



# Benefits of the Regional Greenhouse Gas Initiative

How Cutting Pollution Protects New Jersey's Environment, Builds the Economy, and Reduces Energy Costs



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Written by:  
Jordan Schneider, Frontier Group  
Matt Elliott, Environment New Jersey Research & Policy Center

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# Executive Summary

In 2005, New Jersey joined nine other Northeastern states in a landmark agreement to limit global warming pollution from the region's power plants. This agreement, known as the Regional Greenhouse Gas Initiative (RGGI), is designed to clean up pollution from power plants while fueling the transition to a clean energy economy.

New Jersey has benefited from RGGI through the investment of funds from the sale of pollution allowances in clean energy projects—projects that are cutting pollution, benefiting energy consumers and creating new economic opportunities. **By 2018, New Jersey's ongoing investment in clean energy programs through RGGI will help the state avoid 127,000 metric tons of global warming pollution annually, or as much as is produced by more than 24,300 of today's passenger vehicles.**

New Jersey can achieve even greater benefits by remaining in the RGGI program, directing funds generated through the program to clean energy projects, and working with other Northeastern states to strengthen RGGI in the years ahead.

**RGGI is already delivering benefits to New Jersey's environment, consumers and the economy.**

- **Environment:** Clean energy investments through RGGI have already eliminated the need for 52,000 MWh of electricity generated from fossil fuel sources each year—enough to power nearly 6,000 New Jersey homes. So far, these investments have enabled New Jersey to *cut its global warming emissions by 13,100 metric tons* per year—equivalent to taking 2,500 passenger vehicles off the road.
- **Consumer costs:** RGGI is saving money for consumers. According to a recent study by Analysis Group, RGGI's emission cap has caused an 0.7 percent increase in electricity bills—an increase of less than one-half of 1 percent of annual energy expenditures for New Jersey homes and businesses. Those costs, however, will be more than made up for over time by reductions in energy

consumption driven by RGGI programs. According to Analysis Group, RGGI's investments thus far will lead to *average energy savings of \$25 per residential customer* across the Northeast. In New Jersey, total energy bill savings will amount to approximately \$150 million.

- **Economic benefits:** RGGI is helping to fuel the transition to a clean energy economy in New Jersey. RGGI has led to the installation of approximately 7.5 megawatts of solar energy in New Jersey and the *creation of nearly 1,800 job-years of employment* in the state, according to ENE-Environment Northeast.

**New Jersey can reap even greater benefits by simply staying in the program, even if pollution allowance prices remain low.**

- **Environment:** Even if pollution allowance prices remain at current low levels, New Jersey would achieve significant emissions reductions by simply staying in RGGI and directing program revenues to clean energy programs. By 2018, New Jersey will avoid *127,000 metric tons of carbon dioxide pollution annually*—the equivalent taking 24,300 of today's passenger vehicles off the road.
- **Consumer costs:** The cost of pollution allowances under RGGI is projected to remain low through 2018. Remaining in the program and investing revenues from the program in clean energy programs would eliminate demand for *461 gigawatt-hours (GWh) of centrally generated electricity per year*—enough to power 52,000 typical New Jersey homes, and reducing the need for costly investments in new generation and transmission capacity.
- **Economic benefits:** Remaining in RGGI would enable the state to install *100 MW of solar and 95 MW of combined heat-and-power capacity* (assuming the state continues its current practices of clean energy investment), fueling continued growth in the state's clean energy economy.

**By working with other Northeastern states to strengthen RGGI, New Jersey can maximize the benefits of the program.**

- **Environment:** By adjusting RGGI's emission cap to reflect real (as opposed to projected) 2009 emissions and doubling the reduction target to achieve a 20 percent reduction in emissions by 2020, the Northeastern states could reduce carbon dioxide emissions region-wide by 31 million tons annually by 2020—*the equivalent of taking about 5.9 million of today's cars off the road.*
- **Consumer and economic benefits:** Strengthening RGGI's emission cap would result in only a small impact on electric rates—with the cost of allowances causing an average increase of only 3.6 percent even at allowance prices of \$10 per ton of carbon dioxide—and accelerate New Jersey's transition to a clean energy economy with the installation of between *370 to 730 megawatts of clean, in-state electricity generation*—enough to replace one mid-sized coal-fired power plant.

**To take advantage of RGGI's potential to clean up pollution from New Jersey's power plants and move the state toward a clean energy economy, New Jersey's leaders should:**

- 1. Remain in the RGGI program.** Gov. Christie should reverse course and move to keep New Jersey in the RGGI program. By remaining within RGGI, New Jersey can continue to work side-by-side with other Northeastern states on solutions to the region's energy and pollution problems.
- 2. Support strengthening RGGI's cap on carbon emissions.** When the originators of RGGI established a cap on global warming pollution in 2005, they set a cap on emissions based on projected 2009 levels, which turned out to be much higher than the region's actual emissions—understandable given the inherent uncertainty of modeling future emissions scenarios and energy market variables four years into the future. Now, however, with the benefit of experience, the region should reset the cap to begin from the actual level of emissions in 2009, rather than the incorrect

projections of a half-decade ago. To ensure that the region's power plants clean up their act, the RGGI states should require emission reductions of 20 percent by 2020 and 40 percent by 2030.

- 3. Restore the use of RGGI revenues to support clean energy programs in New Jersey.** By reinvesting funds from the sale of pollution allowances in clean energy programs, RGGI states can hasten the transition to a clean energy economy while reducing the costs of energy for all consumers. Unfortunately, Gov. Christie has diverted more than half of RGGI funds intended for clean energy programs to plug state budget gaps, missing out on the opportunity to make critical clean energy investments. As experience from the past three years of RGGI has shown, the program is a strong economic engine and reduces energy costs for all consumers, but only when funds are spent on clean energy or energy efficiency programs as initially intended. In the future, New Jersey should allocate all RGGI revenues to clean energy and energy efficiency.



# RGGI by the NUMBERS

RGGI investments made so far are **saving the average household \$25 and the average business \$181** in avoided electricity costs over 2009-2021.

