

Exhibit No. PJM-0001

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Exhibit	Exhibit No.	Designation
The Problem/Opportunity Statement	PJM-0002	Public
The Issue Charge	PJM-0003	Public
A presentation summarizing the PJM and IMM positions on the Black Start Problem/Opportunity Statement and Issue Charge	PJM-004	Public
PJM-IMM 1.1(a) Data Response	PJM-0005	Public
IS-IMM Data Response	PJM-0006	Public
PJM Alternative CRFs Calculation	PJM-0007	Public
Table Comparing CRF Values	PJM-0008	Public
Comparison of CRF Revenues with PJM Alternative CRFs and Staff D1 and E1	PJM-0009	Public

1 **Q. Please describe your educational background.**

2 A. I received a Bachelor of Science in Electrical Engineering from Drexel University
3 in 1988 and a Master of Business Administration from St. Joseph's University in
4 1993.

5 **Q. Please describe your professional experience.**

6 A. I have 36 years of experience in the electric power industry. I started my career at
7 PECO Energy Company where I worked for 10 years in various System Operation
8 positions including Shift Manager in the transmission control room. I started at
9 PJM in 1998 where I held various positions in training members and PJM operators
10 on power system fundamentals, market rules and operations procedures. I led the
11 PJM System Operator Training department from 2006–2018. I started my current
12 position as Senior Manager of Performance Compliance Department in 2018.

13 **Q. Have you previously provided testimony to the Federal Energy Regulatory
14 Commission (“Commission”)?**

15 A. No, I have not.

16 **Q. What is the purpose of your testimony?**

17 A. The purpose of my testimony is to respond to the pre-filed direct testimony filed in
18 this proceeding by Dr. Joseph Bowring on behalf of Monitoring Analytics, LLC, in
19 its capacity as the Independent Market Monitor for PJM (“IMM”) and to support
20 the pre-June 2021 stated Capital Recovery Factors (“Stated CRFs”) as just and
21 reasonable for Black Start Units selected to provide Black Start Service prior to
22 June 6, 2021 (“Existing Black Start Investment”). I will explain that the Stated
23 CRFs continue to be just and reasonable for Existing Black Start Investment, the
24 owners of which, at the time they were selected to provide that service, made

1 commitments based on the Stated CRFs that would be used to calculate their
2 recovery of the capital they invested. I will address the arguments against the Stated
3 CRFs made by the IMM. I will also provide a calculation of an alternative capital
4 recovery factor in the event the Commission finds the Stated CRFs unjust and
5 unreasonable and analysis of the revenues that would be collected by the Black
6 Start Unit owners on a going-forward basis to the end dates of their Black Start
7 commitment periods under the Stated CRFs, PJM's alternative calculation, and
8 under the capital recovery factors Trial Staff calculates. These calculations
9 demonstrate that the Stated CRFs are within a range of reasonable capital recovery
10 factors that can be applied to Existing Black Start Investment.

11 **Q. Are other witnesses also providing testimony for PJM in this proceeding?**

12 A. Yes. Mr. Michael Bryson provides testimony ("Bryson Testimony," Exhibit
13 No. PJM-0010) on the importance of Black Start Service to reliable operation of
14 the PJM Transmission System and explains his concern that the continued litigation
15 in this proceeding over the Stated CRFs for Existing Black Start Investment may
16 be causing current and potential future providers of Black Start Service to PJM to
17 lose confidence in the certainty of recovery of their capital investments at the
18 advertised rates and thereby chill their participation in PJM solicitations for units
19 to provide Black Start Service. Mr. Walter Graf testifies ("Graf Testimony,"
20 Exhibit No. PJM-0011) to the Stated CRFs' justness and reasonableness in light of
21 their being within a range of potentially reasonable capital recovery factors,
22 including capital recovery factors approved for use in PJM and those presented by
23 Commission Trial Staff in their testimony in this proceeding.

1 **II. BACKGROUND**

2 **Q. What is Black Start Service?**

3 A. Please refer to the Bryson Testimony, in which Mr. Bryson explains what Black
4 Start Service is and why it is critically important to PJM's ability to reliably operate
5 its Transmission System. In short, PJM's responsibility for maintaining the
6 operational integrity of the PJM Transmission System includes coordinating and
7 monitoring restoration of all or parts of the Bulk Electric System in the PJM
8 footprint, as necessary. As part of this responsibility, PJM must develop and
9 implement a reliable "black start" capability plan, i.e., a plan to restore transmission
10 system operations in the event of unplanned de-energization or separation of
11 transmission systems, by calling on generating units that have equipment enabling
12 them to start without an outside electrical supply, or generating units with a high
13 operating factor and the demonstrated ability to remain operating automatically, at
14 reduced levels, when disconnected from the grid.

15 **Q. How does PJM procure the necessary Black Start Service?**

16 A. Black Start Service is voluntary in PJM and PJM procures the necessary service
17 through a RFP, competitive solicitation process. Once selected in the RFP process,
18 generating units providing Black Start Service to PJM are compensated through a
19 Base Formula Rate set forth in PJM's Open Access Transmission Tariff ("Tariff"),
20 Schedule 6A, which uses a percentage of the net cost of new entry by generating
21 facilities as a proxy for the Fixed Cost of an existing Black Start Unit. However,
22 the Base Formula Rate is not sufficient to incentivize unit owners to make the
23 incremental capital investment needed to convert a unit to be Black Start capable

1 or to account for the additional financial risk of providing Black Start Service. The
2 capital recovery factors set forth in Tariff, Schedule 6A for Black Start Units
3 making an incremental capital investment to make their units Black Start capable
4 contain a built-in return on investment of 12% that provides a sufficient incentive
5 for unit owners to offer their units in PJM's Black Start RFP processes and make
6 the incremental capital investment if selected. PJM aims to attract multiple
7 proposals in its RFP processes so that it is able to select the most reliable and cost
8 effective option for providing the service.

9 **Q. What happens when PJM selects a Black Start Unit that is being offered by its**
10 **owner in the Black Start RFP process?**

11 A. After receiving and evaluating the offers submitted in the RFP process to provide
12 Black Start Service, which includes an estimation of the costs for which the unit
13 owners are to be compensated, PJM selects units using multiple criteria. This
14 criteria includes the location in the PJM zone or zones that needs/need Black Start
15 Service, technical ability of the resource to provide Black Start Service, reliability
16 of the resource, and the resource's costs of service. This criteria is detailed in PJM
17 Manual 14-D, section 10.¹ PJM then sends acceptance letters to the selected Black
18 Start Unit owners confirming their commitment to provide Black Start Service over
19 multiple years in return for compensation at the rates set forth in Tariff,
20 Schedule 6A.

¹ Operations Planning Division, *PJM Manual 14D: Generator Operational Requirements*, PJM Interconnection, L.L.C., section 10 (Dec. 20, 2023), <https://www.pjm.com/-/media/documents/manuals/m14d.ashx>.

1 **Q. Please explain how and why PJM moved from the Stated CRFs for recovery**
2 **of Existing Black Start Investment to the current formulaic capital recovery**
3 **factors for recovery of capital invested to provide Black Start Service that can**
4 **change as the inputs to the formula change.**

5 A. In 2019, PJM and its stakeholders were engaged in a stakeholder process to add a
6 fuel assurance component to Black Start Service compensation, that is, an
7 additional component of the Black Start Service rates set forth in Tariff,
8 Schedule 6A that would incentivize generators to add and/or maintain on-site fuel,
9 interconnect with more than one natural gas pipeline, or maintain some means of
10 assuring that Black Start Units have ready access to the fuel needed to provide
11 Black Start Service when it is needed. In the course of the fuel assurance
12 stakeholder process, the IMM raised the issue of the Tax Cuts and Jobs Act of 2017
13 (“TCJA”) reduction to the federal corporate income tax rate. The IMM argued the
14 Stated CRFs applicable at the time to all Black Start Units with incremental capital
15 invested to support Black Start capability had to be adjusted to account for the
16 reduction in the federal corporate income tax rate.

17 PJM added the issue of updating the capital recovery factor tables in Tariff,
18 Schedule 6A to a new Black Start stakeholder process that was being established to
19 revise Black Start Unit testing requirements, termination and substitution
20 provisions, and the Black Start Minimum Tank Suction Level Recovery provisions.
21 The Problem/Opportunity Statement for that stakeholder process, which is attached
22 as Exhibit No. PJM-0002, specifically states, “Current Black Start Units receiving
23 the capital cost recovery rate (Schedule 6A) and units already awarded in recent
24 Black Start RFPs will continue with the commitment period and capital recovery
25 factor rates as documented in the current Open Access Transmission Tariff,

1 Schedule 6A, Black Start Service.”² The Issue Charge for this stakeholder process
2 did not include that proviso, however, so the possibility of changing the Stated
3 CRFs for Existing Black Start Investment was deemed to be within the scope of the
4 stakeholder discussions.³

5 As shown in Exhibit No. PJM-0004, a presentation summarizing the PJM and IMM
6 positions on the Black Start Problem/Opportunity Statement and Issue Charge, the
7 IMM proposed that the updated Black Start capital recovery factors apply to both
8 new and existing Black Start Units, while PJM proposed that the updated capital
9 recovery factors and annual updates would apply only to Black Start Units selected
10 to provide Black Start Service in RFP processes beginning after the effective date
11 of the Tariff changes coming out of the stakeholder process.⁴ The stakeholders
12 approved the PJM proposal over the IMM proposal.

13 Following that stakeholder process, PJM made its filing in 2021 under section 205
14 of the Federal Power Act (“FPA”) to change the going forward capital recovery
15 factors for Black Start Units to formula-based values. Consistent with the results
16 of its stakeholder process, PJM did not propose to change the Stated CRFs for
17 Existing Black Start Investment, but left them as stated values in the Tariff.

² Exhibit No. PJM-0002 at 2.

³ See Exhibit No. PJM-0003 at 1.

⁴ Exhibit No. PJM-0004 at 10.

1 **Q. Did the Commission accept the filing?**

2 A. Yes, the Commission accepted PJM’s filing in Docket No. ER21-1635-000 that,
3 among other things, established a formula in the Tariff for determining capital
4 recovery factor values for Black Start capital investment going forward. However,
5 at the same time, the Commission issued an order for PJM to show cause (“Show
6 Cause Order”),⁵ initiating this proceeding to investigate whether the TCJA had
7 caused the Stated CRFs to be unjust and unreasonable.

8 **III. THE STATED CRFS ARE STATED RATES**

9 **Q. Given the defined term for the pre-2021 capital recovery factors you have been**
10 **using, is there any doubt that the Stated CRFs are, in fact, stated rates rather**
11 **than formula rates?**

12 A. No, there is not. The pre-June 6, 2021 capital recovery factors for Black Start Units
13 are certainly stated rates. The Commission repeatedly refers to the pre-June 6, 2021
14 capital recovery factors as “stated rates” in the order issued March 24, 2023, in this
15 proceeding to establish hearing and settlement judge procedures to investigate the
16 Stated CRFs (“Hearing Order”).⁶ Therefore, the status of the Stated CRFs as stated
17 rates is not a question in this proceeding. Nevertheless, the IMM maintains that the
18 Stated CRFs are actually formula-based because he was involved in the calculation

⁵ *PJM Interconnection, L.L.C.*, 176 FERC ¶ 61,080 (2021), *order establishing hearing and settlement judge procedures*, 182 FERC ¶ 61,194, *order on reh’g*, 184 FERC ¶ 61,077 (2023).

⁶ *PJM Interconnection, L.L.C.*, 182 FERC ¶ 61,194 (2023).

1 of the Stated CRFs in 2009 and is aware of the components used to develop the
2 Stated CRFs.⁷

3 Also, the inputs to the pre-June 6, 2021 capital recovery factors were not included
4 in the Tariff or PJM Manuals. There were no requirements, criteria or process to
5 update these stated rates presented anywhere in PJM governing documents or
6 manuals.

7 **Q. What is your response to the IMM's claim that the Stated CRFs are formulaic?**

8 A. In addition to directing the IMM's attention to the Commission's references to them
9 as stated rates in the Hearing Order, I note that the elements used in determining
10 the Stated CRF values set forth in the Tariff were not discussed or independently
11 evaluated either in PJM's 2009 filing in Docket No. ER09-730-000 or in the
12 Commission order accepting that filing. The Stated CRFs were established and
13 approved as stated values, with no consideration of the components used in
14 determining those stated values.

15 **IV. PJM WAS NOT REQUIRED TO CHANGE THE STATED CRFS IN**
16 **EITHER 2018 OR IN 2021.**

17 **Q. Why does it matter that the Stated CRFs are stated rates, rather than formula-**
18 **based rates?**

19 A. It matters because the IMM claims that because the Stated CRFs are formula-based
20 rates, PJM was required to adjust them downward to reflect the TCJA's reduced
21 federal corporate income tax rate as of January 1, 2018, when the TCJA went into

⁷ *PJM Interconnection, L.L.C.*, Direct Testimony of Joseph E. Bowring on Behalf of the Independent Market Monitor for PJM, Docket No. EL21-91-003, Exhibit IMM-0001, at 8:18-21, 9:19-11:15 (June 5, 2024). See also Exhibit No. PJM-0005 (PJM-IMM 1.1(a) response to data request) ("The table of CRF rates is an input to the formula rate.").

1 effect. In turn, the IMM's claim that the Stated CRFs should have been adjusted as
2 of January 1, 2018, provides the foundation for the IMM's contention that the
3 capital recovery factors for Existing Black Start Investment to be determined in this
4 proceeding should be adjusted to return amounts the IMM claims were over-
5 recovered starting from January 1, 2018. And if the IMM contention that the Stated
6 capital recovery factors are formula-based, they would have needed to be updated
7 to any change in the inputs (not just the federal tax rate) including state income tax
8 rates, depreciation rates and debt interest rates and for changes in either direction
9 (up or down). The Stated CRFs were not adjusted for any changes in this input data
10 as they were stated rates prior to the changes of June 6, 2021 which then converted
11 them to formula rates.

12 **Q. Is the IMM correct in arguing for a return of supposed over-recovery back to**
13 **January 1, 2018?**

14 A. No, he is not. As I understand the Commission's post-TCJA requirements, public
15 utilities with formula rates for electric transmission service were required to adjust
16 the federal corporate income tax rate component of those formula rates to account
17 for the TCJA's reduction in that tax rate. But the Commission did not require
18 utilities with stated rates to immediately reduce those stated rates to account for the
19 TCJA's reduction of the federal corporate income tax rate. Thus, because the Stated
20 CRFs are stated rates, there was no over-recovery beginning on January 1, 2018, as
21 the IMM claims.

22 **Q. If PJM was not required to reduce the Stated CRFs effective January 1, 2018,**
23 **should it have reduced them in 2021 when it made its FPA section 205 filing in**

1 **Docket No. ER21-1635-000 to make the going forward capital recovery factors**
2 **formula-based?**

3 A. No, PJM was not required to do so. And PJM had good reason to retain the Stated
4 CRFs for Existing Black Start Investment, as it explained in its response to a
5 deficiency letter in Docket No. ER21-1635-000⁸ and in its response to the Show
6 Cause Order in this proceeding.⁹

7 **V. PJM HAD GOOD REASONS TO KEEP THE STATED CRFS FOR**
8 **EXISTING BLACK START INVESTMENT.**

9 **Q. Please explain what you mean by “good reason” to keep the Stated CRFs for**
10 **Existing Black Start Investment.**

11 A. As Mr. Bryson explains in his testimony, Black Start Service is vitally important to
12 PJM’s ability to operate and maintain a reliable transmission system.¹⁰ In light of
13 the critical need for Black Start Service, PJM seeks to promote investment in Black
14 Start capability and participation in Black Start RFP processes, not to discourage
15 investment and participation. PJM decided the way to promote Black Start
16 investment and RFP participation was to respect the expectations Black Start
17 Service providers had at the time they evaluated the risks and rewards of providing
18 Black Start Service, including the Stated CRFs, and chose to commit their units to
19 Black Start Service over a multi-year term and make the necessary investments.

