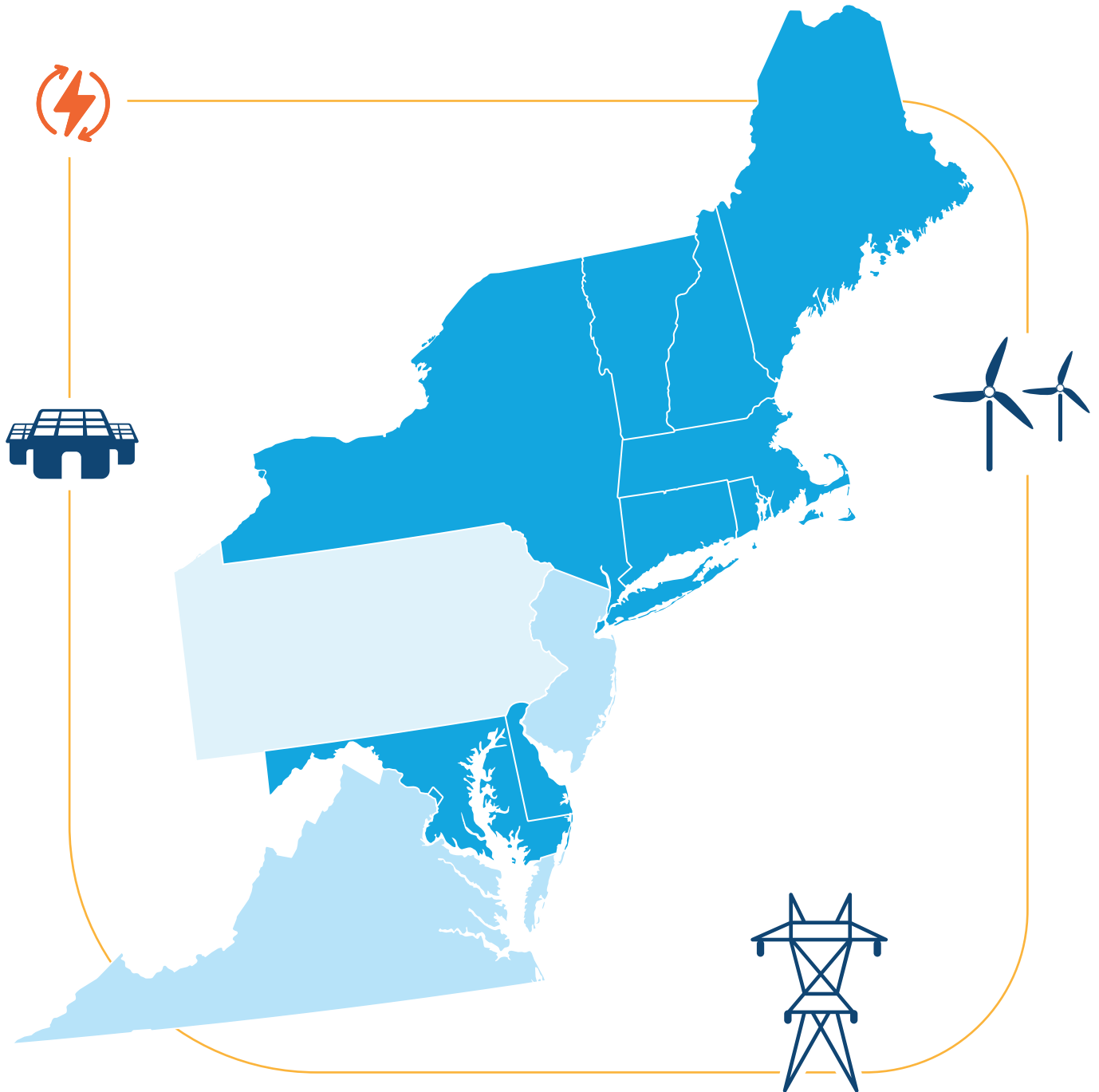


The Regional Greenhouse Gas Initiative

10 Years in Review



2019

Executive Summary

Through ten years of operation, the Regional Greenhouse Gas Initiative (RGGI) has helped Northeast and Mid-Atlantic states¹ achieve significant reductions in emissions of carbon dioxide (CO₂) and other pollutants from the electric power sector. The country's first program designed to reduce climate change-causing pollution from power plants has provided a wealth of lessons to be incorporated into the next generation of climate policies, from successes to build on to opportunities for improvement.

The participating states have experienced substantial benefits from RGGI since 2008, the year before the program launched. Concerns that climate policy would make states less competitive have been directly refuted by RGGI's experience: the RGGI program is helping participating states outperform the rest of the country. Since 2008:

- **CO₂ 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**,ⁱ 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.**ⁱⁱ

Much has changed since RGGI was launched, beyond the climate, economic and health improvements described above. Most notably, climate policy has advanced by leaps and bounds. When RGGI was implemented, it was just the second program in the world to regulate carbon emissions, and the first to require polluters to pay for emissions allowances (permits to emit pollution). Now, there are 57 national or subnational carbon pricing programs in place,ⁱⁱⁱ many of them drawing on lessons learned from RGGI.

