Health Benefits of The Regional Greenhouse Gas Initiative (RGGI)

What is the Regional Greenhouse Gas Initiative?

RGGI, pronounced “Reggie”, is a “cap and invest” program that has been reducing CO₂ emissions from power plants in nine Northeastern States since 2009. The program requires that electrical generating plants purchase an “allowance” for each metric ton of CO₂ emitted during the generation of electricity. Requiring companies that generate electricity to pay for polluting the air rewards generators that are more efficient.

The “cap” is the total number of allowances made available for sale each year. Originally, the cap was set to decline 2.5% per year. Without changes to the program currently under discussion, cap reductions will cease in 2020. The funds received during each quarterly auction of allowances are returned to the RGGI states to be invested in ways that benefit consumers. A major goal of these investments is to further reduce carbon emissions by improving energy efficiency, reducing demand for power, and supporting clean renewable energy. By reducing the use of dirty power, these targeted investments amplify the pollution reductions from the sale of allowances. Although the majority of RGGI funds are spent on such investments, some states use a portion of the funds for direct bill assistance to low income families, which does not reduce carbon emissions.

RGGI is an economic and an environmental success

Between 2009-2014, the RGGI states (ME, NH, VT, NY, CT, RI, DE and MD) received $2.6 billion from the quarterly auctions of pollution allowances. Most of these funds were spent to increase energy efficiency and support renewable energy, which created 30,000 job-years and produced additional economic benefits. The basis of this economic success is described in two recent reports.⁴

By 2014, this cap and invest program had reduced carbon pollution in the region by 45%. Results show that RGGI achieved this impressive reduction in pollution even as the economies of the member states grew (see figure to right). To date, the $1.3 billion in RGGI funds invested in energy efficiency have saved consumers $618 million on their electricity bills, with an additional benefit of over $4.5 billion to come as the investments in energy efficiency continue to save power.⁵

Why Virginia Should Join RGGI

By joining RGGI, Virginia would realize tremendous economic, environmental and public health benefits. One study estimates Virginia could bring in $2.8 billion of cumulative revenue by 2030. That means more resources to protect Virginia’s coastline, stronger energy efficiency programs, an increase in the use of clean, renewable energy, and healthier air for Virginia residents.

¹ See www.rggi.org

Source: RGGI (2016)
RGGI is also a public health success

Burning coal to generate electricity releases a complex brew of over 85 hazardous compounds. These include heavy metals, nitrogen oxides (NOₓ, such as nitrous oxide [N₂O] a greenhouse gas, and nitrogen dioxide [NO₂] a respiratory irritant), sulfur sulfur dioxide (SO₂), and fine particulate matter (PM₂.₅). In addition, chemical reactions occur among the compounds emitted from power plants and other air pollutants in the atmosphere, producing additional PM₂.₅, ground-level ozone (O₃), and sulfuric acid (H₂SO₄), both of which are potent lung irritants and asthma triggers. Many of the hazardous compounds in power plant emissions adsorb onto the fine particulate matter, which carries this toxic cargo deep into lung tissue and even into the bloodstream.

Air pollution from power plants also impacts ecosystem health. For example, airborne nitrogen and mercury from power plant emissions settle onto bodies of water such as the Chesapeake Bay, where they increase nitrogen pollution and form dangerous methylmercury (a neurotoxin for aquatic animals and humans). The table on the right from Abt Associates summarizes the various benefits of reduced air pollution, including the public health benefits on which we focus here.

A detailed accounting of the public health co-benefits attributable to the reduction in air pollution from RGGI reveals substantial improvements in health. Abt Associates took the following approach to estimate the health impacts of RGGI. First, the reductions in NOₓ and SO₂ emissions between 2009-2014 attributable to RGGI were determined and the resulting changes to fine particulate matter (PM₂.₅) levels evaluated (Steps 1 & 2 in the diagram to the right). This allowed the likely public health benefits from the regional reductions in PM₂.₅ to be calculated (Step 3).

It should be noted that the Abt Associates analysis does not take into account the direct impacts on health of other air pollutants emitted from the regions power plants. These include NO₂, SO₂, sulfuric acid, ozone and the many hazardous compounds such as arsenic, mercury and other heavy metals that are emitted when coal is burned for power. It also excludes health benefits associated with mining, transporting and storing less coal, as well as the indirect health benefits from improved ecosystem services. Thus, the benefits to public health estimated in the Abt Associates report represent a lower bound of the likely reduction in pollution-related disease actually attributable to RGGI.

