

# Updated ARR/FTR Offset and Price Convergence Data

AFMTF

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IMM



Monitoring Analytics

# Self Scheduled ARR Offset Ability

- **If all ARR's self schedule and no FTRs sold**
- **Modeled surplus is congestion remaining after paying all self schedule FTRs**
  - **Represents system capacity not available for ARR paths**
- **Offset to congestion charges = (SS FTR + BAL+M2M Charges + Modeled Surplus)/(DA Congestion + BAL+M2M Congestion)**

# Self Scheduled ARR Offset Ability

|          | 16/17 Planning Period |                 |                 |               |                    |                     | 17/18 Planning Period |                 |                 |               |                    |                     | 18/19 Planning Period |                 |                 |               |                    |                     |
|----------|-----------------------|-----------------|-----------------|---------------|--------------------|---------------------|-----------------------|-----------------|-----------------|---------------|--------------------|---------------------|-----------------------|-----------------|-----------------|---------------|--------------------|---------------------|
|          | SS FTR                | Bal+M2M Charges | Modeled Surplus | DA Congestion | Bal+M2M Congestion | Offset with Surplus | SS FTR                | Bal+M2M Charges | Modeled Surplus | DA Congestion | Bal+M2M Congestion | Offset with Surplus | SS FTR                | Bal+M2M Charges | Modeled Surplus | DA Congestion | Bal+M2M Congestion | Offset with Surplus |
| AECO     | \$3.0                 | (\$1.3)         | \$1.0           | \$12.7        | (\$1.5)            | 24.6%               | \$1.8                 | (\$1.6)         | \$1.0           | \$15.9        | (\$1.7)            | 8.3%                | \$11.5                | (\$1.9)         | \$5.7           | \$11.9        | (\$1.9)            | 153.4%              |
| AEP      | \$85.7                | (\$16.0)        | \$28.9          | \$132.2       | (\$17.6)           | 86.0%               | \$203.3               | (\$20.4)        | \$115.2         | \$223.1       | (\$22.2)           | 148.4%              | \$84.9                | (\$23.7)        | \$42.1          | \$129.6       | (\$23.9)           | 97.8%               |
| APS      | \$25.5                | (\$6.1)         | \$8.6           | \$38.0        | (\$6.8)            | 89.9%               | \$78.7                | (\$7.8)         | \$44.6          | \$67.2        | (\$8.1)            | 195.2%              | \$37.4                | (\$9.2)         | \$18.5          | \$53.7        | (\$8.9)            | 104.1%              |
| ATSI     | \$10.1                | (\$8.5)         | \$3.4           | \$58.6        | (\$9.2)            | 10.1%               | \$54.1                | (\$10.6)        | \$30.7          | \$87.7        | (\$11.7)           | 97.6%               | \$45.3                | (\$12.4)        | \$22.4          | \$64.8        | (\$12.3)           | 105.6%              |
| BGE      | \$100.8               | (\$3.9)         | \$34.0          | \$38.4        | (\$3.9)            | 379.6%              | \$83.1                | (\$5.0)         | \$47.1          | \$50.0        | (\$5.2)            | 279.4%              | \$49.0                | (\$5.8)         | \$24.3          | \$26.1        | (\$6.0)            | 336.8%              |
| ComEd    | \$247.6               | (\$12.4)        | \$83.5          | \$216.5       | (\$9.9)            | 154.3%              | \$110.9               | (\$15.4)        | \$62.8          | \$205.3       | (\$17.4)           | 84.2%               | \$51.4                | (\$17.8)        | \$25.5          | \$113.0       | (\$16.5)           | 61.2%               |
| DAY      | \$1.8                 | (\$2.2)         | \$0.6           | \$15.5        | (\$2.2)            | 2.0%                | \$10.5                | (\$2.8)         | \$6.0           | \$25.2        | (\$2.8)            | 61.2%               | \$11.2                | (\$3.2)         | \$5.5           | \$16.1        | (\$3.3)            | 105.6%              |
| DEOK     | \$9.6                 | (\$3.5)         | \$3.2           | \$29.3        | (\$3.7)            | 36.6%               | \$72.2                | (\$4.3)         | \$40.9          | \$44.9        | (\$3.8)            | 264.4%              | \$50.4                | (\$5.0)         | \$25.0          | \$28.9        | (\$5.2)            | 297.3%              |
| DLCO     | \$0.4                 | (\$1.8)         | \$16.6          | \$10.4        | (\$1.9)            | 178.0%              | \$10.6                | (\$2.2)         | \$24.1          | \$15.1        | (\$2.3)            | 253.2%              | \$7.2                 | (\$2.5)         | \$27.6          | \$10.2        | (\$2.5)            | 418.1%              |
