

# Market Monitor Report

MC Webinar  
6.20.2023

IMM



Monitoring Analytics

# Demand Response

- **Review basic rules for demand response performance and payment.**

# Important Terms

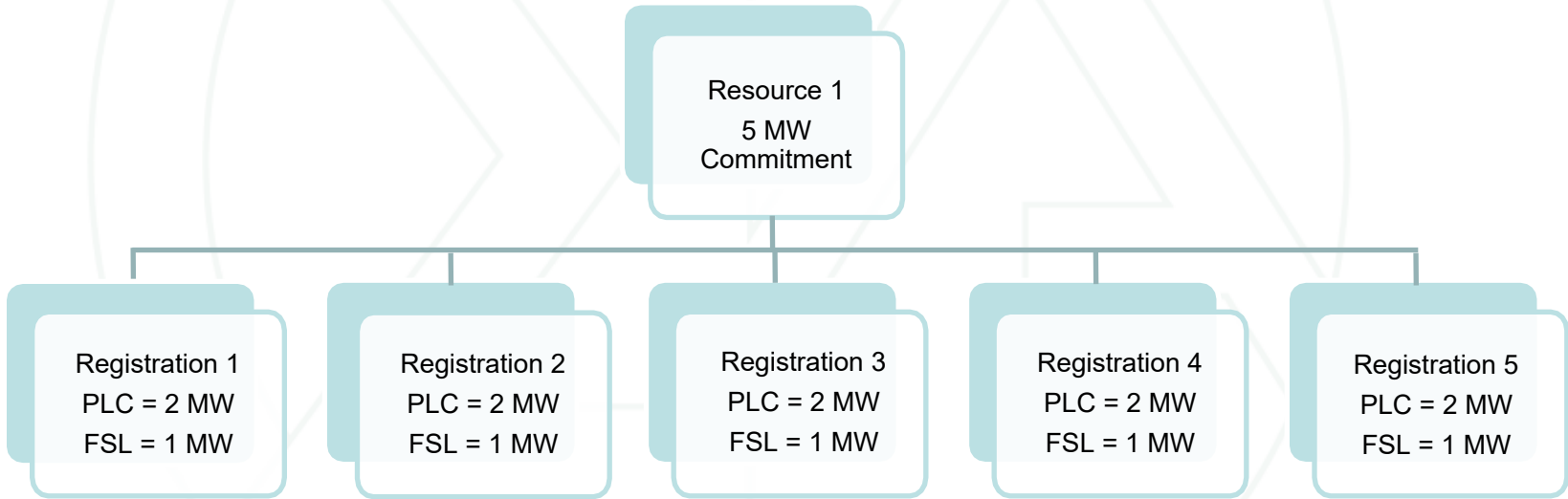
- **Location** – The physical location of an end use customer enrolled in Demand Response
- **Registration** – A grouping of one or more locations used to support a Demand Response resource
- **Resource** – A modeled Demand Response resource having an RPM commitment and backed by registrations
- **PLC** – Peak Load Contribution. The capacity value assigned by the EDC to an end use customer.
- **FSL** – Firm Service Level. The load level that a customer commits to reduce to during a PAI.

