Markets Report

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February 18, 2020
PJM Wholesale Cost for January 2020 is $42.43/MWh, down from full-year 2019 costs of $48.98/MWh. (Slides 5 & 6)

Slides pertaining to weather conditions, in addition to slides showing average fuel prices, generation on-line fuel mixes, and System Marginal Prices have been combined into a Market Conditions section. (Slides 7-16)

In January, temperatures were above average for most of the month. Thus, the sum of Heating and Cooling Degree Days was also below its historic average. (Slides 8-10)

Because temperatures were mild, Energy use was below the historic average. (Slides 8-10)

In January, uplift exceeded $800,000 on one day – the 30th. (Slides 21 & 22)
Executive Summary

• Load-weighted average LMP in January 2020 is $22.05/MWh: (Slides 28-29)
  – January 2020 was $22.05/MWh, which is lower than both January 2019 ($32/MWh) and January 2018 ($84/MWh).

• FTR revenue adequacy for the month of January is 100% and the 2019-2020 Planning Year is currently fully funded. (Slides 44-47)

• Congestion remains low and lower than the values observed last January. (Slide 45)

• Regulation and Synchronized Reserve market costs have generally tracked with energy prices over time. (Slides 60-62)
Markets Report
Market Conditions
The weather parameter shown in the following slide is a monthly sum of daily Heating Degree Days (HDD) and Cooling Degree Days (CDD).

Degree days represent a deviation from a baseline temperature, in this case 60 degrees for HDD and 65 degrees for CDD. As temperatures get more extreme, colder or hotter, either HDDs or CDDs, respectively, will increase.

Typically, winter months will only record HDDs, while summer months will only record CDDs. Shoulder months may have both HDDs and CDDs.

Degree Days are calculated using a daily load weighting that weights values from stations in each TO zone according to the zonal contribution to the RTO peak on that day.

Average values use data from 1998 to the most recent complete year, in this case, 2019. Averages include load data for all of TO zones in the current RTO footprint.
Historic Average Weather and Energy versus Current Month - Daily

- Daily Energy as a Percent of the Historic Average for January
- Daily HDD + CDD as a Percent of the Historic Average for January
- Daily Temperature as a Percent of the Historic Average for January
Average Fuel Prices - Daily

Fuel Price Source: S&P Global Platts

- Average Gas - $1.93
- Average Coal - $1.78
- Average Oil - $12.92
- Average LMP - $21.91
Daily Difference Between Day-Ahead and Real-Time System Marginal Prices

Positive values represent days when the DA daily average price was higher than RT. Negative values represent days when the DA price was lower.

Average price difference for January = $0.26
Monthly Generation by Fuel

'Mother' includes Hydro, Oil, Solar, Wind, and Other
'Other' includes Flywheels, Multiple Fuels, Storage, and Other Renewables
Daily Generation by Fuel - January

'Mother' includes Hydro, Oil, Solar, Wind, and Other
Daily Generation by Fuel, Other - January

‘Other’ includes Flywheels, Multiple Fuels, Storage, and Other Renewables
Operating Reserve

(Uplift)
• In January, uplift exceeded $800,000 on one day – the 30th.
  – Reasons include local reliability

More information on Uplift can be found on PJM’s website at [Drivers of Uplift](#)
Percent of Total CT, CC and Steam Hours with LMP < Offer

- CT
- CC & Steam

JAN18, FEB18, MAR18, APR18, MAY18, JUN18, JUL18, AUG18, SEP18, OCT18, NOV18, DEC18, JAN19, FEB19, MAR19, APR19, MAY19, JUN19, JUL19, AUG19, SEP19, OCT19, NOV19, DEC19, JAN20
• Beginning in December 2008, the daily Balancing Operating Reserves (BOR) rate was replaced with six different BOR rates: RTO BOR for Reliability Rate, RTO BOR for Deviations Rate, East BOR for Reliability Rate, East BOR for Deviations Rate, West BOR for Reliability Rate, West BOR for Deviations Rate.

