NEW YORK INDEPENDENT SYSTEM OPERATOR

Carbon Pricing Draft Recommendations

A Report Prepared for the Integrating Public Policy Task Force

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DRAFT FOR DISCUSSION PURPOSES ONLY

Table of Contents

Introduction

On April 30, 2018, a straw proposal was released outlining a potential design for incorporating the social cost of carbon dioxide ("carbon") emissions into the wholesale electricity markets (Straw Proposal). The Straw Proposal reflects stakeholder input and consideration of how a carbon price would be integrated into the existing NYISO wholesale energy markets and related processes.[1] The Straw Proposal aims to propose market design concepts to incorporate the social cost of carbon in a manner that (1) is economically efficient, (2) avoids major cost shifts among New York customers, (3) is transparent, and (4) provides market and regulatory stability.

These Draft Recommendations build on the Straw Proposal and additional stakeholder input received, both during IPPTF meetings and in writing.[2] These Draft Recommendations continue to be a work in progress. At this time, the recommendations are intended to provide more information for stakeholder consideration and discussion of carbon pricing proposal details within the IPPTF meetings.

Overview of Carbon Pricing Concept

The social cost of carbon emissions could be incorporated into the NYISO-administered wholesale energy markets using a carbon price in dollars per ton of CO_2 emissions. The NYISO would apply a carbon price by debiting each energy supplier a charge for its carbon emissions at the specified price as part of its settlement. Suppliers would embed these additional carbon charges in their energy offers (referred to as the supplier's carbon adder in $/MWh) and thus incorporate the carbon price into the unit commitment, dispatch, and price formation through the NYISO's existing processes. In addition to charging internal generators, the NYISO would charge imports for emissions and credit exports for avoiding other emissions to prevent the carbon charges on internal generation from causing emissions leakage and costly distortions.

Because the carbon charges on suppliers would increase the variable costs of carbon-emitting generation dispatched by the NYISO, a carbon charge would raise the energy market clearing price whenever carbon-emitting resources are on the margin (referred to as the carbon effect on LBMPs, or LBMPc). All suppliers, including clean energy resources, would receive the higher energy price, net of any carbon charges due on their emissions. Low-emitting New York resources, including efficient carbon-emitting units, renewables, hydropower, and nuclear generators, would benefit from higher net revenues. Load Serving Entities (LSEs) would continue to be charged the LBMP for wholesale energy purchases, which would account for the carbon adder of the marginal units. The NYISO would return the carbon charge residuals,

[1] The Straw Proposal was developed based on knowledge and evaluation of all existing alternate proposals provided to the joint staff team on or before Thursday, November 30, 2017.

[2] Stakeholder comments provided the IPP_feedback@nyiso.com email address are posted with the IPPTF materials.

which would be calculated as the sum of the carbon charges debited from suppliers, to the LSEs.[3]

The Gross Social Cost of Carbon

The New York Public Service Commission (PSC) would set the Gross Social Cost of Carbon (SCC) pursuant to the appropriate regulatory process. Such a process would be subject to the State Administrative Procedures Act (SAPA).

Figure 1: Gross and Net Social Cost of Carbon[4]

	Gross SCC	RGGI, Inc	Net SCC
	$nominal/US-ton	$nominal/US-ton	$nominal/US-ton
2020	47.30	6.56	40.74
2021	48.30	6.98	41.32
2022	50.48	7.39	43.09
2023	52.74	7.81	44.93
2024	55.07	8.45	46.62
2025	57.48	9.09	48.39
2026	59.96	9.73	50.23
2027	62.52	10.35	52.18
2028	65.17	10.96	54.20
2029	66.54	11.58	54.96
2030	69.32	12.55	56.77

It is envisioned that the Gross SCC would be set in a manner that compliments existing New York State clean energy programs. Figure 1 contains the Gross SCC levels through 2030 consistent with the values used by the PSC to date. It also shows the resultant Net Social Cost of Carbon (net of the expected RGGI price[5]).The NYISO proposes to implement the full value of the Gross SCC once adopted, without an initial

[3] Residuals are the result of over (or under) collection in the NYISO markets. In this context, the residuals will be over collections that exist because the payments to suppliers do not equal the charges to loads.