At the same time, findings from the scientific community have made the urgency of climate action increasingly hard to ignore. If the planet is to avoid crossing the 1.5 degree warming threshold, global annual GHG emissions need to be reduced by 45% from 2010 levels by 2030.^{iv} To make a meaningful difference in reducing the catastrophic costs of climate change, we need urgent action.

Finally, sound climate policy needs to be oriented around climate justice. Programs designed to reduce GHG emissions must be good for the planet and for communities. In the RGGI context, that means improving air quality in environmental justice communities, ensuring that underserved populations have access to RGGI-funded energy efficiency and clean energy programs, and importantly, that those communities have a say in shaping the policy.^v While there is much more to do to protect vulnerable communities from power plant pollution, states must also act with urgency to reduce locally-harmful pollution from other sources, most notably transportation.

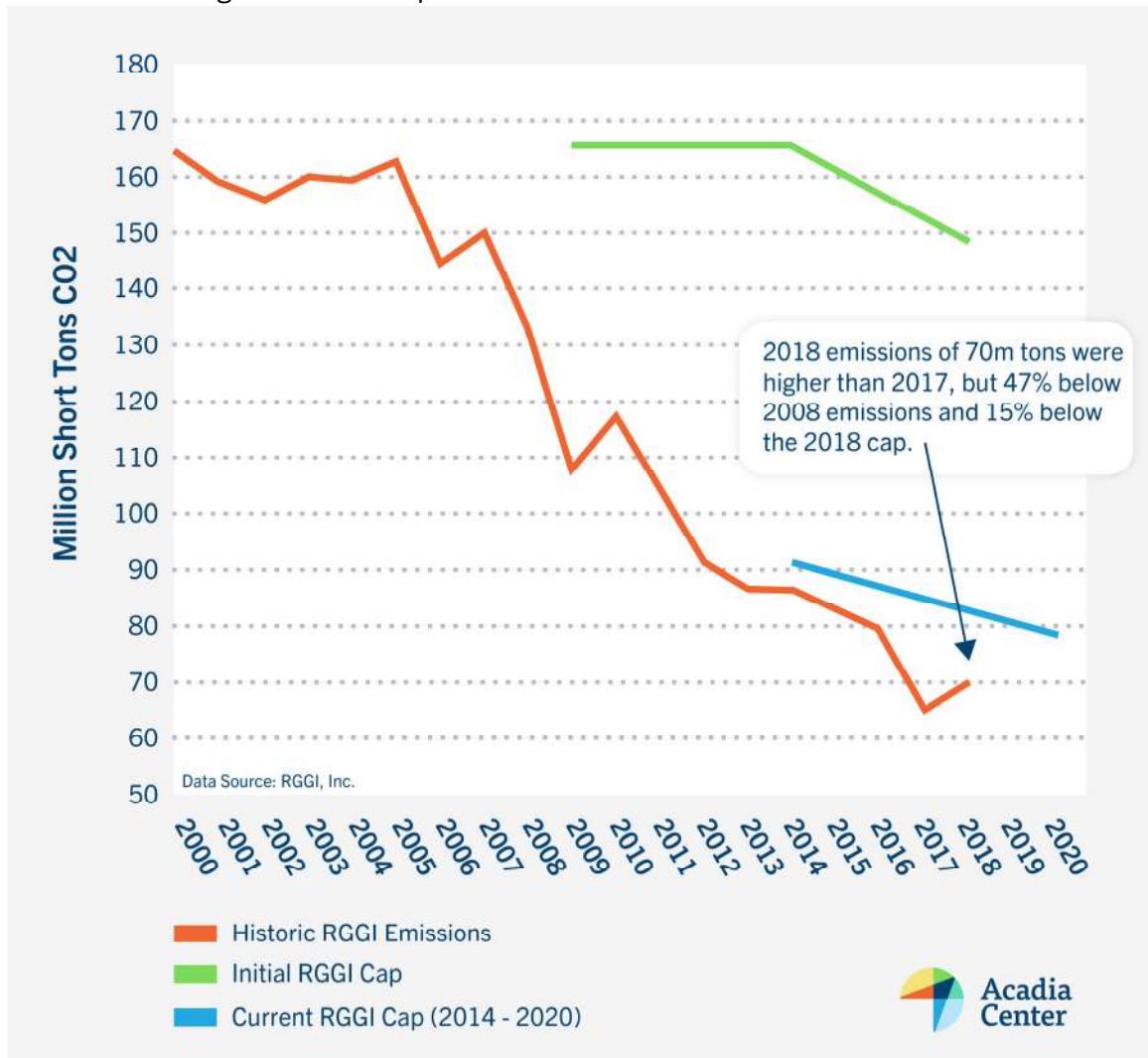
¹ Analysis in this report covers the currently participating RGGI states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. [Footnotes elaborate on points within this report, whereas endnotes cite references and provide detailed analytic methodologies where relevant.]

