Power Supplier Energy Settlements

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Power Supplier Energy Settlements

- **Objectives Per Settlement Name:**
  - Day Ahead Market Energy
  - Balancing Market Basis MW
  - Balancing Market Energy
    - Provide Settlement Description
    - Identify Settlement Eligibility
    - Name Settlement Determinants
    - Name Settlement Intermediates
    - Explain Settlement Algorithm
    - Step Through Settlement Scenario
    - Perform Settlement Example
    - Note Settlement Reference Material

Power Supplier Energy Settlements

- **Day-Ahead Market Energy Description**
  - Intended to compensate Power Suppliers for DAM Energy sales via Energy schedules to the NYISO.

Day Ahead Market Energy

- **Settlement Eligibility**
  - Power Suppliers will be credited for Day-Ahead Market Energy if:
    - Power Supplier's gen bus is scheduled to sell energy in NYISO DAM
  - Power Suppliers will be charged for Day-Ahead Market Energy if:
    - Scheduled transactional energy is greater than scheduled DAM energy

Day Ahead Market Energy

- **Settlement Determinants**
  - Hr DAM Energy Price: Gen ($/MW)
  - Hr DAM Loss Price: Gen ($/MW)
  - Hr DAM Cong Price: Gen ($/MW)

  - Hr DAM Sched Gen (MW)
  - Hr DAM Sched Trans: Gen (MW)

Day Ahead Market Energy

- **Settlement Intermediates**
  - Hr NYISO DAM Energy (MWh)
  - Hr DAM Energy StImnt: Gen ($)
  - Hr DAM Loss StImnt: Gen ($)
  - Hr DAM Cong StImnt: Gen ($)
- **Settlement Results**
  - Hr Total DAM StImnt: Gen ($)

Day Ahead Market Energy

- ## Settlement Algorithm

Hr Total DAM Stlmnt: Gen ($) =
Hr DAM Energy Stlmnt: Gen ($) + Hr DAM Loss Stlmnt: Gen ($) + Hr DAM Cong Stlmnt: Gen ($)

Where:
Hr DAM Energy Stlmnt: Gen ($) =
Hr NYISO DAM Energy (MWh) x Hr DAM Energy Price: Gen ($/MW)

Hr DAM Loss Stlmnt: Gen ($) =
Hr NYISO DAM Energy (MWh) x Hr DAM Loss Price: Gen ($/MW)

Hr DAM Cong Stlmnt: Gen ($) =
Hr NYISO DAM Energy (MWh) x (-1) (Hr DAM Cong Price: Gen ($/MW))

Hr NYISO DAM Energy (MWh) =
Hr DAM Sched Gen (MW) – Hr DAM Sched Trans: Gen (MW)

Day Ahead Market Energy

- **Settlement Scenario 1**
  - ‘Generator A’ submits DAM offer
    - Selling energy to NYISO
    - Offering 50MWs in HB 3
  - Schedule is accepted by NYISO
  - DAM Energy Price is $25.25
  - DAM Loss Price is $3.06
  - DAM Congestion Price is - $5.49
  - DAM LBMP for HB 3 is $33.80
  - Generator will receive a Day Ahead Energy Settlement for HB 3

Day Ahead Market Energy

Settlement Example 1

Hr Total DAM Stlmnt: Gen ($) = $1,690.00
$1,262.50 + $153 + $274.50

Where:
Hr DAM Energy Stlmnt: Gen ($) = $1,262.50
50 x $25.25

Hr DAM Loss Stlmnt: Gen ($) = $153
50 x $3.06

Hr DAM Cong Stlmnt: Gen ($) = $274.50
50 x (-1) (- $5.49)

Hr NYISO DAM Energy (MWh) = 50
50 – 0

Day Ahead Market Energy

- **Settlement Scenario 2**
  - ‘Generator A’ submits DAM offer HB 7
    - Accepted DAM Schedule 125 MWs
    - DAM Transaction Schedule 35 MWs
  - DAM Energy Price is $31.29
  - DAM Loss Price is $2.10
  - DAM Congestion Price is - $0.01

Day Ahead Market Energy

Settlement Example 2

Hr Total DAM Stlmnt: Gen ($) = $3,006.00
$2,816.10 + $189 + $0.9

Where:
Hr DAM Energy Stlmnt: Gen ($) = $2,816.10
90 x $31.29

Hr DAM Loss Stlmnt: Gen ($) = $189
90 x $2.10

Hr DAM Cong Stlmnt: Gen ($) = $0.9
90 x (-1) (- $0.01)

