

the term of the commitment under cost of service rates that ensures that return. It is not reasonable to provide a random, large overpayment to a group of black start owners based on PJM's failure to update rates to reflect changes to the tax code and to assert that the goal of such overpayment is to address risk. PJM has never stated that the rate of return included in the CRF rates is not compensatory. If PJM believes that the rate of return included in the CRF is not correct, PJM should file to change it. CRF is not and has never been a black box. The basics of financial mathematics are well known. PJM's definition of acceptable discrimination is that one set of investors has already received a windfall. Under PJM's proposal, one set of units would receive a windfall and one set of units would not receive a windfall. It is irrelevant to assert that one group had a "different understanding" and that because PJM appears to believe that one group may have expected a windfall, that it is just and reasonable to provide that windfall.

The Market Monitor explains the basic math of the CRF rates, shows the impacts of continuing to pay for black start service under the PJM proposal and derives an updated CRF. The essential point is the explanation of how the CRF rates, for the black start units that have been paid for taxes not incurred, can be adjusted on a going forward basis so that the CRF rates reflect the level of recovery of capital costs that has already occurred. The new, lower CRF rates for these units will compensate black start owners using the existing rate of return for their remaining investment in existing black start units and ensure that black start owners receive full compensation, but no more, as required by the tariff.

I. COMMENTS

A. Background

The October 12th Filing responds to the directive in the Commission's August 10, 2021 order ("August 10th Order") for PJM "(1) to show cause as to why its Tariff remains just and reasonable and not unduly discriminatory or preferential; or (2) to explain what changes to its Tariff it believes would remedy the identified concerns if the Commission were to determine that the Tariff has in fact become unjust and unreasonable or unduly

discriminatory or preferential and, therefore, proceeds to establish a replacement Tariff.”⁴ PJM chose option (1) but offered no new arguments or ideas to support its assertion. PJM reminds the reader of the critical importance of black start service (at 3). PJM attempts to revive the black box argument (at 2) stating that “the evidence shows that the CRF percentages for Existing Black Start Investments were presented in the Tariff as black box stated rates, disconnected from any analyses of the development of the rates and providing no indication of how the CRF rate may be changed during the life of a project, nor under what circumstances.”

The Market Monitor agrees with PJM’s self evident assertions that black start service is a vitally important service and that black start units should be fairly compensated. But neither point supports paying specific black start units a windfall. Continuing to pay black start service providers at current rates that do not reflect the significantly reduced costs that resulted from the Tax Cuts and Job Act (TCJA) of 2017, unambiguously results in a windfall to specific black start units.^{5 6} The TCJA lowered the corporate tax rate to 21 percent and introduced bonus depreciation for capital investments placed in service after September 27, 2017.⁷ PJM provides no support for paying this windfall that results from charging customers for taxes that are not actually paid. PJM does not deny that this windfall has been paid, continues to be paid and would be guaranteed to be paid under the PJM proposal.

B. Continuing to Pay Black Start Units Existing as of June 6, 2021, at the Current CRF Rates Is Unduly Discriminatory.

PJM’s primary argument (at 5) for continuing to pay the existing black start units as of June 6, 2021, at the current CRF rates is that “different rates among non-similarly situated

⁴ 176 FERC ¶ 61,080 at 48.

⁵ Tax Cuts and Jobs Act, Pub. L. No. 115-97, 131 Stat. 2096, Stat. 2105 (2017).

⁶ 26 U.S. Code §11(b).

⁷ See 26 U.S. Code §168(k)(6)(A).

customers are not unduly discriminatory." PJM misapplies the unduly discriminatory standard. PJM misstates the facts, and has not shown that its cited precedents are relevant here.

PJM explains (at 2), "owners of Black Start Units that made the Existing Black Start Investments ... are not similarly situated to new Black Start Unit investors in the timing of investment in Black Start capability and the filed rate at the time of their investment decisions." PJM relies (at 5–8) on various cases where the Commission took into account information available to investors at the time of investment decisions and treated them differently as a consequence. These cases are not on point because the cited cases concern subjective matters like investors' evaluations of the costs and benefits of RTO membership or the impact of certain rule changes on the terms of financing.⁸ The issue in this case is the level of tax rates and taxes paid. The issue in this case concerns objective facts and does not concern subjective investor expectations. It is unduly discriminatory, and unjustifiable, to provide a windfall to a class of black start service providers based on the use of demonstrably incorrect tax payments.

PJM's formula rate has not changed. PJM has now filed and made explicit in the tariff the formula that has always applied. The result is enhanced transparency, but not a change to the formula rate. PJM mischaracterizes its formula rates under OATT Schedule 6A as "stated rates," and, based on that mischaracterization, attempts (at 8–9) to distinguish its formula rates from a straightforward application of the principles in *Alcoa Power Generating Inc.—Long Sault Division*, 162 FERC ¶ 61,224 (2018) ("*Alcoa*"), and *Public Utility Transmission*

⁸ See, e.g., PJM at 6 n.15, citing *Mo. River Energy Servs. v. FERC*, 918 F.3d 954, 958–60 (D.C. Cir. 2019) ("The court affirmed the Commission's reasoning that there was no undue discrimination between new and existing members because the new members had the opportunity to consider the costs and benefits of joining SPP."); PJM at 6–7 n.19, citing *ISO New England Inc.*, 170 FERC ¶ 61,011, at PP 14–15 (2020) ("The Commission found that new non-commercial capacity was not similarly situated with existing non-commercial capacity that cleared before the upcoming auction policy because 'existing capacity would have secured financing and/or made arrangements in anticipation of, and contingent upon, the incumbent financial assurance requirements.'").

Rate Changes to Address Accumulated Deferred Income Taxes, Order No. 864, 169 FERC ¶ 61,139 (2019) (“Order No. 864”).

