

I am submitting these comments on the September 25, 2017 RGGI Program Review Meeting and the proposed revision to the emissions cap in light of the RGGI Investment Proceeds report that was issued after the meeting. Based on the CO2 reduction numbers claimed in the Proceeds report the revised emissions cap appears to be risky and threatens the credibility of the program. It would be prudent for RGGI to delay implementation of any cap reductions post-2020 to determine the feasibility of meeting additional reductions based on the actual rate of CO2 reductions produced by RGGI and other programs.

I have been involved in the RGGI program process since its inception. In the final years before my retirement I analyzed air quality regulations that could affect electric generating company operations and RGGI was one of the regulations reviewed. The opinions expressed in these comments do not reflect the position of any of my previous employers or any other company I have been associated with; these comments are mine alone. I believe the majority of the stakeholder opinions expressed at meetings and in submitted comments are, in my opinion, very naïve relative to the actual burden implementing their preferred alternatives, overly optimistic about the potential value of continued RGGI reductions and ignore the potential for serious consequences if things don't work out as planned.

CO2 Reductions from RGGI Investments

Before I use results in the [Investment of RGGI Proceeds in 2015](#) report I want to comment on a relevant issue with it. The Executive Summary notes that “the RGGI states have reduced power sector CO2 pollution over 45 percent since 2005”. There is no better example of the pervasive mis-direction in the reporting on the impact of RGGI in this document and the RGGI reports overall than this statement. The casual reader would certainly conclude that the RGGI program itself was responsible if not for the entire reduction at least a sizeable portion of the reduction. However, looking at CO2 reductions in the RGGI states that is not the case. In the first place, the program started in 2009 not 2005. As shown in Table 1, the reduction from the last year before RGGI (2009) was instituted was 31%, much less than the 45% claimed. (Note that my numbers don't match the RGGI report which I believe is because I relied on the EPA Clean Air Markets Division database with the assumption that summing all the annual CO2 from the all programs that report CO2 was a good enough approximation. If RGGI only summed data from RGGI-affected units it could certainly account for the difference between numbers.)

However, it is even worse. CO2 emissions in 2015 were 41 million tons less than the 2006-2008 baseline so the investments that were projected to avoid the release of 20.5 million tons of CO2 could account for no more than 50% of the observed reduction. The 20.5 million decrease is only a 16.1% reduction from the 2006-2008 baseline. This is consistent with the [white paper](#) submitted to RGGI by the Environmental Energy Alliance of New York which showed that RGGI is only responsible for between 24% and 5% of the observed reduction.

Importantly, there is an implication to the RGGI investments “success” with carbon reductions relative to the proposed 30% reduction in the emissions cap. The proposed program revisions released last month for RGGI call for an annual post-2021 cap reduction of 2,275,000 tons per year. In the Proceeds Investment Report, Table 1: Benefits of 2015 RGGI Investments Program, it lists the annual benefits of 2015 investments and shows an annual CO2 reduction of 298,410 tons. As also shown in the [white](#)

[paper](#) submitted to RGGI by the Environmental Energy Alliance of New York the affected electrical generation units have made most if not all of the cost effective reductions possible from their operations. As a result, future reductions will have to come from sources outside the affected units and RGGI has no track record providing any assurance that its investments will be sufficient to meet the targets proposed. The fact is that RGGI has not provided a roadmap for the 30% reductions that they have proposed so it is not clear how this will work.

I have personal serious doubts where the additional reductions will come from. There is a lot of hopeful reasoning if the presumption is that other state programs will provide the necessary energy changes needed to reduce CO2 emissions from the affected entities. Even though it has been said before, I will say it again: if a compliance entity has no allowances available to cover emissions their only compliance alternative is to stop running. If that happens then RGGI will have a whole lot of explaining to do in order to salvage any credibility as a template for a successful control program.

Potential Impact

RGGI has never quantified the potential impacts of their program on global warming. In order to address that shortcoming I have adapted data for RGGI emissions in Table 2 from the analysis in [Analysis of US and State-By-State Carbon Dioxide Emissions and Potential “Savings” In Future Global Temperature and Global Sea Level Rise](#). The original analysis of U.S. and state by state carbon dioxide 2010 emissions relative to global emissions quantifies the relative numbers and the potential “savings” in future global temperature and global sea level rise from a complete cessation of all CO2 emissions in the RGGI region as well as the proposed 30% reduction.

My analysis shows current growth rate in CO2 emissions from other countries of the world will quickly subsume any reductions in RGGI CO2 emissions. According to data from the U.S. Energy Information Administration (EIA) and based on trends in CO2 emissions growth over the past decade, global growth will completely replace an elimination of all 2010 CO2 emissions from RGGI states in 190 days. The proposed 30% reduction in the RGGI emissions cap will result in an additional reduction of 22.5 million tons but global growth will completely replace the expected reductions in 10 days.

