Roger Caiazza Personal Comments on the
Proposal to Incorporate Carbon Pricing into the Wholesale Energy Markets
NYISO IPPTF Meeting on June 18, 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 believe that an estimate of the total cost of the carbon pricing initiative is essential for stakeholders and parties to evaluate the proposal to incorporate carbon pricing into the wholesale energy markets. These comments estimate total annual costs to illustrate the need for the NYISO and DPS to do an analysis that breaks down where the carbon price collections and related energy price increases end up.

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).

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 consequences of incorporating the cost of carbon emissions into New York State (NYS) wholesale electricity markets. This comment includes a range of annual costs for the carbon price and puts this additional cost in context with historical electricity revenues. I recommend that the NYISO or DPS do a forward looking analysis to determine variations of generator net revenues, SCC residuals, load payments, which generator types gain what shares of the increase in net revenues, and what portion of the carbon residual is given to new renewables to determine if this theory could work as theorized in this particular application.

I have found that the numbers in this initiative can be intimidating so I have added a section to these comments that attempts to simply describe the potential costs. My concern is that there may be over $1 billion involved and I think that the NYISO owes all stakeholders their estimate of total cost.

Annual Estimate of Carbon Price Based on Total Emissions

At a minimum, incorporating a cost on carbon on whole sale electrical prices will cost NYS ratepayers the Social Cost of Carbon (SCC) value times the CO2 emissions from the electric generating facilities covered by the program. In 2015, NYS sources covered by the Regional Greenhouse Gas Initiative (RGGI) program emitted 33,017,594 tons of CO2 so at a carbon price of $40[1] the cost of this proposal will be $1.321 billion and in 2016 there were 31,194,515 tons so the cost would be $1.248 billion. However, based on the peak hour of 2017 analysis in my previous comments, I think that the carbon price could shift energy prices to equal the sum of the

[1] The assumed value in the Brattle Report "Pricing Carbon into NYISO's Wholesale Energy Market to Support New York's Decarbonization Goals", August 10, 2017, that represents the SCC value less the assumed RGGI allowance cost.

fuel cost of the maximum emission rate unit plus the SCC residual cost. Therefore the true cost of this proposal is the SCC times the maximum emission rate in each zone.

Impact of the Carbon Price on Zone Prices

In order to estimate the actual expected cost we need to know the hourly load and marginal emissions rate (MER) in each zone of New York's energy market. The MER reflects the emissions rate of the marginal, price-setting resource(s). Multiplying the MER by the carbon price determines the effect of a carbon price on Locational Based Marginal Price (LBMP) and including the load would give the total cost.

Historical data are available for an estimate. The meeting materials for the 3/19/2018 IPPTF include a Brattle Group memo describing their methodology to generate the hourly zonal MER values and their hourly results for 2015[2] and 2016[3]. The units in these tables are tons CO2/MWh of the economic marginal generator. Hourly loads for each zone are available from the NYISO. I downloaded the hourly real-time actual load for each zone for every hour in 2015 and 2016.

In the accompanying Price per MER_hourly spreadsheets for 2015 and 2016, the MER tab contains the original data from the Brattle group. Tabs A – K contain the hourly real-time actual load data for each zone. I added a column in those tabs that multiplies the load by the SCC value of $40. The results are shown in tab Cost. The sum of all the hourly values for each zone is listed as is the 2015 total $3.027 billion and 2016 total $2.985 which are both more than double the direct tax of SCC times the annual CO2 emissions.

> Note that even this estimate is an underestimate of the true cost. When the SCC cost (RGGI allowance price plus the difference between RGGI and SCC values) is applied in the future I expect that the carbon cost will exceed the fuel cost so the economical marginal unit will become the unit with the maximum emission rate. In my analysis there are hours when this is not the case but I have no idea how many.

