Roger Caiazza Personal Comments on the
NYISO IPPTF Meeting on June 4, 2018

Via email to NYISO at IPP_feedback@nyiso.com
Response to DPS sent through Document and Matter Management System "Matter 17-01821"

Introduction

I am motivated to submit these comments so that there is at least one voice of the unaffiliated public whose primary interest is an evidence-based balance between environmental goals and costs to ratepayers. There are significant hurdles to implementing carbon pricing in general and as proposed in the straw proposal that should be considered by the Integrating Public Policy Task Force (IPPTF). The questions in these comments are related to the total costs of the program.

These comments are submitted as a private retired citizen. They 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. The majority of New York State (NYS) ratepayers are unaware of the ramifications of this proceeding or have any idea of the ramifications of incorporating the cost of carbon emissions into New York State (NYS) wholesale electricity markets.

I previously submitted a question for the June 4, 2018 meeting regarding the Example: Load Ratio Share Allocation table in Mr. Gilbraith's Carbon Charge Residuals: Allocation Options slides. However, the question was outside the scope of his presentation so I did not follow up during the meeting other than to ask a clarifying question about the source of one of the numbers in the table. It is more appropriate to consider the questions in this comment relative to the NYISO request for additional stakeholder discussion relative to either Issue Tracks 3: Policy Mechanics or Issue Tracks 4: Interaction with Other State Policies and Programs.

In brief, I believe that it would be beneficial for all stakeholders to have the NYISO provide an analysis of historical data that shows what would have happened to the markets if the carbon price were in effect. The discussions to date have avoided estimates of the magnitude of carbon charge costs and the upstate/downstate differences and focused on allocating an example residual. The carbon price will not only affect the consumer via the proposed return of residuals addressed in Mr. Gilbraith's presentation but perhaps the greater influence of carbon prices would be a general increase in market clearing prices. Some of that increase will remain with the providers and only a portion is proposed to be returned to the consumer. It is important for all stakeholders to know the magnitude of these potential costs.

My illustrative example for a single hour raises other implementation questions. New York generation sources are already amongst the very cleanest and most efficient. How will a carbon price affect the dispatch order? How will the carbon price affect LBMP prices? What portions of the LBMP price increases will remain with which generator sectors, and what are the amounts of residuals proposed to be returned to the LSEs? What portion of LBMPs will be credited to new renewables? At the end of the year will the total carbon price paid equal the total emissions times the SCC value? In order to answer these questions the NYISO should evaluate at least a year of data in a similar fashion to what I did for one hour.

Input Data Methodology

This section describes the methodology I used to evaluate the peak hour in 2017. I have expanded my previously submitted analysis and spreadsheet for this analysis. As before there are significant limitations to this approach that limit the application to no more than an order of magnitude approximation

The attached spreadsheet is based on EPA Clean Air Markets Division data for July 19, 2017 at hour 17. Tab “Raw” is simply the data from EPA and tab “Data” lists the parameters I was interested in. I added a column for the NYISO zones and manually entered that data. After years of dealing with NYS emissions data from this source I have a pretty good idea of the location of sources and I did use the Gold Book to confirm zones. There are some emissions questions however. I assumed that the RED-Rochester, LLC-Eastman Business Park, Momentive Performance Materials, and Lehigh Northeast Cement Company sources listed in the EPA data base do not provide electricity to the grid (cells are highlighted in orange). I could not find the following sources in the Gold Book (apparently EPA and NYISO label them differently): Bayswater Peaking Facility, Edgewood Energy, Nissequogue Energy Center, and Riverbay Corp. - Co-Op City. I assumed that all the cells highlighted in yellow are in Zone K. If they need to be corrected simply enter the correct zone and the final numbers will be corrected. Finally, there are small combustion turbines that do not report CO2 to EPA so no values were listed. I estimated a CO2 value for those sources (highlighted in green) using the average reported heat input and the average CO2 mass emissions rate (CO2/mmBtu) for the EF Barrett combustion turbines (highlighted in blue).

There also are some load questions. In the first place the EPA load data is gross load so it is not the load that is sold to NYISO. For this back of the envelope analysis I assumed that this would be close enough. The EPA data base also includes units that do not report hourly load in MW. Instead they report steam (1000 lbs per hour). I assumed that all those sources do not generate load to the grid or at least not all of it. For those sources, I manually copied the CO2 value to another column and set the CO2 values used to zero and highlighted them in red.

Finally, the Arthur Kill CO2 mass reported to EPA was apportioned by heat input. In this analysis I was interested in the CO2 rate per MWh. Using the EPA data generated unrealistic rates so I re-calculated the CO2 per unit based on load by summing the total CO2 and pro-rating by load and not heat input in the grey highlighted cells. Also note that in the previous submittal I calculated CO2 for the turbines that did not report it by apportioning by heat input. This submittal apportions by load.

