Notes on RGGI and the PA CO_2 Trading Testimony

The RGGI program has been setting a cap on carbon emissions from large electric utility stations in participating states since 2009. The nation's first cap-and-trade program, it currently has 11 states as members.[1] Every state from Maine through Virginia is a member of RGGI, with a single hole in the map represented by Pennsylvania.

The initial cap and trade proposed to reduce total CO_2 emissions and effectively tax continuing emissions. Licenses would be sold to power plant owners based on current emissions. The revenues went to participating states, with a minimum of 25% of the funds to be spent benefitting consumers or for strategic energy purposes. Presumably these costs would be passed along to consumers of power through their electric bills with higher per-kwh rates.

Some power plants would be retrofitted to reduce emissions, and so could trade unneeded allowances for money. New or inefficient plants would need to purchase allowances, and so the market would adjust, with more carbon-efficient plants being rewarded and less efficient ones being penalized. The cap would be reduced over time, creating more pressure to reduce greenhouse gases.

A cap and trade system gives economic advantage to lower emissions plants – exactly the boost you want in order to get a free market to recognize the importance of climate and good air quality which otherwise would not be part of most electric utilities' economic calculations.

In fact, actual emissions initially declined faster than the cap, for a variety of reasons. These include a fall in economic activity around 2009-11 and some utility switching to lower-carbon fuels for reasons including falling costs for natural gas and a growing demand for greener fuels. The cap continues to be adjusted downward, though it still generally exceeds actual emissions.

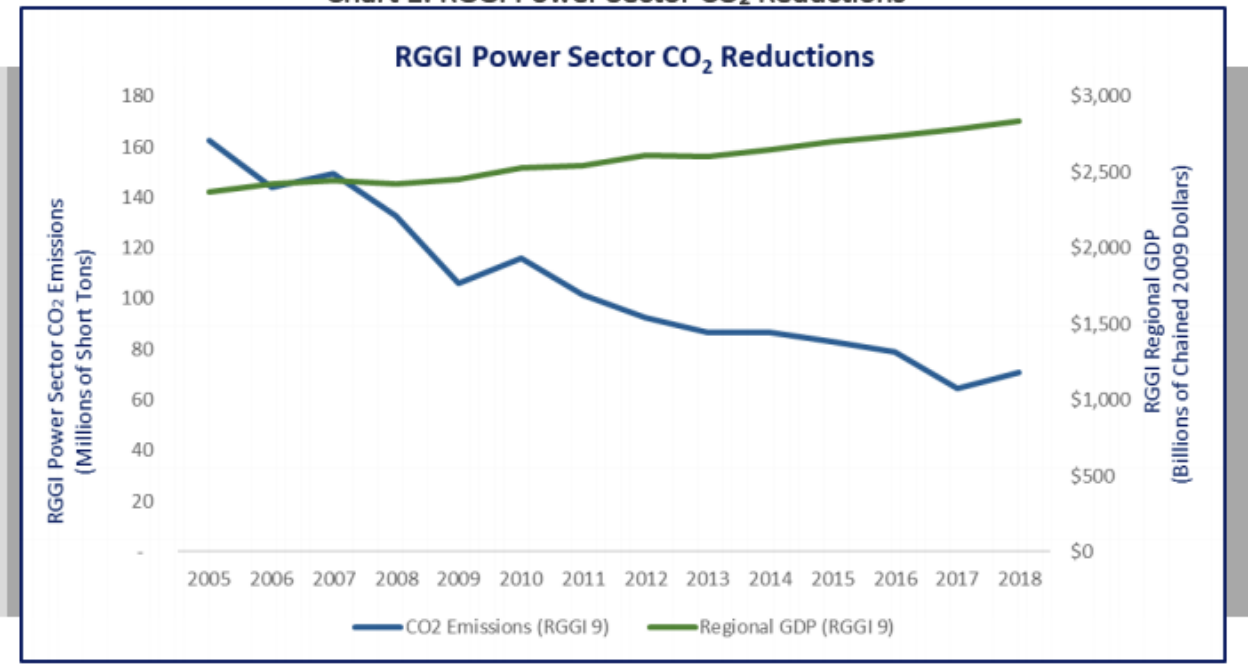
Assessing RGGI's effectiveness

According to RGGI, the original nine RGGI states participating between 2005-2018 experienced a reduction of over 90 million short tons of annual power sector