Estimated Costs of Carbon Initiative Relative to Electric Revenues

It was not clear to me how these carbon price numbers compare to electric revenues. In the attached spreadsheet (Patterns and Trends Electricity Total Costs) I took Load Serving Entity (LSE) electricity price (cents per kWh) and electricity sales (GWh) data from the latest NYSERDA Patterns and Trends report to come up with a guess for total state-wide electric sales revenue. The total cost tables in the "Electricity Costs" tab in the spreadsheet multiplies the price and sales data to get total cost of electricity in NYS.

I have shown that incorporating a cost on carbon on whole sale electrical prices would have cost NYS ratepayers a minimum $1.321 billion in 2015 and $1.248 billion in 2016. In the "Comparison" tab these costs are compared to total NYS electric revenues. In 2015 the carbon price initiative will raise electric revenues 11.6% if the only cost is the direct carbon price. However, if the carbon price raises electricity prices then the expected increase in electric revenues will be 27%. As noted above, even that estimate is potentially an underestimate of the costs.

[2] Note that there are no hourly MER values for March 8, 2015 hour 2.
[3] Note that there are no hourly MER values for March 13, 2016 hour 2 and June 7, 2016 hour 23

Summary of Potential Costs to Consumers of the Carbon Price Initiative

This section attempts to provide a simple summary of the potential cost of this initiative and support my request for a NYISO analysis of costs. Table 1 summarizes the potential range of costs.

The intent of this policy is to set a price on CO2 emissions using the Social Cost of Carbon (SCC) as estimated by the U.S. Interagency Working Group on the Social Cost of Carbon, starting at $43/ton CO2 today and rising to $65/ton by 2029[4] (SCC column in Table 1). The CO2 emissions column in Table 1 lists the observed CO2 emissions for 2015 to 2017. Future emissions are anyone's guess so this table assumed a 1.5% reduction for the future. At a minimum, ratepayers in New York will have pay the SCC value times the CO2 emissions from the affected New York generators (SCC Charge column in Table 1).

The Brattle Report "Pricing Carbon into NYISO's Wholesale Energy Market to Support New York's Decarbonization Goals" proposes breaking the SCC charge into two components: the existing RGGI costs and the carbon price to the wholesale market. The RGGI allowance prices in Table 1 are the observed values from 2015 to 2018 and the value assumed by Brattle for 2015. The RGGI costs will equal the RGGI allowance price times the CO2 emissions (RGGI Charge column in Table 1). See the attachment RGGI component for more discussion of the allowance prices. These are costs already committed to NY ratepayers albeit they are supposed to be invested for the benefit of consumers.

The Integrating Public Policy Task Force (IPPTF) refers to the difference between the SCC Charge and the RGGI Charge as the Residual (Residual column in Table 1). The disposition of this money has not been finalized, but we know that a portion will be returned to the Load Serving Entities to offset ratepayer costs and the rest will be invested in carbon-reducing programs.

The Brattle Report analysis of the impact on customer costs uses average annual values and concludes that the carbon charge would have "approximately zero net impact on customer costs". However, the point of my hourly analyses is that I think that the carbon charge will raise zonal energy prices increasing net energy costs. When I calculated the hourly impact by multiplying the MER hourly values calculated by Brattle by the zonal load and included the carbon charge I estimate that the total cost would have been $3,027,266,788 (Energy Increase column in Table 1). Importantly, none of the difference ($1,728,574,766) between this value and the SCC Charge (Energy Impact column in Table 1) will be returned to customers.

Note that even this estimate is an underestimate of the true cost. When the SCC cost (RGGI allowance price plus the difference between RGGI and SCC values) is applied in the future I expect that the carbon cost will exceed the fuel cost so the economical marginal unit will become the unit with the maximum emission rate. That will increase costs by some amount.

[4] See New York Public Service Commission Order Adopting a Clean Energy Standard (2016) pp. 49, 51, and 131 http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B1A8C4DCAE2CC-449C-AA0D-7F9C3125F8A5%7D, and U.S. Government (2015) Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866. May 2013, revised July 2015.

