# FERC Order 825 – 5 Minute Settlements Manual Revision Update

Ray Fernandez

Manager, Market Settlements Development

Market Implementation Committee

November 8, 2017

- Sections 11.2.1 and 11.2.2
  - Net Energy MWh is distributed over the five minute intervals that a registration is dispatched

    Real-time Load Response Distributed MW =

    Net Energy MWh * (12 / number of five minute intervals in the hour that the registration was dispatched)

  Update: The Real-time Load Response Distributed MW for any five minute interval is capped at the CBL. (The load reduction cannot be greater than the expected load.)

# Appendix

Slides presented for a First Read at the October 11, 2017 MIC meeting

- M-11 – Energy & Ancillary Services Market Operations

- M-18 – Capacity Market

- M-27 – Open Access Transmission Tariff Accounting

- M-28 – Operating Agreement Accounting

- M-29 - Billing

Conforming manual revisions are needed to document and implement the business rules filed with FERC

|  | Impacted Manuals |
|---|---|
| Oct 11 MIC | First Read |
| Oct 26 MRC | First Read |
| Nov 8 MIC | Vote |
| Dec 7 MRC | Vote |

# Manual 11 – Energy & Ancillary Services Market Operations

- Conforming updates throughout the Manual to reflect the change from hourly settlement to Real-time Settlement Interval (five minutes)
- Removed language that is already captured in M-28:
  - Section 2.12 Calculation of Ramp Limited Desired MWh
  - Section 4.2.10 Synchronized Reserve Settlements
  - Section 4.2.12 Synchronized Reserve Non-Performance
  - Section 10.4.3 Economic Energy Settlements

# Manual 18 – Capacity Market

4.3.1    Requirements of Load Management Products in RPM

4.3.5    Pre-emergency and Emergency Load Response Registration

4.3.10   Maintenance Outage Reporting for Annual Demand Resource

4.6.6    Auction Specific MW Transactions

4.9      Aggregate Resources

4.10     Seasonal Capacity Performance Resources

8.4.5.1  Use of Excess Available Capacity in Peak-Hour Period Availability Assessment

8.4A     Non-Performance Assessment

8.7A     Measuring Compliance during Performance Assessment Hour for Demand Resources

8.8      Load Management Test Compliance

8.9      Replacement Resources

9.1.3    Capacity Resource Deficiency Charge

9.1.4    Transmission Upgrade Delay Penalty Charge

9.1.5    Generation Resource Rating Test Failure Charge

9.1.11   Non-Performance Charge/Bonus Performance Credit

11.3     Capacity Plan

11.8.8   Non-Performance Charge/Bonus Performance Credit (FRR)

11.8.9   Physical Non-Performance Assessment

- Change Performance Assessment Hour (PAH) to Performance Assessment Interval (PAI) – in all impacted sections

- Define Performance Assessment Interval - Section 8.4A

- Change the hourly Non-Performance Charge Rate to an interval Non-Performance Charge Rate - Sections 8.4A, 9.1.11, & 11.8.8

- Update hourly rate of 0.01667 MWs/PAH to an interval rate of 0.00139 MWs/PAI for FRR Entity's physical option of non-performance assessment – Section 11.8.9

- Clarify when load reduction is recognized for FSL customer

- Clarify that effective with five-minute settlement implementation, for a partial dispatch clock hour, the Expected Performance of a Demand Resource is not adjusted by the percentage of the hour dispatched

- Describe how the actual hourly load reduction is flat-profiled over the set of dispatch intervals in the hour (when five-minute revenue meter data is not submitted)

- Clarify that actual load reduction for a registration for a Performance Assessment Interval is capped at the PLC of the registration in summer period and at weather-adjusted Winter Peak Load of the registration in winter period

# Manual 27 – Open Access Transmission Tariff Accounting

- Energy Imbalance Service Accounting
  - Remove reference to "hourly" LMP and replace with "five minute" LMP

# Manual 28 – Operating Agreement Accounting

- Revenue Data for Settlements
  - Define settlement interval data for Day-ahead and Real-time energy markets
  - Describe how Revenue Data for Settlements is used in settlement calculations
  - Describe how generation hourly revenue meter data is scaled using telemetry or State Estimator data

- **Spot Market Energy Accounting**
  - Section 3.2 – Business Rules for InSchedule and Power Meter Data Submissions
    - Add details on the process for a Market Participant to request five minute revenue meter data submissions in Power Meter
  - Section 3.3 – Renamed to Spot Market Energy
    - Replace net interchange concept with withdrawals and injections
    - Day-ahead Spot Market remains hourly
    - Balancing Spot Market moves to five minute intervals

- Spot Market Energy Accounting
  - Section 3.8 – Spot Market Energy Charges
    - Describe Day-ahead Spot Market Energy Charges based on hourly difference between scheduled energy withdrawals and injections
    - Describe Balancing Spot Market Energy Charges on a five minute interval basis using the real-time five minute System Energy Price
    - Update data elements and formulas

- **Regulation Accounting**
  - Regulation Credits - Section 4.2
    - Credits calculated using the five minute Regulation Market Capability Clearing Price (RMCCP) and Regulation Market Performance Clearing Price (RMPCP)
    - Performance Score calculated every five minutes
  - Lost Opportunity Cost Credits
    - Calculated on a five minute interval
    - Shoulder hour LOC modified to use the three five minute ramp-in and ramp-out intervals for preceding and following hour
  - Total Hourly Reg Credits = sum of five minute interval Regulation Clearing Price credits + LOC credits in an hour