**Nominated ICAP MW quantity = (PLC-FSL)**

# Registrations Linked to Single RPM Resource

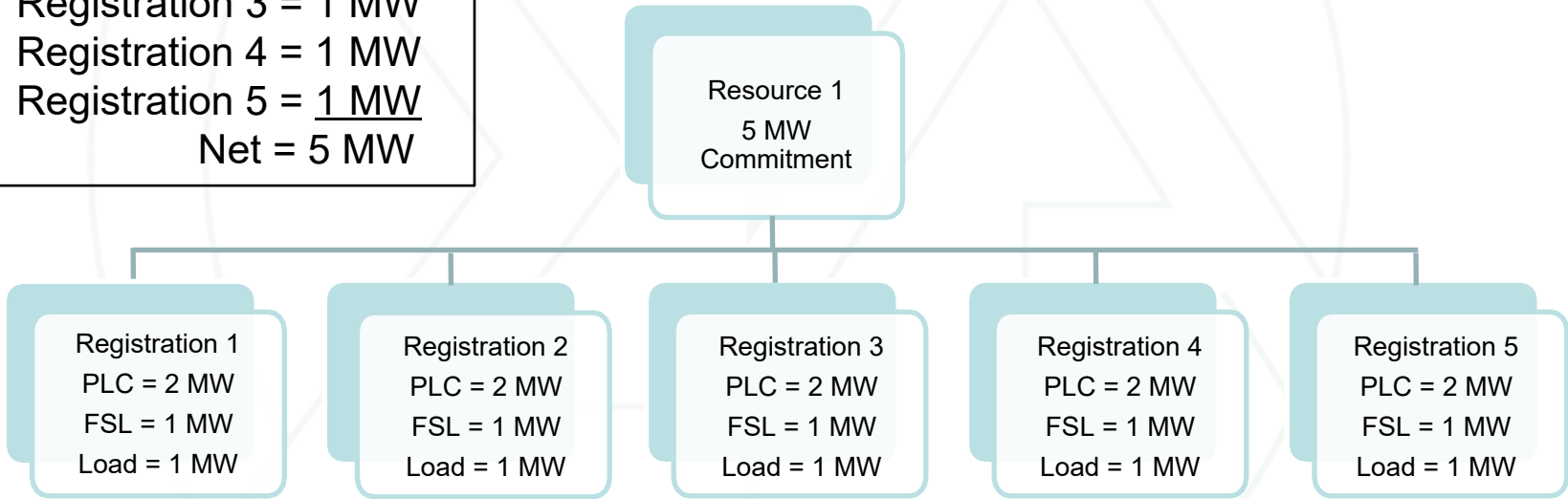
\*Examples assume zero losses

$$\text{Actual Performance} = \text{PLC} - \text{metered load}$$

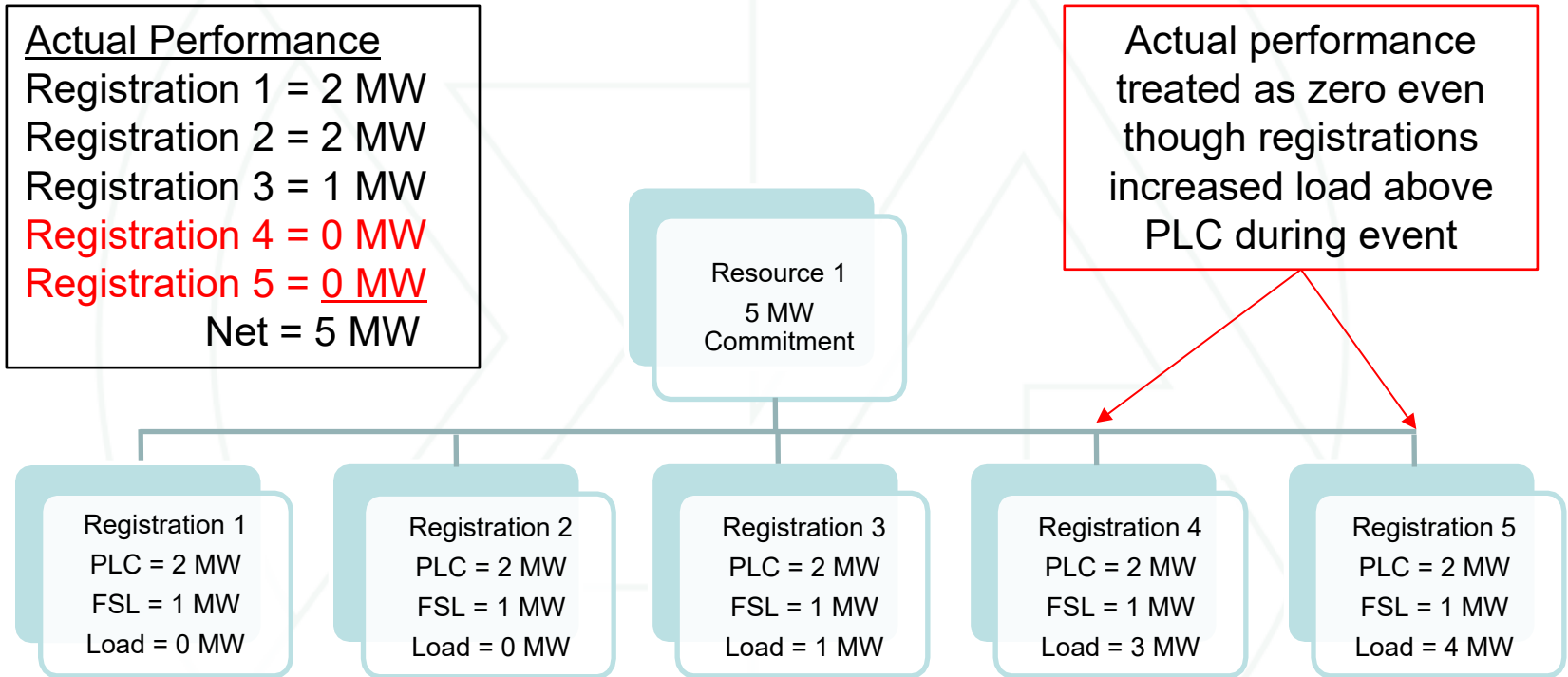


# Scenario 1: All Registrations Reduce to Their FSL

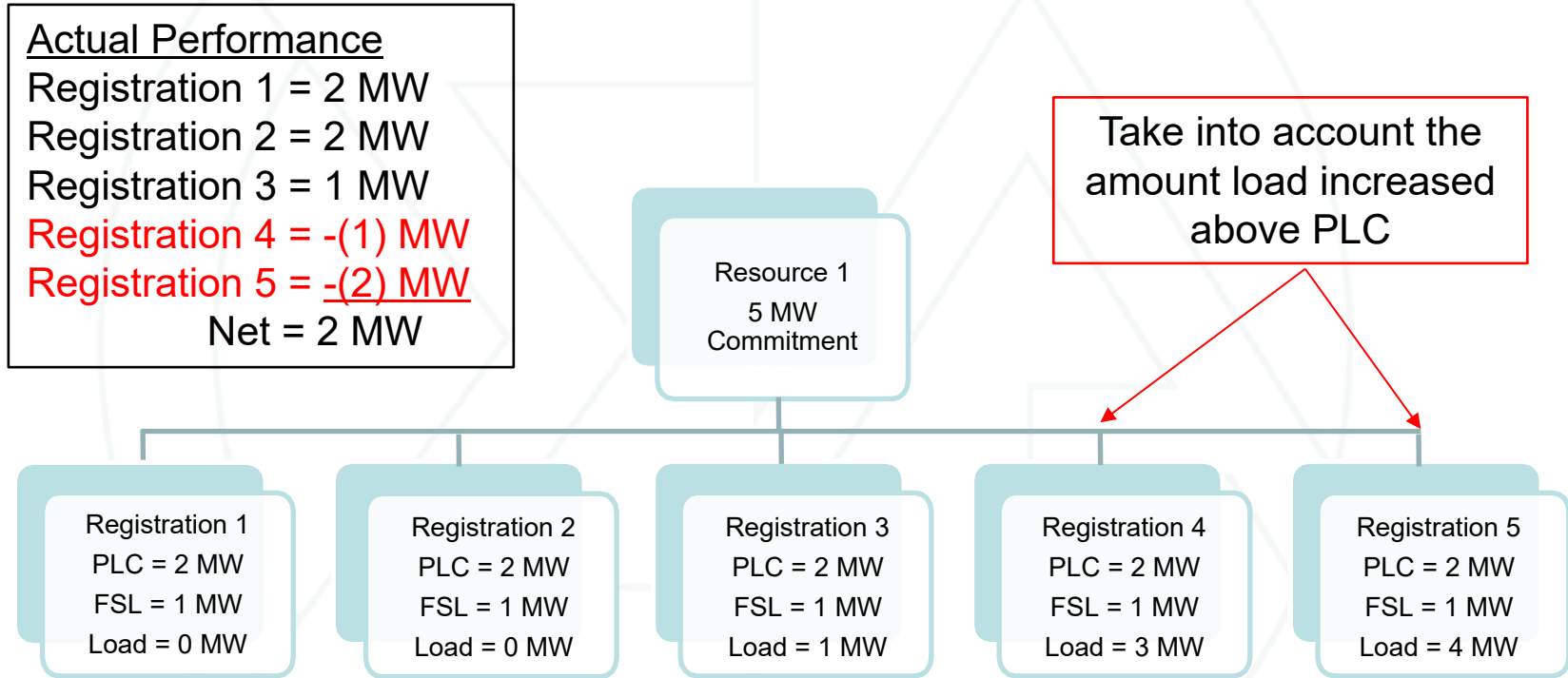
Actual Performance  
Registration 1 = 1 MW  
Registration 2 = 1 MW  
Registration 3 = 1 MW  
Registration 4 = 1 MW  
Registration 5 = 1 MW  
Net = 5 MW



