

# Black Start Costs and Net CONE

MIC

March 5, 2025

IMM



Monitoring Analytics

# Black Start Revenues

- **PJM has proposed to change the method for defining the costs of black start service under the tariff.**
- **PJM's proposal is to remove the link to current Net CONE:**
  - **Use the average five year RTO Net Cone from the 2020/2021 through 2024/2025 delivery years to create a fixed rate for the 2025/2026 delivery year and all subsequent delivery years.**
  - **The fixed rate will be adjusted by the Handy Whitman index for each subsequent delivery year.**

# Issues with PJM Proposal

- **PJM's original rationale for changing the black start revenue requirement was based on use of a CC as the reference resource and zero Net CONE values.**
  - **PJM has modified its recommended reference resource to be a CT**
  - **Gross CONE for a CT < Gross CONE for a CC**
  - **Net CONE for a CT > Net CONE for a CC**
- **Recent black start costs based on Net CONE do not demonstrate a need for change.**
- **There is no reason to accept PJM's proposal re black start revenues.**

# Alternative to PJM Proposal

- **Short term:**
  - **Continue to use Net CONE as the basis for black start payments.**
  - **Use average Net CONE across CONE areas for each delivery year rather than separate Net CONE values.**
    - Same payment for black start across PJM.

# Alternative to PJM Proposal

- **Longer term:**
  - **Use of Net CONE is not based on actual costs of providing black start service**
  - **Full costs of investments in black start are completely recovered under the Capital Cost Recovery Rate for Fixed BSCC, frequently on an accelerated basis**
  - **Need to define ongoing costs to provide black start service plus an incentive as the appropriate basis for black start revenue**
  - **The current revenues under the Base Formula Rate for Fixed BSSC are largely profit**

