



# Cooler Together

**The Benefits of Cooperative Action  
Against Global Warming in the  
Northeast, Mid-Atlantic and Beyond**



# Cooler Together

**The Benefits of Cooperative Action  
Against Global Warming in the  
Northeast, Mid-Atlantic and Beyond**



FRONTIER GROUP

Written by:

Andrea McGimsey and Travis Madsen,  
Environment America Research & Policy Center

Teague Morris, Frontier Group

February 2018

# Acknowledgments

The authors wish to thank Kathryn Zyla of the Georgetown Climate Center and John Garcia-Rogers of the Union of Concerned Scientists for their comments on a draft of this report. Thanks also to Tony Dutzik and Hye-Jin Kim of Frontier Group for editorial support.

Environment Massachusetts Research & Policy Center gratefully thanks the Energy Foundation for making this report possible.

The authors bear responsibility for any factual errors. The recommendations are those of Environment Massachusetts Research & Policy Center. The views expressed in this report are those of the authors and do not necessarily reflect the views of our funders or those who provided review.

© 2018 Environment Massachusetts Research & Policy Center. Some Rights Reserved. This work is licensed under a Creative Commons Attribution Non-Commercial No Derivatives 3.0 Unported License. To view the terms of this license, visit [creativecommons.org/licenses/by-nc-nd/3.0](https://creativecommons.org/licenses/by-nc-nd/3.0).



Environment Massachusetts Research & Policy Center is a 501(c)(3) organization. We are dedicated to protecting Massachusetts' air, water and open spaces. We investigate problems, craft solutions, educate the public and decision-makers, and help Bay Staters make their voices heard in local, state and national debates over the quality of our environment and our lives. For more information about Environment Massachusetts Research & Policy Center or for additional copies of this report, please visit [www.environmentmassachusettscenter.org](http://www.environmentmassachusettscenter.org).

## FRONTIER GROUP

Frontier Group provides information and ideas to help citizens build a cleaner, healthier and more democratic America. We address issues that will define our nation's course in the 21<sup>st</sup> century – from fracking to solar energy, global warming to transportation, clean water to clean elections. Our experts and writers deliver timely research and analysis that is accessible to the public, applying insights gleaned from a variety of disciplines to arrive at new ideas for solving pressing problems. For more information about Frontier Group, please visit [www.frontiergroup.org](http://www.frontiergroup.org).

Layout: To The Point Collaborative, [tothepointcollaborative.com](http://tothepointcollaborative.com)

Cover: Solar panels on the Damariscotta Baptist Church in Damariscotta, Maine. Maine is one of a number of northeastern and mid-Atlantic states to take part in the Regional Greenhouse Gas Initiative.

Credit: William Byers, U.S. Department of Energy

# Table of Contents

<b>Executive Summary</b> .....	<b>4</b>
<b>Introduction: Crossing State and Party Lines to Act on Climate</b> .....	<b>6</b>
<b>Pricing Pollution and Investing in Clean Energy: How the Regional Greenhouse Gas Initiative Works</b> .....	<b>8</b>
Capping Carbon Pollution .....	8
Putting a Price on Carbon .....	8
Reinvesting in Clean Energy .....	9
<b>Northeast and Mid-Atlantic States Have Reduced Carbon Emissions and Sped the Transition to Clean Energy</b> .....	<b>10</b>
Carbon Pollution from Power Plants Has Been Cut in Half .....	11
Billions of Dollars Have Been Invested in Clean Energy .....	11
The Region Has Emerged as a Clean Energy Leader .....	12
People Are Breathing Easier .....	14
Consumers Are Saving Money .....	14
RGGI Will Deliver Even More Benefits in the Future .....	15
<b>A Model of Climate Action for the Nation</b> .....	<b>16</b>
Virginia .....	16
New Jersey .....	18
<b>Conclusion and Recommendations</b> .....	<b>20</b>
<b>Methodology</b> .....	<b>21</b>
<b>Notes</b> .....	<b>22</b>

# Executive Summary

Since it began in 2008, the Regional Greenhouse Gas Initiative (RGGI), the nation's first regional program for limiting carbon dioxide emissions from power plants, has been wildly successful. The program, in place in nine northeastern and mid-Atlantic states, caps power plant emissions, puts a price on carbon pollution, and reinvests much of the revenue into programs that advance the region's transition from fossil fuels to clean energy.

**Now more than ever, state leadership is critical for America to make progress in the fight against global warming.** The Regional Greenhouse Gas Initiative shows the way forward – bringing together political leaders of both parties around effective policies to curb carbon pollution and accelerate the transition to clean energy. Leaders in the Northeast and Mid-Atlantic states should continue to support RGGI and other policies to cut carbon pollution, leaders in nearby states should consider joining the program, and leaders from around the country should follow the example of the program when taking their own steps to address global warming.

**Regional efforts to cut pollution from power plants have helped move the Northeast and Mid-Atlantic toward a healthier future built on clean energy. Benefits of the Regional Greenhouse Gas Initiative include:**

- Contributing to **halving the region's CO<sub>2</sub> emissions from electric power plants since 2005**, with plans to cut emissions to one-third of 2005 levels by 2030;<sup>1</sup>
- Providing more than **\$5.7 billion in health benefits** to the region, including averting hundreds of premature deaths;<sup>2</sup>
- **Raising more than \$2.78 billion for member states**, including more than \$1 billion in investments in energy efficiency improvements and \$270 million for clean and renewable energy investments, with the potential to raise more than \$7 billion more by 2030;<sup>3</sup>
- **Saving consumers more than \$773 million on their energy bills;**<sup>4</sup>
- **\$3 billion in net economic benefits**, including the creation of more than 30,000 jobs in the region.<sup>5</sup>

The success of the Regional Greenhouse Gas Initiative shows that aggressive, bipartisan action on climate changes is possible, and that it can lead to dramatic progress and broad-based benefits for the region.

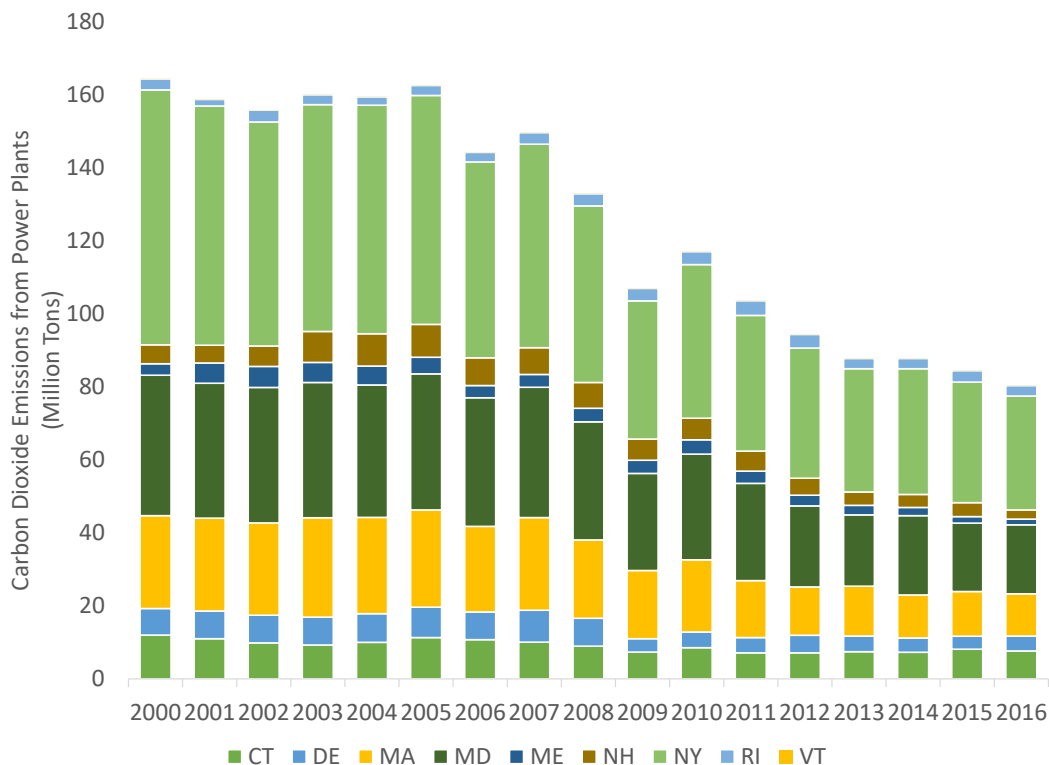
**Northeastern and Mid-Atlantic states should build on the success of the Regional Greenhouse Gas Initiative by:**

- Continuing to invest in clean energy and adopting complementary policies that make it as easy as possible for individuals, businesses and institutions to reduce energy consumption and switch to clean, renewable sources of energy.
- Extending the approach used to successfully reduce emissions from power plants to other sectors of the economy, such as transportation.