The magnitude of the changes in regional air quality that can be ascribed to RGGI can be seen below, where total concentrations of fine particulate matter (PM₂.₅) are used as an aggregate measure of air pollution. Sulfur dioxide (SO₂) from burning coal is the largest contributor to PM₂.₅ from power plants. Not surprisingly, the largest pollution reductions were seen in and around Maryland, home to the dirtiest coal-fired power plants; between 2009-2011, Maryland’s coal-fired plants were responsible for a staggering 55% of the region’s SO₂ emissions.

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What is surprising is the extent of pollution reduction in neighboring non-RGGI states — New Jersey, Virginia, Pennsylvania and West Virginia. If these states were to join RGGI, the regional reduction in air pollution, and the corresponding improvement in public health would be even greater.

**How has RGGI's impact on air pollution improved public health?**

The reductions in air pollution in the RGGI states between 2009-2014 produced significant health co-benefits across the region (analysts are 95% confident that true value falls within the ranges indicated):  
- 300-830 fewer premature deaths  
- 35-390 fewer non-fatal heart attacks  
- 420-510 fewer cases of acute bronchitis  
- 8,200-9,900 fewer asthma attacks, and 200-230 fewer asthma ER visits  
- 180-220 fewer hospital admissions for pollution-related disease  
- 39,000-47,000 fewer lost work days  
- > 240,000 fewer days of restricted activity for individuals with pollution-related disease

The best estimate of the total monetized benefit to citizens of the RGGI states from these reductions in pollution-related disease is $5.7 billion. This is over twice the amount of the funds actually obtained from the sales of allowances. In addition to the economic benefits this RGGI-based reduction in disease results in a significant decline in human suffering and disruption to families and employers in the RGGI region. RGGI’s impact on reducing pollution-related disease in a densely populated region of the U.S. that continues to experience a high burden of air pollution from the electrical sector is a significant accomplishment.

**Advantages to Expanding RGGI**

Bringing more states into RGGI would be economically advantageous to the region and would make it possible for RGGI to achieve much greater reductions in carbon pollution. The RGGI states are currently planning the next phase of the program (2020-2030). One of the key decisions is how much the “cap” (the number of available allowances) should decline each year. Currently, no further reductions in the cap are planned after 2020, though most states agree that at least a 2.5% reduction/year would be possible and worthwhile.

However, if the RGGI states are to reach their emissions goals for 2030 (a 30% reduction in carbon emissions from 2006 levels), a larger annual cap reduction will be necessary. One argument against increasing the cap reduction is that if power becomes more expensive due to a limitation of available allowances, lower-cost power might be purchased from nearby non-RGGI states. This so-called “leakage” would result in economic losses to the RGGI states as well as potentially higher regional emissions. This problem would be solved if these adjoining states join RGGI.

The $2.6 billion returned to RGGI states from the auction of allowances has been a boon to regional economic development, in part due to the job creation from investments in energy efficiency and renewable energy. This should be a powerful incentive for states like Virginia, Pennsylvania and West Virginia to join RGGI, and for New Jersey (one of the original RGGI states) to rejoin the program after leaving in 2009.
Shifting Power Sources in the Grid

RGGI’s investments in energy efficiency and clean renewables are synergizing other forces favoring the eventual electrification of additional sources of carbon pollution outside the electric sector. The market forces that drive pollution reduction under RGGI are helping to catalyze the eventual shift of power sources in the regional grid, because the region’s outdated and highly polluting coal-fired power plants will become less and less profitable to run due to their high emissions.

Eventually, the cost of allowances and RGGI-based investments in energy efficiency and clean renewable energy (wind and solar) will reduce energy demand in the region enough to spur the retirement of our dirtiest coal-fired power plants.

The Regional Greenhouse Gas Initiative was the first market-based program to reduce carbon pollution in the U.S. Its success provides a model for other states that wish to reduce carbon emissions, clean their air, slow climate change and reduce the burden of pollution-related disease on their citizens.

By Sara Via, PhD, Professor of Biology and Entomology at the University of Maryland

Climate Change is the Greatest Public Health Challenge of the 21st Century

Scientists agree: global temperatures are rising, causing a suite of impacts including more variable and extreme weather, increased flooding and drought, more common heat waves and fire and the spread of new and existing vector-borne disease. This “new normal” is already here, and the many impacts of environmental change on health are increasingly being realized.

Chesapeake PSR supports policies that will increase the use of clean, renewable energy, reduce greenhouse gas emissions, and promote energy efficiency. We would like to see fossil fuels eliminated from the state’s energy mix by 2050. Cleaner energy will not only limit climate change, it will have measurable positive effects on cardiovascular and respiratory health. We also support policies to help communities adapt to climate change.

A public health response to climate change is important to ensure that climate policies work to protect the health and well-being of our families and communities.