure would gradually decline each subsequent year in conjunction with the corresponding reduction in electricity generation from emitting resources. The economic impacts of the funds collected would vary somewhat depending on how the Commonwealth chooses to use them.

DEP has modeled three possible scenarios:

- A "Balanced" scenario in which 31% of the funds would be allocated to energy efficiency programs, 32% to renewable energy, 31% to GHG abatement, 6% to program administrative costs and nothing to ratepayer assistance or the Commonwealth's general fund.
- A "Ratepayer Assistance" scenario in which 30% of the funds would be allocated to energy efficiency programs, 8% to renewable energy, 49% to ratepayer assistance, 7% to GHG abatement, 6% to program administrative costs, and nothing to the Commonwealth's general fund.
- A "General Fund" scenario in which 69% of the funds would be allocated to the Commonwealth's general fund, 10% to energy efficiency programs, 5% to renewable energy, nothing to ratepayer assistance, 10% to GHG abatement, and 6% to program administrative costs.

The differences in the way the various scenarios allocate funds have significant implications for RGGI's potential effects on the cost of electricity, job creation, and other economic outcomes. The allocation of funds under the DEP scenarios also differ from the way in which current RGGI members have invested the money. In the period 2015 to 2017, current RGGI states focused more heavily than the DEP scenarios on energy efficiency, which received 52% of the funds while 18% went to renewable energy projects; 13% to ratepayer assistance; 7% to program

administration; 4% to GHG-emission reduction programs; 3% to clean technology research and development; 2% to education, outreach, and job training; and 1% for payments into states' general funds.

BY HOW MUCH WILL CO2 EMISSIONS BE REDUCED UNDER RGGI?

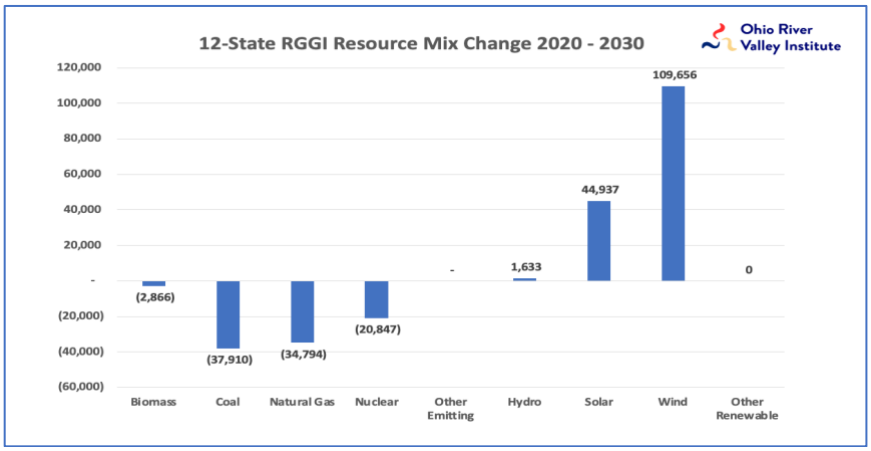
According to a Pennsylvania Department of Environmental Protection analysis, in 2020 the twelve RGGI states, including Pennsylvania and another new member, Virginia, will emit 178 million short tons of carbon annually. Pennsylvania is responsible for 75 million short tons or 42% of that figure. By 2030, emissions from RGGI states would drop by 49 million short tons to 129 million and Pennsylvania emissions would decline by 27 million to 48 million short tons.

In Pennsylvania, sulfur dioxide (SO2) emissions would decline from 38.5 million tons per year to just 4.8 million tons, a decline of 88%. Nitrogen oxide emissions would decline by about half, from 28.7 million tons to 13.9 million.

These findings are consistent with the documented history of RGGI states, which over the last decade achieved a 45% reduction in CO2 emissions. The share of the reduction that is specifically attributable to RGGI as opposed to market forces and other policy measures is a source of disagreement. Some analyses put the figure at 50% or higher, while others suggest the figure could be as low as 20%.