**Other states should consider putting a price on carbon pollution and reinvesting the proceeds in the transition to clean, renewable energy.**

- New Jersey and Virginia will benefit greatly from joining RGGI. Between the two states, joining RGGI could generate as much as \$4.2 billion in revenue by 2030 that could speed their transition to clean energy, while reducing as much as 88 million tons of carbon dioxide emissions cumulatively.
- Other states around the United States should consider adopting similar approaches to reducing greenhouse gas emissions.

**Figure ES-1. CO<sub>2</sub> Emissions from Power Plants in the RGGI States, 2000-2016.<sup>6</sup> (RGGI was fully implemented beginning in 2009).**



Note: VT emissions are too low to be easily visible on the chart.

# Introduction: Crossing State and Party Lines to Act on Climate

**T**ruly bipartisan action on pressing public issues has become a rare thing. Working on challenging issues across state lines can be similarly difficult.

However, bold action that brings people together across barriers of party and geography will be needed if the United States and the world are going to prevent the worst impacts of global warming.

In the early 2000s, the Northeast and Mid-Atlantic states began to recognize the threat posed by climate change, and came together to do something about it.

Global warming poses dire threats to the region. In the past century, average temperatures in the Northeast have increased by almost 2°F, and could increase by up to 10°F in the next century.<sup>7</sup> Sea level rise and increases in extreme precipitation – in a region where the sea level has already risen one foot and the frequency of extreme precipitation has already increased 70 percent – will become major problems.<sup>8</sup> Coastal cities such as Boston and New York could see near-perpetual flooding within the next 30 years, costing, in Boston’s case, up to \$94 billion over the next century and potentially displacing thousands of people.<sup>9</sup> Treasured ecosystems in the Northeast and Mid-Atlantic will be in danger.<sup>10</sup>

Dangerously high temperatures will threaten human health.<sup>11</sup>

In response to the threats posed by climate change, and frustrated by the federal government’s inaction, New York’s Republican governor, George Pataki, established a Greenhouse Gas Task Force in 2001 to develop policies aimed at reducing emissions in the state. At roughly the same time, Massachusetts was in the process of implementing the nation’s first enforceable limits on carbon pollution from power plants, created in 2001 under Republican Gov. Jane Swift. In 2003, the New York task force recommended that the state implement a cap-and-trade system for electric power plants. Recognizing the value of cooperation, Gov. Pataki reached out to other governors of northeastern states, inviting them to join New York in creating a regional program to clean up carbon pollution from the region’s power plants.<sup>12</sup>

After several years of discussions, the governors of seven of these states agreed, in 2006, to create a regional initiative to reduce power plant emissions. The following year, the Regional Greenhouse Gas Initiative – RGGI, for short – launched with 10 participating states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont.

Since the program's inception, it has been successful in driving reductions of the carbon pollution that is the leading contributor to global warming and accelerating the region's transition to a clean energy economy. Rapidly falling carbon emissions and growing urgency to act on climate have twice led participating states to strengthen the program by reducing the amount of allowable carbon pollution from power plants.<sup>13</sup>

Today, people across the United States and around the world are awakening to the dangers of climate change and the need for immediate action. More Americans than ever before (45 percent) say they "worry a great deal" about global warming and believe that the effects of global warming have already begun (62 percent), according to a Gallup poll conducted a few months before the devastating 2017 hurricane season.<sup>14</sup> Fifteen states, along with Puerto Rico, have joined the U.S. Climate Alliance, a group of states committed to meeting the goals of the Paris Climate Agreement. Under its new leadership, it is likely that New Jersey will also take the admirable and important step of joining the Alliance.

With the federal government under the Trump administration rolling back America's commitments

to climate action and attacking key emissions reduction policies, states must take the lead. To do so effectively, however, state leaders will need to look to existing policies that have successfully curbed carbon pollution and accelerated the transition to clean energy. And they will need examples of how leaders from different states and different parties can come together to address the problem.

The Regional Greenhouse Gas Initiative provides both. This report documents the benefits that RGGI has delivered for the climate and the people of the Northeast and Mid-Atlantic states and shows that putting a price on carbon pollution and investing the proceeds in clean energy is an effective and powerful method of climate action.

The proceeds from the sale of CO<sub>2</sub> allowances are used by each state to pursue energy efficiency, renewable energy and other projects, many of which reduce emissions and benefit the environment. Examples of RGGI projects have included making existing homes, buildings and infrastructure more energy efficient; building renewable energy infrastructure; and reducing the cost of residents' electricity through direct bill assistance.



# Pricing Pollution and Investing in Clean Energy: How the Regional Greenhouse Gas Initiative Works

**T**he Regional Greenhouse Gas Initiative (RGGI) is a regional program designed to reduce carbon emissions from power plants.<sup>15</sup> RGGI was drafted and created in 2008, and officially began on January 1, 2009.

The program has three core elements:

- A **cap** on the amount of carbon dioxide that power plants in the region can emit.
- A **price on carbon pollution**, created by requiring power plants to buy permits (called “allowances”) to release pollution in regional auctions.
- **Reinvestment** of proceeds from carbon auctions into energy efficiency and clean energy programs, as well as other programs that benefit consumers.

## Capping Carbon Pollution

RGGI works by placing an annual cap on carbon dioxide (CO<sub>2</sub>) emissions produced by power plants over 25 MW. In 2017, this cap is about 84 million short tons of CO<sub>2</sub> and covers about 160 facilities.<sup>16</sup> Over time, the cap decreases, reducing the amount of permitted carbon emissions and helping the region meet its climate goals.

In order to emit one ton of CO<sub>2</sub>, a fossil fuel plant must have one “allowance,” bought either in a quarterly auction or from another plant that holds allowances. Every three years, power plant owners are required to prove that they hold a number of allowances equal to the number of tons of CO<sub>2</sub> they emitted during that period.<sup>17</sup> Generators that are out of compliance are required to submit additional allowances and to pay fines or other penalties to the state in which they do business.<sup>18</sup>

## Putting a Price on Carbon

One of the most important components of RGGI is the system for auctioning allowances, which ensures that power plants pay a price for the carbon dioxide they produce, and, by extension, their contribution to global warming.

Auctioning allowances avoids unfair discrimination against new power plants – which may be more efficient and lower-emitting than existing ones – because, under cap-and-trade systems that give away allowances to existing facilities based on historical emissions, newer facilities are discouraged from entering the market.<sup>19</sup> Additionally, putting a price tag on carbon emissions provides a financial incentive

for both generators and customers to find ways to reduce their carbon footprint.<sup>20</sup>

To participate in the program, states must agree to use 25 percent of their allowances for public benefit, which all the current RGGI states do by participating in auctions.<sup>21</sup> In practice, all states auction a much higher percentage of their allowances, and most auction all of them. The auction system also has a “floor price” under which auction prices

cannot fall, which ensures that power plants will always pay some price for their pollution.