[1] These nine states are the original nine states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont, plus newcomers New Jersey and Virginia.

carbon pollution, even as the regional economy grew (see Chart 1)[2]. 1 This represents a reduction in power sector carbon pollution of over 50%.

Chart 1: RGGI Power Sector CO_2 Reductions



In 2018 alone RGGI investments managed to avoid 4.6 million tons of carbon pollution. RGGI-funded programs also save consumers money and support businesses. RGGI investments in 2018 are estimated to return $2 billion in lifetime energy bill savings to over 120,000 households and over 1,200 businesses that participated in programs funded by RGGI proceeds, while over 750,000 households and businesses received direct bill assistance in 2018. As a whole, the RGGI states have reduced power sector CO_2 pollution over 50% since 2005, while the region's gross domestic product has continued to grow.

Overall, RGGI states raised billions of dollars for environmental protections through the RGGI program ($3.7 billion), funds which may otherwise not be available to support environmental protections.

The Acadia Center performed a 10 year review of RGGI operations in 2019, updating the previous results and using 2008 as the baseline for comparison

[2] RGGI.org, "The Investment of RGGI Proceeds in 2018," July 2020, https://www.rggi.org/sites/default/files/Uploads/Proceeds/RGGI_Proceeds_Report_2018.pdf

instead of 2005. While results starting in 2005 may track actions taken as states were beginning to organize RGGI, 2008 is probably a better year to use as a baseline for measuring its effectiveness. RGGI began actual operations at the beginning of 2009, so 2008 is the last full year of operations before the cap and trade program began.

In the 10 years from 2008 through 2018, Acadia Center concludes that RGGI states have experienced many positive results[3]:

- CO_2 emissions from RGGI power plants have fallen by 47%, outpacing the rest of the country by 90%;
- Electricity prices in RGGI states have fallen by 5.7%, while prices have increased in the rest of the country by 8.6%;
- GDP of the RGGI states has grown by 47%, outpacing growth in rest of the country by 31%;
- RGGI states have generated $3.2 billion in allowance auction proceeds, in the majority of which have been invested in energy efficiency and renewable energy programs; and
- RGGI-driven reductions in co-pollutant emissions have resulted in over $5.7 billion in health and productivity benefits.

The spread of RGGI's influence beyond RGGI's initial borders

RGGI's impact has been significant enough that New Jersey has decided to rejoin, and Virginia is joining for the first time. Pennsylvania is holding hearings on its plan to join. Other states may also be considering applications.

RGGI was only the second program in the world to regulate carbon emissions, and initially the only one to require polluters to pay. Since then 60 regional carbon pricing programs have been put in place, many looking to RGGI for guidance as well as inspiration.

[3] Acadia Center, "The Regional Greenhouse Gas Initiative: 10 Years in Review," 2019, https://acadiacenter.org/wp-content/uploads/2019/09/Acadia-Center_RGGI_10-Years-in-Review_2019-09-17.pdf

As the Congressional Research Service, a nonpartisan group reporting to the US Congress, points out, "RGGI's activities may stimulate action in other states or at the federal level. When business and industry have confronted a growing patchwork of state requirements, these sectors have historically preferred a national policy."[4]

The arguments for and against RGGI

CO_2 emissions reductions

The key impact, in judging RGGI's performance, must be the reduction of CO_2 emissions which was the guiding purpose for forming RGGI. All other issues are important, but should be considered as side effects – hopefully also positive in impact, or at least minor in comparison to any successes in CO_2 reduction. If RGGI fails to reduce CO_2, then RGGI should be discontinued or revamped until it succeeds; if discontinued, the other issues become moot.