PJM asserts (at 8–9) that “not all utilities with stated transmission rates that were subjects of the show cause order in *Alcoa* filed to reduce their stated transmission rates to reflect the lower federal corporate income tax rate.” This case concerns PJM’s formula rate, and under the principles explained in *Alcoa*, PJM should be required to apply its formula rates accurately. PJM provides no valid reason for continuing to pay black start units for taxes that are not paid based on an arbitrary in service date. PJM does not explain how the circumstances justify any exception, or how the circumstances match those of any entity asserted to have received an exception. The only example of a reason why the Commission might not require accurate treatment of tax rates in a show cause proceeding is where the “the reduced tax rate is being addressed in another proceeding pending before the Commission.”⁹ PJM has not indicated another proceeding addressing this issue. There is no other proceeding.

PJM also argues that it should be treated like “utilities with stated transmission rates” that, under Order No. 864, were allowed “to address TCJA’s impact on ADIT in their next rate case.” OATT Schedule 6A refers explicitly to formula rates, not stated rates.¹⁰ The case concerns the application of PJM’s formula rates. Unlike stated rates, formula rates are meant to accommodate changed inputs without the need for additional filings. PJM provides no reason not to implement just, reasonable and not unduly discriminatory formula rates in this proceeding.

The Market Monitor’s proposed values reflect the actual tax rates and taxable depreciation rates that actually apply to each unit. If the taxable depreciation rate for a unit

⁹ See 162 FERC ¶ 61,224 at P 4 n.7.

¹⁰ See OATT Schedule 6A para. 17 (“Black Start Service revenue requirements for each Black Start Unit shall be based, at the election of the owner, on either (i) a FERC-approved rate ... or (ii) the formula rates set forth in section 18 of this Schedule 6A”).

built in 2016 differs from that for a unit built in 2019, different taxable depreciation rates apply to each unit. That result is not discriminatory because it reflects the actual taxes paid by each unit.

The Market Monitor's proposal is consistent with the case law upon which PJM relies with respect to both taxes paid and the treatment of depreciation. Investor expectations are not relevant to the amount of taxes paid. If a reduction in tax rates is not accounted for, the result is an unjust and unreasonable and unduly discriminatory windfall.¹¹ To avoid undue discrimination, PJM should uniformly calculate and apply the formula rate based on the effective tax rates.

PJM never addresses, in any of its filings, the fact that customers are being unjustly overcharged for black start service. PJM focuses on the expectations of investors rather than the expectations of customers who could reasonably expect that the regulatory process would result in correctly calculated payments for black start service.

The windfall issue resulted from a loophole created by PJM's failure to update the PJM tariff. PJM failed to update its tariff for months after the flaw had been identified. PJM states (at 7) that "at the time existing Black Start Unit owners made the tailored Existing Black Start Investments addressed by a CRF, they did not have notice of the new formulaic, annually updated CRF, or the opportunity to consider this new approach's costs and

¹¹ See *Alcoa Power Generating Inc.—Long Sault Division*, 162 FERC ¶ 61,224 (2018) (Given the reduction in the federal corporate income tax rate, we have undertaken a review of Commission-jurisdictional stated transmission rates under open access transmission tariffs or transmission owner tariffs, and we have identified Respondents as having such arrangements in effect. Because the federal corporate income tax rate has been reduced to 21 percent, absent a change to the stated rates, Respondents' stated rates may not accurately reflect their cost of service. Accordingly, we find that Respondents' stated rates on file with the Commission appear to be unjust, unreasonable, and unduly discriminatory or preferential, or otherwise unlawful.); Order No. 864 at P 8 ("As a result of the Tax Cuts and Jobs Act reducing the federal corporate income tax rate from 35 percent to 21 percent, a portion of an ADIT liability that was collected from customers will no longer be due from public utilities to the IRS and is considered excess ADIT, which must be returned to customers in a cost of service ratemaking context.[footnote omitted] Public utilities are required to adjust their ADIT assets and ADIT liabilities to reflect the effect of the change in tax rates in the period that the change is enacted.[footnote omitted]").

benefits.” While PJM failed to update the tariff, the owners of black start units with service terms beginning, during, or after 2018 knew the results of being paid a revenue amount determined by a CRF calculated under the outdated tax rates and depreciation schedules. While the question of expectations is not at issue, black start owners could not reasonably have expected PJM to fail to update the CRF rate for the lower taxes or have expected the Commission to approve charging excessive cost-based rates not based on costs.

CRF means capital recovery factor. The CRF is calculated to ensure that investors are paid for the return on capital and the return of capital. The basic and well understood financial math of the CRF rate includes taxes. PJM has not supported its implicit claim that investors legitimately expected a windfall based on a reduction in the tax rate and has not supported its implicit claim that, even if true, investors’ expectations of a windfall should be ratified by a regulatory decision.

The issue now is to determine a new CRF rate for payments going forward.

C. Capital Recovery Factor: the Basics

The PJM tariff states that owners of black start units may elect “to recover new or additional Black Start Capital Costs” and defines Incremental Black Start Capital Costs as “new or additional capital costs ... for the incremental equipment solely necessary to enable a unit to provide Black Start Service.”¹² The tariff clearly states that black start owners are entitled to recover black start capital costs, no more and no less.¹³ The black start capital cost recovery consists of a return on the capital investment, a return of the capital investment, and the associated income taxes incurred. The correctly calculated capital recovery factor (CRF), when multiplied by the initial capital investment, provides the necessary and sufficient revenue level to provide for the return on and return of the capital investment and to pay the associated income taxes.

¹² OATT Schedule 6A Paras. 6 and 18.

¹³ *Id.*

Table 1 makes clear what is meant by the phrase “necessary and sufficient revenue to pay the tax liabilities and provide for the return on and the return of the capital investment.” But Table 1 does reflect a rounding error in the existing CRF. The correctly calculated CRF results in exactly the outcome required by the tariff.

Table 1 shows the cash flows for a black start unit with a five year service term and a \$1 million capital investment using the financial parameter and tax rate assumptions for black start service beginning prior to June 6, 2021. The parameter and tax rate assumptions are in Table 2.