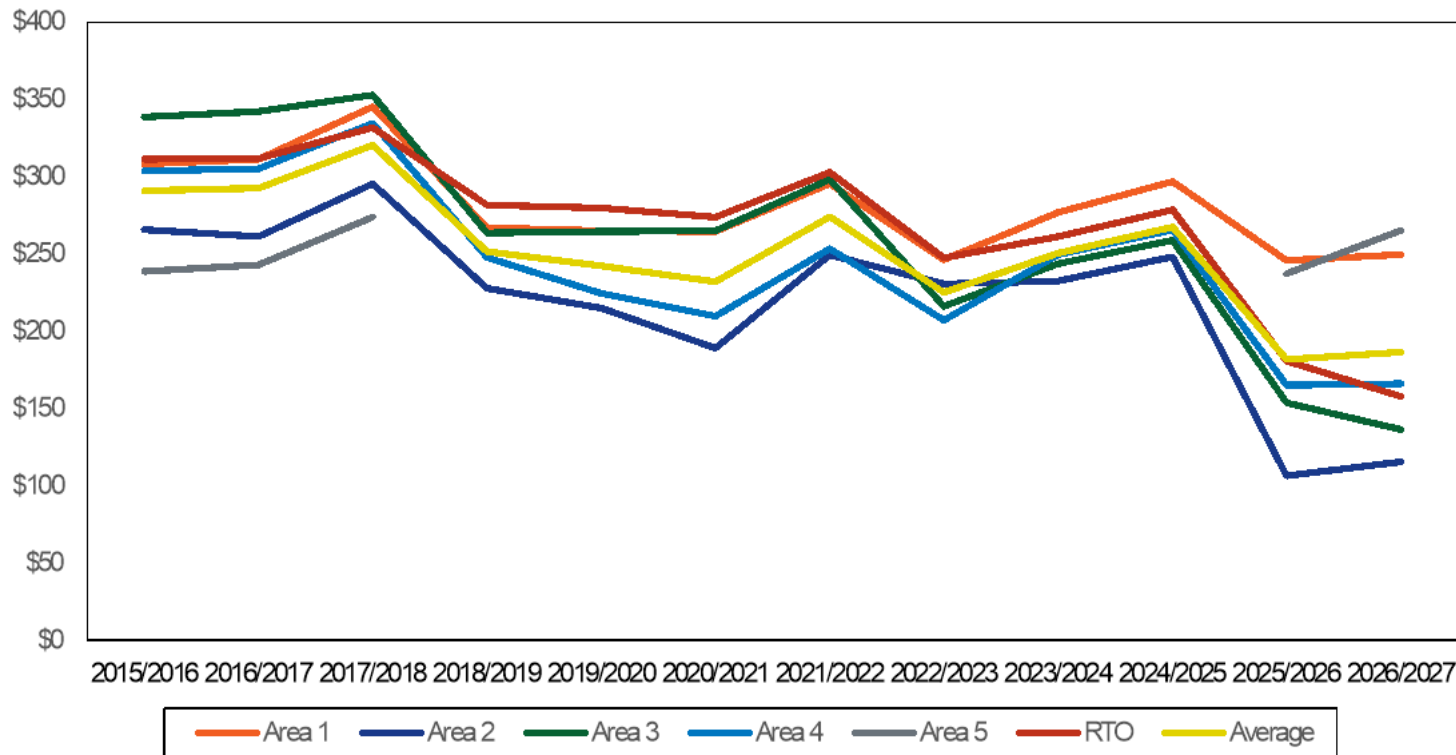
# Net CONE Facts

- **Net CONE has varied across CONE areas:**
  - **CONE Area 1: AE, DPL, JCPL, PE, PSEG and RECO**
  - **CONE Area 2: BGE and PEPCO**
  - **CONE Area 3: AEP, APS, ATSI, DAYTON, DEOK, DLCO, DOM, EKPC and OVEC**
  - **CONE Area 4: METED, PENELEC and PPL**

# Net CONE by CONE Area (\$/MW-Day ICAP)

|                      | 2015/2016 | 2016/2017 | 2017/2018 | 2018/2019 | 2019/2020 | 2020/2021 | 2021/2022 | 2022/2023 | 2023/2024 | 2024/2025 | 2025/2026 | 2026/2027 |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| CONE Area            | Net CONE  | Net CONE  | Net CONE  | Net CONE  | Net CONE  | Net CONE  | Net CONE  | Net CONE  | Net CONE  | Net CONE  | Net CONE  | Net CONE  |
| Area 1               | \$308.14  | \$311.16  | \$345.20  | \$266.73  | \$264.91  | \$264.44  | \$295.29  | \$246.18  | \$276.67  | \$296.70  | \$245.59  | \$249.39  |
| Area 2               | \$265.60  | \$261.14  | \$295.31  | \$227.73  | \$214.75  | \$189.09  | \$249.27  | \$230.60  | \$232.39  | \$247.97  | \$106.31  | \$115.35  |
| Area 3               | \$338.47  | \$342.01  | \$352.63  | \$263.57  | \$264.40  | \$264.88  | \$298.17  | \$216.12  | \$243.59  | \$258.74  | \$153.62  | \$136.29  |
| Area 4               | \$303.65  | \$305.05  | \$334.43  | \$247.58  | \$224.36  | \$209.52  | \$253.22  | \$207.02  | \$249.51  | \$265.37  | \$164.96  | \$165.97  |
| Area 5               | \$238.49  | \$242.72  | \$273.56  |           |           |           |           |           |           |           | \$237.25  | \$265.05  |
| RTO                  | \$311.07  | \$311.72  | \$331.51  | \$281.49  | \$279.55  | \$273.64  | \$302.63  | \$247.26  | \$261.10  | \$278.47  | \$180.76  | \$157.71  |
| Average<br>CONE Area | \$290.87  | \$292.42  | \$320.23  | \$251.40  | \$242.11  | \$231.98  | \$273.99  | \$224.98  | \$250.54  | \$267.20  | \$181.55  | \$186.41  |