CO_2 emissions from RGGI-covered power plants fell by nearly 50% from 2008-2019, almost twice as fast as in non-member states.[5]

There are those who question how much of that CO_2 emissions decline was due to the cap and trade program and how much due to other factors – economics, fuel switching, etc. In other words, would the same decline have happened anyways, and without the cost added by participation in RGGI? There has been little research to tease this out. Perhaps much of the decline can be attributed to factors other than RGGI. Still, there is a clear contrast between the RGGI states and their near neighbor Pennsylvania which significantly lagged in CO_2 utility sector reductions.

The nonpartisan Congressional Research Service estimates that between 2012 and 2018 RGGI emissions dropped 20% while electricity use stayed essentially flat. Their inference is that the emissions drop did not stem from a decrease in demand but from fuel switching (a substantial reduction in coal and petroleum sources occurred in that period while natural gas, hydro, wind and solar

[4] Congressional Research Service, "The Regional Greenhouse Gas Initiative: Background, Impact and Selected Issues," July 16, 2019, https://fas.org/sgp/crs/misc/R41836.pdf
[5] Acadia Center, pp. 3, 7.

generation increased), with the possibility of some additional pollution control equipment and technology improvements may have also aided this reduction in emissions.

Economists Murray and Maniloff concluded in 2015 that RGGI has induced more reduction in regional CO_2 emissions than in the rest of the country; that emissions would have been 24% higher without RGGI, and that RGGI program reductions reduced national CO_2 emissions by 2%.[6] Their econometric model demonstrates that the recession had a statistically insignificant impact on emissions from 2009-11, that the fall of natural gas prices was a significant factor along with the RGGI program.

CERES, a nonprofit working on sustainability issues with investors and corporations, says that from 2009-2014 specifically, RGGI emissions dropped 35% (compared to 12% in non-RGGI states) while RGGI state economies grew 21.2% (compared to 18.2%).[7]

Critics dispute the amount of reductions. Former utility analyst Roger Caiazza estimates that direct investments of RGGI auction proceeds were responsible for only 7.9% reduction in load and the direct investments of RGGI auction proceeds were responsible for 5.4% of CO_2 emissions reduction.[8]

David Stevenson, writing for The Cato Institute,[9] argues that RGGI created no net reductions in emissions, and yet cost the economies of RGGI states significant sums of money for no positive result. Any emissions reductions in that time period they claim were due to other factors – especially loss of industry and energy efficiency programs. Loss of industry can be a real concern which we

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[6] Murray and Maniloff, "Why have greenhouse emissions in RGGI states declined? An econometric attribution to economic, energy market, and policy factors," *Energy Economics,* Volume 51, September 2015, Pages 581-589. An earlier draft of this from 2014 is more easily accessible at https://poseidon01.ssrn.com/delivery.php?ID=472093064123005108091022112012030009041017062031079020023099118006116003118120115024030049123054053040034007126069090093092013051016034093003068112072028126081081124014013043072117066007098085000010092088088092117029019070079075099094120067000105071116&EXT=pdf

[7] CERES.org, "RGGI_ A Fact Sheet" https://www.ceres.org/sites/default/files/Fact%20Sheets%20or%20misc%20files/RGGI%20Fact%20Sheet.pdf

[8] Roger Calazza, "Acadia Center RGGI 10-Year Review, *The Pragmatic Environmentalist*, https://pragmaticenvironmentalistofnewyork.blog/2020/04/15/acadia-center-rggi-10-year-review/

[9] David T. Stevenson, *Cato Journal*, Vol. 38, No. 1 (Winter 2018), https://www.cato.org/sites/cato.org/files/serials/files/cato-journal/2018/2/cato-journal-v38n1-chapter-11.pdf

address below. Energy efficiency programs in many cases may have been instigated by the RGGI program actions, including higher electric costs than otherwise, and through the use of RGGI funds to encourage the energy efficiency programs.