Table 1 Cash flow summary for 5 year service term, \$1 million capital investment^{14 15 16 17}

Service Year	1	2	3	4	5
Revenue	\$363,000	\$363,000	\$363,000	\$363,000	\$363,000
Depreciation	\$50,000	\$95,000	\$85,500	\$77,000	\$69,300
Interest on debt	\$17,204	\$27,952	\$21,656	\$14,920	\$7,712
Tax payment	\$123,524	\$100,244	\$106,840	\$113,203	\$119,428
Debt payment	\$117,889	\$117,889	\$117,889	\$117,889	\$117,889
Return on equity	\$29,150	\$48,908	\$37,393	\$25,287	\$12,493
Payback of debt	\$100,685	\$89,937	\$96,233	\$102,969	\$110,177
Payback of equity	\$92,436	\$95,959	\$100,878	\$106,621	\$113,190
Remaining debt	\$399,315	\$309,378	\$213,145	\$110,177	\$0
Remaining equity	\$407,564	\$311,604	\$210,726	\$104,105	(\$9,085)

¹⁴ The model uses 15 year MACRS depreciation factors with the half year convention and the tax payment is calculated as the product of the effective tax rate in Table 2 and the revenue net of depreciation and interest on debt.

¹⁵ The model assumes the half year convention for revenue and tax payments. The interest on the debt in year 1 is equal to the product of the debt investment and the half year interest rate, $\sqrt{1.07} - 1$. The year 1 return on equity is equal to the product of the equity investment and the half year rate of return, $\sqrt{1.12} - 1$. Interest on the debt in other years is 7.0% of the previous year’s remaining debt. Return on equity beginning in year 2 is 12.0% of the previous year’s remaining equity.

¹⁶ The debt payment is calculated using a standard formula given by $500,000 \cdot \frac{(.07)(1.07)^5}{\sqrt{1.07}[(1.07)^5-1]}$, or Microsoft Excel PMT function can be used, $-\sqrt{1.07} \cdot \text{PMT}(.07,5,500000,0,1)$.

¹⁷ Payback of the debt investment is equal to the debt payment net of interest on the debt. Payback of the equity investment is equal to revenue net of taxes, the debt payment and return on equity.

Table 2 Financial parameter and tax rate assumptions¹⁸

Financial Parameter	Parameter Value
Equity Funding Percent	50.0000%
Debt Funding Percent	50.0000%
Equity Rate	12.0000%
Debt Interest Rate	7.0000%
Federal Tax Rate	36.0000%
State Tax Rate	9.0000%
Effective Tax Rate	41.7600%

The CRF defined in the tariff for black start service beginning prior to June 6, 2021, is 0.363 for a five year service term. This CRF was based on the assumption that tax rates were at levels prior to the TCJA. The cash flow summary in Table 1 is based on the financial model, called a flow to equity (FTE) model, that was used to develop the CRF stated in the tariff.¹⁹ The FTE model treats the return and payback of equity and debt separately. The payback to equity investors in the FTE model is calculated as the revenue net of taxes, the debt payment and return on equity. The weighted average cost of capital (WACC) model which was used to calculate the CRF for black start service after June 6, 2021, averages the equity and debt in the calculation of investment return and investment payback. The cash flow summary in Table 1 shows that in each year after accounting for the tax payment, return on equity and the debt payment, there is additional revenue for payback to the equity investor. The equity investment remaining at the end of the service term should be exactly \$0, but the tariff defined CRF values have rounding errors that cause a small overpayment in this example.

Table 3 shows the cash flow summary for the same example with the rounding errors corrected. The CRF is 0.360545 and the annual revenue payment is \$360,545.²⁰ Table 3 makes

¹⁸ The effective tax rate is equal to State Tax Rate + Federal Tax Rate x (1-State Tax Rate).

¹⁹ Additional details on the flow to equity approach can be found in Section 17.2 in “Corporate Finance,” Ross, Westerfield, Jaffe, 4th Edition, 1996.

²⁰ The CRF value of 0.360545 was calculated using a CRF formula for the FTE model that is similar to the CRF formula used for WACC model CRF.

clear exactly what is meant by the phrase “necessary and sufficient revenue to pay the tax liabilities and provide for the return on and the return of the capital investment.” Table 3 eliminates the small rounding error that is shown in Table 1, but both tables illustrate the essential point. The correctly calculated CRF results in the outcome required by the tariff. Each year the revenue that results from the CRF covers the interest on the debt and the payback of the debt principal, covers the defined return on the equity investment, covers the taxes, and the remaining funds go towards payback of the equity investment. At the end of the service term, the remaining debt investment and the remaining equity investment are both \$0. The entries in the debt payback row sum to \$500,000 as do the entries of the equity payback row, reflecting the 1:1 debt to equity ratio in Table 2.

Table 3 Cash flow summary for 5 year service term, \$1 million capital investment with rounding errors corrected

Service Year	1	2	3	4	5
Revenue	\$360,545	\$360,545	\$360,545	\$360,545	\$360,545
Depreciation	\$50,000	\$95,000	\$85,500	\$77,000	\$69,300
Interest on debt	\$17,204	\$27,952	\$21,656	\$14,920	\$7,712
Tax payment	\$122,499	\$99,219	\$105,815	\$112,178	\$118,403
Debt payment	\$117,889	\$117,889	\$117,889	\$117,889	\$117,889
Return on equity	\$29,150	\$49,079	\$37,756	\$25,866	\$13,313
Payback of debt	\$100,685	\$89,937	\$96,233	\$102,969	\$110,177
Payback of equity	\$91,006	\$94,358	\$99,084	\$104,612	\$110,940
Remaining debt	\$399,315	\$309,378	\$213,145	\$110,177	\$0
Remaining equity	\$408,994	\$314,636	\$215,552	\$110,940	\$0

D. How the CRF Creates a Windfall Based Only on the Tax Rate

The creation of the windfall under PJM’s proposal can be illustrated using the same basic example. The windfall is a result of both the reduction in the tax rate and the change in the depreciation provisions. This illustration is only about the windfall resulting from the change in the tax rate. Consider a black start unit that began service on January 1, 2016. The unit would not have been eligible for bonus depreciation, but the federal tax rate dropped to 21.0 percent on January 1, 2018.

Table 4 shows the resulting cash flow summaries. The first cash flow summary in Table 4 shows the cash flow that was assumed when the CRF determination was made. It

was assumed for the five year service term that the black start owner would pay federal taxes at 36.0 percent and there is a small overpayment by customers due to the rounding errors.

