



Day-ahead Zonal Load Bus Distribution Factors

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Day-ahead Market Operations
MIC
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DA and RT Factor Analysis

- Zonal load is bid in at residual aggregates which must be distributed across the nodes located within that zone.
- In Day-ahead (DA), that distribution for each individual node is calculated based on the percentage of state estimator load for that node as of 8:00 AM the prior week.
 - Example: The factors for the July 14 market day would be calculated using state estimator data from 8:00 AM on July 7.
- These factors are then used throughout the 24 hour DA period.

- Market Days:
 - July 20 (summer peak), May 9, Jan. 27 (winter peak) of 2022.
- Only focused on zones (not residual aggregates)
 - Zones with at least 100 load buses
- Comparison shows the difference between the DA factors and the RT factors from one week prior (July 13, May 2, Jan. 20)
 - Disclaimer: On any given day, topology and modeling differences can exist between DA and RT which can alter factors and other system conditions*
- **Objective:** to evaluate the impact of the proposed solution on historical factors.

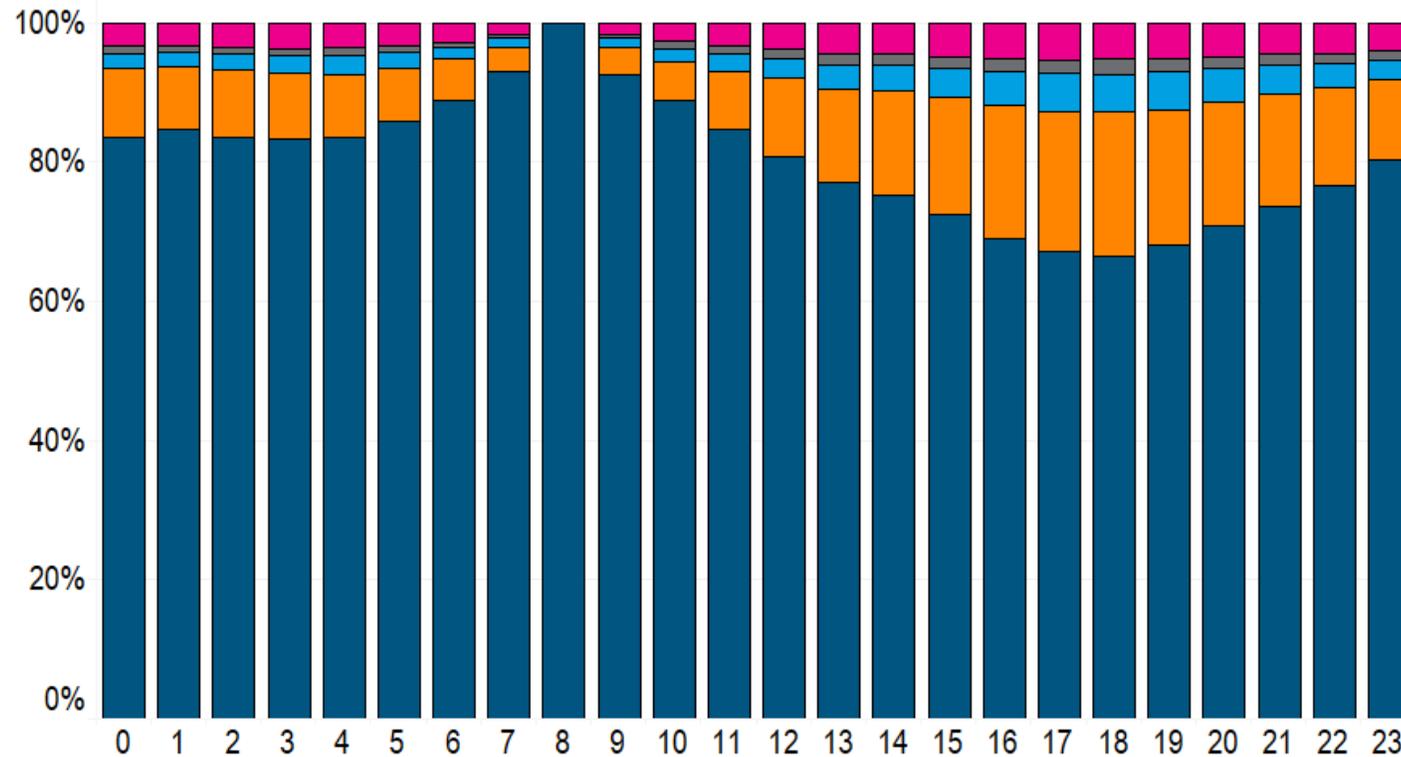
July 20, 2022	
Avg. DA Factor	0.00200
Avg. RT-DA Difference*	0.00025
Max. RT-DA Difference*	0.05812

