Item 5: Multi-Interval Real-Time Market Overview

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Multi-Interval Real-Time Market (MIRTM) Development History

- **<u>Fall 2011:</u> 'MMS Look-Ahead SCED White Paper' discussed at WMS Special Look Ahead Workshop**
  - http://www.ercot.com/content/meetings/wms/keydocs/2011/1128/LookAheadSced_1128workshop.zip

- **<u>February 2012 – January 2013:</u> Market Enhancement Task Force (METF) reported to TAC**
  - http://www.ercot.com/content/meetings/tac/keydocs/2012/1129/09._METF_Draft_Summary_RTM_Enhancement_and_HAM_Proposals_11_.doc
  - METF officially disbanded at the January 3, 2013 TAC meeting

- **<u>September 2014:</u> Updated Multi-Interval Real Time Market paper provided to TAC**
  - http://www.ercot.com/content/meetings/tac/keydocs/2014/0925/11.%20Co_optimization_Multi-interval_DRAFT_09192014.r1.doc

- **<u>Fall 2014 to Current:</u> Multi-Interval Real Time Market concepts discussed at Supply Adequacy Working Group (SAWG)**
  - http://www.ercot.com/content/wcm/key_documents_lists/55046/Co_optimization_Multi_interval_DRAFT_08262015.docx

MIRTM at the other ISOs

ISO/RTO	MIRTM?
PJM	Yes
MISO	Partial (Look-ahead commitment in place; look-ahead dispatch under design discussions)
ISO-NE	Yes
NYISO	Yes
SPP	No
CAISO	Yes
ERCOT	No

How it would work

- MIRTM would extend the Real-Time Market's time horizon from the current 5-minute interval to X minutes in the future
  - Currently, ERCOT contemplates a 30-minute look-ahead
  - This horizon would be divided into 5-minute intervals
- MIRTM could commit and dispatch Resources during any of these intervals based on forecasted prices
- The longer horizon enables more efficient dispatch of current fleet of Resources
- Additionally, MIRTM can be expected to enhance competition by attracting more Resources to the market, including:
  - 'Blocky' resources such as DR that is either on or off
  - Resources with temporal constraints including:
    - Ramp period >5 minutes
    - Minimum run time
    - Maximum run time
    - Return-to-service time

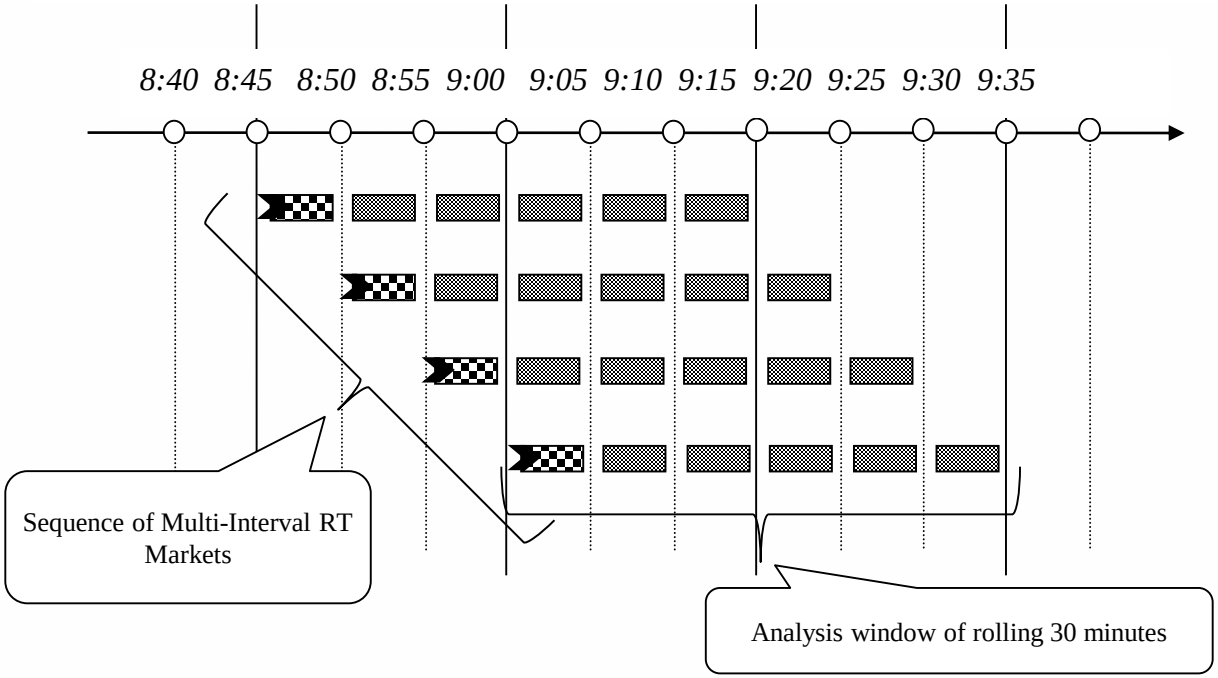
How it would work

- MIRTM with six 5-minute intervals (total of 30 minutes)

RT Market Execution: Depicts the start and end times of the clearing process and the length of symbol is indicative of maximum time allowed to clear market

Interval where the LMPs, MW awards (energy, AS) and Commitment Instructions are **ALL** **binding** commitment instructions

Intervals where **ONLY** Commitment Instructions are **binding** and the LMPs and MW awards (energy, AS) are **indicative**



Make-whole payments / net benefits

- If SCED commits a Resource based on a forecasted price, and the price does not materialize in real time, the Resource would be entitled to a make-whole payment
- The net benefits question is:
  - Would the savings to Load over time from committing lower-priced Resources that otherwise could not participate in the RTM exceed the cost of the occasional make-whole payment?
- ERCOT is developing a MIRTM ‘simulator’ to inform the decision-making process
  - Inputs include Load Resource bids and temporal constraints as provided by Demand Side Working Group participants

Benefits of MIRTM

- IMM recommendation, 2014 State of the Market Report:
  - 'We continue to believe there is opportunity to improve the commitment and dispatch of both load and generation resources that require longer than 5 minutes to come on line, but are available within 30 minutes. Therefore, we recommend that ERCOT evaluate improvements to this process that would allow it to facilitate better real-time generator and load commitments.'
- MIRTM could mitigate several shortcomings inherent in the current single interval (5-minute) RT Market
  - Could enable broader RTM participation by demand response and more efficient use of quick-start generators
  - Could allow ERCOT Operations to rely on market forces to address anticipated conditions, rather than out-of-market instructions
  - Could reduce number of instances of transient price spikes due to ramp rate limitations

Additional considerations

- MIRTM effectiveness will require a more accurate Short-Term Load Forecast
  - ERCOT has identified and is working on significant improvements to the STLF
- Market Management System (MMS) software vendor, ABB, has built MIRTM in numerous other markets, so development would not be ‘from scratch’
- Cost of implementation could be reduced if implemented concurrently with Real-Time Co-optimization of Energy and Ancillary Services

Questions?