



## I. BACKGROUND

The capital recovery factor (CRF) is used in the ACR formula in Attachment DD for determining the APIR component of ACR offer caps and MOPR floor prices.<sup>3</sup> The CRF is a rate, multiplied by the relevant investment, which defines the annual payment needed to provide a return on and of capital for the investment over a defined time period. CRFs include, as inputs, the after tax weighted average cost of capital and its components, including the rate of return on equity and the interest rate on debt and the capital structure, in addition to depreciation and taxes. The CRF rate, calculated using the CRF formula, is part of a larger formula used to calculate market seller offer caps and operates, in conjunction with the PJM capacity market rules, as a formula rate. Including the CRF formula explicitly in the tariff ensures that the calculated CRF values remain accurate when the input values of the CRF formula change.

## II. COMMENTS

### A. PJM Proposes to Fix Error in CRF Approach.

In the May 4<sup>th</sup> Filing, PJM proposes to correct an error in the CRF table in Attachment DD to the tariff that has existed since January 1, 2018. The CRF table currently in Attachment DD to the tariff uses tax rates and taxable depreciation provisions from the prior tax law that were changed in 2017.

The CRF values in the tariff became inaccurate effective January 1, 2018, when amendments to the U.S. Internal Revenue Code became effective, reducing the federal corporate income tax rate from a maximum 35 percent to 21 percent and changing the tax

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<sup>3</sup> The CRF is used to calculate the APIR component of the avoidable cost rate (ACR) used in the calculation of cost offers in the PJM Reliability Pricing Model (RPM). OATT Attachment DD § 6.8(a); see *Independent Market Monitor for PJM v. PJM, et al.*, 174 FERC ¶ 61,212 (2021) (One outcome is ACR based market seller offer caps which would increase the significance of APIR levels.)

depreciation provisions for projects becoming operational on and after September 28, 2017.<sup>4</sup> The federal tax rate and depreciation provisions are inputs to the CRF formula and the combination significantly reduced tax obligations and therefore significantly reduced the CRF values.

There is a separate Commission proceeding to correct the corresponding error in the applicability of CRF values to black start resources.<sup>5</sup> The Market Monitor's definition of CRF is the same formula in both applications.

PJM should have updated the tariff effective in January 2018 so that it would have been applicable for the next capacity market auction in February 2018, and PJM should have fixed this error as soon as they were made aware of it. PJM did not require a stakeholder process to fix this error.<sup>6</sup> The Market Monitor recognizes that the error has affected only one Base Residual Auction to date, plus eight Incremental Auctions, plus the ongoing May 2021 Base Residual Auction for the 2022/2023 Delivery Year. The Market Monitor also recognizes that the impact on the capacity market has been de minimis to date. The situation in the capacity market is very different than in the black start case. Although the required changes to the CRF values should have been implemented well in advance of the currently ongoing BRA, the Market Monitor will not contest PJM's proposed timing of the applicability starting with the 2023/2024 BRA. But the Market Monitor does challenge PJM's failure to address the treatment of continuing APIR recovery for projects put in place prior to the next BRA, scheduled to be held in December 2021.

The Market Monitor supports the need to change the tariff to correct the application of CRF to the capacity market but does not support the details of PJM's proposal because

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<sup>4</sup> Tax Cuts and Jobs Act, Pub. L. No. 115-97, 131 Stat. 2054 (2017).

<sup>5</sup> Docket No. ER21-1635-000.

<sup>6</sup> *See, e.g.*, PJM Filing (re Black Start Service CRF), Docket No. ER21-1635-000 (April 7, 2021) ("PJM retains the FPA section 205 filing rights over its Tariff with the Member vote being advisory," citing OATT § 9.2.)

PJM fails to include the required formula in the tariff and because the proposed modifications to the tariff lack clarity about how CRF values will be determined in the future and to which projects they apply, lack clarity about how CRF values would be applied to APIR for project costs that are currently being recovered, and unnecessarily apply an average state tax rate rather than the correct state tax rates.

