



# Inside Energy

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**RE: Pennsylvania and RGGI**

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Pennsylvania Governor Tom Wolf wants to take the Commonwealth into the multi-state Regional Greenhouse Gas Initiative (RGGI). I conducted a multi-state study, updated for Pennsylvania, which came to the same conclusion as a Congressional Research Center study<sup>1</sup>. The decade old RGGI program has resulted in no additional emission reduction compared to Pennsylvania, or other comparison states. The total economic cost of the proposed RGGI program might be \$58 to \$87 billion over the next decade. The ultimate goal of RGGI promoters is to eliminate all emissions. Meeting that goal might add another \$98 to \$147 billion. A report from the Pennsylvania Public Utility Commissions<sup>2</sup> expects natural gas capacity to double, along with added wind and solar power suggesting even the 2030 RGGI goal will be met without joining RGGI and adding \$10 billion in allowance fees to electric bills.

The RGGI program requires power plants to buy emission allowances for each ton of CO<sub>2</sub> emissions with allowances sold in quarterly auctions. Speculators can participate and potentially resell allowances at higher prices. The initial plan cut emissions 10 percent by 2018, but a second and third stage increased the target to 65% by 2030. The program is touted as market based, but applies minimum reserve prices, and adds extra, or removes allowances to control the range of bid prices. While technically a cap and trade program, ultimately it acts like a tax.

Here are some thoughts. The first question to consider is how Pennsylvania emissions reductions compare to the RGGI states from 2007 to 2017:

- Per capita emissions from Pennsylvania electric power plants fell 40 percent<sup>3</sup>. RGGI states fell 41 percent after adjusting for the emissions RGGI states shifted elsewhere by importing more electricity from other states
- Total Pennsylvania power plant emissions fell 50 million tons<sup>3</sup>, 90 percent of the adjusted reductions of the entire nine RGGI states
- The Pennsylvania generation mix changed by reducing coal-fired generation by 24 percentage points<sup>4</sup> compared to RGGI states 16. Natural gas generation increased by 20 percentage points, 10 in RGGI states. Both added 5 percentage points of zero emission resources

It is no surprise Pennsylvania had essentially the same reduction in emissions as the RGGI states as that was the conclusion of my peer reviewed study published in the Cato Journal, "A Review of the Regional Greenhouse Gas Initiative"<sup>5</sup>: RGGI had essentially no impact on emissions reductions compared to five other states who had similar energy policies except for RGGI. Consequently, there will be no environmental benefits from Pennsylvania joining RGGI.

Electric generators buy the emission allowances and pass the cost on in wholesale prices that eventually wind up on electric bills. The latest auction price for RGGI allowances was \$5.20/ton<sup>6</sup>, and in 2017 Pennsylvania electric generators emitted 79.3 million tons of CO<sub>2</sub>. The total initial annual cost of allowances equals about \$412 million per year added to electric bills from these direct costs. RGGI, Inc. forecasts



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auction prices will rise to between \$12 and \$24/ton<sup>7</sup> which could cost between \$1 and \$1.9 billion per year, so the average allowance cost might be about \$1.2 billion a year.

Joining RGGI would require electric generators to reduce CO<sub>2</sub> emissions by 30 percent by 2030, or 24 million tons. Coal-fired generation totaled about 48 million megawatt-hours in 2017. Closing those power plants would meet the emissions goal. Decommissioning costs would be about \$1.5 billion<sup>8</sup>. Coal production in Pennsylvania would be cut by about 45 percent from the 49 million tons produced in 2017<sup>9</sup>, a loss of about \$1 billion in coal sales a year by 2030, or \$0.5 billion a year average. In 2017 the average wholesale price for electricity plus transmission cost was about \$44/megawatt-hour (MWh)<sup>10</sup>. Lost electricity sales would total about \$2.1 billion a year by 2030, or about \$1 billion a year averaged over the decade. The total direct cost of meeting the 2030 emissions goal could be as high as \$29 billion. Indirect and induced costs typically increase direct cost two to three times. The total economic cost of the proposed RGGI program might be \$58 to \$87 billion over the next decade.