By staying in RGGI, New Jersey can generate enough clean energy investment to install **100 megawatts of solar energy and 95 megawatts of combined heat-and-power capacity** by 2018, reducing demand for polluting electricity from the grid.

**RGGI**  
has created  
**1,800**  
job-years  
of employment  
in New Jersey.

THE ELECTRIC BILL  
IMPACT OF  
RGGI'S EMISSION  
CAP AMOUNTS TO

**LESS THAN**

**½ OF 1%**

OF TOTAL ENERGY  
COSTS.

By strengthening RGGI, New Jersey can **REDUCE POLLUTION** by as much as

**TAKING 780,000 CARS OFF THE ROAD ANNUALLY BY 2020.**



For methodology and citations, see Jordan Schneider, Frontier Group, and Matt Elliott, Environment New Jersey Research & Policy Center, *Benefits of the Regional Greenhouse Gas Initiative: How Cutting Pollution Protects New Jersey's Environment, Builds the Economy, and Reduces Energy Costs*, February 2012.





# Introduction

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“From our beautiful shore to our rivers, mountains and farms, our state’s environmental landscape is full of invaluable treasures that are inseparable from our New Jersey identity. Our collective obligation to carefully and responsibly preserve these gifts for our children and grandchildren is a top priority of my Administration, and a principle that will continue to guide our environmental policy every single day.”

– Gov. Chris Christie<sup>1</sup>

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New Jersey has come a long way from the days when the Garden State was synonymous in the American mind with toxic dumps, air pollution, and medical waste washing up on beaches.

Over the past few decades, New Jersey residents have taken steps to protect our “invaluable treasures” from the Shore to the Highlands, while finally cracking

down on the industrial polluters that for too long threatened our environment and our health.

In 2005, New Jersey built on its efforts to protect our environment and public health by joining nine other Northeastern states in the Regional Greenhouse Gas Initiative (RGGI). RGGI is a pioneering effort to cut harmful air pollution and prevent global warming—which threatens the future of the Shore and the state as a whole—while moving the region away from fossil fuels and toward a clean energy economy.

In May 2011, Gov. Chris Christie moved to withdraw New Jersey from RGGI, criticizing the program as “nothing more than a tax on electricity, a tax on our residents and on businesses with no discernible effect on our environment.”<sup>2</sup> In recent months, however, several studies have suggested that Gov. Christie’s understanding of the program is mistaken. The cost of RGGI to consumers and businesses has been miniscule and is likely to be paid back quickly in energy savings and cleaner air. And the program

is making a discernible impact on the environment—fueling the installation of solar panels, highly efficient industrial energy systems, and other clean energy advances that have cut pollution for New Jersey.

But Gov. Christie’s criticism of RGGI is correct on one score: the program’s environmental impact is far less than it could be. By embracing the

program and working to strengthen it—rather than abandoning New Jersey’s partners in the Northeast—Gov. Christie can help ensure that the state “carefully and responsibly preserves” the gifts of clean air and a livable environment for ourselves and future generations while preserving New Jersey’s track record as an environmental leader.

# The Regional Greenhouse Gas Initiative: How It Works in New Jersey

The Regional Greenhouse Gas Initiative (RGGI) is designed to clean up pollution from power plants in 10 Northeast and Mid-Atlantic states, while helping the region to transition to a clean energy economy. While the program is relatively new, it is already delivering important benefits to New Jersey.

Under RGGI, power plant owners in the region must obtain permits—called allowances—for every ton of carbon dioxide they release into the air. The number of allowances is limited by an overall cap, which declines over time, requiring power plants to clean up. Power plant owners must buy their allowances in an auction or in a secondary market where third parties sell allowances originally purchased at an auction. The revenues from these allowance purchases go back to states such as New Jersey, with the intention that most of the revenues will be used to benefit the public, primarily through investments in clean energy, energy efficiency and other greenhouse gas mitigation programs.

In New Jersey, the primary vehicle for clean energy investments is the Clean Energy Solutions Capital Investments (CESCI) Loan/Grant Program, which provides a mix of zero-interest loans and grants of up to \$5 million.<sup>3</sup> The other vehicle for clean energy investments is the Local Government Greenhouse Gas Reduction Program (LGGGRP), designed to help local governments reduce greenhouse gas emissions through energy efficiency, renewable energy, distributed energy and sustainable land use planning.<sup>4</sup>

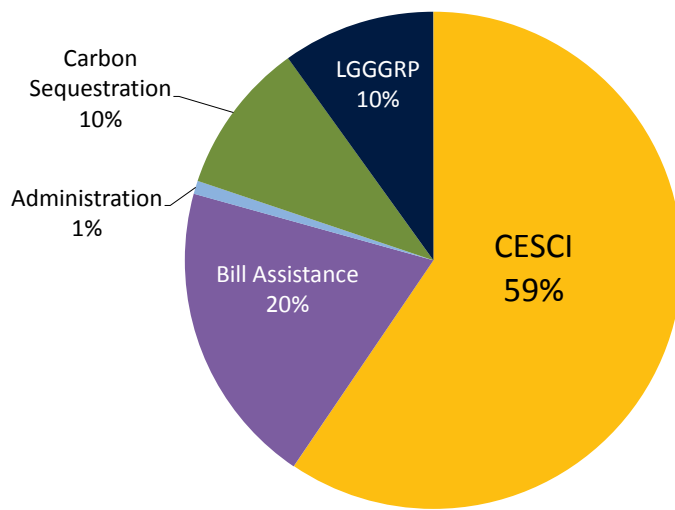
The percentage of RGGI revenues that goes into clean energy investments varies among states. For example, some states may allocate 75 percent of RGGI funds to clean energy projects and the rest to help low-income households pay their utility bills; others may put 50 percent of the funds into clean energy, a smaller percentage into low-income assistance, and the rest into other programs. New Jersey's legislators originally decided to

set aside a little over 60 percent of the state's RGGI funds for clean energy investments through CESCO and LG-GGRP. **However, Gov. Christie has diverted more than 63 percent (\$74 million) of the money intended for clean energy programs to fill gaps in the state budget, significantly limiting the amount of money available for clean energy investments and undercutting RGGI's full economic and environmental potential.**<sup>5</sup> (See Figure 1.)

