Dynamic Change Case and Post-MAPS Analysis

Tariq N. Niazi
Senior Manager, Consumer Interest Liaison

Integrating Public Policy Task Force (IPPTF)

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Introduction

Introduction to Issue Track 5 "Dynamic Analysis"

- Issue Track 5 (IT5) consists of modeling and analysis to refine customer cost impact estimates.
- GE MAPS production cost modeling will serve as the basis of this analysis.
- However, supplemental analyses are needed to estimate "dynamic" effects that change customer costs beyond direct effects on LBMP and refunded carbon charges.
- This presentation:
  - Introduces each dynamic component of net customer cost
  - Reviews how each component was estimated in the 2017 Report
  - Summarizes refinements to each dynamic component under IT5
- The Brattle Group is assisting the NYISO with the Issue Track 5 analysis.

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Customer Cost Impact Analysis

- **IT5 Updates: Primarily Informed by MAPS Analysis.**
  - Impact on Wholesale Energy Prices.
  - Carbon Residuals.
- **IT5 Updates: Static and Dynamic Effects Informed by both MAPS Analysis and Other Supporting Analyses.**
  - Lower ZEC Prices.
  - Lower REC Prices.
  - Increased TCC Value.
  - Adjustments to Static Analysis due to new entry of resources.
  - Carbon Price-Induced Carbon Abatement (Avoids RECs).

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Wholesale Energy Prices

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Impact on Wholesale Energy Prices

- **Assumption:** A carbon charge would generally increase wholesale energy prices when carbon-emitting resources are on the margin.
- **Previous Analysis Approach**
  - Assume historical 2015 MERs are indicative of 2025 MERs, given that reduction in generation from Indian Point will be offset by increased renewable generation from CES.
  - Use historical data on marginal units to inform 2015 MER estimates.
  - Assume $40/ton carbon charge.

Impact on Wholesale Energy Prices

- **Proposed Updates**
  - Use MAPS to simulate LBMPs given assumed carbon charges and emissions rates.
  - Assumed carbon charges are the gross and net carbon charges as presented by DPS staff during the 4/23 IPPTF presentation.*
    - $41/ton in 2020, $48/ton in 2025, $57/ton in 2030.
  - Emission rates are already part of the MAPS data.
  - For external resources, model “Option 1” by freezing the imports/exports.

*Link to the 4/23 DPS IPPTF meeting presentation: 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

Carbon Residuals

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Carbon Residuals

- **Assumption:** NYISO would return to Load Serving Entities (LSEs) all carbon charges collected from Carbon Emitting Resources and imports.
- **Previous Analysis Approach**
  - Assume historical 2015 NYCA carbon emissions are indicative of 2025 emissions, given that reduction in generation from Indian Point will be offset by increased renewable generation from CES.
  - Assume $40/ton carbon charge.

Carbon Residuals

- **Proposed Updates**
  - Directly use emissions results from GE MAPS analysis.
  - Use the gross and net carbon charges as presented by DPS staff during the 4/23 IPPTF presentation.
    - Calculate carbon charges on a unit-specific basis (generators <25MW charged at Gross Social Cost of Carbon (Gross SCC), other generators charged at SCC net of RGGI).

ZEC Prices

Lower ZEC Prices

- **Assumption:** A carbon charge would increase wholesale energy prices, decreasing ZEC prices.

- **Previous Analysis Approach**
  - Use ZEC price equation to estimate 2025 ZEC prices with and without a carbon price. ZEC equation considers upstate energy and capacity prices.
  - Estimate 2025 Upstate energy prices by adjusting 2015 prices for anticipated changes in gas prices and RGGI prices.
  - Estimate 2025 Upstate capacity prices based on DPS forecast.

Lower ZEC Prices

- **Proposed Updates**
  - Continue to use ZEC price equation with updated LBMPs informed by GE MAPS analysis.
  - Estimate upstate capacity prices based on the predicted capacity supply and expected demand.

REC Prices

Lower REC Prices

- **Assumption:** A carbon charge would increase Energy market revenues for new Tier 1 renewable resources supported by RECs, reducing the REC prices needed for renewables to enter and reducing REC payments by customers.

- **Previous Analysis Approach**
  - Estimate change in energy revenues based on assumed MERs when renewables are generating and assumed generation shape.
  - Assume increased energy revenues reduce REC prices.

Lower REC Prices

- **Proposed Updates**
  - Estimate increased energy revenues using updated LBMPs informed by GE MAPS analysis and renewable generation shapes, or direct renewable energy revenue outputs.
  - Review assumptions on locations of renewable additions.
  - Assume carbon price only reduces customer costs for future CES Tier 1 REC procurements (not procurements already conducted).
  - Assume future CES procurements reflect the carbon price in the Energy market, maintaining price reduction assumption.

TCC Values

Increased TCC Value

- **Assumption:** A carbon charge may increase transmission congestion costs, increasing the Transmission Congestion Contract (TCC) revenues returned to customers.

- **Previous Analysis Approach**
  - Estimate increases in congestion across Central-East constraint, based on assumed Upstate/Downstate MERs.

- **Proposed Updates**
  - Use GE MAPS outputs to inform change in NYCA-wide congestion costs.

Adjustments to Static Analysis

Adjustments to Static Analysis due to Entry of CCs

- **Assumption:** A carbon charge would reward the relative efficiency of combined cycles (CCs), attracting additional investment and reducing the capacity price at which resources will enter, reducing customer capacity costs.

- **Previous Analysis Approach**
  - Assume a percentage likelihood of CCs entering the market.
    - Assume 67% chance that CCs would enter.
  - Assume if CCs enter, their energy revenue increases, thereby reducing their capacity market offer price and the market equilibrium price. Estimate reduction in state-wide capacity prices using historical demand curve shapes.
  - Assume if no CCs enter, customers reduce energy demand due to higher energy prices. Estimate based on assumed elasticity of demand.

Adjustments to Static Analysis due to Entry of CCs

- **Proposed Updates**
  - Estimate upstate capacity prices based on the predicted capacity supply and expected demand.
    - Evaluate the likelihood of several different technologies entering (*e.g.*, CTs, renewables, storage), based on each technology's Net CONE and forecasted capacity price.
      - Evaluate how each technology benefits from a carbon charge.
      - Evaluate how energy and capacity prices respond to additional investment.
  - Re-evaluate assumptions regarding energy conservation induced by higher energy prices (and therefore the impact on the peak load).

Carbon Price-Induced Abatement

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Carbon Price-Induced Abatement (Avoids RECs)

- **Assumption:** A carbon charge would incentivize low-cost carbon abatement opportunities not subsidized by the CES. These reductions could reduce the quantity of RECs needed to meet New York's decarbonization goal.

- **Previous Analysis Approach**
  - Evaluate four potential ways in which a carbon charge could spur emission reductions.
    - Tilting renewable investment to locations with greater carbon abatement rates.
    - Supporting investment in CCs.
    - Incorporating storage and demand response.
    - Incentivizing energy efficiency and conservation.

Carbon Price-Induced Abatement (Avoids RECs)

- **Proposed Updates**
  - Use GE MAPS results to calculate emissions reductions due to shifts in commitment and dispatch.
  - Evaluate likelihood of carbon charge spurring investment in technologies other than CCs (e.g. renewables or storage).

Next Steps

Next Steps

- Continue simulation in GE MAPS
- Review results September/ October

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

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