

TO: Mr. Andrew McKeon
Executive Director
RGGI Incorporated

FROM: William O’Sullivan,
Air and Energy Advisor
New Jersey Department of Environmental Protection

SUBJECT: Comments of the New Jersey Department of Environmental Protection on the 2016
Regional Greenhouse Gas Initiative (RGGI) Program Review

DATE: October 6, 2017

We have reviewed the announced plan to amend and extend a revised RGGI program out to 2030, with a goal of cutting CO2 emissions an additional 30% between 2020 and 2031. Of particular importance, we note that RGGI proposes to establish a range of allowance prices, implemented through an Emission Containment Reserve (ECR) and a Cost Containment Reserve (CCR), to avoid either very low or very high allowance costs. These tools, in effect, would establish a floor price and a ceiling price for RGGI allowances during the 2021-2030 program period. The ECR price is proposed at \$6 per ton in 2021, with an increase to \$11 per ton by 2030. The CCR is \$13 per ton in 2021, and rises to \$23.90 in 2030. Since the RGGI allowance price under the current RGGI program is about \$3 in 2030, the cost of RGGI allowances under the new proposal may rise by a factor of 8 by 2030.

Our review suggests that the proposed RGGI program could result in significant increases in electricity rates for any participating RGGI state. We understand that efforts for EE can reduce the total amount spent on electricity and can offset increases in electric rates. However, there is a point where returns on EE investments diminish, which is not sufficiently acknowledged in the proposal. The proposal simply suggests or implies that as more money is spent on EE, the savings will continue to rise proportionately. RGGI should acknowledge and evaluate the impacts on individuals and businesses that will see increases in energy rates and little to no reductions in energy use. In this vein, we note that participating RGGI states already have some of the highest retail electricity rates in the nation, with six of the nine states in the top ten, and increased energy costs should be of major concern. If increased electric rates drive business and industry to other states or nations with less costly and more polluting electric power production, net increases in CO2 emissions would result, to the detriment of the environment as well as the local RGGI economies that have suffered the loss of business and industry. The proposed 8-fold increase in RGGI allowance costs will increase the difference in electric rates between RGGI and PJM states, causing a greater shift of electric production to PJM states.

“Leakage” does not appear to be sufficiently addressed in the proposal, and can result in a net global increase in CO2 emissions, even if the participating RGGI states reduce their own mass emissions. ICF International, a consulting firm hired by RGGI, predicts that for the period of 2017 through 2031, imports from the PJM region into the RGGI states can be expected to increase significantly. The rate of emissions from the PJM power sector is significantly higher than the RGGI rate and, accordingly, a

decrease in mass of emissions for the RGGI states could be offset by an increase in emissions elsewhere, as RGGI imports of electricity increase.

The New Jersey Department of Environmental Protection offers the attached questions, comments, and concerns regarding the cost and effectiveness of the proposed RGGI program. In the attachments, we highlight some of New Jersey's experiences and results of efforts to reduce emissions through air quality regulation, permitting and enforcement, as well as clean energy programs for energy efficiency (EE), renewable energy (RE) and also billing assistance, which are administered through the New Jersey Board of Public Utilities (NJBPU) Clean Energy Program. New Jersey ratepayers support such investments in annual amounts of approximately \$1.23 billion per year.

New Jersey has experienced significant environmental and economic benefits from these initiatives. We have greatly expanded our EE efforts, annually increased the RE portion of our electric generation portfolio (in compliance with our Renewable Portfolio Standard), reduced coal generation to approximately 2% of our annual in-state generation mix, and added significant new, highly efficient and low-emitting combined cycle natural gas generation. When we couple nuclear and RE, approximately 50% of our in-state generation is now zero emission. And the United States Energy Information Administration identifies NJ's CO₂ emission rate for 2016 as 561 lbs/MWh, amongst the lowest in the nation. Targeting improvements in emission rates can make more sense on a national scale. Piecemeal focus on mass emissions can merely result in shifting the production of global and criteria pollutants to other states or nations.

Also, it is not clear whether RGGI has accounted for the CO₂ emissions from the increased imports of electricity from PJM in its projections of CO₂ emission reductions for RGGI states. We recommend this be calculated and included in CO₂ projections. Appendix D shows the trends in rates of CO₂ emissions per MWhr of electric production in NJ, RGGI, and PJM states. NJ has the lowest rates, with RGGI close behind. PJM has much higher rates of CO₂ emissions. Capping RGGI mass emissions to the extent that it increases imports from PJM is counter-productive to the RGGI goal of reducing CO₂ emissions. Optimally, RGGI would further reduce its CO₂ emission rates and decrease its imports of electricity from PJM. That could result in lower CO₂ emissions in the PJM/RGGI region, even though the CO₂ mass emissions in RGGI states may be somewhat higher than proposed. Higher electric production in the cleanest units throughout the larger region makes most sense for overall CO₂ emission reductions.

We appreciate the opportunity to comment on the draft scenario.

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I. Questions on the 2016 Regional Greenhouse Gas Initiative Program Review

A. Preliminary Issues for Further Consideration:

- 1) The RGGI proposal should provide an estimate of the range of wholesale electric price increases for each state, with consideration for the frequency that fossil fuel power plants set the price of electricity. In PJM, fossil fuel power plants generally set the price of electricity in the daily and capacity energy markets. Coal set the price of electricity 45% of the time and NGCC units set the price 44% of the time in 2016. (Source: **Monitoring Analytics: PJM State of the Market Report for 2016 (section 3 – Energy Markets Table 3-6, page 13)**). The report can be found at: http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2016/2016-som-pjm-sec3.pdf
- 2) Some electricity users may be able to reduce electric consumption with EE to offset some or all of the increase in electric rates, but many will see much higher bills; especially energy-intensive industries that have already implemented EE to contain electric costs. RGGI's proposed program for 2020 to 2030 should evaluate measures, or recommended options for states, to address energy intensive industries that may transfer production to non-RGGI states or overseas, due to increases in electric rates resulting from the cost of RGGI allowances.

USEIA projects an increase in coal consumption in the short-term based upon EIA's own projections of higher gas prices. The RGGI proposal should evaluate the impact of increased allowance prices relative to increased imports from PJM and the potential for increases in coal and natural gas usage within the PJM region. Alternatively, the RGGI proposal should evaluate the impact of increasing allowance pricing should USEIA's projection of higher natural gas pricing prove inaccurate.

- 3) Page 9 of the 9/25/17 IPM Potential Scenario Customer Bill Analysis is titled RGGI Average Projected Energy Prices (\$/MWhr). These projections show about a 5% difference in average electric prices (rates) by 2031, between the reference case and policy case for the RGGI states. However, the projection also shows a dramatic increase for average electric rates between 2018 and 2019, escalating from about \$28 per MWhr to \$35 per MWhr. An explanation should be provided for this approximately 25% increase in wholesale electric rates over 1 year.
- 4) Page 11 of the 9/25/17 Overview contains a graph of projected CO₂ emissions in the RGGI region. There is no analysis for the apparent discontinuity between 2016 actual emissions and the 2017 projected emissions. The discontinuity should be explained. In this vein, the reference case for 2017 shows CO₂ higher than the 2016 actual CO₂, without explanation. More specifically, why is the high policy case 2017 emissions lower than the 2016 actual emissions? If the reference case and high policy case start in 2017 at the same level as the policy case and the

lines shifted accordingly, would the reference case end up with lower emissions than the high policy case?