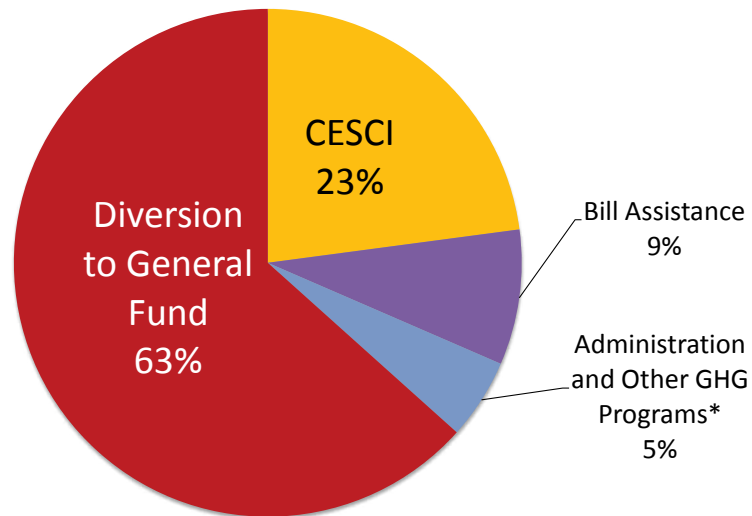
Diverting funds meant for clean energy to the state budget weakens RGGI's "virtuous cycle" in which payments by polluters spur the deployment of clean energy solutions that further cut pollution and reduce the demand for electricity—and therefore the costs of the program—in future years. For example,

Analysis Group found that states that invest more revenues back into clean energy programs—especially in energy efficiency—realize benefits from RGGI even before any macroeconomic "ripple effects" are considered.<sup>7</sup> With energy efficiency, consumers use less electricity and realize immediate savings on their utility bills—about \$4 in savings for every \$1 invested in efficiency, according to the American Council for an Energy Efficient Economy.<sup>8</sup> By investing in clean energy programs, New Jersey can maximize its RGGI revenues to deliver more environmental and economic benefits to the state. However, because of Gov. Christie's decision to divert RGGI funds away from their originally intended uses, New Jersey's consumers (who pay for the program) are currently receiving only a fraction of RGGI's potential benefits.

**Figure 1. Intended Allocation of RGGI Funds in New Jersey Vs. Actual Program Spending Through September 2011<sup>6</sup>**



**Intended Allocation of Funds**



**Actual Spending to Date**

\*GHG Programs are other greenhouse gas mitigation programs that are not defined by the data source as part of the Local Government Greenhouse Gas Reduction Program (LGGGRP) or the Carbon Sequestration Program.

# New Jersey Is Already Benefiting from RGGI

**D**espite the diversion of RGGI revenues away from clean energy programs, New Jersey has made important investments that build up the state's capacity to generate clean, locally produced electricity—cutting pollution, benefiting energy consumers, and creating new economic opportunities.

The investments New Jersey has made so far (about \$25 million) through the CESCO program have gone to solar panel installations and combined heat-and-power projects at commercial and industrial businesses and other institutions.<sup>9</sup> Combined heat-and-power (CHP) systems use energy efficiency to harness the heat produced in industrial facilities to also generate power. This results in a net reduction in pollution that would otherwise be produced if the facility used conventional technologies, such as oil or gas boilers, for its heating

needs and purchased all of its electricity from the grid.

Both solar energy and combined heat-and-power play an important role in helping New Jersey meet its energy challenges by reducing the amount of electricity that must be produced at polluting power plants within New Jersey or imported from dirty power plants in other states via congested transmission lines. New Jersey's long-term energy future depends on the development of clean, local sources of energy, and both solar energy and CHP fit that description.

## **Benefits for the Environment**

Together, New Jersey's solar energy installations and CHP projects installed with support from RGGI have already eliminated the need for 52,000 MWh

of electricity generated from fossil fuel sources each year—enough to power nearly 6,000 typical New Jersey homes.<sup>10</sup> These investments currently help the state avoid *13,100 metric tons of global warming pollution each year*—equivalent to taking nearly 2,500 of today’s passenger vehicles off the road.<sup>11</sup>

