

# 5 Minute Settlements Generation and Load Imbalance

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- **Withdrawals**

- + Demand
- + DECs
- + Exports
- + IBT sales

- **Injections**

- Generation
- INCs
- IBT purchases
- Imports
- Demand Response

All hourly values

On an hourly basis, DA Net Interchange is typically negative.

Day Ahead Net Interchange calculation is not impacted by 5 Minute Settlements.

- **Withdrawals**

- + Load
- + Exports
- + IBT sales

- **Injections**

- Generation
- Imports
- IBTs purchases

On an hourly basis, RT Net Interchange is typically negative.

Adding in losses plus inadvertent, RT Net Interchange nets to 0 for each hour.

All hourly values

- **Withdrawals**

- + Load (Flat profiled)
- + Exports (15 minutes)
- + IBT sales (Flat profiled)

- **Injections**

- Generation (5 minutes)
- Imports (15 minutes)
- IBTs purchases (Flat profiled)

On a 5 minute basis, an imbalance is inherently introduced in RT Net Interchange due to flat profiling.

As a result the sum of the twelve 5 minute intervals will not equal 0 MW.

\*\*\* The current hourly RT Net Interchange does not equal 0 MW \*\*\*

$$\sum \text{RT Net Interchange} + \text{Hourly Losses} + \text{Inadvertant} = 0 \text{ MW}$$

- PJM will transition from an hourly calculation to a 5 minute calculation for Balancing Spot Market Energy Charges
  - Day-ahead Spot Market Energy charge for each hour for each Market Participant:
    - *Day-ahead Spot Market Energy Charge = (Hourly Day-ahead Net Interchange) \* (Hourly Day-ahead System Energy Price)*
  - Balancing Spot Market Energy charge for each hour for each Market Participant:
    - *5 Minute Balancing Spot Market Energy Charge = (5 Minute Real-time Net Interchange – Flat Profiled Day-ahead Net Interchange) \* (5 Minute Real-time System Energy Price)*

- Day Ahead Spot Market Energy Charge = the value of the DA losses
- 5 Minute Balancing Spot Market Energy Charge = the value of the balancing losses
  - *Spot Market Loss Value = Day Ahead Spot Market Energy Charge + Hourly Sum of 5 Minute Balancing Spot Market Energy Charges*

- PJM calculates the total hourly transmission loss charges by summing the day-ahead and balancing loss charges for each market participant plus the **spot market value of losses**, including an adjustment for the inadvertent interchange loss value.
- PJM allocates the total hourly loss charges as hourly transmission loss credits for each market participant based on their hourly real-time load plus exports ratio share.

- Situation 1
  - If load **increases** through the hour, generation is priced accordingly. As a result \$ collected from load will be **less** than the \$ that needs to be paid to generation.
    - **Spot Market Value of Losses increases**
- Situation 2
  - If load **decreases** through the hour, generation is priced accordingly. As a result \$ collected from load will be **greater** than the \$ that needs to be paid to generation.
    - **Spot Market Value of Losses decreases**

# Generation / Load Imbalance Summary

5 Minute Gen / Load MW Imbalance component due to flat profiling



5 Minute RT Net Interchange



5 Minute Balancing Spot Market Energy Charge



Spot Market Loss Value



Total Hourly Transmission Loss Charges



Hourly Transmission Loss Credits allocate to market participants based on ratio share of hourly RT load plus exports