# Scenario 2: Some Registrations Increase in Load

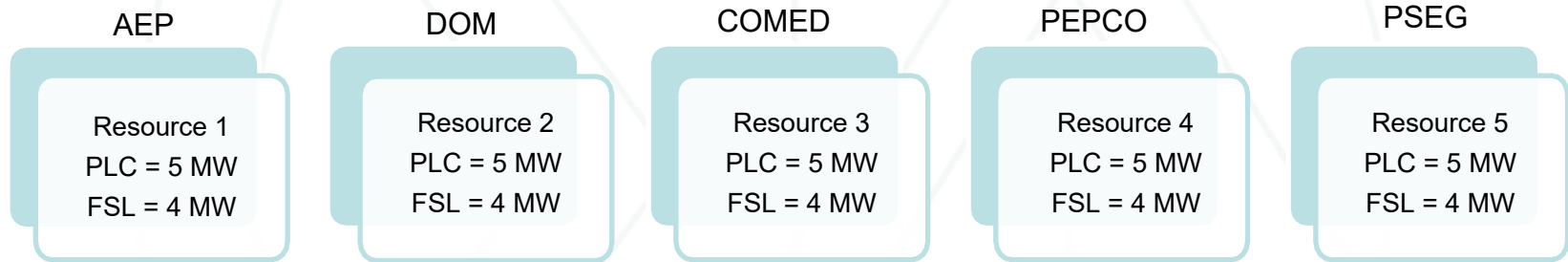


# Scenario 2: Alternate Settlement Example



# Netting of Resources During PAI

\*Example assumes zero losses and all resources in same Emergency Action Area



5 resources each with a 1 MW RPM commitment



# Scenario: RTO Wide PAI

## Actual Performance

Resource 1 = 4 MW; met commitment plus 3 MW bonus

Resource 2 = 3 MW; met commitment plus 2 MW bonus

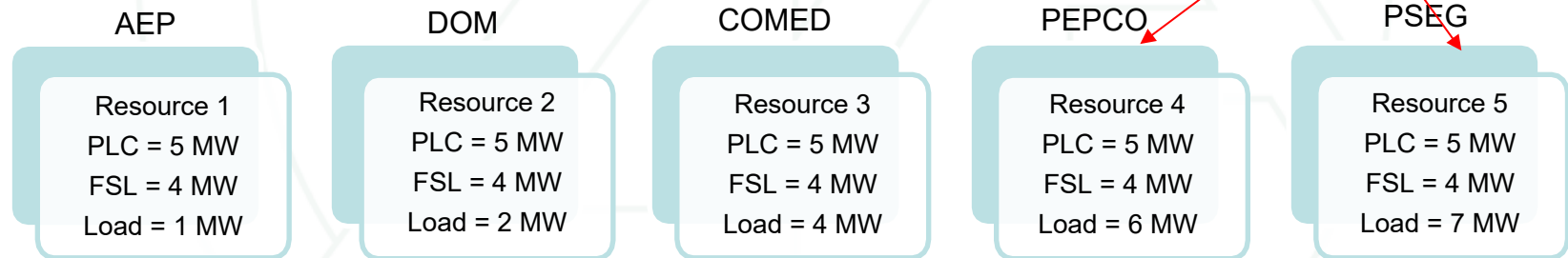
Resource 3 = 1 MW; met commitment

**Resource 4 = 0 MW; 1 MW deficient**

**Resource 5 = 0 MW; 1 MW deficient**

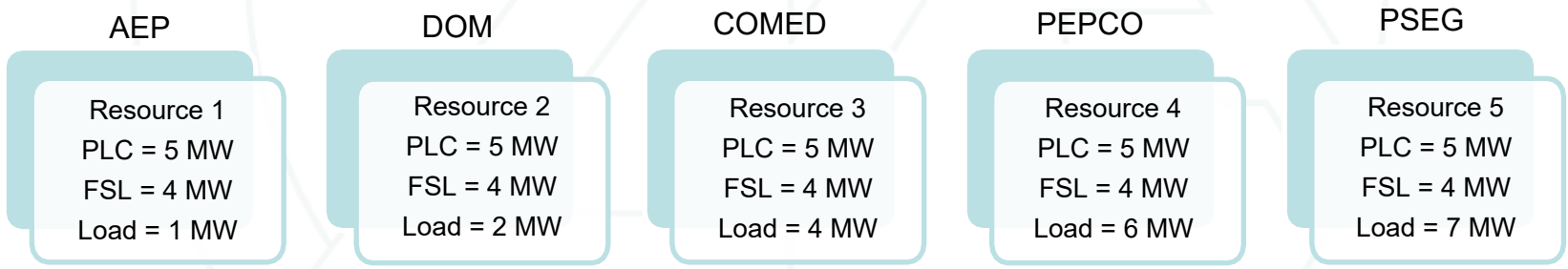
Portfolio Net = 6 MW (1 MW Bonus)

Shortfall capped at 1 MW RPM commitment even though resources increased load above PLC during event



# Resource Netting During PAI

- Resources in same performance assessment area are netted by owner
- Overperformance of Resources 1 and 2 offset shortfall of Resources 4 and 5
- Total Expected Performance = 5 MW
- Net Portfolio Actual Performance = (4) + (3) + (1) - (1) - (1) = 6 MW
- 1 MW bonus split pro-rata between Resources 1 and 2. No nonperformance charges for Resources 4 or 5.



# Alternate Settlement Example

## Actual Performance

Resource 1 = 4 MW; met commitment plus 3 MW bonus

Resource 2 = 3 MW; met commitment plus 2 MW bonus

Resource 3 = 1 MW; met commitment

**Resource 4 = 0 MW; 2 MW deficient**

**Resource 5 = 0 MW; 3 MW deficient**

Portfolio Net = 3 MW (2 MW Shortfall)

Determine shortfall as  
RPM deficiency plus  
MW increase above  
PLC

### AEP

Resource 1  
PLC = 5 MW  
FSL = 4 MW  
Load = 1 MW

### DOM

Resource 2  
PLC = 5 MW  
FSL = 4 MW  
Load = 2 MW

### COMED

Resource 3  
PLC = 5 MW  
FSL = 4 MW  
Load = 4 MW

### PEPCO

Resource 4  
PLC = 5 MW  
FSL = 4 MW  
Load = 6 MW

### PSEG

Resource 5  
PLC = 5 MW  
FSL = 4 MW  
Load = 7 MW

# Alternate Settlement Example

- Resources in same performance assessment area are netted by owner
- Overperformance of Resources 1 and 2 partially offset shortfall of Resources 4 and 5
- Total Expected Performance = 5 MW
- Net Portfolio Actual Performance =  $(4) + (3) + (1) - (2) - (3) = 3$  MW
- 2 MW shortfall split pro-rata between Resources 4 and 5. No Bonus awarded to Resources 1 and 2.

AEP

Resource 1  
PLC = 5 MW  
FSL = 4 MW  
Load = 1 MW

DOM

Resource 2  
PLC = 5 MW  
FSL = 4 MW  
Load = 2 MW

COMED

Resource 3  
PLC = 5 MW  
FSL = 4 MW  
Load = 4 MW

PEPCO

Resource 4  
PLC = 5 MW  
FSL = 4 MW  
Load = 6 MW

PSEG

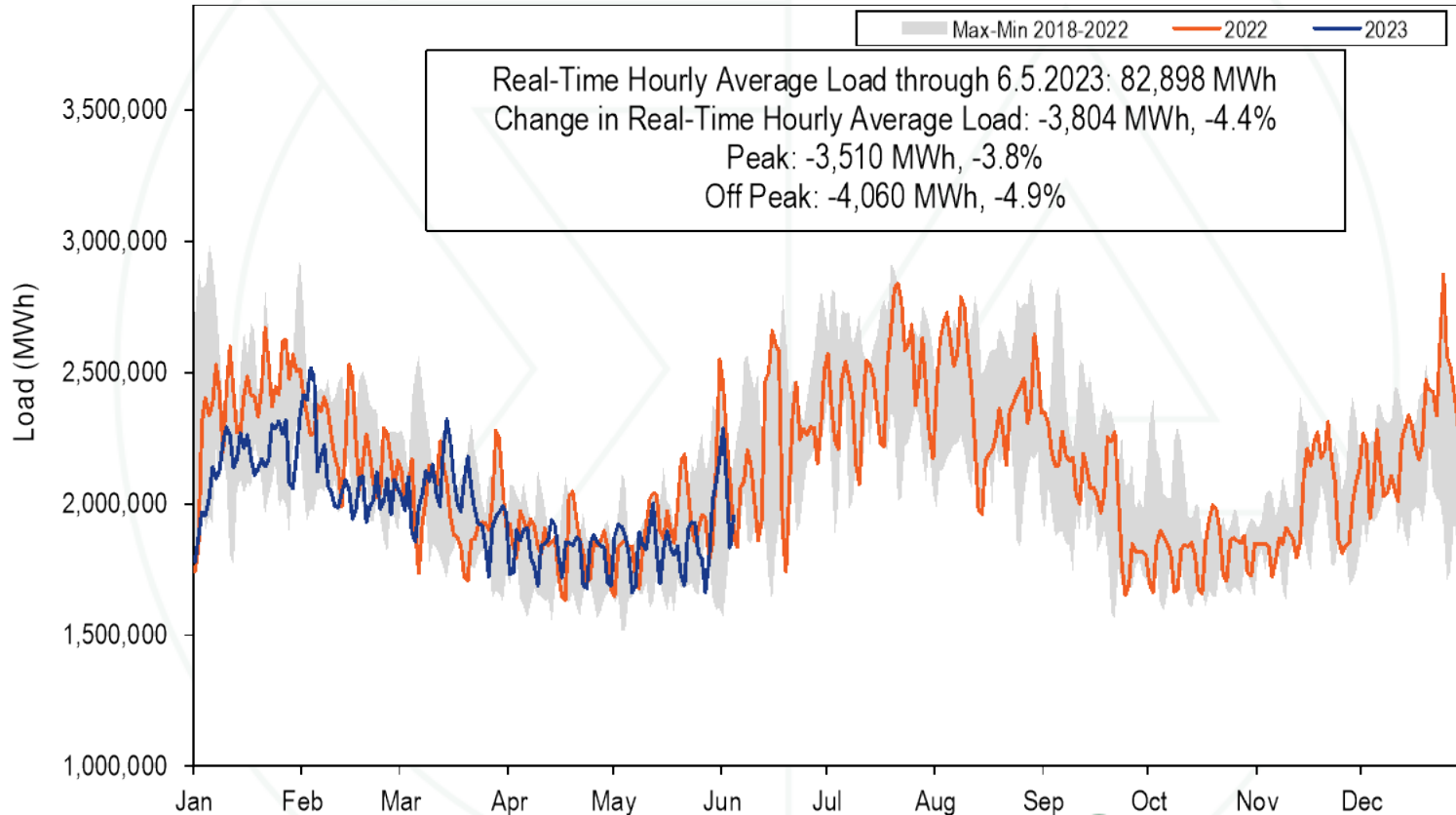
Resource 5  
PLC = 5 MW  
FSL = 4 MW  
Load = 7 MW

