

# Application of the Carbon Price to Transactions at the NYISO Borders

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**IPPTF**

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# Agenda

- **Presentation objective**
- **NYISO proposed border transaction charges and credits**
- **Discussion of proposed implementation**
- **Questions and feedback**

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# Select relevant prior IPPTF materials and presentations

- **All materials available on the NYISO website**
  - [http://www.nyiso.com/public/committees/documents.jsp?com=bic\\_miwg\\_ipptf](http://www.nyiso.com/public/committees/documents.jsp?com=bic_miwg_ipptf)
- **April 9, 2018 IPPTF**
  - Applying Carbon Charge Border Adjustments to NYISO External Transactions. The Brattle Group.
  - Carbon Pricing in the NYISO Wholesale Energy Market: Addressing Leakage. London Economics.
- **April 16, 2018 IPPTF**
  - The Mechanics of Integrating a Carbon Charge into NYISO Energy Market Operations. NYISO.
- **April 30, 2018 IPPTF**
  - Carbon Pricing Straw Proposal. NYISO.
- **May 14, 2018 IPPTF**
  - Carbon Pricing Straw Proposal Overview. NYISO.
- **July 9, 2018 IPPTF**
  - Application of the Carbon Price to External Transactions. NYISO.
- **August 6, 2018 IPPTF**
  - Carbon Pricing Draft Recommendations. NYISO.
- **August 27, 2018 IPPTF**
  - Import Carbon Pricing. LIPA.
- **September 24, 2018**
  - Revenue Allocation and Seams Options. The Brattle Group.

# Presentation objective

- Summarize the NYISO's proposed application of the carbon price to border transactions

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# Background

- **Adopting a carbon charge in New York without considering the pricing effects at the NYCA borders would likely cause large shifts in import and export dynamics**
  - Internal suppliers would become less competitive as a result of paying the NY carbon charge
  - External suppliers would become relatively more competitive as a result of not paying the NY carbon charge
  - Internal generation would likely decrease
  - Total carbon emissions may increase or decrease, depending on the relative efficiency of NYCA versus external marginal generation

# NYISO Draft Recommendation

- **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 be paid the LBMP and pay carbon impact (LBMPc), at the relevant border
    - Bilateral transactions would simply pay the carbon impact
    - Conceptually, this is similar to an internal generator
  - Exports would pay the LBMP and be paid the carbon impact
    - Bilateral transactions would simply be paid the carbon impact
  - Wheel-through transactions pay the carbon impact at the import interface and be paid the carbon impact at the export interface
  - Carbon charges only apply to transactions that flow in real-time
  - This recommendation is consistent with the NYISO Carbon Pricing Draft Recommendations
- **To determine charges and credits, the NYISO proposes to use the carbon impact on LBMP based on the real-time system dispatch, as opposed to forecasting the carbon impact on LBMP**

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# Discussion on how the NYISO could implement the IPPTF Draft Recommendation

# Import and export scheduling and settlements

- **Import and export schedules will be determined as they are determined today, via the system optimization software, based on import and export bids**
- **Traders may incorporate expected payments/charges into their bids**
  - Traders that do not do so face the prospect of receiving an undesired schedule
  - See the examples at the end of the presentation for additional information
- **The NYISO will create a new billing code for carbon charge settlements (i.e., the carbon charge will be a separate line item on bills and invoices)**
  - For example, an import will see both a payment equal to the full LBMP and a charge equal to the carbon impact on LBMP on its bill
  - Carbon charges/credits will only occur when energy flows
    - For example, a day-ahead (DA) schedule that flows in real-time (RT) will result in a charge/credit. A DA schedule that is bought out in RT (no flow) will not incur a carbon charge/credit.
  - Border LBMPs will not reflect the carbon charge/credit (i.e., not show the import/export net settlement associated with a transaction)



# Proposed method to determine the carbon impact on LBMP assigned to border transactions

- The NYISO proposes to charge imports and credit exports a carbon impact on LBMP based on real-time system dispatch
  - This will be consistent with the carbon impact on LBMP used to allocate residuals to loads
  - See the appendix for additional details
- External resources will not be eligible to set the carbon impact value (LBMP<sub>c</sub>)
- The NYISO is targeting the October 22, 2018 or October 29, 2018 IPPTF meeting to discuss the calculation of the carbon impact on LBMP

# Credit implications

- The NYISO's existing Credit provisions can accommodate these carbon charge border transaction rules
- Certain calculations and processes will need to incorporate carbon charges/credits
  - E.g., external transaction net profit and loss calculations

# Carbon impact on LBMP (LBMPc)

- The LBMPc will be based on the change in the marginal unit's energy offer due to the carbon pricing market design, as determined by the NYISO
- The NYISO is targeting the October 22, 2018 or October 29, 2018 IPPTF meeting to discuss carbon impact on LBMPc calculation and transparency (i.e., data postings) with stakeholders