The second cash flow summary in Table 4 reflects the change of federal tax rate to 21.0 percent on January 1, 2018, which in this example is at the beginning of service year 3.²¹ No other parameters were changed. The tax liability in service year 3 dropped by \$34,923 and the extra funds were an additional payback to the equity investors. The lower tax liability has a compounding effect with the result that the rate of equity payback increases each year. At the end of the five year service term the payback to equity investors exceeds the equity investment by \$133,372 or 26.7 percent. The payback in excess of the total capital investment of \$1 million has been exceeded by 13.3 percent. This excess payment, the windfall, is the result of the fact that the actual tax rate decreased but that the CRF was not decreased to reflect that change.

²¹ The new effective tax rate after changing the federal tax rate to 21.0% is 28.11%. This assumes the state tax rate remains at 9.0%.

Table 4 Cash flow summary for 5 year service term, \$1 million capital investment, service term starting January 1, 2016

Service Year	1	2	3	4	5
Cash flow assumed in annual revenue determination					
Revenue	\$363,000	\$363,000	\$363,000	\$363,000	\$363,000
Depreciation	\$50,000	\$95,000	\$85,500	\$77,000	\$69,300
Interest on debt	\$17,204	\$27,952	\$21,656	\$14,920	\$7,712
Tax payment	\$123,524	\$100,244	\$106,840	\$113,203	\$119,428
Debt payment	\$117,889	\$117,889	\$117,889	\$117,889	\$117,889
Return on equity	\$29,150	\$48,908	\$37,393	\$25,287	\$12,493
Payback of debt	\$100,685	\$89,937	\$96,233	\$102,969	\$110,177
Payback of equity	\$92,436	\$95,959	\$100,878	\$106,621	\$113,190
Remaining debt	\$399,315	\$309,378	\$213,145	\$110,177	\$0
Remaining equity	\$407,564	\$311,604	\$210,726	\$104,105	(\$9,085)
Cash flow reflecting actual tax liabilities, return and payback					
Revenue	\$363,000	\$363,000	\$363,000	\$363,000	\$363,000
Depreciation	\$50,000	\$95,000	\$85,500	\$77,000	\$69,300
Interest on debt	\$17,204	\$27,952	\$21,656	\$14,920	\$7,712
Tax payment	\$123,524	\$100,244	\$71,918	\$76,201	\$80,391
Debt payment	\$117,889	\$117,889	\$117,889	\$117,889	\$117,889
Return on equity	\$29,150	\$48,908	\$37,393	\$21,096	\$3,359
Payback of debt	\$100,685	\$89,937	\$96,233	\$102,969	\$110,177
Payback of equity	\$92,436	\$95,959	\$135,801	\$147,814	\$161,361
Remaining debt	\$399,315	\$309,378	\$213,145	\$110,177	\$0
Remaining equity	\$407,564	\$311,604	\$175,804	\$27,989	(\$133,372)

The resultant internal rate of return (IRR) also shows the overpayment by customers for black start service. The IRR is the discount rate for which the net present value of the after tax cash flow is \$0. For example, the after tax cash flow, or revenue net of taxes and the debt payment, for each of the examples is in Table 5. The IRR under the original CRF determination, with no change in tax rates, is 12.5 percent where the rounding error in the CRF has caused the IRR to deviate from the assumed return on equity value of 12.0 percent.²²

²³ The IRR is 12.0 percent for the second row of Table 5. The only difference in the second row

²² The IRR was calculated using the Solver application in Microsoft Excel.

²³ Each annual cash flow amount is assumed to occur at the midpoint of the service year.

is that the rounding error is eliminated in the second row. The IRR is 19.2 percent for the row 3 after tax cash flow which reflects the reduction in actual tax payments compared to the tax payments included in the CRF. The failure to update the CRF to reflect the reduced tax rate increased the black start owner’s return on equity from 12.0 percent to 19.2 percent in this example.

Table 5 After cash flow for 5 year service term, \$1 million capital investment

Service Year	1	2	3	4	5
After tax cash flow - Original CRF determination	\$121,587	\$144,867	\$138,271	\$131,908	\$125,683
After tax cash flow - Rounding errors corrected	\$120,157	\$143,437	\$136,841	\$130,478	\$124,253
After tax cash flow - Actual tax liabilities, return & payback	\$121,587	\$144,867	\$173,193	\$168,910	\$164,720

E. Actual Calculated Windfall Paid by PJM Customers for Units that Have Completed Service

As a result of the reduction in tax payments and the failure to reduce the CRF to reflect that reduction, payback in excess of the capital investment has already occurred for PJM black start service. The Market Monitor calculated the payback of capital investments for seven black start units that completed their service terms between August 2018 and June 2021, and found that the payback exceeded the capital investment amounts by \$4.3 million or 10.2 percent. This means customers paid the black start owners sufficient revenue to cover the tax liabilities associated with the black start revenue and investment return payments at 7.0 percent for the debt portion of the capital investment and 12.0 percent for the equity portion, and the customers paid back the capital investment plus an additional \$4.3 million or 10.2 percent of the capital investment.

In this filing, the Market Monitor is not proposing any adjustment to the payments already made to units that completed their service terms prior to June 2021.

F. How the CRF Creates a Windfall Based on the Tax Rate and Depreciation

The creation of the windfall under PJM’s proposal can be illustrated using the same basic example. The windfall is a result of both the reduction in the tax rate and the change in the depreciation provisions. This illustration is about the windfall resulting from both the

change in the tax rate and the change in depreciation rules. Consider a black start unit that began service on January 1, 2019. This black start unit would have paid federal income tax at 21.0 percent from the start of the service term and would have been eligible for 100 percent bonus depreciation.

Table 6 shows the resulting cash flow summaries. The first cash flow summary in Table 6 shows the cash flow that was assumed when the CRF determination was made. It was assumed for the five year service term that the black start owner would pay federal taxes at 36.0 percent and there is a small overpayment by customers due to the rounding errors. Even though the service term begins after the effective date of the TCJA, the revenue payment is exactly the same as in first example because it is based on the CRF in the tariff that continued to incorporate the incorrect tax rates and depreciation.