Emissions Trends and RGGI Cap Dynamics

Rapid CO₂ Reductions Outpace the Rest of the Country

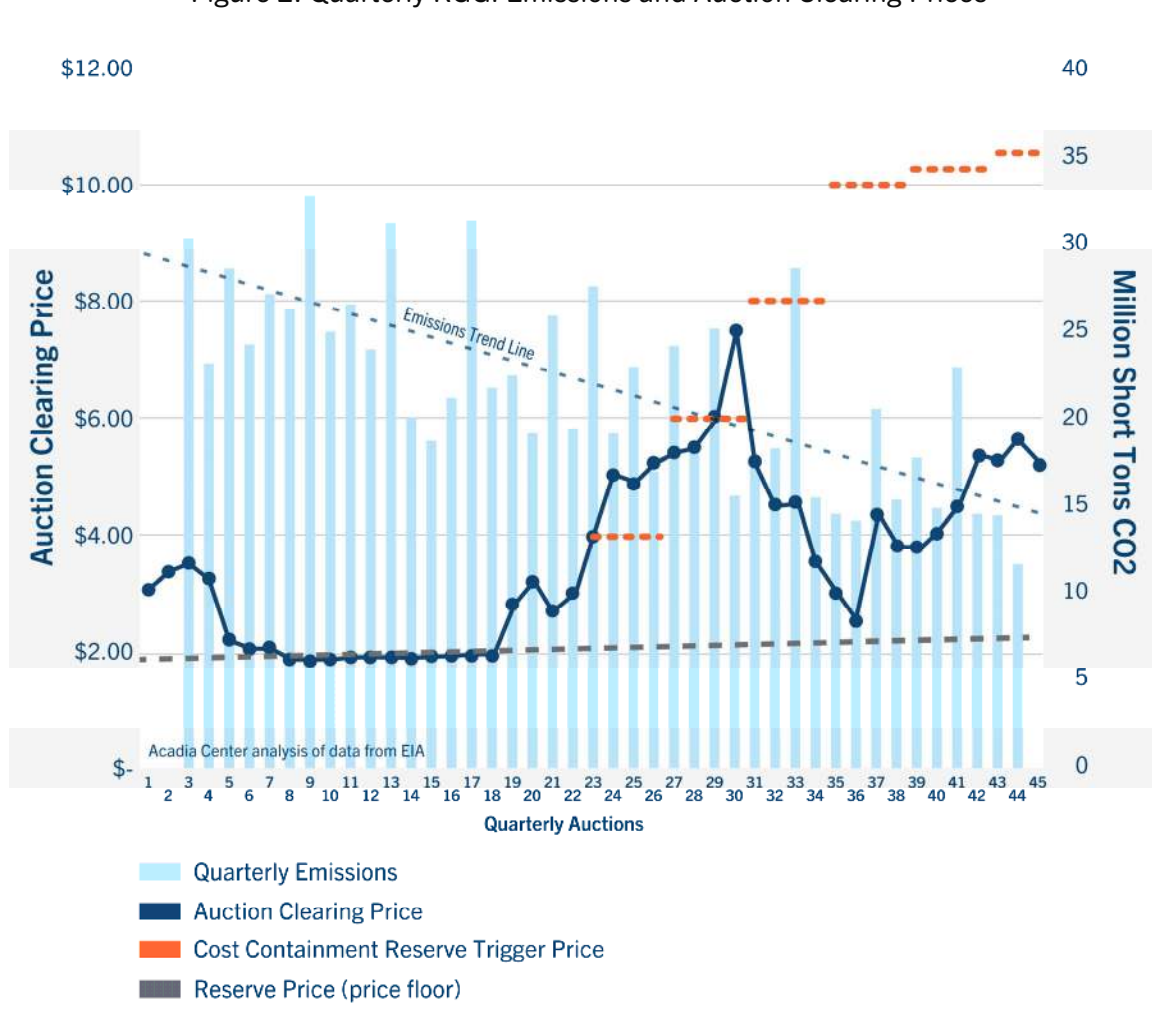
States participating in RGGI have seen a steep decline in CO₂ emissions from power plants over the last 10 years. Since 2008, the year before the program launched, RGGI emissions have fallen from 133 million short tons of CO₂ to 70 million tons in 2018, shown in Figure 1. The impressive electric sector emission reductions achieved in RGGI states over that time period have outpaced reductions in the rest of the country by a staggering 90%. While the RGGI program has not been the sole factor behind the region's rapid electric sector decarbonization, earlier analysis shows that it has been a key driver—and accelerator—of emission reductions from power plants.^{vi}

Figure 1: RGGI Cap and Historic Emissions – Nine RGGI States



As Figure 2 shows, rapidly declining RGGI emissions and an oversupply of allowances have kept RGGI allowance prices relatively low. From Auctions 8 to 18, RGGI allowances sold at the reserve price—the lowest price at which allowances can be sold through auction—and the highest RGGI auction clearing price since the program launched was \$7.50 per allowance. For comparison, the 2019 auction reserve price in California and Quebec’s cap-and-invest program is \$15.62 per allowance.^{vii} This higher reserve price provides a greater incentive to pursue additional CO₂ abatement measures.

