



Inside Energy

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RE: Virginia and RGGI

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Virginia Governor Northam led the Commonwealth into the multi-state Regional Greenhouse Gas Initiative (RGGI). I conducted a multi-state study, updated for Virginia, which came to the same conclusion as a Congressional Research Center study¹. The dozen year old RGGI program has resulted in no significant additional emission reduction compared to comparison states, but did shift generation to other states. Virginia electric generation fell 9% in the first ten months of 2021 despite a 7% increase in demand as the purchase of RGGI allowances began. Virginia natural gas fired power plants lost against regional electric grid bids from non-carbon tax states with 10% to 13% lower cost as shown in the following table².

Fuel Source	2021 MWh	2020 MWh	Difference	% Change
Coal	2,785,000	2,891,000	(106,000)	-4%
Natural Gas	45,673,000	54,297,000	(8,624,000)	-16%
Petroleum	291,000	174,000	117,000	67%
Other Gases	438,000	461,000	(23,000)	-5%
Total Fossil Fuel	49,187,000	57,823,000	(8,636,000)	-15%
Nuclear	23,846,000	24,734,000	(888,000)	-4%
Net Hydro	614,000	775,000	(161,000)	-21%
Biomass	2,898,000	2,870,000	28,000	1%
Solar	3,170,000	1,348,000	1,822,000	135%
Total Zero CO2	30,528,000	29,727,000	801,000	3%
Total	79,715,000	87,550,000	(7,835,000)	-9%
Electric Demand	103,768,000	97,336,000	6,432,000	7%

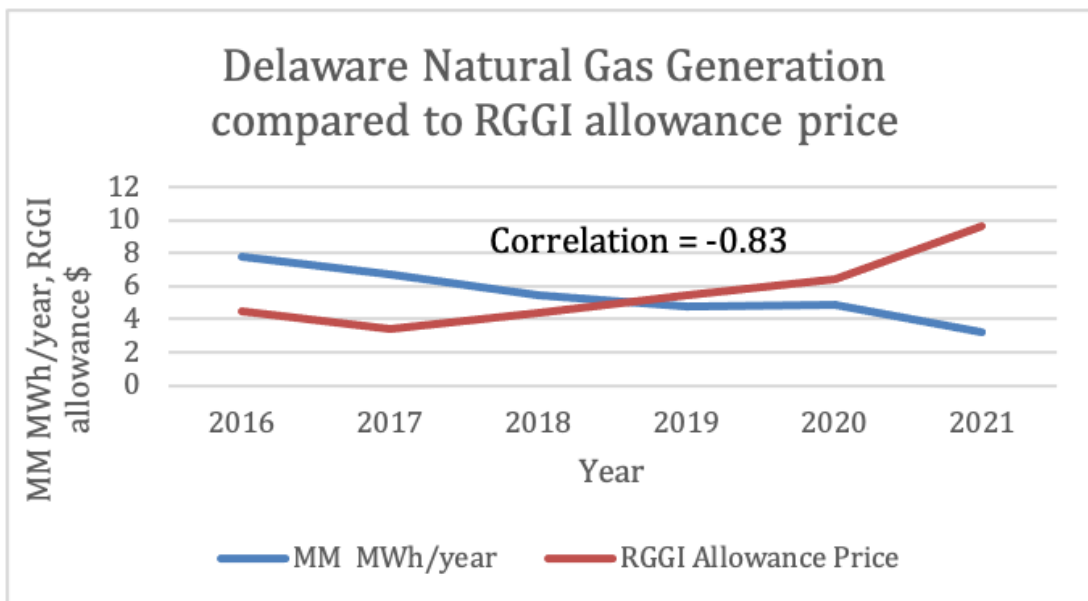
October year to date totals from US EIA Electric Power Monthly



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The RGGI program requires power plants to buy emission allowances for each ton of CO₂ emissions with allowances sold in quarterly auctions. Speculators can participate and potentially resell allowances at higher prices. Virginia power plants will lose about \$330 million in generation revenue in 2021 (9.4 million lost MWh annualized @ \$35/MWh). The loss of in state generation will continue to rise as RGGI allowance prices rise. A study of the RGGI state of Delaware showed natural gas generation could fall to zero at a \$16/ton allowance price (see graph below). Generation will likely shift out of Virginia much faster than new wind and solar generation can be built.



Source: power use from US EIA detailed state data, allowance prices from RGGI auction results

The first question to consider is how Virginia emissions reductions compare to the RGGI states from 2007 to 2019:

- Per capita emissions from Virginia electric power plants fell 46 percent³. RGGI states fell 40 percent after adjusting for the emissions RGGI states shifted elsewhere by importing more electricity from other states, and industrial business lost to other states
- Total Virginia power plant emissions fell 17.5 million tons³
- The Virginia generation mix changed by reducing coal-fired generation by 42 percentage points³ compared to RGGI states 16. Natural gas generation increased by 43 percentage points, 10 in RGGI states. RGGI states added 5 percentage points of zero emission resources, and Virginia saw no change as solar added 4 percentage points replacing the same amount of nuclear and hydro power.

It is no surprise Virginia had a higher rate of reduction in emissions than RGGI states as that was similar to the conclusion of my peer reviewed study published in the Cato Journal, “A Review of the Regional Greenhouse Gas Initiative”¹. RGGI had essentially no impact on emissions reductions compared to five other



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states who had similar energy policies except for RGGI. Consequently, there will likely be no environmental benefits from Virginia joining RGGI.