## Reinvesting in Clean Energy

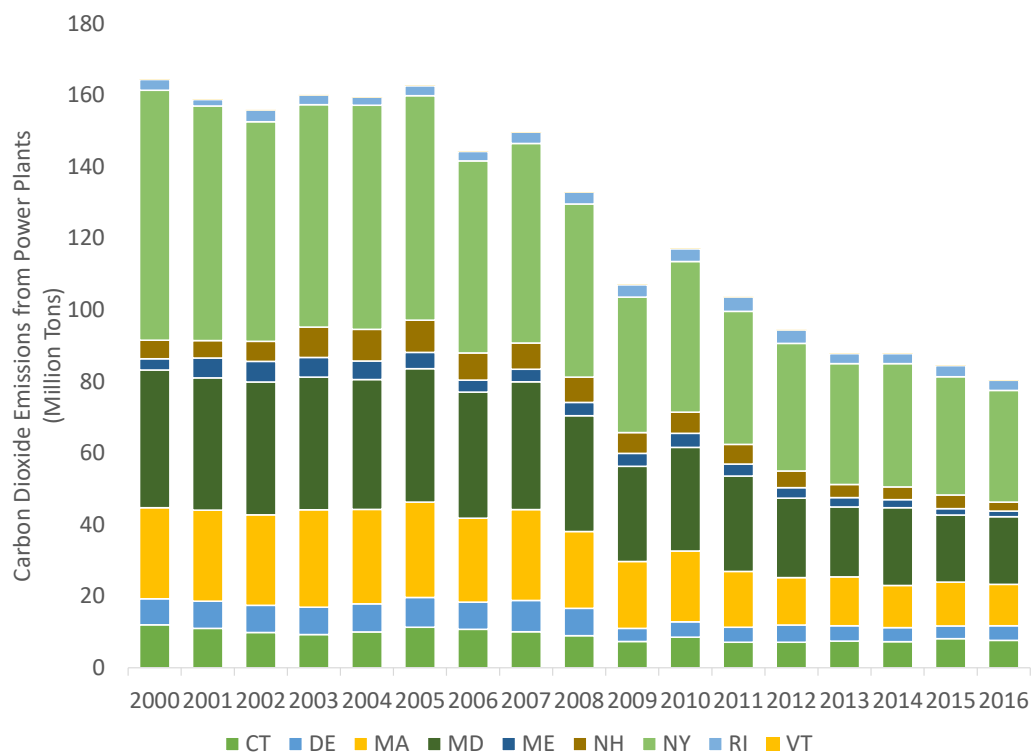
Auctioning allowances rather than giving them away for free provides a guaranteed source of revenue that states may then use to fund programs that help move the region toward a clean energy future.<sup>22</sup>

# Northeast and Mid-Atlantic States Have Reduced Carbon Emissions and Sped the Transition to Clean Energy

Since the implementation of the Regional Greenhouse Gas Initiative, the region has successfully reduced carbon emissions from power plants and delivered many other benefits to consumers and residents. Since the beginning of the program, the member states' carbon emissions from electricity generation have been cut nearly in half,

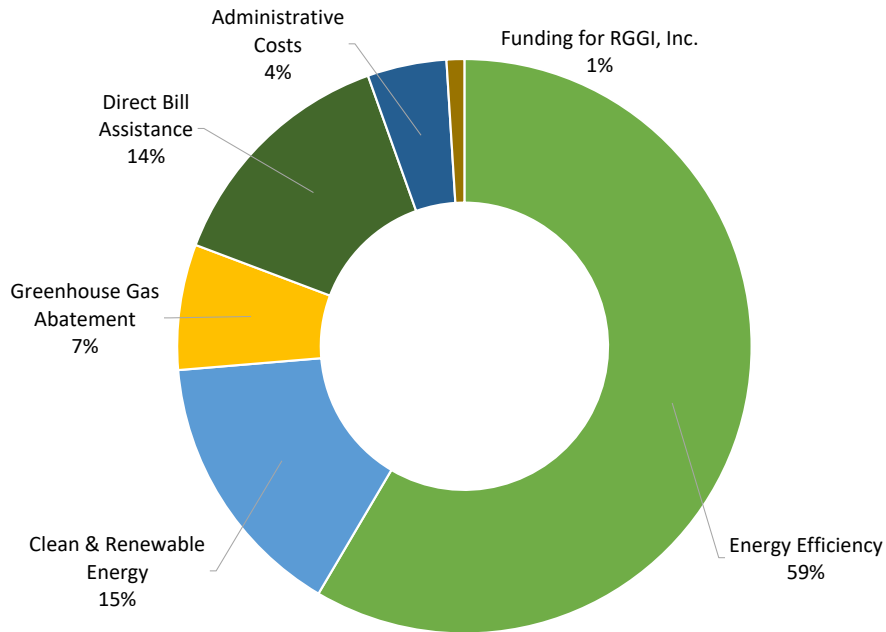
and the region has raised more than \$2.78 billion for investments in energy efficiency and renewable energy projects, saving consumers money and improving public health. RGGI has been rated as one of the most effective policies in the U.S. for reducing carbon emissions, delivering substantial reductions in global-warming contributing carbon pollution.<sup>23</sup>

**Figure 1. CO<sub>2</sub> Emissions from Power Plants in the RGGI States, 2000-2016.<sup>26</sup>  
(RGGI was fully implemented beginning in 2009.<sup>27</sup>)**



Note: VT emissions are too low to be easily visible on the chart.

Figure 2. Percentage of RGGI Funds Spent on Various Types of Projects (through 2015).<sup>31</sup>



## Carbon Pollution from Power Plants Has Been Cut in Half

Carbon dioxide emissions from power plants in RGGI states are on track to have declined by more than 50 percent from 2005 levels by 2020, from 163 million tons to 75 million tons.<sup>24</sup> By 2030, the cap of 56 million tons will be around one-third of 2005 levels. The 2017 cap of 84 million tons already represents a decrease of about half from 2005 levels.<sup>25</sup>

Although some states have done better than others, nearly all have achieved substantial reductions in emissions. Two-thirds of states have achieved emissions reductions in their electricity generation systems since 2009, including Maryland, Massachusetts and New York, the region's three largest emitters.

Not all of these emission reductions are due to the existence of RGGI. Indeed, for essentially all of the period that the program has been in existence, emissions from power plants have been below the cap established in RGGI, the result of improvements in energy efficiency, the replacement of coal-fired power plants with plants burning natural gas, and the expansion of renewable energy. The RGGI region gener-

ated 20 percent of its total electricity from clean and renewable energy in 2015, a 76 percent increase in non-hydro renewable energy since the inception of the program.<sup>28</sup> Some of these improvements would likely have occurred even without the implementation of the Initiative. However, the adoption of RGGI sent a strong signal that the region was committed to long-term emission reductions, and led to the investment of auction revenues into energy efficiency and clean energy programs, which have generated emission reductions in their own right.

## Billions of Dollars Have Been Invested in Clean Energy

To achieve lasting reductions in carbon pollution consistent with those required to meet the goals of the Paris Climate Agreement, states and nations must transition from an energy system built on fossil fuels to one operating on clean, renewable energy. That transition will require investment. The Regional Greenhouse Gas Initiative has generated billions of dollars for states to reinvest in measures to reduce energy waste and expand renewable energy.

In 2017, RGGI raised over \$142 million for investments in energy efficiency, clean and renewable energy programs, greenhouse gas reduction technology, and direct bill assistance. The largest share of RGGI funds (usually half to two-thirds) goes to investments in energy efficiency, with clean and renewable energy making up the second-largest share.<sup>29</sup>

To date, the program has raised more than \$2.78 billion for the RGGI states (including funds raised while NJ was a member). Through 2015, the plurality of RGGI funds – more than \$1 billion – were invested in energy efficiency-related projects.<sup>30</sup> The second-largest share of investment, about \$270 million, went to clean and renewable energy projects.

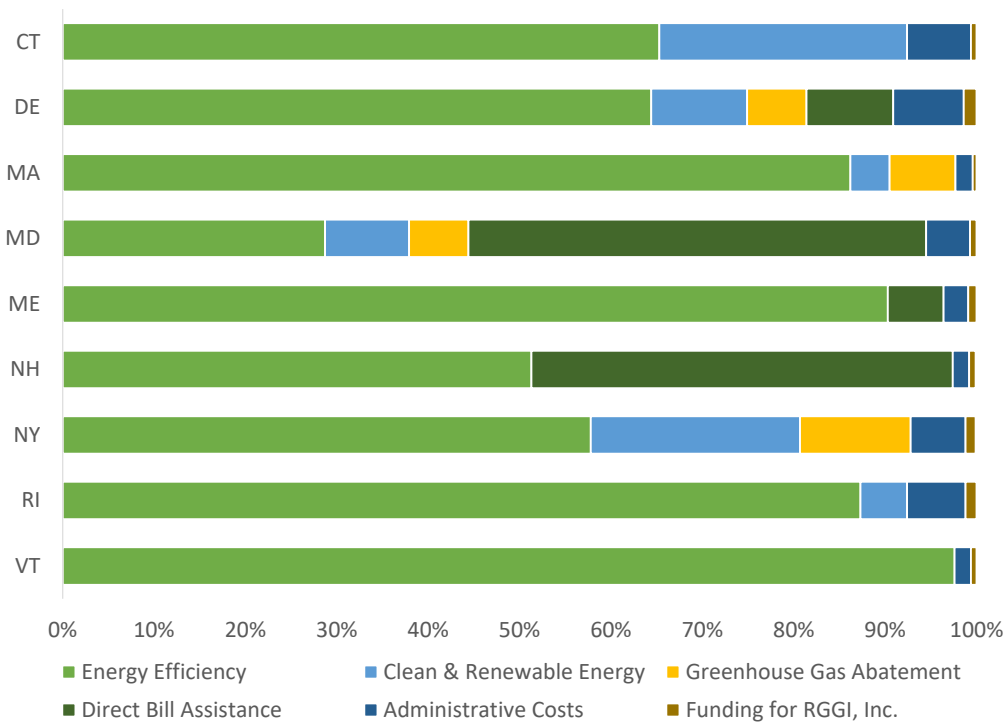
Each state is free to use its funds as it sees fit, giving individual states the flexibility to invest where they will see the most gains. Some states, like Vermont, spend nearly all of their RGGI funds on energy efficiency, while others devote large shares to investing in clean and renewable energy.