# Net CONE by CONE Area (\$/MW-Day ICAP)





# Example of Current Black Start Revenues

- **The total annual revenues using the Base Formula Rate for Fixed BSCC for a 150 MW CT with a diesel added for black start capability by CONE area:**
  - **Average in 2024/2025: \$319,802 or \$2,132 MW-year**
  - **Average in 2025/2026: \$218,672 or \$1,458 MW-year**
  - **Average in 2026/2027: \$224,531 or \$1,497 MW-year**

# Example of Current Black Start Revenues

| Year      | UnitName | Example Zone | CONE Area | MW  | Fixed Cost Formula | Unit type | X Factor | Fixed BSSC | Z factor | Fixed BSSC Plus Z Factor (\$) | Fixed BSSC \$/MW-year |
|-----------|----------|--------------|-----------|-----|--------------------|-----------|----------|------------|----------|-------------------------------|-----------------------|
| 2024/2025 | Unit A   | AE           | 1         | 150 | BFR                | CT/Diesel | 0.02     | \$324,897  | 0.10     | \$357,387                     | \$2,383               |
| 2024/2025 | Unit B   | BGE          | 2         | 150 | BFR                | CT/Diesel | 0.02     | \$271,527  | 0.10     | \$298,680                     | \$1,991               |
| 2024/2025 | Unit C   | AEP          | 3         | 150 | BFR                | CT/Diesel | 0.02     | \$283,320  | 0.10     | \$311,652                     | \$2,078               |
| 2024/2025 | Unit D   | PPL          | 4         | 150 | BFR                | CT/Diesel | 0.02     | \$290,580  | 0.10     | \$319,638                     | \$2,131               |
| 2024/2025 | Unit E   | COMED        | 5         | 150 | BFR                | CT/Diesel | 0.02     | \$283,320  | 0.10     | \$311,652                     | \$2,078               |
| 2025/2026 | Unit A   | AE           | 1         | 150 | BFR                | CT/Diesel | 0.02     | \$268,921  | 0.10     | \$295,813                     | \$1,972               |
| 2025/2026 | Unit B   | BGE          | 2         | 150 | BFR                | CT/Diesel | 0.02     | \$116,409  | 0.10     | \$128,050                     | \$854                 |
| 2025/2026 | Unit C   | AEP          | 3         | 150 | BFR                | CT/Diesel | 0.02     | \$168,214  | 0.10     | \$185,035                     | \$1,234               |
| 2025/2026 | Unit D   | PPL          | 4         | 150 | BFR                | CT/Diesel | 0.02     | \$180,631  | 0.10     | \$198,694                     | \$1,325               |
| 2025/2026 | Unit E   | COMED        | 5         | 150 | BFR                | CT/Diesel | 0.02     | \$259,789  | 0.10     | \$285,768                     | \$1,905               |
| 2026/2027 | Unit A   | AE           | 1         | 150 | BFR                | CT/Diesel | 0.02     | \$273,082  | 0.10     | \$300,390                     | \$2,003               |
| 2026/2027 | Unit B   | BGE          | 2         | 150 | BFR                | CT/Diesel | 0.02     | \$126,308  | 0.10     | \$138,939                     | \$926                 |
| 2026/2027 | Unit C   | AEP          | 3         | 150 | BFR                | CT/Diesel | 0.02     | \$149,238  | 0.10     | \$164,161                     | \$1,094               |
| 2026/2027 | Unit D   | PPL          | 4         | 150 | BFR                | CT/Diesel | 0.02     | \$181,737  | 0.10     | \$199,911                     | \$1,333               |
| 2026/2027 | Unit E   | COMED        | 5         | 150 | BFR                | CT/Diesel | 0.02     | \$290,230  | 0.10     | \$319,253                     | \$2,128               |

# Example of Black Start Revenues Under PJM Proposal

- **Fixed BSSC for each CONE Area based on a 150 MW unit.**
- **The CONE Area values used are based on PJM's proposed value (\$272.62/MW day).**
- **The CONE Area values used for the 2025/2026 and the 2026/2027 planning period are based on PJM's proposal. For the 2026/2027 year the PJM fixed rate was increased by three percent as a proxy for PJM's proposed Handy-Whitman escalation.**

