Response is Vital in a Grid with Growing Variable Resources


Presented by Richard Sedano
How do we plan power markets to ensure reliability ...

- without undermining markets
- without locking in resources incompatible with reliability
- without excessive renewable energy integration costs
Reminder

Reliability has two dimensions

**Resource Adequacy** – enough firm resources to meet system peak

**System Security** – the right resources deployed/operated to balance supply and demand at least cost

Timescales: resource adequacy: investment scale; system security at operational scale
Capacity markets: investment incentives designed to address resource adequacy

Corollary: System security will be handled by flexibility inherent to resources acquired to meet resource adequacy

What happens what flex in the system is insufficient?

When system stability needs “more?”
Resource Adequacy Objective

Gross Demand,

Megawatts

Hours
Objective with High Flexible Resources

Ramping and cycling value is revealed by prioritizing variable resources
Fixing one problem can create others

Capacity markets can work at cross purposes with a market that needs system flexibility.

All capacity is not the same.

Least cost capacity may be least flexible.

Energy only markets can also undervalue flexibility – is waiting for a crisis a biz model?

Inflexibility can lead to higher operating costs, investment in avoidable back up and threaten reliability.
Beyond Energy/Capacity Markets

Modify energy-only market with enhanced forward services
   add ramping and cycling
   forward contract ancillary services
Modify traditional capacity market designs with a apportioned forward capacity system
Elevate “Net Demand” objective
Fully value 24x7 flexibility in power markets
Apportioned forward capacity

Tranches based on resource capabilities supply, demand, storage, functional
Sequenced procurement
most flexible (i.e. cycling, ramping) first
Pay all firm resource for market value of firm capacity, but pays more for resources that possess other reliability attributes
Decision Framework

Variable renewables market share?

- Low
  - Deterministic methodology with recent experience
    - Rate of growth?
      - High
        - Plan for more complex methodology
      - Low
        - Monitor trends in variable renewable production
    - Capacity mechanism?
      - Yes
        - Apportioned forward capacity mechanism*
      - No
        - Enhanced services market mechanisms
  - High
    - Probabilistic methodology with production model
      - Capacity mechanism?
        - Yes
          - Apportioned forward capacity mechanism*
        - No
          - Enhanced services market mechanisms

*Traditional ancillary services can be addressed via long-term ancillary services auctions rather than via the capacity mechanism.
Resources

• What Lies Beyond Capacity Markets?

• Power point
About RAP

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- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

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