PJM's filing was not clear about the applicability of the formula in the future. For example, the columns of PJM's proposed CRF table (Table 2 at 7) include CRF values for projects that go into service for four identified delivery years but fail to note that these CRF values for a later delivery year would not apply for investments made in prior delivery years that will still be in service in the later delivery year. For example, a project that can use the depreciation provisions relevant for the 2023/2024 Delivery Year uses the depreciation provisions once and those provisions affect the project's CRF for its entire life, regardless of the CRF values in the table for subsequent delivery years. However, changes in the tax rate apply each year and if the tax rate changes the applicable CRF values would change for all projects, regardless of vintage. As a result, the CRF values in PJM's Table 2 for delivery years after 2022/2023 would not apply to the calculation of APIR values for projects that go into service for the 2022/2023 Delivery Year.

Similarly, if a project investment were made and went into service under the tax code that applied prior to 2018, the relevant depreciation terms of the prior tax code would continue to apply while the new lower tax rates would also apply.

This is further reason that the tariff should include the formula and define the inputs and the applicability of the inputs so that the CRF for any particular project can be calculated clearly and accurately by PJM and by market participants and verified by the Commission as necessary. This is preferable to creating the multiple tables that would be required in order to include CRF values applicable to all possible circumstances, although including selected multiple tables in a manual could make the process easier for market participants.

PJM proposes to use an average state tax rate for all CRF values. This is clearly incorrect and would result in APIR values that are too high for some projects and too low for others. This is another reason to use the formula. There is no reason that each project cannot use the correct state income tax rate with the formula so that the CRF for any particular project can be calculated clearly and accurately.

The last row in PJM's CRF table is a fixed value and is not calculated using the formula. The value was defined for the special circumstances defined in the tariff for the "40 Plus Alternative Option." PJM proposes to leave that value unchanged. The Market Monitor supports that approach for this filing but recommends a careful review of the rows for all the special circumstances identified in the table.

### **B. The Market Monitor's Proposed Tariff Changes**

The Market Monitor derived a CRF formula to use in place of the standard financial model.<sup>7</sup> The CRF formula, with the identified inputs, produces the CRF values proposed by PJM. The formula produces verified and verifiable and transparent CRF values based on identified inputs. The formula should be included in the tariff rather than references to a standard financial model as PJM suggests.<sup>8</sup> Including the formula in the tariff follows the Commission's rule of reason.<sup>9</sup> If the formula is included in the tariff, any participant can easily understand, verify and/or contest the CRF values based on the identified inputs. Additional details concerning the inputs should be specified in the manual and the basic table or tables that result from applying the formula should also be included in the manual,

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<sup>7</sup> Comments of the Independent Market Monitor for PJM, Docket No. ER21-1635-000 (April 28, 2021) ("April 28<sup>th</sup> Answer"); Answer and Motion for Leave to Answer of the Independent Market Monitor for PJM, Docket No. ER21-1635-000 (May 20, 2021) (attaches a mathematical derivation of the formula).

<sup>8</sup> PJM appears to conflate the meaning of standard financial model and formula.

<sup>9</sup> See, e.g., *PJM Interconnection, L.L.C.*, 175 FERC ¶ 61,084 at P 66 (2021) ("The Commission's rule of reason dictates that any rules that significantly affect rates, terms, and conditions of service and are readily susceptible to specification be on file with the Commission.").

using the same rows and columns identified by PJM, for ease of use by market participants, but only with the appropriate conditions and caveats and the formula should be recognized as the sole definitive source of CRF values. Updated CRF values calculated in accordance with the tariff and manuals should be provided by PJM.

The Market Monitor proposes revisions to PJM's draft tariff language that include the CRF formula and correct the identified flaws in the PJM approach. The proposed revisions are in the Attachment, in blue against PJM's changes that are in red.

### III. 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: May 25, 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 25<sup>th</sup> day of May, 2021.