### Savings for Consumers

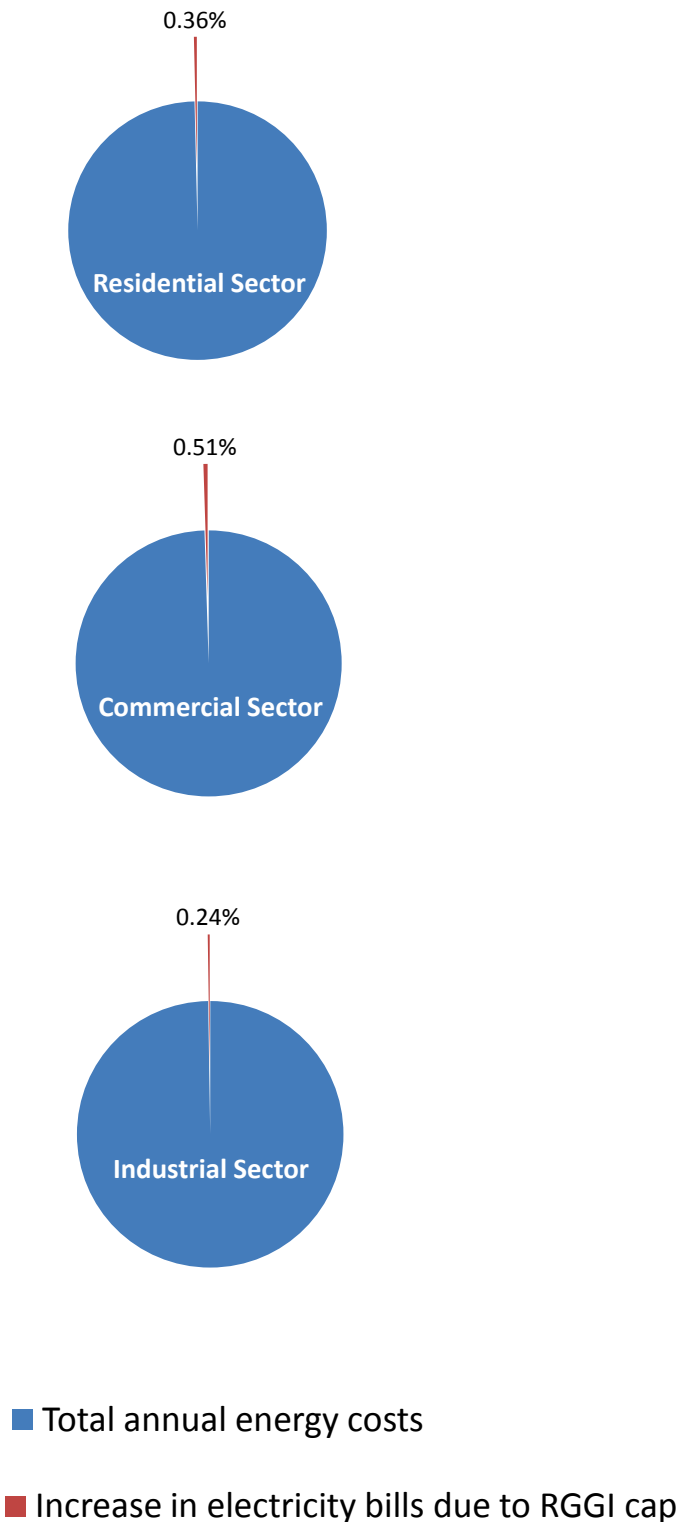
Under RGGI, power plant owners must pay for their emissions of carbon dioxide, and they pass along some of these costs to consumers—resulting in a tiny increase in electricity rates in the short term. However, as long as the majority of those payments are channeled back into investments that reduce the demand for power from the state’s electricity grid, the program generates a net savings for consumers on their utility bills over the long term.

The costs associated with RGGI compliance have thus far been trivial. Analysis Group estimates that across the RGGI region, consumers’ overall payments for electricity increased by about 0.7 percent between 2009 and 2011.<sup>12</sup> RGGI, Inc. estimates that these increases represented about \$0.46 on the average monthly household electric bill in 2010, just over a penny a day.<sup>13</sup> (See Figure 2.)

This increase, if applied to New Jersey, would represent **less than one-half of one percent of total annual energy expenses by New Jersey homes and businesses.**<sup>14</sup> Considered as a percentage of the money that New Jerseyans spend to power their homes and business, this increase is extremely small.

While overall payments for electricity in the RGGI region have gone up in the short term, clean energy investments made since the beginning of the program reduce demand for electricity over the long term, ultimately *saving* consumers

**Figure 2. Short-term Utility Bill Increases from RGGI as a Percentage of Overall Energy Expenditures in the Residential, Commercial and Industrial Sectors<sup>17</sup>**





money. According to Analysis Group, the first three years of the RGGI program have produced net bill savings of *\$25 for the average residential consumer in the Northeast, \$181 for the average commercial consumer, and \$2,493 for the average industrial consumer* over 2009-2021.<sup>15</sup> In New Jersey, total electricity bill savings will amount to approximately \$150 million.<sup>16</sup>

### **Benefits for New Jersey's Economy**

RGGI is also helping to reinvigorate New Jersey's economy through clean energy investments. In New Jersey, RGGI

investments in solar energy have helped strengthen the state's already robust solar market. To date, investments made through the CESCO program have helped increase New Jersey's solar capacity by 7.5 megawatts (MW), increasing the state's total capacity to nearly 450 MW—more than every other state except California, the largest solar market in the United States.<sup>18</sup> These investments have helped sustain a solar energy industry that now employs more than 2,800 people in New Jersey.<sup>19</sup> According to ENE-Environment Northeast, clean energy investments made so far in New Jersey under RGGI have created almost *1,800 job-years of employment in New Jersey*.<sup>20</sup>

# New Jersey Will Reap Additional Benefits by Staying in RGGI

**B**y merely maintaining membership in RGGI, New Jersey will continue receiving environmental and economic benefits through the end of 2018 and beyond. As long as New Jersey remains in the program, the state will continue to receive auction revenues from the sale of pollution allowances, allowing New Jersey to ramp up investments in clean energy and further cut pollution.

## Benefits for the Environment

New Jersey has achieved environmental benefits from RGGI largely through the investment of allowance proceeds in clean energy projects—solar energy and combined heat-and-power systems. However, Gov. Christie’s decision to divert revenue from the program to other purposes has limited its environmental benefits.

Assuming that the state were to reinstate funding for clean energy programs to the levels set by the Global Warming Solutions Fund Act and continue to allocate those funds as it has in the past, the state could achieve seven times the amount of emission reductions by 2018 as it has achieved to date, even if prices remain at the current “floor” price of \$1.93 per ton of carbon dioxide pollution.<sup>21</sup>

Staying in RGGI and directing funds generated through the program to clean energy projects would help the state avert more than ***127,000 metric tons of global warming emissions each year by 2018***—equivalent to taking 24,300 of today’s vehicles off the road—thereby helping New Jersey to meet its obligation under the Global Warming Response Act to reduce emissions of carbon dioxide 80 percent below 2006 levels by 2050.<sup>22</sup>

## Benefits for Consumers

The cost of pollution allowances under RGGI is projected to remain low through 2018; as a result, the program will continue to have a limited impact on consumer utility bills.<sup>23</sup> The small increases in electricity rates due to RGGI's cap on emissions will be offset by electricity savings resulting from reduced demand for dirty electricity from the grid.

By 2018—again assuming that New Jersey reinstates full funding for clean energy programs and invests those funds as it has to date—clean energy investments under RGGI in New Jersey could eliminate demand for **461 gigawatt-hours (GWh) of centrally generated electricity per year**, enough to power 52,000 typical New Jersey homes. By reducing demand for power from the electric grid, RGGI will reduce the need for costly investments in new generation from dirty power plants or transmission capacity to import electricity from out of state.<sup>24</sup> In addition to these benefits, New Jersey residents and businesses will also benefit from clean energy investments made in other RGGI states that reduce demand for electricity on the wholesale market.