However, meeting any emission reduction goal is just transitory. The ultimate goal of RGGI promoters is to eliminate all emissions. Meeting that goal would shut down another 74 million MWh of natural gas and other generation. Lost generation and transmission sales would be \$3.3 billion in electricity sales by 2030, or \$1.65 billion a year average, and a lost \$1 billion in natural gas sales by 2030, or \$0.5 billion a year average. Shutting down all fossil fuel generation in Pennsylvania might cost an additional \$0.2 billion in decommissioning cost. Additional allowance costs can be assumed to be similar to the first phase of cut backs, \$1.1 billion a year. In addition, 46 million MWh of zero emission generation would be needed to meet electric demand. Wind and solar power will cost about \$48/MWh<sup>11</sup> more than the abandoned natural gas power, or \$2.2 billion phased in over ten years at an average cost of about \$1.1 billion a year. A second decade program might cost another \$49 billion, or \$98 to \$147 billion marked up for indirect, and induced cost.

The costs don't count the impact of lost grid reliability. No longer exporting dispatchable power, and relying on intermittent wind and solar power, could cause electric grid reliability issues in the thirteen state PJM, Interconnection electric grid potentially leading to untold cost. A planned two day outage for 800,000 customers by PG&E to prevent California wildfires could have an economic impact of as much as \$2.6 billion, using a planning tool developed by Lawrence Berkeley National Laboratory.

## Notes:

- 1) Congressional Research Service, "The Regional Greenhouse Gas Initiative: Lessons Learned and Issues for Congress", Jonathan L. Ramseur, May 16, 2017, <https://fas.org/sgp/crs/misc/R41836.pdf>
- 2) Pennsylvania Public Utility Commission, "Electric Power Outlook for Pennsylvania 2018 to 2023", <file:///C:/Users/dtste/Documents/Pennsylvania%20PUC%20Power%20Outlook%20for%20Pennsylvania%202019.pdf>, installed capacity 2017, coal 12,686, NG 12,663
- 3) Author calculation from U.S. Energy Information Agency, "Annual Detailed State Data", <https://www.eia.gov/electricity/data/state/> Emissions by State 1990 to 2017, and U. S. Census Population by state 2010 to 2018, RGGI state emissions fell 74.3 million tons, but shifted 18.5



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million tons (based on PJM 2017 Systems Mix of 0.474 tons CO<sub>2</sub>/MWh) by importing 39 MWh of power from PJM, <https://gats.pjm-eis.com/gats2/PublicReports/PJMSystemMix>

- 4) U.S. Energy Information Agency, “Annual Detailed State Data”, <https://www.eia.gov/electricity/data/state/>, State Historical Tables for Electric Generation
- 5) Caesar Rodney Institute, “Review of the Gable Associates EV Report”, <https://www.caesarrodney.org/crri-focus-area/A-Review-of-Gabel-Associates,-Inc-Report.htm>
- 6) Regional Greenhouse Gas Initiative Auction Results, Auction 45, <https://www.rggi.org/auctions/auction-results>
- 7) DRAFT 2017 Model Rule Policy Scenario Overview Sept. 25, 2017, page 13 [https://www.rggi.org/sites/default/files/Uploads/Program-Review/9-25-2017/Draft\\_IPM\\_Model\\_Rule\\_Results\\_Overview\\_09\\_25\\_17.pdf](https://www.rggi.org/sites/default/files/Uploads/Program-Review/9-25-2017/Draft_IPM_Model_Rule_Results_Overview_09_25_17.pdf)
- 8) Resources for the Future, “Decommissioning US Power Plants”, Daniel Raimi, Oct. 2017, <https://media.rff.org/documents/RFF20Rpt20Decommissioning20Power20Plants.pdf> ,Average cost/MW is \$117,000 for coal, \$15,000 for NG,
- 9) U.S. Energy Information Agency, Annual Coal Production by State, <https://www.eia.gov/coal/production/weekly/>
- 10) PJM Interconnection, Average load weighted average electricity cost 2018, <https://annualmeeting.pjm.com/-/media/pjm-annualmeeting/postings/2019-pjm-fact-sheet.ashx?la=en> , Constellation Energy average transmission rate by region, <https://blogs.constellation.com/energy-management/understanding-transmission-costs-in-your-power-bill-2/>
- 11) Center of the American Experiment, Isaac M. Orr, Mitch Rolling, and John Phelan, “Doubling Down on Failure”, <https://www.americanexperiment.org/2019/03/american-experiment-releases-groundbreaking-new-study-high-cost-renewable-energy-mandates-minnesota/#>, Average wind power cost of \$92/MWh compared to \$44/MWh for existing power plants