Do RTOs Need a Capacity Market?

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Topics Covered (not necessarily in order)

• The past vs. the future
  – What is Resource Adequacy today?
  – Capacity markets mismatch
• Environmental compliance planning and energy costs
• Flawed capacity market paradigm and its costs
• Alternatives
• Planning requirements with environmental regs, CO$_2$, RPS,…
• Average cost vs. marginal cost – where are we?
• Growing coordination – More opportunities, including opportunity for conflict
• Portfolios vs. individual assets
• Load growth and environmental constraints
Some things have not changed...

• Capital-intensive nature of electric sector investments
• Requirement for access to fuel, natural resources, and transmission
• Siting constraints
• Profit motive
• Benefits of demand resources
ISO-NE Supply-Demand Balance from 2010 CT IRP

Average Power Supply-Related Costs in Connecticut

2010 ¢/kWh

2013 2015 2020

• Capacity prices were expected to typically be around a generator’s net Cost of New Entry (net-CONE)
  – When capacity prices rise above net-CONE, developers should see that as a signal to invest in new generation
  – Prices below net-CONE indicate oversupply

• Capacity prices remain well below net-CONE in all three capacity markets
Figure 2: RPM Supply Curves - RTO Region

In PJM, most of the capacity market revenues go to baseload generators.
Vermont's Historical GHG Emissions, GHG Reduction Goals, and Draft Forecast of Future GHG Emissions

Existing electrical generating capacity by fuel type

Source: EIA Form 860 2009
Average Retail Prices of Electricity (left) and Cost of Fossil Fuel Receipts at Electric Generating Plants (right)

Average Retail Prices of Electricity
(Cents per kilowatthour), by sector, 1973 – 2010

Cost of Fossil Fuel Receipts at Electric Generating Plants
(Dollars per million Btu, including taxes), costs, 1973 – 2010

Net capacity installed (or retired) in the U.S. by fuel

Coal (a) and CCNG (b) generation by capacity factor – 2008, 2009, and 2010

Capacity factors for CCNG units by season and region for (a) on-peak and (b) off-peak hours

Upcoming EPA rules

### Proposed rules

- Cross State Air Pollution Rule (SO2/NOx)
- Coal Combustion Residuals (Ash)
- Hazardous Air Pollutants (including mercury)
- Cooling Water Intake
- CO2 Prevention of Significant Deterioration
- CO2 New Source Performance Standards
- NAAQS Review for PM 2.5
- NAAQS Review for NOx and SO2 Secondary Standards
- NAAQS Review for Ozone

### Final rules

- NAAQS Review for NOx and SO2 Secondary Standards
- NAAQS Review for Ozone

### Compliance period/NAAQs designations effective

- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- Beyond

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Projected coal capacity “at risk” under various regulatory policies

Observations Based on Coal-at-Risk Studies

- Comprehensive regulation (analysis?) results in more coal at risk
- Natural gas prices—within the bandwidth modeled—do not explain differences in study results regarding plants at risk
- Regulatory details (e.g., flexibility) have a big impact on plants at risk
- Only one analysis included CO$_2$ cost, a significant omission!
- *Take Home: Demand comprehensive analysis!*
U.S. coal units affected by environmental regulations (non-economic with respect to existing natural gas)

GHG allowance price projections based on analyses of federal legislative proposals – levelized

Synapse CO2 trajectories and GHG allowance price projections for HR 2454 and APA 2010 – levelized 2015 - 2030

Retired electrical generating units as of 2009 (Incomplete)

Source: EIA Form 860 2009
Existing electrical generating capacity by fuel type

Source: EIA Form 860 2009
Electric utility energy efficiency costs

– All capacity is *not* created equal
– There is a limited market for new “generic” capacity—only in constrained LDAs
– There is even less market for a one-year capacity product, three years out, through a centralized market
– Administratively determined price is not the same as a market price
– Costs: in PJM, about $50 Billion and counting…
– *Incenting the Old, Preventing the New*
– Support (and do not discourage) long-term bilateral capacity and self supply
– Allow *market* to recognize distinctions in types of capacity – i.e., state mandates, RPS, etc.
– Allow flexibility for portfolios of energy and capacity that can combine attributes and deliver value
– Don’t cook the market outcome by imposing an RPM-style, all-requirements auction
– Portfolios, portfolios, portfolios
Integrated portfolio management in a restructured supply market