

OCTOBER 2, 2014 | CAMBRIDGE, MA



Better Markets, Better Products, Better Prices

*Improving Real Time Price Signals
in the New England Power Market*

Bob Ethier

VICE PRESIDENT, MARKET OPERATIONS



New Challenges Require Enhancements to New England's Real Time Price Signals

- New England faces significant reliability, investment, and resource performance challenges over the coming decade
 - Volatile natural gas prices
 - Increased penetration of renewable resources
 - Need for new capacity with elimination of historical excess
- ISO-NE is addressing these challenges through changes to its capacity market and real time (RT) energy market
 - Capacity market compensation will be tightly linked to real time performance during shortage; same incentives as high shortage pricing
 - Changes largely accepted by FERC in May 2014
 - Real time energy market enhancements will improve pricing
 - Ongoing discussions with stakeholders
- Expected benefits: Cost-effective solutions to region's investment requirements; improved system reliability; more flexible resources; and a simpler, resource-neutral capacity market design

A Number of Pricing Challenges

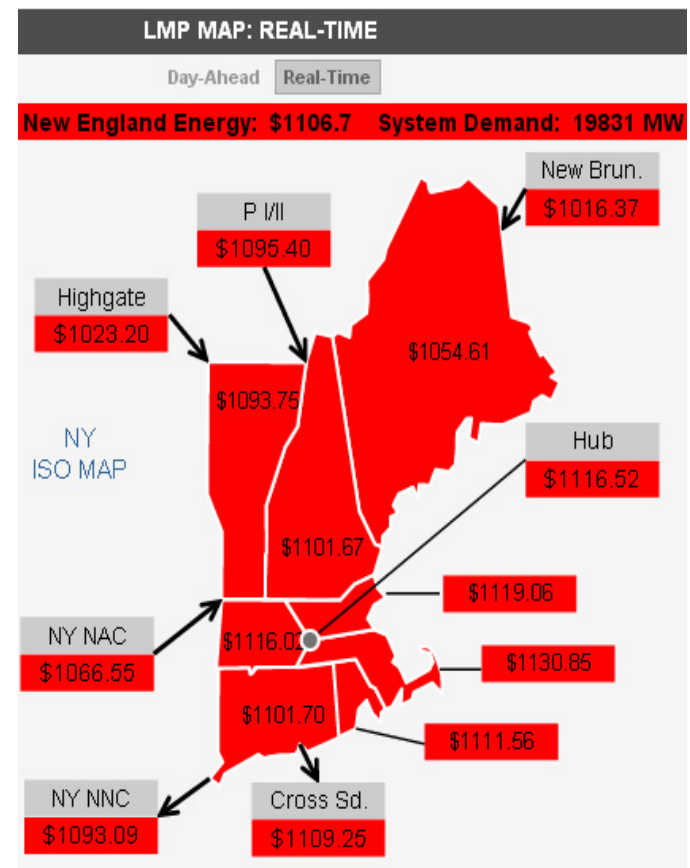
- Think of ISO addressing two (mostly) separate problems:
- Pricing during periods of shortage (energy and/or reserves)
 - Approved capacity market Pay for Performance and RCPFs (reserve scarcity pricing) changes
- Pricing during non-shortage conditions
 - How to reflect fixed (start up and no-load) costs?
 - How to reflect costs of inflexible units (high minimum output levels, minimum run times, ramp rates)?
 - On-going energy price enhancement efforts

FCM PAY-FOR-PERFORMANCE DESIGN

*Cost-Effective Solutions for Resource
Performance and Investment*

A Simple, Conceptual Approach

- **Theory:** In tight conditions, price rises to the value consumers place on reliable service. *Could be very high*
- **Reality:** LMPs reflect short-run marginal costs and administrative reserve prices. *Much lower*
- **Concept:** The “missing money” that a capacity market provides *should depend on performance during scarcity conditions*



Sound Principles for Capacity Market Reforms

1. Reward outputs (power delivered), not specify inputs

- Let suppliers identify least-cost solutions, bearing risks and rewards

2. Re-define performance measures for capacity resources

- Delivery of energy and reserves during (reserve) scarcity conditions
- Not peak period ‘availability,’ or EFOR-based measures

3. Better align resources’ financial incentives with the value of reliable service during tight system conditions

- Mimic the **performance incentives** of an efficient energy market, with the **reduced volatility** that a forward market provides

Pay-for-Performance: Four Major Elements

- **Capacity Obligations: A Standard Incentive Contract**
 - Base payment set in forward auction, and a performance payment
- **Performance Payment:**
 - Delivery of energy & reserves during (reserve) shortage conditions
 - May be positive or negative (on top of base payment)
 - Not based on “availability,” or EFOR-type measures
- **Resource Neutral, No Exemptions**
 - All resources have same base and performance payment rate
- **Who pays what?**
 - **Loads** pay the base payment set by the forward clearing price
 - **Performance payments** are transfers among suppliers

Design Insights: The Product Definition

- **Current FCM capacity ‘product definition’ is... *hard to define***
 - *Common view:* Payment (subsidy) for “steel in the ground”
- **PFP establishes a new, simple, economic product definition, and changes sellers’ financial obligations from current FCM**
- **With PFP, the FCM employs a standard forward contract structure.** It is based on two key concepts:
 - Two-settlement principle in forward markets (i.e., like the DA market)
 - Using a scarcity pricing premium as RT incentive in scarcity conditions