⁸ *PJM Interconnection, L.L.C.*, Submission of Response to Deficiency Letter of PJM Interconnection, L.L.C., Docket No. ER21-1635-000 (June 11, 2021).

⁹ *PJM Interconnection, L.L.C.*, PJM Interconnection, L.L.C. Response to Commission’s Show Cause Order, EL21-91-000 (Oct. 12, 2021).

¹⁰ Exhibit No. PJM-0010 at 3-5 (Prepared Direct and Answer Testimony of Michael E. Bryson on Behalf of PJM Interconnection, L.L.C.).

1 **Q. Please continue.**

2 A. At the time Black Start unit owners made the choice to commit their units for multi-
3 year terms and make the Existing Black Start Investment, the Stated CRFs were a
4 key data point because they provided the additional return to compensate for the
5 incremental capital investment needed to make the units Black Start capable. The
6 Stated CRF values were set and known *before* the Black Start unit owners made the
7 Existing Black Start Investment, as the IMM acknowledges. The IMM states in his
8 Direct Testimony, “[t]he elements of the cost of capital are set prior to selecting a
9 black start resource for service, and they define the expected returns to the investors
10 in black start resources.”¹¹ And, it is important to note that at the time the Existing
11 Black Start Investment was made, there was no indication that the Stated CRFs,
12 which had been found by the Commission to be just and reasonable, could or would
13 later be changed in a formulaic fashion. Indeed, the IMM implicitly acknowledges
14 this fact by providing an updated calculation of the Stated CRF table values to
15 incorporate the federal tax rate changes without updating any other input into the
16 capital recovery factor values as would be expected if it was a formula rate.¹² The
17 IMM also acknowledged that it “has not proposed changing any other part of the
18 CRF calculation” in discovery in this matter.¹³

¹¹ Bowring Testimony at 21:14-16 (emphasis added).

¹² See Exhibit No. IMM-0009 (Email from Joseph Bowring to David Schweizer & Glen D. Boyle (Oct. 3, 2019, 6:07 PM)).

¹³ Exhibit No. PJM-0006 at 13 (Response to IS-IMM-1.13).

1 **Q. Are you saying the return provided by the Stated CRFs was guaranteed to the**
2 **Black Start Units owners making an incremental capital investment?**

3 A. No, I am saying that the Stated CRFs were fixed values, which cuts for and against
4 the Black Start Unit owners when they were making the Existing Black Start
5 Investment. It is true that if the underlying component values such as the federal
6 or state income tax rates were reduced, the Stated CRFs would provide more than
7 adequate recovery of and on the Existing Black Start Investment. However, the
8 fixed nature of the Stated CRFs means generators were taking the risk that if the
9 underlying component values increased, e.g., if the federal corporate income tax
10 rate increased above 36% or state income tax rates on average exceeded 10%, the
11 Stated CRFs would not be increased to compensate for those increased costs of
12 providing the service and they might under-recover their costs.

13 **Q. Were there other risks the generators took in committing to provide Black**
14 **Start Service for multi-year terms and receive compensation through the**
15 **Stated CRFs?**

16 A. Yes. Black Start Service is not only uniquely important; it also presents providers
17 with unique risks. First, it is the only service PJM procures that requires unit
18 owners to commit for multiple years to recoup their investment. As a result, unit
19 owners must evaluate risks over a longer time frame, which introduces more
20 uncertainty. Also, because Black Start Service must be available even in the face
21 of severe grid disruptions, Black Start Service is subject to specific requirements
22 under North American Electric Reliability Corporation (“NERC”) standards.
23 NERC’s Emergency Preparedness and Operations Standard EOP-005-3, which
24 specifically concerns System Restoration from Black Start Resources, underscores
25 the importance of system restoration planning by establishing unique training,

1 testing, and drill requirements for Generation Operators with Black Start
2 Resources. These Black Start Resource-specific NERC requirements establish
3 increased risk of NERC audits and NERC penalties for non-compliance identified
4 in an audit or through the required testing. In addition, Black Start Units are subject
5 to annual testing requirements and risk losing their Black Start Service payments
6 to the extent they fail the test. Black Start Service providers selected before
7 June 6, 2021, had the opportunity to evaluate both the longer term uncertainty
8 (resulting from the multi-year commitment necessary to recover their investment
9 and the annual testing requirements) and the added risk and exposure from Black
10 Start-specific NERC requirements when considering the Stated CRFs in the Tariff
11 at the time they entered into their commitments. What they did not have was an
12 opportunity to evaluate the post-June 6, 2021 formulaic, annually adjusted capital
13 recovery factor percentages before entering their commitments to provide Black
14 Start Service, nor did they have notice that the Stated CRFs on which they based
15 their investment could change.

16 **Q. Would you please summarize PJM's reasons for retaining the Stated CRFs for**
17 **Existing Black Start Investment?**

18 A. Yes. While the Black Start RFP processes do not create contracts between Black
19 Start Unit owners and PJM, PJM acknowledges the expectations of the Black Start
20 Unit Owners when PJM accepted the Black Start Units owners' RFP responses
21 which committed their units to a multi-year term of Black Start Service at the Stated
22 CRFs set forth in Tariff, Schedule 6A. The Black Start Unit owners making the
23 Existing Black Start Investments evaluated the risks and rewards of providing
24 Black Start Service based on what was known at the time. At that time, there was

1 no indication the Stated CRFs could or would change to formula-based values. In
2 light of PJM's desire to promote Black Start Investment and participation in PJM's
3 Black Start RFP processes, PJM chose to honor the expectations of the Black Start
4 Unit owners making the Existing Black Start Investment at the time those
5 investments were made and to recognize the legal consequences that attached when
6 those Black Start Unit Owners committed to provide Black Start Service for a
7 period of years.

8 **VI. THE IMM'S AND TRIAL STAFF'S ANALYSES PROVIDE NO BASIS TO**
9 **CHANGE THE STATED CRFS FOR EXISTING BLACK START**
10 **INVESTMENT**

11 **A. The IMM's Proposed Methodology for Adjusting the Stated**
12 **CRFs Suffers from Fundamental Errors.**

13 **Q. Please describe the IMM's analysis of the Stated CRFs and the revised capital**
14 **recovery factors with which the IMM would replace the Stated CRFs for**
15 **Existing Black Start Investment if the IMM prevails in his argument that the**
16 **Stated CRFs are unjust and unreasonable.**

17 **A.** As I have already discussed, the IMM contends that the Stated CRFs are actually
18 derived from a formula that can and should be updated whenever the inputs to the
19 formula change. The premise on which the IMM relies for adjusting the Stated
20 CRFs to account for a change in one input to the alleged formula is flawed, though,
21 as I have explained. The Stated CRFs are not and never have been formula rates.
22 The IMM also argues that because the Stated CRFs are formula rates and erroneous
23 inputs to formula rates can be corrected retroactively, the correct calculation of
24 capital recovery factors to be applied to Existing Black Start Investment requires
25 determining how much of the capital invested by the Black Start Unit owner has
26 recovered already and establishing a capital recovery factor that will enable the

1 Black Start Unit owner to recover, over the remaining Black Start Service
2 commitment period, no more than the remaining capital investment the owner is
3 owed, assuming the capital recovery factor that applies is reduced to account for
4 the TCJA's income tax rate reduction.

5 **Q. What time period would the IMM's calculation consider?**

6 A. To determine how much of the original investment the Black Start Unit owner has
7 already recovered, the IMM would start from the date the investment was made and
8 determine how much the Black Start Unit owner recovered using the Stated CRFs
9 before January 1, 2018. From January 1, 2018, to the present, the IMM would
10 determine how much of the investment the Black Start Unit owner would have
11 recovered under a capital recovery factor that is reduced to account for the TCJA's
12 income tax rate reduction.

13 **Q. How would the IMM then establish the going forward capital recovery factor**
14 **that would apply to the Black Start Unit owner?**

15 A. After calculating how much of the original investment was recovered under the
16 Stated CRFs from the date the investment was made and up to January 1, 2018, and
17 how much should have been recovered from January 1, 2018, to present under the
18 adjusted capital recovery factor, the IMM would calculate a going forward capital
19 recovery factor that would allow the Black Start Unit owner to recover no more
20 than the remaining investment the Black Start Unit owner has not recovered, over
21 the remaining commitment term.

22 **Q. Do you agree with the IMM's methodology?**

23 A. No, I see several problems with it. First, it is an obvious attempt to circumvent the
24 prohibition on retroactive ratemaking and reach back before the refund effective

1 date the Commission established in this proceeding of August 17, 2021, to attempt
2 to recoup retroactive refunds. The Commission declined in the Show Cause Order
3 to include in the scope of this proceeding the question of whether PJM should make
4 retroactive changes to the Stated CRFs paid to the Existing Black Start Investment,
5 i.e., to change the Stated CRFs before the refund effective date and back to
6 January 1, 2018.¹⁴ The Commission's reason for declining to consider that
7 question in this proceeding was that any such changes would violate the filed rate
8 doctrine and the related rule against retroactive ratemaking.

9 **Q. What other problems do you see with the IMM's methodology?**

10 A. In addition to constituting retroactive ratemaking, the IMM's methodology would
11 require an examination of each individual Black Start Unit's costs, term of
12 commitment, depreciation methodology, and Accumulated Deferred Income Tax
13 balances. The level of granularity the IMM's methodology would require is simply
14 not appropriate for a value included in the Tariff to be applicable to all Existing
15 Black Start Investment. The IMM would turn this single proceeding concerning
16 the correct capital recovery factor to be applied to all Existing Black Start
17 Investment into a unit by unit examination, effectively opening up dozens of mini
18 Black Start revenue requirement cases.

¹⁴ Show Cause Order at P 50.

1 **B. Trial Staff Calculates Artificially Low Capital Recovery Factors**
2 **to Replace the Stated CRFs.**

3 **Q. Turning to Trial Staff’s testimony, what issues do you have with the capital**
4 **recovery factors Trial Staff proposes to use to replace the Stated CRFs?**

5 A. For the most part, Trial Staff appropriately calculated its “Set D” of capital recovery
6 factors by simply reducing the federal income tax rate from 36% to 21%, to account
7 for the TCJA’s reduction of the federal income tax rate. However, Trial Staff’s
8 Set D calculations unnecessarily propose to modify the methodology used to
9 calculate the Stated CRFs. In addition, Trial Staff’s calculations assume that the
10 Stated CRFs are comprised of individual components that can be changed over
11 time, which is not the case. However, the Set D calculations are consistent with the
12 Commission’s focus in the Hearing Order on the TCJA’s reduction in the federal
13 income tax rate.

14 But Trial Staff also calculated a set of capital recovery factors in its “Set E”
15 calculations that change not just the federal income tax rate but several other
16 components, including the capital structure, the rate of return on equity, and the
17 cost of debt (collectively, the “cost of capital”).

18 **Q. Do you view that as an appropriate way to calculate a replacement rate for the**
19 **Stated CRFs?**

20 A. No, I do not. This proceeding is focused on the impact of the TCJA’s reduction in
21 the federal income tax rate on the Stated CRFs. Other underlying components of
22 the Stated CRFs are not at issue here.

23 **VII. PJM’S ALTERNATIVE CAPITAL RECOVERY FACTORS**

24 **Q. If the Commission were to determine that the Stated CRFs that apply to**
25 **Existing Black Start Investment are no longer just and reasonable and require**

1 **PJM to establish a replacement rate, does PJM have a proposal for a**
2 **replacement rate?**

3 A. Yes. As I have testified, the Stated CRFs remain just and reasonable for Existing
4 Black Start Investment. However, if the Commission nevertheless decides that the
5 Stated CRFs are not just and reasonable, the correct way to address the issue set for
6 hearing—whether the TCJA reduction in the federal corporate income tax rate
7 renders the Stated CRFs unjust and unreasonable—is to calculate capital recovery
8 factors that differ from the Stated CRFs only in the tax rate used to calculate the
9 federal corporate income tax allowance component of the capital recovery factors.
10 This is largely what Trial Staff’s Set D1 capital recovery factors represent, except
11 Trial Staff proposes to modify the Levelized Rate Method.

12 **Q. Have you calculated such a set of capital recovery factors?**

13 A. Yes. PJM has calculated the Stated CRFs with the federal corporate income tax
14 rate reduced to 21% (“PJM Alternative CRFs”), as shown on Exhibit No. PJM-
15 0007. PJM also provides a comparison of the PJM Alternative CRFs with two of
16 Trial Staff’s proposed capital recovery factors: Set D1, derived using Trial Staff’s
17 Levelized Rate Method and a 21% federal corporate income tax rate; and Set E1,
18 derived using Staff’s Levelized Rate Method, a 21% federal corporate income tax
19 rate, and Staff’s cost of capital inputs based on transmission owners’ financial
20 information in Exhibit No. PJM-0008. As shown on Exhibit No. PJM-0008, the
21 PJM Alternative CRFs are comparable to Trial Staff’s Set D1 and Set E1 proposed
22 capital recovery factors.

1 **Q. Have you performed any other analyses of the Stated CRFs compared to the**
2 **capital recovery factors proposed by Trial Staff, the IMM, and PJM's**
3 **Alternative CRFs?**

4 A. Yes, I have compared the Stated CRFs, the PJM Alternative CRFs, and Trial Staff's
5 proposed Set D1 and Set E1 capital recovery factors. The IMM did not calculate,
6 or at least did not provide, a set of replacement capital recovery factors. Exhibit
7 No. PJM-0009 shows the difference in the various capital recovery factor values'
8 revenue impact going forward from January 1, 2026 (a conservative estimate of the
9 earliest date the Commission could order a prospective change in the Stated CRFs
10 in this proceeding) until 2040 (when the Black Start Service commitment periods
11 for all Existing Black Start investment will have ended). In addition, Exhibit
12 No. PJM-0009 calculates potential refunds from the locked-in refund period of
13 August 17, 2021 to November 17, 2022.

14 **Q. What did your analyses of the Stated CRFs, PJM's Alternative CRFs, and**
15 **Trial Staff's proposed capital recovery factors find?**

16 A. My analysis found that the Stated CRFs actually result in a lower revenue
17 requirement on a going-forward basis than Trial Staff's proposed Set D1 capital
18 recovery factors exclusive of potential refunds. In particular, exclusive of refunds,
19 the Stated CRFs would result in a revenue requirement of \$191,563,590.94 through
20 2040 whereas Trial Staff's Set D1 capital recovery factors would result in a revenue
21 requirement of \$194,385,915.00 for the same time period. The PJM Alternative
22 CRFs would result in a total revenue requirement of \$185,108,613.25 for the same
23 time period, which is \$6,454,977 lower than the Stated CRFs' total revenue
24 requirement and \$9,277,302 lower than Trial Staff's proposed Set D1 capital
25 recovery factors' total revenue requirement. Trial Staff's Set E1 capital recovery

1 factors' would result in an additional going-forward revenue reduction of
2 \$9,429,484 relative to the PJM Alternative CRFs. Inclusive of potential refunds,
3 the PJM Alternative CRFs would result in a 7.78% revenue reduction compared to
4 the Stated CRFs. In comparison, Trial Staff's Set D1 capital recovery factors would
5 result in only a 3.86% revenue reduction over the Stated CRFs, inclusive of
6 potential refunds. Finally, Trial Staff's Set E1 capital recovery factors would result
7 in a 17.34% revenue reduction, inclusive of refunds.

8 **Q. What conclusion do you draw from these comparisons?**

9 A. I conclude that the Stated CRFs are within a range of reasonable capital recovery
10 factors that can be calculated and applied to Existing Black Start Investment,
11 particularly because the revenues flowing from the use of the Stated CRFs on a
12 going-forward basis through 2040 are slightly less than the revenues associated
13 with the use of Trial Staff's Set D1 over that same period exclusive of potential
14 refunds. I also conclude that if, despite the Stated CRFs being within a range of
15 reasonable capital recovery factors, the Commission were to decide the Stated
16 CRFs are no longer just and reasonable, the PJM Alternative CRFs would be a just
17 and reasonable replacement rate.

