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May 10, 2019

The Honorable Kimberly D. Bose  
Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E. Room 1A  
Washington, D.C. 20426

*Re: PJM Interconnection L.L.C., Docket Nos. ER19-210-001, EL19-8-000, EL19-8-001  
Compliance Filing Concerning Variable Operating and Maintenance Costs*

Dear Secretary Bose:

Pursuant to the April 15, 2019 Order of the Federal Energy Regulatory Commission (“Commission”) in the above referenced proceeding,<sup>1</sup> PJM Interconnection, L.L.C. (“PJM”) submits this compliance filing containing modifications to the Amended and Restated Operating Agreement of PJM (“Operating Agreement”) as described herein.

## **I. BACKGROUND**

On April 15, 2019, the Commission accepted PJM’s proposal to remove the disparate treatment of combined cycle and combustion turbine resources by explicitly defining the Maintenance Adders<sup>2</sup> and Operating Costs that a Market Seller can include in its cost-based offers in the energy market for all resource types.<sup>3</sup> In accepting this proposal, the Commission directed PJM to submit a compliance filing that provides greater clarity regarding the permissible

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<sup>1</sup> *PJM Interconnection, L.L.C.*, 167 FERC ¶ 61,030 (Apr. 15, 2019) (“April 15 Order”).

<sup>2</sup> All capitalized terms not defined herein shall have the meaning as contained in PJM’s Reliability Assurance Agreement Among Load Serving Entities in the PJM Region (“RAA”), Open Access Transmission Tariff (“Tariff”) and Operating Agreement.

<sup>3</sup> April 15 Order at P 1.

components of cost-based offers.<sup>4</sup> The Commission provided detailed redline changes to effectuate this clarification.<sup>5</sup>

PJM agrees that the additional revisions regarding the permissible components of cost-based offers provide greater clarity in the Operating Agreement and appreciates the Commission's detailed redlines. Accordingly, PJM submits this compliance filing incorporating the Commission directed amendments to the Operating Agreement.<sup>6</sup>

## **II. SATISFACTION OF THE COMPLIANCE REQUIREMENTS OF THE APRIL 15 ORDER.**

In accordance with the Commission's April 15 Order, PJM submits the attached revisions to the Operating Agreement, Schedule 2, which adopts the redline amendments directed by the Commission. More particularly, consistent with the Commission's directive, the revisions clarify the permissible components of cost-based offers and clearly specify in the Operating Agreement expenses that are allowed in cost-based offers. The revisions impact the following sections of Operating Agreement, Schedule 2:

- Section 1.1 – Permissible Components of Cost-based Offers.
- Section 1.3 – Application of Cost Components to Three-Part Cost-based Offers<sup>7</sup>
- Section 4.1 –Maintenance Adders
- Section 4.2 –Operating Costs
- Section 4.3 –Labor Costs
- Section 4.4 – Review of Maintenance Adders and Operating Costs
- Section 5 – Opportunity Costs

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<sup>4</sup> Id. at P 60.

<sup>5</sup> Id. at Appendix A.

<sup>6</sup> As explained herein, this compliance filing includes certain limited modifications to the redline changes contained in the April 15 Order.

<sup>7</sup> It is noted that the Commission-directed redlines placed this new section under Operating Agreement, Schedule 2, section 1.2. However, that section already exists and pertains to the method of determining costs components, which the Commission recently accepted in Docket Nos. ER16-372-003, ER16-372-004, and ER16-372-005. Therefore, PJM is adding the Commission-directed redlines regarding the three-part cost-based offers entirely in Operating Agreement, Schedule 2, section 1.3 instead.

As part of this compliance filing, PJM is making three minor modifications to the Commission-directed redlines to provide further clarity on the permissible components of cost-based offers.

First, with respect to the Commission's directive regarding the three part offer, PJM is not including the definitions for the terms "Start-Up Costs," "No-load Cost," and "Incremental Energy Offer" in Operating Agreement, Schedule 2, section 1.3 because those terms are already defined verbatim in the main definition section of the Operating Agreement, section 1. The exclusion of the definitions in Operating Agreement, Schedule 2 is consistent with PJM's efforts to move all definitions into the main definition section rather than being dispersed throughout the governing documents. Therefore, instead of including the definitions in Operating Agreement, Schedule 2, section 1.3, PJM will specify that the definitions for these three terms are as defined in Operating Agreement, section 1.