## The Region Has Emerged as a Clean Energy Leader

### Reducing Energy Waste

The largest share of RGGI investments are in energy efficiency programs. Energy efficiency investments reduce greenhouse gas emissions and are a crucial part of any plan to combat climate change. Using the proceeds generated by the Initiative, the Northeast region has emerged as a clear leader in energy efficiency. Out of 10 states selected by the American Council for an Energy-Efficient Economy (ACEEE) as the strongest on energy efficiency in the U.S., five states are part of RGGI – Massachusetts (#1), Rhode Island (#3), Vermont (#4), Connecticut (#6) and New York (#7).<sup>33</sup> The top-scoring state was Massachusetts, which posted energy savings equal to 3 percent of its electricity sales – among the highest of any state.<sup>34</sup> Massachusetts’ proceeds from RGGI have helped fund the variety of energy efficiency programs that have made this achievement possible.

**Figure 3. Percent of RGGI Funds Spent on Different Types of Projects by State.<sup>32</sup>**



Massachusetts, for example, has launched the Green Communities Program. Under the program, communities can elect to become “Green Communities,” which means committing to the goal of cutting energy use by 20 percent over five years, as well as meeting four other criteria, the most important of which concern allowing expedited siting and permitting of renewable energy facilities and mandating that new residential buildings meet stringent energy efficiency requirements.<sup>35</sup>

Communities that make these commitments become eligible for state funds (partially funded by RGGI) that can be used to help them achieve their goals. To date, Green Communities has provided more than \$65 million in funding for communities’ energy efficiency projects.<sup>36</sup> Projects have included converting town streetlamps to energy-efficient LEDs, installing more efficient HVAC systems and financing solar panels and wind turbines.<sup>37</sup>

The Connecticut Energy Efficiency Fund (CEEF) provides another example of how well-administered energy efficiency investments can benefit the environment. CEEF provides funding, through low-interest loans, to energy efficiency initiatives across the state. CEEF has contributed funding to more than 70 projects, resulting in annual energy savings of more than 89.3 billion Btu, the same amount of energy used by about 819 average homes in Massachusetts, which has a similar climate to Connecticut.<sup>38</sup> Through investments in things like home insulation, energy-efficient appliances and lighting and retrofits of multifamily units to improve energy efficiency, CEEF has contributed to annual reductions of more than 262,000 tons of CO<sub>2</sub>.<sup>39</sup>

These and other programs have helped RGGI states achieve enormous progress in energy efficiency. The median energy savings rate in RGGI states in 2016 was 1.38 percent of total energy sales, more than twice as high as the median rate in the U.S, according to the American Council for an Energy-Efficient Economy.<sup>40</sup> In all, the region saved nearly 5

million MWh of electricity through energy efficiency programs, enough to power nearly 500,000 typical U.S. homes for a year.<sup>41</sup>

The region’s investments in energy efficiency have helped change the trajectory of electricity demand in the region, from steady growth to long-term stability. Indeed, the New England region’s grid operator, ISO New England, has forecast that electricity demand in the region will actually *fall* 0.2 percent annually until 2025, even as the region’s population continues to grow.<sup>42</sup>

### *Expanding Clean and Renewable Energy*

The second-largest share of RGGI investments is dedicated to investments in clean and renewable energy. These investments have allowed the region to achieve progress in clean energy to match its performance in energy efficiency. The flexibility of RGGI makes it possible for states to invest in the renewable energy projects that deliver the greatest benefits.

In Maryland, for example, RGGI funds are being directed into investments in offshore wind, leading to two recently-approved projects that will power 140,000 homes and lead to annual emissions reductions of 19,000 tons of CO<sub>2</sub>.<sup>43</sup> In New York, RGGI funds have allowed statewide expansion of the NY-Sun initiative, a project aimed at making solar energy more accessible and affordable.<sup>44</sup> The project has allowed the installation of solar at more than 850 locations, contributing to an eightfold growth in solar energy since 2011.<sup>45</sup> By 2023, the program could result in as much as 3 GW of installed solar energy.<sup>46</sup>

NY-Sun is supplemented by the Solarize program, also partially funded by RGGI proceeds, which provides funding and outreach incentivizing homeowners and businesses in communities to install solar energy. In essence, the program allows community members to come together to learn about and commit to expanding solar energy in

their community. To date, more than 26 Solarize projects have been completed, resulting in the installation of solar power at more than 900 locations, adding enough energy capacity to power 1,360 average homes.<sup>47</sup>

In addition, RGGI-funded programs like Green Communities in Massachusetts and CEEF in Connecticut have contributed to thousands of smaller-scale, local projects like adding solar panels to the roofs of schools and government buildings, and providing funding for small towns to purchase wind turbines. For example, the Connecticut Green Bank's Commercial Property Assessed Clean Energy (C-PACE) program has provided hundreds of millions of dollars in loans to business and property owners to finance the installation of renewable energy infrastructure on their properties.<sup>48</sup> To date, C-PACE has provided more than \$100 million in loans to more than 170 property owners, resulting in energy cost savings of more than \$9 million annually.<sup>49</sup>

The region has also significantly expanded the amount of renewable energy in its electricity generation sector. Since 2008, the region has added more than 3 GW of solar, wind and hydroelectric power capacity to its grid from installations by utilities and electricity suppliers.<sup>50</sup> In all, the region now boasts almost 11 GW of renewable energy on its grid, not counting the many community and home renewable energy installations financed by the program.

In 2015, the most recent year for which data are available, RGGI, Inc. estimates that projects funded by RGGI proceeds prevented 298,410 tons of CO<sub>2</sub> emissions, with a lifetime benefit of 5.3 million tons avoided.<sup>51</sup> Emission reductions delivered by RGGI clean energy investments in 2015 alone were equivalent to taking more than 57,000 cars off the road.

Cumulatively, RGGI investments made to date will have the lifetime impact of avoiding 20.7 million tons of CO<sub>2</sub>.<sup>52</sup>

## People Are Breathing Easier

RGGI has delivered improved public health by reducing emissions of dangerous pollutants from power plants.

A report released by Abt Associates in January 2017 found that, in its first six years of implementation (2009 to 2014), RGGI provided around \$5.7 billion in benefits in the form of avoided health problems, including avoidance of hundreds of premature deaths.<sup>53</sup> Improved air quality leads to reductions in asthma and bronchitis, fewer premature deaths, and decreased ER visits due to air-quality-related illness, and prevents thousands of missed days of work related to these symptoms. The positive health impacts have been so great, particularly in terms of air quality gains, that they have shown up in nearby states as well: the emissions reductions in the RGGI region also have also led to positive health effects in Washington, D.C., Virginia and West Virginia.<sup>54</sup>

These health and environmental benefits have come in parallel with economic gains in the region. Work by the Analysis Group estimates that, in its first and second compliance periods (2009-2014), RGGI added more than 30,000 jobs to the region and added nearly \$3 billion in net economic value.<sup>55</sup> (Data are not yet available for the third compliance period, which is ending soon.)