May 9, 2022	
Avg. DA Factor	0.00202
Avg. RT-DA Difference*	0.00024
Max. RT-DA Difference*	0.07416

January 27, 2022	
Avg. DA Factor	0.00201
Avg. RT-DA Difference*	0.00016
Max. RT-DA Difference*	0.03568

Key Takeaway:
The magnitude of individual load factors overall are small

*Absolute Difference



Key Takeaways:

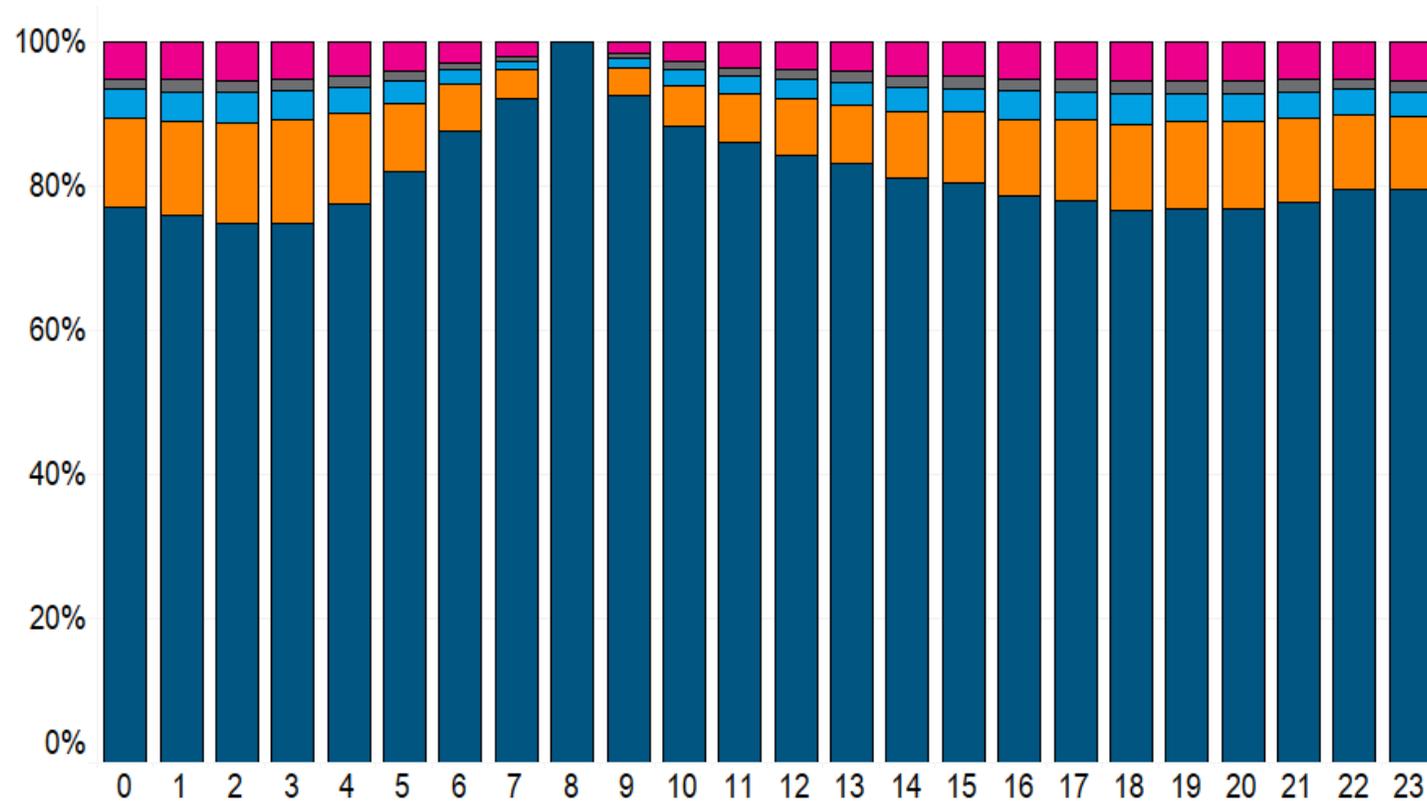
- Most factors are below 25% difference
- Peak hours show the largest differences in factors

Classification

- Greater than 100%
- Within 75 and 100%
- Within 50 and 75%
- Within 25 and 50%
- Within 0 and 25%