## Benefits to New Jersey's Economy

By simply remaining in RGGI and continuing to invest RGGI proceeds as described above, New Jersey will

install nearly **100 MW of solar and 95 MW of combined heat-and-power capacity by 2018**, fueling continued growth in New Jersey's robust solar market and other parts of its clean energy economy.<sup>25</sup> New Jersey will realize these benefits even if allowance prices remain low and it makes no changes to the way it currently invests program revenues—as long as future fund diversions to the state budget are eliminated.

Solar and CHP systems will particularly benefit New Jersey's commercial and industrial businesses because they provide a secure and reliable source of electricity generated on-site, which helps reduce the amount of electricity they must purchase from the grid. By reducing their purchases of dirty electricity, New Jersey's businesses can insulate themselves against future spikes in fossil fuel prices. They can also keep millions of dollars in the state economy each year by reducing imports of electricity from other states.

New Jersey can achieve even greater economic benefits through RGGI in the future by investigating other clean energy strategies as well. For example, in its examination of RGGI investments in other states, Analysis Group found that energy efficiency provides the greatest direct benefit to consumers by decreasing overall demand and electricity prices.<sup>26</sup> By spending less on electricity, New Jersey's businesses can be more competitive.

# Strengthening RGGI Would Deliver Even Greater Benefits

**G**lobal warming pollution from electric power plants in the RGGI states has declined significantly in recent years. While RGGI's system of investments in clean energy has contributed to that decline, RGGI's core program has had a muted role because of incorrect emission projections that resulted in a flawed and inflated cap. To achieve the original goal of the program as a tool to achieve significant reductions in global warming emissions in the Northeast, RGGI must be strengthened. By doing so, New Jersey and the other Northeastern states can achieve greater environmental benefits and consumer savings while accelerating the transition to a clean energy economy.

## The Need to Strengthen the Carbon Dioxide Cap Under RGGI

When policymakers set the RGGI cap in 2005, experts expected that emissions

from the region's power plants would continue to grow over time.<sup>27</sup> As a result, the RGGI states agreed to limit emissions at the levels projected for 2009 until 2014, with emissions under the cap ultimately declining to 10 percent below 2009 emissions by 2018.

However, emissions did not rise as projected. In fact, emissions from power plants in the RGGI states peaked in 2005—the year the RGGI states signed the memorandum of understanding establishing the program—at 184 million tons. By 2008, the year before RGGI took effect, emissions had already fallen to 153 million tons. In 2009 the RGGI states emitted only 123 million tons of carbon dioxide from their power plants—34 percent below the amount permitted under the cap. In 2010, emissions rebounded slightly but were still 27 percent below the cap, and in 2011, emissions dropped once more to 34 percent below the cap.<sup>28</sup>

There are many reasons for the decline in emissions in the RGGI region, including lower prices for natural gas

(which produces less carbon dioxide pollution per unit of energy than coal), increased usage of energy efficiency measures, greater availability of clean energy generation options, and—to a lesser extent—the economic downturn and milder weather.<sup>29</sup> Because of these changing conditions, experts now predict that emissions from power plants in the RGGI states are unlikely to increase in the foreseeable future (even as the economy recovers), and will not surpass the emission cap prior to 2030.<sup>30</sup> (See Figure 3.)

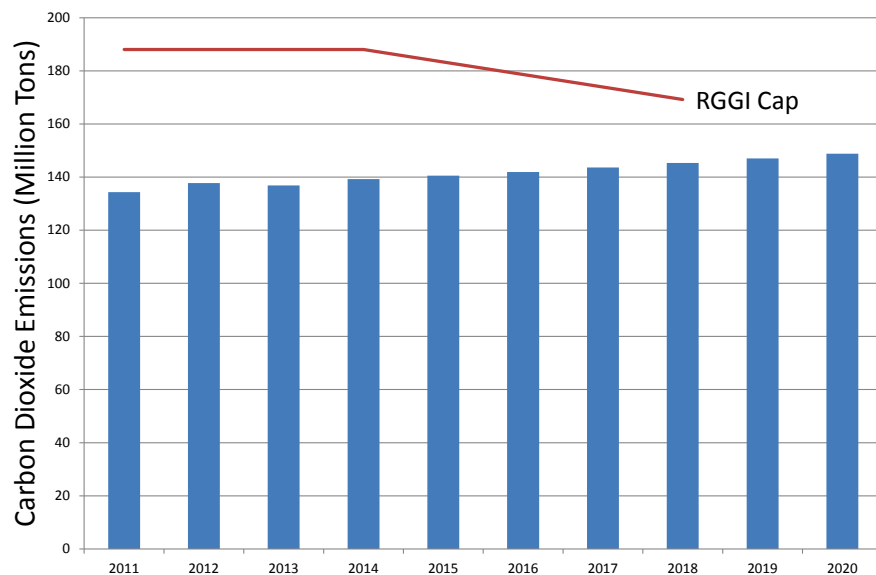
It is clear that greater reductions in the RGGI region’s emissions are possible than previously thought. In addition, continued advances in climate science suggest that—if anything—the need to achieve significant reductions in global warming pollution is *more urgent* today than it was when the RGGI states signed their memorandum of agreement six years ago.

The scientific consensus is clear that developed countries need to cut emissions quickly and sharply—by 25 to 40 percent below 1990 levels by 2020 and by 80 to 95 percent by 2050—for the world to be able to prevent the worst impacts of climate change.<sup>32</sup> Given the severity of global warming and the urgency of moving away from fossil fuels, policymakers should move to strengthen RGGI’s cap on carbon dioxide emissions from power plants.

## The Benefits of Strengthening RGGI

By strengthening RGGI to fulfill the program’s original promise of cleaning up power plants, New Jersey and the rest of the region can both make a significant dent in global warming pollution and make a major push toward a clean energy economy.