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# **ATTACHMENT**



## 6.8 Avoidable Cost Definition

### (a) Avoidable Cost Rate:

The Avoidable Cost Rate for a Generation Capacity Resource that is the subject of a Sell Offer shall be determined using the following formula, expressed in dollars per MW-year:

$$\text{Avoidable Cost Rate} = [\text{Adjustment Factor} * (\text{AOML} + \text{AAE} + \text{AFAE} + \text{AME} + \text{AVE} + \text{ATFI} + \text{ACC} + \text{ACLE}) + \text{ARPIR} + \text{APIR} + \text{CPQR}]$$

Where:

- **Adjustment Factor** equals 1.10 (to provide a margin of error for understatement of costs) plus an additional adjustment referencing the 10-year average Handy-Whitman Index in order to account for expected inflation from the time interval between the submission of the Sell Offer and the commencement of the Delivery Year.
- **AOML (Avoidable Operations and Maintenance Labor)** consists of the avoidable labor expenses related directly to operations and maintenance of the generating unit for the twelve months preceding the month in which the data must be provided. The categories of expenses included in AOML are those incurred for:
  - (a) on-site based labor engaged in operations and maintenance activities;
  - (b) off-site based labor engaged in on-site operations and maintenance activities directly related to the generating unit; and
  - (c) off-site based labor engaged in off-site operations and maintenance activities directly related to generating unit equipment removed from the generating unit site.
- **AAE (Avoidable Administrative Expenses)** consists of the avoidable administrative expenses related directly to employees at the generating unit for twelve months preceding the month in which the data must be provided. The categories of expenses included in AAE are those incurred for: (a) employee expenses (except employee expenses included in AOML); (b) environmental fees; (c) safety and operator training; (d) office supplies; (e) communications; and (f) annual plant test, inspection and analysis.
- **AFAE (Avoidable Fuel Availability Expenses)** consists of avoidable operating expenses related directly to fuel availability and delivery for the generating unit that can be demonstrated by the Capacity Market Seller based on data for the twelve months preceding the month in which the data must be provided, or on reasonable projections for the Delivery Year supported by executed contracts, published tariffs, or other data sufficient to demonstrate with reasonable certainty the level of costs that have been or shall be incurred for such purpose. The categories of expenses included in AFAE are those incurred for: (a) firm gas pipeline transportation; (b) natural gas storage costs; (c) costs of gas balancing agreements; and (d) costs of gas

park and loan services. AFAE expenses are for firm fuel supply and apply solely for offers for a Capacity Performance Resource

- **AME (Avoidable Maintenance Expenses)** consists of avoidable maintenance expenses (other than expenses included in AOML) related directly to the generating unit for the twelve months preceding the month in which the data must be provided. The categories of expenses included in AME are those incurred for: (a) chemical and materials consumed during maintenance of the generating unit; and (b) rented maintenance equipment used to maintain the generating unit.
- **AVE (Avoidable Variable Expenses)** consists of avoidable variable expenses related directly to the generating unit incurred in the twelve months preceding the month in which the data must be provided. The categories of expenses included in AVE are those incurred for: (a) water treatment chemicals and lubricants; (b) water, gas, and electric service (not for power generation); and (c) waste water treatment.
- **ATFI (Avoidable Taxes, Fees and Insurance)** consists of avoidable expenses related directly to the generating unit incurred in the twelve months preceding the month in which the data must be provided. The categories of expenses included in AFTI are those incurred for: (a) insurance, (b) permits and licensing fees, (c) site security and utilities for maintaining security at the site; and (d) property taxes.
- **ACC (Avoidable Carrying Charges)** consists of avoidable short-term carrying charges related directly to the generating unit in the twelve months preceding the month in which the data must be provided. Avoidable short-term carrying charges shall include short term carrying charges for maintaining reasonable levels of inventories of fuel and spare parts that result from short-term operational unit decisions as measured by industry best practice standards. For the purpose of determining ACC, short term is the time period in which a reasonable replacement of inventory for normal, expected operations can occur.
- **ACLE (Avoidable Corporate Level Expenses)** consists of avoidable corporate level expenses directly related to the generating unit incurred in the twelve months preceding the month in which the data must be provided. Avoidable corporate level expenses shall include only such expenses that are directly linked to providing tangible services required for the operation of the generating unit proposed for Deactivation. The categories of avoidable expenses included in ACLE are those incurred for: (a) legal services, (b) environmental reporting; and (c) procurement expenses.
- **CPQR (Capacity Performance Quantifiable Risk)** consists of the quantifiable and reasonably-supported costs of mitigating the risks of non-performance associated with submission of a Capacity Performance Resource offer (or of a Base Capacity Resource offer for the 2018/19 or