The second cash flow summary in Table 6 reflects the actual tax liabilities and expected return on and return of the capital investment. The federal tax rate of 21.0 percent beginning with service year 1, and 100 percent bonus depreciation, are reflected in the second cash flow summary. No other changes were made.

Table 6 Cash flow summary for 5 year service term, \$1 million capital investment, service term starting January 1, 2019²⁴ ²⁵

Service Year	1	2	3	4	5
Cash flow assumed in annual revenue determination					
Revenue	\$363,000	\$363,000	\$363,000	\$363,000	\$363,000
Depreciation	\$50,000	\$95,000	\$85,500	\$77,000	\$69,300
Interest on debt	\$17,204	\$27,952	\$21,656	\$14,920	\$7,712
Tax payment	\$123,524	\$100,244	\$106,840	\$113,203	\$119,428
Debt payment	\$117,889	\$117,889	\$117,889	\$117,889	\$117,889
Return on equity	\$29,150	\$48,908	\$37,393	\$25,287	\$12,493
Payback of debt	\$100,685	\$89,937	\$96,233	\$102,969	\$110,177
Payback of equity	\$92,436	\$95,959	\$100,878	\$106,621	\$113,190
Remaining debt	\$399,315	\$309,378	\$213,145	\$110,177	\$0
Remaining equity	\$407,564	\$311,604	\$210,726	\$104,105	(\$9,085)
Cash flow reflecting actual tax liabilities, return and payback					
Revenue	\$363,000	\$363,000	\$363,000	\$363,000	\$363,000
Depreciation	\$1,000,000	\$0	\$0	\$0	\$0
Interest on debt	\$17,204	\$27,952	\$21,656	\$14,920	\$7,712
Tax payment	(\$183,897)	\$94,182	\$95,952	\$97,845	\$99,871
Debt payment	\$117,889	\$117,889	\$117,889	\$117,889	\$117,889
Return on equity	\$29,150	\$12,017	(\$4,652)	(\$23,110)	(\$43,555)
Payback of debt	\$100,685	\$89,937	\$96,233	\$102,969	\$110,177
Payback of equity	\$399,857	\$138,912	\$153,812	\$170,375	\$188,794
Remaining debt	\$399,315	\$309,378	\$213,145	\$110,177	\$0
Remaining equity	\$100,143	(\$38,769)	(\$192,581)	(\$362,956)	(\$551,751)

As a result of the CRF including revenues for taxes that are not paid, the equity portion of the capital investment was fully paid back in service year 2, rather than at the end of the five year period. An assumption in the FTE model, is that the equity investor invests the excess payback at the same rate of return on equity included in the CRF, 12 percent. This is reflected in the cash flow summary as a negative return on equity in Table 6, which is then

²⁴ It is assumed that the capital investor would use the negative tax liability in service year 1 as an offset against the tax liabilities resulting from other revenue.

²⁵ The effective tax rate is 28.11% after changing the federal tax rate to 21.0%.

included in the payback to equity as a positive number.²⁶ The cash flow summary shows that payback in excess of the equity investment is \$551,751 or 110.4 percent. The payback in excess of the total capital investment of \$1 million is 55.2 percent. The IRR is 61.6 percent for the after tax cash flow reflecting the actual tax liabilities. This excess payment, the windfall, is the result of the fact that the actual tax rate decreased and the depreciation rules changed but that the CRF was not decreased to reflect those two changes.

A row by row comparison between the two cash flow summaries in Table 6 shows that the payback in excess of the capital investment can be separated into three distinct categories, payment of taxes that were not incurred, return on capital investments that have already been paid back and return on reinvestment of the excess payback. (See Table 7.) The difference between the service year 1 tax payment assumed in the outdated CRF and the actual tax payment is \$307,421. The difference between the investment return numbers for service year 2 is \$36,891. This reflects the accelerated payback of the equity investment. In service year 3 through service year 5, the equity investment has been paid back in full yet the revenue payment of \$363,000 assumes a return on equity for each year. In fact, the equity investor, having been paid back in full in service year 2, is earning returns on the excess payback in service year 3 through service year 5 as shown in the third row of Table 7. The Table 7 total of \$542,666 and the excess payback due to rounding errors, \$9,085, sum to the total payback in excess of the capital investment given in Table 6.

Table 7 Payback in excess of the capital investment by category

Service Year	1	2	3	4	5
Payments for taxes not incurred	\$307,421	\$6,062	\$10,889	\$15,358	\$19,557
Return on capital that has already been paid back	\$0	\$36,891	\$37,393	\$25,287	\$12,493
Return on reinvestment of payback in excess of the capital investment	\$0	\$0	\$4,652	\$23,110	\$43,555
T total for Year	\$307,421	\$42,953	\$52,933	\$63,755	\$75,604
Total for All Years					\$542,666

²⁶ Payback to equity in the FTE model is (Revenue – Taxes – Debt Payment – Return on Equity).

G. Actual Calculated Windfall Paid by PJM Customers for Black Start Units Still in Service

If black start units continue to receive the annual revenue payments determined by the incorrect CRF, as PJM recommends, customers will overpay black start units that started service prior to June 6, 2021, by \$126.0 million. The overpayment will go to the existing black start service fleet and \$126 million does not include the \$4.3 million in excess payback that has already been paid to black start units that completed their service terms between August 2018 and June 2021. The Market Monitor uses the FTE model to calculate the overpayment because that was the model used to calculate the CRFs that created the overpayment.

For black start units that started service during or after 2018 and prior to June 6, 2021, the percent payback in excess of the capital investment and the IRR in excess of the required level will be the same for units with the same term of service. All five year black start units will have the same percent overpayment. All ten year black start units will have the same percent overpayment. The same is true for all service lives. All such black start units were eligible for 100 percent bonus depreciation and the new federal tax of 21.0 percent was effective from the start of the service terms.