Furthermore, using assumptions based on the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports we can estimate the actual impact to global warming for a change to the cap. The proposed 30% reduction in the RGGI emissions cap will result in an additional reduction of 22.5 million tons which is projected to ultimately impact global temperature rise by a reduction, or a “savings,” of 0.00033°C by the year 2050 and 0.00069°C by the year 2100.

These predicted temperature savings for the 30% RGGI emission reduction have to be put in context to fully appreciate their insignificance. The National Oceanic & Atmospheric Administration’s Requirements and Standards for NWS Climate Observations states that: “The observer will round the entered data to whole units Fahrenheit”. The nearest whole degree Fahrenheit (0.55°C) is over 1600 times greater than the projected change in temperature so the impact will not be observed.

Another way to relate to the savings is to compare those temperatures differences to climatological temperature variation. Table 3 compares the projected temperature savings to the temperature climatology of Syracuse, NY. I chose Syracuse because I live there but using any location in the RGGI states would show similar numbers. On an annual basis the temperature range for the highest and lowest recorded temperatures in Syracuse was a 129 deg. F which is 214,000 times greater than the temperature difference that would result from the proposed 30% reduction in emissions. On a seasonal basis the ranges between the daily maximum, minimum and average are all listed and the lowest ratio is that the daily minimum temperature range over the year is 77,000 times greater than the temperature difference that would result from the proposed 30% reduction in emissions. There also is a range in temperature every day and the maximum, minimum, and average hourly maximum and minimum difference ranges are listed. The lowest ratio is for the minimum difference between the observed maximum and minimum temperatures and that is over 22,000 times greater than the temperature difference that would result from the proposed 30% reduction in emissions.

Unfortunately those numbers still don't completely reflect the futility of claiming that the 30% RGGI emission reduction is anything other than a symbolic gesture. A more relatable context would be to consider them in relation to [typical changes in temperature with elevation and latitude](#). Generally, temperature decreases three degrees Fahrenheit for every 1,000 foot increase in elevation above sea level. The temperature difference projected for the 30% reduction in RGGI emission is equivalent to a one inch drop in elevation. The general rule is that temperature changes three degrees Fahrenheit for every 300 mile change in latitude at an elevation of sea level. The temperature difference projected for the 30% reduction in RGGI emission is equivalent to going south 159 feet. Given that those changes are insignificant compared to everyone's daily experience it is clear that no environmental impacts caused by global warming could possibly be affected with this emission reduction.

Summary

RGGI has been a success inasmuch as it has successfully demonstrated how a cap and auction program can be run, has contributed to the observed CO2 reductions and has provided worthwhile investments in energy efficiency, energy conservation, and ratepayer direct bill assistance. On the other hand, RGGI has no demonstrated success providing the magnitude of CO2 reductions necessary to meet the proposed post-2021 cap reduction of 2,275,000 tons per year. Therefore, it would be prudent for RGGI to delay implementation of any cap reductions after 2020 to determine the actual rate of CO2 reductions produced by other programs. As shown in my analysis of global warming impacts there is no pressing environmental impact rationale to implement reductions as proposed. The success and the credibility of the program itself is endangered by the reckless insistence on a further 30% reduction in emissions at this time.

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Table 1: EPA CAMD Annual CO2 Trend Data for All Programs for the Nine RGGI States

| Year | CO2 (Tons) | CO2 from 2005 | | CO2 from 2008 | | Mean CO2 | | CO2 from base | | | |
|------|-------------|---------------|--------|---------------|--------|--------------------|-------------|---------------|--------|--|--|
| | | (tons) | (%) | (tons) | (%) | Years | (tons) | (tons) | (%) | | |
| 2005 | 147,032,069 | | | | | | | | | | |
| 2006 | 128,402,332 | -18,629,738 | -12.7% | | | 2006 to 2008 | 127,294,411 | | | | |
| 2007 | 133,903,150 | -13,128,919 | -8.9% | | | | | | | | |
| 2008 | 119,577,750 | -27,454,319 | -18.7% | | | | | | | | |
| 2009 | 108,487,823 | -38,544,246 | -26.2% | -11,089,927 | -9.3% | 2009 to 2011 | 110,592,340 | -16,702,071 | -13.1% | | |
| 2010 | 118,444,437 | -28,587,632 | -19.4% | -1,133,313 | -0.9% | | | | | | |
| 2011 | 104,844,759 | -42,187,310 | -28.7% | -14,732,991 | -12.3% | | | | | | |
| 2012 | 95,595,473 | -51,436,596 | -35.0% | -23,982,277 | -20.1% | 2012 to 2014 | 91,421,635 | -35,872,775 | -28.2% | | |
| 2013 | 89,115,811 | -57,916,258 | -39.4% | -30,461,939 | -25.5% | | | | | | |
| 2014 | 89,553,622 | -57,478,447 | -39.1% | -30,024,128 | -25.1% | | | | | | |
| 2015 | 86,336,226 | -60,695,843 | -41.3% | -33,241,524 | -27.8% | 2015 2016 | 84,477,018 | -42,817,392 | -33.6% | | |
| 2016 | 82,617,811 | -64,414,258 | -43.8% | -36,959,939 | -30.9% | | | | | | |