## Consumers Are Saving Money

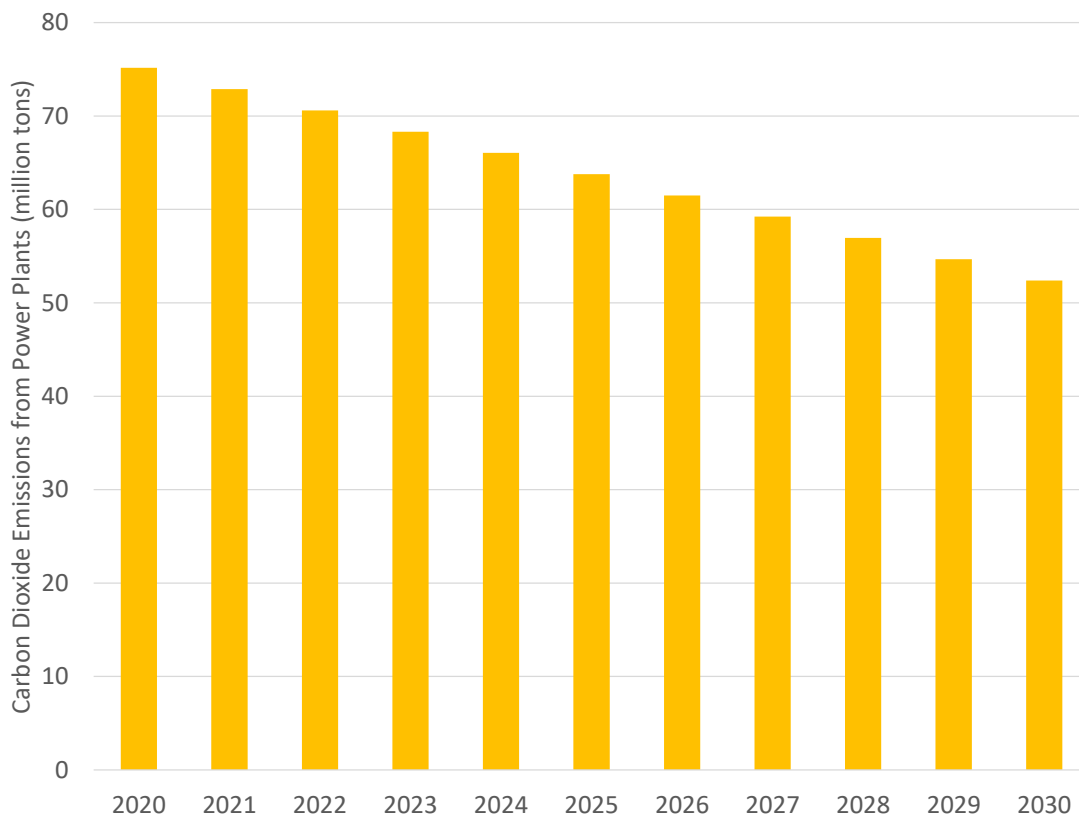
RGGI also has benefited consumers in the region. Through its investments in energy efficiency and direct bill assistance, RGGI has generated almost \$773 million in energy bill savings for consumers, while efficiency improvements delivered through the program will save consumers nearly \$6 billion over their lifetime.<sup>56</sup>

## RGGI Will Deliver Even More Benefits in the Future

In August 2017, the RGGI states announced that they would pursue an even more aggressive cap on emissions over the coming decade, delivering an additional 30 percent reduction in the emissions cap by 2030 relative to 2020 levels.<sup>57</sup> As a result, carbon pollution from power plants in the Northeast will be 68 percent lower in 2030 than it was in 2005 – a dramatic reduction in emissions that positions the region well for meeting the goals of the Paris Climate Agreement.<sup>58</sup>

In 2018 and 2019, RGGI will likely raise nearly \$1 billion, and from 2020 to 2030 it could bring in as much as \$6.3 billion.<sup>59</sup> If these proceeds are spent in ways that align with historical spending, the next 13 years of the Initiative could provide nearly \$6 billion in funding for energy efficiency, renewable energy, and greenhouse gas reduction projects. These are essential investments to facilitate the region’s transition from fossil fuels to clean, renewable energy.

**Figure 4. CO<sub>2</sub> Emissions Under the Reduced RGGI Cap, 2020-30.<sup>60</sup>**





# A Model of Climate Action for the Nation

**R**GGI provides a model for how states and regions can take effective action on climate change. As more Americans awaken to the threat of climate change, and as states assert climate leadership in the wake of Trump administration's pull-back on the Paris Climate Agreement, the program provides a practical approach to reducing emissions and spurring the transition to clean energy.

New Jersey and Virginia, both of which are adjacent to states currently participating in RGGI, provide examples of the kinds of benefits that capping emissions and reinvesting in clean energy can bring to states that adopt it.

## Virginia

While Virginia has never been a member of RGGI, it has a history of climate leadership, especially in the last 10 years. In 2008, at the direction of then-governor Tim Kaine, Virginia created a Climate Action Plan setting out ambitious goals for greenhouse gas emissions reduction and other climate-related policies. Now, Virginia has taken the first steps towards joining RGGI: the Virginia Department of Environmental Quality (DEQ) has announced a cap-and-trade program directly modeled off of RGGI. The department has stated that it intends to pursue a linkage with the

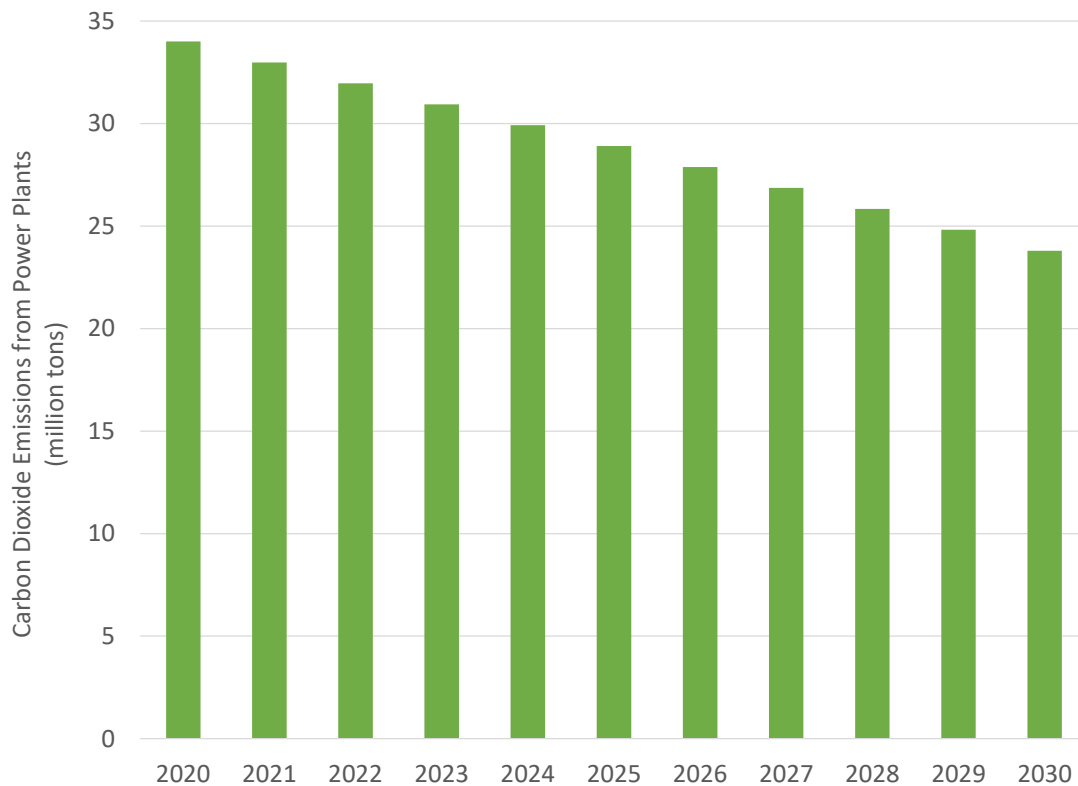
program, under which it would implement its own version of RGGI and ideally participate in RGGI auctions, although its current proposal does not include auctions (just a cap). Under the proposal, Virginia would adopt a cap on carbon emissions starting in 2020 (to be set at or near the state's 2015 level of emissions), which would then decline 30 percent by 2030.<sup>61</sup>

Virginia would benefit immensely from joining or "linking up with" RGGI. Under its proposed cap, it stands to reduce carbon emissions by between 56 million and 65 million tons between 2020 and 2030, raising as much as \$2.8 billion for reinvestment (assuming the state formalized a proposal under which auctions would be possible).<sup>62</sup>

## Examples of Possible Clean Energy Projects in Virginia

The 2008 Climate Action Plan provides a set of proposals for uses of RGGI funds in Virginia. For example, it calls for "a central, publicly-administered capital fund for energy efficiency investments in residential and small commercial markets," as well as in commercial and industrial businesses.<sup>64</sup> This goal can be achieved by doubling down on existing programs in Virginia, and by supplementing them

**Figure 5. CO<sub>2</sub> Emissions Reductions from Electric Power Plants under Virginia's Proposed Initial 34 Million Ton Cap.<sup>63</sup>**



with funds from allowance auctions under RGGI or a parallel program.