- 5) The RGGI proposal should identify the type of units that typically set the on-margin electric rates, and identify the on-margin CO2 emission rates of those units. The proposal should also identify the average on-margin emission rates for the New England and New York power grids.

B. Issues Related to Natural Gas Prices

Natural gas prices have been shown to be a significant driver for projections of electric generation mix in other other modeling efforts. ICF should address the potential for price variations to influence modeling results.

Specifically, Henry Hub gas prices can vary significantly from Marcellus gas prices and there should be discussion of this variation could significantly affect RGGI modeling. Modeling shows a difference in price of natural gas between 2017 and 2020 –a large differential in the assumed gas prices between 2017 and 2020, of \$1.81 for the high sensitivity case and \$1.42 for the base case. There should be a discussion of the confidence level for such price projections and the impact on modeling results.

- 6) There needs to be clarification as to whether and to what extent estimates of natural gas prices were used to calculate savings from energy efficiency and how such savings may vary under different price projections.
- 7) A number of studies have identified the need for additional natural gas pipeline infrastructure in the RGGI region. The RGGI proposal should evaluate whether such constraints could impact RGGI's CO2 reduction goals in the 2020-2030 timeframe.

C. The Role of Energy Efficiency in RGGI:

The materials provided for the 9/25/17 stakeholder meeting show a significant reliance upon allowance revenue to fund expanding energy efficiency efforts and that EE investments are critical to reducing electricity price increases attributable to increasing allowance costs. In this regard, the materials appear to state the following: Allowance revenue will continue to be applied to EE in the % amounts identified by each RGGI state;

- Rising allowance revenue will continue to increase EE investments by the RGGI states;
- The amount of EE for the draft policy scenario will be higher than for the reference case; and,
- EE will reduce the demand for electricity and reduce electric rates.

Based upon the above, graphs that support such projections and conclusions over the 2020 to 2030 timeframe should be developed and provided, along with the identification of EE assumptions and

analysis to support the differing conclusions between the reference case and policy scenario. More specifically,

- 8) Explain the difference in EE between the reference case and the draft policy scenario as relates to energy use reduction and savings on electric bills.
- 9) Explain the means by which each EE dollar from RGGI allowances are invested, and then converted to wathours of electric savings. For example, how many wathours per year are saved per EE dollar spent? Do these factors change over time as the major EE improvements are implemented and less cost-effective EE improvements remain?
- 10) With respect to the reference case and the draft policy case – identify the total amount of new EE in the reference case and draft policy cases?

the proportion of the reference case new EE and draft policy scenario new EE that is independent of RGGI allowance revenue;

the proportion of the reference case new EE and draft policy scenario new EE that is dependent on RGGI allowance revenue;

if available, the % reduction of electric use caused by new EE for each year between 2020 and 2030 for the reference and policy cases, comparing projections of electric generation without the extra EE paid by allowance revenue;

Since ratepayers will implement various levels of EE, there should be a prediction of the distribution of electric bill changes for all the ratepayers

- 11) Increasing use of electric vehicles will increase electric demand and will impact electricity rates relative to cost savings sought to be achieved through EE investments to decrease electric demand. Explain how EV penetration may impact RGGI cost projections over time.

D. Banking and Availability of Banked Allowances

- 12) The footnote for the 2032 cap in the 9/25/17 overview material indicates that there would be no bank beyond 2031. Clarify whether the 2031 projected emissions on page 12 are without any reduction in banking and whether the 2032 cap on page 12 is with the elimination of banking?
- 13) Explain whether states joining RGGI will be allocated a bank of allowances at the start of their RGGI program.
- 14) Explain or evaluate whether allowances will be readily available to power plants in states that join RGGI, from the holders of the “banks” in other states.

- 15) Evaluate whether the proposed elimination of currently banked allowances could result in a hoarding of allowances, thereby driving up the cost of allowances relative to the Cost Containment Reserve price.

E. More Detailed Comments

1. RGGI Proposes to Raise the Trigger for the Cost Containment Reserve (CCR)

When this price of allowances is reached, it would result in releasing more credits to control further cost increases. It does not guarantee costs will not go above the CCR trigger. However, use of the CCR amount is a reasonable estimate of the high end of RGGI allowance costs. In 2030 the CCR would be \$23.90. This is much higher (8 times) than the \$3 allowance price predicted in 2030, if the current RGGI program had been extended as is (page 14 of 9/25/17 overview).

2. RGGI Allowance Revenue is Less Than Ratepayer Costs

The amount of RGGI allowance revenue returned to the states is less than the increase in ratepayer costs due to electric rate increases. This is especially true for states with nuclear power plants. In New Jersey we estimate that for every \$1 in electric cost increase, there would be about a 50 cent return of allowance revenue if NJ was in RGGI. This is because RGGI regulates at the wholesale level, and increased electric bids by fossil fuel units to recover allowance costs results in increased wholesale prices for all electric producers in the area, including nuclear. NJ's current practice of funding EE and other clean energy programs at the retail level ensures that for every \$1 in electric bill increase, there is \$1 in revenue for EE and other clean energy programs. RGGI allowances are a more costly way to fund EE.

3. Increased Price of Electricity Could Benefit Existing Nuclear

RGGI allowance costs increase the price of all electricity sold. For states with existing nuclear, such units would likely benefit from increased auction prices caused by rising RGGI allowance prices on fossil fuels. These price increases, however, would be levied on ratepayers and, accordingly, reduce the value of allowance revenue returned to the respective states, which could be significant. These impacts should be evaluated for RGGI states with existing nuclear. With respect to New Jersey's power sector where nuclear and RE energy combine for about 50% of in-state generation, we estimate that under a RGGI program, New Jersey ratepayers would likely see a return of only \$0.50 on each \$1 invested, and such costs would come on top of current ratepayers assessments under existing programs, which totaled, as mentioned above, approximately \$1.23 billion in Energy Year 2016.

4. Net Air Pollution Increases in PJM

Higher RGGI allowance costs could result in net air pollution emission increases in the PJM region. Generators must submit bids to the electric market that include the price of RGGI allowances. These generators are competing with PJM units located in other non-RGGI states to supply power to the PJM grid. This competitive disadvantage could result in the PJM market selecting power from higher-emitting units in the non-RGGI PJM states. Hence, the power generation and the associated CO2 emissions "leak" out of RGGI. The net result would be that

the overall generation mix shifts from RGGI units with lower emission rates to non-RGGI units that generally have higher emission rates. This could result in increased, rather than decreased, CO2 emissions in the PJM region. The CO2 emission rate for the marginal units that clear the PJM energy auction is about 1500 lb/MWhr, which is about 50% higher than the NJ approximately 1000 lb/MWhr NGCC rate (assuming NGCC units set the marginal electric rate in NJ). Hence, for every ton of NJ CO2 reduction due to power shifting, there could be a 1.5 ton of PJM CO2 increase, resulting in a net increase in CO2 emissions. Using 1500 and 1000 lbs per MWhr are conservative assumptions to calculate CO2 increases in PJM. Similar CO2 increase calculations could be done for RGGI states' leakage to non-RGGI PJM states. In RGGI states this "leakage" issue is exacerbated by the electric import trends documented in Appendix B, and RGGI projections of increasing imports of electricity between 2020 and 2030. Additionally, leakage due to higher RGGI allowance costs may have other unintended consequences, such as NOx emissions increases in non-RGGI PJM states, adding to, or causing, exceedances of the ozone health standard in NJ and RGGI states due to ozone transport.

