Long-Term Market Design

Dr. Eric Gimon

Senior Fellow

Energy Innovation

Framing for Panel

We are going to discuss new paradigms for market design adapted to high penetrations of variable energy:

- Either new kinds of structures that complement or replace existing ones
- Or existing structures with new behaviors and tweaks to adapt to changing mix

We will not discuss:

- Policy for implementing/driving clean grid, although these will be necessary and should be complementary
- Details of operating the grid or exact technology mix (these discussions do not exclude nuclear, CCS etc…)
- Evolutions of capacity markets and regulated design – we assume market driven designs (although clearly hybrids like competitive IRPs also relevant).
- New tech we would like: better demand response, long-term storage, modular nuclear, cheap CCS. Rather assuming some solution set emerges, how does it get financed and supported in way that supports de-carbonization that is fast and cheap

Papers from February 2018 Workshop

Three papers were in pre-read, outgrowth from Feb workshop sponsored by Hewlett Foundation and run by Energy Innovation

(1) Overview Paper

(2) Energy-only Market framework

(3) Bifurcated Markets paper with new Long-term markets

I will cover some of (1) and set the table for (2) and (3)

This is my current view/frame – doesn't necessarily match up exactly with what other authors think but hope will be helpful.

Framing: What Problems Are We Solving?

I see start with two principle needs for grid:

(1) providing large chunks of cheap clean electricity (base-cost) while minimizing burden on grid operators by fostering diversity and largest useful footprint for sharing.

(2) Balancing/Resource Adequacy. Making sure tha grid operators have the wherewithal – capabilities – to balance supply and demand in real time. Traditional paradigm based on dispatchable fossil plants (baseload, midmerit, peaker) increasingly less workable.

I will try to proposals in papers on a in spectrum with these in mind. Will not discuss perceived flaws and Steve will cover more similarities/differences.

(A) Energy Only + Ancillary Services + Bilateral Secondary Market Design

- EO (SCED) design works very well for managing short term (Real-time/hour-ahead/Day-ahead/Week ahead) operations.
- Supplement with co-optimized ancillary services
- So far this is "**baseline**" to all proposals
- Balancing resources incented through scarcity pricing, penalties for under-procurement/state resource adequacy oversight.
- Long-term cost recovery through economic rents moderated by secondary bilateral markets
- Advantage: very flexible, adaptive, transparent, minimal need for central decision maker.
- Example: ERCOT today

(B) Bifurcared Market I: CPI Brendan Pierpont Design

- Meant to work hand-in-glove with design (A)
- Focuses attention and formalized part of secondary bilateral markets.
- Creates central market/clearinghouse for long-term purchase of clean electrons
  - Buyers have long-term contracts that can come from a diversity of sellers.
  - Must-take what you committed for, but can resell excess in RT Market
  - If short-term market prices go negative, sellers can curtail and substitute third-party power.
- Does not speak that balancing/RA need.
- Advantages: Aligns financing needs with market, portfolio advantages in central buyer/seller, creates standardized PPA/Contracts which reduces transaction costs and creates liquid long-term market.
- Likely voluntary, but could also be mandatory. Helps meet RPS/Clean Energy Standard
- Example: RE Auctions in Europe/Brazil.

(C) Bifurcated Market II: El Eric Gimon Design

- Still hand-in glove with EO design (A), but further formalizes long-term market in (B) by incorporating some elements of resource-adequacy with long-term visibility (think duck neck ramp, or two-week lulls in RE)
- Requires some separability of balancing/resource adequacy.
- Can incorporate bids from transmission, storage, demand-side paid as-bid.
- Sells shaped (within some bands) blocks of power to LSEs, with cost-allocation built in.
- Voluntary design, and LSE can submit bids for various amounts/shapes each priced by central market optimizer. Can also buy in short-term residual market.
- Suppliers can curtail when residual prices go negative, loads can curtail and resell power when price are high.
- Annual staircase market, never procure all needs in one-year.
- Some residual surplus/costs need cost-allocation mechanisms but goal is to minimize this.
- Advantages: Long-term investment signals for predictable needs, concentrates risk budget in residual market to create stronger marginal value signals.
- Examples: Residual market ~ EIM, Long-term market like PPAs + VFAs, block and index rates.

(D) Configuration Market Steve Cornelli Design

- Also based on existing market design. Less concerned with supporting long-term electricity and more with balancing/resource adequacy.
- Expands market's role as a platform. ISO buys/contracts for portfolio of supply-side/infrastructure/demand-side resources. Cost allocation similar to existing transmission planning.
- Advantages: one-stop shop for complicated array of resources for balancing, creates more stable short-term market platform, simpler long-term bilateral deals, accelerates deployment of infrastructure needed for fast/cheap clean energy transition.
- Examples: Transmission planning, MVP/CREZ, open-access storage

On to other panelists!

Quick questions now, more time for discussion/questions later