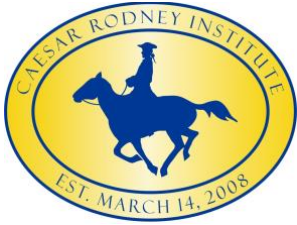
Importing power adds cost to cover the greater transmission distances and congestion at key transmission sub-stations. Well-paying jobs at the power plants would be lost, and that has secondary impacts on the economy. The direct cost of RGGI is currently about \$58/year based on a Dominion Power rate increase request to the utility commission of \$4.37/Megawatt-hour⁴, and an average monthly usage of 1.1 megawatt-hour per month⁵. A large industrial customer using 6,000 Megawatt-hours a month in a utility commission example would pay about \$315,000/year in 2022 for RGGI.

Allowance prices averaged \$9.60/ton in 2021 and ended the year at \$13⁶, and resulted in \$128 million in costs added to electric bills. RGGI, Inc. itself shows prices rising to as much as \$24/ton⁷ by 2030. RGGI costs may average \$250 million a year through 2030 based on the RGGI upper end forecast, or \$2.5 billion over 10 years. RGGI, Inc. raised \$284 million in RGGI auction revenue which was added to electric bills, and claims to have saved \$112 million on electric bills by investing in energy efficiency, renewable energy, and greenhouse gas abatement⁸. Our analysis¹ showed the savings estimates are questionable as no robust auditing has been done on the supposed savings, or of how money was spent. For example the RGGI report shows Connecticut invested money, but in actuality the state directed RGGI revenue to its general fund. In any case the supposed savings were insignificant. Energy efficiency and renewable energy savings represented 0.09% of RGGI state electric generation in 2019.

Joining RGGI would require electric generators to reduce CO₂ emissions 65% from 2007 levels, or an additional 13 million tons by 2030. In 2020 coal fired power plants emitted 4.5 million tons of CO₂. Closing those power plants would meet 35% of the emissions goal. Electric generation would fall 3.3 million Megawatt-hours. That is lost power plant generation worth about \$115 million (3.3 million MWh @ \$35/MWh). Decommissioning costs for those power plants would be about \$325 million⁹. Coal production in Virginia would fall about 1.8 million tons a year currently worth \$90 million a year¹⁰ at \$50/ton.

The balance of the emission reduction would have to come from natural gas fired plants reducing generation by about 19.3 million Megawatt-hours. Lost generation would be worth about \$675 million a year by 2030 (19.3 million MWh @ \$35/MWh). Virginia produces enough natural gas to generate 14.7 million megawatt-hours of natural gas that should be worth an average of \$500,000 a year a year by 2030¹⁰. By 2030 35% of Virginia natural gas generation would have to close with a decommissioning cost of \$83 million⁸.

The average annual cost between now and 2030 of lost generation, and lost coal and natural gas production could be as high as \$560 million. RGGI expense may be \$250 million a year, and there may be \$400 million in one-time power plant decommissioning cost. Over 10 years RGGI might have a direct cost of \$8.5 billion. Indirect and induced impacts are calculated using a regional multiplier from the US Bureau of Economic Analysis, which is 1.2983 for utilities¹¹ may cost \$19.5 billion to reduce emissions by about half. To go to zero emissions with RGGI alone may cost \$39 billion.



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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.

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> , Cato Journal, "A review of the Regional Greenhouse Gas Initiative", : <https://object.cato.org/sites/cato.org/files/serials/files/cato-journal/2018/2/cato-journal-v38n1-chapter-11.pdf>
- 2) US Energy Information Agency, Electric Power Monthly, [Electric Power Monthly - U.S. Energy Information Administration \(EIA\)](#)
- 3) Author calculation from U.S. Energy Information Agency, "Annual Detailed State Data", <https://www.eia.gov/electricity/data/state/> Emissions, Generation, Demand, and Capacity charts by State 1990 to 2020, Inside Energy, Lost In Transmission: How Much Electricity Disappears Between A Power Plant And Your Plug? www.insideenergy.org/2015/11/06/lost-in-transmission-how-much-electricity-disappears-between-a-power-plant-and-your-plug/
- 4) Thomas Jefferson Institute, "Youngkin to Withdraw from RGGI, End Carbon Tax", [Youngkin to Withdraw from RGGI, End Carbon Tax | \(jeffersonpolicyjournal.com\)](#)
- 5) Virginia State Corporation Commission, Carol Meyers cost testimony on Dominion Power Integrated Resource Plan, <https://scc.virginia.gov/docketsearch/DOCS/4p8t01!.PDF>
- 6) Regional Greenhouse Gas Initiative Auction Results, <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
- 8) RGGI, Inc., "The Investment of RGGI proceeds in 2019", [RGGI Proceeds Report 2019.pdf](#)
- 9) 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,
- 10) US EIA weekly coal production, [Weekly Coal Production by State \(eia.gov\)](#) , coal prices, [Coal prices and outlook - U.S. Energy Information Administration \(EIA\)](#) , natural gas production, [Microsoft Word - table_02.doc \(eia.gov\)](#) Free Energy, "Straight Facts on the environmental impact on coal", 1100 pounds of coal/MWh, [Straight facts on the environmental impact of coal: CO2 emissions, pollution, land, and water \(freeingenergy.com\)](#)
- 11) U.S. Bureau of Economic Analysis Regional Impact Multiplier System, composite multiplier for indirect impact of utilities is 1.2983, available by subscription service only