| Dominion | \$49.3                | (\$12.2)        | \$13.4          | \$88.2        | (\$13.1)           | 67.1%               | \$42.5                | (\$15.8)        | \$19.4          | \$155.9       | (\$16.1)           | 33.0%               | \$55.7                | (\$18.7)        | \$26.0          | \$84.4        | (\$18.2)           | 95.3%               |
| DPL      | \$39.6                | (\$2.3)         | \$0.1           | \$34.7        | \$3.9              | 97.0%               | \$34.3                | (\$2.9)         | \$6.0           | \$48.9        | \$7.6              | 66.0%               | \$52.6                | (\$3.4)         | \$3.6           | \$63.0        | (\$4.0)            | 89.3%               |
| EKPC     | (\$0.3)               | (\$1.6)         | (\$0.1)         | \$12.4        | (\$1.6)            | -17.8%              | (\$3.5)               | (\$2.1)         | (\$2.0)         | \$23.5        | (\$1.7)            | -34.5%              | \$0.9                 | (\$2.4)         | \$0.4           | \$11.8        | (\$2.2)            | -11.3%              |
| EXT      | \$1.6                 | \$0.0           | \$0.5           | (\$1.0)       | (\$4.5)            | -39.9%              | \$3.4                 | \$0.0           | \$1.9           | \$0.3         | (\$3.8)            | -152.0%             | \$1.7                 | \$0.0           | \$0.8           | \$0.7         | (\$4.8)            | -60.7%              |
| JCPL     | \$1.6                 | (\$2.9)         | \$0.5           | \$20.8        | (\$3.3)            | -4.5%               | \$2.7                 | (\$3.6)         | \$1.5           | \$38.6        | (\$3.8)            | 1.9%                | \$2.6                 | (\$4.2)         | \$1.3           | \$24.6        | (\$4.2)            | -1.3%               |
| Met-Ed   | \$8.9                 | (\$1.9)         | \$3.0           | \$18.2        | (\$1.8)            | 61.0%               | \$7.6                 | (\$2.5)         | \$4.3           | \$31.5        | (\$4.1)            | 34.2%               | \$5.0                 | (\$2.9)         | \$2.5           | \$17.9        | (\$3.3)            | 31.2%               |
| PECO     | \$9.9                 | (\$5.1)         | \$3.3           | \$36.4        | (\$6.1)            | 26.7%               | \$15.7                | (\$6.4)         | \$8.9           | \$65.5        | (\$6.9)            | 31.1%               | \$15.7                | (\$7.5)         | \$7.8           | \$37.3        | (\$7.3)            | 53.2%               |
| Penelec  | \$8.2                 | (\$2.2)         | \$2.8           | \$16.6        | (\$2.9)            | 64.4%               | \$13.5                | (\$2.7)         | \$7.6           | \$30.7        | (\$3.0)            | 66.4%               | \$17.5                | (\$3.2)         | \$8.7           | \$21.7        | (\$4.1)            | 130.7%              |
| Pepco    | \$11.1                | (\$3.8)         | \$3.8           | \$29.3        | (\$3.8)            | 43.5%               | \$30.3                | (\$4.8)         | \$17.2          | \$46.4        | (\$4.7)            | 102.4%              | \$16.7                | (\$5.5)         | \$8.3           | \$23.6        | (\$5.3)            | 106.9%              |
| PPL      | (\$2.4)               | (\$5.1)         | (\$0.8)         | \$37.3        | (\$6.3)            | -26.7%              | \$14.7                | (\$6.4)         | \$8.3           | \$71.2        | (\$6.1)            | 25.5%               | \$4.3                 | (\$7.6)         | \$2.1           | \$44.2        | (\$7.6)            | -3.0%               |
| PSEG     | \$18.6                | (\$5.6)         | \$6.3           | \$41.0        | (\$6.2)            | 55.4%               | \$58.6                | (\$6.9)         | \$33.2          | \$72.8        | (\$7.3)            | 129.6%              | \$35.6                | (\$8.1)         | \$17.6          | \$47.3        | (\$8.7)            | 117.0%              |
| RECO     | \$0.0                 | (\$0.2)         | \$0.0           | \$1.6         | (\$0.2)            | -12.1%              | (\$0.1)               | (\$0.2)         | (\$0.1)         | \$2.3         | (\$0.3)            | -18.4%              | \$0.2                 | (\$0.3)         | \$0.1           | \$2.0         | (\$0.9)            | -2.5%               |
| Total    | \$630.8               | (\$98.7)        | \$212.8         | \$887.0       | (\$102.6)          | 95.0%               | \$844.7               | (\$124.3)       | \$478.7         | \$1,322.1     | (\$125.3)          | 100.2%              | \$556.9               | (\$145.2)       | \$275.8         | \$832.7       | (\$151.1)          | 100.9%              |

