Inside Energy

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RE: Pennsylvania Governor's carbon tax plan a bad idea
DATE : 6/20/2021 **David T. Stevenson, Director**

Governor Wolf is dragging Pennsylvania into a regional carbon cap tax and trade scheme without legislative approval. In fact for a second time the legislature is likely to pass a bill banning participation in the Regional Greenhouse Gas Initiative (RGGI). Perhaps this time the bill will pass with a veto proof majority that was just missed the first time.

Eleven Mid-Atlantic and New England states participate, and every state joined through legislative approval, not executive action that doesn't reflect the will of the people. To justify his action a report titled, "Pennsylvania RGGI Modeling Report"[1] was prepared to demonstrate RGGI would reduce carbon dioxide (CO_2) emissions while boosting the economy and lowering electric rates. The assumptions used in the report are flawed as are the forecasted outcomes. Using information learned from the decade old RGGI program it is clear emissions will not be reduced globally, electric rates will rise, and there will be billions of dollars of economic damage if Pennsylvania joins RGGI.

RGGI hasn't worked

My peer reviewed study, "A Review of the Regional Greenhouse Gas Initiative"[2], came to the same conclusion as the Congressional Research Service, "The Regional Greenhouse Gas Initiative: Lessons Learned and Issues for Congress"[3]. Emissions from electric generation have been falling for a decade because of the switch from coal to lower emitting natural gas that is less expensive, EPA regulations that led to coal plant closures, and the addition of non-emitting wind and solar power. RGGI and non-RGGI states had similar reductions in emissions, after adjusting for RGGI state exporting of emissions through generating less power in state[4], and exporting energy intense manufacturing jobs[5] to other states. Table 1 shows the changes.

Table 1: PA v. RGGI change in imports/exports, industrial demand

	2007	2019	Change	% Change
RGGI State Electricity Imports Million Megawatt-hours	16.5	56.0	39.5	239 %
PA Electricity Exports Million Megawatt-hours	74.5	83.4	8.9	12 %
RGGI State Industrial Electric Demand Million Megawatt-hours	52.4	39.5	-12.8	-24.5 %
PA Industrial Electric Demand Million Megawatt-hours	48.6	50.4	1.8	3.8 %
RGGI State Real GDP Goods Manufacturing $ Billions	211.9	193.7	-18.2	-8.6 %
PA Real GDP Goods Manufacturing $ Billions	87.0	86.2	-0.8	-0.9 %

RGGI electricity imports from nine states that have been in the program since 2008 increased from 5% in 2007 to 17% in 2019 essentially exporting their CO_2 emissions. Since imports were primarily from the PJM regional grid we can use the increased electricity imports of 39.5 million megawatt-hours (MWh) times the PJM average Systems Mix[6] for 2019 of 0.39 metric tons of CO_2/MWh to add 15.4 metric tons to RGGI emissions. Also, high RGGI state electric rates shifted energy intensive businesses out of state with the same effect of exporting CO_2. The loss of 12.8 million MWh of industrial electric demand times 0.39 tons resulted in shifting 5 million metric tons of CO_2 out of state. Table 2 summarizes the changes showing Pennsylvania reduced emissions 40% compared to RGGI's real reduction of 37%. RGGI didn't work.

Table 2: PA v. RGGI changes in CO_2 emissions 2007 to 2019 – millions of metric tons

State	2007	2019	Change	% Change
PA	129.3	77.4	-51.9	-40 %
RGGI	165.0	84.2	-80.8	-49 %
RGGI Adjusted	165.0	104.6	-60.6	-37%

Pennsylvania electric generation will fall faster than forecast

The state report sets an emission reduction target of 20 million metric tons spread roughly equally by year from 2022 to 2030 (78 million to 58 million). In reality emissions may fall by 46 million tons very rapidly. Pennsylvania participates in the 13 state PJM regional electric grid. Generators bid wholesale power prices in day ahead and hour ahead auctions. The bid that meets the last MWh needed sets the price for all suppliers in that hour of production. Since the cost of the RGGI allowances need to be added to the bids in RGGI states their bids are accepted less often.

Coal-fired power plants emit about a ton of CO_2 for each MWh, while natural gas-fired plants emit about 0.38 tons so are impacted less. Coal-fired power plants in Delaware and Maryland saw operating hours drop 89% with RGGI allowance prices of about $5.50/ton[7], and Delaware natural gas-fired power plants saw a 30% reduction in operating hours. Translating that to Pennsylvania we might expect coal-fired generation to fall from 38 terawatt-hours (TWh) to 5 reducing CO_2 emissions by 33 million tons, and natural gas-fired generation to fall from 98 TWh to 68 reducing emissions by 13 million tons for a total reduction of 46 million tons. Since the latest RGGI auction was priced at $7.60/ton[8] it is expected the loss of 63 TWh of Pennsylvania electric generation would come almost immediately in 2022 or 2023.

Increasing emissions reduction might seem like a good thing. However, the US Energy Information Agency[9] expects electric demand to remain stable through 2050 with perhaps a 1% growth. A reduction in generation in Pennsylvania will be met by generation in other non-RGGI PJM states with similar emissions. In fact, the state report discloses the expected 20 million metric ton reduction will be offset by 11 million metric tons of emissions by other PJM states. It is more likely the entire 46 million tons of Pennsylvania reductions will be matched by increases elsewhere.