18 **VIII. CONCLUSION**

19 **Q. Does this conclude your testimony?**

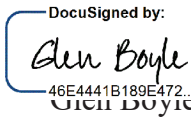
20 A. Yes.

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

PJM Interconnection, L.L.C.)
)
) Docket No. EL21-91-003

VERIFICATION

I, Glen Boyle, pursuant to 28 U.S.C. § 1746, state, under penalty of perjury, that I am the Glen Boyle referred to in the foregoing document entitled “Prepared Answering Testimony of Glen Boyle on behalf of PJM Interconnection, L.L.C.,” that I have read the same and am familiar with the contents thereof, and that the facts set forth therein are true and correct to the best of my knowledge, information, and belief.

By:  _____
DocuSigned by:
46E4441B189E472...
Glen Boyle

Dated: July 17, 2024

Exhibit No. PJM-0002



Problem/Opportunity Statement

Black Start Unit Capital Recovery Factor; and Involuntary Termination & Substitution Rules

Problem / Opportunity Statement

A Black Start Unit is a generating unit that has equipment enabling it to start without an outside electrical supply or a generating unit with a high operating factor (subject to Transmission Provider concurrence) with the demonstrated ability to automatically remain operating, at reduced levels, when disconnected from the grid. A Black Start Unit must meet the criteria set forth in the Open Access Transmission Tariff (Schedule 6A Black Start Service) and PJM Manuals (Section 4.6 Black Start Service in PJM Manual 12). PJM has identified four areas in the Black Start Service documentation that requires additional clarification or updating.

1) Testing Requirements for Black Start resources not compensated through Schedule 6A

Black Start units in PJM are typically compensated through Schedule 6A of the Open Access Transmission Tariff. In order to receive Black Start Service compensation, the Unit must have a successful black start test submitted to PJM within the preceding 13 months from the last successful test on record. Some Black Start Units entered Black Start Service via a Transmission Owner (TO) integration and are not compensated via Schedule 6A but through a contractual relationship with the TO. PJM has identified the need to provide clarity within its black start testing requirements to ensure consistency, including testing submittal timelines, for Black Start Units compensated by either PJM or Transmission Owner(s).

2) Black Start Unit Substitution Rules

A Black Start Unit Owner may utilize another unit to substitute as a Black Start Unit as long as the unit is on the same voltage level and has a valid annual black start test. This is generally intended to allow for more than one Black Start Unit on planned outage at the same time. PJM has received an increase in questions and interest in adding, maintaining, and managing units as Black Start Unit substitutes. Some examples of the questions include notification time required to allow a Black Start Unit substitution; managing updates to system restoration plans to document black start resources, and reporting of black start testing for units not designated as critical. As a result, PJM has identified the need to provide additional clarification to the existing substitution process rules.

3) Black Start Termination Rules

Per PJM's Open Access Transmission Tariff and PJM Manual language, PJM or a Black Start Unit owner is required to provide a one year's advance notice of intent to terminate Black Start Service (following an initial two years of Black Start Service). PJM has identified the potential for a Black Start Unit to either fail or not perform a black start test and remain without a successful black start test on file for an extended period of time before issuing or receiving a termination notice. This can potentially delay PJM from procuring replacement Black Start Service. PJM has identified the need to update the Open Access Transmission Tariff and PJM Manual language with additional rules to address this potential delay.



Problem/Opportunity Statement

4) Black Start Capital Recovery Factor (CRF)

Black Start Units electing to recover new or additional Black Start capital costs commit to provide Black Start Service for a term based on the age of the Black Start Unit. Open Access Transmission Tariff, Schedule 6A, Capital Recovery Factor (CRF) Table lists the term periods of commitment and applicable Capital Cost Recovery factors. Recent tax law and interest rate changes no longer reflect the multiple assumptions used in the current CRF. These changes include implementation periods in order to conform to the new tax laws, along with expected future changes that are not yet finalized. PJM is requesting to update the current CRF Table to meet current tax law and interest rates; and take this opportunity to explore a new process for automatically updating and documenting the CRF Table to remain consistent with tax law changes.

(Please note: Current Black Start Units receiving the capital cost recovery rate (Schedule 6A) and units already awarded in recent Black Start RFPs will continue with the commitment period and CRF rates as documented in the current Open Access Transmission Tariff, Schedule 6A, Black Start Service.)

Exhibit No. PJM-0003



Issue Charge

Black Start Unit Involuntary Termination & Substitution Rules

Issue Source

PJM has identified the following areas in PJM Black Start Service rules need review and additional clarification:

- 1) Testing Requirements for Black Start resources not compensated through Schedule 6A
- 2) Black Start Unit Substitution Rules
- 3) Black Start Termination Rules
- 4) Capital Recovery Factor (CRF) updates

Issue Content

Work is intended to address specific Open Access Transmission Tariff (Schedule 6A Black Start Service) and PJM Manual language.

Key Work Activities and Scope

1. Education of current: Black Start testing requirements; Black Start Unit commitment, termination and substitution processes; and Capital Recovery Factors.
2. Update Black Start testing requirements.
3. Update requirements and guidance for Black Start Unit termination and substitution.
4. Update Capital Recovery Factors to align with current tax law and interest rates.
5. Review and endorse governing documents to implement requirements, guidance, and new tax laws as related to Key Work Activities 2, 3 and 4 listed above.

Expected Deliverables

1. Updated Tariff language (Schedule 6A Black Start Service)
2. Updated PJM Manual language (M-12; M-10; M-14D)

Decision-Making Method

Tier 1, consensus (unanimity) on a single proposal.

Stakeholder Group Assignment

PJM proposes this issue be addressed through the “CBIR Lite” process at the Operating Committee.



Issue Charge

Expected Duration of Work Timeline

It is estimated that this work effort will take two to three months. Implementation of changes needed to governing documents to take an estimated six months following potential Tariff changes.

Start Date	Priority Level	Timing	Meeting Frequency
Click here to enter a date.	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> Immediate <input checked="" type="checkbox"/> Near Term <input type="checkbox"/> Far Term	<input type="checkbox"/> Weekly <input checked="" type="checkbox"/> Monthly <input type="checkbox"/> Quarterly

Charter

(check one box)

<input type="checkbox"/>	This document will serve as the Charter for a new group created by its approval.
<input checked="" type="checkbox"/>	This work will be handled in an existing group with its own Charter (and applicable amendments).

More detail available in M34; Section 6

Exhibit No. PJM-0004



Black Start PS/IC: Summary of IMM and PJM Proposals

Becky Davis, Sr. Analyst
Operating Committee
October 8, 2020

September 3 – Third first read of Black Start Problem Statement / Issue Charge

- [*Black Start Options Matrix*](#)
- [*Black Start Options Matrix - Presentation*](#)

October 8 – There are two proposals - from IMM and PJM

- Includes summary material of proposals
- The OC will be asked to vote on the two proposals

Black Start Testing

- All Black Start Units (including units not under Schedule 6A to black start test every 13 months)

Black Start Unit Termination

- Ability to terminate Black Start Service if Black Start Unit is unable to successfully black start test within 90 days following a failed test AND not working on enabling black start capability to successfully test within a one year period

Black Start Unit Substitution

- Add guidance and clarifying language for unit substitution
- Substitutions require units meet specific black start criteria

Update Capital Recovery Factors

- Reflect federal income tax and interest rate changes
- Updates to Depreciation as applicable under the tax code
- Provide for annual updates
- Updates via PJM website (not hard coded in Schedule 6A)
- Commitment period to reflect life of black start equipment

Update Minimum Tank Suction Level Recovery

- Revised Minimum Tank Suction Level to calculate a ratio based on the fuel burn needed to meet minimum run hours

Black Start Unit Testing

	PJM	IMM
Black Start Unit testing required every 13 months for Black Start Units under Schedule 6A or service agreement with Transmission Owner	X	X
Testing requirement update to be added to Schedule 6A and Manual 12	X	X

Black Start Unit Substitution

Clarifying language to address Black Start Unit substitution	X	X
Substitute unit must be connected to the same bus		X

Black Start Unit Substitution continued

	PJM	IMM
Substitutions only permitted under very specific circumstances and with defined conditions		X
Substitutions must be supported by documentation (for operational or technical reasons)	X	
Substitution guidance to be added to Schedule 6A and annual 12	X	X



Summary of Proposals

Black Start Unit Termination

	PJM	IMM
Ability to terminate Black Start Service if Black Start Unit unable to successfully black start test within 90 days following a failed test AND not working towards enabling black start capability / successful testing within a one year period	X	X
Termination updates to be added to Schedule 6A and annual 12	X	X



Summary of Proposals

Black Start Capital Recovery Factor (CRF)

	PJM	IMM
<p>move CRF from Schedule 6A and add new Manual 15 section documenting CRF methodology; and post annual Tables (plus historical CRFs) via PJM website</p> <p>interest rate assumption: Moody's Utility index bond Baa1</p> <p>interest rate assumption: ATWACC from Quadrennial CONE review with "significant change protection" for interest rate changes between Quadrennial Reviews</p>	X	X



Summary of Proposals

Black Start Capital Recovery Factor (CRF)

	PJM	IMM
CRF Annual updates include changes in federal tax rate, average state tax rates and interest rate changes	X	X
Updated CRF rates apply to new/existing Black Start Units		X
Updated CRF rates, including annual updates, apply only to Black Start Units selected in RFPs after the effective date of Tariff changes	X	
CRF Recovery Periods - Status Quo (5; 10; 15; 20 years)	X	
CRF Recovery Periods – 10 and 20 year recovery periods		X



Summary of Proposals

Black Start Capital Commitment Period

	PJM	IMM
<p>Black Start Unit starting on capital recovery rate to remain black start for life of asset unless:</p> <ul style="list-style-type: none"> Unit retirement / deactivation with at least one year's advance notice Expiration of a state, federal, or other governmental agency permit(s) required for Black Start Service with at least one year's advance notice Additional capital is required to maintain Black Start Service PJM terminates Black Start Service with at least one year's advance notice 	X	X
<p>Black Start commitment periods removed from CRF table</p>	X	X



Summary of Proposals

Minimum Tank Suction Level (MTSL)

	PJM	IMI
Black Start Unit eligible to recover Black Start Energy Tank ratio of the MTSL in its fuel storage calculation	X	X
Black Start Energy Tank Ratio = $\frac{\text{Fuel Burn Rate} \times \text{Minimum Run Hours}}{\text{Tank Capacity} - \text{MTSL}}$	X	X



Conta



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custsvc@pjm.com



Appendix

Black Start Testing

- Clarifying language added to Open Access Transmission Tariff Schedule 6A Black Start Service Sections 12, 13 & 14; PJM Manual 12 Section 4.6.14 Non-performance

Periodicity	Successful test within last 13 months <i>(Units under Schedule 6A will not qualify to receive revenue without successful test within the rolling 13 month test window)</i>
Black Start Units	Black Start Units providing Black Start Service under Schedule 6A or under a service agreement with Transmission Owner

Black Start Termination (following unsuccessful black start testing)

Adding language to Schedule 6A Section 15 and M-12 Section 4.6.14

- Ability to immediately terminate Black Start Service if Black Start is unable to successfully black start test within 90 days following a failed test AND is not working on making the necessary repairs to enable the Black Start Unit to successfully black start test within a year period.
- PJM Performance Compliance Department to work directly with Black Start Unit owner to determine a schedule to complete repairs in order to return black start capability and successfully black start test.

Black Start (next 90 days following unsuccessful testing)

Next 90 days following Black Start Testing	
Test Result	Schedule 6A Compensation
Pass	Reinstate next month (no retroactive compensation)
No Test Conducted + Black Start Unit owner working with PJM for future successful black start testing within a period of one year	Reinstate compensation the following month of successful test (no retroactive compensation)
Test Conducted + No Plans to return to Black Start Service	Immediate Black Start Termination (no retroactive and no future compensation)

Existing Process, no proposed changes

Proposed changes to reflect failed testing and no successful test on record for the following 90 day period



Black Start Testing – Schedules & Reporting

Black Start Unit Owner Test
Scheduling

Black Start Unit Owner Test
Reporting

Coordinates with PJM

Submit test results via eDART within
14 days of testing

Submit eDART ticket with three days
advance notice

Provide supporting documentation of
test procedure and training

Request additional testing (if needed)

Black Start Unit Substitution

- Clarifying language added to Open Access Transmission Tariff Schedule 6A Black Start Service Section 10; PJM Manual 12 Section 4.6.14 Non-performance
- Substitution Requirements:
 - PJM and host Transmission Owner(s) approval
 - Valid Black Start Test within previous 13 months
 - Connected at same voltage level and cranking path
 - Similar unit age
 - Provides equivalent Black Start Unit capacity
 - Cannot add new or additional capital recovery
 - No change to existing capital recovery period



Black Start Unit Substitution Timeline

Timeline Example: Black Start Unit Owner (GO) scheduling overhaul on CT1 (current Black Start Unit) and is requesting substitution of CT2 during overhaul period. CT2 is black start capable and tested August 2020.

Substitution requested by before November 1, 2020

PJM verifies successful test, similar unit age, unit capacity & revenue requirement

PJM & host TO(s) approve substitution



GO Submit Substitution Request by before Sept. 22, 2020

TO verifies voltage and cranking path

Sept. 23 – Oct. 1, 2020

Host TO(s) updates System Restoration Plan(s) Update by before Nov. 1, 2020

Determining Black Start Unit Capital Recovery:

- Two Methods at unit-owner election:
 - Use of Default Capital Cost Recovery Factor (CRF)
 - Unit-Specific rate approved by FERC

CRF reflects proxy value for capital cost recovery elements

- PJM recognizes that individual circumstances could compel unit owners to seek a unit-specific rate approved by FERC

Goal of Updating of CRF:

- Per 4/16/2020 Problem Statement:

“Recent tax law and interest rate changes no longer reflect the multiple assumptions used in the current CRF. These changes include implementation periods in order to conform to the new tax laws, along with expected future changes that are not yet finalized. PJM is requesting to update the current CRF Table to meet current tax law and interest rates; and take this opportunity to explore a new process for automatically updating and documenting the CRF Table to remain consistent with tax law changes.”



CRF calculated at time of Black Start in-service da

preciation as applicable under the tax code

Current Federal Tax Rate

Average State Tax Rate

Debt Interest Rate

Return on equity of 12 percent

50 Percent Equity

50 percent Debt

5, 10, 15 & 20 year capital recovery period based on unit age at
time of unit entering Black Start Service

Red text indicates these values
will be updated annually

Debt interest rate from the quadrennial Net CONE update as modified below:

“Significant Change Protection” ---Results subject to adjustment within a bandwidth to reflect significant interest rate changes (up or down) if they occur between the quadrennial review period:

- Annual adjustment using Moody’s Utility Bond Index for bonds rated Baa1
- Adjustment only if interest rates increase or decrease by 2 percentage points greater than the 12 month bond index rate two years ago. The difference to be added to latest quadrennial review Net CONE debt interest rate.



Capital Recovery Factor (CRF) for new Black Start Un

CRF re-calculated annually (based on April 1st references and effective June 1st for new annual revenue requirement)

- Changes to Federal Tax Rates
- Average State Tax Rate
- Interest rate – only changes if cumulative difference is 2 percentage points greater than the 12 month bond index rate two years ago for the Moody's Utility Bond Index for bonds rated Baa



Effect of CRF Changes on Units Already Designated as Black Start Units

Current Black Start Units under a Capital Recovery Rate and Units selected in recent RFPs to continue with the commitment period and CRF rates provided in the current OATT, Schedule 6A

New CRF Rates, including annual updates, will apply only to Black Start Units selected in RFPs after the effective date of the Tariff changes



Black Start Service Commitment Period for New Units on CRF R

Future selected Black Start Units shall continue to provide Black Start Service after the initial capital cost recovery period for the remaining life of the black start equipment unless:

- Unit retirement / deactivation with at least one year’s notice
- Expiration of a state, federal, or other governmental agency permit required for Black Start Service, with at least one year’s notice
- Additional capital is required to maintain Black Start Service (in that case, the unit will apply through the Black Start RFP process and continue if selected)
- PJM terminates Black Start Service (requires a one year advance notice if testing is up-to-date)

Black Start Service Commitment Period for Transition Units and Units on the Base Formula Rate

Current and recently selected Black Start Units on the capital recovery rate continue service through current Schedule 6A termination rules.