[4] From Myers, Warren *Recommended CO2 Value to Use in IPPTF Analysis*, IPPTF (April 23, 2018), available at http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_miwg_ipptf/meeting_materials/2018-04-23/IPPTF%20CO2%20Value%204%2023%202018%20final%20%20pd.pdf.

[5] The expected RGGI price is based on the August 2017 Base Case forecast for RGGI prices (in black). The blue values are interpolated.

transition mechanism.

Application of the Carbon Price to Internal Suppliers

All internal suppliers participating in the wholesale energy markets would be subject to carbon charges in the wholesale energy market equal to the product of the applicable carbon price and their point-of-production carbon emissions.[6]

The applicable carbon price would be based on the PSC's Gross SCC with adjustments for RGGI allowance prices for those suppliers required to hold RGGI allowances. Suppliers covered by RGGI (currently, fossil-fuel-fired electric generating units with capacity of 25 MW or greater) would be charged the Gross SCC *minus* the most recently posted quarterly RGGI price. Suppliers not covered by RGGI would incur a carbon price equal to the Gross SCC.

All internal suppliers participating in the wholesale energy markets would self-report their carbon emissions or their estimated emissions to the NYISO through a new weekly emissions data submission process. Self-reported emissions and the applicable carbon price would determine the carbon charges assessed in the NYISO settlements process. Just like today's NYISO settlements process, these settlements would be subject to true-ups as part of the normal billing processes.[7] Internal suppliers that provide updated data in time for the final bill closeout would have their final settlements adjusted.[8] Self-reported emissions would be subject to verification; for example, with emissions data from the U.S. EPA's Clean Air Markets Division (CAMD) database.[9]

Some stakeholders proposed having the NYISO estimate emissions and only having suppliers report final emissions. This approach was not adopted because suppliers are better positioned to accurately estimate their emissions than the NYISO.

Certain resource types will require special treatment within the wholesale energy markets to identify the emitting resources in the wholesale markets and to be consistent with State policies:

- **Tier 1 resources under the Clean Energy Standard** with point-of-production emissions, including biomass, biogas/landfill gas, and digesters, would not be assessed carbon charges, consistent with

[6] "Point-of-production emissions" refer to the stack emissions or "burner tip" carbon dioxide emissions that can be directly tied to providing wholesale energy and ancillary services, including those associated with start-ups, no-load levels and generations, not lifecycle emissions, with a few exceptions discussed herein.

[7] *See*, NYISO Market Administration and Control Area Services Tariff Section 7.4.1.

[8] The NYISO is considering a deadline consistent with the current billing challenge period. If emissions data is supplied after the billing deadline for emissions reporting the emitting resource would be charged for emissions greater than the amount for which the resource was billed. If emissions are less than the amount for which the resource was billed, then the resource would not receive a credit.

[9] Fuel consumption data from Form EIA-923 is also available for resources not tracked in the CAMD database (such as fossil-fired units smaller than 25 MW). The CAMD database tracks plant-level emissions for units over 25 MW on an ongoing hourly basis and is also used for RGGI compliance. Generators must report quarterly emissions to CAMD within 30 days of the end of each quarter. Emissions are tracked with Continuous Emissions Monitoring Systems (CEMS) using calculations and procedures that have been certified by the EPA. U.S. EPA, "Plain English Guide to the Part 75 Rule," June 2009.

their eligibility to receive Tier 1 Renewable Energy Credits via CES and their treatment under RGGI.

- **Cogeneration** resources would only be assessed carbon charges on the portion of their carbon emissions associated with electrical generation participating in the NYISO wholesale energy markets.[10]
- **Behind-the-Meter Net Generation Resources** that participate in the NYISO wholesale energy markets and produce carbon emissions would be charged based on the carbon emissions produced as a result of their net injections to the grid.