# Issues with Current DR Rules

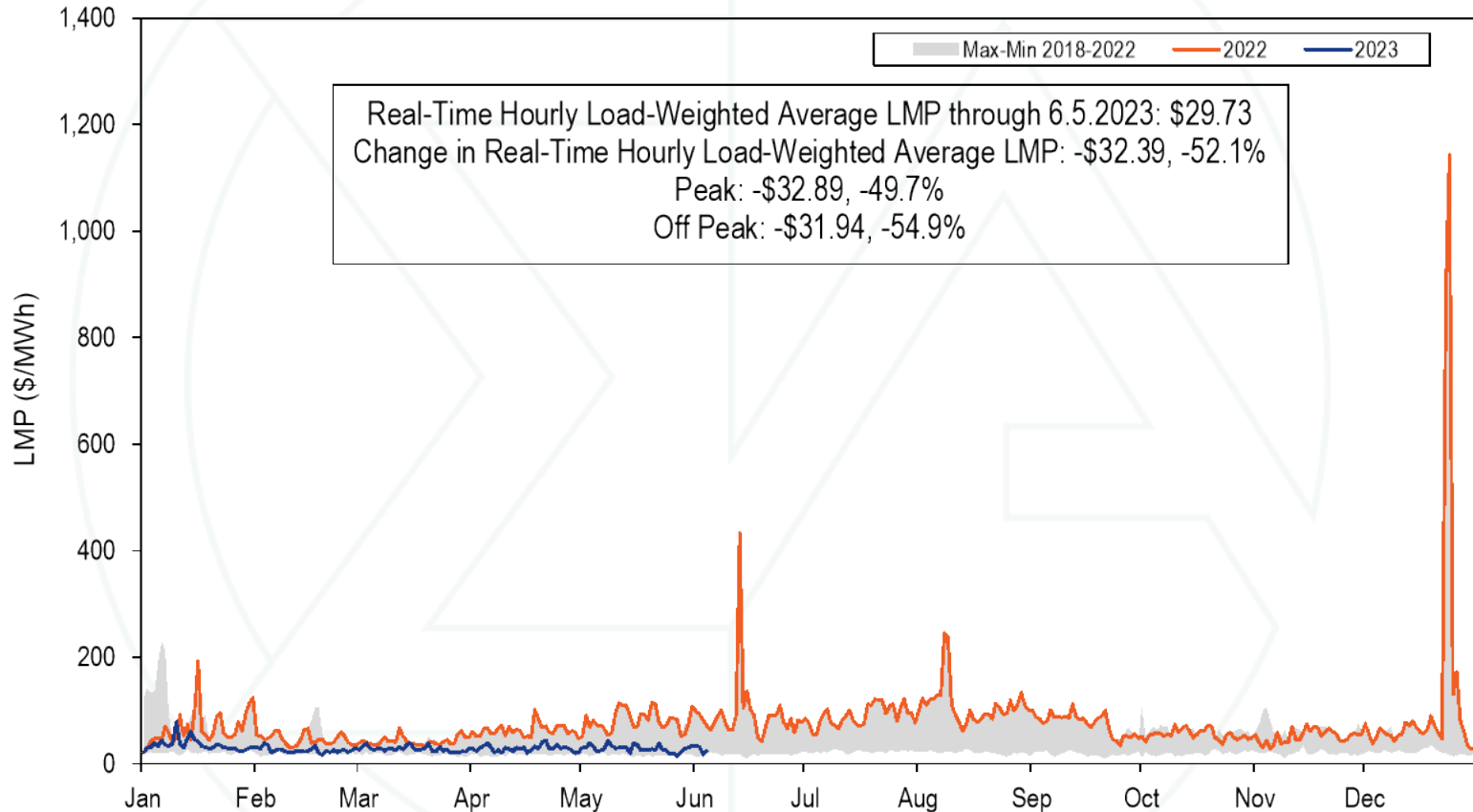
- **Resource netting is asymmetrically applied to Demand Response**
- **Resource performance may be overstated**
  - **Registration nonperformance is capped at zero**
  - **Resource nonperformance is capped at RPM commitment quantity even when load has increased above PLC**