Future Units entering Black Start Service (awarded in future Black Start RFP's) and starting Black Start Service using the Base Formula Rate will maintain the ability to terminate with one year's notice.



Capital Recovery Factor (CRF) Table Assumptions

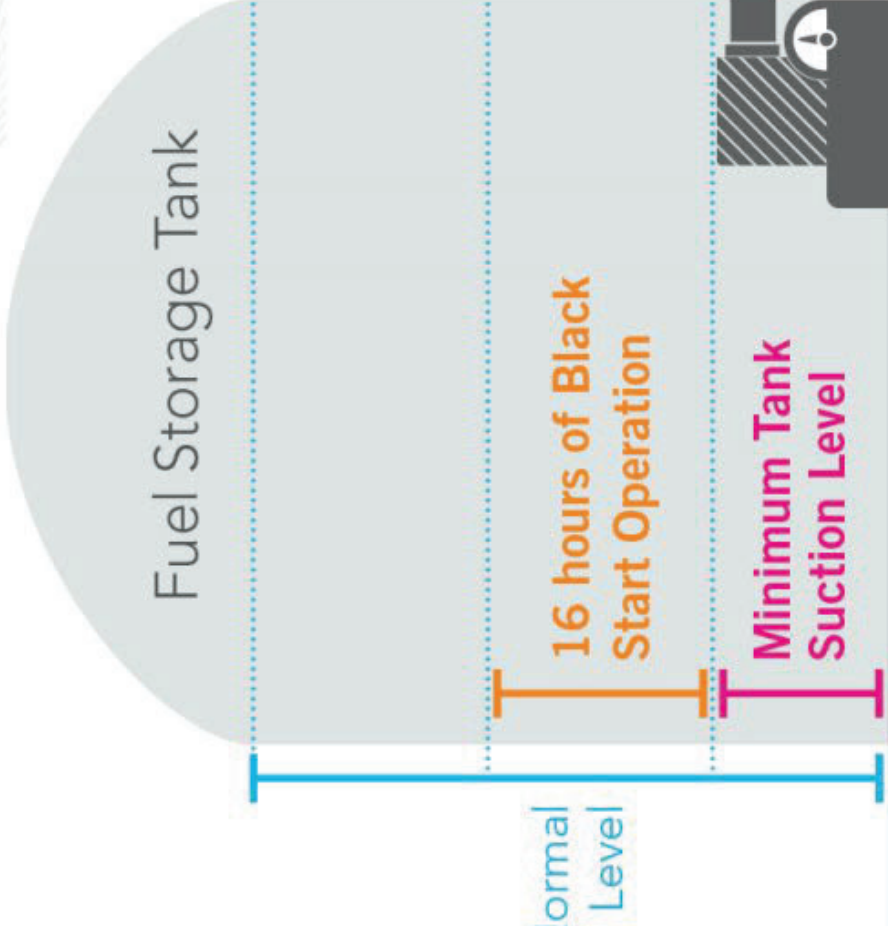
Capital Recovery Factor (CRF) Table to be removed from Open Access Transmission Tariff, Schedule 6A Black Start Service.

- New Section in PJM Manual 15 for CRF calculation method and assumptions
- Annual CRF Tables posted to PJM's website
- Existing Black Start Units and units selected in recent RFP's , CRF Table will also be placed on PJM's website



Minimum Tank Suction Level

Black Start Energy Tank Ratio * MTSL) + [(# Run Hours) * (Fuel Burn Rate)] * (12 Month Forward Strip + Basis) * (Black Start Energy Tank Ratio * MTSL)



Black Start Energy Tank Ratio = {(Fuel Burn Rate / Minimum Run Hours) / (Tank Capacity - MTSL)}



[Black Start Education](#) (presented at May 14, 2020 OC)

[OATT Schedule 6A: Black Start Service](#)

[PJM Manual 12 Balancing Operations: Section 4.6 Black Start Service](#)

Black Start Testing / Compensation Reference

Black Start Testing		
Initial Test Result	Most recent Test result within 10 days of Initial Test	Schedule 6A Compensation
Pass	-	No Change
Fail	Pass	No Change
No Test	-	Forgone
Fail	Fail	Forgone
Fail	No Test Conducted	Forgone

Existing process, no proposed changes – presented for reference purpose

Exhibit No. PJM-0005

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.

)
)
)

Docket No. EL21-91-003

RESPONSE OF THE INDEPENDENT MARKET MONITOR FOR PJM
TO PJM INTERCONNECTION, L.L.C.'S
FIRST SET OF DATA REQUESTS

PJM-IMM-1.1.

Please refer to the statement in IMM-001 at 4:34-25 that “[t]he specific rate at issue in this proceeding is a formula rate included in Paragraph 18 of Schedule 6A.”

a) Please confirm that the “specific rate at issue in this proceeding” in the above-quoted sentence is the following table of CRF rates from Paragraph 18 of Schedule 6A:

Age of Black Start Unit	Term of Black Start Commitment	Levelized CRF
1 to 5	20	0.125
6 to 10	15	0.146
11 to 15	10	0.198
16+	5	0.363

b) Please define the term “formula rate” in the above-quoted sentence from IMM-0001.

c) In the context of FERC regulated electric transmission rates, what does the term “stated rate” ordinarily mean?

d) In the context of FERC regulated electric transmission rates, what does the term “formula rate” ordinarily mean?

e) Please explain the difference between a formula rate and a stated rate.

RESPONSE

- a) The table of CRF rates is an input to the formula rate.
- b) "Formula rate" in the quoted passage refers to the formula rate included in Paragraph 18 of Schedule 6A to the OATT.
- c) A stated rate means a fixed rate.
- d) A formula rate means a rate that takes the form of a defined formula with components specified in the tariff.
- e) See the response to PJM-IMM 1.1(c) and (d).

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 8, 2024

- PJM-IMM-1.2. Please refer to the statement in IMM-001 at 8:2-4 that “[i]t was explicit at the time of the filing that the CRF rate was a specifically defined formula rate and not a stated rate.¹⁶”
- a) Please define the term “formula rate” as used in the above quoted sentence.
 - b) Please provide the basis for the supposed requirement for PJM to update the CRF rate referenced in the above-quoted sentence.

RESPONSE

- a) See the response to PJM-IMM 1.1.
- b) See PJM OA § 10.4. See also, e.g., *Ameren Ill. Co.*, 162 FERC ¶ 61,025 at P 26 (2018) (“The Commission’s acceptance of a formula rate constitutes acceptance of the formula, but not the inputs to the formula. Parties can challenge the inputs to the formula rate in the same way as they can challenge costs in a stated rate case, including by raising prudence issues. In order for formula rates to work properly, they must allow for after-the-fact corrections and updates. While parties should use due diligence to ensure that correct data is used, should an error be discovered, the inputs to the formula rate must be corrected and the formula rate re-calculated to prevent parties from being overcharged or undercharged.”).

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.3. Please refer to the statement in IMM-001 at 8:16-18 that “[t]he CRF calculation is not and has never been a black box calculation.”

- a) For the CRF referenced in the above-quoted sentence, please identify where PJM specified the inputs to the CRF in FERC Docket No. ER09-730-000.

RESPONSE

- a) As noted in Dr. Bowring’s direct testimony (at 7:5–9:18), the CRF values that were included in Schedule 6A of the PJM tariff were taken from the offer cap definition in Attachment DD, Section 6.8 of the PJM tariff. Dr. Bowring’s direct testimony (at n.14) cites the relevant documents in the ER05-1410 filing that specify the CRF input parameter assumptions.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 8, 2024

- PJM-IMM-1.4. Please refer to the statement in IMM-001 at 11:24-28 that “the CRF is intended to pay black start owners the exact amount of the CRF revenue requirement.”
- a) Please provide the basis for the claim regarding what the CRF is “intended” to do in the above-quoted sentence.
 - b) Please provide a narrative explanation of what you mean by “the exact amount” in the above-quoted sentence.

RESPONSE

- a) The cited statement from IMM-001 follows directly from the definition of a CRF which is a calculation with defined inputs that has a unique mathematical result given the input values. See, for example, the response to PJM-IMM 1.3 (a).
- b) “The exact amount” means that the CRF revenue requirement is based on a calculation with defined inputs that has a unique mathematical result given the input values.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.5.

Please refer to the statement in IMM-001 at 12:15-17 that “[t]he CRF, a component of the Capital Cost Recovery Rate, is a specific formula rate with clearly defined characteristics that distinguish it from other formula rates.”

- a) Please confirm that the CRF referenced in the above-quoted sentence is the following table of CRF rates from Paragraph 18 of Schedule 6A:

Age of Black Start Unit	Term of Black Start Commitment	Levelized CRF
1 to 5	20	0.125
6 to 10	15	0.146
11 to 15	10	0.198
16+	5	0.363

- b) Please provide a narrative explanation what you mean by “a specific formula rate with clearly defined characteristics” in the above-quoted sentence. Please provide the basis for your explanation.
- c) Please provide a narrative explanation of what distinguishes the CRF “formula rate” in the above-quoted sentence from other formula rates.

RESPONSE

- a) The CRF values in the table are examples of CRF values using the CRF calculation. The CRF values are an input into the formula rate defined in the OATT Schedule 6A para. 18.
- b) See response to PJM-IMM-1.1.
- c) The CRF is an input to a formula rate that is defined in the OATT Schedule 6A para. 18. The CRF rate is clearly defined based on the input values to the CRF formula.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 8, 2024

- PJM-IMM-1.6. Please refer to the statement in IMM-001 at 13:10-11 that “PJM should have reduced CRF rates immediately, effective January 1, 2018, for all existing and new black start resources.”
- a) Please provide the basis for the statement that “PJM should have reduced the CRF rates immediately” in the above-quoted sentence.
 - b) Please provide the basis for the claimed obligation for PJM to reduce the CRF effective January 1, 2018 in the above-quoted sentence.

RESPONSE

- a) The CRF is a calculated input to a formula rate. The CRF calculation includes defined inputs, one of which is the federal tax rate which changed effective January 1, 2018. When an input to the formula rate changes, the result of the formula changes. See Comments of the Independent Market Monitor for PJM, Docket No. ER21-1635-000 (April 28, 2021).
- b) See the response to PJM-IMM 1.2(b).

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.7. Please produce all workpapers related to the number and term of black start generators discussed in IMM-001 at 13:24-14:15.

RESPONSE

See Attachment A (CUI//PRIV-HC).

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.8. Please provide a narrative explanation why “not all over recovery can be eliminated through adjustments to the CRF going forward” as stated in IMM-001 at 14 footnote 29.

RESPONSE

Not all over recovery can be eliminated through adjustments to the CRF going forward because some black start units have completed their CRF recovery period and others have over recovered to the point that even a zero CRF for the remainder of their CRF recovery period would not eliminate the over recovery.

/ Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.9. Please provide a narrative explanation of how recalculating the CRF to reflect “the return of capital already received” as discussed at IMM-001 at 14:21-23 does not violate the rule against retroactive ratemaking.

RESPONSE

The CRF values included in the tariff prior to the effective date would not change and no refunds or rebilling would be required.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.10. Please produce the workpapers for calculating the updated CRF as discussed at IMM-001 at 15:1-2 in native Excel format.

RESPONSE

See Attachment B.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.11. Under the IMM's proposal as described at IMM-001 at 15:3-19, please provide a narrative explanation of what CRF rate would apply in the event that there is no outstanding investment principal when calculating a revised CRF.

RESPONSE

If there were no unrecovered investment in the black start resource, the CRF rate would not apply.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.12. Please provide a narrative explanation why the IMM believes using the debt rate of 7 percent and 12 percent return on equity continues to be appropriate as discussed in IMM-001 at 15:3-19.

RESPONSE

The issue raised in this case by the IMM is about the fact that after January 1, 2018, the CRF rates were calculated using an incorrect federal tax rate, a statutorily defined rate. The IMM has not proposed changing any other part of the CRF calculation.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.13. Please produce all workpapers for the “overpayments” identified in IMM-001 at 16:13-20 in native Excel format.

RESPONSE

See Attachment A (CUI//PRIV-HC) at Table 1.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.14. In light of the presiding judge's Order Adopting Revised Procedural Schedule issued April 25, 2024 in docket number EL21-91-003 that calls for an initial decision by March 18, 2025, please explain how the IMM's proposal could be implemented effective January 1, 2025, as discussed in IMM-001 at 16:13-20.

RESPONSE

The implementation of the IMM's proposal would be determined by the presiding judge and ultimately by the Commission.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.15. Please provide all workpapers for calculating the Capital Recovery Payments and Overpayment in Table 1 at IMM-001 at 17:6 in native Excel format.

RESPONSE

See Attachment A (CUI//PRIV-HC).

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 8, 2024

PJM-IMM-1.16. To the extent not otherwise requested in the foregoing data requests, please produce all workpapers for IMM-001.

RESPONSE

All requested workpapers have been provided.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 8, 2024

Exhibit No. PJM-0006

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

PJM Interconnection, L.L.C.

)
)
)

Docket No. EL21-91-003

**RESPONSE OF THE INDEPENDENT MARKET MONITOR FOR PJM
TO INDICATED SUPPLIERS'
FIRST SET OF DATA REQUESTS**

- IS-IMM-1.1. With respect to each Request for Proposal (“RFP”) for Black Start Service issued by PJM prior to June 6, 2021:
- (a) Please describe in detail the IMM’s involvement.
 - (b) Please provide all documents prepared by the IMM with respect to any such RFP(s). If none exist, so state.

RESPONSE

PJM staff reviewed PJM’s basic RFP objectives and criteria, and the final PJM letters to RFP winners, with the IMM. The IMM provided informal feedback. The IMM had no involvement in any decision making related to any of the identified RFPs. The IMM did not prepare documents related to review of the RFPs.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.2. To the extent not previously provided, provide any documents notifying any parties responding to an RFP for Black Start Service issued by PJM prior to June 6, 2021 that the CRFs were calculated based on a federal income tax rate of 36 percent. If none exist, so state.

RESPONSE

Dr. Bowring's direct testimony (at fn 14) cites the relevant documents in the ER05-1410 filing that specify the CRF input parameter assumptions. Dr. Bowring's direct testimony also includes additional relevant documents. See Exhibit IMM-0013 REV, fn 15 and fn 16. See also Exhibits IMM-0006 REV (at 7), IMM-0007 REV (at 8) and IMM-0008 REV (at 9). Any market participant was capable of recognizing that the tax rate was an element of the CRF. Any market participant was capable of recognizing that the federal tax provisions changed due to the TCJA and that the CRF should have changed.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.3. To the extent not previously provided, provide any documents notifying any parties responding to an RFP for Black Start Service issued by PJM prior to June 6, 2021 that the CRFs were calculated using Modified Accelerated Cost Recovery System ("MACRS") depreciation.

RESPONSE

See the response to IS-IMM-1.2.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.4. State yes or no whether any changes were made to the calculations in the initial workpapers the IMM prepared and used to develop the pre-June 6, 2021 CRF rates, including the use of the 36% corporate federal income tax rate in those calculations. If yes, please provide documentation of these changes. If none exist, so state.

RESPONSE

The question is not clear.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.5.