• Reliability rates are charged to all real-time load and exports, whereas deviation rates, as before, are charged only to real-time deviations. RTO rates are charged to the whole footprint, whereas East and West rate adders are charged based on location.
Energy Market

LMP Summary
Load-Weighted Average LMP

$/MWh

$100
$80
$60
$40
$20
$0

$84
$26
$33
$35
$38
$31
$33
$34
$35
$34
$33
$31
$32
$28
$30
$26
$24
$23
$24
$28
$29
$28
$27
$23
$22

JAN18  FEB18  MAR18  APR18  MAY18  JUN18  JUL18  AUG18  SEP18  OCT18  NOV18  DEC18  JAN19  FEB19  MAR19  APR19  MAY19  JUN19  JUL19  AUG19  SEP19  OCT19  NOV19  DEC19  JAN20
Fuel Cost Adjusted LMP (Referenced to 1999 Fuel Prices)
Energy Market

Demand Response Summary
Demand Side Response Estimated Revenue

$ Millions

Year: 2008 to 2020

- Capacity
- Ancillary Services
- Emergency Energy
- Economic Energy
- Economic Energy Incentives
Economic Demand Response Activity

*Data for the last few months are subject to significant change due to the settlement window.*
Total Registered MW in PJM's Economic Demand Response
Energy Market

Virtual Activity Summary
The following six charts depict trends in submitted and cleared virtual and up-to-congestion transactions, in terms of number and volume, into the PJM Energy Market. The first two of these charts show the submitted and cleared increment and decrement bids (virtual transactions or virtuals) and they are the same as what was previously being presented in this report. The two charts after them display the trends in submitted and cleared up-to-congestion transactions into the PJM Energy Market. The last two of these six charts combine the virtual and up-to-congestion transactions and show the sum of these two categories.

To clarify what a bid or transaction is, please consider the following example: An offer (increment, decrement or up-to-congestion) of 10 MW, valid for eight hours for a given day, is captured in the charts as eight submitted bids/transactions and 80 submitted MWh. If this offer fully clears for three of the hours it was submitted for, it shows in the charts as three cleared bids/transactions and 30 cleared MWh.
Virtual Bids (INC & DECs) - Total Volume

MWh (Millions)

- Submitted MWh
- Cleared MWh

| Month  | JAN18 | FEB18 | MAR18 | APR18 | MAY18 | JUN18 | JUL18 | AUG18 | SEP18 | OCT18 | NOV18 | DEC18 | JAN19 | FEB19 | MAR19 | APR19 | MAY19 | JUN19 | JUL19 | AUG19 | SEP19 | OCT19 | NOV19 | DEC19 | JAN20 |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|        | 10    | 9     | 8     | 7     | 6     | 5     | 4     | 3     | 2     | 1     | 0     | 0     | 10    | 9     | 8     | 7     | 6     | 5     | 4     | 3     | 2     | 1     | 0     | 10    | 9     | 8     | 7     |

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Up-To-Congestion Transactions - Total Number

Number of Transactions ( Millions )

- Submitted Transactions
- Cleared Transactions

|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
INCs, DECs and Up-To-Congestion Transactions - Total Number

Number of Transactions (Millions)

- Submitted Transactions
- Cleared Transactions

JAN18: 7.5
FEB18: 5.3
MAR18: 5.1
APR18: 4.8
MAY18: 4.5
JUN18: 4.2
JUL18: 4.0
AUG18: 3.8
SEP18: 3.6
OCT18: 3.4
NOV18: 3.2
DEC18: 3.0
JAN19: 3.8
FEB19: 3.5
MAR19: 3.2
APR19: 3.0
MAY19: 2.8
JUN19: 2.6
JUL19: 2.4
AUG19: 2.2
SEP19: 2.0
OCT19: 1.8
NOV19: 1.6
DEC19: 1.4
JAN20: 1.2
INCs, DECs and Up-To-Congestion Transactions - Total Volume
Energy Market