Second, with respect to the Commission's directive concerning maintenance history Maintenance Adders, PJM clarifies that Maintenance Adders for units with less than 10 years of actual maintenance history will be calculated based on the average cost of unit's available maintenance history.<sup>8</sup> This additional clarification is needed because the redline language directed by the Commission only appears to contemplate units with more than 10 years of maintenance history. However, the Commission-directed redlines do not explicitly address how Maintenance Adders would be calculated for newer units that do not have 10 years of actual maintenance history. This additional clarification removes any ambiguity regarding how Maintenance Adders for newer units would be calculated. Therefore, in addition to the

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<sup>8</sup> This is consistent with existing practice for such units, which is outlined in PJM Manual 15: Cost Development Guidelines, §2.6.5 (rev. 29, May 15, 2017), <https://www.pjm.com/-/media/documents/manuals/m15.ashx>

Commission's redline changes, PJM is amending Operating Agreement, Schedule 2, section 4.1, as shown in blackline below, with the additional language noted in italics:

Maintenance Adders are expenses directly related to electric production and can be a function of starts and/or run hours. Allowable expenses may include repair, replacement, and major inspection and overhaul expenses, including variable long term service agreement expenses. Maintenance Adders are calculated as the 10 or 20 year average cost of a unit's maintenance history, or all available actual maintenance history if a unit has less than 10 years of maintenance history. The major inspection and overhaul costs listed below in sections (a)-(c) are not exhaustive. A Market Seller may include costs in cost-based offers if those costs are similar to the costs outlined in this provision, so long as they are variable costs that are directly attributable to the production of electricity.

Third, with respect to the Commission's directive concerning labor costs, PJM is also including contractor labor and plant personnel overtime labor associated with maintenance activities in allowable Labor Costs. Plant personnel straight time labor is already included in a Market Seller's capacity market Sell Offer, so PJM does not allow labor cost performed by plant personnel during those hours to be included in the calculation of a unit's Maintenance Adder. However, there are times when maintenance activities directly related to electric production, such as repairing a tube leak over a weekend, are performed by plant personnel overtime or contracted labor. Since these labor costs are not included in the straight time labor and thus, the unit's capacity market offer, it is appropriate to allow the inclusion of these additional labor costs in the energy market offers because they are maintenance activities directly related to the production of electricity. The Commission-directed redlines could be read to only allow additional labor costs associated with Start-Up Costs, but not additional maintenance-related labor costs.

Based on the foregoing, PJM is further amending the Commission's redlines in Operating Agreement, Schedule 2, section 4.3, as shown in blackline below, with the additional language noted in italics:

#### 4.3 Labor Costs

Labor costs included in cost-based offers do not include straight-time labor costs and are limited to: (1) start-up costs for additional staffing requirements and (2) contractor labor or plant personnel overtime labor included in the Maintenance Adder associated with maintenance activities directly related to electric production. Straight time labor expenses may be included under an Avoidable Cost Rate in the RPM auction.

#### **VI. DESCRIPTION OF SUBMITTAL**

This filing consists of the following:

1. This transmittal letter;
2. Attachment A – Revisions to the Operating Agreement in redline format; and
3. Attachment B – Revisions to the Operating Agreement in clean format.

#### **V. COMMUNICATIONS**

Correspondence and communications with respect to this filing should be sent to the following persons:

Craig Glazer  
Vice President – Federal Government Policy  
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#### **VI. SERVICE**

PJM has served a copy of this filing on all PJM Members and on all state utility regulatory commissions in the PJM Region by posting this filing electronically. In accordance with the Commission's regulations,<sup>9</sup> PJM will post a copy of this filing to the FERC filings section of its internet site, located at the following link: <http://www.pjm.com/documents/ferc->

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<sup>9</sup> See 18 C.F.R §§ 35.2(e) and 385.2010(f)(3).

[manuals.aspx](#) with a specific link to the newly-filed document, and will send an e-mail on the same date as this filing to all PJM Members and all state utility regulatory commissions in the PJM Region<sup>10</sup> alerting them that this filing has been made by PJM today and is available by following such link.

## VII. CONCLUSION

PJM respectfully requests that the Commission accept this compliance filing, with an effective date of April 15, 2019 as ordered by the Commission.

Respectfully submitted,



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*On behalf of  
PJM Interconnection, L.L.C.*

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<sup>10</sup> PJM already maintains, updates, and regularly uses e-mail lists for all PJM members and affected commissions.