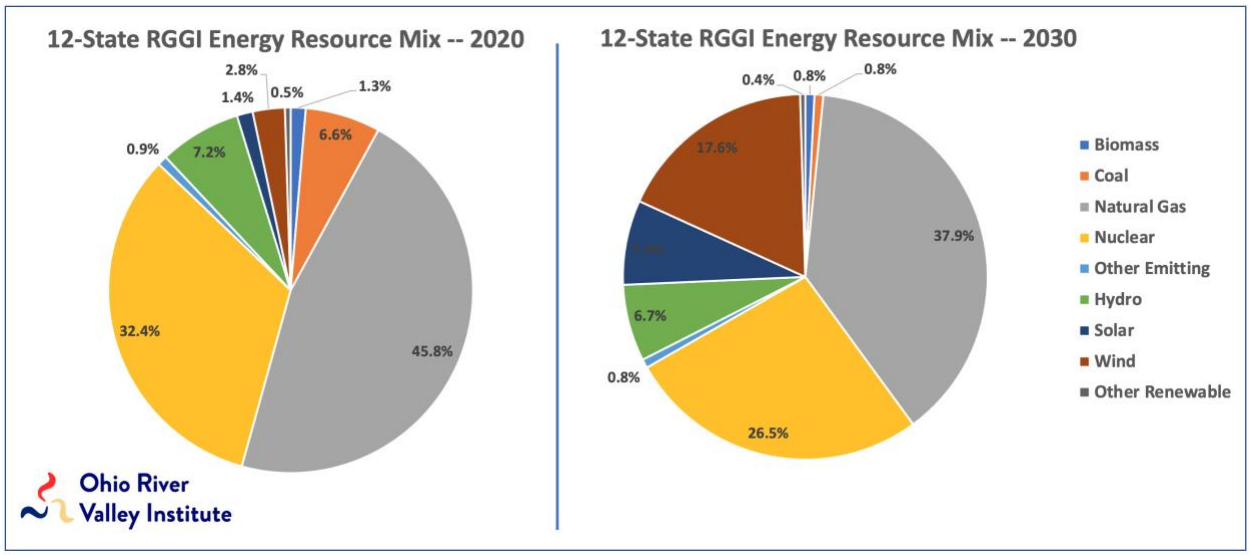
HOW WOULD RGGI EMISSION REDUCTIONS CHANGE PENNSYLVANIA'S ENERGY RESOURCE MIX?

The Pennsylvania DEP analysis found that between 2020 and 2030 a 12-state RGGI, which includes the ten current RGGI states plus Pennsylvania and Virginia, will increase electricity generation by 68,773 GWh, an increase of 10.4%. That includes major growth in contributions from renewable resources including wind and solar power. Offshore wind generation in particular would expand dramatically. But fossil fuel resources, coal and natural gas, along with nuclear, would experience declines.



