Harvard Electricity Policy Group

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Standard Market Design Basis

• **Sound Congestion Management System**
  – LMP based (for all nodes), ex post pricing
  – Financial transmission rights
  – Bid-based security constrained economic dispatch

• **Sound Organizational Structure**
  – Single Market Operator and System Operator
  – Day-Ahead and Real-Time Markets operated by same organization

• **Supports Choice**
  – Dominant bilateral marketplace plus residual Spot markets
Day-Ahead Markets

• **Concerns:**
  - Additional features proposed to increase market flexibility will dramatically increase computational requirements
    - Multi-hour block bids for transactions
    - Multi-hour block demand bids
    - Multi-part demand bids
    - Day-ahead Regulation Market
    - Hourly Resource offers

_PJM Comment: It is not technically feasible to implement all of these features in the near-term and to develop the proposed larger regional markets._
• **Concern:** - The SMD proposes to permit generation offer prices to change hourly
  - Will require dramatic increase in market monitoring
  - Hourly offer changes will tend to consume scarce system ramping capability
  - Will create additional operational uncertainty which will require restrictions to scheduling flexibility.
  - Cannot be implemented without penalties for uninstructed deviations

_PJM Comment: Do not allow hourly offer changes; scheduling flexibility is more important to members. Provide capability to submit multiple sets of Daily offers_
Transmission Service

• **Concern:** The SMD proposes to eliminate the forward physical transmission reservation system for managing external transactions
  – Purely financial scheduling system could cause scheduling problems at the market borders
  – Experience has shown that near-term curtailments and operational uncertainty can result without some system that provides forward scheduling certainty

*PJM Comment: Some form of pre-scheduling method is required to achieve operational and market certainty.*
Ancillary Service Markets

- **Concern:** The SMD proposes to mandate Day-ahead, financially binding Regulation Market
  - Day-Ahead Regulation Market increases scale of unit commitment problem
  - In near term, implementation reality is that we need to choose between larger Regional Energy Markets and Day-ahead Regulation Market

**PJM Comment:** Only require real-time Ancillary Markets. The Implementation of larger regional market will provide more benefit to PJM Members than Day-ahead Ancillary Markets.
Ancillary Service Markets

- **Concern:** The SMD proposes to mandate Day-ahead, financially binding Spinning and Supplemental Reserve Markets
  - Day-Ahead Ancillary Markets are performed on an hourly basis Day-ahead. This is an inadequate predictor of real-time reserve requirement.
  - Forward market positions in multiple ancillary markets will incent generators to protect Day-ahead positions rather than follow real-time dispatch instructions.
  - These complex financial incentives will require restrictions in scheduling flexibility and penalties for uninstructed deviations in order to ensure reliable real-time operations.

**PJM Comment:** Only require real-time Ancillary Markets. Benefits of Day-ahead Ancillary Markets do not justify the cost or the reduction in operational flexibility.
Forward Price Certainty - Is it worth it?

- Average PJM prices (January - July 2002)
  - Energy - $25 per MWh
  - Regulation - $0.41 per MWh of load
  - Spinning Reserve - $0.14 per MWh of load
  - Operating Reserve - $0.16 per MWh of load
Real Time Markets

- **Concerns:** The SMD proposes to eliminate real-time availability bids Spinning Reserve
  - This would virtually eliminate Synchronous Condensers from real-time Spinning Market.
  - There are valid costs for these units over and above opportunity costs

*PJM Comment: Allow real-time Spinning Market to consider availability bids.*
• **Minor Issue** - SMD proposes that CRRs holders have a physical scheduling priority
  - CRRs should be financial only and must not include physical attributes.
  - Day-ahead preferences based on CRR holdings can be performed
  - Real-time curtailments based on CRRs is not workable and would adversely impact emergency operations.

**PJM Comment:** Discussion with FERC staff has indicated that the scheduling priority was intended to be in the Day-ahead market only as a mechanism to discriminate between self-scheduled demand when infeasible solutions are encountered.
• **Minor Issue** - SMD proposes Completely voluntary Day-ahead Market participation
  – May cause significant feasibility problems when combined with the ability to ‘self-schedule’ generation and demand.
  – May require additional mitigation measures in Transmission-constrained areas
  – Vulnerable to strategic physical withholding strategies.

*PJM Comment: Discussion with FERC staff has indicated that ‘voluntary’ means choice between self-schedule and dispatchable. Does not imply physical withholding is permitted.*
Miscellaneous Market Items

• Modular Software Design
  – standards take time to develop; result in a moving target until standards are adopted
  – EPRI / NAESB / other? may each try to take control of the standard setting process

• Market Monitoring
  – establishment of penalties for non-compliance
  – scope of oversight

• New Stakeholder Segments