Stevenson admits that RGGI states had a larger reduction in CO_2 emissions (40%) than non-RGGI states (20%) from 2007-15 but then reminds us RGGI only covers a small part of the country. He points out that non-RGGI states had a larger growth in wind and solar than RGGI states in the period. This may have more to do with climate than the economic effects of RGGI – for example the greater number of sunny days making Southern and Western states better suited to solar, and the steady winds of the West Coast and Great Plains states. He adds that power imports from other states increased in RGGI states, yet that might be argued to be a positive effect of RGGI – when RGGI area coal plants shut down, for instance, and their owners sell the permits at auction for a profit, then replace the power with renewables transmitted across the lines from Kansas and Texas.

Cato's research does indicate that industrial economic demand fell faster in RGGI states (18%) vs other states (4%) from 2007-15. Again, the use of a base year other than 2008 is suspect.

Some critics question whether the emissions cap actually does anything to provoke emissions reductions, given that it has mostly been higher than actual emissions. We argue that even though it may have been ineffective in directly influencing reductions, that indirectly it has a substantial impact. Capital investments in power plants – whether designing new production or deciding to invest in emissions control equipment or maintenance programs – are forward planning events. Utility companies must make their calculations, go out and get bids from contractors and component manufacturers, decide and contract for these investments and obtain regulatory approvals before making these switches. This is easily a 3-6 year time lag. The certain knowledge that your costs for high-carbon-emitting fuels will be increasing in the next several years may easily spur the long process of making the adjustments needed for a lower-carbon future.

Health Impacts

Reducing carbon emissions will have a positive effect on public health by reducing factors contributing to global warming. If the health impacts stopped there, it would be a significant contribution. Yet the public health impacts are even greater and more immediate. By cleaning up their carbon emissions, utilities will usually capture or reduce other pollutants also, including sulfur dioxide, nitrous oxide and particulates. These gains will result in fewer cases of asthma, lung cancer, cardiovascular diseases and cancers, helping people lead longer and healthier lives, as well as reducing health care costs for individuals, employers and governments. One study estimates that RGGI states enjoyed almost $6 billion in healthcare savings since 2008. Another study in *BMJ* in 2019 indicated a statistically significant drop in neonatal and infant mortality as an impact of RGGI emissions reductions. [10]

The Cato Institute argues that there were no net health gains but provides no analysis. The Allegheny Institute for Policy [11] points out that Pennsylvania already has lower rates of asthma than RGGI states. This is not a persuasive argument that RGGI is unnecessary. No matter what Pennsylvania's asthma rates are compared to other states, the rates will improve by reducing emissions from power plants, not only CO_2 but other pollutants with known deleterious impacts on health such as sulfur dioxide, nitrous oxide and particulates from burning fossil fuels.

Job and economic growth

The Cato Institute argues that RGGI price increases shifted jobs to other states. They look at electricity price changes from 2002 to 2015 and state that prices increased faster in that period in the RGGI states (57%) than 5 non-RGGI states which had deregulated energy markets similar to RGGI states (36%) and other

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10 Jaeseok Lee and Taehwan Park, "Impacts of the Regional Greenhouse Gas Initiative (RGGI) on infant mortality: a quasi-experimental study in the USA, 2003–2014," BMJ Open. 2019; 9(4): e024735,.https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6500359/

[11] The Allegheny Institute for Public Policy, "Regional Greenhouse Gas Initiative is Wrong for PA," October 10, 2019, https://www.alleghenyinstitute.org/regional-greenhouse-gas-initiative-is-wrong-for-pa/

non-RGGI states (52%). Yet it makes no sense to use 2002 as the base year for these comparisons as the RGGI program did not take effect until 2009. If you use 2008 as the base, being the last year before RGGI kicked in, prices remained roughly the same in all the deregulated states, RGGI or not, while rising in the regulated states.