2019/20 Delivery Years), such as insurance expenses associated with resource non-performance risks. CPQR shall be considered reasonably supported if it is based on actuarial practices generally used by the industry to model or value risk and if it is based on actuarial practices used by the Capacity Market Seller to model or value risk in other aspects of the Capacity Market Seller's business. Such reasonable support shall also include an officer certification that the modeling and valuation of the CPQR was developed in accord with such practices. Provision of such reasonable support shall be sufficient to establish the CPQR. A Capacity Market Seller may use other methods or forms of support for its proposed CPQR that shows the CPQR is limited to risks the seller faces from committing a Capacity Resource hereunder, that quantifies the costs of mitigating such risks, and that includes supporting documentation (which may include an officer certification) for the identification of such risks and quantification of such costs. Such showing shall establish the proposed CPQR upon acceptance by the Office of the Interconnection.

- **APIR (Avoidable Project Investment Recovery Rate) = PI \* CRF**

Where:

- **PI** is the amount of project investment completed prior to June 1 of the Delivery Year, except for Mandatory Capital Expenditures ("CapEx") for which the project investment must be completed during the Delivery Year, that is reasonably required to enable a Generation Capacity Resource that is the subject of a Sell Offer to continue operating or improve availability during Peak-Hour Periods during the Delivery Year.
- **CRF** is the annual capital recovery factor *from the following table*, applied in accordance with the terms specified below. CRF values are calculated for recovery periods of 1, 4, 5, 10, 15, 20, 25, and 30 years, using ~~this~~ standard financial model CRF formula, and assumptions of the following components: (i) after tax weighted average capital structure and cost of capital; (ii) debt interest rate; (iii) individual state income tax rates, and (iv) federal income tax and depreciation rates as utilized by the U.S. Internal Revenue Service.

*The CRF formula is:*

$$CRF = \frac{r(1+r)^N \left[ 1 - \frac{sB}{\sqrt{1+r}} - s(1-B)\sqrt{1+r} \sum_{j=1}^L \frac{m_j}{(1+r)^j} \right]}{(1-s)\sqrt{1+r} [(1+r)^N - 1]}$$

*Where:*

- r* After Tax Weighted Average Cost of Capital (ATWACC)
- s* Effective Tax Rate
- B* Bonus Depreciation Percent
- N* Cost Recovery Period (years)
- L* Lesser of N or 16 (years)
- m<sub>j</sub>*: Modified Accelerated Cost Recovery System (MACRS) depreciation factor for year *j* = 1, ..., 16 (15 year MACRS with half year convention per Appendix

*A, Table A-1, IRS Publication 946, U. S. Dept. of  
Treasury (2020))*

The CRF values of the following table shall be used for RPM Auctions through and including the Base Residual Auction conducted for 2022/2023 Delivery Year. Thereafter, the ~~table of~~ CRF values applicable to each RPM Auction shall be ~~determined~~ *calculated using the CRF formula* and posted on the PJM website by no later than 150 days prior to the commencement of the offer period of the RPM Auction. The ~~CRF values of the posted CRF table~~ shall be determined using federal ~~and state~~ income tax ~~rates~~ *laws* in effect at the time of the determination for the relevant Delivery Year and shall use the same assumptions of (i) capital structure and cost of capital; ~~(ii) rate of return on equity (iii) debt interest rate; and (iv) state~~

income tax rate, as those utilized to calculate the Cost of New Entry for the Reference Resource for the relevant Delivery Year. For the purpose of the CRF calculation determination, the state income tax rates will be set equal to the average state income tax rates in effect for each specific state at the time of the determination for the relevant Delivery Year used to calculate the Cost of New Entry of the Reference Resource across the four CONE Regions.

The depreciation provisions of the tax code that are effective for the in service date of each APIR investment shall be reflected in the CRF for the life of that APIR investment.

Age of Existing Units (Years)	Remaining Life of Plant (Years)	Levelized CRF
1 to 5	30	0.107
6 to 10	25	0.114
11 to 15	20	0.125
16 to 20	15	0.146
21 to 25	10	0.198
25 Plus	5	0.363
Mandatory CapEx	4	0.450
40 Plus Alternative	1	1.100

Unless otherwise stated, Age of Existing Unit shall be equal to the number of years since the Unit commenced commercial operation, up to and through the relevant Delivery Year.