Conclusion

The Brattle Report notes that:

> The deduction of a carbon charge in the NYISO's settlement with generators would result in a sizable carbon fund. One possible use of the fund, which we assume in this paper, is to aim to mitigate customer cost impacts from carbon-elevated LBMPs. Exactly how refunds are allocated among LSEs or EDCs, and from those entities to customers, would need to be resolved. Presumably, both NYISO and the NYPSC would both have a role.

It is important to realize that the carbon fund referred to here is only the equal to the total CO2 tons times the social cost of carbon minus the RGGI allowance price. In 2025, the Brattle Report assumes the cost multiplier will be $40. If we apply that value to 2015 then the carbon fund will be $1,321 million and, assuming the same ratio of residential, commercial and industrial pricing the residential portion of that will be $839 million. The IPPTF process has mentioned that a portion of this will be returned to the customers but nothing has been decided. Moreover, as shown by the Environmental Advocates of New York, the Cuomo Administration does not have a good record investing funds from RGGI because it has "deviated from the original intent of the program by choosing to fund other priorities".

The true cost of the Carbon Price proposal to impose the SCC on wholesale electricity prices equals not only the social cost of carbon residuals but also the increase in generator net revenues. This analysis shows that in 2015 the total cost of the net revenues due to higher LBMP prices is $3.027 billion as compared to $1.321 billion calculated by applying the SCC to actual CO2 emissions. That difference of $1.707 billion will not be returned to residential, commercial and industrial ratepayers and $1.084 billion will not be returned to residential ratepayers. In addition, my estimate is potentially an underestimate because I could not incorporate how the cost of carbon will change the dispatch order if that cost makes the maximum emitting unit in the zone the marginal emissions rate unit.

The theory for a carbon price is that it could be an effective market design to reduce CO2 emissions by increasing the cost of CO2-emitting sources which should increase the share of generation by renewables. While I am primarily interested in cost it is not at all clear how the theory will work in this application. I recommend that the NYISO do a forward looking analysis to determine variations of generator net revenues, SCC residuals, load payments, which generator types gain what shares of the increase in net revenues, and what portion of the carbon residual is given to new renewables to determine if this theory could work as theorized in this particular application. Stakeholders need to know the economic efficiency of this proposal, e.g. what is the money spent on renewables divided by total money collected from both the SCC and the increase in energy prices.

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Table 1: Potential Costs of the Carbon Pricing Initiative

		Future % Change -1.5%					
Year	SCC $/ton	CO2 Emissions (tons)	SCC Charge $	Allowance Price $	RGGI Charge $	Residual $	Energy Increase $
2015	$ 39	33,017,594	$ 1,298,692,021	$ 6.11	$ 201,737,498	$ 1,096,954,524	$ 3,027,266,788
2016	$ 41	31,194,515	$ 1,284,174,214	$ 4.47	$ 139,439,483	$ 1,144,734,730	
2017	$ 43	25,130,927	$ 1,080,629,859	$ 3.42	$ 85,947,770	$ 994,682,089	
2018	$ 45	24,762,385	$ 1,110,180,250	$ 3.91	$ 96,820,924	$ 1,013,359,326	
2019	$ 47	24,399,247	$ 1,138,631,536				
2020	$ 49	24,041,435	$ 1,166,009,598				
2021	$ 50	23,688,870	$ 1,192,339,795				
2022	$ 52	23,341,476	$ 1,217,646,972				
2023	$ 54	22,999,175	$ 1,241,955,473				
2024	$ 56	22,661,895	$ 1,265,289,145				
2025	$ 58	22,329,561	$ 1,287,671,351	$ 17.00	$ 379,602,537	$ 908,068,814	
2026	$ 60	22,002,101	$ 1,309,124,982				
2027	$ 61	21,679,442	$ 1,329,672,457				
2028	$ 63	21,361,516	$ 1,349,335,740				
2029	$ 65	21,048,251	$ 1,368,136,345				

RGGI Component

The Brattle Group assumed that 2025 RGGI prices are $17/ton based on their review of the 2016 RGGI Program Review. Note, however, that the RGGI program review provides a range of values and that all the scenarios include the now rescinded Clean Power Plan so this number has to be considered speculative. Figure 1 shows a range of between $7 and $22 and Figure 2 shows a range of between $8 and $27 for 2025.

