

The Mechanics of Integrating a Carbon Charge into NYISO Energy Market Operations

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IPPTF

April 16, 2018, KCC, Rensselaer, NY

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Agenda

- **Implementation Objectives**
- **Incorporating the Carbon Charge into Load bills**
- **Two Approaches to Incorporating Carbon Charge into Offers**
- **Energy Market Operations with Carbon Charges**

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Presentation objective

- Outline how a carbon charge could be implemented in the NYISO-administered wholesale energy market if the Joint Staff team and stakeholders move forward with a carbon charge

Carbon Charge Implementation Objectives

- **Economic Efficiency:** Send price signals that account for carbon costs
- **Information Sufficiency:** Provide information on marginal emission rates (MERs) and the carbon charge effect on LBMPs needed to support other implementation processes, including:
 - Treatment of external transactions, if required by the border approach chosen
 - Allocation of carbon charge residuals to loads

Approaches to Incorporating Carbon Charge into Load bills

- **No changes to how Loads are billed for wholesale electricity products**
 - For example, Loads will continue to pay the applicable LBMP for energy withdrawals
- **A carbon charge would create a carbon charge residual**
 - The allocation of carbon charge residuals will be discussed at a future IPPTF meeting

Two Approaches to Incorporating Carbon Charge into Offers

▪ Approach 1:

- NYISO charges suppliers for their (self-reported or NYISO-determined) emissions during the appropriate billing period settlement. Suppliers embed expected carbon charges into existing all-in energy offers (as they currently do with RGGI allowance costs). **Assumed for rest of presentation**

▪ Approach 2:

- Suppliers submit additional emissions information for each segment of energy offers (startup, no load, and each incremental offer). NYISO incorporates this information into its market software and calculates a carbon shadow price.

Energy Market Operations Today

Participants Submit
Supply Offers

NYISO Commitment &
Dispatch

NYISO Settles
Transactions

- **Market participants** submit supply offers for DA and RT energy markets (startup, no-load, incremental in \$/MWh).
- **NYISO** minimizes production costs subject to system constraints using commitment and dispatch software: SCUC in DA, RTC and RTD in RT.
- **NYISO** charges loads and credits suppliers for energy scheduled in the RT and DA markets through appropriate billing periods.

Notes:

SCUC: Security-Constrained Unit Commitment, RTC: Real-Time Commitment, RTD: Real-Time Dispatch



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Energy Market Operations Today with Carbon Charges

Participants Submit
Supply Offers

NYISO Commitment &
Dispatch

NYISO Settles
Transactions

- **Market participants** submit supply offers for DA and RT energy markets (startup, no-load, incremental in \$/MWh), inclusive of their estimated carbon charges.
- **NYISO** minimizes production costs subject to system constraints using commitment and dispatch software: SCUC in DA, RTC and RTD in RT.
- **NYISO** charges loads and credits suppliers for energy scheduled in the RT and DA markets through appropriate billing periods accounting for carbon charges to suppliers and residuals to load (subject to true-ups).

Notes:

SCUC: Security-Constrained Unit Commitment, RTC: Real-Time Commitment, RTD: Real-Time Dispatch



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External transactions in the NYISO energy market

- **The Brattle Group discussed potential options for applying carbon charge border adjustments to external transactions (see 4/9/18 IPPTF materials)**
 - External transactions compete on a status-quo basis
 - External transactions compete on a green power basis, accounting for all emissions and estimated externalities

Determination of Carbon Charge Billing

- NYISO charges internal suppliers in the appropriate billing period settlement for point-of-production emissions times the applicable carbon price:

$$\begin{array}{rcccl} \text{Carbon Charges} & = & \text{Applicable Price} & \times & \text{Applicable} \\ (\$) & & (\$/\text{ton}) & & \text{Emissions (tons)} \end{array}$$

- Internal suppliers include expected carbon charges into energy offers, as currently done with RGGI allowance costs.

Applicable Carbon Price

Applicable Price	
Generators that are subject to RGGI	The PSC-determined Social Cost of Carbon (SCC) minus the relevant RGGI price
Generators that <u>are not</u> subject to RGGI (e.g. fossil <25 MW)	The full PSC-determined SCC

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Applicable Emissions

■ What are the applicable emissions?

- Fossil: point-of-production CO₂ emissions
- Biomass: treat as zero-carbon resources to be consistent with state policies
- Cogeneration: options are (1) portion of emissions associated with electricity generation or (2) all emissions from both electricity and heat production
 - Option 1 is more consistent with an electric-sector carbon charge, but it requires determining each resource's electric vs. non-electric fuel usage
 - Option 2 is consistent with RGGI but may distort decisions since other forms of heat would not be subject to carbon charges
- Behind-The-Meter Net Generation: CO₂ emissions associated with wholesale net-injections onto the grid
 - For several reasons (lack of visibility on BTM emissions, jurisdictional questions), it may be impractical to assess carbon charges on all CO₂ emissions from BTM Net Generation
 - However, facilities registered as BTM Net Generation Resources can participate in NYISO markets, and will face carbon charges on point-of-production CO₂ emissions from net injections

Unit Commitment and Dispatch

- No expected changes to NYISO commitment/dispatch software
- Existing software would accommodate modified energy offers

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Settlements

- **No changes to frequency of settlements**
- **Carbon charges would be added to appropriate billing period settlement. Two options to determine emissions:**
 - Option 1: Suppliers self-report emissions; NYISO would need to create a new process for suppliers to report these emissions in sufficient time for billing period settlement
 - Option 2: NYISO would estimate emissions for the appropriate billing period settlement
 - In either case, carbon charges might also need to be trued-up
- **Carbon charge residuals would be credited to LSEs**
 - This topic will be discussed at a future IPPTF meeting

Questions?

We are here to help. Let us know if we can add anything.

Feedback?

- Questions and/or comments can be sent to IPP_feedback@nyiso.com

The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefits to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policy makers, stakeholders and investors in the power system

