Markets and Environmental Policy in New England

Chris Geissler

DIRECTOR, ECONOMIC ANALYSIS
CGEISSLER@ISO-NE.COM

Key Questions in Grid Decarbonization

- Question 1: How can we efficiently facilitate the transition to a decarbonized grid?
- Question 2: How can we design electricity markets to ensure that once we have a decarbonized grid, we can continue to operate it reliably?

HOW CAN WE EFFICIENTLY FACILITATE THE TRANSITION TO A DECARBONIZED GRID?

Status Quo: State Contracts

- New England states have ambitious policies to decarbonize the electricity sector by 2030, 2040, etc.
  - Some policies more specifically focus on other attributes or technologies (e.g., offshore wind)
- To satisfy these policies, states negotiate long-term contracts with developers to build new green projects
  - Not technology neutral
  - Fixed price for energy delivered
  - Some of these projects are being renegotiated or postponed due to a range of factors (economics, supply chain, etc.)
  - Produces increasingly negative prices as more contracts are signed
- Revenues from RGGI and Renewable Portfolio Standards (RPS) help offset the out-of-market costs

Alternative Approaches Discussed

- Region has expressed interest in assessing alternate market-based approaches to meet their decarbonization objectives
- Net Carbon Pricing
- Forward Clean Energy Market (FCEM)
- *Next*: Discuss each alternative approach

Net Carbon Pricing Overview

- Assign a cost to each unit of carbon emitted
  - Can be done with fixed price, or via a cap-and-trade
  - Revenue collected can be rebated to consumers, used to fund other environmental programs, etc.
  - Tends to increase energy prices (does not produce negative prices)
- Set the price or quantity target to align with the policy goals
  - Price/quantity target can be updated based on past outcomes, etc.

Key Net Carbon Pricing Observations

- Carbon & energy prices increase with decarbonization target
- As carbon price increases to very high value, effectively enforces 100% decarbonization target
- Economic logic is sound, but support has been limited
  - Requires a high degree of regional coordination on carbon price/target
  - Concerns about ratepayers in one state paying for the more ambitious environmental policy of its neighbor

FCEM Overview

- Resources sell CECs forward thought a centralized market to states or other entities with clean energy goals
- Resources are then awarded CECs to satisfy these forward positions by producing clean energy
  - 1 CEC for each 1 MWh of clean energy produced
- Resources that produce less clean energy than CECs sold forward must buy CECs from competitors that produce more clean energy than CECs sold
- Similar to state RPS policies, but has a centralized (and regional) forward market and defines clean energy broadly

Key FCEM Observations

- Produces increasingly positive CEC prices and increasingly negative energy prices as decarbonization target increases
  - Clean resources want to generate electricity in order to be awarded CECs
- Achieves decarbonization objectives less efficiently than carbon pricing
  - Does not provide incentives to invest in ‘cleaner’ technologies
- Requires regional coordination on what constitutes clean energy
  - Efficiency benefits of a centralized market diminish as more products introduced (e.g., different CECs by technology/vintage)
  - Does not require close coordination on regional decarbonization targets

Pathways to a Future Grid Study: Overview

- ISO-NE worked with the Analysis Group, an economic consulting firm, on a study assessing the market outcomes under various decarbonization approaches
- Focused on an 80% reduction in carbon emissions in the electricity sector in 2040 relative to 1990
- Study is available on ISO New England's website

Pathways to a Future Grid Study: Key Findings

- With current commercially available technology, and expected increases in load, decarbonization under any policy will be very expensive
  - Costs grow further when decarbonization increases beyond 80% target
- Net Carbon Pricing is the lowest cost approach studied
  - Cost savings relative to FCEM are modest (1%), though this may be an artifact of New England's resource mix (e.g., limited non-gas generation)
  - The Status Quo is more expensive (9%)
- Status Quo and FCEM produce negative energy prices in significant number of hours, whereas Net Carbon Pricing does not

HOW CAN WE DESIGN ELECTRICITY MARKETS TO ENSURE THAT ONCE WE HAVE A DECARBONIZED GRID, WE CAN CONTINUE TO OPERATE IT RELIABLY?

Decarbonized Grid Creates New Sources of Uncertainty

- Many new non-emitting resources' electricity generation depends on the weather (e.g., solar, wind)
- These resources may not be dispatchable in a manner similar to many fossil resources
- How can we set up the system to be able to manage the increased uncertainty associated with such changes?

Long-Term Market Signals: Capacity Market Reforms

- Currently, the capacity market is set up to procure enough capacity to meet the summer peak
  - Historically viewed as the time when the system was most stressed
- Going forward, it will need to meet load across broader range of stressed system conditions, including during periods with limited weather-dependent energy production
- ISO-NE is reforming its capacity market so that resources are compensated based on their contributions across broader set of stressed system conditions

Short(er)-Term Market Signals: Flexible Response Services

- ISO-NE is evaluating the system's sources of uncertainty in the operational timeframe, and how these may evolve (grow) as we see more weather-dependent resources come online
  - Magnitude of uncertainty as a function of observable conditions
  - How uncertainty resolves over time (e.g., how much larger is this uncertainty 4 hours out than 1 hour out?), as this may inform the types of products we may wish to procure
- Assessment will help inform the types and quantities of new ancillary services that the system may require in the future