Figure 2: Quarterly RGGI Emissions and Auction Clearing Prices



Aligning the RGGI Cap with Current Emissions and the Climate Crisis

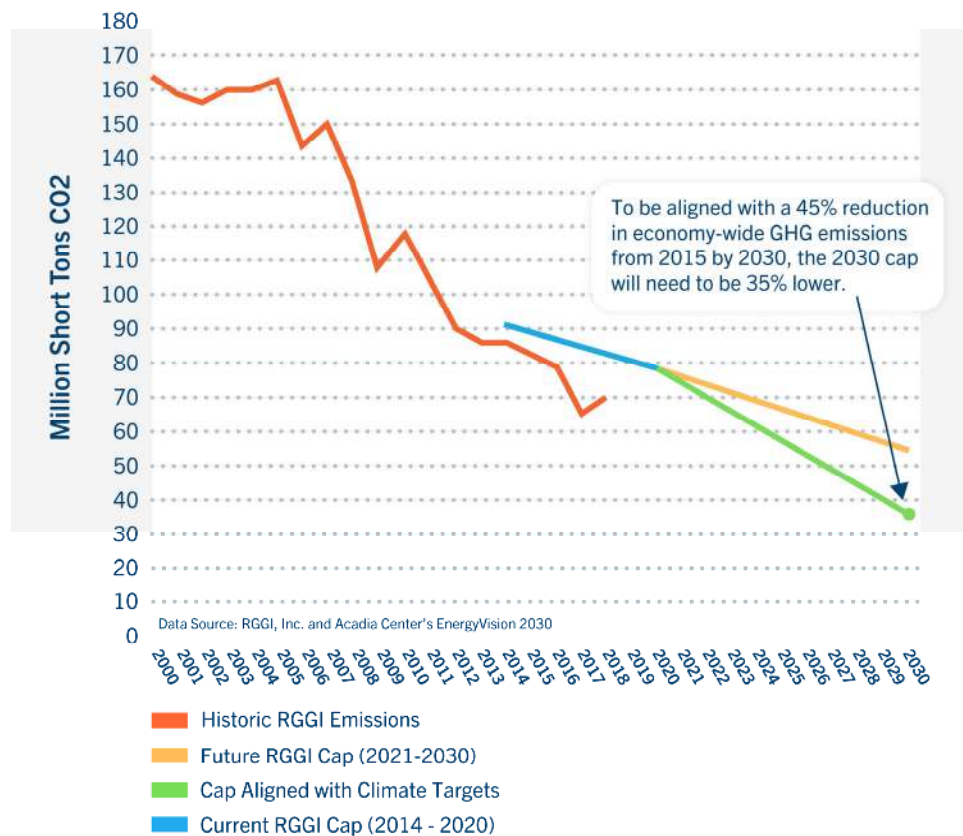
Through the first half of 2019 it appears the trend of declining RGGI emissions will continue, with RGGI COATS^{viii} data showing the lowest first-half emissions in the program’s history (see Figure 2).^{ix} The fact that RGGI emissions have been well below the RGGI cap in every year of the program’s history, as shown in Figure 1, is good for the climate and encouraging for future decarbonization efforts, but it also highlights the need for certain program reforms.

Chief among these reforms is a more stringent cap on emissions. In 2017, at the conclusion of the latest RGGI Program Review, the RGGI states committed to a new cap from 2021-2030 with a slightly faster emission reduction trajectory than the cap in place from 2014-2020. The extension of the cap and the increased ambition are positive steps, and the 2030 cap level of 54.7 million short tons commits the region to a 30% reduction in electric sector CO₂ emissions beyond the 2020 requirement. In addition to the lower cap, the Program Review resulted in measures that will strengthen the program by constraining RGGI allowance supply and limiting future emissions.^x A third adjustment for banked allowances will eliminate the allowance surplus accrued through 2020, higher Cost Containment Reserve (CCR) price triggers will help avoid unnecessary increases in allowance supply, and the innovative Emissions Containment Reserve (ECR) will help the RGGI states secure additional, low-cost emission reductions.^{xi}

Despite these measures to strengthen the program, a more ambitious RGGI cap is necessary. 2018 emissions are already well below the new, more ambitious cap set for 2021. In fact, 2018 emissions are already below the cap level set for 2023. To be most effective, the RGGI cap needs to more closely reflect the new, lower-carbon reality of the region's electric sector and the science-based GHG reduction targets adopted by the RGGI states.

The region's electric sector CO₂ emissions will need to be far below the 2030 cap if the region is to achieve its economy-wide GHG reduction goals. Acadia Center's EnergyVision 2030^{xii} finds that for the Northeast states to achieve a 45% reduction in economy-wide GHG emissions by 2030 (from 2015 levels), the region would need to achieve a 57% reduction in electric sector GHG emissions by 2030 (compared to a 20% reduction from transportation and 30% reduction from buildings). As shown in Figure 3, if that 57% reduction from 2015 were applied to the RGGI cap, it would yield a 2030 cap of 35.8 million short tons: a 35% lower RGGI cap than what the states have agreed to. This more ambitious electric sector decarbonization will make it possible for the region to achieve greater emission reductions through the electrification of other sectors.