## 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 Audubon, this 10<sup>th</sup> day of May 2019.



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# Attachment A

Revisions to the  
PJM Operating Agreement

(Marked / Redline Format)



**SCHEDULE 2 -  
COMPONENTS OF COST**

**1. GENERAL COST PROVISIONS**

**1.1 Permissible Components of Cost-based Offers.**

(a) Each Market Participant obligated to sell energy on the PJM Interchange Energy Market at cost-based rates may include the following components or their equivalent in the determination of costs for energy supplied to or from the PJM Region:

For generating units powered by boilers

Firing-up cost

Peak-prepared-for maintenance cost

For generating units powered by machines

Starting cost from cold to synchronized operation

For all generating units

~~Incremental fuel cost~~

Incremental maintenance cost

No-load cost during period of operation

~~Incremental Labor cost~~

Operating Costs

Opportunity Costs

Emission allowances/adders

Maintenance Adders

Ten percent adder

~~Other incremental operating costs~~

~~(b) — For a generating unit that is subject to operational limitations due to energy or environmental limitations imposed on the generating unit by Applicable Laws and Regulations, the Market Participant may include in the calculation of its “other incremental operating costs” an amount reflecting the unit specific Energy Market Opportunity Costs expected to be incurred. Such unit specific Energy Market Opportunity Costs are calculated by forecasting Locational Marginal Prices based on future contract prices for electricity using PJM Western Hub forward prices, taking into account historical variability and basis differentials for the bus at which the generating unit is located for the prior three year period immediately preceding the relevant compliance period, and subtract therefrom the forecasted costs to generate energy at the bus at which the generating unit is located, as specified in more detail in PJM Manual 15. If the difference between the forecasted Locational Marginal Prices and forecasted costs to generate energy is negative, the resulting Energy Market Opportunity Cost shall be zero. Notwithstanding the foregoing, a Market Participant may submit a request to PJM for consideration and approval of an alternative method of calculating its Energy Market Opportunity Cost if the standard methodology described herein does not accurately represent the Market Participant’s Energy Market Opportunity Cost.~~

~~For a generating unit that is subject to operational limitations because it only has a limited number of starts or available run hours resulting from (i) the physical equipment limitations of the unit, for up to one year, due to original equipment manufacturer recommendations or insurance carrier restrictions, or (ii) a fuel supply limitation, for up to one year, resulting from an event of Catastrophic Force Majeure, the Market Participant may include in the calculation of its “other incremental operating costs” an amount reflecting the unit-specific Non-Regulatory Opportunity Costs expected to be incurred. Such unit-specific Non-Regulatory Opportunity Costs are calculated by forecasting Locational Marginal Prices based on future contract prices for electricity using PJM Western Hub forward prices, taking into account historical variability and basis differentials for the bus at which the generating unit is located for the prior three-year period immediately preceding the period of time in which the unit is bound by the referenced restrictions, and subtract therefrom the forecasted costs to generate energy at the bus at which the generating unit is located, as specified in more detail in PJM Manual 15. If the difference between the forecasted Locational Marginal Prices and forecasted costs to generate energy is negative, the resulting Non-Regulatory Opportunity Cost shall be zero.~~

~~(c) — All fuel costs shall employ the marginal fuel price experienced by the Member, reading as follows:~~

~~(d) — Operating Costs are expenses related to consumable materials used during unit operation and may include lubricants, chemicals, limestone, trona, ammonia, acids, caustics, water injection, activated carbon for mercury control, and demineralizers usage.~~

~~(e) — Maintenance Adders may include expenses incurred as a result of electric production and can be a function of starts and/or run hours. Allowable expenses include repair, replacement, inspection, and overhaul expenses including variable long-term service agreement expenses.~~

## **1.2 Method of Determining Cost Components.**

The PJM Board, upon consideration of the advice and recommendations of the Members Committee, shall from time to time define in detail the method of determining the costs entering into the said components, and the Members shall adhere to such definitions in the preparation of incremental costs used on the Interconnection.

## **1.3 Application of Cost Components to Three-Part Cost-based Offers.**

A cost-based offer, as defined in Operating Agreement, Schedule 1, section 1.2, is a three-part offer consisting of Start-up Costs, No-load Costs, and the Incremental Energy Offer. These terms are as defined in Operating Agreement, section 1.