The NYISO would not have to change existing energy market mechanics or supplier offer procedures in order to incorporate a carbon price. Suppliers would be expected to add their carbon charges into each applicable component of their energy offers (*i.e.*, startup, minimum generation, and/or incremental cost curves). Supplier energy market payments would continue to be based on the full LBMP, which will rise due to the carbon charge when carbon-emitting resources are on the margin.[11]

The NYISO's market software will not automatically calculate the carbon effect on LBMPs since the carbon charge will be included in the energy offer with fuel costs and other relevant costs when bid. Instead, an after-the-fact estimate of the carbon impact on LBMPs will be determined.[12] This will provide carbon pricing transparency as well as information needed for the cost levelizing residual allocation and the proposed treatment of imports and exports.

To calculate an after-the-fact estimate of $LBMP_C$, the NYISO will identify the marginal unit and approximate its marginal carbon emissions. This, combined with the shift factors of the transmission constraints will provide the estimates of the carbon component of each Zonal LBMP and each external proxy bus price. The NYISO is considering whether the carbon impact on each component of the LBMP needs to be determined.

Interaction of the Carbon Charge with Existing Out of Market Carbon Payments

Some stakeholders have expressed concern that if the NYISO implements carbon pricing in the wholesale energy markets, certain resources may receive compensation for the same carbon reduction benefits twice; once from State REC payments, and once from the NYISO's carbon charge. In response to

[10] The U.S. EIA uses data on input fuel type, prime mover efficiency, and final electricity generation from Form EIA-923 to isolate the emissions from electricity generation, assuming that the remaining emissions are due to heat generation. U.S. Energy Information Administration, "Appendix C, Technical Notes, to the Electric Power Monthly," January 2018; U.S. Environmental Protection Agency, "The Emissions and Generation Resource Integrated Database: Technical Support Document for eGRID with Year 2016 Data," February 2018.

[11] LBMPs will also rise when flexible hydropower or storage resources are on the margin since their opportunity costs will reflect the carbon effect on LBMPs.

[12] The estimated carbon component will be reported for all 11 Load Zones and external interface Proxy Busses however the exact time granularity of the calculation for the Real Time market is still being considered. More information about the calculation can be found in the July 9, 2018 IPPTF presentation "LBMP Carbon Impact ($LBMP_C$)."

these concerns, the NYISO is considering options to reduce the potential for double payments. The NYISO encourages further discussion, feedback, and consideration of approaches to reducing potential double payments for carbon emission reductions.

Application of the Carbon Price to External Transactions

Applying a carbon charge to only internal resources would make them less competitive compared to external resources. Imports would increase, potentially up to the transmission limits, and exports would decrease. Production would shift to resources outside of New York that would not otherwise generate—resources that are costlier and likely higher-emitting. Such distortions would undermine the State's energy, environmental and economic objectives.

To avoid creating such distortions, the Straw Proposal proposes to apply carbon charges to external transactions such that they compete with internal resources (and each other) as if the NYISO was not applying a carbon charge to internal suppliers (*i.e.*, on a status quo basis). Imports would earn the LBMP without the carbon effect, at the relevant border; similarly, exports would buy energy at the LBMP without the carbon effect.[13] This would apply to all external transactions, with no unit-specific or portfolio-specific exceptions for existing or new clean energy resources.

The benefits of this approach are that it creates a level playing field for imports and exports, prevents distortions from the way imports and exports participate today (*i.e.*, the *status quo*), is transparent, relatively simple to implement, and sends price signals within New York consistent with the State's value of carbon. The drawback for this approach is that it does not incentivize cost-effective carbon abatement outside of New York.

Based on some additional feedback and consideration of coordination arrangements with neighboring markets, the NYISO is considering whether the external proxy bus LBMPs should be posted without the carbon effects rather than establishing a settlement mechanism that applies a carbon charge to imports and a credit to exports for each transaction.