**Figure 3. Projected Annual Emissions of Carbon Dioxide in RGGI States through 2020<sup>31</sup>**



## Benefits for the Environment

Adjusting RGGI's cap to limit emissions to 20 percent below actual 2009 emissions by 2020 could reduce carbon dioxide emissions region-wide by 31 million tons relative to projected 2020 levels—*the equivalent of taking more than 5.9 million cars off the road*.<sup>33</sup> Assuming that New Jersey would achieve emission reductions proportionate to its share of emissions in 2009, the state would cut emissions by 4.1 million tons, or the equivalent of taking 780,000 cars off of the road.<sup>34</sup> These emission reductions are more than 40 times greater than those the state would achieve by simply remaining in RGGI at the current level of the cap.

In addition to the emission reductions achieved through the cap, New Jersey would achieve additional environmental and energy benefits through clean energy programs financed with revenue from the sales of pollution allowances. The amount of revenue generated by RGGI depends upon both the number of allowances sold and their price. Strengthening RGGI would reduce the number of allowances available, but, by making pollution allowances a scarce commodity, it would also increase their price. With higher revenues, New Jersey could do more to build up its clean energy capacity and deliver significant benefits to the economy and consumers.

## Benefits for Consumers and the Economy

To illustrate the potential impact of RGGI allowance revenue in driving investment in the state's clean energy economy, we evaluated two scenarios in which allowance prices are \$5 and \$10 (2011\$) per ton of carbon dioxide. These figures are within the range of allowance prices originally anticipated for RGGI

at the outset of the program (though allowance prices ultimately turned out to be much lower).<sup>35</sup> These allowance prices are used for illustrative purposes only—allowance prices could turn out to be higher or lower than these figures due to myriad factors.

Currently, allowance prices are at the “floor” price of \$1.93 per ton.<sup>36</sup> Actual emission prices will depend on a variety of factors—from the prices of various fossil fuels to the level of energy efficiency of the economy—and could conceivably exceed the highest price level evaluated here. We encourage policy-makers to conduct more in-depth modeling to develop a clearer picture of likely allowance prices under a scenario in which RGGI is strengthened.

In addition, given Governor Christie's pledge to end “all one-shot gimmicks” and diversions of funds in the future, we also assumed that New Jersey would restore all RGGI allowance revenue intended for clean energy investments under the Global Warming Solutions Fund Act to clean energy programs—reversing the trend toward revenue diversions in recent years—and that it would continue to invest that revenue much as it has to date, in solar energy and combined heat-and-power applications.<sup>37</sup>

Based on those assumptions, the state could build between 190 and 390 megawatts (MW) of additional solar capacity, and between 180 and 340 MW of new CHP capacity at its industrial facilities—that's an additional *370 to 730 megawatts of clean, in-state electricity generation, enough to replace one mid-size coal-fired power plant*.<sup>38</sup>

With an additional 370 to 730 MW of clean electricity generation capacity—equivalent to about 2.2 percent of the state's current electricity generation capacity—New Jersey would realize the following benefits:<sup>39</sup>

- It would alleviate costly investments in additional power plants within New Jersey or transmission lines to carry dirty power in from out of state.
- It would also reduce demand for electricity from the grid—reducing the cost of power and of the RGGI program to consumers and businesses.
- New Jersey would create new economic opportunities, both in the installation of clean energy technologies and by increasing the competitiveness of businesses that have invested in CHP or solar energy production.

RGGI provides these benefits at a minimal cost to consumers, even under a strengthened cap. If allowance prices were to reach \$10, the increase in consumer utility bills resulting from increased cost of RGGI allowance purchases would still be modest—about 3.6 percent of total energy expenditures.<sup>40</sup> However, at least part of this increase would be offset by reduced electricity

demand and a corresponding decrease in wholesale electricity prices. Additionally, given that the RGGI program leaves states free to choose how to spend their revenue, New Jersey could invest in other clean energy strategies as well, including strategies that may have opportunities to deliver even greater environmental and economic benefits. Energy efficiency improvements, in particular, have great potential to curb energy demand at low cost, saving money for consumers, cutting global warming pollution, and counteracting electricity price increases associated with RGGI.

By creating RGGI, the Northeastern states have created a vehicle for curbing global warming pollution and making it a global leader in the transition to a clean energy future. New Jersey faces a clear choice. The state can turn its back on the progress it has made to date and consign itself to continued dependence on dirty, fossil fuel-fired power plants. Or it can continue to join with its partners in the Northeast to clean up the region's power plants, reduce dependence on fossil fuels, and lay the foundation of a clean energy economy.

# Policy Recommendations

To take advantage of RGGI's potential to clean up pollution from New Jersey's power plants and move the state toward a clean energy economy, New Jersey's leaders should:

## 1. Remain in the RGGI program.

Gov. Christie should reverse course and move to keep New Jersey in the RGGI program. By remaining within RGGI, New Jersey can continue to work side-by-side with other Northeastern states on solutions to the region's energy and pollution problems.

## 2. Support strengthening RGGI's cap on carbon emissions.

When the originators of RGGI established a cap on global warming pollution in 2005, they set a cap on emissions based on projected 2009 levels, which turned out to be much higher than the region's actual emissions—understandable given the inherent

uncertainty of modeling future emissions scenarios and energy market variables four years into the future. Now, however, with the benefit of experience, the region should reset the cap to begin from the actual level of emissions in 2009, rather than the incorrect projections of a half-decade ago. To ensure that the region's environmental policy is grounded in reality and current climate science, the RGGI states should require emission reductions of 20 percent by 2020 and 40 percent by 2030.<sup>41</sup> RGGI states should also track emissions resulting from electricity imported from outside the RGGI region to ensure that efforts to reduce emissions within the region are not negated by increases in emissions elsewhere—a phenomenon known as “leakage.” Finally, RGGI states should include all power generating facilities, including those that fall under the 25 MW threshold for inclusion in RGGI; this will



avoid incentivizing construction of smaller facilities that, in aggregate, still produce significant emissions.

**3. Ensure all RGGI revenues are directed to clean energy programs in New Jersey.** By reinvesting funds from the sale of pollution allowances in clean energy programs, RGGI states can hasten the transition to a clean energy economy while reducing the costs of complying with the program as demand for electricity decreases. As experience from the past three years of RGGI has shown, the program is a strong economic engine and reduces energy costs for all consumers, but only when funds are spent on clean energy or energy efficiency programs, as initially intended. In the future, New Jersey should allocate all RGGI revenues to clean energy and energy efficiency.