# Information on Load, DLMP and PLMP

# 2023 YTD PJM Real-Time Daily Load



# 2023 YTD PJM Real-Time Daily LMP

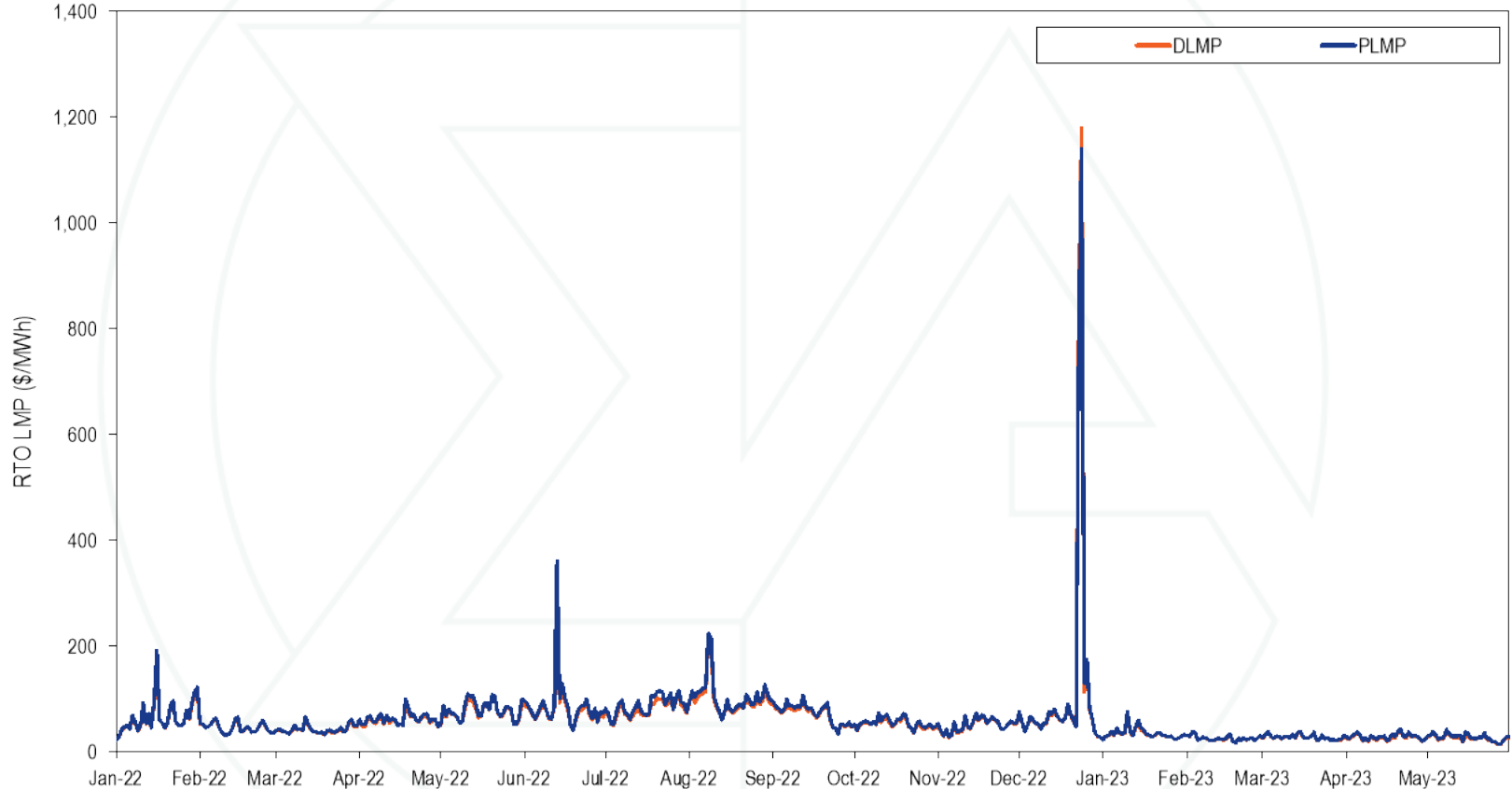




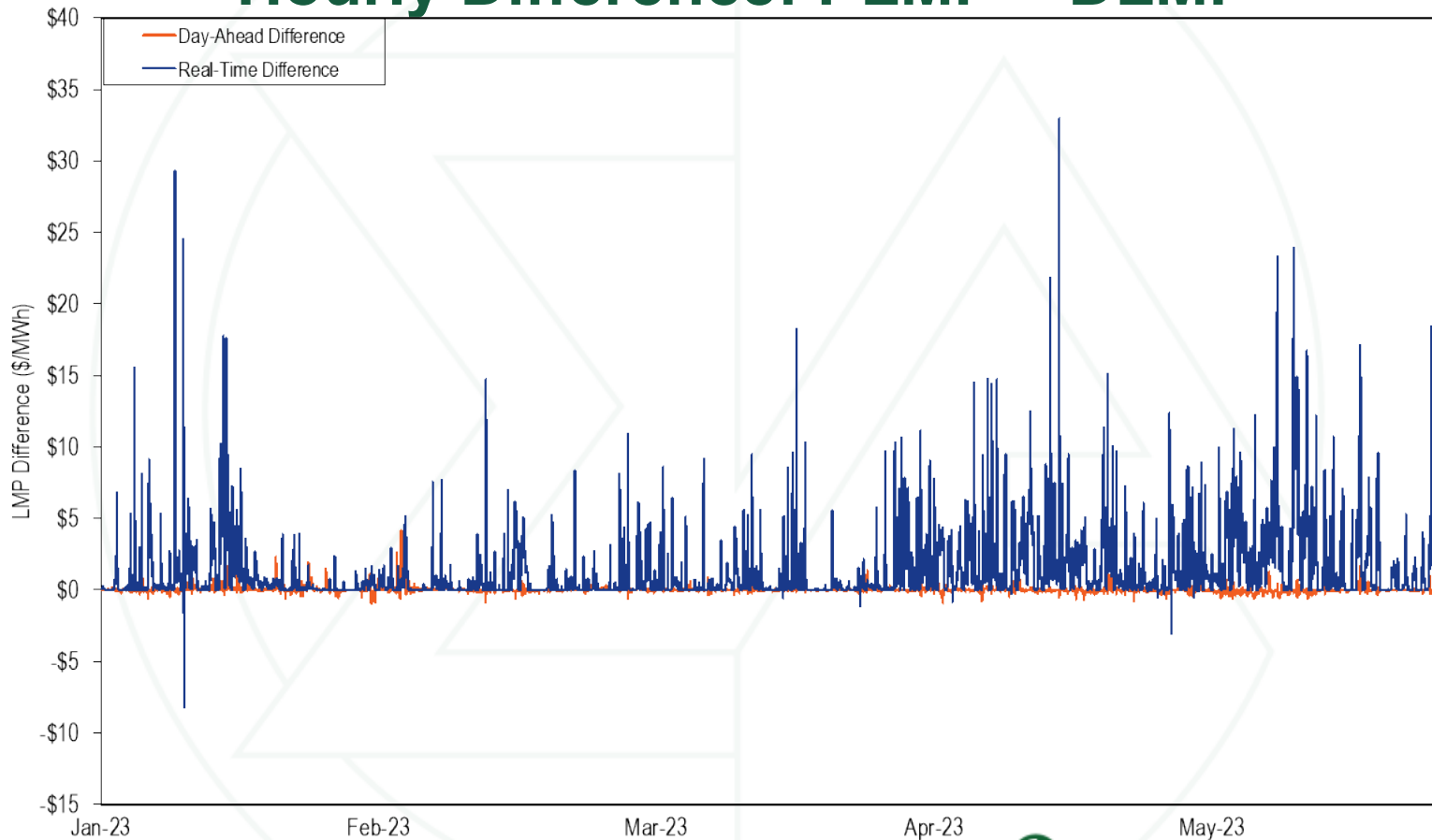
# Monthly Average Load-Weighted DLMP and PLMP