Remaining Life of Plant defines the amortization schedule (i.e., the maximum number of years over which the Project Investment may be included in the Avoidable Cost Rate.)

#### IV. Capital Expenditures and Project Investment

For any given Project Investment, a Capacity Market Seller may make a one-time election to recover such investment using: (i) the highest CRF and associated recovery schedule to which it is entitled; or (ii) the next highest CRF and associated recovery schedule. For these purposes, the CRF and recovery schedule for the 25 Plus category is the next highest CRF and recovery schedule for both the Mandatory CapEx and the 40 Plus Alternative categories. The Capacity Market Seller using the above or posted table must provide the Market Monitoring Unit with information, identifying and supporting such election, including but not limited to the age of the unit, the amount of the Project Investment, the purpose of the investment, evidence of corporate commitment (e.g., an SEC filing, a press release, or a letter from a duly authorized corporate officer indicating intent to make such investment), and detailed information concerning the governmental requirement (if applicable). Absent other written notification, such election shall be deemed based on the CRF such Seller employs for the first Sell Offer reflecting recovery of any portion of such Project Investment.

For any resource using the CRF and associated recovery schedule from the CRF table that set the Capacity Resource Clearing Price in any Delivery Year, such Capacity Market Seller must also provide to the Market Monitoring Unit, for informational purposes only, evidence of the actual expenditure of the Project Investment, when such information becomes available.

If the project associated with a Project Investment that was included in a Sell Offer using a CRF and associated recovery schedule from the above or posted table has not entered into commercial

operation prior to the end of the relevant Delivery Year, and the resource's Sell Offer sets the clearing price for the relevant LDA, the Capacity Market Seller shall be required to elect to either (i) pay a charge that is equal to the difference between the Capacity Resource Clearing Price for such LDA for the relevant Delivery Year and what the clearing price would have been absent the APIR component of the Avoidable Cost Rate, this difference to be multiplied by the cleared MW volume from such Resource ("rebate payment"); (ii) hold such rebate payment in escrow, to be released to the Capacity Market Seller in the event that the project enters into commercial operation during the subsequent Delivery Year or rebated to LSEs in the relevant LDA if the project has not entered into commercial operation during the subsequent Delivery Year; or (iii) make a reasonable investment in the amount of the PI in other Existing Generation Capacity Resources owned or controlled by the Capacity Market Seller or its Affiliates in the relevant LDA. The revenue from such rebate payments shall be allocated pro rata to LSEs in the relevant LDA(s) that were charged a Locational Reliability Charge for such Delivery Year, based on their Daily Unforced Capacity Obligation in the relevant LDA(s). If the Sell Offer from the Generation Capacity Resource did not set the Capacity Resource Clearing Price in the relevant LDA, no alternative investment or rebate payment is required. If the difference between the Capacity Resource Clearing Price for such LDA for the relevant Delivery Year and what the clearing price would have been absent the APIR amount does not exceed the greater of \$10 per MW-day or a 10% increase in the clearing price, no alternative investment or rebate payment is required.

#### **V. Mandatory CapEx Option**

The Mandatory CapEx CRF and recovery schedule is an option available, beginning in the third BRA (Delivery Year 2009-10), to a resource that must make a Project Investment to comply with a governmental requirement that would otherwise materially impact operating levels during the Delivery Year, where: (i) such resource is a coal, oil or gas-fired resource that began commercial operation no fewer than fifteen years prior to the start of the first Delivery Year for which such recovery is sought, and such Project Investment is equal to or exceeds \$200/kW of capitalized project cost; or (ii) such resource is a coal-fired resource located in an LDA for which a separate VRR Curve has been established for the relevant Delivery Years, and began commercial operation at least 50 years prior to the conduct of the relevant BRA.

A Capacity Market Seller that wishes to elect the Mandatory CapEx option for a Project Investment must do so beginning with the Base Residual Auction for the Delivery Year in which such project is expected to enter commercial operation. A Sell Offer submitted in any Base Residual Auction for which the Mandatory CapEx option is selected may not exceed an offer price equivalent to 0.90 times the then-current Net CONE (on an unforced-equivalent basis).