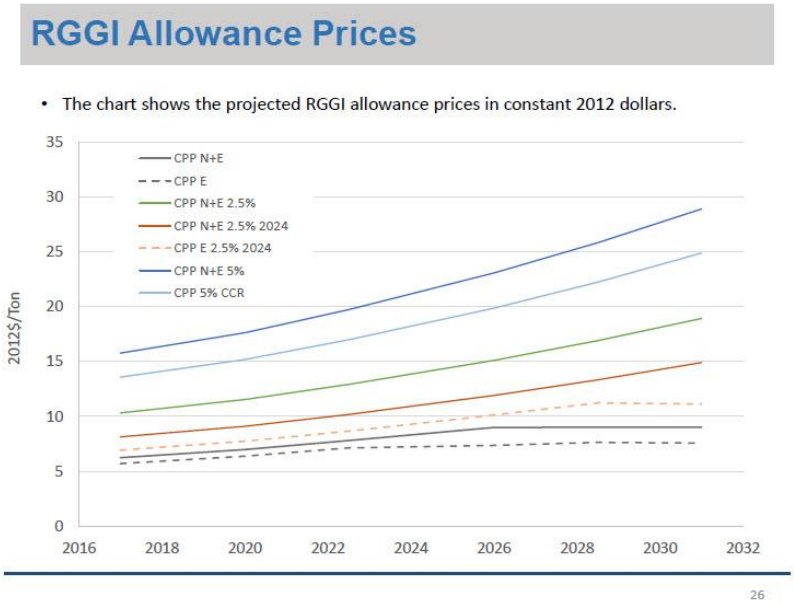

Figure 1: RGGI Allowance Prices Presented at the June 17, 2016 RGGI Stakeholder Meeting [Introduction to IPM Modeling Scenarios]

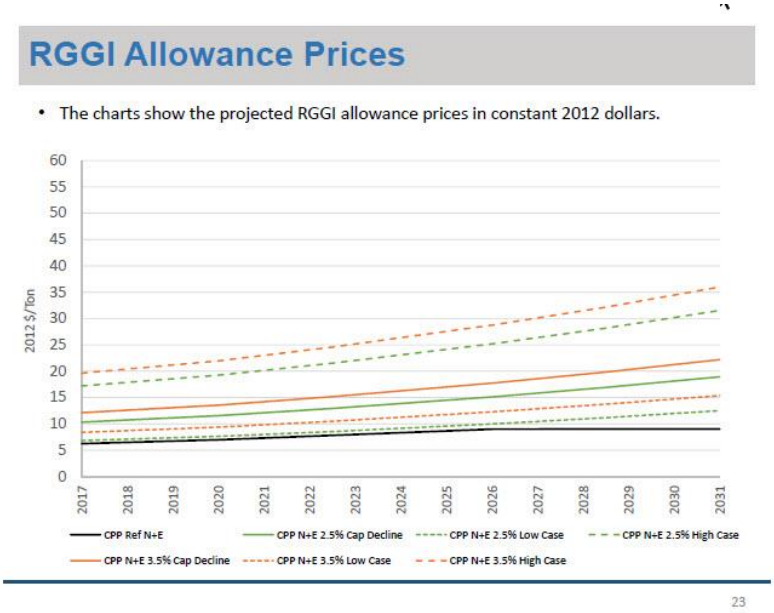

Figure 2: RGGI Allowance Prices Presented at the November 21, 2016 RGGI Stakeholder Meeting [Draft IPM Modeling Results Overview]