Virginia has two existing energy efficiency programs that could benefit from these funds: the Clean Energy Development and Services (CEDS) program and the Commonwealth Energy Fund (CEF). The purpose of CEDS is to identify the potential of locations to go solar, including determining how much infrastructure would be necessary for sites to support themselves fully on solar power.<sup>65</sup> The CEF provides funds to companies involved in energy efficiency and renewable energy.<sup>66</sup>

The 2008 plan also includes several other energy efficiency policy recommendations, including implementing a consumer education program and providing funding for weatherizing homes. Such a project could be undertaken along the lines of Connecticut's weatherizing program.

Another of the most important recommendations in the Plan is "increasing the proportion of energy demands that are met by renewable sources."<sup>67</sup> One important piece of this puzzle is incentivizing individuals and businesses to go solar. The RGGI states provide numerous examples of effective incentive schemes. Loan programs such as the property-assessed clean energy program (PACE), along with direct subsidies for solar energy installations by homeowners and businesses, could incentivize citizens to participate in the clean energy transition. Other states have shown that rebates, loans and subsidies can effectively incentivize clean energy investments. If Virginia were to follow the RGGI states' model in allocating the majority of proceeds to clean energy and energy efficiency programs, it could provide more than \$2 billion of funding to homeowners and businesses to finance clean energy and energy efficiency projects between 2020 and 2030.<sup>68</sup>

Direct state investment in renewable energy is also important. In 2017, Virginia launched the Community Solar pilot program, which allows residents to buy in to receive their electricity from a small, local solar array (under 2 MW in size).<sup>69</sup> Virginia is also moving forward on its first offshore wind project, with two 6-MW turbines currently planned, part of a project that could result in as much as 2,000 MW of wind power.<sup>70</sup> Other states have effectively used RGGI funds to directly invest in renewable energy; Virginia’s existing Community Solar and offshore wind initiatives provide excellent opportunities for funding further projects with RGGI proceeds.

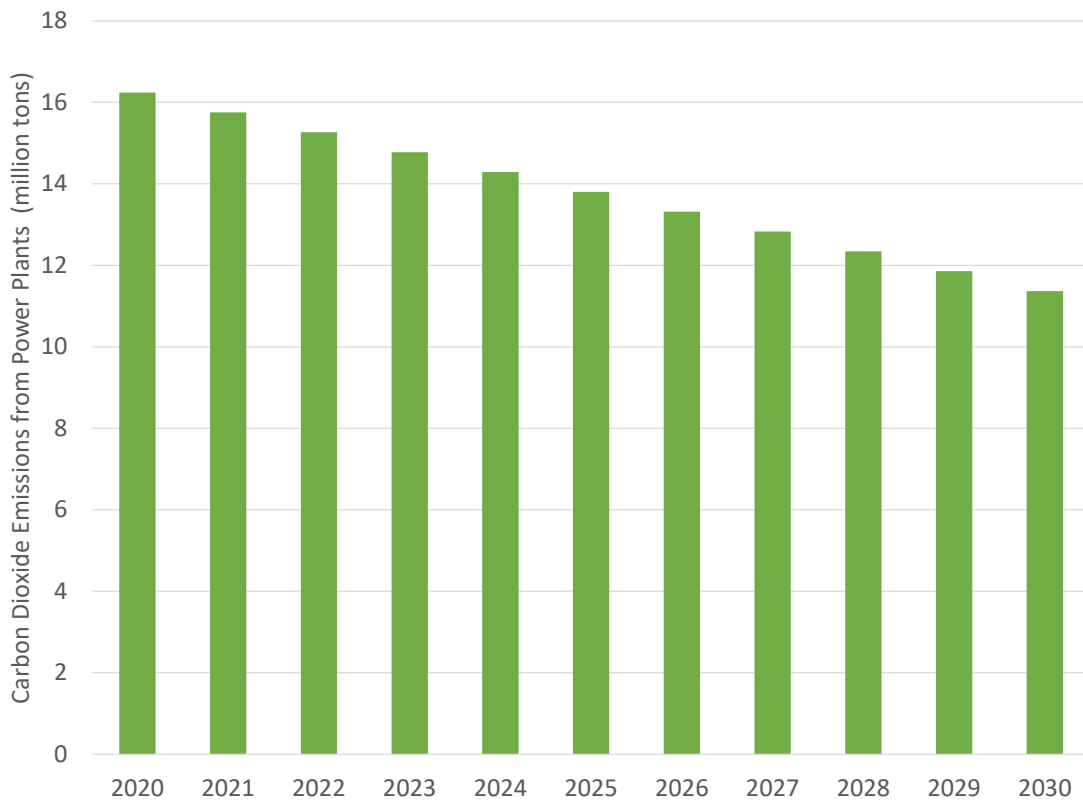
## New Jersey

New Jersey was an original member of RGGI, but then-Gov. Chris Christie removed the state from the program in 2012.<sup>71</sup> This was a huge mistake.

Had it stayed in RGGI, New Jersey could have already seen carbon dioxide emissions reductions of more than 4 million tons.<sup>72</sup> Furthermore, because New Jersey shares its electric grid with the current RGGI states, ratepayers in New Jersey have already been paying some of the cost of the program – through slightly raised electricity rates – without directly receiving its benefits. Now, New Jersey has an opportunity to rejoin the program and reap substantial benefits. After the November 2017 elections, the state seems poised to rejoin the program, with lawmakers signaling their eagerness to participate once again.<sup>73</sup>

If New Jersey follows Virginia’s lead in setting a 2020 cap at 2015 levels of emissions and lowering the cap 30 percent by 2030, it would drive cumulative emission reductions of 27 million tons by 2030, raising approximately \$1.4 billion for reinvestment in clean energy.

**Figure 6. Emissions Reductions in New Jersey Under Potential Cap, Beginning at 2015 Emissions Levels.<sup>74</sup>**



## Examples of Possible Clean Energy Projects in New Jersey

New Jersey already has goals for reducing greenhouse gas emissions, as well as pre-existing clean energy programs. Revenue from RGGI could supplement and expand these projects, helping to increase their effectiveness, ambition and scope. Taking effective action can help New Jersey meet its goal of reducing emissions to 20 percent of 1990 levels by 2050.<sup>75</sup>

While it was a member of RGGI, New Jersey reinvested much of the \$113 million in revenue from the program in clean energy.<sup>76</sup> As in other RGGI states, two major categories of investment were energy efficiency and clean energy infrastructure.

For example, New Jersey provided a \$5 million interest-free loan to Nautilus Solar, a New Jersey-based solar developer and operator, to install a photovoltaic system at William Paterson University, a state institution that was interested in going solar but could not afford the infrastructure costs itself.