ISO New England's Reforms: Make Capacity a Proper Forward-Sold Good

Forward-Sold Goods

- Initial revenue on fwd sale
- Specifies a forward financial commitment ('position')
- 2nd Settlement based on *deviations* at delivery ...
- ... at a contract rate, or at replacement (floating) price

ISO's Capacity Reforms

- ✓ Auction-based fwd sale (FCA)
- ✓ *Pro-rata share* of system demand (load + reserves) during RT reserve shortages
- ✓ 2nd Settle, for delivery (energy + reserves) delta from share
- ✓ At (high) tariff-specified rate (analogous to scarcity pricing)

Expected Benefits of Improved Capacity Design

- **Efficient resource evolution.** Strong incentives for investment in new capacity that is either:
 - (1) Low-cost and highly reliable (nearly always operating); or
 - (2) Highly flexible and highly reliable (gets online quickly and reliably)
- **Greater operational-related investments** at existing resources to improve resource performance
 - Esp.: Fuel arrangements and/or secondary fuel supplies
- **A more reliable power system, using market incentives**
 - PFP rewards suppliers who make cost-effective investments that enable them to perform during tight system conditions



Expected Operational-Related Investments

- **PFP provides strong incentives** for suppliers to improve their resources' performance and availability:
 - Dual-fuel capability to protect against fuel shortages
 - LNG, transport arrangements yielding 'less' interruptible fuel supply
 - Faster unit startup capability to supply energy during deficiency hours
 - More rapid price-responsive demand, with more times available
 - Staffing improvements at many facilities
 - And so on.
- **Expectations:** Suppliers will resolve availability and ongoing performance issues in the most cost-effective ways possible

Alternative: Texas-Style Energy Pricing

- **Select suppliers:** Argue for higher RT scarcity prices alone, leaving FCM unchanged (aka, “Texas-sized RCPF” alternative)
- **Stakeholder and ISO Concerns:**
 - **Greater volatility in suppliers’ revenue** year to year
 - Would tend to *increase* financing costs for new entry
 - **Greater volatility in loads’ expenditures** over time
 - Face higher DA/RT spot prices during scarcity conditions
 - More risks for competitive retailers signing 1+ yr forward with consumers
 - **Does not fix the inherent capacity product definition problem**
 - **Market clearing problems** may require increasing offer caps above current \$1,000 / MWh
 - A ‘liquidity’ game problem if DA LMP can’t converge to expected RT LMP

REAL TIME PRICING ENHANCEMENTS

Many Market Changes Expected to Improve Real Time Pricing

- Replacement Reserve constraints (currently in place)
- Hourly Offers (implementing 12/3/14)
- Increasing RCPFs (pricing during reserve shortages, 12/3/14)
 - \$1,000/MWh for 30-min operating reserve (currently \$500/MWh)
 - \$1,500/MWh for 10-min non-spinning reserve (currently \$850/MWh)
- Demand Resource Energy Market Integration (scheduled 2017)
- Real-Time Pricing Review and Enhancements (schedule TBD)
 - In the midst of series of in-depth technical sessions with stakeholders to explain how pricing works, which characteristics lead to perceived pricing problems, and explore alternatives
 - All identified changes involve trade offs
 - Initial solution focus on fast-start/peaker pricing

Principles for Evaluating Pricing Changes

- **Efficiency.** *In the context of the RT energy market, this means two things:*
 - a) RT dispatch on **offered prices will minimize actual production cost**
 - b) Assets want to produce to the cleared (dispatched) MW amount, not something else.
- **Price Transparency**
 - Defined as when "much is known by many" about transaction price(s)
 - In this context, it is everyone knowing the price(s) others receive
 - Side payments (uplift and lost opportunity costs) are not transparent
- **Simplicity**
 - a) As few prices as possible (for each location and time)
 - Example: Pay-as-bid systems can have many different prices for the same location and time (to different sellers); uniform pricing has one price
 - b) Price formation process should have a simple logic that buyers/sellers understand (ideally)
 - No difficulties answering questions like: "How do we interpret the price?"

Electricity Market Pricing is Inherently Problematic

- Root Causes of Pricing Concerns:
 - Minimum production constraints: Economic minimum (EcoMin) values, minimum run times, minimum down times
 - Commitment-related costs: start-up costs
- Unfortunately, there is NO “perfect” pricing approach that satisfies all three principles when “lumpy” units are needed
- As a consequence, there are NO “perfect” LMPs. All pricing methods make compromises to achieve their goal
- Reviewing three pricing methods: two-tier pricing, convex hull pricing, ELMP (MISO)

ISO New England Fast-Start Pricing: Summary

- **Fast Start fixed costs**
 - Incorporates fast start, no-load, and start-up costs during start-up
 - Does not incorporate fast start, no-load, and start-up costs when online
- **Lumpiness treatment in pricing**
 - Relax EcoMin to 0, amortize fast start, start-up and no-load costs during start-up
 - Respect offered EcoMin value when online
- **Side payments and transparency**
 - Relatively easy to understand and implement
 - Fast-start units may still require make-whole payments to recover bid-in cost

Possible Enhancements to Fast-Start Pricing

- Incorporate start-up and no-load during dispatch?
- Relax economic minimum for pricing purposes while online?
- Other?



Summary

- Accurate electricity pricing is critical to ensuring both long-term investment and incenting an appropriate resource mix
- ISO-NE is seeking to improve price signals
 - Recent capacity market changes directly link compensation to energy market performance
 - Evaluating improvements to energy-market pricing
 - A number of changes are likely to be needed
- All options involve trade-offs between efficiency, transparency, and simplicity