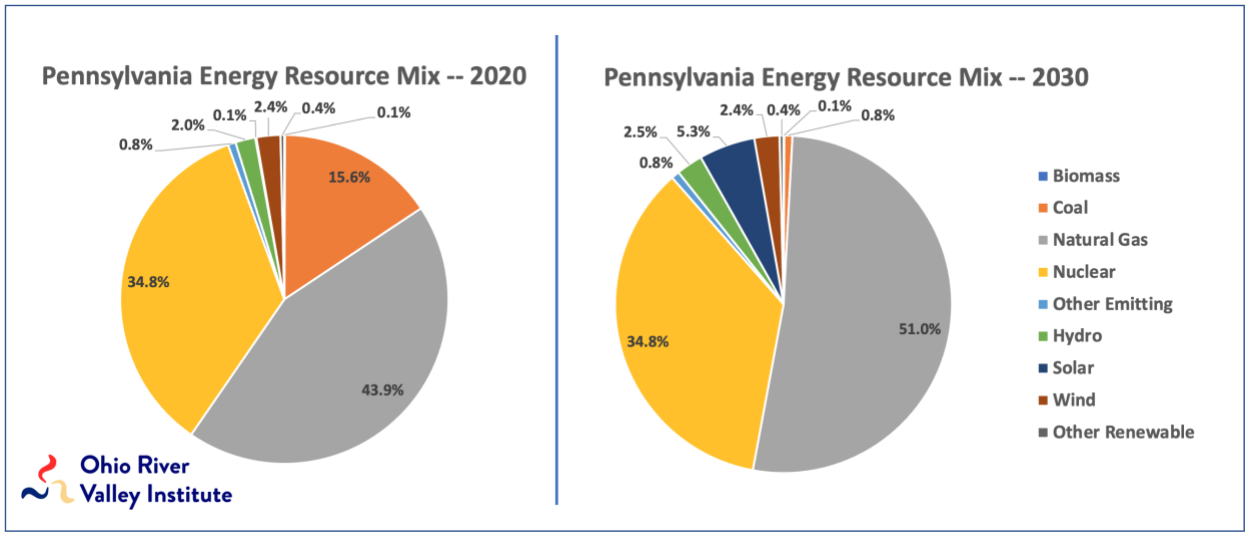
SOURCE: Author's calculations from the Pennsylvania Department of Environmental Protection; Regional Greenhouse Gas Initiative Power Sector Modeling

As a result of these changes, by 2030 nearly a third of the power produced in RGGI states would come from renewable resources and, when combined with nuclear power, over 60% would be non-emitting.



SOURCE: Author's calculations from the Pennsylvania Department of Environmental Protection; Regional Greenhouse Gas Initiative Power Sector Modeling

Pennsylvania's evolution would be somewhat different. Total generation in the Commonwealth would decline by about 5%, from 218,704 GWh in 2020 to 207,836 GWh in 2030. But, whereas both coal and gas are projected to decline significantly in the overall RGGI market, in Pennsylvania, gas generation would be expected to grow slightly while coal, which currently represents 16% of generation in Pennsylvania, would almost vanish. It should be noted however that the actual peak in Pennsylvania natural gas generation would occur between 2022 and 2025 before going into a slight decline.



SOURCE: Author's calculations from the Pennsylvania Department of Environmental Protection; Regional Greenhouse Gas Initiative Power Sector Modeling

In the long term, the greatest threat to natural gas-fired power in Pennsylvania isn't RGGI, whose allowance costs represent only about 8% of the wholesale price of electricity. It is competition from lower-priced renewable resources including, in RGGI's case, offshore wind. Already, in states such as Texas and California, we are seeing construction of new gas-fired power plants slow to a crawl or stop altogether while expansions of solar and wind capacity are accelerating.

More on the issue of how cost reductions in renewable energy and energy efficiency threaten to take market share from natural gas in the PJM region can be found in a recent Institute for Energy Economics and Financial Analysis report written by Bryndis Woods, Elizabeth Stanton, and Dennis Wamsted.

