



# 5-Minute Settlements Roadmap

As of March 20, 2018

- Proposed implementation date now April 1, 2018
- FERC Order 825 – Sub-Hourly Settlements
  - Align settlement and dispatch intervals by:
    - Settling energy transactions in its real-time markets at the same time interval it dispatches energy
    - Settling operating reserves transactions in its real-time markets at the same time interval it prices operating reserves
    - Settling intertie transactions in the same time interval it schedules intertie transactions
  - Final Rule issued June 16, 2016
  - Compliance Filing submitted January 11, 2017
- Align prices with resource dispatch instructions and operating needs, providing appropriate incentives for resource performance

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Training Implementation</b>									
<b>Member Education Session</b>	◆ January 8, 2018								
<b>Production Implementation</b>				◆ Implementation Date: April 1, 2018					

**Legend**

- Start Date
- ◆ End Date



- Market Settlement Calculation System (MSCS)
- Market Settlement Reporting System (MSRS)
  - New 5 Minute reports
  - Minimize changes to current hourly reports
- Power Meter
  - Accept 5 minute meter data (though not required)
- Emergency Procedures application changes
  - User Interface changes
  - XML file changes

- The following MSRS reports containing static test data for the operating days of 11/13 and 12/15 have been released in the MSRS training environment.
  - Spot Market Energy Charge Summary
  - Energy Market & Congestion Loss Charges Details
  - Generator LMP Charge Summary
  - Balancing Generator LMP Charges
  - Explicit Loss Charges
  - Explicit Congestion Charges
  - Real-Time Daily Energy Transactions\*
  - Day-Ahead Daily Energy Transactions\*

\* Denotes new

- Ancillary Services and Operating Reserves data available in MSRS Training environment
  - Utilize the same operating days as the Day-ahead and Balancing market trials
    - 11/13/2017 and 12/15/2017
  - Regulation, Sync Reserve, and Non-Sync Reserve data on 2/20
  - Load Response and Operating Reserve data on 2/26
  - Communication will be sent out to identify specific reports
- 3<sup>rd</sup> Market Trial date – Posted on or before 3/19 for the date of 3/6/2018
- Questions/Comments?
  - [mss@pjm.com](mailto:mss@pjm.com)

## Generation Resource

- Sends email to PJM Market Settlements at least 3 business days prior to Operating Day for which 5-minute revenue meter data is effective

## PJM Market Settlements

- Performs verification
- Notifies Generation Resource that resource is set-up in Power Meter

## Generation Resource

- Submits five minute revenue meter data on effective Operating Day

- Based on member requests, the following data will be available beginning March 6 for testing purposes for the operating day of March 5
  - Five Minute Real-Time LMPs – Daily only
  - Five Minute Ancillary Services Prices – Daily only
- Data Miner 2 beta environment will provide UI and API interface to access this data
- These Real-Time LMPs will be considered test data and will not be used for any settlement calculations

**Note 1:** PJM is publishing the LMP data solely for member testing purposes only. These LMPs will be available on Data Miner 2 train environment until April 1. After April 1, the verified LMP data will be available in Data Miner 2 production

**Note 2:** This data will be available on Data Miner 2 only. The csv files will be posted on [pjm.com](http://pjm.com) will remain the hourly LMP values





# Existing Hourly Data: Where will data exist for an Operating Day?

	Operating Days < 4/1/2018	Operating Days >= 4/1/2018
Hourly RT LMP & Ancillary Service LMP (Daily and Monthly files)	<ul style="list-style-type: none"> <li>Flat files on pjm.com**</li> <li>Data Miner 2</li> </ul>	<ul style="list-style-type: none"> <li>Data Miner 2</li> </ul>
Hourly DA LMP (Daily and Monthly Files)	<ul style="list-style-type: none"> <li>Flat files on pjm.com**</li> <li>Data Miner 2</li> </ul>	<ul style="list-style-type: none"> <li>Data Miner 2</li> </ul>
Operational Data Page	pjm.com**	
RT Marginal Value	<ul style="list-style-type: none"> <li>Flat files on pjm.com**</li> <li>Data Miner 2</li> </ul>	<ul style="list-style-type: none"> <li>Data Miner 2</li> <li>Consolidated into 1 data feed</li> <li>5-minute version only</li> </ul>
RT Transmission Constraints	<ul style="list-style-type: none"> <li>Flat files on pjm.com**</li> <li>Data Miner 2</li> </ul>	
Preliminary Billing Data <ul style="list-style-type: none"> <li>Operating Reserve Rates</li> <li>Regulation</li> <li>Sync &amp; Non-Sync Reserves</li> <li>DASR</li> </ul>	<ul style="list-style-type: none"> <li>Flat files on pjm.com**               <ul style="list-style-type: none"> <li>Data Miner 2</li> </ul> </li> </ul>	