| Year | Month     | Day-Ahead Load-Weighted Average |          |            |                    | Real-Time Load-Weighted Average |          |            |                    |
|------|-----------|---------------------------------|----------|------------|--------------------|---------------------------------|----------|------------|--------------------|
|      |           | DLMP                            | PLMP     | Difference | Percent Difference | DLMP                            | PLMP     | Difference | Percent Difference |
| 2022 | Jan       | \$64.57                         | \$64.80  | \$0.22     | 0.3%               | \$66.43                         | \$69.06  | \$2.64     | 4.0%               |
| 2022 | Feb       | \$49.96                         | \$50.35  | \$0.39     | 0.8%               | \$45.93                         | \$46.76  | \$0.83     | 1.8%               |
| 2022 | Mar       | \$45.25                         | \$45.50  | \$0.25     | 0.6%               | \$41.83                         | \$43.56  | \$1.73     | 4.1%               |
| 2022 | Apr       | \$64.10                         | \$64.18  | \$0.08     | 0.1%               | \$60.38                         | \$63.91  | \$3.52     | 5.8%               |
| 2022 | May       | \$83.17                         | \$83.24  | \$0.06     | 0.1%               | \$79.04                         | \$83.16  | \$4.12     | 5.2%               |
| 2022 | Jun       | \$90.24                         | \$90.54  | \$0.29     | 0.3%               | \$91.44                         | \$97.89  | \$6.46     | 7.1%               |
| 2022 | Jul       | \$96.07                         | \$96.38  | \$0.32     | 0.3%               | \$84.03                         | \$92.48  | \$8.45     | 10.1%              |
| 2022 | Aug       | \$106.18                        | \$106.07 | (\$0.10)   | (0.1%)             | \$105.68                        | \$113.74 | \$8.06     | 7.6%               |
| 2022 | Sep       | \$82.86                         | \$82.80  | (\$0.06)   | (0.1%)             | \$74.08                         | \$78.29  | \$4.22     | 5.7%               |
| 2022 | Oct       | \$58.30                         | \$58.37  | \$0.07     | 0.1%               | \$52.27                         | \$55.90  | \$3.63     | 6.9%               |
| 2022 | Nov       | \$56.29                         | \$55.24  | (\$1.05)   | (1.9%)             | \$50.86                         | \$52.93  | \$2.07     | 4.1%               |
| 2022 | Dec       | \$93.02                         | \$93.39  | \$0.37     | 0.4%               | \$143.65                        | \$142.22 | (\$1.42)   | (1.0%)             |
| 2022 | Jan - Dec | \$75.35                         | \$75.44  | \$0.08     | 0.1%               | \$76.34                         | \$80.14  | \$3.80     | 5.0%               |
| 2023 | Jan       | \$36.53                         | \$36.58  | \$0.05     | 0.1%               | \$34.66                         | \$35.75  | \$1.09     | 3.1%               |
| 2023 | Feb       | \$31.16                         | \$31.22  | \$0.06     | 0.2%               | \$25.47                         | \$26.04  | \$0.57     | 2.2%               |
| 2023 | Mar       | \$28.39                         | \$28.41  | \$0.02     | 0.1%               | \$27.58                         | \$28.42  | \$0.85     | 3.1%               |
| 2023 | Apr       | \$29.81                         | \$29.81  | (\$0.00)   | (0.0%)             | \$27.09                         | \$29.32  | \$2.22     | 8.2%               |
| 2023 | May       | \$28.86                         | \$28.80  | (\$0.05)   | (0.2%)             | \$25.91                         | \$28.44  | \$2.53     | 9.7%               |
| 2023 | Jan - May | \$31.08                         | \$31.09  | \$0.02     | 0.1%               | \$28.34                         | \$29.75  | \$1.42     | 5.0%               |

# Daily Average Real-Time DLMP and PLMP



# Hourly Difference: PLMP – DLMP



# Fast Start Units as a Percent of Marginal Units

| Year | Month     | Dispatch Run |        |      |                      | Pricing Run |        |      |                      |
|------|-----------|--------------|--------|------|----------------------|-------------|--------|------|----------------------|
|      |           | CT           | Diesel | Wind | All Fast Start Units | CT          | Diesel | Wind | All Fast Start Units |
| 2022 | Jan       | 1.3%         | 0.3%   | 0.2% | 1.8%                 | 4.9%        | 0.9%   | 0.2% | 6.2%                 |
| 2022 | Feb       | 0.6%         | 0.2%   | 0.3% | 1.1%                 | 3.2%        | 0.5%   | 0.3% | 4.0%                 |
| 2022 | Mar       | 0.5%         | 0.2%   | 0.4% | 1.1%                 | 3.4%        | 0.5%   | 0.4% | 4.4%                 |
| 2022 | Apr       | 0.8%         | 0.1%   | 0.1% | 1.2%                 | 4.4%        | 0.3%   | 0.1% | 5.0%                 |
| 2022 | May       | 1.4%         | 0.7%   | 0.1% | 2.4%                 | 6.6%        | 1.2%   | 0.1% | 8.1%                 |
| 2022 | Jun       | 2.3%         | 0.3%   | 0.1% | 2.6%                 | 9.3%        | 0.8%   | 0.1% | 10.2%                |
| 2022 | Jul       | 2.7%         | 0.6%   | 0.1% | 3.3%                 | 16.3%       | 1.4%   | 0.0% | 17.7%                |
| 2022 | Aug       | 2.0%         | 0.4%   | 0.0% | 2.4%                 | 12.0%       | 1.3%   | 0.0% | 13.3%                |
| 2022 | Sep       | 0.8%         | 0.3%   | 0.1% | 1.2%                 | 5.6%        | 1.0%   | 0.1% | 6.7%                 |
| 2022 | Oct       | 2.2%         | 0.2%   | 0.3% | 2.6%                 | 6.6%        | 0.9%   | 0.2% | 7.7%                 |
| 2022 | Nov       | 1.3%         | 0.2%   | 0.2% | 1.7%                 | 5.1%        | 0.9%   | 0.2% | 6.1%                 |
| 2022 | Dec       | 1.3%         | 0.7%   | 0.2% | 2.2%                 | 6.3%        | 1.5%   | 0.2% | 8.0%                 |
| 2022 | Jan - Dec | 1.4%         | 0.3%   | 0.2% | 2.0%                 | 7.0%        | 0.9%   | 0.1% | 8.1%                 |
| 2023 | Jan       | 1.6%         | 0.5%   | 0.1% | 2.1%                 | 6.2%        | 2.8%   | 0.0% | 9.0%                 |
| 2023 | Feb       | 0.9%         | 0.2%   | 0.0% | 1.1%                 | 3.1%        | 0.6%   | 0.0% | 3.7%                 |
| 2023 | Mar       | 0.8%         | 0.4%   | 0.1% | 1.2%                 | 3.0%        | 0.7%   | 0.1% | 3.8%                 |
| 2023 | Apr       | 2.5%         | 0.4%   | 0.2% | 3.2%                 | 8.1%        | 0.8%   | 0.2% | 9.1%                 |
| 2023 | May       | 1.0%         | 0.3%   | 0.1% | 1.3%                 | 4.8%        | 0.7%   | 0.1% | 5.6%                 |
| 2023 | Jan - May | 1.4%         | 0.4%   | 0.1% | 1.8%                 | 5.0%        | 1.1%   | 0.1% | 6.2%                 |

# Fast Start Impacts: Zonal Average Differences

| Zone  | 2023 Jan - May |              |            |                    |              |              |            |                    |
|-------|----------------|--------------|------------|--------------------|--------------|--------------|------------|--------------------|
|       | Day-Ahead      |              |            |                    | Real-Time    |              |            |                    |
|       | Average DLMP   | Average PLMP | Difference | Percent Difference | Average DLMP | Average PLMP | Difference | Percent Difference |
| ACEC  | \$51.84        | \$51.96      | \$0.12     | 0.2%               | \$51.37      | \$53.52      | \$2.15     | 4.2%               |
| AEP   | \$58.53        | \$58.64      | \$0.11     | 0.2%               | \$56.87      | \$59.60      | \$2.74     | 4.8%               |
| APS   | \$59.50        | \$59.66      | \$0.16     | 0.3%               | \$57.52      | \$60.39      | \$2.86     | 5.0%               |
| ATSI  | \$58.03        | \$58.16      | \$0.13     | 0.2%               | \$55.73      | \$58.43      | \$2.70     | 4.8%               |
| BGE   | \$68.33        | \$68.46      | \$0.13     | 0.2%               | \$66.15      | \$69.55      | \$3.40     | 5.1%               |
| COMED | \$49.80        | \$49.90      | \$0.10     | 0.2%               | \$47.55      | \$49.99      | \$2.44     | 5.1%               |
| DAY   | \$60.77        | \$60.88      | \$0.11     | 0.2%               | \$58.79      | \$61.64      | \$2.85     | 4.8%               |
| DUKE  | \$59.64        | \$59.76      | \$0.11     | 0.2%               | \$57.56      | \$60.36      | \$2.80     | 4.9%               |
| DOM   | \$69.83        | \$69.44      | (\$0.40)   | (0.6%)             | \$70.53      | \$73.53      | \$2.99     | 4.2%               |
| DPL   | \$55.03        | \$55.17      | \$0.14     | 0.3%               | \$54.89      | \$57.81      | \$2.91     | 5.3%               |
| DUQ   | \$57.04        | \$57.17      | \$0.13     | 0.2%               | \$55.04      | \$57.72      | \$2.68     | 4.9%               |
| EKPC  | \$58.83        | \$58.93      | \$0.11     | 0.2%               | \$57.62      | \$60.37      | \$2.75     | 4.8%               |
| JCPLC | \$52.90        | \$53.02      | \$0.12     | 0.2%               | \$52.52      | \$54.81      | \$2.29     | 4.4%               |
| MEC   | \$60.16        | \$60.27      | \$0.11     | 0.2%               | \$58.45      | \$61.14      | \$2.69     | 4.6%               |
| OVEC  | \$57.44        | \$57.55      | \$0.11     | 0.2%               | \$55.64      | \$58.32      | \$2.68     | 4.8%               |
| PECO  | \$50.71        | \$50.82      | \$0.11     | 0.2%               | \$50.25      | \$52.30      | \$2.05     | 4.1%               |
| PE    | \$57.26        | \$57.38      | \$0.12     | 0.2%               | \$54.92      | \$57.49      | \$2.57     | 4.7%               |
| PEPCO | \$66.04        | \$66.17      | \$0.12     | 0.2%               | \$63.96      | \$67.18      | \$3.23     | 5.0%               |
| PPL   | \$55.55        | \$55.67      | \$0.12     | 0.2%               | \$54.31      | \$56.73      | \$2.42     | 4.5%               |
| PSEG  | \$53.57        | \$53.69      | \$0.12     | 0.2%               | \$53.22      | \$55.53      | \$2.31     | 4.3%               |
| REC   | \$55.63        | \$55.75      | \$0.12     | 0.2%               | \$54.77      | \$57.20      | \$2.44     | 4.5%               |