The following lists the categories of cost that may be applicable to a Market Participant’s three-part cost-based offer:

(a) For Start-up Costs

Fuel cost  
Emission allowances/adders  
Maintenance Adders  
Operating Costs  
Labor costs

(b) For No-load Costs  
Fuel cost  
Emission allowances/adders  
Maintenance Adders  
Operating Costs

(c) Incremental Costs in Incremental Energy Offers  
Fuel cost  
Emission allowances/adders  
Maintenance Adders  
Operating Costs  
Opportunity Costs

(d) All fuel costs shall employ the marginal fuel price experienced by the Member.

## **2. FUEL COST POLICY**

### **2.1 Approved Fuel Cost Policy Requirement for Non-Zero Cost-based Offer.**

A Market Seller may only submit a non-zero cost-based offer into the PJM Interchange Energy Market for a generation resource if it has a PJM-approved Fuel Cost Policy consistent with each fuel type for such generation resource.

### **2.2 Fuel Cost Policy Approval Process.**

(a) A Market Seller shall provide a Fuel Cost Policy to PJM and the Market Monitoring Unit for each generation resource that it intends to offer into the PJM Interchange Energy Market, for each fuel type utilized by the resource. The Market Seller shall submit its initial Fuel Cost Policy for a generation resource to PJM and the Market Monitoring Unit for review by no later than 45 days prior to the Market Seller's expected initial submittal of a cost-based offer for the resource and shall update existing Fuel Cost Policies consistent with the annual update requirements set forth below in Operating Agreement, Schedule 2, section 2.6. For each new generation resource for which the Market Seller does not have commercial operating data, the Market Seller shall submit a provisional Fuel Cost Policy, which describes the Market Seller's methodology to procure and price fuel and includes all available operating data, to PJM and the Market Monitoring Unit for review and approval by no later than forty five (45) calendar days prior to the Market Seller's expected initial submittal of a cost-based offer for the resource. Within ninety (90) calendar days of the commercial operation date of the generation resource, the Market Seller shall submit to PJM and the Market Monitoring Unit for review an updated

Fuel Cost Policy reflecting actual commercial operating data of the resource. The basis for the Market Monitoring Unit's review is described in Tariff, Attachment M-Appendix. PJM shall consult with the Market Monitoring Unit, and consider any input and advice timely received from the Market Monitoring Unit, in its determination of whether to approve a Market Seller's Fuel Cost Policy. After it has completed its evaluation of the submitted Fuel Cost Policy, PJM shall notify the Market Seller in writing, with a copy to the Market Monitoring Unit, whether the Fuel Cost Policy is approved or rejected. If PJM rejects a Market Seller's Fuel Cost Policy, PJM shall include an explanation for why the Fuel Cost Policy was rejected in its written notification.

(b) PJM and the Market Monitoring Unit will have an initial thirty (30) Business Days for review of a submitted policy. Market Sellers shall have five (5) Business Days or an alternative deadline agreed to by PJM, to provide additional documentation or information on any request from PJM or the Market Monitoring Unit. If the Market Seller does not believe it can provide the information within five (5) Business Days, it can request an alternative deadline for submission of the data from PJM no later than one (1) Business Day before the due date of the request for additional data, and if PJM consents to extend the deadline, PJM will advise the Market Seller and the Market Monitoring Unit of the new deadline. If the Market Monitoring Unit makes a request directly to the Market Seller, the Market Monitoring Unit shall, within one (1) Business Day, inform PJM of such request at the time it is made. Failure to meet a data request deadline may result in PJM's rejection of the policy. If additional documentation or information has been requested by PJM or the Market Monitoring Unit, PJM has five (5) Business Days after the deadline for the Market Seller's submittal of such additional information or documentation to notify the Market Seller and Market Monitoring Unit of its approval or rejection of the Fuel Cost Policy.

### **2.3 Standard of Review.**

(a) PJM shall review and approve a Fuel Cost Policy if it meets the requirements set forth in subsections (a)(i) through (v) of this section. PJM shall reject Fuel Cost Policies that fail to meet such requirements and that do not accurately reflect the applicable costs, such as the fuel source, transportation cost, procurement process used, applicable adders, commodity cost, or provide sufficient information for PJM to verify the Market Seller's fuel cost at the time of the Market Seller's cost-based offer. If PJM rejects a Market Seller's Fuel Cost Policy, PJM shall include an explanation for why the Fuel Cost Policy was rejected in its written notification. A Fuel Cost Policy must:

(i) Provide information sufficient for the verification of the Market Seller's fuel procurement practices, as further described below and in PJM Manual 15, and how those practices are utilized to determine cost-based offers the Market Seller submits into the PJM Interchange Energy Market;