Table 8 summarizes the actual percent payback in excess of the capital investment and the IRR that will result under the PJM proposal. Under the PJM proposal with the financial assumptions in Table 2, all black start units beginning a ten year service term during or after 2018 and before June 6, 2021 will receive payback in excess of their capital investment totaling 70.5 percent of the capital investment. For every \$1 million invested the black start owner will receive \$700,500 in addition to being paid back the \$1 million capital investment and receiving annual revenue payments to cover the tax liabilities and return on the investment. A unit with a 20 year service term will receive payback in excess of their capital investment totaling 155.2 percent of the capital investment.

Table 8 Payback in excess of capital investment and IRR for service terms beginning on or after January 1, 2018 and before June 6, 2021

Service Term	Excess Payback as Percent of Investment	Internal Rate of Return (IRR)
5	55.2%	61.6%
10	70.5%	34.0%
15	96.2%	25.6%
20	155.2%	22.8%

Table 9 shows the actual expected payback in excess of the capital investment, by service term start date, for the black start units in PJM. The majority of the excess payback, 71.4 percent, is attributable to black start units that began services terms after January 1, 2019.

Table 9 Expected payback in excess of capital investments for existing black start units

	Excess Payback (\$ million)	Percent
Service Terms Beginning Prior to January 1, 2017	\$36.05	28.6%
Service Terms Beginning After January 1, 2019	\$89.93	71.4%
Total	\$126.0	100.0%

H. Closing the Loophole

The Commission invited interested entities to respond with “what changes to PJM’s Tariff should be implemented as a replacement rate.”²⁷

The Market Monitor proposes to update the CRF applicable to existing units going forward to a rate that will reflect the return of capital already received by existing black start units and eliminate the payback in excess of the capital investment for existing black start units. The Market Monitor’s proposal is consistent with the “capital cost recovery” language in Schedule 6A of the PJM tariff and can be implemented without any retroactive resettlement

²⁷ August 10th Order at 53.

or disgorgement. The updated CRF can be set at the level that covers the tax liabilities going forward, pays a return at the required rates on any remaining capital investment, pays back the full investment and therefore results in the required return on and of capital over the CRF term.

Using the formula for the CRF, a different CRF will need to be calculated for each existing black start unit based on the exact in service date and the duration of the service period. The Market Monitor is providing the formula in this filing. The Market Monitor has calculated the resulting CRF for each existing black start unit and will provide to the Commission and PJM if that would be helpful.

Table 10 shows updated CRF values for several combinations of service start dates and service terms. The updated CRF values were calculated using equation (1) below and the financial parameter and tax rate values in Table 12.

Table 10 Updated CRF for selected dates and service terms

Service Start	Service Term	Current CRF	Updated CRF
7/1/2019	5	0.363	0.083443
7/1/2020	5	0.363	0.174620
7/1/2021	5	0.363	0.225022
7/1/2019	10	0.198	0.110218
7/1/2020	10	0.198	0.127560
7/1/2021	10	0.198	0.137200
7/1/2019	20	0.125	0.083515
7/1/2020	20	0.125	0.088581
7/1/2021	20	0.125	0.092963

The procedure for establishing a formula for the updated CRF is a two step process: (1) the remaining capital investment is determined as of the effective date of the updated CRF and (2) an updated CRF formula is derived based on the remaining service term and the remaining capital investment amount.

1. Model for Updated CRF Reflecting a Change in the Tax Law

The updated model incorporates a change in the tax rate and a change in the CRF to permit the calculation of the impact of over collection under the initial tax rate and associated

CRF, the new tax rate, and the updated CRF. The timing of these two changes is treated independently in order to reflect the delayed implementation of the revised CRF.²⁸ To account for these factors, variable m represents the service year during which the tax change occurs, and variable q represents the first service year during which the updated CRF is effective. Variable γ represents the fractional portion of service year m for which the old tax rate is applicable. Variable μ is defined to be the fractional portion of service year q for which the old CRF is applicable.

The formula for the updated CRF is given in equation (1).

$$\begin{aligned}
c_2 = & \frac{r_e(1+r_e)^{N-q}}{(1-s_2)[(1+r_e)^{N-q+1} - 1 - \mu r_e(1+r_e)^{N-q}]} \left\{ F_{q-1}(1+r_e) - \mu c_1(1-s_2) \right. \\
& - s_2 \sum_{j=q}^N \delta_j \left(\frac{1}{1+r_e} \right)^{j-q} \\
& - (1-E)s_2 \frac{r_d(1+r_d)^{q-3/2} [(1+r_d)^{N-q+1} [(1+r_e)^{N-q+1} - 1]]}{[(1+r_d)^N - 1] \left[\frac{r_e(1+r_e)^{N-q}}{r_e(1+r_e)^{N-q}} \right]} \\
& \left. - \frac{(1+r_e)^{N-q+1} - (1+r_d)^{N-q+1}}{(r_e - r_d)(1+r_e)^{N-q}} \right] \\
& + (1-E) \left(\frac{r_d(1+r_d)^{N-1/2}}{(1+r_d)^N - 1} \right) \left(\frac{(1+r_e)^{N-q+1} - 1}{r_e(1+r_e)^{N-q}} \right) \left. \right\}. \tag{1}
\end{aligned}$$

The factor F_{q-1} which when multiplied by the initial capital investment K_0 gives the remaining equity investment prior to the effective date of the updated CRF,

²⁸ At this point the implementation of a revised CRF will take place at least three year and ten months after the effective date of the TCJA.