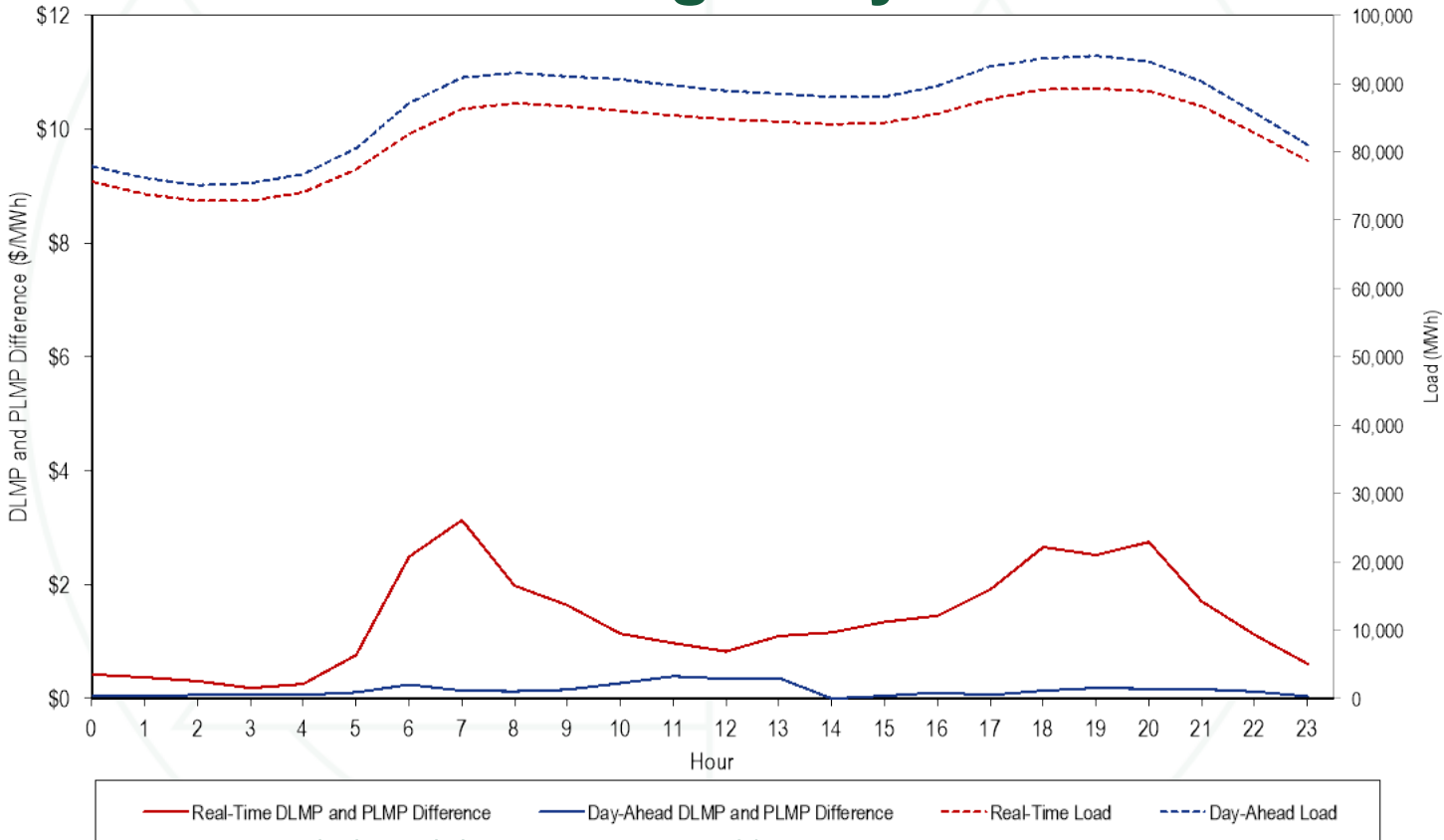
# Fast Start Impacts: Hub Average Differences

| Hub             | 2023 Jan - May  |                 |            |                       |                 |                 |            |                       |
|-----------------|-----------------|-----------------|------------|-----------------------|-----------------|-----------------|------------|-----------------------|
|                 | Day-Ahead       |                 |            |                       | Real-Time       |                 |            |                       |
|                 | Average<br>DLMP | Average<br>PLMP | Difference | Percent<br>Difference | Average<br>DLMP | Average<br>PLMP | Difference | Percent<br>Difference |
| AEP GEN HUB     | \$56.89         | \$57.01         | \$0.12     | 0.2%                  | \$54.84         | \$57.47         | \$2.62     | 4.8%                  |
| AEP-DAYTON HUB  | \$57.95         | \$58.06         | \$0.11     | 0.2%                  | \$55.88         | \$58.58         | \$2.70     | 4.8%                  |
| ATSI GEN HUB    | \$56.86         | \$56.99         | \$0.13     | 0.2%                  | \$54.40         | \$57.03         | \$2.63     | 4.8%                  |
| CHICAGO GEN HUB | \$49.04         | \$49.14         | \$0.10     | 0.2%                  | \$46.69         | \$49.10         | \$2.41     | 5.2%                  |
| CHICAGO HUB     | \$50.01         | \$50.11         | \$0.10     | 0.2%                  | \$47.73         | \$50.19         | \$2.46     | 5.1%                  |
| DOMINION HUB    | \$63.84         | \$63.87         | \$0.02     | 0.0%                  | \$62.62         | \$65.55         | \$2.93     | 4.7%                  |
| EASTERN HUB     | \$55.22         | \$55.36         | \$0.14     | 0.3%                  | \$54.53         | \$57.37         | \$2.84     | 5.2%                  |
| N ILLINOIS HUB  | \$49.62         | \$49.72         | \$0.10     | 0.2%                  | \$47.41         | \$49.84         | \$2.43     | 5.1%                  |
| NEW JERSEY HUB  | \$53.00         | \$53.12         | \$0.12     | 0.2%                  | \$52.60         | \$54.87         | \$2.27     | 4.3%                  |
| OHIO HUB        | \$57.83         | \$57.94         | \$0.11     | 0.2%                  | \$55.73         | \$58.43         | \$2.69     | 4.8%                  |
| WEST INT HUB    | \$59.48         | \$59.55         | \$0.07     | 0.1%                  | \$57.42         | \$60.17         | \$2.75     | 4.8%                  |
| WESTERN HUB     | \$60.95         | \$61.07         | \$0.13     | 0.2%                  | \$58.38         | \$61.23         | \$2.85     | 4.9%                  |