(ii) Reflect the Market Seller's applicable commodity and/or transportation contracts (to the extent it holds such contracts) and the Market Seller's method of calculating delivered fossil fuel cost, limited to inventoried cost, replacement cost or a combination thereof, that reflect the way fuel is purchased or scheduled for purchase, and set forth all applicable indices as

a measure that PJM can use to verify how anticipated spot market purchases are utilized in determining fuel costs;

(iii) Provide a detailed explanation of the basis for and reasonableness of any applicable adders included in determining fuel costs in accordance with PJM Manual 15;

(iv) Account for situations where applicable indices or other objective market measures are not sufficiently liquid by documenting the alternative means actually utilized by the Market Seller to price the applicable fuel used in the determination of its cost-based offers, such as documented quotes for the procurement of natural gas; and

(v) Adhere to all requirements of PJM Manual 15 applicable to the generation resource.

(b) To the extent a Market Seller proposes alternative measures to document its fuel costs in its Fuel Cost Policy for a generation resource, the Market Seller shall explain how such alternative measures are consistent with or superior to the standard specified in subsection (a) of this section, accounting for the unique circumstances associated with procurement of fuel to supply the generation resource.

(c) If PJM determines that a Fuel Cost Policy submitted for review does not contain adequate support for PJM to make a determination as to the acceptability of any portion of the proposed policy consistent with the standards set forth above, PJM shall reject the Fuel Cost Policy. If PJM rejects the Fuel Cost Policy, the Market Seller's previously PJM-approved Fuel Cost Policy shall apply to all of the Market Seller's cost-based offers until such time as, subject to the review process set forth below in Operating Agreement, Schedule 2, section 2.6, PJM approves a new Fuel Cost Policy for the Market Seller.

## **2.4 Revocation of Approved Fuel Cost Policies.**

If, after having approved a Fuel Cost Policy, PJM determines, with input and advice timely received from the Market Monitoring Unit, that the Market Seller's procurement practices or the method for determining other components of cost-based offers is no longer consistent with the approved Fuel Cost Policy, this Operating Agreement, Schedule 2 or PJM Manual 15, PJM may revoke its approval of the Fuel Cost Policy, and Market Seller shall be required to submit a new Fuel Cost Policy for approval pursuant to the process and deadlines set forth in PJM Manual 15. If PJM revokes a Market Seller's previously approved Fuel Cost Policy, PJM shall notify the Market Seller in writing, with a copy to the Market Monitoring Unit, and include an explanation for the revocation. Upon revocation of a Fuel Cost Policy, the penalty referenced in Operating Agreement, Schedule 2, section 5(a) below shall apply beginning on the day after PJM issues the written notification of revocation to the Market Seller, with no additional requirement for PJM to provide any further notice to the Market Seller.

## **2.5 Information Required To Be Included In Fuel Cost Policies.**

(a) Each Market Seller shall include in its Fuel Cost Policy the following information, as further described in the applicable provisions of PJM Manual 15:

(i) For all Fuel Cost Policies, regardless of fuel type, the Market Seller shall provide a detailed explanation of the Market Seller's established method of calculating fuel costs, indicating whether fuel purchases are subject to a contract price and/or spot pricing, and specifying how it is determined which of the contract prices and/or spot market prices to use. The Market Seller shall include its method for determining commodity, handling and transportation costs.

(ii) For Fuel Cost Policies applicable to generation resources using a fuel source other than natural gas, the Market Seller shall adhere to the following guidelines:

1. Fuel costs for solar, Energy Storage Resources and run-of-river hydro resources shall be zero.
2. Fuel costs for nuclear resources shall not include in-service interest charges whether related to fuel that is leased or capitalized.
3. For Pumped Storage Hydro resources, fuel cost shall be determined based on the amount of energy necessary to pump from the lower reservoir to the upper reservoir.
4. For wind resources, the Market Seller shall identify how it accounts for renewable energy credits and production tax credits.
5. For solid waste, bio-mass and landfill gas resources, the Market Seller shall include the costs of such fuels even when the cost is negative.

(iii) Market Sellers shall report, for all of the generation resource's operating modes, fuels, and at various operating temperatures, the incremental, no load and start heat requirements, the method of developing heat inputs, and the frequency of updating heat inputs.

(iv) A Fuel Cost Policy shall include any applicable unit specific performance factors, and the method used to determine them, which may be modified seasonally to reflect ambient conditions.