# Example of Black Start Revenues Under PJM Proposal

- **The total annual revenues using the Base Formula Rate for Fixed BSSC for a 150 MW CT with a diesel added for black start capability by CONE area:**
  - **Average in 2024/2025: \$319,802 or \$2,132 MW-year**
  - **Average in 2025/2026: \$328,371 or \$2,189 MW-year**
  - **Average in 2026/2027: \$338,222 or \$2,255 MW-year**

# Example of Black Start Revenues Under PJM Proposal

| Year      | UnitName | Example Zone | CONE Area | MW  | Fixed Cost Formula | Unit type | X Factor | Fixed BSSC | Z factor | Fixed BSSC Plus Z Factor (\$) | Fixed BSSC \$/MW-year |
|-----------|----------|--------------|-----------|-----|--------------------|-----------|----------|------------|----------|-------------------------------|-----------------------|
| 2024/2025 | Unit A   | AE           | 1         | 150 | BFR                | CT/Diesel | 0.02     | \$324,897  | 0.10     | \$357,387                     | \$2,383               |
| 2024/2025 | Unit B   | BGE          | 2         | 150 | BFR                | CT/Diesel | 0.02     | \$271,527  | 0.10     | \$298,680                     | \$1,991               |
| 2024/2025 | Unit C   | AEP          | 3         | 150 | BFR                | CT/Diesel | 0.02     | \$283,320  | 0.10     | \$311,652                     | \$2,078               |
| 2024/2025 | Unit D   | PPL          | 4         | 150 | BFR                | CT/Diesel | 0.02     | \$290,580  | 0.10     | \$319,638                     | \$2,131               |
| 2024/2025 | Unit E   | COMED        | 5         | 150 | BFR                | CT/Diesel | 0.02     | \$283,320  | 0.10     | \$311,652                     | \$2,078               |
| 2025/2026 | Unit A   | AE           | 1         | 150 | BFR                | CT/Diesel | 0.02     | \$298,519  | 0.10     | \$328,371                     | \$2,189               |
| 2025/2026 | Unit B   | BGE          | 2         | 150 | BFR                | CT/Diesel | 0.02     | \$298,519  | 0.10     | \$328,371                     | \$2,189               |
| 2025/2026 | Unit C   | AEP          | 3         | 150 | BFR                | CT/Diesel | 0.02     | \$298,519  | 0.10     | \$328,371                     | \$2,189               |
| 2025/2026 | Unit D   | PPL          | 4         | 150 | BFR                | CT/Diesel | 0.02     | \$298,519  | 0.10     | \$328,371                     | \$2,189               |
| 2025/2026 | Unit E   | COMED        | 5         | 150 | BFR                | CT/Diesel | 0.02     | \$298,519  | 0.10     | \$328,371                     | \$2,189               |
| 2026/2027 | Unit A   | AE           | 1         | 150 | BFR                | CT/Diesel | 0.02     | \$307,474  | 0.10     | \$338,222                     | \$2,255               |
| 2026/2027 | Unit B   | BGE          | 2         | 150 | BFR                | CT/Diesel | 0.02     | \$307,474  | 0.10     | \$338,222                     | \$2,255               |
| 2026/2027 | Unit C   | AEP          | 3         | 150 | BFR                | CT/Diesel | 0.02     | \$307,474  | 0.10     | \$338,222                     | \$2,255               |
| 2026/2027 | Unit D   | PPL          | 4         | 150 | BFR                | CT/Diesel | 0.02     | \$307,474  | 0.10     | \$338,222                     | \$2,255               |
| 2026/2027 | Unit E   | COMED        | 5         | 150 | BFR                | CT/Diesel | 0.02     | \$307,474  | 0.10     | \$338,222                     | \$2,255               |