Absolute % of Factor Differences by Hour – May 9, 2022

RT Factors from May 2, 2022

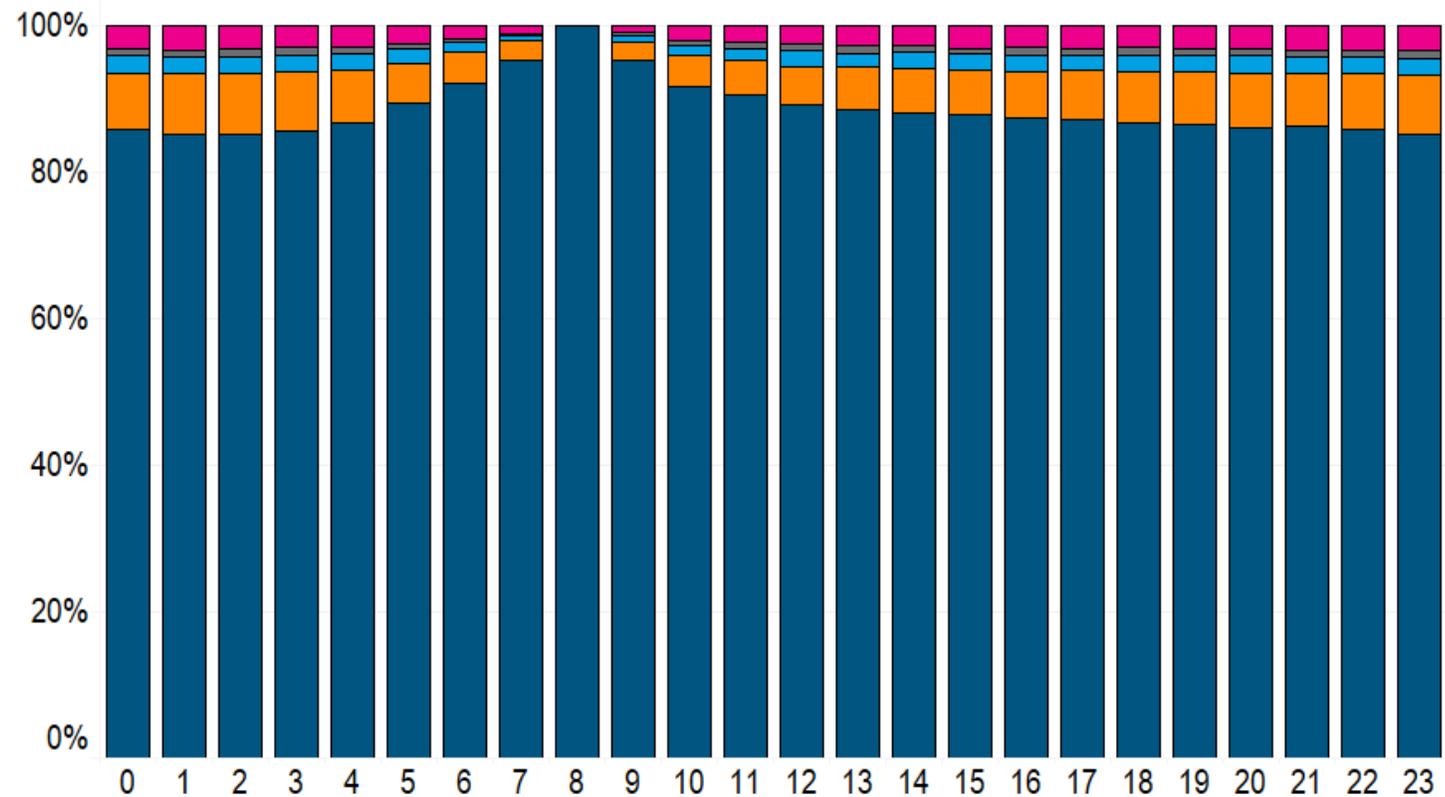


Classification

- Greater than 100%
- Within 50 and 75%
- Within 0 and 25%
- Within 75 and 100%
- Within 25 and 50%

Key Takeaways:

- Most factors are below 25% difference
- The difference in factors is more consistent throughout the day than the summer peak, having a slight larger difference midnight – 5:00 a.m.



Key Takeaways:

- Most factors are below 25% difference
- Across the day, factor differences are relatively constant

Classification

- Greater than 100%
- Within 50 and 75%
- Within 0 and 25%
- Within 75 and 100%
- Within 25 and 50%

First Read

With an influx of non-conforming loads in conjunction with assigned zonal factors from this single morning hour, nodal load ratios can differ from what is expected in Real-time, creating a potential misalignment between Day-ahead and Real-time.