Cato's research also states that more energy-intensive businesses left RGGI states, again using data from 2007-2015. Using 2007 as a baseline continues to be less than ideal. Still, they may have a point here. It may be true that large energy users find it harder to compete with their peers facing lower electric rates or which have adopted lower-energy-using technologies. This is an expected outcome of increasing the costs of power. One of the things states can do with the RGGI revenues is to work with manufacturers who are at risk and help them identify lower cost technologies. Or states can provide grants or low-cost loans to encourage them taking energy efficiency measures which offset the higher electric rates. Many states do have such programs – in Pennsylvania for example, there is the Small Business Advantage Grant program, the Solar Energy Program, the Green Energy Loan Fund, which may mitigate this problem if Pennsylvania goes ahead.

Additional jobs and economic growth from investing in renewables and efficiency may result in a net economic gain.

Effects on markets

Has RGGI distorted electricity markets, as some of its critics claim? And has the existence of a market mechanism created speculation, allowing investors to benefit while electricity suppliers and consumers suffer, as others have feared? Initial research does not support either of these negative impacts.

In spite of the excess of allowances under the cap, auction clearing prices have been going up - $4.41 per short ton in 2018, $5.43 in 2019 https://www.rggi.org/sites/default/files/Uploads/Market-Monitor/Annual-Reports/MM_2019_Annual_Report.pdf , and by September 2020 auction the market clearing price was $6.82, with 2.6 bids for every one allowance.

Even during COVID, the proceeds have continued to rise – from these auctions:

9/19	$68.2 million		
12/19	$73.6	8% increase from the previous quarter	
3/20	$91.6	24%	
6/20	$93.9	3%	
9/20	$110.4	18%	or a 62% increase from previous year's proceeds

RGGI Auction Results - https://www.rggi.org/auctions/auction-results

This indicates that, by creating a cap and trade system, the market under RGGI is succeeding in making it more expensive to pollute, yet not greatly stifling economic activity.

There is a small amount of interest and participation by speculators who purchase CO_2 allowances and futures, but Potomac Economics, which monitors the markets, has found no evidence to date of significant anticompetitive conduct. No hoarding of CO_2 allowances to influence price or to prevent competitors from accessing allowances; little investing activity by outsiders hoping to enjoy a windfall from speculating successfully in the shifting prices at auctions or during secondary market trades.[12]

Emissions leakage

One of the problems Cato Institute cites with RGGI is the exit of generating capacity from RGGI states to less regulated states, sometimes known as "emissions leakage". Murray and Maniloff conclude that the evidence for this is mixed. It is possible that the small incremental cost of generation has had this effect, even though utilities are able to pass costs on to their ratepayers via periodic Public Utility Commission regulated rate increases. Bringing additional states into these pacts would slow this leakage down.

Nonetheless the adoption of a good idea should not be stymied by the fact that other states have not (yet) adopted the same good idea. If one state is

[12] Potomac Economics, "Report on the Secondary Market for RGGI CO2 Allowances– Second Quarter 2020," August 2020 https://www.rggi.org/sites/default/files/Uploads/Market-Monitor/Quarterly-Reports/MM_Secondary_Market_Report_2020_Q2.pdf

considering increasing the “sin taxes” on cigarettes or alcohol, they do it partly to discourage unhealthy behavior, and partly to have the people making unhealthy choices at least partly pay for the additional costs of their behavior imposed on all citizens. States may consider what neighboring states do, but rarely decide to forgo levying such a tax or increasing such taxes on harmful behaviors just because other states continue to live in denial of these problems and their solutions.

Similarly with CO2 emissions – just because other states have not (yet) imposed taxes on emissions does not mean it is a bad idea. States can lead the way in spreading good ideas, just as people can.

Racial and economic justice

Generating stations often are located within or near low income residential neighborhoods, exposing the poorest and most vulnerable populations in disproportionate ways to the negative health impacts of air pollution. Programs reducing air pollution from industrial and utility sites thus will have immediate positive impacts on the poorest neighborhoods, restoring some measure of the inequalities which beset our society.