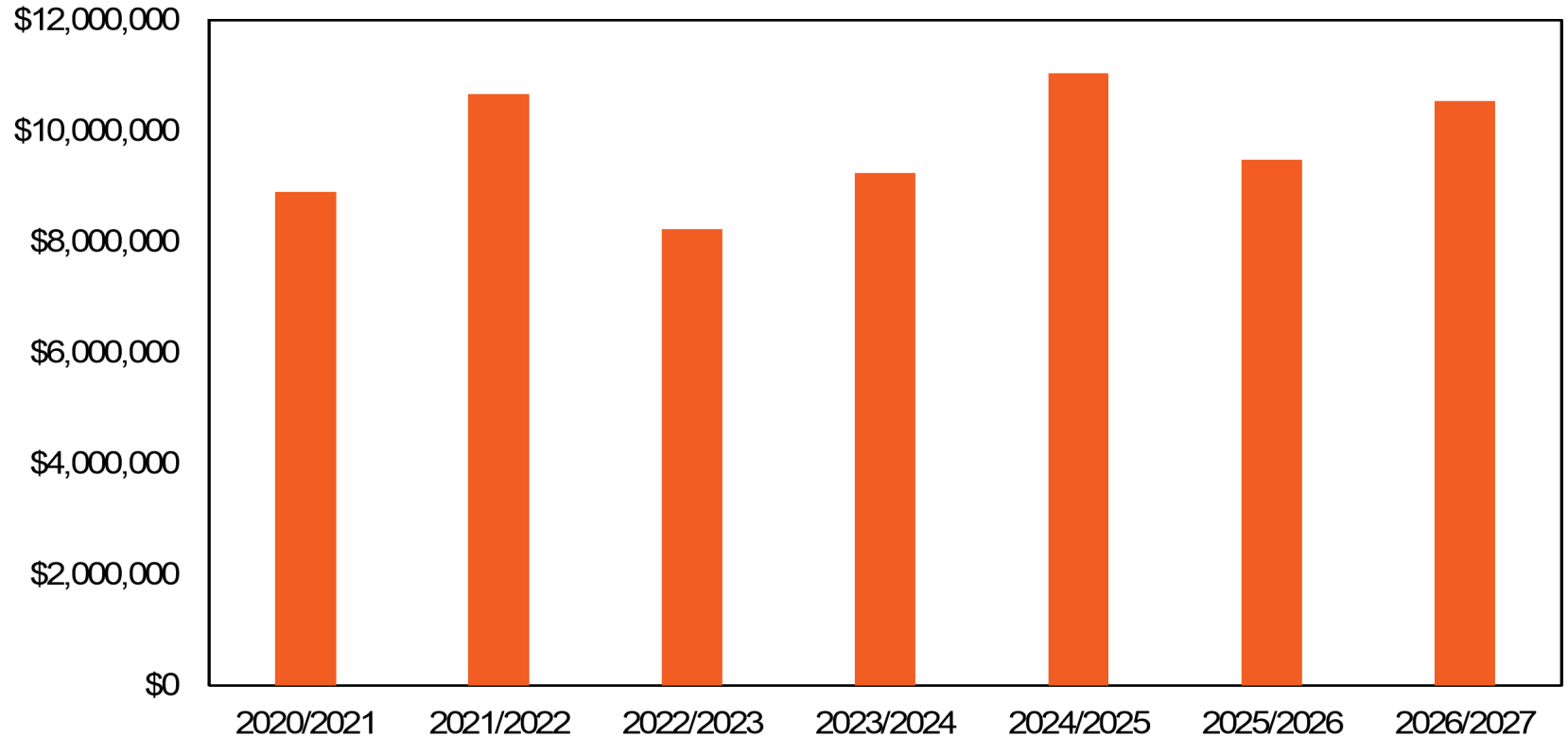
# Difference in Example Black Start Payments Between Status Quo and PJM Proposal