Allocation of the Carbon Charge Residuals to Loads

LSEs would continue to pay the full LBMP, including the effect of the carbon charge on LBMP, but they would be allocated the carbon charge residuals collected from suppliers through a cost levelizing allocation. The methodology would compensate for zonal differences in the carbon component of the LBMP. The

[13] And wheel-through transactions would pass through without being subjected to carbon charges other than the difference between entry and exit points (as they are already assessed congestion and marginal losses today). They would face the equivalent of an import transaction at the entry point plus an export transaction at the exit point.

carbon charge residuals would be allocated to customers in two steps: the NYISO would allocate all carbon residuals to LSEs, and then LSEs would allocate their portion of the residuals to customers. For the second step, LSE allocation to customers would be under PSC jurisdiction pursuant to the appropriate regulatory process, the details of which are outside the scope of the draft recommendations.

Any allocation mechanism should be evaluated against at least two design objectives:

- **Economic Efficiency**. LSEs in zones with higher carbon effects on LBMPs would still pay more on net than other LSEs, providing a stronger price signal to reduce consumption where marginal emissions rates are highest.
- **Equity of Cost Burden**. More of the residuals would be allocated to the customers who bear a greater cost of carbon pricing, thus reducing (but not eliminating) differences among LSEs in the net cost they face from carbon pricing.

The proposed carbon charge impact levelizing approach (Levelizing Allocation) prioritizes equity of cost burden: more of the residuals would be allocated to the customers who bear a greater cost of carbon pricing, thus reducing differences among LSEs in the net cost they face from carbon pricing. This could be considered more equitable as it likely results in all LSEs paying the same net cost of carbon pricing. However, by fully equalizing the net cost of carbon pricing across all LSEs, this approach would eliminate the differential price signal to reduce consumption (and emissions) more in zones with higher marginal emission rates.

An alternative approach that was considered would return carbon charge residuals to all LSEs on a load-ratio share basis (Load-Ratio Allocation).[14] As compared to the proposed approach, this would provide LSEs with a price signal more reflective of the carbon implications of their consumption. However, it could create equity concerns by causing greater differences in the net cost of carbon pricing across LSEs.

A third approach that was considered would return carbon charge residuals to all LSEs based on the proportional effect carbon prices have on their gross payments for energy (*i.e.*, the product of the carbon effect on applicable zonal LBMPs and their MWh of load) (Proportional Allocation). This approach would return more revenues to LSEs that face higher $/MWh cost impacts, but would not go so far as levelizing these cost impacts. This approach provides some balance between two competing objectives *economic efficiency* and *equity of cost burden*, as this approach would maintain some of the differential price signal to reduce consumption (and emissions) more in zones with higher marginal emission rates. To determine the proportional allocation of the carbon residuals, the NYISO would calculate the carbon effect on LBMP for each Load Zone in each real-time interval.[15]

The allocation of the carbon charge to Loads has led to robust stakeholder discussion with stakeholders expressing preferences for different allocation methodologies. A fourth approach was proposed: a

[14] The NYISO would calculate each LSE's carbon charge residuals as total residuals multiplied by the LSE's load divided by total NYCA load.

[15] As noted in footnote 13 above, the NYISO would generate such data ex-post using the real-time data it already has.

proportional percentage levelization where all zones would see the same net percentage increase in LBMP net of the residual allocation. Stakeholders requested that Issue Track 5 include information on the different allocation methodologies. The IPPTF will meet again on this topic after the Issue Track 5 results are available.

Glossary of Terms

Carbon Price: The dollar per ton ($/ton) price the NYISO charges suppliers for their carbon emissions.

Carbon Charge: For internal suppliers, the total dollar amount charged for their emissions. For importers, the total dollar amount charged such that they compete on a status quo basis as if the NYISO was not applying a carbon charge to internal suppliers.

Carbon Adder: The additional costs in dollars per MWh ($/MWh) that suppliers include in their energy market offers due to the carbon charges.

Carbon Effect on LBMPs: The LBMP increase in dollars per MWh ($/MWh) due to the carbon adder of the marginal unit for each time interval and location.

Carbon Charge Residuals: The total dollar amount of carbon charges collected by the NYISO from suppliers.