Figure 3: Aligning the Future RGGI Cap with Climate Targets



Of course, achieving economy-wide climate targets will require significant action to reduce GHG emissions from all sectors. There are critical carbon pricing policies currently in development or under consideration that, if implemented, will steer the region in the right direction. At the state level, momentum is building around carbon pricing bills that would establish a price on CO₂ emissions from sectors not covered by RGGI. Across the region, the 12 states of the Transportation & Climate Initiative (TCI) are developing a multi-state cap-and-invest program to reduce CO₂ emissions from the transportation sector.^{xiii} Both of those policies can build on the best of the RGGI model, but in order to be most effective, they will depend on a decarbonized electric sector.

Economic Trends and Electricity Prices

RGGI's Economic Impacts

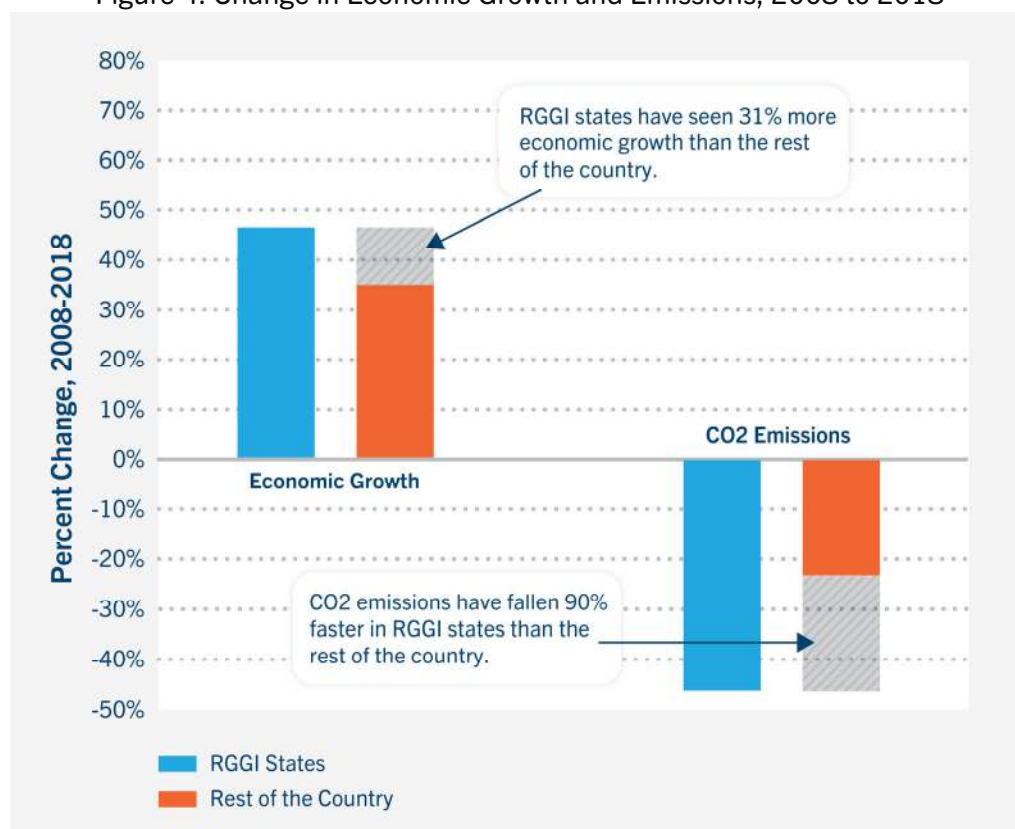
RGGI has generated significant economic benefits for states participating in the program. By selling allowances, RGGI states raise revenue to reinvest in energy efficiency, renewable energy, and other consumer programs that increase economic activity in participating states. The majority of program revenue (58% through 2016^{xiv}) has been invested in energy efficiency programs that reduce consumers' bills and reduce demand for power. Lower power demand resulting from energy efficiency means fewer emissions from power plants, and less money leaving the region to pay for imported fossil fuels. Energy bill savings increase consumer spending, benefiting businesses that offer goods and services in the region. According to independent macroeconomic analysis of

RGGI through 2017, the program has created over \$4 billion in net economic gains and over 44,000 job-years of employment.^{xv}

Economic Growth and Emissions

The RGGI states have managed to rapidly reduce CO₂ emissions without impeding economic growth. In fact, the region has proven that decarbonization and economic growth can go hand in hand. While the country as a whole has been experiencing declining CO₂ emissions and economic growth, the RGGI states have seen faster economic growth and steeper CO₂ reductions. As shown in Figure 4, from 2008 (before RGGI's launch) to 2018, **RGGI states' economies grew by 46.9% versus 35.8% in states that do not regulate or put a price on carbon emissions** (this group of 40 states, referred to below as the "rest of the country", does not include California, which has similarly outpaced national growth since capping carbon emissions^{xvi}). Over the same 2008 to 2018 period, **emissions in the RGGI region dropped by 46% versus 24% in the rest of the country.**^{xvii}