Hr NYISO DAM Energy (MWh) = 90
125 – 35

Day Ahead Market Energy

- **Summary**
  - Power Suppliers Eligible to Receive Payment
    - Selling Energy to NYISO
  - Payments Based on:
    - Accepted DAM Schedule
    - DAM LBMP

Day Ahead Market Energy

- **Settlement Reference Material**
  - Accounting and Billing Manual Section 4
    - Advisory Billing File
    - Power Supplier
      - Day Ahead Forward Energy $
    - Hourly Bill Code 204
    - Daily Bill Code 301
  - DSS Corporate Report
    - Settlement Details - Power Supplier - Day Ahead Market Energy

Power Supplier Energy Settlements

- **Objectives Per Settlement Name:**

  - Day Ahead Market Energy
  - Balancing Market Basis MW
  - Balancing Market Energy

Power Supplier Energy Settlements

- **Balancing Market Basis MW Description**
  - Number representing the generation output value used as the basis for the determination of the amount of the given Generator's balancing market Energy (MW), for the given RTD-interval.

Balancing Market Basis MW

- **Eligibility**
  - Balancing Market Basis MW
    - Calculated for all Generators located within the New York Control Area (NYCA), assigned to an organization.

Balancing Market Basis MW

- **Determinants**
  - Hr Gen MA Reported (MWh)
  - RTD Gen Avg Actual Energy (MW)
  - RTD Basepoint
  - RTD Interval Seconds
  - RTD AGC Basepoint (MW)
  - Hr Gen Upper Op Limit (MW)
  - RTD Avg Energy Limit (MW)

Balancing Market Basis MW

- **Determinants**
  - RTD Gen Avg Actual Injection Energy (MW)*
  - RTD Gen Avg Actual Withdrawal Energy (MW)*
  - Hr Gen Lower Op Limit (MW)*

**** Specific to ESRs***

Balancing Market Basis MW

- **Determinants**
  - RTD Out of Merit Type Desc
  - RTD Out of Merit Type ID
  - RTD RT Sched Reg Avail (MW)
  - RTD Reserve Pickup Ind
  - RTD PURPA Units Class Type

Balancing Market Basis MW

- **Intermediates**
  - Hr Gen Avg Actual Energy (MWh)
  - RTD Gen Adjusted Energy (MW)

- **Results**
  - RTD RT Gen Basis Energy (MW)
  - Hr RT Gen Basis Energy (MWh)

Balancing Market Basis MW

- **Intermediates**
  - RTD Gen Adjusted Injection Energy (MW)*
  - RTD Gen Adjusted Withdrawal Energy (MW)*
  - Hr Gen ISO PTS Avg Actual Injection Energy (MWh)*
  - Hr Gen ISO PTS Avg Actual Withdrawal Energy (MWh)*
  - RTD Gen Injection Tolerance (MW)*
  - RTD Gen Withdrawal Tolerance (MW)*

- **Results**
  - RTD Gen Default Balancing Basis (MW)*

**** Specific to ESRs***

Balancing Market Basis MW

- Algorithm

RTD RT Gen Basis Energy (MW) =

Scenario 1 - RTD Gen Adjusted Energy (MW) or

Scenario 2 - Minimum (RTD Basepoint, RTD Gen Adjusted Energy (MW)) or

Scenario 3 - Minimum (RTD AGC Basepoint, RTD Gen Adjusted Energy (MW)) or

Scenario 4 - Minimum (RTD Avg Energy Limit (MW), RTD Gen Adjusted Energy (MW)) or

Scenario 5 - RTD Gen Default Balancing Basis (MW)

Balancing Market Basis MW

- Algorithm

RTD RT Gen Basis Energy (MW) =
Scenario 1 - RTD Gen Adjusted Energy (MW) if:

1. In Large Event Reserve Pickup
2. PURPA Class (Fixed)
3. Out of Merit for Reliability
4. Wind Unit & Wind Output Not Limited

RTD Gen Avg Actual Energy (MW) * {Hr Gen MA Reported (MWh) / Hr Gen Avg Actual Energy (MWh)}

Where:
Hr Gen Avg Actual Energy (MWh) =
∑ RTD Gen Avg Actual Energy (MW) * {RTD Interval Seconds/3600} for all RTD Intervals in the given hour

Balancing Market Basis MW

- Algorithm

RTD RT Gen Basis Energy (MW) =

Scenario 2 - **Minimum (RTD Basepoint, RTD Gen Adjusted Energy (MW)) if:**
1. Operator Intervention

RTD RT Gen Basis Energy (MW) =

Scenario 3 - **Minimum (RTD AGC Basepoint, RTD Gen Adjusted Energy (MW)) if:**
1. Regulating