- For each hour in the DA market day, utilize the distribution from the hourly RT State Estimator solution from that same hour on the day that is one week prior that market day.

Hour	Real-time (11/1/22)	Day-ahead Status Quo (11/8/22)	Day-ahead Proposal (11/8/22)
01:00 – 07:00	0.025	.033	0.025
08:00	0.033	.033	0.033
9:00	0.030	.033	0.030
10:00	0.025	.033	0.025
11:00 – 24:00	0.027	.033	0.027



- All 24 hours from the most recently available day of the week that the operating day falls on will be used.
 - Recently available day of the week means the most recent day that shares the same day of the week and for which all 24 hours are available for that day.
 - This would apply for significant/wide scale missing or inaccurate factors and would not apply to minor individual bus discrepancies

Design Component 3: Missing or Inaccurate Factors

Hour	Real-time (10/25/22)	Real-time (11/1/22)	Day-ahead Status Quo (11/8/22)	Day-ahead Proposal (11/8/22)
01:00 – 07:00	0.030	0.025	0.029	0.030
08:00	0.029	missing	0.029	0.029
9:00	0.025	0.030	0.029	0.025
10:00	0.033	0.025	0.029	0.033
11:00 – 24:00	0.030	0.027	0.029	0.030



- Manual 11 Section 2.3.2.4
- Manual 28 Section 3.7
- OATT Section 31.7

2.3.2.4 Electric Distribution Company (EDC) Activities

- For the Day-ahead Market, the Electric Distribution Company (EDC) shall specify the transmission zone, bus distributions, and aggregate bus distributions as a daily distribution. The default distribution for a transmission zone for the Day-ahead Market is the state estimator distribution for that zone for each corresponding hour of the Operating Day one week prior at 0800 one week prior to the Operating Day (i.e. if next Operating Day operating hour is Monday at 0800, the default distribution is from 0800 on Monday of the previous week). The default distribution for a residual metered load aggregate for the Day-ahead Market is the final Real-time distribution factors for the residual metered load aggregate for each corresponding hour of the Operating Day one week prior at 0800 one week prior to the Operating Day. See PJM Manual 28: Operating Agreement Accounting, Section 3 for additional details on residual metered load aggregates.

- Day-ahead Residual Metered Load aggregate distribution factors default to the final real-time distribution factors for the Residual Metered Load aggregate for each corresponding hour of the Operating Day one week prior at 8:00 a.m. one week prior to the Operating Day (i.e., if next Operating operating Day hour is Monday at 8:00 a.m., the default distribution is from 8:00 a.m. on Monday of the previous week). ~~Consistent with physical transmission zones, the definition applies to all hours in the day.~~

(c) The distribution of load buses in an Energy Settlement Area for the determination of a Transmission Loss Charge and Transmission Congestion Charge per Tariff, Part I, section 5.1 and Tariff, Part I, section 5.4 are determined as follows.

- (i) *Zonal aggregate determination.* The default distribution of load buses for a Zone for the Day-ahead Energy Market is the State Estimator distribution of load for that Zone ~~for each corresponding hour of the Operating Day one week prior at 8:00 a.m. one week prior to the Operating Day~~ (i.e. if the ~~operating hour - Operating Day~~ is ~~8:00 a.m.~~ Monday, the default distribution is from 8:00 a.m. on Monday of the previous week). ~~Should the Office of the Interconnection experience technical limitations that would restrict the ability to obtain the State Estimator distribution of load for a Zone for any hour of the Operating Day one week prior at 8:00 a.m. one week prior to the Operating Day~~ or if the required data is not available, a State Estimator distribution of load from the most recently available day of the week that the ~~Operating Day~~ falls on will be used (i.e., if the ~~missing hour(s) is Operating Day Hour is~~ ~~on~~ Monday, the Office of the Interconnection will utilize the State Estimator distribution of load ~~for each corresponding hour~~ from the most recent Monday for which data is available). If the default distribution does not accurately reflect the distribution of load for the Zone for the relevant electric distribution company for the Day-ahead Energy Market, it may specify another more accurate distribution of load buses for the Zone in the Office of the Interconnection's internet-based software application. The distribution of load buses for a Zone for the Real-time Energy Market is the State Estimator distribution of load for that Zone for each hour during the Operating Day.

- First Reads
 - November 2 MIC
 - November 16 MRC
- Endorsements
 - December 7 MIC
 - December 21 MRC
- Approvals
 - January MC: Tariff

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Appendix

References from September MIC education