The Bowring Testimony states: "The CRF values were added to Schedule 6A in 2009 to allow for the recovery of new or additional fixed black start capital costs. It was explicit at the time of the filing that the CRF rate was a specifically defined formula rate and not a stated rate." Bowring Testimony at 8:1-4 (citing PJM Filing, Docket No. ER09-730 (February 19, 2009) at 7; Exhibit IMM-0011).

- a) Identify all statements in the referenced PJM filings in Docket No. ER09-730-000 indicating that "the CRF rate was a specifically defined formula rate and not a stated rate." If none exist, so state.
- b) Identify all statements in any filings by the IMM in Docket No. ER09-730-000 indicating that "the CRF rate was a specifically defined formula rate and not a stated rate." If none exist, so state.
- c) Identify all statements in any Commission orders in Docket No. ER09-730-000 recognizing that "the CRF rate was a specifically defined formula rate and not a stated rate." If none exist, so state.

RESPONSE

(a – c) The CRF values added to Schedule 6A in 2009 are CRF values calculated using the identified inputs. The CRF values are an input into the formula rate defined in the OATT Schedule 6A para. 18.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.6.

The Bowring Testimony states: "The federal income tax rate is one of the explicitly stated inputs to the CRF calculation." Bowring Testimony at 9:1-2.

- (a) Identify all statements in PJM's filings in Docket No. ER09-730-000 indicating that the federal income tax rate is one of the inputs to the CRF calculation. If none exist, so state.
- (b) Identify all statements in any filings by the IMM in Docket No. ER09-730-000 indicating that the federal income tax rate is one of the inputs to the CRF calculation. If none exist, so state.
- (c) Identify all statements in any Commission orders in Docket No. ER09-730-000 recognizing that the federal income tax rate is one of the inputs to the CRF calculation. If none exist, so state.

RESPONSE

(a-c) As noted in Dr. Bowring's direct testimony (at 7:5-9:18), the CRF values that were included in Schedule 6A of the PJM tariff were taken from the offer cap definition in Attachment DD, Section 6.8 of the PJM tariff. Dr. Bowring's direct testimony (at n.14) cites the relevant documents in the ER05-1410 filing that specify the CRF input parameter assumptions.

See also the response to IS-IMM-1.2.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.7.

The Bowring Testimony states: "The original CRF calculations explicitly included federal income tax payments based on [the] MACRS depreciation rate." Bowring Testimony at 9:14-16.

- (a) Identify all statements in PJM's filing in Docket No. ER09-730-000 indicating that the CRFs were based on the MACRS depreciation rate. If none exist, so state.
- (b) Identify all statements in any filings by the IMM in Docket No. ER09-730-000 indicating that the CRFs were based on the MACRS depreciation rate. If none exist, so state.
- (c) Identify all statements in any Commission orders in Docket No. ER09-730-000 recognizing that the CRFs were based on the MACRS depreciation rate. If none exist, so state.

RESPONSE

(a-c) See the response to IS-IMM-1.6

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.8.

The Bowring Testimony states that a revised CRF should be calculated that provides, among other things, for “a 12 percent return on equity” Bowring Testimony at 15:18.

- (a) Identify all statements in PJM’s filings in Docket No. ER09-730- 000 indicating that the CRFs were not intended to provide for a return of equity of more than 12 percent. If none exist, so state.
- (b) Identify all statements in any filings by the IMM in Docket No. ER09-730-000 indicating that the CRFs were not intended to provide for a return of equity of more than 12 percent. If none exist, so state.
- (c) Identify all statements in any Commission orders in Docket No. ER09-730-000 finding that the CRFs were not intended to provide for a return of equity of more than 12 percent. If none exist, so state.

RESPONSE

(a–c) The CRF calculation results in a single number based on a defined set of inputs. One of those defined inputs is the rate of return on equity of 12.0 percent. By definition, if a black start resource owner is paid the CRF and the other input assumptions are correct, the result will be that the resource owner is paid 12.0 percent.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.9. Explain when the IMM became aware that the TCJA reduced the federal income tax rate from 36 percent to 21 percent effective January 1, 2018.

RESPONSE

The IMM became aware that the TCJA reduced the federal income tax rate to 21 percent on or around the date that the bill was signed into law, December 22, 2017.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.10. Provide any documents demonstrating that owners of Black Start Units have claimed bonus depreciation under the TCJA. If none exist, so state.

RESPONSE

The IMM does not have knowledge of the tax depreciation used by black start owners. Rational profit maximizing black start owners would use the bonus depreciation provision of the TCJA.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.11.

The Bowring Testimony states that the “CRF values were included in the initial RPM filing in 2005.” Bowring Testimony at 7:22. In support, the Bowring Testimony points to a filing submitted by PJM in Docket No. ER05-1410 on August 31, 2005, including the testimony of Joseph Bowring and an Independent Study to Determine the Cost of New Entry Combustion Turbine Power Plan Revenue Requirement (“CONE Study”). In Dr. Bowring’s testimony in Docket No. ER05-1410, Dr. Bowring asserted that the financial model assumptions used to calculate the CRFs included in PJM’s filing “are identical to those used in PJM’s definition of the CONE.” PJM Interconnection, L.L.C.’s Reliability Pricing Model Filing, Tab G, Affidavit of Joseph E. Bowring on behalf of PJM Interconnection, L.L.C. at 23:43, Docket No. ER05-1410-000 (filed Aug. 31, 2005). The CONE Study, in turn, refers to a federal tax rate of 35%. *Id.*, Tab I, Affidavit of Raymond M. Pasteris on behalf of PJM Interconnection, L.L.C., CONE Study at 4, 18.

- (a) Please identify any statements in PJM’s filing, Dr. Bowring’s testimony, or the CONE Study supporting the conclusion that the CRFs were calculated using a 36% tax rate.

RESPONSE

- (a) See S-IMM-4.1. See the response to IS-IMM-1.2.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.12.

The IMM has claimed that the CRFs were calculated using a 36% tax rate rather than the 35% tax rate established by law because “corporations with a taxable income over \$15 million were subject to an additional tax equal to the lower of \$100,000 or 3 percent of the excess over \$15 million.” S-IMM 4.1.

- (a) Please provide support for the IMM’s assertion that federal law required corporations with a taxable income over \$15 million to pay an additional tax equal to the lower of \$100,000 or 3 percent, including a citation to the relevant provision of the tax code.
- (b) Please provide copies of any documents demonstrating that the federal tax rate was adjusted from 35% to 36% in the calculation of CRFs to reflect the incremental tax responsibility for companies with taxable income over \$15 million on an annual basis.
- (c) Please provide the calculation that was used to determine that adding 1% to the assumed federal tax rate appropriately reflected the tax responsibility of a corporation with income over \$15 million.

RESPONSE

(a–c) See the response to S-IMM-4.1. The details are not relevant to this case. It is a fact that a 36 percent federal tax rate was used in 2005 and it is a fact that the TCJA reduced the federal income tax rate to 21 percent.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 15 2024

IS-IMM-1.13.

The IMM has claimed that the “CRF calculations in the PJM OATT were originally developed for use in defining market seller offer caps in PJM capacity market auctions.” S-IMM-5.1a.

- (a) State yes or no whether the IMM performed any original data modeling specific to cost recovery for Black Start Units.
- (b) If yes, explain why identical model assumptions for long-term debt, capital structure, cost of equity, and capital recovery periods were chosen for market seller offer caps and Black Start Units.
- (c) If answer to (a) above is yes, please provide any documentation. If none exist, so state.

RESPONSE

(a–c) The issue raised in this case by the IMM is about the fact that after January 1, 2018, the CRF rates were calculated using an incorrect federal tax rate, a statutorily defined rate. The IMM has not proposed changing any other part of the CRF calculation.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.14. With respect to Exhibit IMM-0001, page 17, Table 1, please provide the Excel file and all supporting data and calculations used to develop the overpayment estimates.

RESPONSE

See the response to PJM-IMM-1.7.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.15. With respect to Exhibit IMM-0014, Attachment B, Table 8, please provide the Excel file and all supporting data and calculations used to develop the Excess Payback and IRR estimates.

RESPONSE

See Attachment A.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.16. With respect to Exhibit IMM-0018 (Att. to Staff-IMM DR 1-3 Response (9.15.2023)), please provide the IMM's FTE and WACC calculations for the remaining service terms of 10 years, 15 years, and 20 years.

RESPONSE

See Attachment B.

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: "the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry."

/s/Joseph E. Bowring

Dated: July 15, 2024

IS-IMM-1.17.

With respect to Exhibit IMM-0018 (Att. to Staff-IMM DR 1-3 Response (9.15.2023)), IRR Calculations tab, cells C2:H4, confirm or deny that the IRR calculations assume that the black start capital investment occurs on January 1 of the same year in which the black start payments begin.

(a) If confirm, please explain:

- (i) Why the model does not account for a development or construction period;
- (ii) Why this assumption is reasonable; and
- (iii) How much time is typically required to develop and build black start resources.

(b) If deny, please explain:

- (i) The purpose and rationale of the assumed IRR calculation start date of 1/1/2020, given that the first payment period is listed as 7/1/2020; and
- (ii) How the model accounts for the time between the development and commercial operations.

RESPONSE

(a–b) The calculations include AFUDC during construction in the capital cost. See the response to S-IMM-DR5-5.1(e).

Sponsor: Prepared under the supervision of Dr. Joseph E. Bowring, who states under oath: “the statements contained or to be contained therein are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.”

/s/Joseph E. Bowring

Dated: July 15, 2024

Federal Corporate Income Tax Rate State Tax Rate Percent Equity Percent Debt Cost of Equity Loan Term Debt Rate Depreciation Effective Tax Rate

Capital Cost Recovery Period (N) Federal Corporate Income Tax Rate State tax Rate Effective Tax Rate (s) After Tax Weighted Average Cost Of Capital (ATWACC) - Formula $\text{ATWACC } (r)$ $\text{Bonus Depreciation Percent } (B)$ $1+r$ $(1+r)^N$ $r(1+r)^N$ sB $\text{Square Root}(1+r)$ $sB / (\text{Square Root}(1+r))$ $s(1-B) (\text{Square Root}(1+r))$ L $\left(\sum_{j=1}^L (m_j / (1+r)^j) \right)$ $(1-s) (\text{Square Root}(1+r)) ((1+r)^N - 1)$

Summation - Year (j)	m_j
1	5.00%
2	9.50%
3	8.55%
4	7.70%
5	6.93%
6	6.23%
7	5.90%
8	5.90%
9	5.91%
10	5.90%
11	5.91%

12	5.90%
13	5.91%
14	5.90%
15	5.91%
16	2.95%

Numerator
Denominator

CRF

PJM Alternative CRFs

Values
21.0%
9.00%
50.0%
50.0%
12.0%
Remaining Plant Life
7.00%
0%
28.11%

Bonus

20 Year Recovery	15 Year recovery
20	15
21.00%	21.00%
9.00%	9.00%
28.11%	28.11%
(Percent Equity * Cost of Equity) + (Percent	
8.52%	8.52%
0.00%	0.00%
108.52%	108.52%
5.1273	3.4073
0.4366	0.2902
0.0000	0.0000
1.0417	1.0417
0.0000	0.0000
0.2928	0.2928
16.0000	15.0000
0.5625	0.5545
3.0909	1.8028

$m_i / (1+r)^j$	$m_i / (1+r)^j$
0.0461	0.0461
0.0807	0.0807
0.0669	0.0669
0.0555	0.0555
0.0461	0.0461
0.0382	0.0382
0.0333	0.0333
0.0307	0.0307
0.0283	0.0283
0.0261	0.0261
0.0241	0.0241

0.0221	0.0221
0.0204	0.0204
0.0188	0.0188
0.0173	0.0173
0.0080	0.0080

0.3647	0.2431
3.0909	1.8028

0.1180	0.1348
--------	--------

0.118

0.1348

10 Year Recovery	5 Year Recovery
10	5
21.00%	21.00%
9.00%	9.00%
28.11%	28.11%
Debt * Debt Rate) * (1- Effective Tax Rate)	
8.52%	8.52%
0.00%	0.00%
108.52%	108.52%
2.2644	1.5048
0.1928	0.1281
0.0000	0.0000
1.0417	1.0417
0.0000	0.0000
0.2928	0.2928
10.0000	5.0000
0.4518	0.2952
0.9469	0.3780

$m_i / (1+r)^j$	$m_i / (1+r)^j$
0.0461	0.0461
0.0807	0.0807
0.0669	0.0669
0.0555	0.0555
0.0461	0.0461
0.0382	0.0382
0.0333	0.0333
0.0307	0.0307
0.0283	0.0283
0.0261	0.0261
0.0241	0.0241

0.0221	0.0221
0.0204	0.0204
0.0188	0.0188
0.0173	0.0173
0.0080	0.0080

0.1673	0.1171
0.9469	0.3780

0.1767	0.3097
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0.1767

0.3097

Exhibit No. PJM-0008

Comparison of CRF Values and Components											
Capital Recovery Factor	Capital Cost Recovery Period (Years)				Capital Structure	Cost of Debt	ROE	Federal Income Tax Rate	State Income Tax Rate	Depreciation	Methodology
	20	15	10	5							
Black Start PJM Alternative CRFs	0.1180	0.1348	0.1767	0.3097	50/50	7%	12%	21%	9%	MACRS	FTE/Levelized
Black Start Staff Proposal (D1)	0.1292	0.1428	0.1739	0.2754	50/50	7%	12%	21%	9%	MACRS	FCR/Levelized
Black Start Staff Proposal (E1)	0.1075	0.1225	0.1548	0.2567	47.40/52.60	3.97%	10.04%	21%	6.49%	MACRS	FCR/Levelized

Exhibit No. PJM-0009

Refund Period				
August 17, 2021 to November 17, 2022				
	Tariff CRF	Proposed PJM CRF	FERC D1 CRF	FERC E1 CRF
2021	\$20,838,703.26	\$18,512,591.75	\$18,039,302.23	\$16,067,109.35
2022	\$54,712,355.51	\$48,582,137.86	\$47,292,670.93	\$42,142,787.19
TOTALS	\$75,551,058.78	\$67,094,729.61	\$65,331,973.16	\$58,209,896.54
REFUND	----	(\$8,456,329.17)	(\$10,219,085.62)	(\$17,341,162.24)

Revenue Cost Summary				
	Tariff CRF	Proposed PJM CRF	FERC D1 CRF	FERC E1 CRF
2024	\$55,028,112.00	\$55,028,112.00	\$55,028,112.00	\$55,028,112.00
2025	\$26,448,407.68	\$26,448,407.68	\$26,448,407.68	\$26,448,407.68
2026	\$12,728,692.02	\$11,725,783.58	\$12,279,774.55	\$10,474,403.83
2027	\$8,737,713.89	\$8,248,401.91	\$9,031,301.07	\$7,514,433.94
2028	\$8,737,713.89	\$8,248,401.91	\$9,031,301.07	\$7,514,433.94
2029	\$8,737,713.89	\$8,248,401.91	\$9,031,301.07	\$7,514,433.94
2030	\$8,737,713.89	\$8,248,401.91	\$9,031,301.07	\$7,514,433.94
2031	\$8,737,713.89	\$8,248,401.91	\$9,031,301.07	\$7,514,433.94
2032	\$8,737,713.89	\$8,248,401.91	\$9,031,301.07	\$7,514,433.94
2033	\$8,737,713.89	\$8,248,401.91	\$9,031,301.07	\$7,514,433.94
2034	\$8,737,713.89	\$8,248,401.91	\$9,031,301.07	\$7,514,433.94
2035	\$7,383,705.47	\$6,970,217.96	\$7,631,797.97	\$6,349,986.70
2036	\$5,106,056.41	\$4,820,117.25	\$5,277,619.90	\$4,391,208.51
2037	\$5,106,056.41	\$4,820,117.25	\$5,277,619.90	\$4,391,208.51
2038	\$5,106,056.41	\$4,820,117.25	\$5,277,619.90	\$4,391,208.51
2039	\$2,693,227.39	\$2,542,406.65	\$2,783,719.83	\$2,316,175.55
2040	\$2,061,566.08	\$1,946,118.38	\$2,130,834.70	\$1,772,946.83
TOTALS	\$191,563,590.94	\$185,108,613.25	\$194,385,915.00	\$175,679,129.65

TOTALS WITH REFUNDS				
	Tariff CRF	Proposed PJM CRF	FERC D1 CRF	FERC E1 CRF
CRF Payments	\$191,563,590.94	\$185,108,613.25	\$194,385,915.00	\$175,679,129.65
Refund	---	(\$8,456,329.17)	(\$10,219,085.62)	(\$17,341,162.24)
% of total payments	---	4.57%	5.26%	9.87%
TOTAL	\$191,563,590.94	\$176,652,284.08	\$184,166,829.38	\$158,337,967.41
% Difference from Tariff Rates		7.78%	3.86%	17.34%

Notes:
 Costs exclude the following items:
 - Training costs
 - Variable Black Start Service Costs
 - Fuel Storage costs
 - Annual Revenue Requirements for units on the Base Formula Rate

Exhibit No. PJM-0010

**UNITED STATES OF AMERICA
BEFORE THE**

FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.,)

Docket No. EL21-91-003

**PREPARED ANSWERING TESTIMONY OF MICHAEL E. BRYSON
ON BEHALF OF PJM INTERCONNECTION, L.L.C.**

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**UNITED STATES OF AMERICA
BEFORE THE**

FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.,)

Docket No. EL21-91-003

**SUMMARY OF PREPARED ANSWERING TESTIMONY
OF MICHAEL E. BRYSON
ON BEHALF OF PJM INTERCONNECTION, L.L.C.**

Mr. Michael E. Bryson's testimony explains the critical importance of Black Start Service to restore the Bulk Electric System in the event of a major system disturbance. Mr. Bryson explains what is necessary to make a unit capable of providing Black Start Service and the typical investment involved. Mr. Bryson then explains that PJM procures Black Start Service on a voluntary basis and that, as a result, it is important to honor the expectations of the units that provide the service so as to not chill Black Start Service participation going forward.