# ARR Allocation Volume(MW): 2019/2020

- **Measure of ARR volume (MW) from source to sink**
  - **“Out of zone” means source is external to sinking zone**
  - **“In zone” means source is internal to sinking zone**



# ARR Allocation Volume(MW): 2019/2020

| Zone     | Stage 1A    |         | Stage 1B    |         | Stage 2     |         | Total       |         |
|----------|-------------|---------|-------------|---------|-------------|---------|-------------|---------|
|          | Out of Zone | In Zone | Out of Zone | In Zone | Out of Zone | In Zone | Out of Zone | In Zone |
| AECO     | 17.4%       | 48.3%   | 7.9%        | 20.1%   | 0.0%        | 6.3%    | 25.3%       | 74.7%   |
| AEP      | 8.5%        | 64.6%   | 1.4%        | 23.6%   | 0.2%        | 1.8%    | 10.1%       | 89.9%   |
| APS      | 11.1%       | 51.7%   | 0.2%        | 34.1%   | 0.3%        | 2.6%    | 11.6%       | 88.4%   |
| ATSI     | 26.1%       | 53.8%   | 9.7%        | 8.9%    | 0.2%        | 1.3%    | 36.1%       | 63.9%   |
| BGE      | 26.8%       | 33.6%   | 0.0%        | 37.8%   | 0.0%        | 1.8%    | 26.8%       | 73.2%   |
| COMED    | 0.0%        | 66.5%   | 0.0%        | 18.6%   | 0.0%        | 14.8%   | 0.0%        | 100.0%  |
| DAY      | 71.2%       | 0.6%    | 2.2%        | 0.0%    | 0.0%        | 26.0%   | 73.4%       | 26.6%   |
| DEOK     | 41.8%       | 34.5%   | 0.1%        | 13.5%   | 0.1%        | 9.9%    | 42.1%       | 57.9%   |
| DOM      | 0.7%        | 61.8%   | 0.0%        | 35.7%   | 0.0%        | 1.8%    | 0.7%        | 99.3%   |
| DPL      | 24.7%       | 59.9%   | 1.8%        | 10.0%   | 0.3%        | 3.3%    | 26.8%       | 73.2%   |
| DUQ      | 35.8%       | 9.7%    | 0.2%        | 0.7%    | 9.7%        | 43.9%   | 45.7%       | 54.3%   |
| EKPC/EXT | 75.4%       | 12.7%   | 7.8%        | 0.0%    | 4.1%        | 0.0%    | 87.3%       | 12.7%   |
| JCPL     | 7.9%        | 68.5%   | 0.1%        | 1.3%    | 13.9%       | 8.3%    | 22.0%       | 78.0%   |
| METED    | 25.4%       | 67.7%   | 0.7%        | 0.5%    | 0.0%        | 5.7%    | 26.1%       | 73.9%   |
| PECO     | 3.7%        | 57.7%   | 4.7%        | 22.8%   | 2.2%        | 8.9%    | 10.6%       | 89.4%   |
| PENELEC  | 17.9%       | 59.9%   | 0.0%        | 16.2%   | 0.1%        | 5.9%    | 18.0%       | 82.0%   |
| PEPCO    | 16.7%       | 31.1%   | 0.0%        | 11.4%   | 0.2%        | 40.6%   | 16.9%       | 83.1%   |
| PPL      | 0.0%        | 83.7%   | 0.0%        | 7.7%    | 0.8%        | 7.7%    | 0.9%        | 99.1%   |
| PSEG     | 27.1%       | 44.4%   | 1.8%        | 18.9%   | 0.3%        | 7.5%    | 29.2%       | 70.8%   |
| RECO     | 0.0%        | 0.0%    | 0.0%        | 0.0%    | 100.0%      | 0.0%    | 100.0%      | 0.0%    |
| Total    | 13.1%       | 55.6%   | 1.6%        | 20.9%   | 0.9%        | 7.9%    | 15.6%       | 84.4%   |

# ARR Allocation Value: 2019/2020

- **Assumes no self schedule FTRs to calculate value**
  - “Out of zone” and “In zone” refer to whether ARR sources in the sinking zone of the path
- **Total Congestion is DA + Balancing congestion**
- **Offset is total In/Out zone revenue divided by Total Congestion**



