Power Market Design to Fully Address Reliability

Gulf Coast Power Association

Presented by Richard Sedano
General Remarks on Power Markets
Resource Adequacy is part of Reliability

How do we design markets to ensure reliability...
  without undermining competitive markets
  without locking in resources incompatible with reliability
  without excessive renewable energy integration costs
Addressing Reliability in Full

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: The temptation of the familiar

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 when flex in the system is insufficient?

When system stability needs “more?”
Resource Adequacy Objective

Gross Demand,

Megawatts

Hours

Energy solutions
for a changing world
Objective with High Flexible Resources

Ramping and cycling value is revealed by accepting all 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
Thoughts for Texas
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
Multiple Clearing Price Auction (c)

- Price
- Gigawatts

Legend:
- Bids

Graph showing price and gigawatts with various bids represented.
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

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.
A “Texas” Solution for Texas

Lots of good ideas from the experiences elsewhere
High variable resource penetration gives Texas the opportunity to innovate in response to reliability challenge
Crossroad now, but harder work is building a coherent market around the decision emphasizing value and reflecting reality
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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Richard Sedano
rsedano@raponline.org
802 498 0710