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

PJM Interconnection, L.L.C.,

)

Docket No. EL21-91-003

**PREPARED ANSWERING TESTIMONY OF MICHAEL E. BRYSON
ON BEHALF OF PJM INTERCONNECTION, L.L.C.**

1 **I. QUALIFICATIONS AND PURPOSE OF TESTIMONY**

2 **Q. Please state your name and business address.**

3 A. My name is Michael Bryson and my business address is 2750 Monroe Blvd.,
4 Audubon, PA 19403.

5 **Q. By whom are you employed and in what capacity?**

6 A. I currently serve as the Senior Vice President of Operations for PJM
7 Interconnection, L.L.C. (“PJM”). As part of my work for PJM, I am responsible
8 for PJM’s Operations Division, overseeing the 24-hour per day, 7-days per week
9 transmission operations for real-time systems. These operations include
10 scheduling, transmission dispatch, generation dispatch, reliability coordination,
11 training, and all engineering analysis required to run the system and support the
12 critical energy management systems.

13 **Q. Please describe your educational background.**

14 A. I earned a Bachelor of Science in general engineering from the United States
15 Military Academy in West Point, NY, focusing on computer science and electrical
16 engineering, and have a Master of Business Administration from Saint Joseph’s
17 University in Philadelphia, PA. I earned a graduate certificate in power engineering
18 from the Worcester Polytechnic Institute in Worcester, MA.

1 **Q. Please describe your professional experience.**

2 A. Prior to my current position, at PJM I have held the positions of executive director
3 of System Operations, general manager of Dispatch Operations, and manager of the
4 Transmission Department for the System Operations Division. I am a member of
5 the Independent System Operator and Regional Transmission Organization
6 Operating Committee. I serve on the board of PJM Technologies, Inc. and
7 previously served on the board of directors of the ReliabilityFirst Corporation as
8 well as Consortium for Electric Reliability Technology Solutions.

9 **Q. Have you previously provided testimony to the Federal Energy Regulatory**
10 **Commission (“Commission”)?**

11 A. No, I have not provided hearing testimony previously.

12 **Q. What is the purpose of your testimony?**

13 A. The purpose of my testimony is to respond to the pre-filed direct testimony filed in
14 this proceeding by Dr. Joseph Bowring on behalf of Monitoring Analytics, LLC, in
15 its capacity as the Independent Market Monitor for PJM (“IMM”) and by
16 Commission Trial Staff witnesses, and to support the pre-June 2021 stated Capital
17 Recovery Factors (“Stated CRFs”) as just and reasonable for Black Start Units
18 selected to provide Black Start Service prior to June 6, 2021 (“Existing Black Start
19 Investment”). I explain the critical importance of Black Start Service to PJM’s
20 reliable operation of the PJM transmission system and the need to respect prior
21 long-term commitments by Black Start Units as part of the balance between
22 securing resources to provide this critical service while also containing the cost of
23 the service to ratepayers. I also express my concern about the potential effect the
24 litigation in this proceeding continuing for another one to two years could have on

1 generator resource participation in Black Start request for proposals (“RFP”)
2 processes.

3 **II. THE CRITICAL IMPORTANCE OF BLACK START SERVICE**

4 **Q. Why is Black Start Service essential to PJM’s reliable operation of the**
5 **transmission system in the PJM Region?**

6 A. Transmission system blackouts or power system disturbances are most likely to
7 occur as the result of loss of generating equipment or transmission facilities, or as
8 the result of unexpected load changes. These disturbances could be of, or could
9 develop into, a magnitude sufficient to affect the reliable operation of the PJM
10 transmission system.

11 PJM is responsible for taking actions that are necessary to maintain the operational
12 integrity of the PJM transmission system. This responsibility includes coordinating
13 and monitoring restoration of all or parts of the Bulk Electric System (“BES”) in
14 the PJM footprint, as necessary. As part of this responsibility, PJM must develop
15 and implement a reliable “black start” capability plan. This plan includes
16 consideration of fuel sources for Black Start power for generating units, available
17 cranking ability, available transmission paths, communication adequacy, operating
18 instructions and procedures for synchronizing areas of the system that have become
19 separated, and procedures for simulating, testing and verifying the Black Start
20 plan’s resources and procedures.

21 PJM’s policy is to maintain, at all times, the integrity of the PJM transmission
22 system and the Eastern Interconnection, and to prevent any unplanned separation
23 of the PJM Transmission Owners’ systems. PJM’s system restoration plan
24 identifies all of the locations where Black Start Units are needed. PJM

1 Manual 14D¹ sets forth the criteria and process for selecting or identifying the
2 Black Start Units necessary to commit to providing Black Start Service at the
3 identified locations.

4 **Q. What are Black Start Units and what is needed for them to provide Black Start**
5 **Service?**

6 A. A Black Start Unit is a generating unit that has equipment enabling it to start
7 without an outside electrical supply, or a generating unit with a high operating
8 factor and the demonstrated ability to automatically remain operating, at reduced
9 levels, when disconnected from the grid. Development of a new Black Start Unit,
10 including converting an existing generating unit into a Black Start Unit, typically
11 requires capital expenditures in the range of \$10 million to \$30 million. A typical
12 upgrade would involve installing diesel generators, controls that allow the units to
13 start without a source of power from the transmission system, and controls that
14 allow the unit operators to close a unit's output breaker to a dead (de-energized)
15 bus. Necessary additional controls also would allow the units to control voltage
16 and frequency during a restoration event. Existing Black Start Units may also need
17 additional capital investment to comply with North American Electric Reliability
18 Corporation ("NERC") standards and for refurbishment, replacement, or upgrade
19 of outdated black start equipment and controls.

¹ Operations Planning Division, *PJM Manual 14D: Generator Operational Requirements*, PJM Interconnection, L.L.C., section 10 (Dec. 20, 2023), <https://www.pjm.com/-/media/documents/manuals/m14d.ashx>.

1 **Q. What NERC standard or standards applies/apply to Black Start Units?**

2 A. The NERC Reliability Standard for System Restoration from Black Start Resources
3 (EOP-005-3) was established to ensure plans, facilities, and personnel are prepared
4 to enable system restoration from Black Start Resources to ensure reliability is
5 maintained during restoration and priority is placed on restoring the transmission
6 system.² This standard, which applies to transmission operators such as PJM,
7 transmission owners, and generator operators, generally has a Severe Violation
8 Severity Level across all requirements. The high Severity Level is a testament to
9 the critical nature of system restoration and Black Start Service to the reliability of
10 the BES.

11 **III. THE NEED TO HONOR EXPECTATIONS AND COMMITMENTS**

12 **Q. How does PJM procure Black Start Service from Black Start Units?**

13 A. The essential role Black Start Units play in BES reliability demands that they be
14 identified in advance and committed to provide service on very short notice.
15 Because Black Start Service is voluntary, in return for their long-term commitment,
16 PJM desires to provide Black Start Unit owners with certainty and long-term

² See *NERC Reliability Standards: EOP-005-3 – System Restoration from Blackstart Resources*, North American Electric Reliability Corporation, <https://www.nerc.com/pa/Stand/Reliability%20Standards/EOP-005-3.pdf> (last visited July 16, 2024). Another NERC Reliability Standard, NERC EOP-006-3, for System Restoration Coordination, applies to PJM as a Reliability Coordinator and was established to ensure plans are established and personnel are prepared to enable effective coordination of the system restoration process. See *NERC Reliability Standards: EOP-006-3 – System Restoration Coordination*, North American Electric Reliability Corporation, <https://www.nerc.com/pa/Stand/Reliability%20Standards/EOP-006-3.pdf> (last visited July 16, 2024). This standard also generally has a Severe Violation Severity Level across all requirements. *NERC Reliability Standards: EOP-006-3 – System Restoration Coordination*, North American Electric Reliability Corporation, 6-9, <https://www.nerc.com/pa/Stand/Reliability%20Standards/EOP-006-3.pdf> (last visited July 16, 2024).

1 stability and predictability. PJM's long-standing procurement practices underscore
2 the importance PJM attaches to securing commitments to provide this service:

- 3 • PJM procures Black Start Resources through an RFP every five years, and
4 supplements that procurement with Incremental RFPs as necessary (e.g., to
5 address plant retirements and changing transmission system needs);
- 6 • PJM seeks to procure 110% of its critical load requirement (i.e., cranking power
7 to all units with a hot start time four hours or less, off-site nuclear safe shutdown
8 power, and critical Natural Gas Infrastructure) for each transmission zone, to
9 satisfy its Black Start Plan requirements;
- 10 • PJM includes some redundancy in its Black Start procurement given the
11 inherent uncertainty in the system conditions operators could face in a system
12 separation and shut-down event (e.g., unavailability of Black Start Units or
13 obstacles posed by transmission system damage);
- 14 • PJM has long sought and secured commitments from Black Start Units, to
15 provide greater certainty and stability in the fleet of resources PJM relies upon
16 to meet this critical need.

17 **Q. What other factors does PJM consider in procuring Black Start Service?**

18 A. PJM balances meeting the reliability need for Black Start Service against the goal
19 of reasonably containing the cost of obtaining Black Start Service. As part of this
20 balance, PJM seeks to meet its system restoration goals both through securing long-
21 term commitments offered in good faith at a reasonable cost, and through avoiding
22 *disincentives* to existing units maintaining their commitments and to new units
23 offering new commitments that are reliant on additional investments.

1 **Q. What kind of disincentives to Black Start Units maintaining their Black Start**
2 **Service commitments and entering into new commitments are you**
3 **referencing?**

4 A. When PJM made its filing in 2021 in Docket No. ER21-1635-000 to change the
5 Stated CRFs that apply to the incremental capital investment needed to make
6 generating facilities capable of providing Black Start Service, PJM distinguished
7 between past Black Start Unit long-term commitments reliant on the Stated CRFs,
8 and future long-term commitments of Black Start Units, to which PJM would apply
9 a formulaic capital recovery factor. PJM proposed to change the going forward
10 capital recovery factors to formula-based values that would change every year but
11 did not propose to change the Stated CRFs that apply to the Existing Black Start
12 Investment committed prior to June 6, 2021. PJM proposed not to change the
13 Stated CRFs that apply to Existing Black Start Investment to avoid disincentives
14 for Black Start Unit owners' participation in PJM's Black Start RFP processes.

15 **Q. Why would changing the Stated CRFs that apply to Existing Black Start**
16 **Investment be a disincentive to generators participating in PJM's Black Start**
17 **RFP process?**

18 A. Changing the capital recovery factor that applies to Existing Black Start Investment
19 from a stated, locked-in, pre-2021 rate to a rate that can fluctuate each year
20 undermines the certainty of recovery for Existing Black Start Investments. I cannot
21 speak to what any Black Start Unit owner expects, but the 2021 filing in Docket
22 No. ER21-1635-000 clearly made a substantial change in the basic structure of the
23 Black Start capital recovery and raised the possibility that such a change could
24 happen again. At the time, I expressed concern that changing the Stated CRFs that
25 apply to Existing Black Start Investment might undermine certainty in Black Start

1 Service compensation and thereby cause some of the owners of Existing Black Start
2 Investment to seek to terminate their Black Start Unit commitments prematurely. I
3 was also concerned that the change might dissuade Black Start Unit owners
4 considering new Black Start Service commitments from making those
5 commitments. Such a loss of confidence in Black Start Unit compensation could
6 reduce participation in Black Start Service RFP processes, which might result in
7 insufficient amounts of Black Start capability for PJM to procure and might leave
8 only higher cost Black Start Units available.

9 **Q. That was three years ago. Do you still have concerns about chilling**
10 **participation in Black Start RFP processes?**

11 A. Yes. I am concerned that the litigation of this case for the past three years and the
12 possibility of the litigation continuing for another one to two years may engender
13 uncertainty as to Black Start compensation and negatively affect the amount of
14 Black Start Service PJM can procure or the costs of that procurement.

15 **Q. Does this conclude your testimony?**

16 A. Yes, it does.

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

PJM Interconnection, L.L.C.)
)
) Docket No. EL21-91-003

VERIFICATION

I, Michael E. Bryson, pursuant to 28 U.S.C. § 1746, state, under penalty of perjury, that I am the Michael E. Bryson referred to in the foregoing document entitled “Prepared Answering Testimony of Michael E. Bryson on behalf of PJM Interconnection, L.L.C.,” that I have read the same and am familiar with the contents thereof, and that the facts set forth therein are true and correct to the best of my knowledge, information, and belief.

By: 
Michael E. Bryson

Dated: July 17, 2024

Exhibit No. PJM-0011

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**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

PJM Interconnection, L.L.C.,

)

Docket No. EL21-91-003

**SUMMARY OF PREPARED ANSWERING TESTIMONY
OF DR. WALTER GRAF
ON BEHALF OF PJM INTERCONNECTION, L.L.C.**

Dr. Walter Graf's testimony responds to the pre-filed direct testimony filed in this proceeding by Dr. Joseph Bowring on behalf of Monitoring Analytics, LLC, in its capacity as the Independent Market Monitor for PJM ("IMM") and by Commission Trial Staff witnesses, and to support the pre-June 2021 stated Capital Recovery Factors ("Stated CRFs") as just and reasonable for Black Start Units selected to provide Black Start Service prior to June 6, 2021 ("Existing Black Start Investment"). Dr. Graf explains that the IMM errs in insisting that the Stated CRFs are a formula rate and there can be only one just and reasonable set of capital recovery factors to be applied to the Existing Black Start Investment. Dr. Graf explains that contrary to the IMM's claims, there is a range of just and reasonable capital recovery factors that can be calculated and the bounds of that range are not fixed. Dr. Graf places the Stated CRFs in context within a range of other potentially reasonable capital recovery factors, including capital recovery factors used in other settings in PJM and capital recovery factors proposed in this proceeding by Trial Staff. Dr. Graf also compares the revenues resulting from the Stated CRFs to the revenues produced by the application of other capital recovery factors and discusses the asymmetric risks associated with overestimating the Black Start capital recovery factors as opposed to underestimating them. Finally, Dr. Graf discusses the artificially low inputs to Black Start Units' cost of capital Trial Staff proposes for use in calculating one set of capital recovery factors, based on reference to a transmission owner proxy group rather than a merchant generator proxy group.