# ARR Allocation Value: 2019/2020

| Zone         | Stage 1A      |                | Stage 1B     |               | Stage 2      |              | Total         |                | Total Congestion | Offset       |              |              |
|--------------|---------------|----------------|--------------|---------------|--------------|--------------|---------------|----------------|------------------|--------------|--------------|--------------|
|              | Out of Zone   | In Zone        | Out of Zone  | In Zone       | Out of Zone  | In Zone      | Out of Zone   | In Zone        |                  | Out of Zone  | In Zone      | Total        |
| AECO         | \$0.8         | \$1.0          | \$0.2        | \$0.5         | \$0.0        | \$0.1        | \$1.0         | \$1.5          | \$2.9            | 35.2%        | 52.6%        | 87.8%        |
| AEP          | \$7.7         | \$41.0         | \$0.7        | \$6.9         | \$0.1        | \$0.3        | \$8.4         | \$48.2         | \$63.3           | 13.3%        | 76.1%        | 89.4%        |
| APS          | \$5.8         | \$11.6         | (\$0.0)      | \$3.8         | \$0.0        | \$0.2        | \$5.9         | \$15.6         | \$23.5           | 24.9%        | 66.1%        | 91.0%        |
| ATSI         | \$8.3         | \$3.2          | \$0.0        | \$0.4         | \$0.0        | \$0.1        | \$8.4         | \$3.7          | \$26.8           | 31.2%        | 13.8%        | 45.0%        |
| BGE          | \$17.8        | \$3.3          | \$0.0        | \$1.6         | \$0.0        | \$0.0        | \$17.8        | \$4.9          | \$11.8           | 150.6%       | 41.4%        | 192.0%       |
| ComEd        | \$0.0         | \$21.1         | \$0.0        | \$0.2         | \$0.0        | \$0.6        | \$0.0         | \$21.9         | \$48.3           | 0.0%         | 45.4%        | 45.4%        |
| DAY          | \$3.8         | (\$0.0)        | \$0.1        | (\$0.0)       | \$0.0        | \$0.0        | \$3.9         | \$0.0          | \$7.2            | 53.5%        | 0.1%         | 53.6%        |
| DEOK         | \$10.8        | \$4.1          | \$0.0        | \$0.2         | \$0.0        | \$0.0        | \$10.8        | \$4.3          | \$11.6           | 93.1%        | 36.9%        | 129.9%       |
| Dominion     | \$0.7         | \$18.8         | \$0.0        | \$2.4         | \$0.0        | \$0.3        | \$0.7         | \$21.5         | \$43.8           | 1.6%         | 49.0%        | 50.6%        |
| DPL          | \$5.1         | \$8.3          | \$0.2        | \$0.5         | \$0.0        | \$0.3        | \$5.3         | \$9.1          | \$16.1           | 32.9%        | 56.2%        | 89.1%        |
| DLCO         | \$1.3         | (\$0.0)        | (\$0.0)      | (\$0.0)       | \$0.2        | \$0.4        | \$1.5         | \$0.3          | \$4.0            | 37.6%        | 8.8%         | 46.4%        |
| EKPC/EXT     | \$1.1         | \$0.5          | \$0.1        | \$0.0         | \$0.0        | \$0.0        | \$1.2         | \$0.5          | \$3.7            | 32.6%        | 12.5%        | 45.1%        |
| JCPL         | \$0.2         | \$0.7          | (\$0.0)      | \$0.0         | \$1.0        | \$0.1        | \$1.2         | \$0.8          | \$7.1            | 17.4%        | 11.4%        | 28.7%        |
| Met-Ed       | \$0.8         | \$1.6          | \$0.0        | \$0.0         | \$0.0        | \$0.1        | \$0.8         | \$1.8          | \$7.0            | 12.2%        | 25.3%        | 37.5%        |
| PECO         | \$0.1         | \$7.0          | \$0.1        | \$0.5         | \$0.4        | \$0.1        | \$0.6         | \$7.6          | \$9.5            | 6.4%         | 79.6%        | 86.0%        |
| PENELEC      | \$2.0         | \$3.5          | \$0.0        | \$0.4         | \$0.0        | \$0.2        | \$2.0         | \$4.1          | \$7.7            | 26.2%        | 53.7%        | 80.0%        |
| Pepco        | \$7.0         | \$1.0          | \$0.0        | (\$0.0)       | \$0.0        | \$0.4        | \$7.0         | \$1.5          | \$10.7           | 65.4%        | 13.6%        | 78.9%        |
| PPL          | (\$0.0)       | \$12.2         | (\$0.0)      | \$0.4         | (\$0.0)      | \$0.2        | (\$0.0)       | \$12.8         | \$15.4           | -0.2%        | 82.8%        | 82.6%        |
| PSEG         | \$6.6         | \$8.4          | \$0.1        | \$0.2         | \$0.0        | \$0.3        | \$6.7         | \$8.9          | \$14.5           | 46.2%        | 61.4%        | 107.6%       |
| RECO         | \$0.0         | \$0.0          | \$0.0        | \$0.0         | \$0.3        | \$0.0        | \$0.3         | \$0.0          | \$0.5            | 46.0%        | 0.0%         | 46.0%        |
| <b>Total</b> | <b>\$79.8</b> | <b>\$147.1</b> | <b>\$1.5</b> | <b>\$17.8</b> | <b>\$2.0</b> | <b>\$3.9</b> | <b>\$83.4</b> | <b>\$168.8</b> | <b>\$335.4</b>   | <b>33.1%</b> | <b>66.9%</b> | <b>75.2%</b> |