#### **VI. 40 Plus Alternative Option**

The 40 Plus Alternative CRF and recovery schedule is an option available, beginning in the third BRA (Delivery Year 2009-10), for a resource that is a gas- or oil-fired resource that began commercial operation no less than 40 years prior to the conduct of the relevant BRA (excluding, however, any resource in any Delivery Year for which the resource is receiving a payment under Tariff, Part V. Generation Capacity Resources electing this 40 Plus Alternative CRF shall be treated as At Risk Generation for purposes of the sensitivity runs in the RTEP process). Resources electing the 40 Plus Alternative option will be modeled in the RTEP process as "at-risk" at the end of the one-year amortization period.

A Capacity Market Seller that wishes to elect the 40 Plus Alternative option for a Project Investment must provide written notice of such election to the Office of the Interconnection no later than six months prior to the Base Residual Auction for which such election is sought; provided however that shorter notice may be provided if unforeseen circumstances give rise to the need to make such election and such seller gives notice as soon as practicable.

The Office of the Interconnection shall give market participants reasonable notice of such election, subject to satisfaction of requirements under the PJM Operating Agreement for protection of confidential and commercially sensitive information. A Sell Offer submitted in any Base Residual Auction for which the 40 Plus Alternative option is selected may not exceed an offer price equivalent to the then-current Net CONE (on an unforced-equivalent basis).

## **VII. Multi-Year Pricing Option**

A Seller submitting a Sell Offer with an APIR component that is based on a Project Investment of at least \$450/kW may elect this Multi-Year Pricing Option by providing written notice to such effect the first time it submits a Sell Offer that includes an APIR component for such Project Investment. Such option shall be available on the same terms, and under the same conditions, as are available to Planned Generation Capacity Resources under Tariff, Attachment DD, section 5.14(c).

- **ARPIR (Avoidable Refunds of Project Investment Reimbursements)** consists of avoidable refund amounts of Project Investment Reimbursements payable by a Generation Owner to PJM under Tariff, Part V, section 118 or avoidable refund amounts of project investment reimbursements payable by a Generation Owner to PJM under a Cost of Service Recovery Rate filed under Tariff, Part V, section 119 and approved by the Commission.

(b) For the purpose of determining an Avoidable Cost Rate, avoidable expenses are incremental expenses directly required to operate a Generation Capacity Resource that a Generation Owner would not incur if such generating unit did not operate in the Delivery Year or meet Availability criteria during Peak-Hour Periods during the Delivery Year.

(c) Variable costs that are directly attributable to the production of energy shall be excluded from a Market Seller's generation resource Avoidable Cost Rate. Notwithstanding the foregoing, a Market Seller that included variable costs attributable to the production of energy in a generation resource's Avoidable Cost Rate prior to April 15, 2019 shall not include such costs in such generation resource's Maintenance Adders or Operating Costs for any Delivery Year for which it has already included such costs in the generation resource's Avoidable Cost Rate. A Market Seller implicated by this paragraph may continue including such variable costs attributable to the production of energy in its Avoidable Cost Rate for each generation resource for any Delivery Year for which it already did so prior to April 15, 2019.

(d) For Delivery Years up to and including the 2021/2022 Delivery Year, projected PJM Market Revenues for any Generation Capacity Resource to which the Avoidable Cost Rate is applied shall include all actual unit-specific revenues from PJM energy markets, ancillary services, and unit-specific bilateral contracts from such Generation Capacity Resource, net of energy and

ancillary services market offers for such resource. Net energy market revenues shall be based on the non-zero market-based offers of the Capacity Market Seller of such Generation Capacity Resource unless one of the following conditions is met, in which case the cost-based offer shall be used: (x) the market-based offer for the resource is zero, (y) the market-based offer for the resource is higher than its cost-based offer and such offer has been mitigated, or (z) the market-based offer for the resource is less than such Capacity Market Seller's fuel and environmental costs for the resource which shall be determined either by directly summing the fuel and environmental costs if they are available, or by subtracting from the cost-based offer for the resource all costs developed pursuant to the Operating Agreement and PJM Manuals that are not fuel or environmental costs.