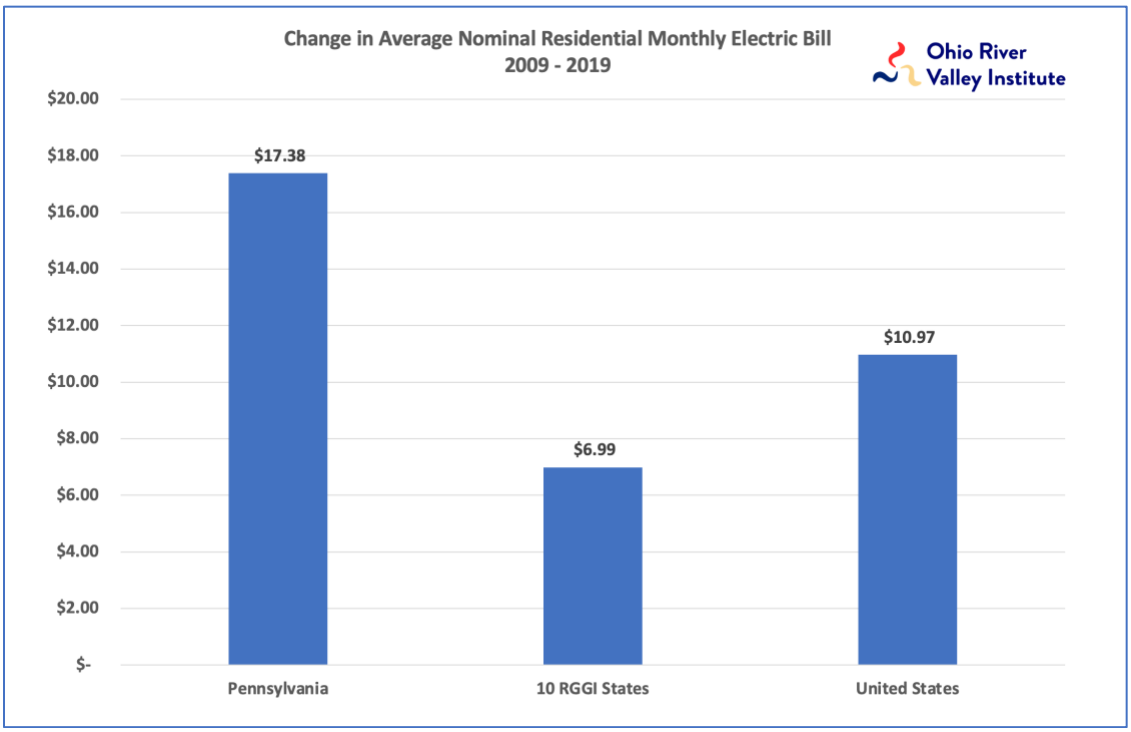
WHAT EFFECT WILL RGGI HAVE ON PENNSYLVANIANS' UTILITY BILLS?

The cost of RGGI allowances would raise the wholesale cost of electricity from coal by about $6/MWh or about 20%. The wholesale price of electricity from natural gas would rise by about $2.50/MWh or about 8%. That might cause some residential consumers' average monthly residential bill to initially rise by about $1.50 to $2.50 per month – a 1.25% to 2.5% increase. The figure would decline gradually year over year as the use of energy from emitting resources in reduced.

Also, because consumption of energy from coal in particular would decline significantly and because the Commonwealth would invest a considerable share of revenue from RGGI in helping customers become more energy efficient, the resulting reduction in electricity consumption would likely be greater than any rise in rates resulting in a net reduction in consumers' average residential monthly bill. In short, RGGI could cause the amount of money Pennsylvanians spend on electricity to go down.

A 2018 Analysis Group study of RGGI's economic impacts on participating states found that, "Since RGGI's commencement in 2009, energy and dollar savings resulting from all states' investments in EE and RE has more than offset the wholesale market price increases associated with inclusion of allowance costs in market bids." As a result, after adjusting for inflation, residential customers in RGGI states pay less today for electricity than they did a decade ago.

That would be a welcome outcome for Pennsylvania residential customers who, despite hearing a great deal of rhetoric about how low-cost natural gas is delivering great savings on energy, have actually seen their average monthly electric bills go up faster than the rate of inflation, far faster than the national average, and more than twice as fast as the ten current RGGI states.



SOURCE: Author's calculations from the U.S. Energy Information Administration; Electric Sales, Revenue, and Average Price Report. October 2020.

Pennsylvania's failure to match the savings enjoyed by other states owes in part to the fact that, in the last decade, per capita energy consumption has declined 33% faster in other states than in Pennsylvania.

WHAT EFFECT WILL RGGI HAVE ON JOBS AND COMMERCE IN PENNSYLVANIA?