# In/Out of Zone ARR's Offset

- **Path based ARR's result in inaccurate congestion offsets**
  - For BGE, 26.8 percent volume is out of zone, but 150.6 percent of offset is from out of zone
  - For Dominion, 99.3 percent of volume is in zone, but only 49.0 percent of offset is from in zone
- **Path based ARR's do not match actual congestion costs**
  - Reliance on historical contracts
  - Gen to load paths are a fiction that do not reflect actual network power flows and congestion

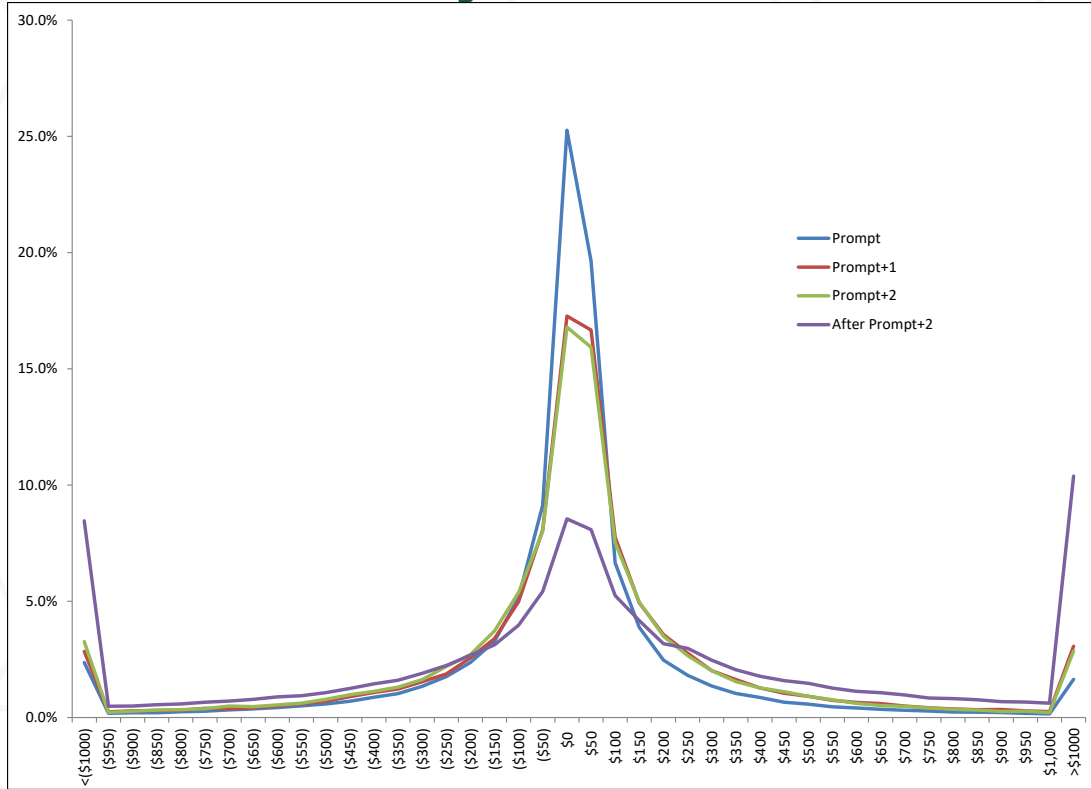


# FTR Auction Price Convergence: 2018/2019

## Monthly Auctions

- **Compares FTR auction path price for period to DA average hourly price difference for the same period, for monthly auctions**
- **Compute difference for every FTR path over every type/period**
- **Figure shows these differences**
- **The difference between the FTR price and DA price difference decreased drastically the closer to the prompt month.**

# FTR Auction Price Convergence: 2018/2019 Monthly Auctions



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