# Methodology

## **RGGI's Clean Energy Benefits for New Jersey, 2009-2011**

To calculate the global warming pollution avoided by New Jersey's clean energy investments from the start of its participation in the program through Auction 13 in September 2011, we totaled the installed MW capacity for both the combined heat and power (CHP) and the solar projects approved by the New Jersey Department of Environmental Protection (DEP) under the Clean Energy Solutions Capital Investment (CESCI) Loan/Grant Program.<sup>42</sup> We then used the Environmental Protection Agency's (EPA) PV Watts Grid Data Calculator Version 2 to estimate the kilowatt-hours generated by a 1 kW solar installation in New Jersey, and multiplied that number by the kW of installed solar under the CESCI program. To calculate the amount of carbon dioxide pollution avoided by replacing a kWh generated with fossil fuels with kWh generated by solar panels, we used the annual carbon

dioxide total output emission rate for the ReliabilityFirst Corporation-East (RFCE) subregion found in EPA eGRID 2010 Version 1.1.<sup>43</sup>

To determine the amount of global warming pollution avoided by the combined heat-and-power capacity installed with RGGI funding, we compared emissions from a prototypical CHP system with the combined emissions that would result from operation of a standard boiler and purchase of grid electricity.

Emissions from the prototypical CHP system were based on the assumption that the CHP system is a 75 percent efficient system that consumes 11,373 Btu of natural gas to produce 8,530 Btu of useful energy (or 1 kWh of site electricity, and 5,118 Btu of process heat). See the EPA's website for a description of a prototypical CHP facility of this type.<sup>44</sup>

Emissions from the standard boiler assumed that the boiler would have the same capacity to produce process heat as the prototypical CHP system, and would

operate at 80 percent efficiency (a conservative assumption from our perspective, since the actual figure is likely lower). Individual boilers typically consume only one type of fuel, but these fuel types vary across the Northeast. In order to estimate the amount of fuel displaced by installing CHP in New Jersey, we assumed that fuel consumption by the standard boiler reflects the breakdown of boiler fuels used for non-cogenerating boilers typical in the Northeast, according to the EIA's 2006 *Manufacturing Energy Consumption Survey*; therefore, the standard boiler uses the following amounts of energy to produce 5,118 Btu of process heat:<sup>45</sup>

- 4,798 Btu of natural gas
- 1,115 Btu of residual fuel oil
- 222 Btu of coal
- 177 Btu of distilled fuel oil
- 44 Btu of liquefied petroleum gases

From this, we used the carbon coefficients (pounds of carbon dioxide released per Btu) to obtain an emissions factor for process heat generated by the standard boiler.

To determine the total amount of energy savings that would result from operation of CHP plants, we assume that those plants operate at the 41.2 percent capacity factor that is typical for CHP plants in the Mid-Atlantic.<sup>46</sup> From this and the total capacity of CHP constructed in a given scenario we derived the amount of natural gas that these prototypical CHP plants would consume in a year, and the amount of electricity and process heat that they would produce.

We calculated the amount of global warming pollution that would be produced by CHP plants by multiplying the amount of natural gas they consumed by the carbon dioxide coefficient of natural gas. We calculated the pollution that would be avoided from conven-

tional electric power plants and boilers by multiplying the amount of grid electricity displaced by CHP plants by the emissions factor of grid electricity in New Jersey, and multiplying the energy value (in Btu) of process heat produced by CHP plants by the emissions factor of process heat from conventional boilers (described above). To obtain the net savings produced by replacing standard boilers with CHP we subtracted the pollution produced by the CHP plant from the pollution avoided from conventional electric power plants and boilers.

## **RGGI Benefits to New Jersey through 2018**

Because neither the Economic Development Authority (EDA) nor the Department of Environmental Protection (DEP) have published any plans about how RGGI program revenues will be spent in the future, we used the state's clean energy investments from 2009-2011 as a precedent for how funds will be distributed through 2018—assuming, however, that the diversion of RGGI funding to the state budget ends and full funding is restored to clean energy programs. Of the clean energy funding that has been distributed so far, 66 percent has gone to solar installations and 34 percent to CHP projects.<sup>47</sup> We assumed this same distribution through the end of 2018.

We also assumed that 61.4 percent of all RGGI program funds are allocated to clean energy projects through the EDA and the DEP each year, without the large diversions of RGGI revenues to New Jersey's General Fund. We obtained this figure from New Jersey's Global Warming Solutions Fund Act, which distributes 55.2 percent of all RGGI revenues to the EDA to fund the CESCO program, and 9.2 percent of all revenues to the DEP to fund the Local Government Greenhouse Gas Reduction Program (LGGGRP). We

assumed that at least two-thirds of the Local Government fund goes into renewable energy or energy efficiency, with the rest allocated to other greenhouse gas reduction measures, such as sustainable land use planning.<sup>48</sup>

All monetary figures in this report reflect the value of the dollar in 2011. The “floor price” of RGGI allowances is periodically adjusted for inflation and is now set at \$1.93 per ton of carbon dioxide.<sup>49</sup> We did not attempt to project the future value of the floor price, nor did we apply a discount rate.