$$\begin{aligned}
F_{q-1} = & F_{m-1}(1+r_e)^\alpha - c_1(1-s_2) \frac{(1+r_e)^{q-m} - 1}{r_e} + \gamma c_1(s_1 - s_2)(1+r_e)^{q-m-1} \\
& - \gamma \delta_m(s_1 - s_2)(1+r_e)^{q-m-1} - s_2 X - (1-E)[\gamma s_1 + (1-\gamma)s_2]Z(1+r_e)^{q-m-1} \\
& + (1-E) \frac{r_d(1+r_d)^{N-1/2}}{(1+r_d)^N - 1} \frac{(1+r_e)^{q-m} - 1}{r_e} \\
& - (1-E)s_2 \frac{r_d(1+r_d)^{m-1/2}}{[(1+r_d)^N - 1]} \left\{ \frac{(1+r_d)^{N-m}[(1+r_e)^{q-m-1} - 1]}{r_e} \right. \\
& \left. - \frac{(1+r_e)^{q-m-1} - (1+r_d)^{q-m-1}}{r_e - r_d} \right\}
\end{aligned}$$

where

$$\alpha = \begin{cases} q - m - 1/2, & m = 1 \\ q - m, & m > 1 \end{cases}$$

$$X = \begin{cases} 0, & m = q \\ \sum_{j=m}^{q-1} \delta_j (1+r_e)^{q-j-1}, & m < q \end{cases}$$

$$Z = \begin{cases} \sqrt{1+r_d} - 1, & m = 1 \\ \frac{r_d(1+r_d)^{m-1}}{\sqrt{1+r_d}} \left(\frac{(1+r_d)^{N-m+1} - 1}{(1+r_d)^N - 1} \right), & m > 1. \end{cases}$$

Factor F_{m-1} which when multiplied by the initial capital investment K_0 gives the remaining equity investment prior to the change in the tax law. In the case that the tax law change occurs in the first service year ($m = 1$), the value of the equity investment prior to the tax change is equal to the equity funding percent, or $F_0 = E$. In the case the $m > 1$

$$\begin{aligned}
F_{m-1} = & E\sqrt{1+r_e}(1+r_e)^{m-2} - c_1(1-s_1) \left[\frac{(1+r_e)^{m-1} - 1}{r_e} \right] - s_1 \sum_{j=1}^{m-1} \delta_j (1+r_e)^{m-1-j} \\
& - (1-E)s_1(\sqrt{1+r_d} - 1)(1+r_e)^{m-2} \\
& + \frac{(1-E)r_d(1+r_d)^{N-1/2}}{(1+r_d)^N - 1} \left[\frac{(1+r_e)^{m-1} - 1}{r_e} \right] \\
& - (1-E)s_1 \frac{r_d\sqrt{1+r_d}}{(1+r_d)^N - 1} \left\{ \frac{(1+r_d)^{N-1}[(1+r_e)^{m-2} - 1]}{r_e} \right. \\
& \left. - \frac{(1+r_e)^{m-2} - (1+r_d)^{m-2}}{r_e - r_d} \right\}.
\end{aligned}$$

As an example, consider a black start unit that began service on December 1, 2018, and assume the updated CRF will be effective on January 1, 2022. In this case the new tax law was effective prior to the service start date so that m is 1 and γ is 0. The updated CRF becomes effective one month into service year 4, so that q is 4 and μ is 0.0833.

Table 11 Variable descriptions for updated CRF

Variable	Description
E	Equity funding percent
r_e	Return on equity
r_d	Debt interest rate
s_1	Effective tax rate prior to tax rate change
s_2	Effective tax rate after tax rate change
c_1	Initial CRF
c_2	Updated CRF
N	Cost recovery period
m	Service year in which tax rate change occurs
γ	Partial year in service year m for which tax rate s_1 applies
q	Service year in which updated tax rate is incorporated into CRF
μ	Partial year in service year q for which CRF c_1 applies
δ_i	Depreciation factor for service year i

The Market Monitor recommends that the financial parameters for black start units that began service prior to June 6, 2021, remain unchanged. This directly addresses the expectation question. The risk and return expectations are unchanged. The only updates are to include the actual federal and state tax rates and bonus depreciation where applicable. The financial parameter and tax rate assumptions, the current assumptions for existing black start

units that began service prior to June 6, 2021, along with the proposed updates, are presented in Table 12.

Table 12 Financial parameter and tax rate assumptions

Parameter	Black start service beginning prior to June 6, 2021	Market Monitor's Replacement Rate
Equity Funding Percent	50.0000%	50.0000%
Debt Funding Percent	50.0000%	50.0000%
Equity Rate	12.0000%	12.0000%
Debt Interest Rate	7.0000%	7.0000%
Federal Tax Rate	36.0000%	21.0000%
State Tax Rate	9.0000%	9.3000%
Effective Tax Rate	41.7600%	28.3470%
After tax Weighted Average Cost of Capital	8.0384%	8.5079%

Consider again the example of a black start unit with a five year service term and a \$1 million capital investment that began service on July 1, 2020.²⁹

Using the formula in equation (1) and the parameter assumptions under the Market Monitor's replacement rate in Table 12, gives an updated CRF value of 0.174620, where the updated CRF is effective on January 1, 2022.³⁰ The updated annual revenue requirement is \$174,620.

Table 13 shows the corresponding update to the cash flow summary. The updated revenue requirement is effective beginning in service year 2. The year 2 revenue reflects six months at the old CRF rate and six months at the updated CRF. The remaining capital investment is \$0 at the end of the service term and summing the capital investment payback row produces a total investment payback of \$1 million. The loophole has been closed and the result is fully consistent with the goal of the formula rate in the tariff. The black start owner

²⁹ The black start unit service start date is after the TCJA effective date so that parameter $m = 1$ and parameter $\gamma = 0$.

³⁰ The updated CRF effective date is at the start of service year 2 so that parameter $q = 2$ and parameter $\mu = 0.5$.

would receive the necessary and sufficient revenue to cover the target return on the investment, the full recovery of the capital investment, and all the tax liabilities associated with the annual revenue payment. The internal rate of return (IRR) for the after tax cash flow resulting from the updated CRF is 12.0 percent which matches the return on equity in Table 12.