Using the "Balanced Scenario" described above, the DEP's modeling estimates that, " . . . from 2022 to 2030, participating in RGGI would lead to an increase in Gross State Product of nearly $2 billion and a net increase of over 27,000 jobs". It also projects that "overall citizens of this Commonwealth could see a cumulative increase in Disposable Personal Income of $3.7 billion by 2050."

However, these findings probably understate the increase in jobs and economic activity. They also don't explain that the benefits would be more effectively dispersed throughout the Commonwealth to the advantage of small towns and cities and rural counties, which have not seen as much growth over the last few decades as larger cities and metropolitan areas.

That would happen because RGGI would effectively redirect funds away from fossil fuel power generation and resource extraction to investments in energy efficiency and distributed energy generation. Doing so would:

1. Shift spending away from industries that allocate a quarter or less of their income to hiring and payrolls -- utilities and resource extraction -- and instead direct it to energy

efficiency and renewable energy businesses that allocate a half to three-quarters of income to hiring and payrolls, thereby producing more jobs for each dollar spent.

2. Keep money in local communities. For most Pennsylvanians, money spent on utility bills goes to far-away corporate headquarters and even farther away corporate shareholders. However, money spent on energy efficiency and distributed generation goes primarily to local companies -- HVAC contractors, lighting contractors, solar installers, insulation companies, and more -- that will hire more workers locally in response to increased demand.

3. Trigger a cascade of additional energy efficiency and home solar investment from families and building owners, which would produce downstream bill savings. In the Pacific Northwest, a region that's among national leaders in energy efficiency, The Bonneville Power Administration (BPA) found that state and utility incentives help unleash additional consumer investments in energy efficiency and distributed generation, which compound the effects on commerce and job growth. BPA concluded that these consumer investments account for a third to a half of energy efficiency savings. The effect was also examined by Lawrence Berkeley National Laboratory in a 2018 study, which found that Pennsylvania's cost to save energy is well below the national average and much less expensive than the cost of generating electricity, which makes the potential for incremental energy savings and associated economic benefits even greater.

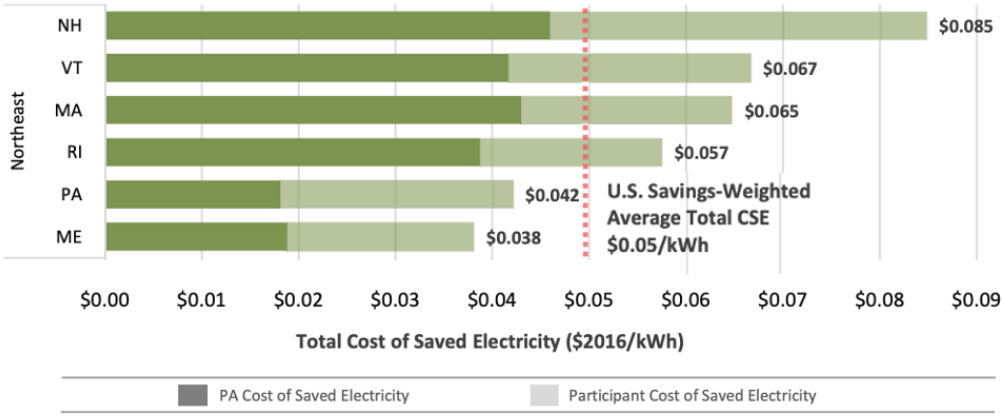


Figure ES-8. Total CSE by state: savings-weighted averages and program administrator (PA) vs. participant costs

SOURCE: Lawrence Berkeley National Laboratory; "The Cost of Saving Electricity Through Energy Efficiency Programs Funded by Utility Customers: 2009–2015"; June 2018.

4. Finally, the investment of RGGI funds would produce ongoing savings on monthly utility bills that will continue for decades, resulting in increased home and building values and

more discretionary income for families. The majority of those savings would flow into local economies to support more local jobs and commerce.