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

PJM Interconnection, L.L.C.,

)

Docket No. EL21-91-003

**PREPARED ANSWERING TESTIMONY OF DR. WALTER GRAF
ON BEHALF OF PJM INTERCONNECTION, L.L.C.**

I. QUALIFICATIONS AND PURPOSE OF TESTIMONY

1 **Q. Please state your name, title, and business address.**

2 A. My name is Dr. Walter Graf. I am the Chief Economist for PJM Interconnection,
3 L.L.C. (“PJM”). My business address is 2750 Monroe Blvd, Audubon, PA 19403.

4 **Q. Please describe your current function and responsibilities.**

5 A. In my current position my core function is to advise the executive team and staff of
6 the market services division on all economic policy and economic analysis
7 activities related to market operations, design, and long-term evolution, across all
8 PJM markets including the energy, ancillary services, capacity, and financial
9 transmission rights markets. My responsibilities include: providing analysis of
10 operational, economic, and accounting data on the overall performance of the
11 competitive wholesale electricity markets; supporting the development of a
12 strategic direction of PJM’s activities in market development and evolution;
13 performing qualitative and quantitative economic analysis of proposed changes to
14 the PJM market rules; and supporting the stakeholder process in related areas.

15 **Q. Please describe your educational background.**

16 A. I received Bachelors of Science degrees in Economics and in Civil and
17 Environmental Engineering from the University of Michigan in Ann Arbor, MI. I
18 received a Masters of Science degree and a Doctor of Philosophy degree in
19 Agricultural and Resource Economics from the University of California in
20 Berkeley, CA.

21 **Q. Please describe your professional experience.**

1 A. Prior to my current position I was Senior Director, Economics for PJM, before
2 which I was Associate and Senior Associate at The Brattle Group, an economic
3 consulting firm. I worked on market design engagements in both energy and
4 capacity markets, and also consulted for generation resource developers to develop
5 market and price outlooks and inform capital budgeting and investment project
6 valuation.

7 **Q. Have you previously provided testimony to the Federal Energy Regulatory**
8 **Commission (“Commission”)?**

9 A. No, I have not previously provided hearing testimony to the Commission.

10 **Q. What is the purpose of your testimony?**

11 A. The purpose of my testimony is to respond to the pre-filed direct testimony filed in
12 this proceeding by Dr. Joseph Bowring on behalf of Monitoring Analytics, LLC, in
13 its capacity as the Independent Market Monitor for PJM (“IMM”) and by
14 Commission Trial Staff witnesses, and to support the pre-June 2021 stated Capital
15 Recovery Factors (“Stated CRFs”) as just and reasonable for Black Start Units
16 selected to provide Black Start Service prior to June 6, 2021 (“Existing Black Start
17 Investment”). I will explain that the IMM errs in insisting that the Stated CRFs are
18 a formula rate and there can be only one just and reasonable set of capital recovery
19 factors to be applied to the Existing Black Start Investment. Contrary to the IMM’s
20 claims, there is a range of just and reasonable capital recovery factors that can be
21 calculated and the bounds of that range are not fixed. I place the Stated CRFs in
22 context within a range of other potentially reasonable capital recovery factors,
23 including capital recovery factors used in other settings in PJM and capital recovery
24 factors proposed in this proceeding by Trial Staff. I also compare the revenues

1 resulting from the Stated CRFs to the revenues produced by the application of other
2 capital recovery factors and discuss the asymmetric risks associated with
3 overestimating the Black Start capital recovery factors as opposed to
4 underestimating them. The final section of my testimony discusses the artificially
5 low inputs to Black Start Units' cost of capital Trial Staff proposes for use in
6 calculating one set of capital recovery factors, based on reference to a transmission
7 owner proxy group rather than a merchant generator proxy group.

II. THE STATED CRFS ARE WITHIN A RANGE OF JUST AND REASONABLE CAPITAL RECOVERY FACTORS

8 **Q. What is the starting point of your answering testimony?**

9 A. The central question in this case is whether the Stated CRFs that apply to Existing
10 Black Start Investment are just and reasonable going forward, given the reduction
11 in the federal corporate income tax rate from the Tax Cuts and Jobs Act of 2017.¹

12 **Q. What is your view on this question?**

13 A. In my view, the existing capital recovery factor values remain just and reasonable
14 for Black Start Units selected prior to July 2021. These were stated rates that Black
15 Start providers relied on when making multi-year commitments and capital
16 investments. There was no mechanism to automatically update these stated rates,
17 and PJM was not required to change them when the tax law changed. Maintaining
18 the existing rates provides regulatory certainty and honors the expectations of Black
19 Start providers.

¹ Tax Cuts and Jobs Act, Pub. L. No. 115-97, 131 Stat. 2054 (2017).

1 **Q. What other considerations support your view that the Stated CRFs are just**
2 **and reasonable?**

3 A. There is a logical and economic argument that the Stated CRF values fall in a “zone
4 of reasonableness,” thus directly addressing one of the questions raised in this
5 proceeding by the Presiding Judge: “Is there a zone of reasonableness applicable to
6 the Capital Cost Recovery Rate, CRF values, or the relevant inputs to either?”²

7 **Q. Please explain your logical and economic argument.**

8 A. The logical and economic argument that the Stated CRFs are just and reasonable
9 proceeds as follows:

- 10 • First, I rebut the IMM’s argument that the Stated CRFs are formula rates
11 and that there is only a single “correct” set of capital recovery factor values,
12 which are the values resulting from applying his formula with updated
13 federal income tax rate inputs.
- 14 • Even if the set of capital recovery factor values the IMM presents as the
15 “correct” values are just and reasonable, they are not the only set of just and
16 reasonable capital recovery factor values that can exist. The IMM leaves
17 no room for a “zone of reasonableness,” which accords neither with
18 economics, nor the Commission’s approach to rate review, nor the facts of
19 this case.

20 A. **The Stated CRFs are not formula rates so there can be more than one correct**
21 **calculation of a just and reasonable capital recovery factor.**

22 **Q. What does the IMM argue about the Stated CRFs?**

² *PJM Interconnection, L.L.C.*, Letter Order, Docket No. EL21-91-003, at 4 (Nov. 2, 2023).

1 A. The IMM asserts that “the CRF is a formula rate”³ that can only be applied in a
2 single, previously prescribed manner based on defined inputs.

3 **Q. Do you agree?**

4 A. No, I do not. As an initial matter, I am not aware that the Commission had ever
5 previously approved any formula, whether proposed by PJM or otherwise, to
6 calculate the Black Start capital recovery factors prior to accepting PJM’s proposed
7 revisions to the formula used to calculate Black Start Capital Cost Recovery
8 revenue requirements in PJM Tariff, Schedule 6A, section 18, on August 10, 2021,
9 in Docket No. ER21-1635-001. Further, the Commission’s statement that “[t]he
10 import of the tax rate in the determination of the CRF value is a material fact that
11 cannot be determined based on the existing record”⁴ precludes the IMM’s claim
12 that the Commission views the Stated CRFs as a formula rate for the calculation of
13 capital recovery factor values. If the Commission believed the Stated CRFs were
14 a formula rate, changing the values to account for the reduction in the tax rate would
15 be a matter of simple computation, not a material issue of fact.

16 **Q. What is the significance of the IMM’s claim that the Stated CRFs are formula**
17 **rates?**

18 A. The IMM’s claim that the Stated CRFs are formula rates forms the basis for his
19 argument that, “[t]here is no zone of reasonableness in this case of a formula rate

³ *PJM Interconnection, L.L.C.*, Direct Testimony of Joseph E. Bowring on Behalf of the Independent Market Monitor for PJM, Docket No. EL21-91-003, Exhibit IMM-0001, at 17:9, 22:4-5 (June 5, 2024) (“Bowring Testimony”).

⁴ *PJM Interconnection, L.L.C.*, 182 FERC ¶ 61,194, at P 32, *order on reh’g*, 184 FERC ¶ 61,077 (2023).

1 with an objectively incorrect input.”⁵ If you remove the predicate for this assertion,
2 and acknowledge that the Stated CRFs are not formula rates, you are left with the
3 fact that there can be a range of reasonable capital recovery factor values. As the
4 IMM openly admits, “[t]he elements of the cost of capital, which are the debt to
5 equity ratio, rate of return on equity, and interest rate on debt, are all matters of
6 judgment. The elements of the cost of capital are set prior to selecting a black start
7 resource for service, and they define the expected returns to the investors in the
8 black start resources [...]”⁶ Thus, the IMM implicitly acknowledges that there is
9 some zone of reasonableness around both the capital recovery factor values and the
10 inputs used in calculating the values. Contrary to the IMM’s contention, there is
11 no single correct set of capital recovery factor values; instead, there must be an
12 array or range of reasonable capital recovery factor values that can be calculated.

13 **B. Calculating reasonable capital recovery factors and their components involves**
14 **multiple considerations and variations.**

15 **Q. Do you have experience in calculating capital recovery factors and similar cost**
16 **of capital values?**

17 A. Yes, I have experience with calculating these sorts of financial metrics and have
18 worked on related questions regarding corporate investment decisions, capital
19 budgeting, and investment project valuation. I also am aware of discussions of a
20 zone or zones of reasonableness around these metrics.

21 **Q. Are the Stated CRFs used for Black Start recovery of capital investment the**
22 **only capital recovery factors PJM uses?**

⁵ Bowring Testimony at 22:12-13.

⁶ Bowring Testimony at 21:12-16 (emphasis added).

1 A. No, they are not. PJM calculates an Avoidable Project Investment Recovery Rate
2 (“APIR”) capital recovery factor for use in determining the Avoidable Cost Rate
3 for a Generation Capacity Resource.⁷ The Avoidable Cost Rate is part of the
4 Capacity Market mitigation.

5 **Q. In addition to capital recovery factors, what other similar measures of capital**
6 **costs or investment metrics are used in the Tariff?**

7 A. PJM and other regional transmission organizations (“RTOs”) also use
8 computations of capital costs such as the after-tax weighted-average cost of capital
9 (“ATWACC”) in their calculations of the Cost of New Entry (“CONE”) and Net
10 CONE. PJM also uses ATWACC in the formula for Black Start capital recovery
11 factors the Commission accepted in Docket No. ER21-1635-001. The CONE and
12 Net CONE, like the Avoidable Cost Rate for a Generation Capacity Resource that
13 has the APIR capital recovery factor as a component, are used in administering the
14 Capacity Market mitigation measures. All of these measures—capital recovery
15 factors, ATWACC, APIR, CONE, and Net CONE—are metrics used for
16 quantifying different components or views of the cost of capital investment in
17 resources.

18 **Q. Is the manner in which these metrics are constructed considered to be clear-**
19 **cut, with only limited variations?**

20 A. No. To the contrary, they are considered to be more art than science. In the context
21 of determining the ATWACC for projecting the CONE in the Electric Reliability
22 Council of Texas, The Brattle Group authors Samuel Newell and others write

⁷ See Tariff, Attachment DD, section 6.8(a).

1 broadly that “[t]he ATWACC is grounded in empiricism but without plentiful data
2 on the full cost of capital for projects exactly like the ref tech.”⁸ Also, discussing
3 the 2023 analysis of the ATWACC used in calculating the CONE for the ISO New
4 England Inc. (“ISO-NE”) Forward Capacity Market, which the Commission
5 accepted in Docket No. ER24-401-000, Todd Schatzki and Carlo Gallimberti of
6 The Analysis Group write: “Our recommended values reflect consideration of
7 multiple financial metrics” and “[r]ecommended values for financial parameters
8 reflect multiple considerations, including relationship between observable financial
9 metrics and circumstances of merchant projects in ISO-NE.”⁹ Regarding the cost
10 of equity (“COE”), one input to the calculation of the ATWACC used for the CONE
11 calculation in ISO-NE (and a relevant input in the computation of the ATWACC
12 component of the Black Start capital recovery factor formula in the Tariff), they
13 write “[p]roject COE is unobservable and thus cannot be directly estimated” and
14 describe seven scenarios using different analytic approaches.¹⁰ They further state
15 that, while the “[u]pper bound of estimated company COE in each scenario ranges
16 from 9.35% to 13.10%,” they recommend a COE value of 13.8%—*outside that*

⁸ *Cost of New Entry Study Status Update, Project No. 54584*, Electric Reliability Council of Texas, Inc. (June 6, 2024), https://interchange.puc.texas.gov/Documents/54584_64_1400659.PDF.

⁹ Todd Schatzki & Carlo Gallimberti, *Analysis of the ATWACC of New Entry for the ISO New England Forward Capacity Market*, New England Power Pool Markets Committee, 3 (Aug. 10, 2023), https://www.iso-ne.com/static-assets/documents/2023/08/a08a_mc_2023_08_08-10_fcm_netcone_updates_mopr_reforms_for_fca19_analysis_group_presentation.pdf.

¹⁰ *Id.* at 13.

1 *range*— citing “multiple considerations,” “other financial metrics,” and “relevant
2 professional experience.”¹¹

3 Similarly, PJM’s determination of the estimated CONE for the Reference Resource,
4 which is used in setting prices on the demand curve for purposes of administering
5 the Capacity Market mitigation measures, requires market observations and
6 judgment to select inputs for the ATWACC calculation, as noted by the authors of
7 the PJM CONE 2026/2027 Report (“2022 CONE Report”) in the Quadrennial
8 Review of the PJM Capacity Market filed September 30, 2022, in Docket No.
9 ER22-2984-000.¹² The authors of the 2022 CONE Report also state, “[t]here is
10 considerable uncertainty in the development of the estimated CONE values for the
11 reference resources, particularly regarding volatile inflation, relevant technologies
12 and plant designs, and the analyst’s judgment on economic life and long-term cost
13 recovery.”¹³ As allowed by the Tariff, PJM and its stakeholders currently are
14 engaged in a “Quick Fix” stakeholder process to update the input values and
15 financial parameters used in the calculation of CONE.

16 **Q. Are the inputs to these metrics the only source of variability?**

17 A. No. There are multiple capital recovery factor equations, each using a different
18 financial model and assumptions, that can be used to determine reasonable capital
19 recovery factor values. For example, the IMM claims that a “financial model,

¹¹ *Id.* at 23-24.

¹² *PJM Interconnection, L.L.C.*, Periodic Review of Variable Resource Requirement Curve Shape and Key Parameters, Docket No. ER22-2984-000, Attachment D, Exhibit No. 2 at 38 (Sept. 30, 2022).

¹³ *Id.* at vii.

1 called a flow to equity (FTE) model, [...] was used to develop the CRF stated in
2 the tariff.”¹⁴ But a different financial model, “[t]he weighted average cost of capital
3 (WACC) model [...] was used to calculate the CRF for black start service after
4 June 6, 2021.”¹⁵ The IMM explains that the weighted average cost of capital model
5 “averages the equity and debt in the calculation of investment return and investment
6 payback” yielding a different capital recovery factor.¹⁶ As the IMM recognizes,
7 different methodologies can be used to calculate different, but still just and
8 reasonable, capital recovery factor values.