The funds were distributed by New Jersey's Clean Energy Solutions Capital Investment Loan/Grant program (CESCI), which was launched in 2009 and used RGGI proceeds to offer interest-free loans to energy efficiency and clean energy projects.<sup>77</sup> During New Jersey's time in RGGI, CESCI provided more than \$29 million in funds to these kinds of projects, leading to the installation of enough clean electric energy to run more than 19,600 typical New Jersey households.<sup>78</sup>

With the potential for over \$1 billion in revenue available for investment, New Jersey could also make substantial direct investments in clean and renewable energy. States have provided millions of dollars in direct funding to building owners and utilities for investment in clean energy projects.<sup>79</sup> Funds could also finance the installation of renewable energy infrastructure in and around government buildings; for example, Rhode Island's Office of Energy Resources has provided funds to public schools for the installation of renewable energy infrastructure.<sup>80</sup>

# Conclusion and Recommendations

The recent commitment by member states to further strengthen the Regional Greenhouse Gas Initiative represents an admirable continuation of one of the U.S.'s most important efforts to combat global warming. By strengthening the program further, the RGGI states will prevent a further 125 million tons of CO<sub>2</sub> emissions (compared with continuation of 2020 emissions levels) and raise more than \$7 billion for investment in important projects.<sup>81</sup>

**Northeast and Mid-Atlantic states that are part of RGGI should reaffirm their commitment to investing auction revenue from the program in clean energy and adopt complementary policies to speed the region's transition from reliance on fossil fuels to the use of clean, renewable energy.**

In addition, Northeast and Mid-Atlantic states should consider expanding the approach used in RGGI to other sectors of the region's economy, including transportation, the region's largest source of greenhouse gas emissions. **By limiting transportation emissions, pricing carbon, and reinvesting revenue in cleaner cars and trucks, public transportation and other low-carbon modes of travel, the region can continue the transformation to a clean energy economy and set a powerful example for other states and regions to follow.**

States outside of the current RGGI region should look to the program as an effective model of climate action. **States adjacent to the region, including New**

**Jersey and Virginia, should consider joining the Regional Greenhouse Gas Initiative or adopting a parallel program.** These states should also commit to reinvesting the bulk of auction revenues in energy efficiency and renewable energy programs, hastening their transition to a clean energy future.

Every state, even those unlikely to join RGGI themselves, can **adopt the strategies that have made the program successful: capping carbon pollution, putting a price on carbon emissions, and reinvesting revenue in the clean energy transition.** California, through its cap-and-trade programs for major carbon polluters, power plants and transportation, has put these principles into place. In particular, states that have joined the Climate Alliance – the group of U.S. states that have reaffirmed their commitment to the goals of the Paris Climate Agreement – should consider this approach as a way to cut carbon pollution and demonstrate leadership to the rest of the country.

The Regional Greenhouse Gas Initiative is an example of effective, bipartisan action that addresses global warming and hastens the transition to a clean energy economy. Doubling down on climate progress in the Northeast and Mid-Atlantic and expanding the use of RGGI's proven tools to cut carbon pollution elsewhere in the nation can help America maintain its momentum in the fight against global warming.

# Methodology

The analysis in this report includes the estimates of future RGGI proceeds in the nine RGGI states and the estimated benefits accruing to New Jersey and Virginia should they join the Initiative or adopt a parallel program.

Future revenue in the RGGI states was estimated using the estimates of future allowance auction prices from RGGI, Inc.'s Draft IPM.<sup>82</sup> Each year's carbon allowance price estimate was multiplied by the provisional number of allowances available, yielding a result in nominal (not inflation-adjusted) dollars. These totals were added to produce the \$7.3 billion estimate for revenues 2018-30.

Future revenue in Virginia and New Jersey was estimated using the same auction price estimates. Virginia has published a proposed cap for 2020-30; this was then simply multiplied by RGGI's IPM-modeled carbon allowance prices to derive possible proceeds. To produce the annual cap for New Jersey, historical emissions data were obtained from EPA's eGRID database and the initial cap was then set at 2015 levels of emissions.<sup>83</sup> Emissions reductions were then calculated by summing each year 2020-2030's reductions from 2015 levels of emissions (the most recent year for which there is data), assuming a similar trajectory of emissions reductions as other states in the RGGI program.

# Notes

1. Bruce Ho and Jackson Morris, National Resources Defense Council, *RGGI Agrees to Cut Power Plant Pollution by Another 30%*, archived at <https://web.archive.org/web/20171127222309/https://www.nrdc.org/experts/bruce-ho/rggi-agrees-cut-power-plant-pollution-another-30>, 27 November 2017.
2. Abt Associates, *Analysis of the Public Health Impacts of the Regional Greenhouse Gas Initiative, 2009–2014*, January 2017.
3. Regional Greenhouse Gas Initiative, *Investment of RGGI Proceeds in 2015*, October 2017.
4. Ibid.
5. Paul J. Hibbard et al., Analysis Group, *The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic States: Review of RGGI's Second Three-Year Compliance Period (2012-2014)*, 14 July 2015. These numbers reflect the benefits of RGGI in its first two compliance periods. Comprehensive information on RGGI's third compliance period is not yet available.
6. This information was provided by RGGI's COATS emissions tracking service, which can be accessed at <https://rggi-coats.org/eats/rggi/>.
7. R Horton et al., "Northeast," in *National Climate Assessment*, U.S. Global Change Research Program, 16-1-nn. 2014.
8. Ibid.
9. Ibid.
10. Ibid.
11. Ibid.
12. Bruce R. Huber, Notre Dame Law NDLScholarship, *How Did RGGI Do It? Political Economy and Emissions Auctions*, 1 January 2013, accessed at [https://scholarship.law.nd.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1477&context=law\\_faculty\\_scholarship](https://scholarship.law.nd.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1477&context=law_faculty_scholarship).
13. New Jersey chose to withdraw from RGGI after the first compliance period.
14. Gallup, *Public Opinion and Trump's Decision on the Paris Agreement*, 2 June 2017, archived at [https://web.archive.org/web/20171130215948/http://news.gallup.com/opinion/polling-matters/211682/public-opinion-trump-decision-paris-agreement.aspx?g\\_source=CATEGORY\\_CLIMATE\\_CHANGE&g\\_medium=topic&g\\_campaign=tiles](https://web.archive.org/web/20171130215948/http://news.gallup.com/opinion/polling-matters/211682/public-opinion-trump-decision-paris-agreement.aspx?g_source=CATEGORY_CLIMATE_CHANGE&g_medium=topic&g_campaign=tiles).
15. Regional Greenhouse Gas Initiative, *Welcome*, accessed at <http://www.rggi.org/>, 1 November 2017.
16. Cap: Regional Greenhouse Gas Initiative, *Cap*, archived at <https://web.archive.org/web/20171127223502/http://www.rggi.org/design/overview/cap>, 27 November 2017; Covered facilities: Regional Greenhouse Gas Initiative, *About the Regional Greenhouse Gas Initiative (RGGI)*, June 2017.
17. Brian M. Jones, Christopher Van Atten and Kaley Bangston, MJ Bradley and Associates, *A Pioneering Approach to Carbon Markets: How the Northeast States Redefined Cap and Trade for the Benefit of Consumers*, February 2017.

18. Environmental Defense Fund, cdc climat research, IETA, *Regional Greenhouse Gas Initiative: An Emissions Trading Case Study*, May 2015.

19. See note 12.

20. Ibid.

21. Regional Greenhouse Gas Initiative, *Memorandum of Understanding*, archived at [https://web.archive.org/web/20171130223621/https://www.rggi.org/docs/mou\\_final\\_12\\_20\\_05.pdf](https://web.archive.org/web/20171130223621/https://www.rggi.org/docs/mou_final_12_20_05.pdf), 30 November 2017. This caveat is necessary because Virginia would not, under some proposals, be able to directly participate in RGGI auctions.

22. See note 12.

23. Geoff Martin and Eri Saikawa, "Effectiveness of State Climate and Energy Policies in Reducing Power-Sector CO<sub>2</sub> Emissions," *Nature Climate Change*, 7: 912-919, doi: 10.1038/s41558-017-0001-0, 6 November 2017.

24. RGGI.org, "Historical Emissions," archived at [https://web.archive.org/web/20180117234400/https://www.rggi.org/historical\\_emissions](https://web.archive.org/web/20180117234400/https://www.rggi.org/historical_emissions). These data do not include New Jersey. This projection uses the full (unadjusted) RGGI cap from this document, since the fully adjusted cap will not be known until just before its implementation.

25. Regional Greenhouse Gas Initiative, *Cap*, archived at <https://web.archive.org/web/20171127225252/https://www.rggi.org/design/overview/cap>, 27 November 2017.

26. This information was provided by RGGI's COATS emissions tracking service, which can be accessed at <https://rggi-coats.org/eats/rggi/>.

27. Ibid.

28. See note 3.

29. Regional Greenhouse Gas Initiative, *Investment of RGGI Proceeds Through 2014*, September 2016; See note 3.

30. The chart does not include diversions of RGGI funds for purposes other than those for which they are intended, as practiced by New Jersey before its departure from RGGI.

When these are counted, it is no longer true that the majority of RGGI funds have been spent on energy efficiency projects.