In short, we don't really know how many additional jobs and how much savings for customers RGGI membership would produce. It depends in large measure on how the governor and legislature decide to allocate the revenue acquired through allowance auctions. But, we do know that the RGGI funds spent on energy efficiency and distributed generation have significantly more positive effects on job and income growth, especially in local communities, than spending the money on utility bills.

WHAT EFFECT WILL EMISSIONS REDUCTIONS HAVE ON PEOPLES' HEALTH?

Yes. Under RGGI more than 90% of Pennsylvania's coal-fired generating capacity would be retired. This would result in an 88% reduction in the power system's sulfur dioxide (SO2) emissions and a 47% reduction in nitrogen oxide (NOx) emissions. Both substances are highly harmful to human health particularly for infants, the elderly, and people who suffer from upper respiratory conditions such as asthma, bronchitis, and emphysema.

The Department of Environmental Protection estimates that the avoided emissions would prevent up to 639 deaths by 2030 and would save between $232 million and $535 million in healthcare costs while avoiding as many as 30,000 emergency room visits.

WILL SOME PEOPLE AND COMMUNITIES BE HARMED IF PENNSYLVANIA JOINS RGGI?

While RGGI membership would result in significant job increases generally, some communities, such as those that host retiring coal-fired power plants might experience localized job losses. Given the direction of the energy market, it's likely that some of those jobs would be lost anyway. The good news is that those cases are readily identifiable and, with the help of RGGI revenue generated by the sales of emissions allowances, the Commonwealth will have resources it can use to help workers and communities transition.

Pennsylvania counties that produce natural gas are not likely to see major job losses as a result of RGGI membership because, as noted earlier, power generation from natural gas is expected to be higher in 2030 than it is today. That said, it is expected that by the second half of the decade, gas-fired power will start to decline as it starts to be replaced by lower-priced renewable energy.

WILL RGGI JUST SHIFT CARBON EMISSIONS TO OHIO AND WEST VIRGINIA?

The concern is that the added cost of RGGI allowances will reduce the competitiveness of Pennsylvania fossil fuel power plants compared to those in non-RGGI states, including Ohio and West Virginia. If that happens, it is argued, utilities may not reduce their emissions, but rather acquire fossil fuel power elsewhere. This phenomenon is called, "leakage".

A few analysts, including Chan and Morrow (2019) and the Environmental Defense Fund and M. J. Bradley Associates, have looked at this question and determined that, while leakage takes

place, the prevalence is low. Moreover, states can implement measures to limit or stop leakage. Also, the PJM Interconnection, of which Pennsylvania is a member, has convened a task force to explore methods to address the problem.

CONSIDERING ALL THESE FACTORS, WILL RGGI MEMBERSHIP BE GOOD FOR PENNSYLVANIA?

If the criteria by which we judge RGGI are (1) its effectiveness in reducing emissions, (2) its economic costs and benefits, and (3) its collateral effects on health and other areas, then RGGI membership will be a net positive for Pennsylvania.

RGGI will reduce CO2 emissions from the energy system at a rate that is faster than would be accomplished otherwise and, therefore, will make a significant contribution to combating global warming.

Economically, RGGI is likely to produce a net gain -- probably a large net gain -- rather than a net cost. That's because, in the mid and long-terms, RGGI will result in lower utility costs as the cost of clean energy resources continue to fall. Meanwhile, RGGI's allowance market and the subsequent allocations of market revenues by the Commonwealth will redirect money from fossil fuel power generation to activities that create far more jobs and which spur greater local economic activity. That doesn't mean some dislocations won't take place and some people and communities won't need help transitioning. But, RGGI combined with other policies can generate the resources needed to help those people and communities while economically benefiting Pennsylvanians generally.

In addition to RGGI's contributions to fighting global warming and increasing jobs and incomes, it will reduce health care costs and improve the quality of life for millions of Pennsylvanians by removing from the air and water pollutants that trigger and aggravate conditions including bronchitis, asthma, and heart disease. And that translates into greater productivity and less absenteeism at work and at school.

So, while there is no free lunch, RGGI's benefits more than offset any costs it imposes.