Congestion and FTR Summary
<table>
<thead>
<tr>
<th>Period</th>
<th>Surplus / Underfunding</th>
<th>Payout Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>January, 2020</td>
<td>$18,195,629</td>
<td>100%</td>
</tr>
<tr>
<td>2020</td>
<td>$18,195,629</td>
<td>100%</td>
</tr>
<tr>
<td>2019/2020</td>
<td>$84,047,342</td>
<td>100%</td>
</tr>
</tbody>
</table>
Ten Most Heavily Congested Transmission Facilities - Overall, January

The ten most heavily congested facilities account for 72% of total congestion for January.
The ten most heavily congested facilities account for 72% of total congestion for 2020.
Energy Market

Interchange/Seams Summary
Monthly Average MISO Interface Pricing

$/MWh

PJM MISO Price (RT)
MISO PJM Price (RT)
PJM MISO Price (DA)
MISO PJM Price (DA)

JAN18  APR18  JUL18  OCT18  JAN19  APR19  JUL19  OCT19  JAN20
Monthly Average NYISO Interface Pricing

$/MWh

- PJM NYISO Price (RT)
- NYISO PJM Price (RT)
- PJM NYISO Price (DA)
- NYISO PJM Price (DA)

Jan 18 - Jan 20
Hourly Difference Between PJM and MISO Real-Time Prices

Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Average price difference for January = $-2.15
Percent of hours in which the direction of flow is consistent with price differentials = 64.25%
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Average price difference for January = $-1.53
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.
Hourly Difference Between PJM and NYISO Day-Ahead Prices

Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Average price difference for January = $1.78
Negative M2M Credit represents PJM payment to NYISO
Ancillary Service Market Summary
Synchronized Reserve and Synchronous Condenser Costs

- Synchronized Reserve Market Payments
- Synchronous Condenser Payments

$ Millions

JAN18: $12M, FEB18: $1M, MAR18, APR18, MAY18, JUN18, JUL18, AUG18, SEP18, OCT18, NOV18, DEC18, JAN19, FEB19, MAR19, APR19, MAY19, JUN19, JUL19, AUG19, SEP19, OCT19, NOV19, DEC19, JAN20

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Load-Adjusted Synchronized Reserve and Synchronous Condenser Costs

- Synchronized Reserve Market Payments / MWh
- Synchronous Condenser Payments / MWh
DR Participation in PJM Regulation Markets

- **Total Payments ($ Millions)**
- **MWh Cleared (MWh)**

### Y-axis: $ Millions
- $0.0
- $0.2
- $0.4
- $0.6

### X-axis: Months
- JAN18
- FEB18
- MAR18
- APR18
- MAY18
- JUN18
- JUL18
- AUG18
- SEP18
- OCT18
- NOV18
- DEC18
- JAN19
- FEB19
- MAR19
- APR19
- MAY19
- JUN19
- JUL19
- AUG19
- SEP19
- OCT19
- NOV19
- DEC19
- JAN20

### X-axis: MWh
- 0
- 5,000
- 10,000
- 15,000
DR Participation in PJM Synchronized Reserve Markets

- **Total Payments ($ Millions)**
- **MWh Cleared (MWh)**

![Chart showing total payments and MWh cleared over time](chart.png)
Regulation Market Daily Prices and Charges

- Total Daily Regulation Charges ($ Millions)
- Minimum Interval Price ($/MWh)
- Average Interval Price ($/MWh)
- Maximum Interval Price ($/MWh)
Synchronized Reserve Market Daily Prices and Charges

- Total Daily Synchronized Reserve Charges ($ Millions)
- Minimum Interval Price ($/MWh)
- Average Interval Price ($/MWh)
- Maximum Interval Price ($/MWh)

Graph showing daily prices and charges from 01 Jan 2020 to 31 Jan 2020.