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# Examples

# Example 1 – Import Scheduled in Day-Ahead Market and Flows in Real-Time

- Today's market
  - Importer submits a \$45 bid
  - DA LBMP is \$46, import receives a schedule
  - Importer is compensated NY DA LBMP
- Market with carbon charge (importer assumed RTD carbon impact \$15)
  - Importer submits a \$60 bid (i.e., \$45 energy plus \$15 carbon charge)
  - DA LBMP is \$61, importer receives a schedule
  - Importer is compensated NY DA LBMP
  - The transaction flows in real time and the importer is charged RTD carbon impact (\$15)

In both cases, the importer's net incentive to import is \$1, or the 'status quo' price spread

# Example 2 – Import Bid in Day-Ahead Market

- **Today's market**
  - Importer submits a \$45 bid
  - DA LBMP is \$44, importer does not receive a schedule or a DA settlement
- **Market with carbon charge (importer assumed RTD carbon impact \$15)**
  - Importer submits a \$60 bid (i.e., \$45 energy plus \$15 carbon charge)
  - DA LBMP is \$59, importer does not receive a schedule or a DA settlement
  - Importer is not charged a carbon charge

In both cases, the importer's net incentive to import is \$4, or the 'status quo' price spread

# Example 3 – Import Bid in Day-Ahead Market

- **Today's market**
  - Importer submits a \$45 bid
  - DA LBMP is \$44, importer does not receive a schedule or a settlement
- **Market with carbon charge (importer assumed RTD carbon impact \$15)**
  - Importer submits a \$45 bid (i.e., does not reflect the \$15 carbon charge in the bid)
  - DA LBMP is \$59, importer receives a schedule
  - Importer is paid the DA LBMP
  - Importer is charged RTD carbon charge (\$15)

In both cases, the importer's net incentive to import is -\$1, or the 'status quo' price spread. However, by not accounting for the carbon charge, the importer receives a schedule and its net compensation (\$44) is \$1 less than its original bid (\$45).

# Example 4 – Import Scheduled in Day-Ahead Market and Does Not Flow in Real-Time

- **Today's market**
  - Importer submits a \$45 bid
  - DA LBMP is \$46, importer receives a schedule
  - Importer is paid the DA LBMP
  - Importer does not flow in RT (e.g., buys out of DA position)
  - Importer in the balancing settlement is charged the RTD LBMP
- **Market with carbon charge (importer assumed RTD carbon impact \$15)**
  - Importer submits a \$60 bid (i.e., \$45 energy plus \$15 carbon charge)
  - DA LBMP is \$61, importer receives a schedule
  - Importer is compensated NY DA LBMP
  - Importer does not flow in RT (e.g., buys out of DA position in the balancing settlement)
  - Importer is charged the NY RTD LBMP and does not have a carbon charge

No energy flows, thus no carbon charge/credit occurs



# Example 5– Import Scheduled in Real-Time (RTC) and Flows in Real-Time

- Today's market
  - Importer submits a \$5 spread bid
  - RTC spread is \$6, importer receives a schedule
  - Importer is paid the RTD LBMP
- Market with carbon charge (importer assumed RTD carbon impact \$15)
  - Importer submits a \$20 spread bid (i.e., \$5 energy spread plus \$15 carbon charge)
  - RTC spread is \$21, importer receives a schedule
  - Importer is paid the RTD LBMP
  - Importer is charged RTD carbon impact (\$15)

In both cases, the importer's net incentive to import is \$6, or the 'status quo' price spread

# Example 6 – Export Scheduled in Day-Ahead Market and Flows in Real-Time

- Today's market
  - Exporter submits a \$45 energy bid (based on price available in neighboring region)
  - NY DA LBMP is \$44, exporter receives a schedule
  - Exporter is charged the DA LBMP
- Market with carbon charge (exporter assumed RTD carbon impact \$15)
  - Exporter submits a \$60 bid (i.e., \$45 energy plus \$15 carbon credit)
  - NY DA LBMP is \$59, exporter receives a schedule
  - Exporter is charged the DA LBMP
  - Exporter is credited a carbon impact (\$15), for a net charge of  $\$59 - \$15 = \$44$

In both cases, the exporter's net incentive to import is \$1, or the 'status quo' price spread

# Feedback?

- Questions and/or comments can be sent to [IPP\\_feedback@nyiso.com](mailto:IPP_feedback@nyiso.com)

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- 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



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# Appendix

# Implementation options considered for determining border transactions' carbon impact on LBMP

- **Forecasted carbon impact on LBMP**
  - Importers and exporters know the binding carbon impact prior to the bid window closing
  - Requires the NYISO to produce a binding forecast of the carbon impact (inherently uncertain)
  - Minimizes traders' risk of carbon impact uncertainty (e.g., forecast errors)
  - Loads bear risk of carbon impact uncertainty (e.g., forecast errors)
  - Discussed at 7/9/18 IPPTF
- **Real-time system dispatch determined carbon impact on LBMP**
  - Importers and exporters face the actual carbon impact on LBMP as determined by system dispatch
  - Does not require the NYISO to produce a binding forecast of the carbon impact
  - Traders bear risk of carbon impact uncertainty
  - Minimizes loads' risk of carbon impact uncertainty

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