Figure 4: Change in Economic Growth and Emissions, 2008 to 2018

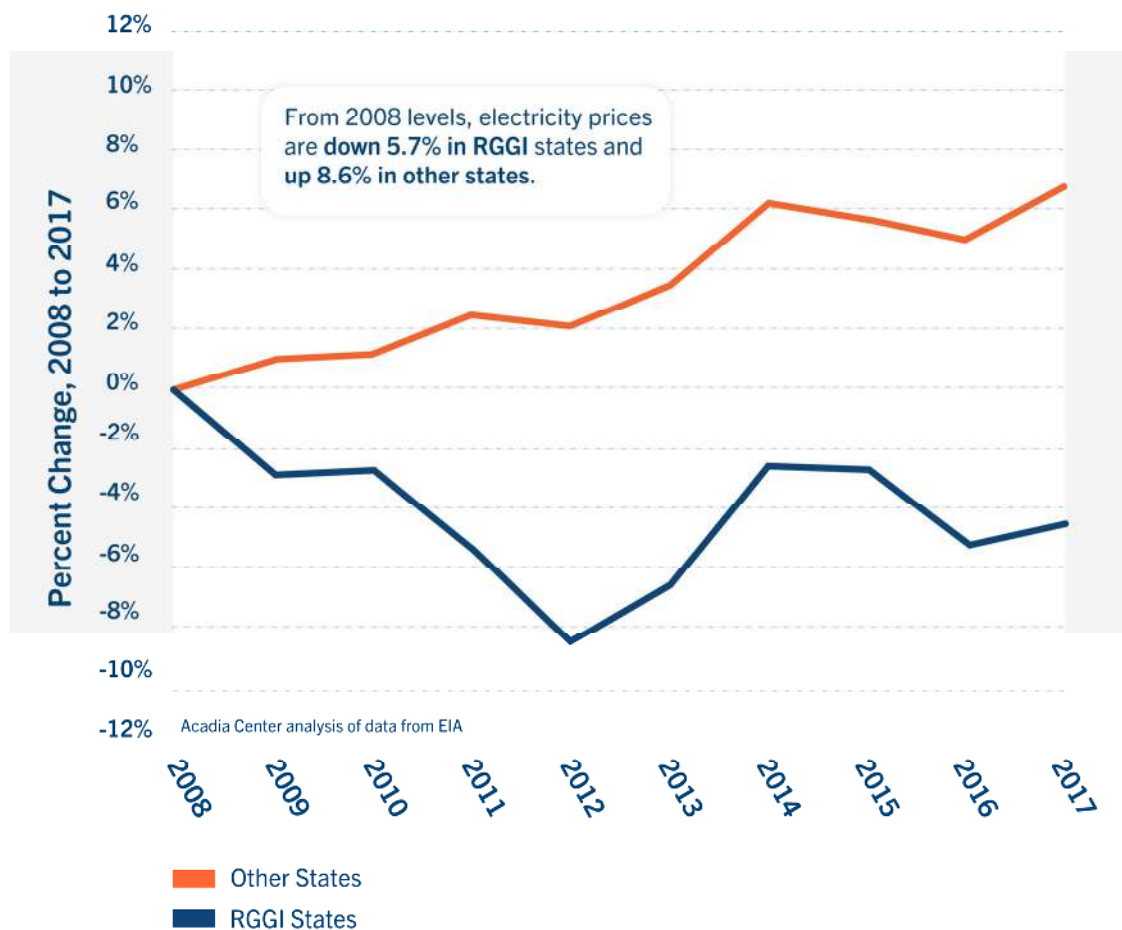


Electricity demand has historically been tied to economic growth, with electricity consumption and related emissions increasing during periods of economic expansion and decreasing in economic downturns. This correlation has been broken in the RGGI region, a new reality that appears to be mirrored—though slightly less dramatically—at the national level. A decade of RGGI and decarbonization of the electric power sector demonstrates that emissions reductions can be achieved as the economy grows.

Electricity Prices

Average retail electricity prices in the region have decreased since RGGI took effect. Comparing retail electricity prices from 2008 to 2017 shows that prices have dropped by 5.7% across the region.^{xviii} While RGGI's direct impact on electricity prices is difficult to isolate from other factors, it is evident that the program has not caused electricity prices to rise from 2008 levels, in part due to RGGI-funded investments in energy efficiency. Concerns that climate policy will make states less competitive are directly refuted by RGGI's experience: RGGI states are faring much better than the rest of the country on electricity price trends. As shown in Figure 5, while RGGI's electricity prices have fallen from where they were in 2008, the rest of the country² has experienced an 8.6% increase in retail electricity prices over the same period.