5. Estimates on Potential RGGI Program Price Impact on NJ Electric Rates

The following exercise provides an estimate of the potential impact of RGGI participation on NJ electric rates. Assumptions/methodology are outlined below:

A. Estimated increase in NJ electric rates:

$74 \text{ million MWhrs} \times \$23.90/\text{ton allowance cost} \times 1000 \text{ lb/MWhr for avg electric price setter} / 2000 \text{ lb/ton} = \$884 \text{ million per year in 2030}$

B. Minimum estimated increase in NJ total electric cost:

Assuming the minimum RGGI allowance price will be \$11.03, based on the ERC trigger, the minimum increase in NJ electric rates would be:

$74 \text{ million MWhrs} \times \$11.03 \times (1000 \text{ lb/MWhr}) / 2000 \text{ lb/ton} = \$408 \text{ million per year in 2030}$

C. The above cost estimates assume that a 1000 lb/MWhr NGCC unit is always the price-setter. In PJM coal plants at 2000 lbs/MWhr can also be the price-setter. Appendix D includes information on the CO2 emission rate for the average unit that sets the price of electricity, which is referred to as the "on-margin average" on this graph. Assuming an average of 1500 lbs/MWhr sets the price in PJM, the cost increase for NJ ratepayers could be \$612 million to \$1.3 billion in 2030.

D. Conclusion: The potential electricity cost increase in NJ in 2030 due to RGGI is therefore in the range of \$400 million to \$1.3 billion per year in 2030. That is 4% to 13% of the current approximately \$10 billion of electric sales in NJ. Appendix D includes information on the CO2 emission rates for the average unit that sets the price of electricity each year for the PJM grid. This is referred to as the "on-margin average" on the Appendix D graph. The actual amount of the RGGI increase will depend on the RGGI allowance market price (based on the supply and demand for RGGI allowances), the amount of energy efficiency (reduces demand), the amount of nuclear retirements (decreases supply), and CO2 emission characteristics of the electric plants that are setting the price of electricity in the energy and capacity markets (lower CO2 reduces the impact of allowance prices). It is not unreasonable to expect that the proposed

revised RGGI program could increase NJ electric bills by \$1 billion in 2030, resulting in a 10% increase in retail electricity costs.

Even if NJ is not in RGGI, electric rates would likely increase in NJ as a result of Maryland and Delaware being in the Eastern Mid-Atlantic Area Council (EMAAC) region of PJM if the proposed RGGI changes are implemented. (See appendix C for a map of the PJM and EMAAC regions, and a table ranking all fifty states by electricity rates). This is because fossil fuel power plants in Maryland and Delaware could set the market price of electricity in EMAAC at times, and the increased price of allowances (about four to eight times higher than current allowance prices) would then be included in that EMAAC market price. Note that six of nine RGGI-participating states are in the top ten of electricity rates, and, collectively, all within the top 14 states.

6. The Projection of Average Wholesale Energy Prices for the RGGI Policy Case is Lower Than Expected

Page 9 of the 9/25/17 IPM Potential Scenario Customer Bill Analysis is titled RGGI average projected energy prices (\$/MWhr). This shows about a 5% difference in average electric prices (rates) by 2031, between the reference case and policy case for the RGGI states. That seems inconsistent with the increase in RGGI allowance price projected on page 14 of the 9/25/17 Overview. The differential between the policy \$13 per ton projection and the reference case \$3 per ton projection is \$10 per ton for 2031. If 1000 lb/MWhr emission rate (typical of natural gas combined cycle units) on average sets the electric prices in RGGI, and the increase in \$10 per ton for a RGGI allowance is included in that rate, then the electric rates for the policy case would be \$5 per MWhr more than the reference case in 2031. If the reference case is \$36 per MWhr, then the policy case would be \$41 per MWhr (instead of about \$38 per MWhr projected). That would be about a 14% increase in electric rates as compared to the reference case. However, the graph shows a difference of less than \$2 per MWhr, a bit over a 5% difference. In the RGGI region, what type of units typically set the on - margin electric rates, and what is the on - margin CO2 emission rates of those units? See appendix D which shows PJM's on-margin CO2 emission rates. Does RGGI have similar information for the on- margin emission rates for the New England and NY power grids?

7. RGGI State Electric Rates are Already High

The nine RGGI states rank amongst the states in the nation with the highest average retail electricity costs; specifically, six states are in the top ten and the remaining three states are in the top fourteen. NJ is ranked tenth in terms of costs. See Appendix C for a table ranking all fifty states by electricity rates. RGGI impacts on electricity costs should be of concern since such costs could serve to drive business and industry to other states or nations with less efficient power sectors, resulting in a net detriment to global emissions, localized air quality and negative impacts on the regional economy.

8. USEIA Projects Increase in Coal Consumption in the Short-Term. Does RGGI Exacerbate This?

Recently, the USEIA projected that USA coal use would increase in 2017 relative to gas because of an increase in gas prices (Source: [International Energy Outlook 2017](http://www.utilitydive.com/news/eia-power-generators-burning-less-gas-this-year-as-prices-rise/448618/), United States Energy Information Administration. See <http://www.utilitydive.com/news/eia-power-generators-burning-less-gas-this-year-as-prices-rise/448618/>). RGGI allowance prices have the purpose of

increasing the cost of coal and gas combustion units in RGGI states. Under such circumstances, RGGI may serve to support the USEIA projections of greater coal combustion.

9. RGGI Comments on the Clean Power Plan Affirm Natural Gas Was Key to RGGI Reductions

The RGGI States acknowledged the role of natural gas in their comments on the Clean Power Plan. RGGI staff have previously commented that increased use of natural gas within the RGGI region, rather than the RGGI program itself, is the primary factor which led to CO₂ reductions in the region over the last decade. RGGI representatives have stated that “between 2005, when an agreement to implement RGGI was announced, and 2012, power sector CO₂ emissions in the RGGI participating states fell by more than 40 percent. RGGI was not the primary driver for these reductions, but the reductions led RGGI-participating states to later adjust the CO₂ emission limits downward” (**Fed Reg, vol 79, no 117, p. 34848. June 18, 2014**). It is our understanding that the primary driver of these emission reductions was the advent of cheap natural gas, which supplanted dirtier fuel stocks. Also, we note that gas is the largest fuel component in the ICF projections for RGGI states in 2023 and 2031 (page 10 of 9/25/17 overview). To decrease natural gas combined cycle (NGCC) use in New Jersey and increase coal use in PJM would dampen the declining regional CO₂ trend.