- Regulation Accounting
  - Regulation Charges – Section 4.3
    - Methodology Change: RMCCP and RMPCP credits allocated based on hourly real-time load adjusted obligation ratio share
      - Hourly obligation is adjusted for regulation bilaterals

    - No change to LOC credits allocation
      - Based on ratio share of hourly regulation purchases

- **Operating Reserve Accounting**
  - Operating Reserve Credits - Section 5.2
    - No changes to Day-ahead Operating Reserve credits
    - Offer and revenues for Balancing Operating Reserve credits move from hourly to five minute interval
    - LOC credit calculations move from hourly to five minute interval
    - Segments continue to be determined for operating periods but are no longer constrained to hourly boundaries. Segments can start and end intra-hour.

- **Operating Reserve Accounting**
  - Operating Reserve Charges – Section 5.3
    - No changes to Day-ahead Operating Reserve charges
    - Balancing Operating Reserve charges
      - Deviations for generating resources, withdrawals, and injections calculated every five minutes and summed to an hourly charge
        - » Existing requirements for generating resources not following PJM dispatch move from hourly to five minute interval
      - Total Daily Balancing Operating Reserve Charges = sum of the hourly deviation charges
      - Charge allocation remains the same, based on ratio share of daily deviations

- **Synchronized Reserve Accounting**
  - Synchronized Reserve Credits – Section 6.2
    - Credits calculated on a five minute interval
    - Tier 1
      - When the Non-Synchronized Market Clearing Price is $0, Tier 1 credits equal the response MW time the Synchronized Energy Premium ($50/MWh) divided by 12
      - When the Non-Synchronized Market Clearing Price is not equal to $0, Tier 1 credits are paid at the Synchronized Reserve Market Clearing Price (SRMCP) divided by 12
    - Tier 2
      - Credits paid at the SRMCP divided by 12
      - Sync Reserve LOC credits calculated on a five minute interval

- **Synchronized Reserve Accounting**
  - Synchronized Reserve Charges – Section 6.3
    - Add equations to provide detail on adjusted obligation, Tier 1 charges, Tier 2 charges, and Tier 2 LOC calculations
    - Tier 1
      - Charges allocated hourly based on Market Participant ratio share of their Tier 1 adjusted obligation
    - Tier 2
      - Charges allocated hourly based on Market Participant ratio share of their adjusted Sync Reserve obligation minus any Tier 1 reserve applied to the obligation
    - Refund for Tier 2 shortfall calculated on a five minute interval

- Non-Synchronized Reserve Accounting
  - Non-Synchronized Reserve Credits – Section 7.2
    - Credits calculated on a five minute interval using the five minute Non-Synchronized Reserve Market Clearing Price divided by 12
    - Non-Synchronized Reserve LOC credits calculated on a five minute interval
    - Total Hourly Non-Sync Credits = sum of five minute interval Non-Sync Clearing Price credits + Non-Sync LOC credits in an hour

- Non-Synchronized Reserve Accounting
  - Non-Synchronized Reserve Charges – Section 7.3
    - Methodology Change: NSRMCP credits allocated based on hourly non-synchronized reserve adjusted obligation ratio share
      - Hourly obligation is adjusted for bilateral purchase and sales

    - No change to LOC credits allocation
      - Based on ratio share of hourly non-synchronized reserve purchases

- **Transmission Congestion Accounting**
  - Day-ahead Implicit and Explicit Congestion Charges
    - Remains an hourly calculation
    - Bus prices replaced with aggregate prices
  - Balancing Implicit and Explicit Congestion Charges
    - Calculations change to five minute intervals
    - Bus prices replaced with aggregate prices

- **Transmission Loss Accounting**
  - Day-ahead Implicit and Explicit Loss Charges
    - Remains an hourly calculation
    - Bus prices replaced with aggregate prices
  - Balancing Implicit and Explicit Loss Charges
    - Calculations change to five minute intervals
    - Bus prices replaced with aggregate prices

- **Emergency Energy Accounting**
  - Replace net interchange concept with withdrawals and injections
  - Calculations change to five minute intervals:
    - Emergency Energy Purchases
    - Emergency Energy Sales
    - Min Generation Emergency Purchases
    - Min Generation Emergency Sales

- Load Response Programs Accounting
  - Update data elements for Full Emergency and Emergency Energy Only and Real-time Economic Load Response sections
  - Describe how the reduction MWh value is distributed over sub-hourly dispatch intervals
  - Update calculations to determine the credits for a five minute interval
  - Conduct the Net Benefits Test on a five minute interval

- Meter Reconciliation Accounting
  - Replace "MWh" with "MW" to reflect the change to a five minute MW value in calculating MW weighted average interface and generation real-time LMPs

- **Station Power Accounting**
  - Use generation MW values from energy market settlements for monthly netting calculation
  - Allocation of net negative MWh across five minute intervals where negative during the month

# Manual 29 – Billing

- **Monthly Billing Statement**
  - Sections 2.1.1, 2.12, 2.1.3
    - Change "hourly" references to "settlement interval" where appropriate
  - Section 2.1.2
    - Remove ComEd from RTO Start-up Cost Recovery credits
    - Delete Expansion Cost Recovery credits since no longer applicable