When utilities are not taxed on their negative effects on the environment, they enjoy lower costs and higher profits until society recognizes the lack of accountability this creates. Their profits have been subsidized by the rest of us. RGGI’s cap and trade program will impose such a tax and some measure of accountability. The result will begin to address this inequity, where shareholders benefit from not having to pay the full cost of their product, while residents suffer from the climate, health and other impacts which result.

Turning this around will especially benefit poor and moderate income residents who may not be able to afford take advantage of more expensive efficient appliances, or tax incentives for efficiency or renewable energy projects which wealthier residents can enjoy. And with RGGI-subsidized projects (renewables, insulation and other efficiency investments) providing good paying, skilled jobs, an additional measure of justice will be restored.

Affordability

Stevenson argues that non-RGGI states had electricity price increases which were lower than RGGI states. Dr Susan Tierney, former Assistant Secretary of Energy for the Department of Energy, looked at these arguments and testified in a Delaware court that while RGGI might push up electricity costs by adding the auction costs for electric generating stations, when the states invest in energy efficiency programs, the reduction in demand more than offsets the RGGI direct costs. Thus electric bills for consumers fall through these dual effects of RGGI. [13] Notably, this reduction in demand further reduces greenhouse gases, part of the *raison d'etre* for RGGI.

The Cato Institute implies that electric rates increased faster in RGGI states from 2007 to 2015 than in non-RGGI states. The numbers are small – a 4.6% increase over the 8 year period for the RGGI states compared to a 2.8% increase for the 5 non-RGGI states. This is a fraction of a percent per year in either group, less than the cost of inflation. Even so, there are two reasons which invalidate this argument. First, to compare the 9 geographically proximate states in RGGI to 5 states spread out over the rest of the country, without accounting for the vastly differing tax incentives, political cultures, economic profiles and other factors, is a poor statistical methodology. Second, if you compare the RGGI states to the average electric rate increase in the entire US (5.5%), RGGI states experienced lower electric power price increases than the nation as a whole.

Regardless, this tax is tempered in many states by programs designed to support lower income individuals so their financial situation does not worsen because of the program. In terms of affordability for lower income residents, states considering joining, such as Pennsylvania, may already have programs in place (and can add more if needed) to subsidize any increases which stretch the budgets of the poor.

Conclusion

[13] *Stevenson, et al. v. Delaware Dept, of Nat. Resources & Environmental Control, et al., C.A.* No. S13C-12-025 RFS. Decision after trial submitted June 26, 2018.

RGGI has succeeded on several fronts. Is it perfect? Probably not. Their cap seems to be overly generous, as evidenced by the chronic gap between demand for CO_2 allowances and the total allowed. And in creating a mechanism which increases costs to users of electricity, it may indeed cause economic disruptions which result in loss of manufacturing, jobs and tax revenues to states which still allow ratepayers to subsidize utility shareholders who are not (yet) paying the full cost of producing electricity without mitigating climate and environmental harms.

Yet RGGI is an established mechanism of the type many economists say is the best way for our economy to reduce greenhouse gases. In its 10 years of operation it has successfully brought states together in cooperation; it has successfully helped cap CO2 emissions and continually reduce them; it has successfully held auctions to redistribute money from shareholders to the citizenry of member states, which have succeeded in using the money for other climate and equity aims. These accomplishments are no small thing.

There are flaws in RGGI's design, but most can be mitigated by member states – the effect on industry and jobs, the effect on low-income consumers. And members can decide to lower the cap to adjust the rate of emissions reduction.

RGGI has developed the infrastructure for a cap and auction program, has successfully conducted years of sales without a hitch, created a CO_2 tracking program and a compliance methodology which works. The health benefits are an undeniable social good. Where states have used the proceeds to invest in energy efficiency and equity measures, there are additional social gains. Overall, we believe that RGGI is a success and other states should consider applying to join.