RGGI States’ Supplemental Comments on Proposed Clean Power Plan, December 1, 2014

“The RGGI states respectfully reiterate their support for consideration of the potential for new NGCC plants in Building Block Two. The significant increase in NGCC generation in the RGGI region in recent years is illustrative of the potential on a nationwide scale. In New York alone, 18 new NGCC units came on-line between 2004 and 2011, increasing the State’s natural gas-fired nameplate capacity by approximately 150 percent in a seven-year period. This experience is typical of the RGGI region, which added more than 21 gigawatts of natural gas-fired generation capacity between 1997 and 2011.”

RGGI Chairwoman Katie Dykes on need for pipeline infrastructure

"Because we made such a rapid transition to natural gas-fired generation [in New England], we have work to do to get gas pipeline infrastructure developed to serve that gas generation," RGGI chairwoman and Connecticut Department of Energy and Environmental Protection deputy commissioner Katie Dykes said at an event hosted by the Center for Strategic and International Studies in Washington, DC. (Washington, 5 June 2015 – Argus)
Does RGGI still support these views under the 2020-2030 Program Update?

PJM projects that under low natural gas price scenarios, the PJM region will by 2019 reach the CO₂ reduction target EPA established for 2030 under the Clean Power Plan.

The significant increase in natural gas generation that NJ has experienced is also seen in the data for RGGI, in the charts included in Appendix B.

10. NJ Renewable Portfolio Standard (RPS) Compliance Costs Second Only to California

NJ spends the 2nd highest amount in the USA (after CA) and highest in the eastern USA on RPS compliance in 2016 (7.5% RPS costs vs 1.6% average for other states with RPS) with Massachusetts close behind. (Source: [U.S. Renewables Portfolio Standards, 2017 Annual Status Report](#), Lawrence Berkeley National Laboratory, July 2017).

<https://emp.lbl.gov/sites/default/files/2017-annual-rps-summary-report.pdf>

The 7.5 % of NJ electric bill that is dedicated to renewable energy and energy efficiency is high relative to the average state in the USA. Not further increasing the electric rates significantly is important in states like NJ that already have major EE and RE programs.

11. Energy Efficiency Progress

Based on EIA data, over the last 10 years, the overall electricity consumption in the RGGI region has declined by about 5%. The approximately 9% decline in New Jersey electricity use has been almost twice as much over these same 10 years. See appendix B for more information. We recognize that the reduction in electric sales is not solely the result of EE progress, but the greater decline in NJ could be the result of NJ's EE program.

12. Energy Efficiency Funding Under Current RGGI Program

NJ's energy efficiency program is much better funded with the New Jersey Board of Public Utilities (NJBPU) Clean Energy Program, than if NJ had relied on RGGI allowance revenue to fund our EE program. NJ's Clean Energy Program budget for 2017 is \$145 million, with approximately \$100 million of this dedicated to electric EE (Source: NJBPU Clean Energy Program Comprehensive Resource Analysis), while RGGI would have only generated about \$60 million in annual allowance revenue (at about \$3 per ton) to potentially have been used for EE.

13. Energy Efficiency is Not Available for Everyone

We understand that funding of energy efficiency does reduce the total amount spent on electricity and can offset the increase in electric rates for some persons. However, if a state is already spending significant amounts on energy efficiency (NJ spends over \$200 million per year), the cost of additional EE will likely be higher and result in less benefit. Over the last decade, NJ has reduced electric consumption by about 9%, which is almost two times higher than the RGGI region's approximately 5% reduction in electric usage. The ICF International conclusion that EE will almost fully offset the cost of higher electric rates for the average ratepayer in RGGI may not apply to all states. Also, there will be a significant number of persons and industries that will not benefit from the energy efficiency improvements that may be funded with RGGI allowance revenue. There will be persons and industries that will see the full effect of the proposed electric rate increases resulting from the much higher cost of RGGI allowances. RGGI should evaluate the distribution of EE benefits and show the effect on persons and industries that achieve little or no reductions in electricity use, not just analyze the average bill.

14. New Jersey Has Efficient Sources of Funding for EE

The New Jersey Board of Public Utility's (BPU's) energy efficiency program and Renewable Portfolio Standard (RPS) are well funded and effective. If NJ funded energy efficiency with RGGI allowance revenue, this would result in greater increases in the cost of wholesale power since the RGGI allowance value would be bid into the electricity markets. For every \$1 in allowance revenue from RGGI NJ ratepayers would pay up to about \$2 in increased electric costs. For every \$1 invested in energy efficiency and renewable energy in NJ, the NJ ratepayers now pay about \$1.

- A. RGGI - Since RGGI regulates at the wholesale market level, the cost of a RGGI allowance would be included in the bid prices for fossil fueled electric production in NJ, which is mostly natural gas combined cycle (NGCC) units. This would increase the bid price for NJ NGCC units, but not the bid price for coal units in non RGGI PJM states. When the price of coal-fired power approaches the cost of NGCC fired power, the RGGI allowance price difference in bids will result in less NJ NGCC electric production and more PJM coal fired electric production. That results in greater emissions of NOx and CO2 in the non RGGI PJM states, than the reductions in NOx and CO2 from less use of much cleaner NGCC power in RGGI states. Hence, the way RGGI prices CO2 at the wholesale level results in more CO2 and other air pollutants being emitted regionally. This is detailed further in the charts in Appendix A, attached.

RGGI would also result in higher electric prices in NJ because of the increase in bids for wholesale electric production by NGCC plants in NJ. If NJ were in RGGI, New Jersey could have a deficit of RGGI allowances as the RGGI cap declines. New Jersey would need to purchase RGGI allowances from the RGGI allowance banks in other states, which would result in the flow of a portion of the NJ retail electric revenue to other RGGI states.

- B. SBC - The societal benefit charge (SBC) which is used to fund energy efficiency in New Jersey, is placed on the retail use of electricity, not the wholesale production of electricity. Therefore, it has no direct effect on the wholesale price of electricity and does not cause a shift of electric production from clean NGCC units in NJ to much higher emitting coal units in non RGGI PJM states.

While increasing retail electric rates, the SBC can also indirectly reduce wholesale electric rates because the energy efficiency financed by the SBC reduces the demand for electricity. That reduction in the demand for electricity reduces emissions of air pollutants. The reduction in wholesale prices of electricity may offset the price of the SBC.

The use of all SBC funds in NJ contributes to NJ's economy. SBC funds do not flow to other states.

Revenue amounts raised by the SBC and the effect on electric rates are predictable and certain compared to the revenue raised by selling RGGI allowances at an uncertain auction price.

A dollar of ratepayer expenditure under the SBC results in a dollar of benefit to the NJ ratepayers. About half the ratepayer increase caused by RGGI would benefit the nuclear power industry.

15. NJ As a Net Exporter of Cleaner Energy

New Jersey's imports of out-of-state electricity have declined by 70% since 1990. Beginning in 2015-2016, NJ became a net exporting state. NJ has the cleanest power sector within the PJM region and also ranks amongst states with the lowest CO₂, NO_x and SO₂ emission rates in the nation.

Displacing less efficient sources reduces both global and local pollutants. While mass emissions of CO₂ may have increased within NJ's power sector, PJM regional mass emissions have decreased and will continue to decrease due to NJ's contribution. (See NJ Trend Chart included in Appendix B).