The calculation of Projected PJM Market Revenues shall be equal to the rolling simple average of such net revenues as described above from the three most recent whole calendar years prior to the year in which the BRA is conducted.

If a Generation Capacity Resource did not receive PJM market revenues during the entire relevant time period because the Generation Capacity Resource was not integrated into PJM during the full period, then the Projected PJM Market Revenues shall be calculated using only those whole calendar years within the full period in which such Resource received PJM market revenues.

If a Generation Capacity Resource did not receive PJM market revenues during the entire relevant time period because it was not in commercial operation during the entire period, or if data is not available to the Capacity Market Seller for the entire period, despite the good faith efforts of such seller to obtain such data, then the Projected PJM Market Revenues shall be calculated based upon net revenues received over the entire period by comparable units, to be developed by the MMU and the Capacity Market Seller.

(d-1) For the 2022/2023 Delivery and subsequent Delivery Years, Projected PJM Market Revenues for any Generation Capacity Resource to which the Avoidable Cost Rate is applied shall be equal to forecasted net revenues, which shall be determined in accordance with Tariff, Attachment DD, section 5.14(h-1)(2)(B)(ii), or for resource types not specified in such section, in a manner consistent with the methodologies described in such section, that utilizes Forward Hourly LMPs and Forward Hourly Ancillary Service Prices for such resource, forecasted fuel prices as applicable, as well as resource-specific operating parameters and capability information specific to the simulated dispatch of such resource, where such dispatch shall either consider the hourly output profiles for Intermittent Resources in a manner consistent with solar and onshore wind methodologies, or utilize the Projected EAS Dispatch. To the extent the resource has achieved commercial operation, the dispatch shall utilize the resource-specific operating parameters as determined in accordance with the PJM Manuals based on offers submitted in the Day-ahead Energy Market and Real-time Energy Market, as well as the operating parameters approved, as applicable, in accordance with Operating Agreement, Schedule 1, section 6.6(b) and Operating Agreement, Schedule 2 (including any Fuel Costs, emissions costs, Maintenance Adders, and Operating Costs). Adjustments to resource-specific operating parameters may be submitted to the Market Monitoring Unit and the Office of the Interconnection for review and consideration in the simulated dispatch with supporting documentation. For resources that have not yet achieved commercial operation, the operating parameters used in the simulation of the net energy and ancillary service revenues will be based on the manufacturer's specifications and/or from parameters used for other existing, comparable resources, as developed by the Market



Monitoring Unit and the Capacity Market Seller, and accepted by the Office of the Interconnection.

In the alternative, the Capacity Market Seller may provide their own estimate of Projected PJM Market Revenues to the Market Monitoring Unit and the Office of the Interconnection for review and approval. Such a request shall identify all revenue sources (exclusive of any State Subsidies), including, without limitation, long-term power supply contracts, tolling agreements, or tariffs on file with state regulatory agencies, and shall demonstrate that such offsetting revenues are consistent, over a reasonable time period identified by the Capacity Market Seller, with the standards prescribed above. In making such demonstration, the Capacity Market Seller may rely upon revenues projected by well-defined, forward-looking dispatch models designed to generally follow the rules and processes of PJM's energy and ancillary services markets. Such models must utilize forward prices for energy, ancillary service and fuel in the PJM Region based on contractual evidence of an alternative fuel price or sourced from liquid forward markets (where available), and other publicly available data to develop the forward prices used in the estimate. Where forward fuel markets are not available, publicly available estimates of future fuel sources may be used.

The model shall also contain estimates of variable operation and maintenance expenses, which may include Maintenance Adders, and emissions allowance prices. Documentation for net revenues also must include, as available and applicable, plant performance and capability information, including heat rate, start-up times and costs, forced outage rates, planned outage schedules, maintenance cycle, fuel costs and other variable operations and maintenance expenses, capacity factors, and ancillary service capabilities. Any evaluation of revenues should include, but would not be not limited to, consideration of Fuel Costs, Maintenance Adders and Operating Costs, as applicable, pursuant to Operating Agreement, Schedule 2.