31. See note 29; See note 3. Greenhouse Gas Abatement projects are those specifically intended to reduce or ameliorate the effects of greenhouse gas emissions.

32. See note 29; See note 3.

33. Weston Berg et al., American Council for an Energy-Efficient Economy, *The 2017 State Energy Efficiency Scorecard*, September 2017.

34. Ibid.

35. Massachusetts Session Law Chapter 7, Section 9A, "An Act Relative to Green Communities." Available online at <https://malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter169>.

36. Massachusetts State Department of Energy and Environmental Affairs, *Baker-Polito Administration Designates 30 Cities and Towns as Green Communities* (press release), 2 February 2017.

37. Massachusetts State Department of Energy and Environmental Affairs, *Green Community Designations Reach 185*, available online at <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/muni-projects-green-communities.pdf>, 19 June 2017.

38. Reductions: American Council for an Energy-Efficient Economy, *Connecticut*, August 2017, archived at <https://web.archive.org/web/20171205163633/https://database.aceee.org/state/connecticut>; Btu conversion: U.S. Energy Information Administration, *Household Energy Use in Massachusetts*, archived at [https://web.archive.org/web/20180122184453/https://www.eia.gov/consumption/residential/reports/2009/state\\_briefs/pdf/ma.pdf](https://web.archive.org/web/20180122184453/https://www.eia.gov/consumption/residential/reports/2009/state_briefs/pdf/ma.pdf).

39. Connecticut Energy Efficiency Fund, *Energy Efficiency Board 2016 Programs and Operations Report*, 1 March 2017.

40. See note 33.



41. Conversion: U.S. Energy Information Administration, *Frequently Asked Questions*, archived at <https://web.archive.org/web/20180108223035/https://www.eia.gov/tools/faqs/faq.php?id=97&t=3>; savings: See note 33.
42. Energy use: ISO Newswire, *ISO New England Issues Power System Plan for New England* (press release), 2 November 2017; population: Connecticut State Data Center, *2015 to 2040 Population Projections – State Level*, 19 September 2017, archived at <https://web.archive.org/web/20171205164559/https://ctsd.c.uconn.edu/2015-to-2040-population-projections-state-level/>.
43. Josh Hicks, “Maryland Regulators Greenlight Two Major Offshore Wind Projects,” *The Washington Post*, 12 May 2017.
44. New York State Energy Research and Development Authority, *New York State’s Regional Greenhouse Gas Initiative-Funded Programs Status Report*, August 2017.
45. New York State Energy Research and Development Authority, *NY-Sun*, archived at <https://web.archive.org/save/https://www.nysed.ny.gov/All-Programs/Programs/NY-Sun>, 27 November 2017.
46. Edgar Meza, “New York Merges Solar Programs Under NY-Sun Initiative,” *PV Magazine*, 25 August 2014.
47. See note 3.
48. Quentin Karpilow, Yale Center for Business and the Environment, *Connecticut’s C-PACE Program is Picking up Speed*, 30 March 2016, archived at <https://web.archive.org/web/20171205164900/https://www.cleanenergyfinanceforum.com/2016/03/30/connecticut%E2%80%99s-c-pace-program-is-picking-up-speed>.
49. CT Green Bank, *Connecticut Green Bank’s C-PACE Program Reaches \$100 Million Milestone* (press release), 24 July 2017.
50. Calculated using data from the U.S. Energy Information Administration’s State Electricity Profiles, available at <https://www.eia.gov/electricity/state/>.
51. See note 3.
52. These conversions were calculated using EPA’s online greenhouse gas equivalencies calculator, available at <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.
53. See note 2.
54. Ibid.
55. See note 5.
56. See note 3.
57. RGGI Inc., *RGGI States Announce Proposed Program Changes: Additional 30% Emissions Cap Decline by 2030* (Press Release), 23 August 2017.
58. The United States’ stated goal for emissions reductions under the Paris Agreement is to reach levels 26 to 28 percent less than 2005 emissions by 2025. United States of America, Statement of Intended Contribution to the Paris Climate Agreement, accessed at <http://www4.unfccc.int/submissions/INDC/Published%20Documents/United%20States%20of%20America/1/U.S.%20Cover%20Note%20INDC%20and%20Accompanying%20Information.pdf>, 27 November 2017.
59. See the Methodology section for details on how proceeds from the program were estimated.
60. Reductions were calculated using the proposed annual cap numbers available in RGGI’s press release: RGGI Inc., *RGGI States Announce Proposed Program Changes: Additional 30% Emissions Cap Decline by 2030* (press release), 23 August 2017.
61. Independent Chemical Information Services (ICIS), *Virginia DEQ Unveils Proposal to Link with RGGI*, 13 November 2017.
62. Cap: Virginia State Air Pollution Control Board, *Tentative Agenda from Townhall Meeting*, 16 November 2017, available at [http://www.townhall.virginia.gov/L/GetFile.cfm?File=C:%5CTownHall%5Cdroot%5CMeeting%5C1%5C26694%5Cagenda\\_DEQ\\_26694\\_v1.pdf](http://www.townhall.virginia.gov/L/GetFile.cfm?File=C:%5CTownHall%5Cdroot%5CMeeting%5C1%5C26694%5Cagenda_DEQ_26694_v1.pdf); revenue

calculated using auction price estimates available in RGGI, Inc.'s Draft IPM, available at <http://rggi.org/design/2016-program-review/rggi-meetings>.

63. Ibid.

64. The Honorable L. Preston Bryant, Jr., Virginia Governor's Commission on Climate Change, *Final Report: A Climate Change Action Plan*, 15 December 2008.

65. State of Virginia, *Energy in the New Virginia Economy: Update to the 2014 Virginia Energy Plan*, 2016.

66. State of Virginia, *Commonwealth Energy Fund*, archived at <https://web.archive.org/web/20171127235252/https://www.dmme.virginia.gov/de/CommonwealthEnergyFund.shtml>, 27 November 2017.

67. See note 64.

68. Assuming that 74 percent of funds are invested in these programs, in line with the RGGI state average.

69. US Climate Alliance, *Virginia*, archived at <https://web.archive.org/web/20171127235742/https://static1.squarespace.com/static/5936b0bde4fcb5371d7ebe4c/t/59bc0c84197aea94613ce500/1505496207872/Virginia>, 27 November 2017.

70. Dominion Energy, *Coastal Virginia Offshore Wind*, accessed at <https://www.dominionenergy.com/about-us/making-energy/renewables/wind/coastal-virginia-offshore-wind>, 27 November 2017.

71. State of New Jersey, *Video & Transcript: Governor Christie: New Jersey's Future is Green* (announcement by Governor Christie), archived at <https://web.archive.org/web/20171127233545/http://www.nj.gov/governor/news/news/552011/approved/20110526a.html>, 27 November 2017.

72. Jordan Schneider and Matt Elliott, Frontier Group and Environment New Jersey Research & Policy Center, *Benefits of the Regional Greenhouse Gas Initiative*, February 2012.

73. Patrick Skahill, "With Christie Out, New Jersey Poised to Rejoin New England in Climate Pact," *WNPR*, 9 November 2017.

74. 2015 emissions data from EPA's Emissions & Generation Resource Integrated Database (eGRID), accessible at <https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid>.

75. MyCentralJersey, *EDITORIAL: NJ Flops on Environmental Goals*, 22 September 2017, accessed at <http://www.mycentraljersey.com/story/opinion/editorials/2017/09/22/new-jersey-environment-emissions/105889018/>.

76. See note 29.

77. Analysis Group, *Appendix to The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States*, 15 November 2011.

78. RGGI Inc., *Report Highlights Economic Benefits of RGGI CO<sub>2</sub> Auction Investments* (press release), 28 February 2011.

79. For example, the Polamer Precision solar project. Information available at <http://www.cpace.com/projects/polamer-precision>.

80. See note 3.

81. The Natural Resources Defense Council estimates the emission reductions from the program at a slightly higher 132 million short tons. See Bruce Ho and Jackson Morris, Natural Resources Defense Council, *RGGI Agrees to Cut Power Plant Pollution by Another 30%*, 23 August 2017, archived at <https://web.archive.org/web/20180131171302/https://www.nrdc.org/experts/bruce-ho/rggi-agrees-cut-power-plant-pollution-another-30>.

82. The Draft IPM is available here: <http://rggi.org/design/2016-program-review/rggi-meetings>

83. Available here: <https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid>.