Curtailed output from NJ, which could be the case under a RGGI program as higher allowance costs undermine the competitiveness of NJ's cleaner fossil units, would serve to undermine the dynamic of displacing the operation of less efficient units within PJM. Under such circumstances, global CO₂ increases and local air quality suffers. And higher energy costs may drive business to other states or nations with no net benefit for global or local pollution reductions.

16. Banking and Availability of Banked Allowances

The RGGI power plant CO₂ cap is proposed to decline by 30% between 2020 and 2031 (3% decline each year). However, RGGI predicts that actual power plant emissions would not decline by 30% because of banked allowances. Actual CO₂ reductions from RGGI power plants are projected to be about 18% less by 2031, per page 12 of the 9/25/17 overview; $(74 \text{ ref case} - 61 \text{ policy case}) / 74 = 0.18$.

RGGI intends to reduce the amount of banked allowances, has a draft plan on that reduction, but has not decided on the details of that plan. It is not clear how the plan to reduce banked allowances affects actual emission reductions. On page 12 of the 9/25/17 overview, the 2031 projected emissions of 61 million tons per year for the policy case is about 18% less than the reference case 74 million tons. The footnote for the 2032 cap indicates that there would be no bank beyond 2031. Please clarify what that means. Is the 2031 projected emissions on page 12 without any reduction in banking and the 2032 cap on page 12 with elimination of banking?

Would states joining RGGI have a bank of allowances at the start of their RGGI program? If not and the cap is set based on actual emissions in 2020, the 3% per year decline means power plants in the new RGGI state must produce less electricity from their fossil fuel plants (causing leakage to non RGGI PJM) and/or buy allowances from RGGI states with allowance banks.

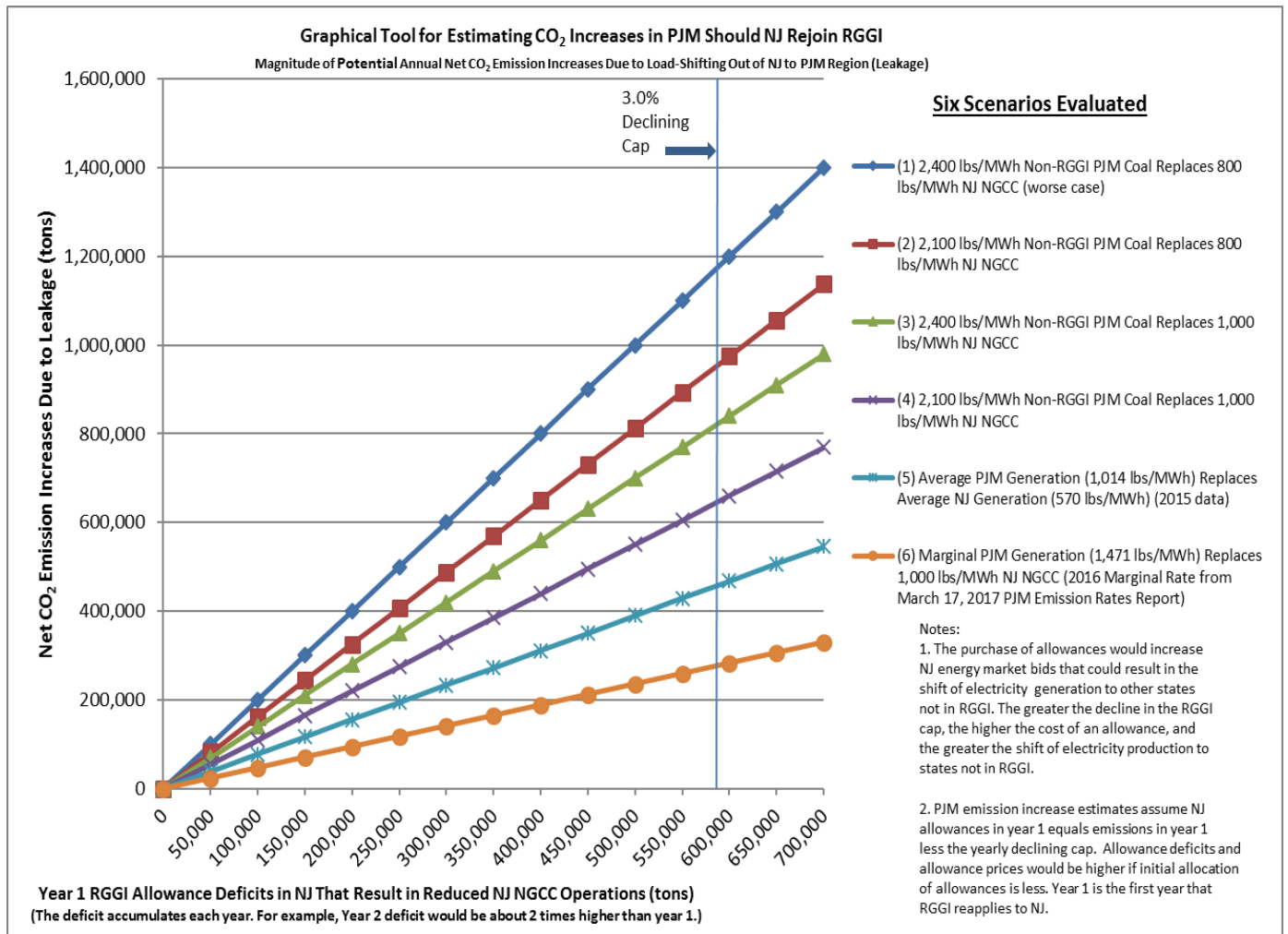
Has RGGI evaluated whether allowances will be readily available to power plants in states that join RGGI, from the holders of the "banks" in other states? RGGI to date has had an excess of allowances by design, so there has not been an issue with allowance availability. With the proposed program, one goal is to reduce the amount of "banked" allowances to zero by 2031, and to significantly increase the price of allowances (by 4 to 8 times the current price). Could a reduction in banked allowances result in the hoarding of a scarce commodity, driving up the cost of allowances to the cost containment reserve amount?

Appendix A:

Adding a RGGI Allowance Cost to Gas Combustion Reduces Gas Competitiveness, Drives Increased Coal Combustion From Non-RGGI States in PJM

Introduction - This analysis qualitatively discusses a potential environmental downside to NJ rejoining RGGI. It also provides, as attachments, graphical tools for estimating potential increases in carbon dioxide (CO₂) emissions in the PJM electric grid should NJ rejoin RGGI. Over the 10 year period from 2020 to 2030, NJ membership in RGGI could increase cumulative CO₂ emissions in the non RGGI PJM states by over 16 million tons (see charts, below). This analysis does not estimate the increases in NJ wholesale and retail electric rates that would result from NJ rejoining RGGI. According to the 9/25/17 RGGI analysis by ICF International, RGGI allowances could cost between \$13 and \$24 by 2030. These allowance costs would directly increase the price of electricity. The higher the wholesale price of electricity in NJ, the greater the shift of electric power production (and higher CO₂ emissions) to non RGGI PJM states that continue to produce a significant amount of electricity with coal fired power plants.