Figure 5: Volume-Weighted Electricity Prices, 2008 to 2017



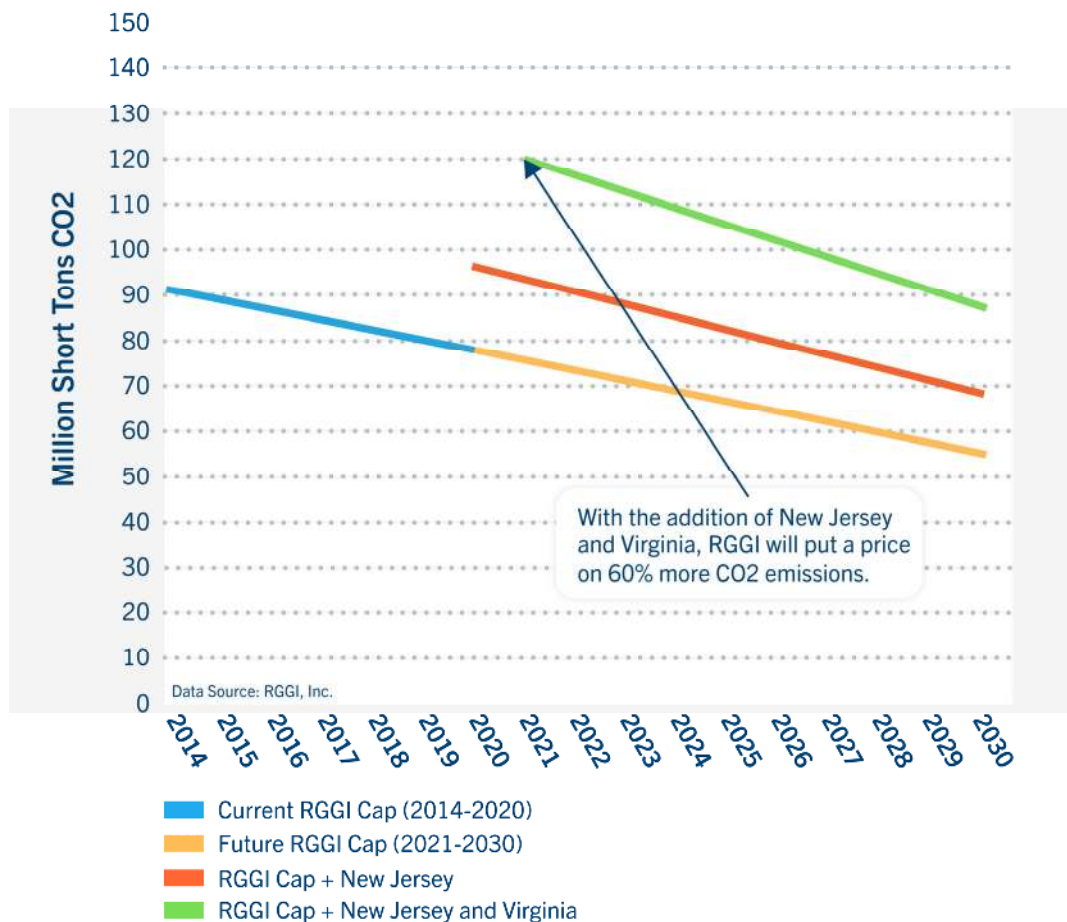
² The “rest of the country” excludes California, which, like the RGGI states, has implemented a cap-and-invest program to reduce CO₂ emissions.

Welcoming Additional States

There are currently nine states participating in the RGGI market, but that number is poised to grow to 11 by 2021. New Jersey is set to be the first addition, with the New Jersey Department of Environmental Protection adopting regulations in the summer of 2019 to rejoin the RGGI program on January 1st, 2020.^{xix} This will mark New Jersey's return to the program, as the state participated in RGGI as a founding member until then-Governor Christie removed the state from the program in 2011. It appears likely that Virginia will follow New Jersey, with regulations approved to participate in a carbon trading program linked with the RGGI market.^{xx} Virginia's participation in the RGGI market is expected to begin on January 1st, 2021.

Regulations in both New Jersey and Virginia would implement state CO₂ emission budgets aligned with the 2020-2030 RGGI cap, requiring a 30% reduction in region-wide emissions over that time period. The addition of these two states to the program will represent a substantial expansion, both in terms of CO₂ emissions and economic weight. By adding New Jersey and Virginia to the program, the combined GDP of the RGGI states would rise from \$3.3 trillion to \$4.5 trillion, a 35% increase, the equivalent of the world's 4th largest economy. As shown in Figure 6, expanding the RGGI cap to include these states would increase the amount of CO₂ emissions that face a carbon price by 60%.

Figure 6: RGGI Cap with New Jersey and Virginia



Conclusion

RGGI has successfully demonstrated the viability of a market-based program to reduce CO₂ emissions from the power sector while generating benefits for participating states. RGGI's experience has disproven the concerns most frequently associated with capping emissions from the power sector. Emissions have declined rapidly, far more dramatically than projected, without stifling economic growth. RGGI's reinvestment model has benefited the regional economy and increased employment while accelerating deployment of renewable energy and funding energy efficiency programs. The region's residents now pay lower electricity prices than before the program began and breathe cleaner air.