The cost of lost power generation

The state report shows PJM wholesale electric rates have been averaging $32/MWh. The loss of 63 TWh of electric generation will cost the state economy $2 billion a year, or $18 billion over the 2022 to 2030

period. In addition, using information from the "2020 Pennsylvania Energy Employment Report"[10] we can calculate the loss of 515 jobs at coal-fired power plants, and 890 at natural gas-fired power plants, or about 1,400 lost jobs in total.

Less power generation means less fuel consumed. Coal mining may fall 27% ($800 million, 2795 jobs), and natural gas drilling may fall 3% ($300 million, 712 jobs). The total loss in fuel production could be $1.1 billion a year, $10 billion from 2022 to 2030, and 3500 jobs.

The state report estimates the state economy will grow by 0.02% by 2030 because of RGGI, an amount too small to measure. Lost electric generation, drilling and mining could actually reduce Pennsylvania's $726 billion economy by 0.4%.

Higher electric rates likely

RGGI allowance cost will be passed along to Pennsylvania electric customers. The state report estimates allowance prices will average about $5/ton falling to $4/ton by 2030. RGGI, Inc. itself forecast allowances will gradually rise from about $8/ton now to $12 to $22 by 2030 in nominal dollars[11]. At $10/ton and an expected 32 million tons annual emissions, allowance revenue should total $320 million a year. At $22/ton the cost would be $704 million a year. The average cost might be $500 million a year or almost $4.5 billion between 2022 and 2030.

The same RGGI analysis indicates the direct higher wholesale costs of electricity in RGGI states in PJM will leak into non-RGGI PJM states with region wide prices rising between $0.44/MWh to $2.64/MWh on top of the direct cost of RGGI allowances. With Pennsylvania still producing possibly 163 TWh of electricity a year the added cost might be $72 million to $430 million a year, or $0.6 to $3.9 billion between 2022 and 2030.

Worst case costs could be as high as $8.4 billion between 2022 and 2030. With electric demand at about 146 TWh a year the electric bill premium might be $57.50/MWh. Residential use is about 10 MW a year so cost to households could be $575 between 2022 and 2030. However, it is not unusual for a manufacturing business to use 75,000 MWh a year, for a cost between 2022 and 2030 over $400,000.

Lost manufacturing

The state report suggests the spending of RGGI revenue on wind & solar power generation, energy efficiency, and other emission reduction strategies will add 3,083 jobs. Those allocations of funds can only happen with supporting legislation; otherwise the revenue will probably wind up in the General Fund. Not only is legislative approval unlikely pending legislation may successfully ban RGGI in Pennsylvania.

As shown in Table 1 RGGI states have experienced an 8.6 % drop in goods manufacturing between 2007 and 2019, compared to only a 0.9% loss of such jobs in Pennsylvania. The 7.7% net loss represents a $6.6 billion a year loss in Real GDP in Pennsylvania, and 46,600 lost jobs should the Commonwealth face the same experience as the RGGI states. There are a lot of factors that go into the loss of manufacturing jobs including labor, and tax policies. However, energy costs are a big piece of the puzzles especially for highly energy intense industries, such as, primary metals, food processing, paper products, petroleum refining,

chemicals, and plastics and rubber products. Even limiting the 7.7% potential loss to those energy intense industries the resulting decline would still be $3.8 billion a year, or $17 billion between 2022 and 2030 assuming a prorated loss each year, and 17,460 jobs.

Allowance Revenue

The modeling report estimates allowance sale revenue will average $261 million a year. Using the economic analysis details above in Table 3 below we see the expected allowance revenue will be erased by lost Corporate Income Tax, Personal Income Tax, and Utility Gross Receipts Tax income. Tax revenue will be redistributed with less revenue going to the General Fund. Instead money will be spent subsidizing wind and solar projects which have come down in cost so much state subsidies are no longer needed, subsidies to the wealthy to buy over prices electric vehicles, and electric bill offsets for the poor that wouldn't be needed if RGGI didn't exist.

Table 3: Net Tax Revenue average 2022-2030

Tax Name	Tax Basis	Annual Tax Revenue
RGGI Allowance		**$261 Million**
Corporate Income Tax	-$7.7 billion sales X 6% earnings X 9.99% tax rate X 2 for indirect and induced losses	- $92 million
Personal Income Tax	-22,000 jobs @$75,000/year X 3.07% tax rate X 2 for indirect and induced losses	- $102 million
Utility Gross Receipts Tax	-$2 billion sales X 4.4% tax rate	-$88 million
Total tax losses		**-$282 million**

Conclusion

Taken together the negative impacts could be:

- RGGI does not lower global emissions, any cut in PA will likely show up in other PJM states as electric demand is expected to remain constant
- Lost electricity sales to other states may total $2 billion a year, and cost 1,400 electric generation jobs
- Lost coal & natural gas production may total $1.1 billion a year and cost 3,500 jobs a year
- Electric rates may rise $0.75 million a year
- Lost energy intense manufacturing jobs from higher electric rates may cost up to $3.8 billion and 17,460 jobs (7.7%) as happened in RGGI states
- Total loss to the economy could be as high as $7.7 billion a year, and over 22,000 jobs, with total cost between 2022 and 2030 over $50 billion
- No net gain in tax revenue

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