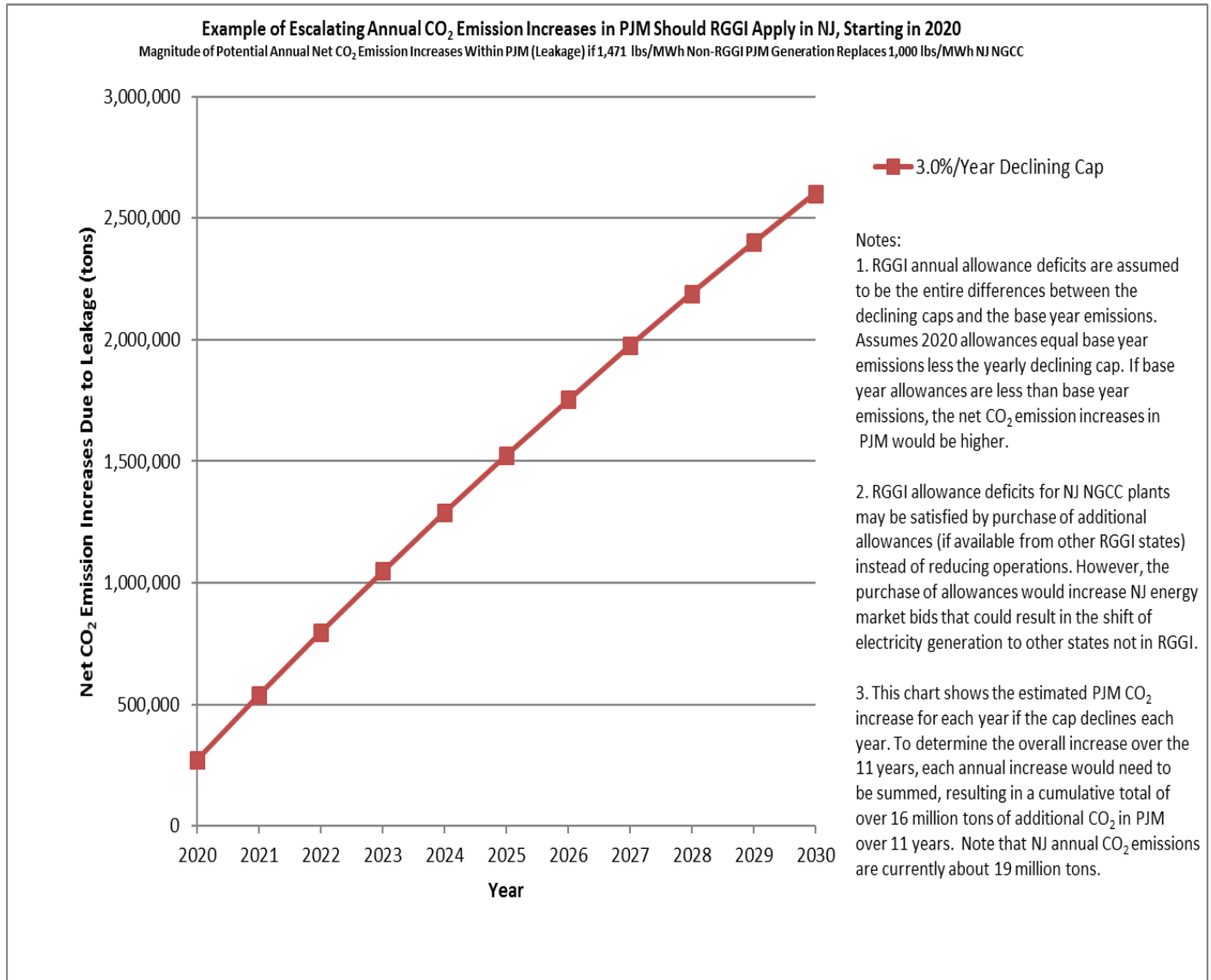
A recent USEIA projection indicates that USA coal use would increase in 2017 relative to gas because of increases in gas prices. RGGI allowance prices would further increase the cost of gas combustion in NJ and other RGGI states, resulting in more coal use in non RGGI states on the same or contiguous electric grids. Load shifting from NJ NGCC generators to other non-RGGI PJM resources could result in the following net CO₂ emission increases due to leakage:



The first chart shows the potential net CO₂ emission increases in PJM if New Jersey were to rejoin RGGI. The net CO₂ emission increases are shown for six scenarios that depict various assumptions regarding non-RGGI PJM generation replacing New Jersey generation due to the relatively higher prices of New Jersey generation caused by the RGGI allowance prices. The potential net CO₂ emission increases are shown for various levels of RGGI allowance deficits in New Jersey that result in reduced New Jersey NGCC operation.

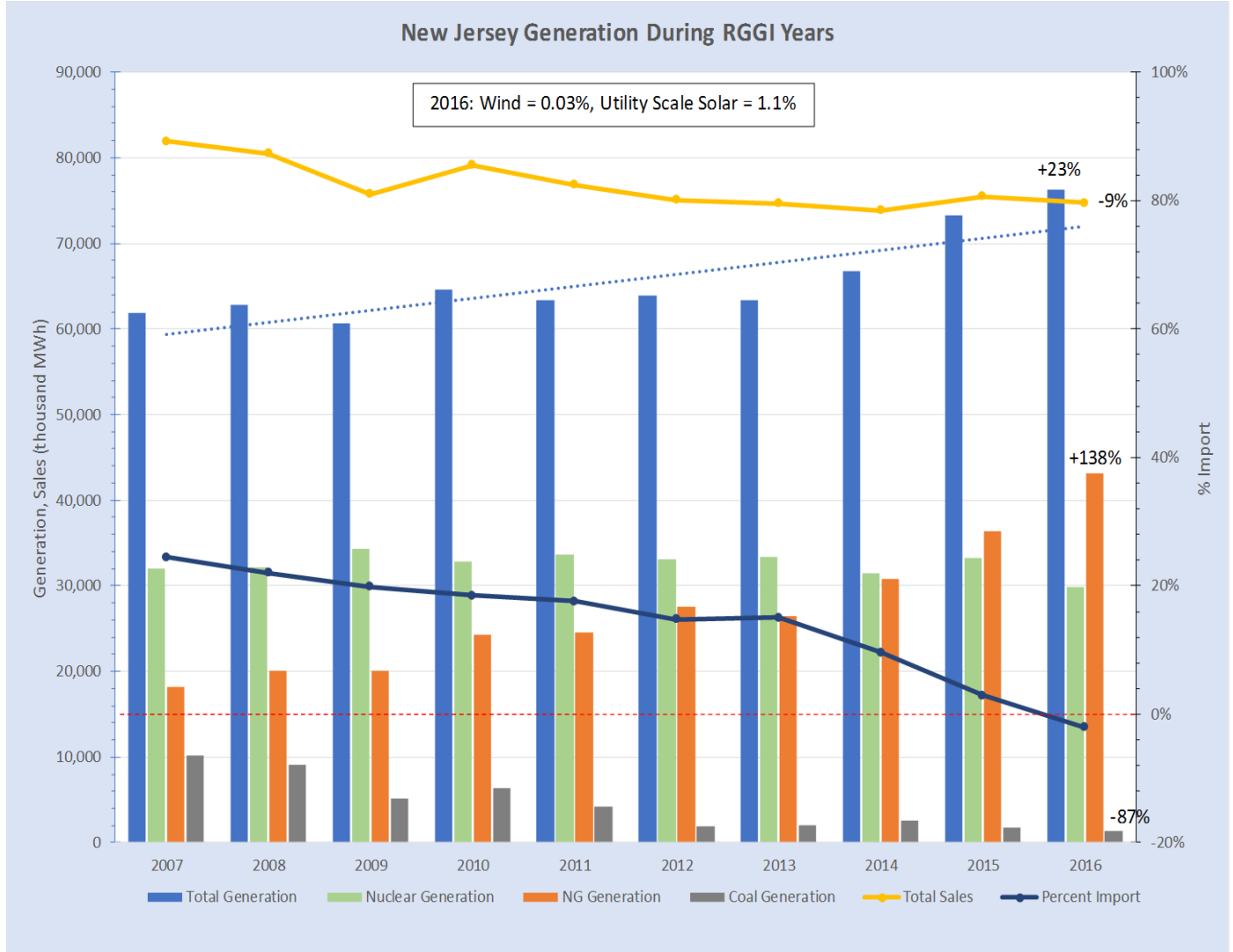
The second chart (below) uses Scenario 6 from the first chart as an example of the potential escalating annual CO₂ emission increases in PJM should New Jersey rejoin RGGI. Scenario 6 assumes that generation by units that emit the PJM on-margin average for 2016 (1471 lbs CO₂/MWhr from the chart in Appendix D) replaces New Jersey NGCC generation that emits at a rate of 1000 lbs CO₂/MWhr. This chart shows how the potential net CO₂ emission increase, each year, due to additional leakage as the RGGI allowance deficits in New Jersey increase. The RGGI allowance deficits increase due to the 3% RGGI yearly declining cap. The overall potential net CO₂ increase over the 11 years (2020-2030) can be