RTD RT Gen Basis Energy (MW) =

Scenario 4 - **Minimum (RTD Avg Energy Limit (MW), RTD Gen Adjusted Energy (MW)) if:**
1. Non-Regulating
2. Wind Unit & Wind Output Limited

*****Note RTD Avg Energy Limit (MW) represents Compensable Power*****

Balancing Market Basis MW

- ## Algorithm

RTD RT Gen Basis Energy (MW) =
Scenario 5 - RTD Gen Default Balancing Basis (MW) if:

1. Energy Storage Resource

RTD Gen Adjusted Injection Energy (MW) + RTD Gen Adjusted Withdrawal Energy (MW)

Where:
RTD Gen Adjusted Injection Energy (MW) =
RTD Gen Avg Actual Injection Energy (MW) * {Hr Gen MA Reported (MWh) / Hr Gen ISO PTS Avg Actual Injection Energy (MWh)}

Hr Gen ISO PTS Avg Actual Injection Energy (MWh) =
∑ RTD Gen Avg Actual Injection Energy (MW) * {RTD Interval Seconds/3600} for all RTD Intervals in the given hour

RTD Gen Adjusted Withdrawal Energy (MW) =
RTD Gen Avg Actual Withdrawal Energy (MW) * {Hr Gen MA Reported (MWh) / Hr Gen ISO PTS Avg Actual Withdrawal Energy (MWh)}

Hr Gen ISO PTS Avg Actual Withdrawal Energy (MWh) =
∑ RTD Gen Avg Actual Withdrawal Energy (MW) * {RTD Interval Seconds/3600} for all RTD Intervals in the given hour

Balancing Market Basis MW

- **Summary**
  - Basis for Determining Generator's Balancing Market Energy (MW)
    - RTD Interval Level
  - Basis MW Dependent on Operating Scenario

Balancing Market Basis MW

- **Settlement Reference Material**
  - Accounting and Billing Manual Section 4
    - Appendix C
  - Advisory Billing File
    - Power Supplier
      - Hrly Integrated R/T Balancing MWh
    - Hourly Bill Code 207
    - Daily Bill Code 303
  - DSS Corporate Report
    - Settlement Details - Power Supplier - Balancing Energy

Power Supplier Energy Settlements

- **Objectives Per Settlement Name:**
  - Day Ahead Market Energy
  - Balancing Market Basis MW
  - Balancing Market Energy

Power Supplier Energy Settlements

- **Balancing Market Energy Description**
  - Intended to credit or charge Market Participants acting as Power Suppliers for Balancing Market Energy sold or purchased in the NYISO Balancing Energy Market.
  - Settlement accounts for Energy variations in a Generator's real-time dispatch from what is sold in the NYISO DAM and/or DAM Transaction Schedules.

Balancing Market Energy

- **Settlement Eligibility**
  - Balancing Market Energy Settlements are Performed for each RTD interval
    - Nominally Five Minutes in Length
    - Based on Generator's Measured Performance
      - Relative to: Scheduled Operation and Bid Parameters
    - Generator is not - Group Unit, Station Service Group, Curtailable Load, or Self Supply

Balancing Market Energy

- **Settlement Determinants**
  - Gen Type Desc
  - Hr DAM Sched Gen (MW)
  - Hr DAM Sched Trans: Gen (MW)
  - RTD RT Sched Trans: Gen (MW)

  - RTD Interval Seconds

  - RTD RT Energy Price: Gen ($/MW)
  - RTD RT Loss Price: Gen ($/MW)
  - RTD RT Cong Price: Gen ($/MW)

Balancing Market Energy

- **RTD Interval Seconds**
  - Typically 300 seconds/5 minute RTD Interval
  - Sometimes more or less…
  - Calculated as:

(Current Interval Time Stamp – Previous Interval Time Stamp)

Balancing Market Energy

- **RTD Interval Seconds Example**
  - Calculated as:

(Current Interval Time Stamp – Previous Interval Time Stamp)

  - HB 8

8:00:00 AM	300
8:05:00 AM	300
8:05:24 AM	24
8:06:42 AM	78
8:15:00 AM	498
8:20:00 AM	300
8:25:00 AM	300
8:30:00 AM	300
8:35:00 AM	300
8:40:00 AM	300
8:45:00 AM	300
8:50:00 AM	300
8:55:00 AM	300

Balancing Market Energy

- **Settlement Intermediates**
  - RTD Gen BalMkt Basis (MW)
  - RTD Gen BalMkt Energy (MW)

