



5 Minute Settlements Manual 28 Updates

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- Issued on February 21, 2018
 - FERC approved PJM's compliance filing for 5 Minute Settlements
 - 4 additional revisions required
 1. Demand Response resources subject to applicable provisions for generation resources – M-28 update
 2. Clarification on Regulation charge calculation
 3. Wording change for consistency on Bonus Performance
 4. Update the effective dates for Shortage Pricing and 5 Minute Settlements

- Identified an issue during Market Trials
- Revenue Data for Settlements calculation
 - Generation Resource submitting hourly revenue meter data
 - Specific operating condition
 - Positive and negative Telemetry/State Estimator values in an hour
 - Opposite sign between Hourly Integrated Telemetry/State Estimator and the Hourly Revenue Meter value

Actual condition from Market Trials. Values are both + and - in an hour.

Interval Number	Telemetry/SE (MW)	Current Revenue Data for Settlements (MW)	Proposed Revenue Data for Settlements (MW)
1	3.96	-678.857143	2.836682
2	-6.68	1145.142857	-8.574891
3	3.12	-534.857143	2.234961
4	4.27	-732.000000	3.058745
5	5.18	-888.000000	3.710609
6	-3.13	536.571429	-4.017875
7	1.53	-262.285714	1.095991
8	2.79	-478.285714	1.998571
9	-2.86	490.285714	-3.671286
10	0.46	-78.857143	0.329514
11	-1.23	210.857143	-1.578910
12	-7.34	1258.285714	-9.422110
	Telemetry/SE Hourly Average(MW)	Power Meter (MW)	
	0.005833	-1	

Large Scaling Factor results in erroneous scaled values

New calculation results in accurate settlement values

Opposite signs

Values are all the same sign in an hour.

Interval Number	Telemetry/SE (MW)	Current Revenue Data for Settlements (MW)	Proposed Revenue Data for Settlements (MW)
1	3.96	4.467215	4.467215
2	6.68	7.535605	7.535605
3	3.12	3.519624	3.519624
4	4.27	4.816921	4.816921
5	5.18	5.843478	5.843478
6	3.13	3.530905	3.530905
7	1.53	1.725969	1.725969
8	2.79	3.147356	3.147356
9	2.86	3.226322	3.226322
10	0.46	0.518919	0.518919
11	1.23	1.387544	1.387544
12	7.34	8.280141	8.280141
	Telemetry/SE Hourly Average(MW)	Power Meter (MW)	
	3.545833	4	

Same results are produced when the specific condition does not occur

Both positive values



Technical Correction – Revenue Data for Settlements

Previous calculation:

$$\text{Revenue Data for Settlements} = \text{Time-Weighted Telemetry MW} * \text{Scaling Factor}$$

Corrected calculation:

$$\begin{aligned} \text{Revenue Data for Settlements} &= \text{Time-Weighted Telemetry MW} \\ &+ (\text{Hourly Revenue Meter MWh} - \text{Hourly Integrated Telemetry MWh}) \\ &* 12 * \left| \frac{\text{Time-Weighted Telemetry MW}}{\sum_{i=1}^n |\text{Time-Weighted Telemetry MW Value}_i|} \right| \end{aligned}$$

- Removed reference to M-33, Administrative Services for the PJM Interconnection Agreement
 - Not cited in M-28

- Added title to the section - “Business Rules for Revenue Data for Settlements”
- Removed the calculation for the Telemetry and State Estimator Scaling Factor
- Updated the check to determine whether telemetry or State Estimator values are used for scaling
 - Required since Scaling Factor is no longer being calculated

- Corrected the Revenue Data for Settlements calculation
- Noted Demand Response resources can submit hourly or five minute load reduction data

- For Emergency and Economic Demand Response
 - Added equations to calculate the real-time settlement interval load reduction based on five minute data