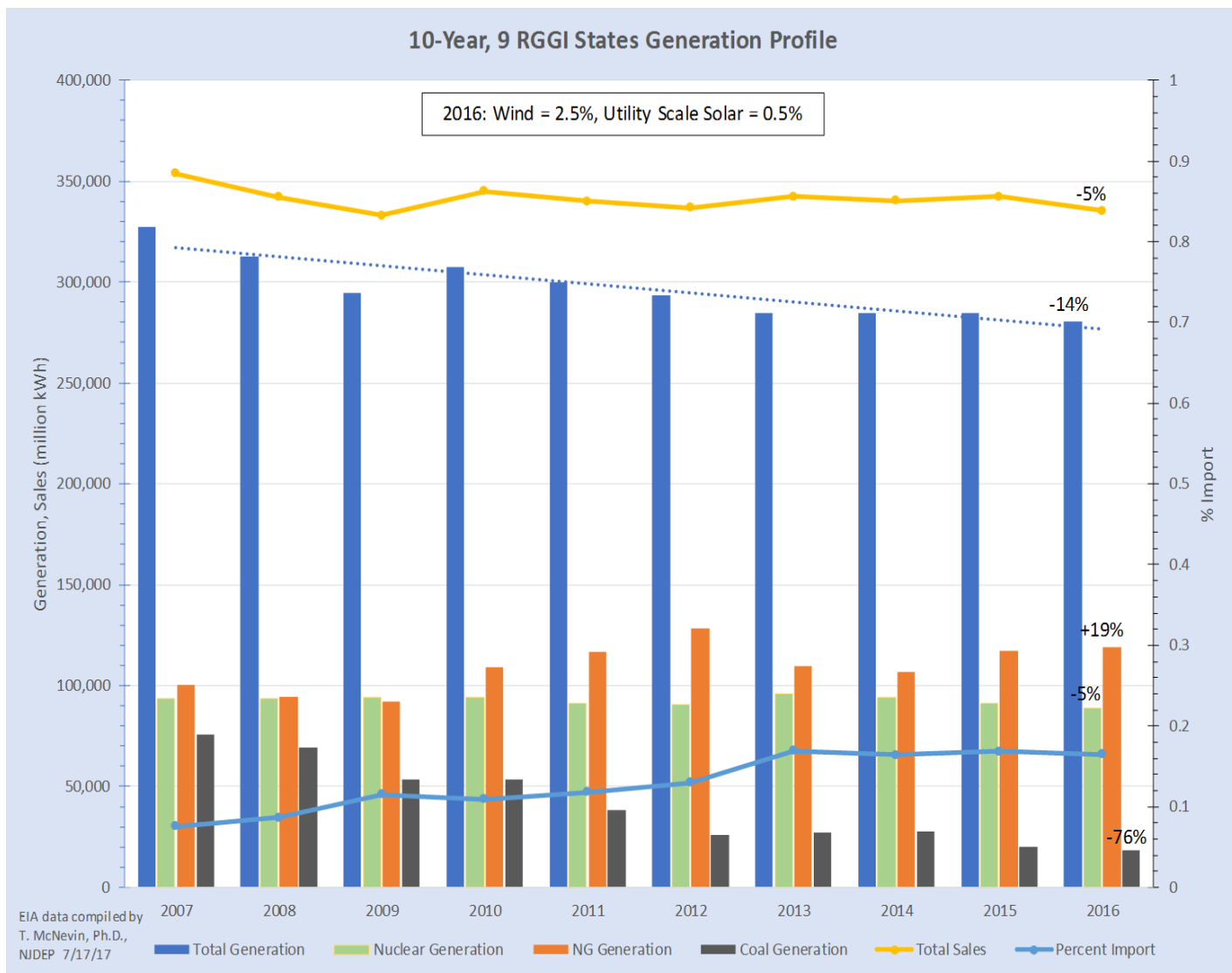
estimated by adding each annual increase which results in a cumulative total of over 16 million tons of additional CO₂ in the PJM region.



Appendix B:

Comparison of Trends in New Jersey Electric Generation Mix Versus RGGI States' Generation Mix





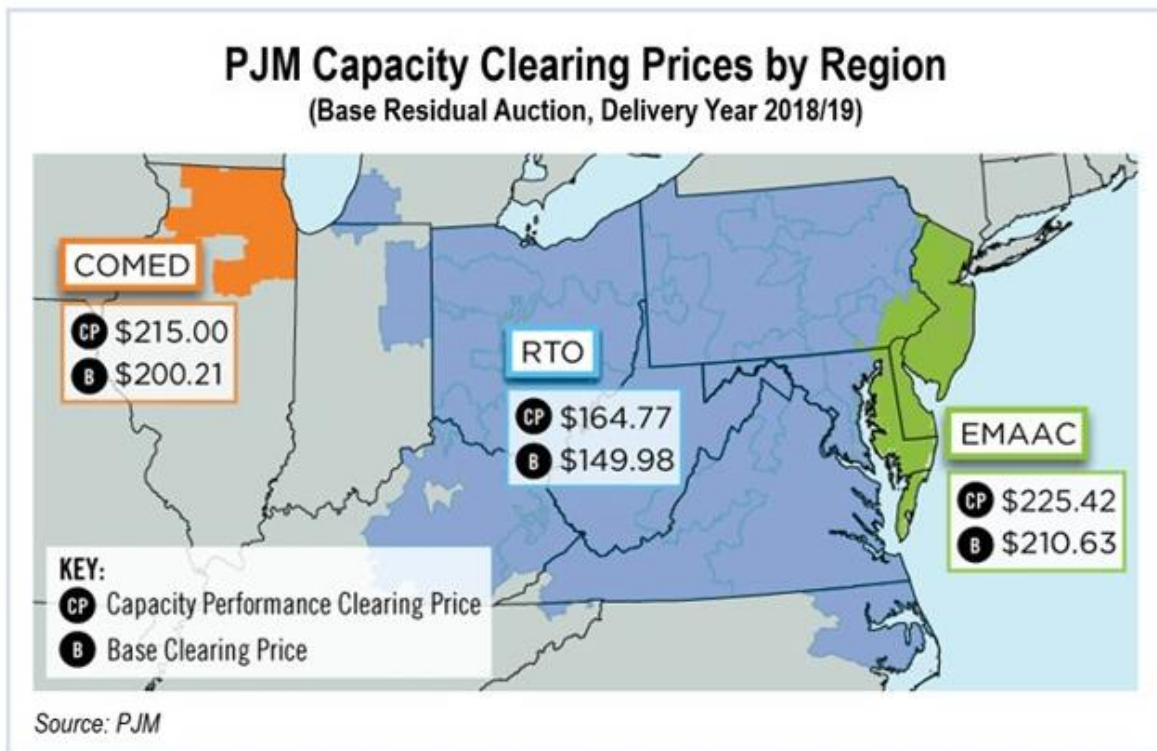
The charts above indicate the following:

1. Electric generation in RGGI declined significantly, and electric imports into RGGI increased significantly over the last decade. This is the most important take away from this slide. This highlights the leakage problem because some of those imports came from PJM which has higher CO2 emission rates than the RGGI states. In contrast, NJ electric generation increased significantly.
2. RGGI electric sales are mostly flat in the last 5 years, with a 5% decline over the last decade. NJ's 9% decline in electric consumption was almost twice that of RGGI.
3. Coal use declined significantly in RGGI, similar to what we are seeing in the PJM states. NJ had a somewhat greater decline, and coal is now only about 2% of the generation in NJ.

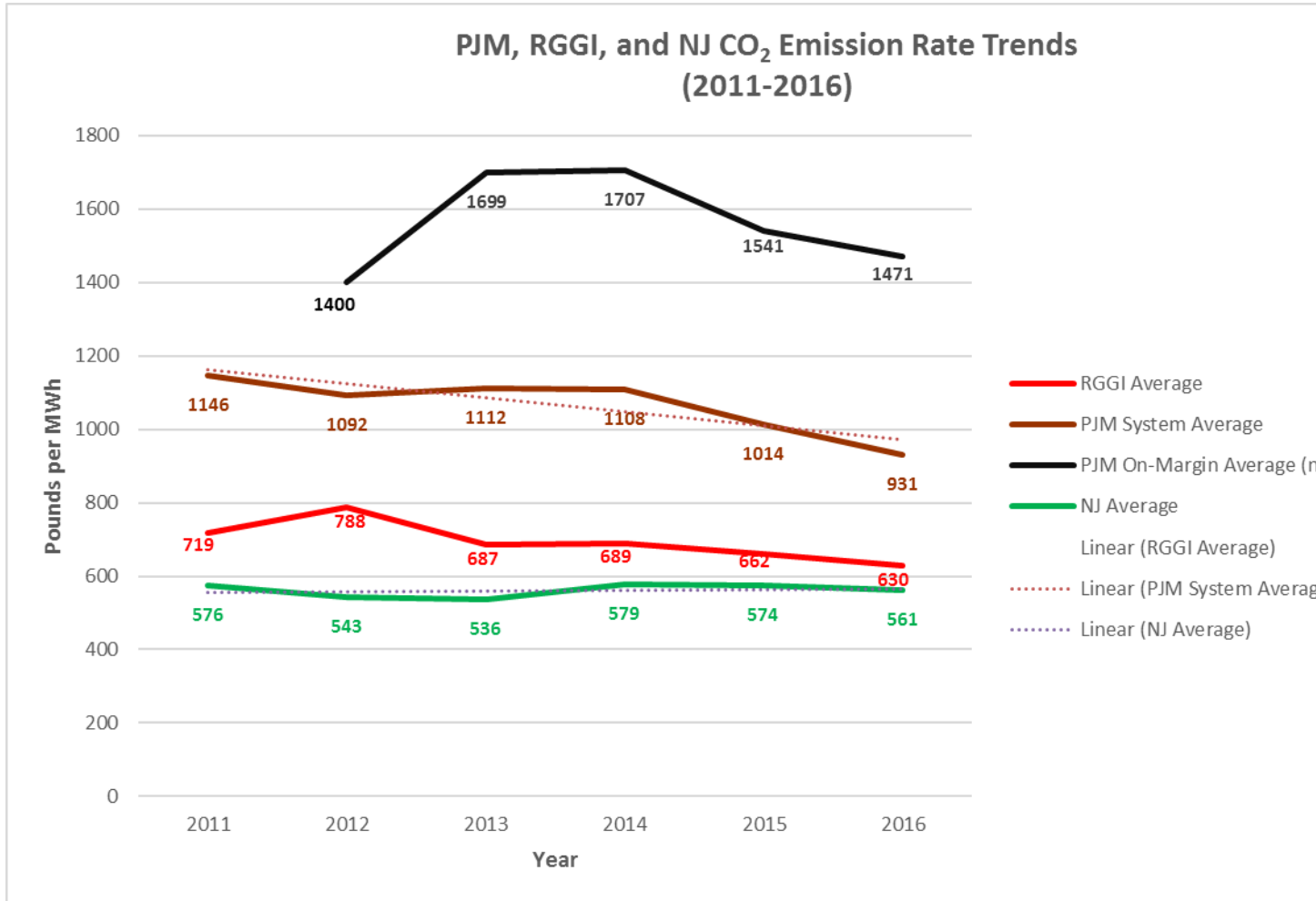
4. Gas use increased in RGGI, but not to the degree we are seeing in the PJM states. NJ gas use increased much more than in RGGI, primarily because of the construction and use of NGCC units.

Bottom line: Most of the electric generation changes inside and outside of RGGI appear to have been primarily because of the economics of cheaper gas, with gas replacing coal. What is different is that RGGI has increased imports of electricity, while NJ has decreased imports. RGGI should evaluate how its increased imports of electricity increases CO2 emissions in PJM and take steps in the design of RGGI program changes to avoid further leakage of electricity and CO2 to the PJM region.

Appendix C



Appendix D



Source: RGGI, PJM and USEIA data

Appendix E

PJM State	Average Retail Electricity Price (cents/kWh)	Rank versus Other U.S. States
NJ	13.49	10
MD	12.21	12
MI	11.16	13
DE	11.15	14
PA	10.26	18
OH	9.74	23
TN	9.26	28
NC	9.25	29
IL	9.17	30
VA	9.16	31
IN	9.14	32
WV	8.89	36
KY	8.26	43

RGGI State	Average Retail Electricity Price (cents/kWh)	Rank versus Other U.S. States
CT	17.27	3
MA	16.47	4
RI	16.24	5
NH	15.68	6
NY	14.53	8
VT	14.41	9
ME	12.84	11
MD	12.21	12
DE	11.15	14

Average Retail Electricity Price, 2016