To determine the value of RGGI revenues through 2018, we used historical emissions data from RGGI, Inc. to make a linear projection of annual emissions through 2018.<sup>50</sup> We multiplied anticipated emissions by the allowance floor price of \$1.93, assuming no increase in the floor price through 2018. (Allowance prices are unlikely to increase beyond inflation adjustments in coming years because RGGI’s high pollution cap—which contributes to a surplus of allowances—is unlikely to put upward pressure on prices before the end of the program.)<sup>51</sup>

To determine both the amount of solar and CHP capacity generated by future RGGI funding, we divided the money allocated to solar and CHP projects from 2009-2011 by the amount of installed capacity for each technology during that period, resulting in a rough \$/MW rate for each. The U.S. Department of Energy anticipates that the cost of installing solar will decline by more than half over the next decade. To account for those falling prices, we applied a projection for the future costs of solar in the U.S. Department of Energy’s *Solar America Communities Photovoltaics (PV) Cost Convergence Assumptions*.<sup>52</sup>

To determine the pollution avoided in 2018 by investments in both solar and CHP technologies, we totaled the

accumulated capacity for each by the end of 2018 and used the methodologies described above to determine the amount of clean electricity produced in that year by each technology, as well as the corresponding amount of global warming pollution avoided using current emission rates for the RFCE subregion.<sup>53</sup>

## RGGI Benefits Under a Strengthened Cap

To calculate the benefits New Jersey would receive under a strengthened cap scenario, we first calculated the carbon dioxide emissions avoided region-wide by lowering RGGI’s cap to reflect a 20 percent reduction below actual 2009 emissions by 2020.<sup>54</sup> We multiplied 2009 actual emissions for the RGGI region by 80 percent, which represents emissions in 2020 under the strengthened cap. We then found the difference between this number and a reference case projection for emissions in 2020 assuming no strengthening of the cap on pollution (and exclusion of New Jersey from RGGI) that was prepared for RGGI, Inc.<sup>55</sup> The difference represents emissions saved region-wide by strengthening the cap. We assumed that New Jersey’s theoretical “share” of that reduction in emissions would be roughly equivalent to its share of total emissions in the RGGI region in 2009, or about 13 percent.<sup>56</sup>

To calculate total revenues generated for clean energy investments each year under a strengthened cap, we applied New Jersey’s share of regional auction allowances under the current cap (about 12 percent) to the lowered cap, resulting in an overall drop in New Jersey’s available pollution allowances.<sup>57</sup> The number of allowances is assumed to decrease according to a schedule outlined under the current program, except that New Jersey’s allowances between 2012 and the end of

2014 reflect an adjusted cap based on actual 2009 emissions that decreases by 4 percent each year after 2014 to reach a 20 percent reduction by the end of 2020. We then used \$5 and \$10 prices for allowances to calculate potential allowance revenue scenarios. For each scenario, we used the methodology outlined above to calculate the solar and CHP generating capacity (MW) that could be installed

based on those revenues, assuming the continuation of the funding distribution between solar and CHP projects established thus far. We also used the above methodology to calculate MWh generated by both solar and CHP capacity in New Jersey, illustrating the amount of dirty electricity generation that could be avoided in New Jersey through clean energy investments.

# Notes

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4. Ibid.

5. Analysis Group, *The Impact of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States*, 15 November 2011.

6. Allocation plan: RGGI, Inc., *Emissions of Proceeds from RGGI CO<sub>2</sub> Allowances*, February 2011; Spending to date: see note 5.

7. See note 5.

8. Maggie Eldridge, et al., American Council for an Energy-Efficient Economy, *Energy Efficiency: The First Fuel for a Clean Energy Future*, February 2008.

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13. RGGI, Inc., *Fact Sheet: The Regional Greenhouse Gas Initiative*, downloaded from [www.rggi.org/docs/RGGI\\_Fact\\_Sheet.pdf](http://www.rggi.org/docs/RGGI_Fact_Sheet.pdf) on 26 November 2010.

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16. Ibid.

17. See note 14.

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25. See Methodology.
26. See note 5.
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35. “Originally anticipated” based on Jim Platts and Hang Wang, *Evaluation of Impact of Regional Greenhouse Gas Initiative CO<sub>2</sub> Cap on the New England Power System*, ISO New England, 26 October 2006.
36. See note 21.
37. Office of Gov. Chris Christie, *Remarks of Governor Chris Christie Regarding the Fiscal Year 2012 Budget*, 22 February 2011.
38. Assuming one coal-fired power plant with a generation capacity of 500 MW.
39. U.S. Energy Information Administration, *New Jersey Electricity Profile* (2009), April 2011.
40. To demonstrate that the effect of a 5-fold allowance price increase would be trivial, we began with work by the Analysis Group, which estimated that RGGI compliance increased consumer electricity bills by 0.7 percent from 2009 to 2011 (see note 5). New Jerseyans spent about \$11 billion on electricity in 2009. A 0.7 percent increase would add \$77 million to the overall bill. If that cost were increased to \$400 million (roughly the impact of increasing allowance prices from

\$1.93 per ton of carbon dioxide to \$10 per ton), it would represent a 3.6 percent increase in overall electricity costs, though part of this increase would be offset by decreased electricity demand and a corresponding decrease in power prices.

41. See note 32.

42. See note 5.

43. U.S. Environmental Protection Agency, *eGRID2010 Version 1.1*, downloaded from [www.epa.gov/cleanenergy/energy-resources/egrid/index.html](http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html) on 10 December 2010.

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46. U.S. Energy Information Administration, *Form EIA-923 (2010)*, 2010. We calculated the capacity factor using 2009 data from the EIA's Form 860 (the *Annual Electric Generator Report*) and Form 923 (the *Power Plant Operations Report*), for CHP plants built between 2000 and 2009 operating in the Reliability First Corporation region, which incorporates New Jersey and parts of other Mid-Atlantic states. We then multiplied it by the amount of CHP capacity funded by CESCO. (Note that, in the judgment of the authors, the 41.2 percent capacity factor estimate is very conservative. Assuming a higher capacity factor would result in greater displacement of fossil fuel electricity from the grid and greater emission reductions and cost

savings.)

47. See note 5.

48. Our assumption is conservative, since the Global Warming Solutions Fund Act allows the DEP to use all 9.2 percent of the RGGI revenues available to the Local Government Greenhouse Reduction Program for renewable energy for energy efficiency investments.

49. See note 21.

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53. See note 43.

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56. New Jersey's share of 2009 emissions calculated by dividing New Jersey emissions in 2009 (See note 34) by total 2009 emissions in the RGGI region (per per ENE-Environment Northeast, *RGGI Emission Trends*, June 2010.)

57. New Jersey's regional share of pollution allowances, per RGGI, Inc., *Emissions of Proceeds from RGGI CO<sub>2</sub> Allowances*, February 2011.