| Year      | Average<br>Current<br>Fixed BSSC Plus<br>Z Factor (\$) | Average<br>Current<br>Fixed BSSC<br>\$/MW-year | Average<br>PJM<br>Fixed BSSC Plus<br>Z Factor (\$) | Average<br>Fixed BSSC<br>\$/MW-year | Difference<br>Fixed BSSC Plus<br>Z Factor (\$) | Difference<br>Fixed BSSC<br>\$/MW-year |
|-----------|--|--|--|-------------------------------------|--|--|
| 2024/2025 | \$319,802  | \$2,132  | \$319,802  | \$2,132                             | \$0  | \$0                                    |
| 2025/2026 | \$218,672  | \$1,458  | \$328,371  | \$2,189                             | (\$109,699)                                    | (\$731)                                |
| 2026/2027 | \$224,531  | \$1,497  | \$338,222  | \$2,255                             | (\$113,691)                                    | (\$758)                                |

# Total Annual Fixed BFR BSSC Revenue

- **Total annual revenue for black start units paid under the Base Formula Rate for Fixed BSCC.**
- **The Net CONE Area values for a CT were used to estimate revenue for the 2025/2026 and the 2026/2027 Delivery Years.**
- **The total annual revenue for existing black start units under the Base Formula Rate for Fixed BSCC calculated by PJM was not correct because it did not account for the exact timing of when individual units started/ended recovery under this rate.**