The "Summary" tab lists the total Gross load, CO2 mass and other emission parameters for the State and by zone for the peak hour of the summer of 2017. I also calculated totals for Downstate (Zones J and K) and Upstate (everything else). I assumed that the marginal emission rate would equal the total CO2 mass divided by the total load in each zone.

This version of the spreadsheet provides more details for the CO2 emissions than the previous analysis. Tab "CO2" extracts the CO2 records for only those hours where there were emissions and load available from 128 generating units. The data are sorted by zone and summary data provided in the tab "CO2 Summary".

<u>Load Ratio Share Allocation Table</u>

Tab "IPPTF" mimics the Example: Load Ratio Share Allocation table from the June 4 presentation and uses the EPA data to estimate the order of magnitude of costs and emissions. I copied the presentation slide data in columns A-F and substituted the EPA data in columns H-J. The question I had for the June 4 meeting was the provenance of the value of the Total Dollars to Allocate in row [6] column [c]. As I understand it now that value represents the dollars that the Brattle group decided should be allocated back to the consumers via the LSEs. I expect that the final allocation of the residual will be a topic of discussion at some point.

<u>CO2 Summary</u>

The CO2 data in my example for one hour are interesting. The hourly CO2 emissions range from 681 tons per hour at the remaining coal plant to 1.2 tons for a partial operating hour at a natural-fired turbine. More importantly, it turns out that the CO2 emission rate (lbs/mmBtu) data only lists three general emission rates corresponding to natural gas, oil, and coal fuels. If the results for this hour are generally consistent throughout the year then the efficacy of this program to lower CO2 emissions is questionable. There are slight differences within these rate categories but there are relatively minor. The Department of Environmental Conservation recently announced a new regulation that will for all intents and purposes ban the future use of coal so this program cannot be expected to shut down the use of coal. The oil generating units do not burn oil for economic reasons so this program cannot be expected to change the use of those units relative to natural gas units. The difference in CO2 emission rate for the natural gas units is so small that this program cannot be expected to lead to the use of lower emitting units. Therefore, this program will not likely cause fuel switching due to the price of carbon.

Carbon Prices

In the tab "IPPTF" I calculated the total carbon price for the 2017 maximum load hour as $440,373 by multiplying the actual CO_2 emissions by the $50 SCC value. Based on the actual emissions $173,995 was allocated Upstate and $266,978 was allocated Downstate. However, following the example used in the IPPTF presentation slide does not reflect the reality of the program's financial impact.

I believe it is necessary and appropriate for the NYISO to provide estimates of the expected historic market response to the carbon price for an entire year based on hourly LBMP values. The NYISO knows the marginal economic unit and can use the USEPA data to show the marginal and maximum emission rates, CO_2 mass/MWH and CO_2 mass/mmBtu. At the proposed price of carbon this analysis can determine what would happen to the LBMPs. In my example I assumed that the zone cost equals the total load times the maximum CO_2 rate (tons per MWhr) times the Social Cost of Carbon (Tab "LBMP") and that the price of carbon sets the price of the most expensive unit in the zone. If that presumption is correct then the results are far different than the previous example. The total statewide cost is $773,644 and the Upstate portion is $209,394 and Downstate is $564,251.

In addition to the financial impacts we can estimate what kind of impact the carbon price will have on generation patterns. Based on the CO_2 rates in the example hour it appears that we will find very small shifts in the marginal economic unit. Only when we have annual results can we verify whether this proposal will drive reductions in fossil generation CO_2 emissions estimates are consistent with reality but in this example this is not the case.

According to the latest NYSERDA Patterns and Trends report, in 2014 the electric sector CO_2 emission rate was 39,406,671 tons per year. If the carbon price is $50 per ton then we can expect this program to generate a minimum of over $1.5 billion dollars per year. The Brattle report proposed that only a portion of this money be allocated back to the consumers. More important to the consumer however is whether this program will affect prices due to a general increase in market clearing prices. If that is the case then the consumers will have no venue to recoup anything close to a revenue neutral carbon price. Clearly this could be a significant cost to the ratepayers of New York. In order to estimate the full magnitude of the cost the NYISO must do an analysis of historical data.

Finally, the analysis I recommend will not only estimate how the carbon price will affect LBMP prices but also provide information about where those revenues end up. If my assumption that the LBMP prices are based on the maximum emission rate but the residual that goes back to the consumers is based on the actual rates for each generator then the only facility that fully pays its residual is the maximum emission rate unit. All the other units contribute less to the consumer. The NYISO should provide the analysis so that we can determine what portions of the LBMP price increases remain with which generator sectors and what residuals could be returned to the LSEs. Finally, we can estimate the portion of LBMPs that could be credited to new renewables.

Thank you.

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