Table 13 Updated cash flow summary reflecting updated CRF

Service Year	1	2	3	4	5
Revenue	\$363,000	\$268,810	\$174,620	\$174,620	\$174,620
Depreciation	\$1,000,000	\$0	\$0	\$0	\$0
Interest on debt	\$17,204	\$27,952	\$21,656	\$14,920	\$7,712
Tax payment	(\$185,447)	\$68,276	\$43,361	\$45,270	\$47,313
Debt payment	\$117,889	\$117,889	\$117,889	\$117,889	\$117,889
Return on equity	\$29,150	\$11,831	\$3,333	\$2,129	\$1,009
Payback of debt	\$100,685	\$89,937	\$96,233	\$102,969	\$110,177
Payback of equity	\$401,408	\$70,814	\$10,037	\$9,332	\$8,409
Remaining debt	\$399,315	\$309,378	\$213,145	\$110,177	\$0
Remaining equity	\$98,592	\$27,778	\$17,741	\$8,409	\$0

Next consider a black start unit with a ten year service term and a \$10 million capital investment. Assume the service term begins on March 1, 2020 and the updated CRF is effective on January 1, 2022.³¹ The current CRF for black start units with at 10 year service term and a service start date prior to June 6, 2021 is 0.198. Using equation (1) and the parameters in Table 12 results in an updated CRF of 0.120700. The new annual revenue requirement is \$1,207,002. Table 14 shows the cash flow summary corresponding to the updated CRF.

³¹ The service start date is after the TCJA effective date so that parameter $m = 1$ and parameter $\gamma = 0$. The effective date for the updated CRF is ten months into service year 2 so that $q = 2$ and $\mu = 0.8333$.

Table 14 Ten year black start service term, \$10 million investment (\$ 000)

Service Year	1	2	3	4	5	6	7	8	9	10
Revenue	\$1,980.0	\$1,851.2	\$1,207.0	\$1,207.0	\$1,207.0	\$1,207.0	\$1,207.0	\$1,207.0	\$1,207.0	\$1,207.0
Depreciation	\$10,000.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Interest on debt	\$172.0	\$313.9	\$287.7	\$259.6	\$229.6	\$197.5	\$163.2	\$126.4	\$87.1	\$45.0
Tax payment	-\$2,322.2	\$435.8	\$260.6	\$268.6	\$277.1	\$286.2	\$295.9	\$306.3	\$317.5	\$329.4
Debt payment	\$688.2	\$688.2	\$688.2	\$688.2	\$688.2	\$688.2	\$688.2	\$688.2	\$688.2	\$688.2
Return on equity	\$291.5	\$201.3	\$138.2	\$123.8	\$108.6	\$92.6	\$75.9	\$58.2	\$39.7	\$20.3
Payback of debt	\$516.2	\$374.3	\$400.5	\$428.6	\$458.6	\$490.7	\$525.0	\$561.8	\$601.1	\$643.2
Payback of equity	\$3,322.5	\$525.9	\$120.0	\$126.4	\$133.1	\$140.0	\$147.1	\$154.3	\$161.6	\$169.1
Remaining debt	\$4,483.8	\$4,109.5	\$3,709.0	\$3,280.4	\$2,821.8	\$2,331.1	\$1,806.1	\$1,244.3	\$643.2	\$0.0
Remaining equity	\$1,677.5	\$1,151.6	\$1,031.6	\$905.2	\$772.1	\$632.1	\$485.0	\$330.8	\$169.1	\$0.0

The revenue in service year 2 reflects 10 months at the old CRF and 2 months at the updated CRF. The remaining capital investment at the end of the service term is \$0 indicating that the revenue determined by the updated CRF provides the necessary and sufficient level of revenue to cover the tax liabilities and provide for the return on and return of the capital investment. The IRR for the after tax cash flow resulting from the updated CRF is 12.0 percent which matches the return on equity in Table 12.

Under the PJM proposal, this black start unit would continue to receive the annual revenue amount of \$1,980,000 and the payback in excess of the capital investment would total \$7,041,067 for a total of 170.4 percent of the \$10 million capital investment, or a total return of capital of \$17,041,067.³²

I. Additional recommendations

In order to address any concerns regarding impacts on risk and expectations, the Market Monitor recommends that the financial parameters used to calculate the CRF for a black start unit be fixed at the parameters in place as of the service start date.³³ For example, the CRF for a black start unit beginning service on December 1, 2021, would be calculated

³² The excess payback value, 70.4 percent, differs from the corresponding excess payback value in Table 9 because of the state tax rate assumption. The Market Monitor's replacement rate assumes a state tax rate of 9.3 percent. The values in Table 9 were calculated assuming a 9.0 percent state tax rate.

³³ Financial parameters to be fixed at the start of the service term consist of the debt to equity funding ratio, interest rate on debt and the return on equity.

using the CRF formula in Schedule 6A of the PJM tariff, the financial parameters in Table 15 and the current tax rates and applicable level of bonus depreciation.³⁴ The CRF value determined at the start of the service term would only be updated in the event of a change in the tax rate or applicable depreciation schedule. PJM included language in a recent compliance filing that specifies the values for the debt to equity ratio and the rate of return on equity given in Table 15.³⁵ The new tariff language also describes the source of the debt interest rate and describes a process for updating the debt interest rate going forward. In the case that PJM does update one of the financial parameters listed in Table 15, the Market Monitor recommends that the new financial parameters only apply to black start service terms that begin on or after the effective date of the new financial parameters. A change to one of the parameters in Table 15 would not require a change to the CRF of an existing black start unit under the Market Monitor’s proposed approach.

Table 15 Financial parameters for black start units with service starting after June 6, 2021³⁶

Financial Parameter	Parameter Value
Equity Funding Percent	50.0000%
Debt Funding Percent	50.0000%
Equity Rate	12.0000%
Debt Interest Rate	6.0000%

³⁴ The Commission directed PJM to include a formula for calculating CRF for black start service beginning after June 6, 2021 in 176 FERC ¶ 61,080 at 43.

³⁵ See *Attachment A (Redlines) to the Compliance Filing re: Tariff, Schedule 6A, Black Start Revision* (at Schedule 6A, Section 18), PJM Interconnection L.L.C., Docket ER21-1635 (September 9, 2021).

³⁶ Section 18 of Schedule 6A of the PJM tariff says the “debt interest rate is based on the most recent Net CONE quadrennial review after-tax weighted average cost of capital (ATWACC)”. The most recent quadrennial review used a debt interest rate of 6.0 percent and this value is used here for illustrative purposes.

II. CONCLUSION

The Market Monitor respectfully requests that the Commission afford due consideration to these comments as it resolves the issues raised in this proceeding.

Respectfully submitted,



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Dated: November 11, 2021

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Eagleville, Pennsylvania,
this 11th day of November, 2021.



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