# Total Annual BFR Fixed BSSC Revenue

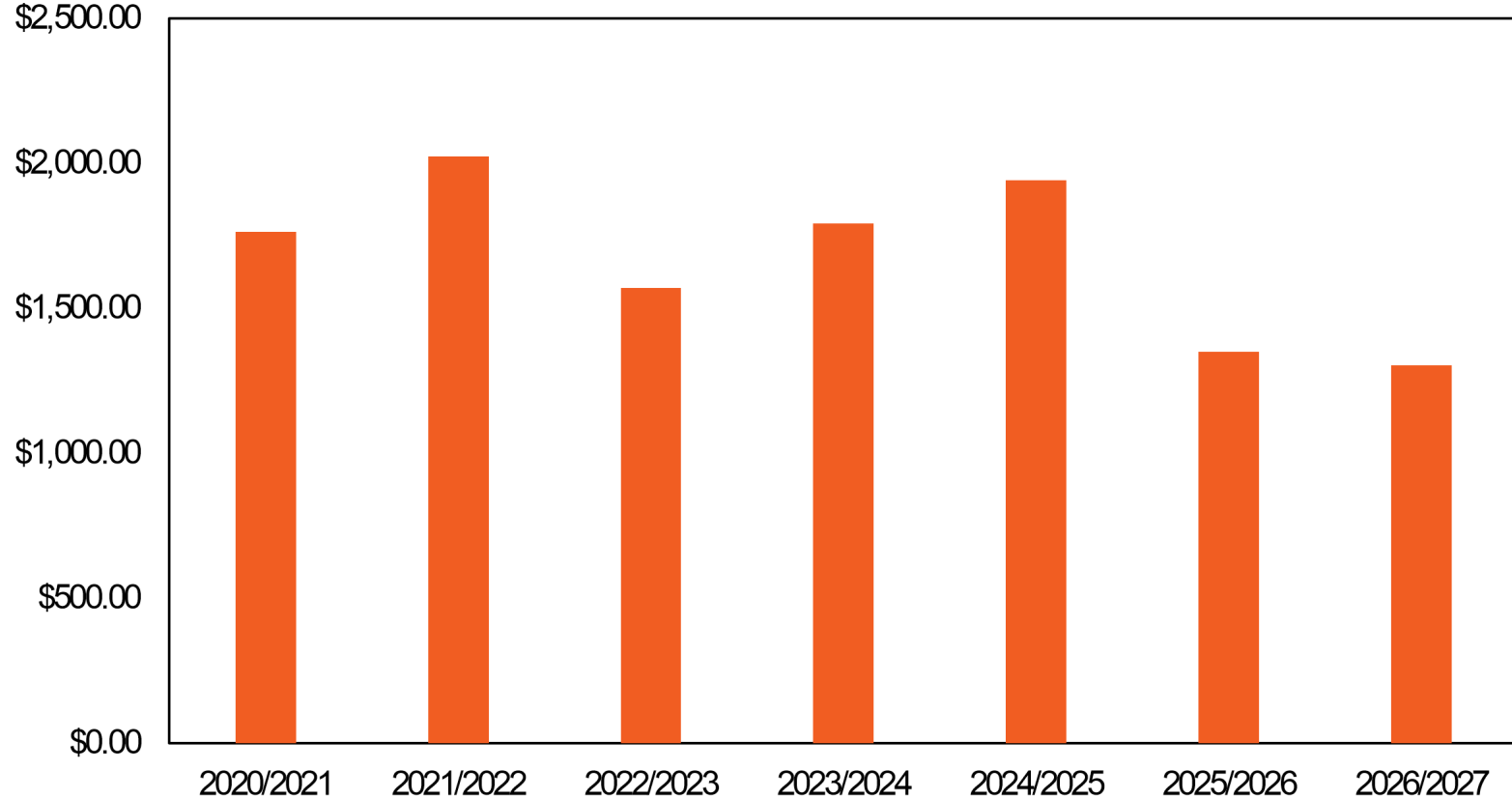




# Annual BFR Fixed BSSC Revenue per MW-Year

- **Annual revenue for black start units paid under the Base Formula Rate for Fixed BSCC in \$/MW-year.**