9 **C. Placing the Stated CRFs in Context.**

10 **Q. You have testified to the reasons there can be a range of just and reasonable**
11 **capital recovery factor values. Do the capital recovery factors in this**
12 **proceeding and in other PJM settings show such a range?**

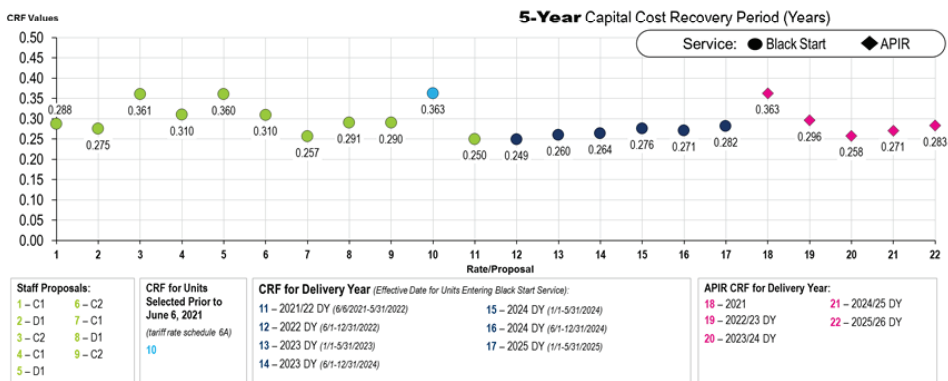
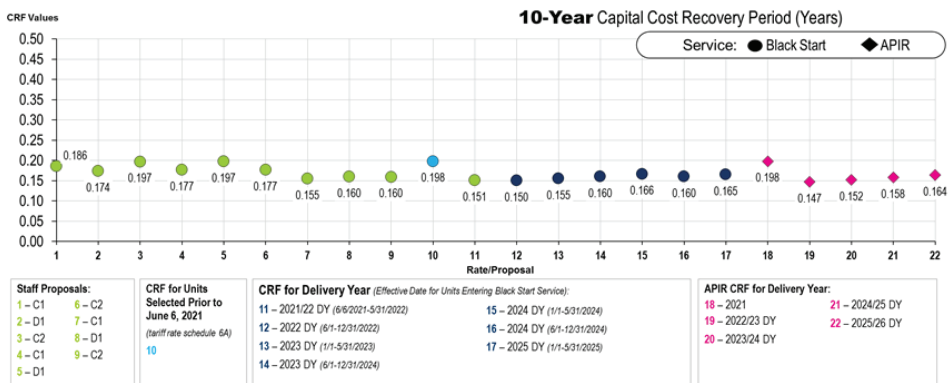
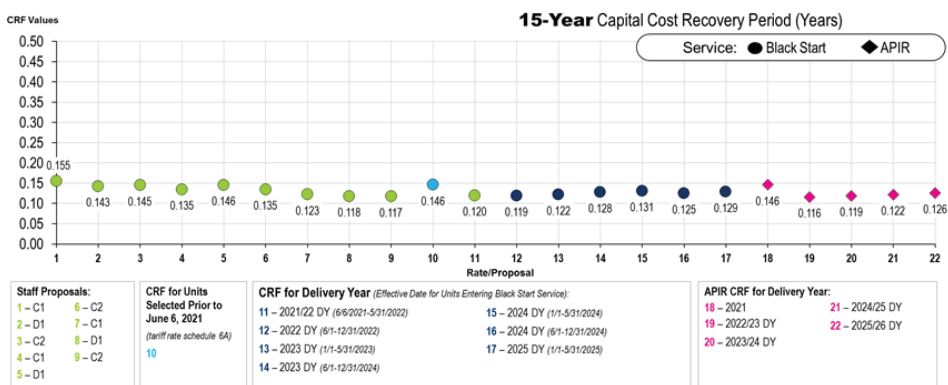
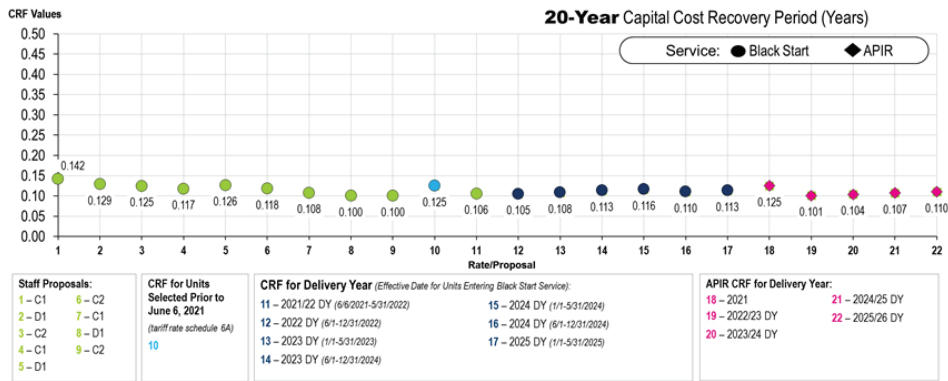
13 A. Yes, they do, and they also show that the Stated CRFs are within that range. I
14 analyzed the range of capital recovery values proposed in this proceeding and used
15 elsewhere in the Tariff, to contextualize the Stated CRFs. The following charts
16 compare, for each commitment term for Black Start Service, the Stated CRFs to
17 nine alternative Trial Staff proposals for the Black Start capital recovery factor
18 values to be applied to Existing Black Start Investment; seven capital recovery
19 factor values calculated utilizing the Commission-approved formula-based
20 methodology for Black Start capital recovery factors for the 2021/2022 Delivery

¹⁴ Exhibit No. IMM-0014 (Comments of the Independent Market Monitor) at 9.

¹⁵ *Id.* at 11.

¹⁶ *Id.*

1 Year forward; and five capacity market APIR values calculated utilizing the FERC-
2 approved methodology for APIR capital recovery factors for the 2021/2022
3 Delivery Year forward. With the exception of the Stated CRF values for five-year
4 commitment terms, the Stated CRF values are not materially outside the range of
5 other capital recovery factor values proposed in this proceeding or approved by the
6 Commission for use in the Tariff.



1
2 Figure 1

1 **D. Asymmetric Risks of Over or Under Estimating the Black Start Capital**
2 **Recovery Factors.**

3 **Q. What other support exists for a range of just and reasonable Black Start**
4 **capacity recovery factor values?**

5 A. When evaluating the sum total of evidence supporting various “zones of
6 reasonableness” for Black Start capital recovery factors, I believe it is worthwhile
7 to consider the asymmetric risks associated with under- and over-estimation of the
8 “correct” capital recovery factor values, if there were such a singular value. The
9 risk of choosing “too high” a capital recovery factor value is, at worst, very modest
10 excess costs. Bearing this out, I would point to the analysis of the revenues under
11 various capital recovery factor values that is further discussed in the Boyle
12 Testimony.¹⁷ This analysis shows the difference in total Black Start revenues for
13 Existing Black Start Investment over the period from 2021 to 2040, comparing
14 revenues¹⁸ under the Stated CRFs to revenues under a reasonable alternative (the
15 “PJM Alternative CRFs” discussed in the Boyle Testimony) that utilizes the current
16 federal income tax rate and depreciation schedules. The difference in total Black
17 Start revenues for Existing Black Start Investment over that period resulting from
18 these two capital recovery factor values is less than \$15 million and below 8 percent
19 of Black Start Service costs, *excluding* variable black start service costs, fuel
20 storage costs, costs for payments to any units under the base formula rate.

¹⁷ See Exhibit No. PJM-0001 (Prepared Answering Testimony of Glen Boyle) (“Boyle Testimony”).

¹⁸ Note that revenues for Existing Black Start Investment represent costs for transmission service customers.

1 In contrast, the long-term risks of choosing “too low” a capital recovery factor value
2 include not only under-provision of Black Start Service in the future but also under-
3 investment in the PJM markets more generally. It is possible too low a capital
4 recovery factor value reinforces investors’ perception of the risk regarding
5 unexpected claw-backs of revenues based on stated rates in more substantive cases
6 in the future.

7 **Q. What other evidence exists for the zone of reasonableness including somewhat**
8 **higher cost recovery factors?**

9 A. While Tariff, Schedule 6A includes provisions for participants to file for unit-
10 specific rates for Black Start cost recovery,¹⁹ there is a risk that resources that could
11 qualify to provide Black Start Service with some investment, but cannot justify that
12 investment at the default values, will opt to forgo the admittedly small revenue
13 potential rather than pursue unit-specific compensation. Economically, this is an
14 argument regarding the opportunity cost of pursuing an investment opportunity. If
15 a PJM market participant is human resource- or budget- constrained, the natural
16 profit-maximizing course of action may be to direct the constrained resources to
17 areas of opportunity where the expected returns are larger in total magnitude,
18 notwithstanding the rate of return.²⁰ For small projects, the administrative, and
19 overhead costs of evaluating and pursuing a capital expenditure opportunity to
20 provide Black Start Service may be large relative to the potential return. This points

¹⁹ Tariff, Schedule 6A, section 17(i).

²⁰ To express this colloquially, if there are proverbial twenty dollar bills laying around everywhere, you don’t stop to pick up pennies.

1 to the zone of reasonableness for the default CRF including higher values to
2 mitigate the reliability risks associated with not attracting sufficient commitments
3 to provide Black Start service.

III. TRIAL STAFF CALCULATES ARTIFICIALLY LOW CAPITAL RECOVERY FACTORS TO REPLACE THE STATED CRFS.

4 **Q. Have you reviewed the prepared direct testimony filed in this proceeding by**
5 **Trial Staff Witnesses Robert Keyton and Raymond He?**

6 A. Yes, I have.

7 **Q. Do you have any observations on that testimony and, specifically, on the**
8 **various sets of capital recovery factors they provide?**

9 A. Yes. Trial Staff appropriately calculated one set of capital recovery factors, Set D1,
10 that simply reduces the federal income tax rate from 36% to 21%, to account for
11 the TCJA's reduction of the federal income tax rate. This calculation assumes that
12 the Stated CRFs is comprised of individual components that can be changed over
13 time without consideration for changes in other components in the same time
14 period, which is not the case. However, the calculation may nonetheless be a useful
15 point of comparison given the Commission's focus in the Hearing Order on the
16 TCJA's reduction in the federal income tax rate.

17 Trial Staff also calculated a set of capital recovery factors, Set E1, that changes not
18 just the federal income tax rate but several other components, including the capital
19 structure, the rate of return on equity ("ROE"), and the cost of debt (collectively,
20 the "cost of capital").

1 **Q. Do you view the methodology underlying Trial Staff's Set E1 as an appropriate**
2 **way to calculate a replacement rate for the Stated CRFs?**

3 A. No, I do not. If I were to alter other underlying components of the Stated CRFs, as
4 Trial Staff proposes, I would look to more relevant proxies for the values being
5 altered than the transmission owners to which the Black Start Units are connected.

6 **Q. What do you mean by more relevant proxies?**

7 A. Trial Staff Witness Robert Keyton explains that he adopted a proxy for generators'
8 cost of capital that has been used in the development of cost of service rates for
9 reactive power service, namely, the cost of capital for the transmission owner to
10 which the generator providing the service is connected.²¹ It is true that connected
11 transmission owners' costs of capital have been used in reactive power rate cases
12 and that Black Start Service, like reactive power service, is an ancillary service.
13 However, there is no need to look to a different line of precedent concerning a
14 different service when the Commission has accepted values that are actually
15 associated with generators as opposed to transmission owners as proxies for
16 generators' cost of capital for Black Start Service, and for use in PJM's capacity
17 markets to determine the APIR for generating facilities that are in service.²²

18 **Q. Does it matter whether the proxy values are associated with transmission**
19 **owners instead of generators?**

20 A. Yes, it does. Transmission owners largely have guaranteed cost recovery over
21 transmission capital expenditures, and thus generally face lower risk than merchant

²¹ *PJM Interconnection, L.L.C.*, Prepared Direct Testimony of Robert J. Keyton Witness for the Trial Staff of the Federal Energy Regulatory Commission, Exhibit No. S-0024, at 11:5-14 (June 5, 2024).

²² *See, e.g.*, Tariff, Schedule 6A, section 18; *id.*, Attachment DD, section 6.8(a).

1 generators. Because the cost of capital is a function of the market's risk free rate
2 and of the premium for the risk associated with the investment, transmission owners
3 thus have a lower cost of capital than merchant generators do. This is borne out by
4 comparing the capital structure, ROE, and cost of debt Mr. Keyton provides for
5 Trial Staff Witness Raymond He's calculation of the E1 set of capital recovery
6 factors to the capital structure, ROE, and cost of debt currently being used in PJM's
7 formulaic Black Start capital recovery factors, and PJM's APIR capital recovery
8 factors. The table provided in Exhibit PJM-0012 compares the generator cost of
9 capital values used in these three calculations to the transmission owner cost of
10 capital values Mr. Keyton supplies for use in Mr. He's E1 set of capital recovery
11 factors. As you can see, the transmission owner proxy values Trial Staff uses are
12 lower than any of the other proxy values that are based on generators' costs of
13 capital. Since the Commission has accepted the three generator-associated proxies,
14 there is no reason to consider artificially lower estimates of the cost of capital used
15 to calculate Black Start capital recovery factors by using transmission owner costs
16 of capital.

IV. CONCLUSION

17 **Q. Does this conclude your testimony?**

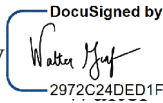
18 A. Yes, it does.

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

PJM Interconnection, L.L.C.)
)
) Docket No. EL21-91-003

VERIFICATION

I, Dr. Walter Graf, pursuant to 28 U.S.C. § 1746, state, under penalty of perjury, that I am the Dr. Walter Graf referred to in the foregoing document entitled “Prepared Answering Testimony of Dr. Walter Graf on Behalf of PJM Interconnection, L.L.C.,” that I have read the same and am familiar with the contents thereof, and that the facts set forth therein are true and correct to the best of my knowledge, information, and belief

By  _____
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Dated: July 17, 2024

Exhibit No. PJM-0012

Comparison of CRF Values and Components							
Capital Recovery Factor	Capital Cost Recovery Period (Years)				Capital Structure (Debt/Equity)	Cost of Debt	ROE/Cost Equity
	20	15	10	5			
Black Start Trial Staff Proposal (E1)	0.1075	0.1225	0.1548	0.2567	47.40/52.60	3.97%	10.04%
Black Start CRF for 2021/2022 Delivery Year Effective For Units Entering Black Start Service 06/06/2021 - 05/31/2022)	0.106	0.120	0.151	0.250	50/50	7.5%	12%
Black Start CRF for 2022 Delivery Year (Effective For Units Entering Black Start Service 06/01/2022 - 12/31/2022)	0.105	0.119	0.150	0.249	50/50	7.5%	12%
Black Start CRF for 2023 Delivery Year (Effective For Units Entering Black Start Service 01/01/2023 - 05/31/2023)	0.108	0.122	0.155	0.260	50/50	9.53%	12%
Black Start CRF for 2023 Delivery Year (Effective For Units Entering Black Start Service 06/01/2023 - 12/31/2023)	0.113	0.128	0.160	0.264	50/50	9.53%	12%
Black Start CRF for 2024 Delivery Year (Effective For Units Entering Black Start Service 01/01/2024 - 05/31/2024)	0.116	0.131	0.166	0.276	50/50	7.5%	12%
Black Start CRF for 2024 Delivery Year (Effective For Units Entering Black Start Service 06/01/2024 - 12/31/2024)	0.110	0.125	0.160	0.271	50/50	7.5%	12%
Black Start CRF for 2025 Delivery Year (Effective For Units Entering Black Start Service 01/01/2025 - 05/31/2025)	0.113	0.129	0.165	0.282	50/50	7.5%	12%
APIR CRF for 2021/22 Delivery Year	0.125	0.146	0.198	0.363	50/50	7%	12%
APIR CRF for 2022/23 Delivery Year	0.101	0.116	0.147	0.296	50/50	7%	12%

Comparison of CRF Values and Components

Capital Recovery Factor	Capital Cost Recovery Period (Years)				Capital Structure (Debt/Equity)	Cost of Debt	ROE/Cost Equity
	20	15	10	5			
APIR CRF for 2023/24 Delivery Year	0.104	0.119	0.152	0.258	55/45	6%	13%
APIR CRF for 2024/25 Delivery Year	0.107	0.122	0.158	0.271	55/45	6%	13%
APIR CRF for 2025/26 Delivery Year	0.110	0.126	0.164	0.283	55/45	6%	13%