# Zonal PLMP-DLMP Difference Frequency

| Zone    | 2023 Jan - May |                   |                |       |              |                |                |                 |                  |           |  |
|---------|----------------|-------------------|----------------|-------|--------------|----------------|----------------|-----------------|------------------|-----------|--|
|         | < (\$50)       | (\$50) to (\$100) | (\$100) to \$0 | \$0   | \$0 to \$100 | \$100 to \$200 | \$200 to \$500 | \$500 to \$1000 | \$1000 to \$2000 | >= \$2000 |  |
| PJM-RTO | 0.0%           | 0.0%              | 0.4%           | 45.4% | 51.5%        | 2.2%           | 0.4%           | 0.0%            | 0.0%             | 0.0%      |  |
| ACEC    | 0.0%           | 0.0%              | 7.0%           | 46.0% | 44.9%        | 1.7%           | 0.3%           | 0.0%            | 0.0%             | 0.0%      |  |
| AEP     | 0.0%           | 0.0%              | 0.6%           | 45.8% | 50.6%        | 2.4%           | 0.5%           | 0.0%            | 0.0%             | 0.0%      |  |
| APS     | 0.0%           | 0.0%              | 0.5%           | 45.7% | 50.7%        | 2.5%           | 0.5%           | 0.0%            | 0.0%             | 0.0%      |  |
| ATSI    | 0.0%           | 0.0%              | 0.5%           | 45.6% | 51.1%        | 2.4%           | 0.5%           | 0.0%            | 0.0%             | 0.0%      |  |
| BGE     | 0.0%           | 0.0%              | 3.8%           | 45.3% | 46.9%        | 2.8%           | 1.0%           | 0.1%            | 0.0%             | 0.0%      |  |
| COMED   | 0.0%           | 0.0%              | 2.8%           | 46.5% | 48.2%        | 2.0%           | 0.4%           | 0.0%            | 0.0%             | 0.0%      |  |
| DAY     | 0.0%           | 0.0%              | 0.6%           | 45.7% | 50.3%        | 2.6%           | 0.6%           | 0.0%            | 0.0%             | 0.0%      |  |
| DUKE    | 0.0%           | 0.0%              | 0.7%           | 45.8% | 50.3%        | 2.6%           | 0.6%           | 0.0%            | 0.0%             | 0.0%      |  |
| DOM     | 0.0%           | 0.1%              | 2.2%           | 45.6% | 48.4%        | 2.7%           | 0.8%           | 0.1%            | 0.0%             | 0.0%      |  |
| DPL     | 0.0%           | 0.0%              | 11.7%          | 45.9% | 40.0%        | 1.7%           | 0.4%           | 0.2%            | 0.1%             | 0.0%      |  |
| DUQ     | 0.0%           | 0.0%              | 0.5%           | 45.6% | 51.1%        | 2.3%           | 0.5%           | 0.0%            | 0.0%             | 0.0%      |  |
| EKPC    | 0.0%           | 0.0%              | 0.8%           | 45.8% | 50.4%        | 2.5%           | 0.5%           | 0.0%            | 0.0%             | 0.0%      |  |
| JCPLC   | 0.0%           | 0.0%              | 3.1%           | 45.8% | 49.1%        | 1.6%           | 0.3%           | 0.0%            | 0.0%             | 0.0%      |  |
| MEC     | 0.0%           | 0.0%              | 2.2%           | 45.4% | 49.6%        | 2.2%           | 0.5%           | 0.1%            | 0.0%             | 0.0%      |  |
| OVEC    | 0.0%           | 0.0%              | 0.8%           | 45.9% | 50.4%        | 2.4%           | 0.5%           | 0.0%            | 0.0%             | 0.0%      |  |
| PECO    | 0.0%           | 0.0%              | 10.5%          | 46.0% | 41.4%        | 1.7%           | 0.3%           | 0.0%            | 0.0%             | 0.0%      |  |
| PE      | 0.0%           | 0.0%              | 0.4%           | 45.3% | 51.7%        | 2.2%           | 0.4%           | 0.0%            | 0.0%             | 0.0%      |  |
| PEPCO   | 0.0%           | 0.0%              | 2.6%           | 45.6% | 48.2%        | 2.7%           | 0.8%           | 0.1%            | 0.0%             | 0.0%      |  |
| PPL     | 0.0%           | 0.0%              | 2.8%           | 45.5% | 49.6%        | 1.8%           | 0.4%           | 0.0%            | 0.0%             | 0.0%      |  |
| PSEG    | 0.0%           | 0.0%              | 2.8%           | 45.8% | 49.4%        | 1.6%           | 0.3%           | 0.0%            | 0.0%             | 0.0%      |  |
| REC     | 0.0%           | 0.0%              | 2.0%           | 45.6% | 50.4%        | 1.7%           | 0.3%           | 0.0%            | 0.0%             | 0.0%      |  |

# Hourly Average Load and LMP Difference: Jan through May 2023





# Real-Time Load-Weighted Average LMP

|     | 2022     |          |            |                    | 2023     |         |            |                    |
|-----|----------|----------|------------|--------------------|----------|---------|------------|--------------------|
|     | Off Peak | On Peak  | Difference | Percent Difference | Off Peak | On Peak | Difference | Percent Difference |
| Jan | \$74.99  | \$62.54  | (\$12.46)  | (16.6%)            | \$33.20  | \$38.53 | \$5.32     | 16.0%              |
| Feb | \$45.70  | \$47.86  | \$2.16     | 4.7%               | \$23.45  | \$28.67 | \$5.22     | 22.3%              |
| Mar | \$41.58  | \$45.41  | \$3.83     | 9.2%               | \$26.96  | \$29.78 | \$2.82     | 10.5%              |
| Apr | \$55.93  | \$71.89  | \$15.96    | 28.5%              | \$24.08  | \$35.00 | \$10.92    | 45.4%              |
| May | \$66.12  | \$100.85 | \$34.73    | 52.5%              | \$22.65  | \$33.84 | \$11.19    | 49.4%              |
| Jun | \$61.63  | \$126.83 | \$65.20    | 105.8%             |          |         |            |                    |
| Jul | \$71.83  | \$114.14 | \$42.31    | 58.9%              |          |         |            |                    |
| Aug | \$85.89  | \$136.31 | \$50.42    | 58.7%              |          |         |            |                    |
| Sep | \$66.36  | \$89.76  | \$23.40    | 35.3%              |          |         |            |                    |
| Oct | \$47.61  | \$64.50  | \$16.90    | 35.5%              |          |         |            |                    |
| Nov | \$45.48  | \$60.50  | \$15.01    | 33.0%              |          |         |            |                    |
| Dec | \$153.54 | \$129.51 | (\$24.03)  | (15.7%)            |          |         |            |                    |

**Monitoring Analytics, LLC**

**2621 Van Buren Avenue**

**Suite 160**

**Eagleville, PA**

**19403**

**(610) 271-8050**

**[MA@monitoringanalytics.com](mailto:MA@monitoringanalytics.com)**

**[www.MonitoringAnalytics.com](http://www.MonitoringAnalytics.com)**