# Annual BFR Fixed BSSC Revenue per MW-Year

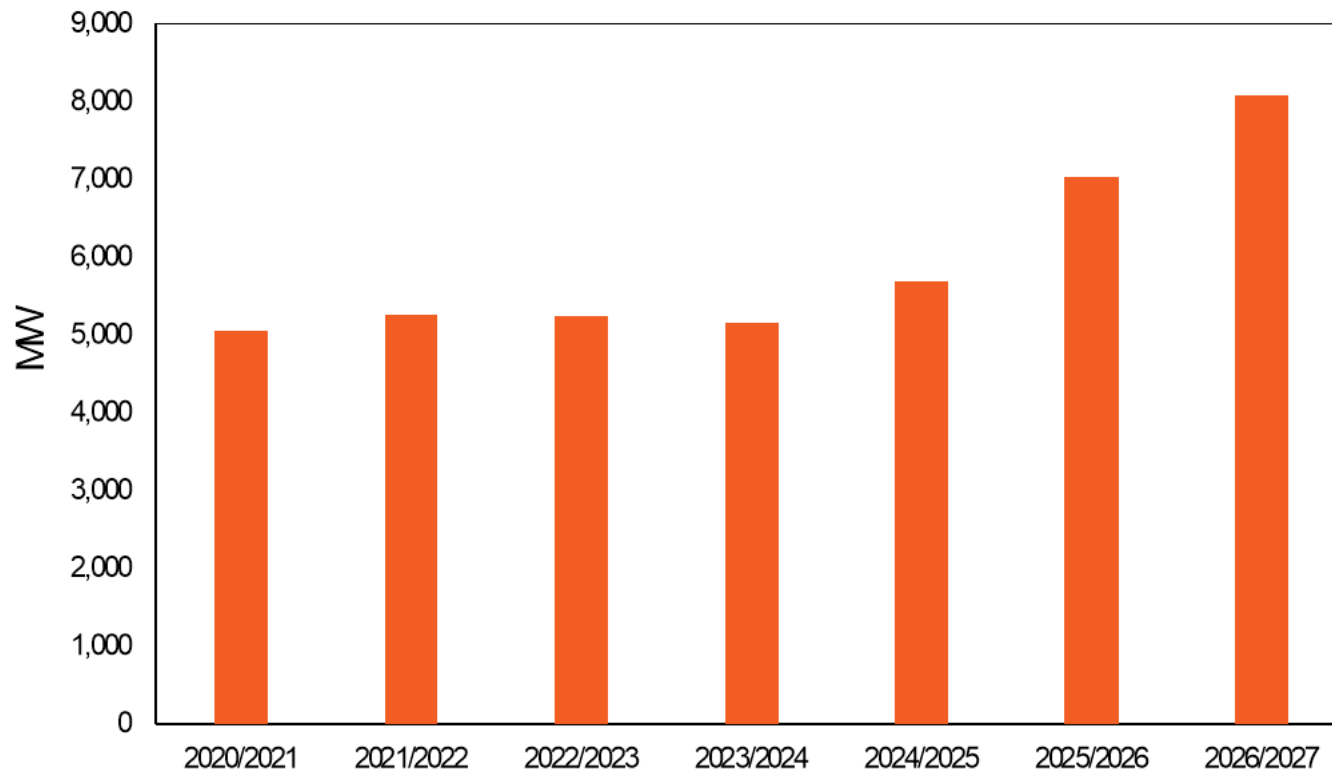


## Total BFR ICAP MW

- **Total ICAP MW for black start units paid under the Base Formula Rate for Fixed BSCC.**



# Total BFR ICAP MW



# Annual Revenue Requirement

- **Black Start Formula Rate:**
  - **Annual Revenue Requirement = {(Fixed BSSC) + (Variable BSSC) + (Training Costs)+ (Fuel Storage Costs)} \* (1+Z)**
- **Base Formula Rate (BFR) for Fixed BSSC under section 5 of 6A:**
  - **Fixed BSSC BFR = Net CONE \* Black Start Unit Capacity \* X**
- **Total Base Formula Rate (BFR) for Fixed BSSC payments under section 5 of 6A:**
  - **Total Fixed BSSC = Net CONE \* Black Start Unit Capacity \* X \* (1+Z)**

Source: PJM OATT Schedule 6A

# Status Quo Compared to PJM Proposal

| Year      | Current<br>Fixed BSSC Plus<br>Z Factor (\$) | Current<br>Fixed BSSC<br>\$/MW-year | PJM<br>Fixed BSSC<br>Plus Z Factor (\$) | PJM<br>Fixed BSSC<br>\$/MW-year | Difference<br>Fixed BSSC<br>Plus Z Factor (\$) | Difference<br>Fixed BSSC<br>\$/MW-year |
|-----------|---|-------------------------------------|---|---------------------------------|--|--|
| 2025/2026 | \$9,479,262                                 | \$1,350                             | \$13,841,048                            | \$1,971                         | (\$4,361,786)                                  | (\$621)                                |
| 2026/2027 | \$10,542,267                                | \$1,304                             | \$16,650,635                            | \$2,059                         | (\$6,108,368)                                  | (\$755)                                |

For PJM BSSC in 2026/2027 Net CONE was escalated by 3 percent

# IMM Proposal Compared to PJM Proposal

| Year      | IMM<br>Fixed BSSC Plus<br>Z Factor (\$) | IMM<br>Fixed BSSC<br>\$/MW-year | PJM<br>Fixed BSSC<br>Plus Z Factor (\$) | PJM<br>Fixed BSSC<br>\$/MW-year | Difference<br>Fixed BSSC<br>Plus Z Factor (\$) | Difference<br>Fixed BSSC<br>\$/MW-year |
|-----------|---|---------------------------------|---|---------------------------------|--|--|
| 2025/2026 | \$9,217,381                             | \$1,312                         | \$13,841,048                            | \$1,971                         | (\$4,623,667)                                  | (\$658)                                |
| 2026/2027 | \$11,053,579                            | \$1,367                         | \$16,650,635                            | \$2,059                         | (\$5,597,056)                                  | (\$692)                                |

The average of the Net CONE Area used in IMM BSSC



**Monitoring Analytics, LLC**

**2621 Van Buren Avenue**

**Suite 160**

**Eagleview, PA**

**19403**

**(610) 271-8050**

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

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