\*\*3Q 2018 pjm.com flat files retirement plan and Operational Data Page changes will continue to be discussed at Tech Change Forum

## Operating Days $\geq$ 4/1/2018

5-minute RT LMPs	Data Miner 2 only
5-minute Ancillary Service LMPs	
5-minute RT Marginal Value and Transmission Constraints	
RT Settlement LMPs in eDataFeed	Data Miner 2 only

- Preliminary and Final load weighted average transmission zone LMPs and residual aggregate LMPs will be available

# Appendix – Previously Communicated Information

## **Hourly RT and DA LMP CSV files**

Available through March 31, 2018

Will no longer be published  
effective April 1, 2018

## **Production Data Miner**

Hourly RT LMPs, Ancillary Service  
Clearing Prices, and DA LMPs available  
in August 2017

Hourly values will continue to be  
published in Data Miner after April 1,  
2018

5 Minute RT LMPs and Ancillary Service  
Clearing Prices published on  
April 1, 2018

- PJM will be implementing the following:
  - Transpose the data label column into numerous report columns and add in EPT Interval Ending and GMT Interval Ending columns
    - Conserves report width, but adds more rows to report
    - Removes “Total” column



# Option Implemented: Transposed Data Labels

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Operating Reserve Generator Credit Details																								
Customer Account: Report Creation Timestamp (EPT):																								
Start Date:		End Date:																						
4000.01	4000.02	4000.04	4001.4	4001.41	4000.63	4000.64	3000.8																	
Customer ID	Customer Code	Date	EPT Interval Ending	GMT Interval Ending	Unit ID	Unit Name	Unit Ownership Share	DA Generator LMP (\$/MWh)	DA Scheduled MWh	Dispatch Rate (\$/MWh)	RT Generator LMP (\$/MWh)	RT Generation (MWh)	DA Schedule ID	DA Energy Offer (\$)	DA No-Load Cost (\$)	DA Startup Cost (\$)	DA Value (\$)	DA Net Revenue (\$)	Scheduled Min (MWh)	Scheduled Max (MWh)	RT Schedule ID	Segment ID	BOR Reason ID	BOR Region ID
123	ABC		2/1/2018 0:05	2/1/2018 5:05	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	2	1	2
123	ABC		2/1/2018 0:10	2/1/2018 5:10	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	2	1	2
123	ABC		2/1/2018 0:15	2/1/2018 5:15	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	2	1	2
123	ABC		2/1/2018 0:20	2/1/2018 5:20	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	2	1	2
123	ABC		2/1/2018 0:25	2/1/2018 5:25	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	1	1	2
123	ABC		2/1/2018 0:30	2/1/2018 5:30	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	1	1	2
123	ABC		2/1/2018 0:35	2/1/2018 5:35	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	1	1	2
123	ABC		2/1/2018 0:40	2/1/2018 5:40	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	1	1	2
123	ABC		2/1/2018 0:45	2/1/2018 5:45	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	1	1	2
123	ABC		2/1/2018 0:50	2/1/2018 5:50	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	1	1	2
123	ABC		2/1/2018 0:55	2/1/2018 5:55	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	1	1	2
123	ABC		2/1/2018 1:00	2/1/2018 6:00	12341234	ABC	1	1.123	1.123	1.123	1.123	1.123	11	1.123	1.123	1.123	1.123	1.123	1.123	1.123	12	1	1	2

Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
Economic Min (MWh)	Economic Max (MWh)	RT Dispatch Desired MWh	RT Dispatch Desired Type	RT MWh Used	Bal Value MWh Used	RT Energy Offer (\$)	RT No-Load Cost (\$)	RT Startup Cost (\$)	RT Additional Startup Cost (\$)	Bal Value (\$)	Operating Reserve Offsetting Synch Reserve Revenue (\$)	Operating Reserve Offsetting Reactive Services Revenue (\$)	Operating Reserve Offsetting DASR Revenue (\$)	Operating Reserve Offsetting Non-Synch Reserve Revenue (\$)	Bal Net Revenue (\$)
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1.123	1.123	1.123	1	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123