The RGGI states have committed to build on this success by extending the program through 2030. In the coming years the RGGI states will need to conduct another Program Review to reevaluate how the program aligns with the achievement of state climate targets.

A cleaner electric grid will prove vital to delivering significant CO₂ reductions from the electrification of transportation and buildings – the two other key sectors that must be decarbonized to avert climate disaster. By strengthening RGGI and applying lessons learned from the program to the transportation sector, the region can take meaningful action to address vehicle pollution—the largest source of CO₂ emissions in the country. Many of the RGGI states are currently building on their track record of bipartisan collaboration to develop a regional cap-and-invest program for the transportation sector through the Transportation and Climate Initiative (TCI). If this program applies the best of the RGGI model while delivering an even bolder, more equitable framework, the region will be well on its way to a low-carbon future that works for all.

For More Information:

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Endnotes

ⁱ RGGI, Inc., *Auction Results*, 2019. Available at: <https://www.rggi.org/auctions/auction-results>

ⁱⁱ Michelle Manion, et al., *Analysis of the Public Health Impacts of the Regional Greenhouse Gas Initiative*, Abt Associates, January 2017. Available at: <https://www.abtassociates.com/insights/publications/report/analysis-of-the-public-health-impacts-of-the-regional-greenhouse-gas>

ⁱⁱⁱ World Bank, *States and Trends of Carbon Pricing 2019*, Available at: <https://openknowledge.worldbank.org/handle/10986/31755>

^{iv} Joeri Rogelj, Drew Shindell, and Kejun Jiang, *Global Warming of 1.5°C, Chapter 2: Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development*, IPCC, October 2018. Available at:

https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter2_Low_Res.pdf

^v Jeanne Herb and Marjorie Kaplan, *Field Notes: Equity and State Climate Policy*, Rutgers University, September 2019. Available at:

<https://drive.google.com/file/d/1mB-12SYJHQV4VjFe4OIzZFfvQPdLB-cz/view>

^{vi} Brian Murray and Peter Maniloff, *Why Have Greenhouse Emissions in RGGI States Declined? An Econometric Attribution to Economic, Energy Market, and Policy Factors*, Duke Nicholas Institute, August 2015. Available at:

<https://nicholasinstitute.duke.edu/environment/publications/why-have-greenhouse-emissions-rggi-states-declined-econometric-attribution-economic>

^{vii} California Cap-and-Trade Program and Québec Cap-and-Trade System, *Joint Auction #20 Summary Results Report*, August 2019. Available at: https://ww3.arb.ca.gov/cc/capandtrade/auction/aug-2019/summary_results_report.pdf

^{viii} RGGI CO₂ Allowance Tracking System: <https://www.rggi.org/allowance-tracking/rggi-coats>

^{ix} RGGI cap levels and emissions data from RGGI, Inc., at: <http://rggi.org/>

^x RGGI, Inc., *Summary of RGGI Model Rule Updates*, December 2017. Available at: https://www.rggi.org/sites/default/files/Uploads/Program-Review/12-19-2017/Summary_Model_Rule_Updates.pdf

^{xi} RGGI, Inc., *Elements of RGGI*, 2019. Available at: <https://www.rggi.org/program-overview-and-design/elements>

^{xii} EnergyVision 2030, Acadia Center, 2017. Available at: <https://2030.acadiacenter.org/>

^{xiii} The Transportation & Climate Initiative: <https://www.transportationandclimate.org/content/about-us>

^{xiv} RGGI, Inc., *The Investment of RGGI Proceeds in 2016*, September 2018. Available at:

https://www.rggi.org/sites/default/files/Uploads/Proceeds/RGGI_Proceeds_Report_2016.pdf

^{xv} Paul Hibbard, et al., *The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic States*, Analysis Group, April 2018. Available at:

https://www.analysisgroup.com/globalassets/uploadedfiles/content/insights/publishing/analysis_group_rggi_report_april_2018.pdf

^{xvi} As detailed in the Environmental Defense Fund's recent report, *Carbon Market California: A Comprehensive Analysis of the Golden State's Cap-and-Trade Program*, California has experienced significant economic benefits resulting from AB 32, and GDP growth in the state outpaced the national average in 2011, 2012, and 2013: http://www.edf.org/sites/default/files/content/carbon-market-california-year_two.pdf

^{xvii} In order to compare emissions in the RGGI states to emissions in the rest of the country, the emissions measured in this section are from EIA Form 923. This represents a broader range of emissions sources than those covered by RGGI, which explains the difference in reported RGGI emissions here versus elsewhere in this report.

^{xviii} Energy Information Administration (EIA), Form 826, <http://www.eia.gov/electricity/data/eia826/>. The volume-weighted average shown in Figure 5 is a product of each state's electricity price multiplied by electric load in the given year.

^{xix} *Governor Murphy Announces Adoption of Rules Returning New Jersey to Regional Greenhouse Gas Initiative*, Office of the Governor of New Jersey, June 2019. Available at: <https://www.state.nj.us/governor/news/news/562019/approved/20190617a.shtml>

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