  - RTD BalMkt Energy Stlmnt: Gen ($)
  - RTD BalMkt Loss Stlmnt: Gen ($)
  - RTD BalMkt Cong Stlmnt: Gen ($)
- **Settlement Results**
  - RTD Total BalMkt Stlmnt: Gen ($)

Balancing Market Energy

- ## Settlement Algorithm

RTD Total BalMkt Stlmnt: Gen ($) =
RTD BalMkt Energy Stlmnt: Gen ($) + RTD BalMkt Loss Stlmnt: Gen ($) +
RTD BalMkt Cong Stlmnt: Gen ($)

Where:
RTD BalMkt Energy Stlmnt: Gen ($) =
RTD Gen BalMkt Energy (MW) x RTD RT Energy Price: Gen ($/MW) x RTD Interval Seconds/ 3600 seconds

RTD BalMkt Loss Stlmnt: Gen ($) =
RTD Gen BalMkt Energy (MW) x RTD RT Loss Price: Gen ($/MW) x RTD Interval Seconds/ 3600 seconds

RTD BalMkt Cong Stlmnt: Gen ($) =
RTD Gen BalMkt Energy (MW) x (-1) (RTD RT Cong Price: Gen ($/MW)) x RTD Interval Seconds/ 3600 seconds

Balancing Market Energy

- Settlement Algorithm

Where:
RTD Gen BalMkt Energy (MW) =
RTD Gen BalMkt Basis (MW) - Hr DAM Sched Gen (MWh) - {RTD RT Sched Trans: Gen (MW) - Hr DAM Sched Trans: Gen (MW)}

Balancing Market Energy

- **Settlement Scenario 1**
  - 'Generator A' sells Energy in RT Market
    - DAM Accepted Schedule of 50 MWs for HB 3
    - RTD Gen BalMkt Basis (MW) is 65 MWs for HB 3
  - No Transactions Scheduled for HB 3
  - Each Interval of HB 3 is 300 seconds
  - RT Energy Price for 03:00:00 is $33.65
  - RT Loss Price for 03:00:00 is $1.72
  - RT Congestion Price for 03:00:00 is $0
  - RT LBMP for 03:00:00 is $35.37
  - Generator will receive a Real Time Energy Settlement for HB 3

Balancing Market Energy

- ## Settlement Example 1

RTD Total BalMkt Stlmnt: Gen ($) = $44.21
$42.06 + $2.15 + $0

Where:
RTD BalMkt Energy Stlmnt: Gen ($) = $42.06
15 x $33.65 x 300/3600

RTD BalMkt Loss Stlmnt: Gen ($) = $2.15
15 x $1.72 x 300/3600

RTD BalMkt Cong Stlmnt: Gen ($) = $0
15 x (-1) (- $0) x 300/3600

Where:
RTD BalMkt Energy (MW) = 15
65 - 50 - {0 - 0}

Balancing Market Energy

- **Settlement Scenario 2**
  - ‘Generator A’ provides Energy in RT Operating HB 15
    - DAM Accepted Schedule of 130 MWs for HB 15
    - RTD Gen BalMkt Basis (MW) is 162 MWs for HB 15
  - DAM and RT Transaction Schedule 28 MWs for HB 15
  - Each Interval of HB 15 is 300 seconds
  - RT Energy Price for 15:30:00 is $917.89
  - RT Loss Price for 15:30:00 is $90.87
  - RT Congestion Price for 15:30:00 is -$4.49

Balancing Market Energy

- ## Settlement Example 2

RTD Total BalMkt Stlmnt: Gen ($) = $2,702
$2,447.71 + $242.32 + $11.97

Where:
RTD BalMkt Energy Stlmnt: Gen ($) = $2,447.71
32 x $917.89 x 300/3600

RTD BalMkt Loss Stlmnt: Gen ($) = $242.32
32 x $90.87 x 300/3600

RTD BalMkt Cong Stlmnt: Gen ($) = $11.97
32 x (-1)(-$4.49) x 300/3600

Where:
RTD BalMkt Energy (MW) = 32
162 - 130 - {28 - 28}

Balancing Market Energy

- **Summary**
  - Balancing Market Energy Settlement
    - Intended to credit or charge Market Participants for:
      - Balancing Market Energy Sold or Purchased
      - In NYISO Balancing Energy Market
  - Payments Based on:
    - RTD BalMkt Energy (MW)
    - RT LBMP

Balancing Market Energy

- **Settlement Reference Material**
  - Accounting and Billing Manual Section 4
    - Appendix C
  - Advisory Billing File
    - Power Supplier
      - Balancing Energy $
    - Hourly Bill Code 209
    - Daily Bill Code 304
  - DSS Corporate Report
    - Settlement Details - Power Supplier - Balancing Energy