Table 2: Analysis of Carbon Dioxide Emissions and Potential “Savings” in Future Global Temperature and Global Sea Level Rise from a Complete Cessation of All CO2 Emissions in the RGGI States and the United States in Addition to the RGGI Observed Reductions and the proposed 30% Reduction by 2030

http://scienceandpublicpolicy.org/images/stories/papers/originals/state_by_state.pdf

| Scenario | CO2 Emissions Million Metric Tons | Percentage of Global Total | Time Until Total Emissions Subsumed by Global Growth | | Temperature "Savings" Deg C | | Sea-Level "Savings" (cm) | | |
|-------------------------|---|----------------------------------|---|-----------------|--------------------------------|---------|-----------------------------|---------|--|
| | | | Global Growth | China Growth | 2050 | 2100 | 2050 | 2100 | |
| | | | | | | | | | |
| CT | 36.9 | 0.12 | 17 | 26 | 0.0005 | 0.0011 | 0.0039 | 0.0118 | |
| DE | 11.7 | 0.04 | 5 | 8 | 0.0002 | 0.0004 | 0.0012 | 0.0037 | |
| ME | 18.5 | 0.06 | 8 | 13 | 0.0003 | 0.0006 | 0.0020 | 0.0059 | |
| MD | 70.5 | 0.22 | 32 | 50 | 0.0010 | 0.0022 | 0.0075 | 0.0225 | |
| MA | 73 | 0.23 | 33 | 51 | 0.0011 | 0.0022 | 0.0078 | 0.0233 | |
| NH | 17 | 0.05 | 8 | 12 | 0.0003 | 0.0005 | 0.0018 | 0.0054 | |
| NY | 172.8 | 0.55 | 79 | 121 | 0.0025 | 0.0053 | 0.0184 | 0.0552 | |
| RI | 11 | 0.03 | 5 | 8 | 0.0002 | 0.0003 | 0.0012 | 0.0035 | |
| VT | 6 | 0.02 | 3 | 4 | 0.0001 | 0.0002 | 0.0006 | 0.0019 | |
| RGGI Total | 417.4 | 1.33% | 190.0 | 293.1 | 0.0062 | 0.0127 | 0.0445 | 0.1334 | |
| US Total | 5631.3 | 17.88% | 2,563 | 3,954 | 0.083 | 0.172 | 0.6 | 1.8 | |
| RGGI Impacts | | | | | | | | | |
| RGGI Reductions to 2020 | 44.5 | 0.14% | 20.2 | 31.2 | 0.00066 | 0.00136 | 0.00474 | 0.01421 | |
| RGGI 30% Reduction | 22.5 | 0.07% | 10.3 | 15.8 | 0.00033 | 0.00069 | 0.00240 | 0.00721 | |

Table 3: Comparison of RGGI 30% Emission Reduction Temperature Savings to Syracuse, NY Climate (Deg F)

20.5 Emission Reduction (million metric tons)

0.0003 Temperature (Deg F) Savings for Emission Reduction

| Maximum | Minimum | Range | Parameter | Ratio Climate to RGGI Savings |
|---------|---------|-------|---|-------------------------------|
| 102 | -26 | 128 | Record Annual Temperature Range | 424,627 |
| 81.9 | 31.2 | 50.7 | Seasonal Daily High Temperature Range | 168,192 |
| 61.4 | 15.2 | 46.2 | Seasonal Daily Low Temperature Range | 153,264 |
| 71.6 | 23.2 | 48.4 | Seasonal Daily Mean Temperature Range | 160,562 |
| | | 18.7 | Average Daily Difference Between Hourly Max and Min | 62,155 |
| | | 22.6 | Maximum Daily Difference Between Hourly Max and Min | 74,973 |
| | | 13.6 | Minimum Daily Difference Between Hourly Max and Min | 45,117 |