(v) A Fuel Cost Policy shall include the cost-based Start Cost calculation for the generation resource, and identify for each temperature state the starting fuel (MMBtu), station service (MWh), start Maintenance Adder, and any Start Additional Labor Cost.

(vi) A Fuel Cost Policy shall also include any other incremental operating costs included in a Market Seller's cost-based offer for a resource, including but not limited to the consumables used for operation and the marginal value of costs in terms of dollars per MWh or dollars per unit of fuel, along with all applicable descriptions, calculation methodologies associated with such costs, and frequency of updating such costs.

## **2.6 Periodic Update and Review of Fuel Cost Policies.**

On an annual basis, all Market Sellers will be required to either submit to PJM and the Market Monitoring Unit an updated Fuel Cost Policy that complies with this Operating Agreement, Schedule 2 and PJM Manual 15, or confirm that their currently effective and approved Fuel Cost Policy remains compliant, pursuant to the procedures and deadlines specified in PJM Manual 15. Market Sellers must submit such information by no later than June 15 of each year. PJM shall consult with the Market Monitoring Unit, and consider any input timely received from the Market Monitoring Unit, in its determination of whether to approve a Market Seller's updated Fuel Cost Policy. After it has completed its evaluation of the request, PJM shall notify the Market Seller in writing, with a copy to the Market Monitoring Unit, of its determination whether the updated Fuel Cost Policy is approved or rejected by no later than November 1. If PJM rejects a Market Seller's updated Fuel Cost Policy, in its written notification, PJM shall provide an explanation for why the Fuel Cost Policy was rejected. If a Market Seller desires to update its Fuel Cost Policy, or PJM determines either on its own or based on input received from the Market Monitoring Unit, that the Market Seller must update its Fuel Cost Policy outside of the annual review process, the Market Seller shall follow the applicable processes and deadlines specified in this Operating Agreement, Schedule 2 and the PJM Manual 15.

## **2.7 Market Monitoring Unit Review For Market Power Concerns.**

Nothing in this Operating Agreement, Schedule 2 is intended to abrogate or in any way alter the responsibility of the Market Monitoring Unit to make determinations about market power pursuant to Tariff, Attachment M and Attachment M-Appendix.

# **3. EMISSION ALLOWANCES/ADDERS**

## **3.1 Review of Emissions Allowances/Adders.**

(a) For emissions costs, Market Sellers shall report the emissions rate of each generation resource, the method for determining the emissions allowance cost, and the frequency of updating emission rates. Such adders must be submitted and reviewed at least annually by PJM and be changed if they are no longer accurate.

(b) Market Sellers may submit emissions cost information to PJM and the Market Monitoring Unit as part of the information it submits during the annual Fuel Cost Policy review process, described in Operating Agreement, Schedule 2, section 2.6. The basis for the Market Monitoring Unit's review is described in Tariff, Attachment M-Appendix, section II.A.2. PJM shall consult with the Market Monitoring Unit, and consider any input and advice timely received from the Market Monitoring Unit, in its determination of whether to approve emissions costs.

# **4. MAINTENANCE ADDERS & OPERATING COSTS**

## 4.1 Maintenance Adders

Maintenance Adders are expenses directly related to electric production and can be a function of starts and/or run hours. Allowable expenses may include repair, replacement, and major inspection, and overhaul expenses including variable long term service agreement expenses. Maintenance Adders are calculated as the 10 or 20 year average cost of a unit's maintenance history, or all available actual maintenance history if a unit has less than 10 years of maintenance history. The major inspection and overhaul costs listed below in sections (a)-(c) are not exhaustive. A Market Seller may include costs in cost-based offers if those costs are similar to the costs outlined in this provision, so long as they are variable costs that are directly attributable to the production of electricity.

(a) Major inspections and overhauls of gas turbine and steam turbine generators include, but are not limited to, the following costs:

- turbine blade repair/replacement;
- turbine diaphragm repair;
- casing repair/replacement;
- bearing repair/refurbishment;
- seal repair/replacement and generator refurbishment;
- heat transfer replacement and cleaning;
- cooling tower fan motor and gearbox inspection;
- cooling tower fill and drift eliminators replacement;
- Selective Catalytic Reduction and CO Reduction Catalyst replacement;
- Reverse Osmosis Cartridges replacement;
- air filter replacement;
- fuel and water pump inspection/replacement;

(b) Major maintenance of gas turbine generators directly related to electric production include, but are not limited to:

- compressor blade repair/replacement;
- hot gas path inspections, repairs, or replacements.

(c) Major maintenance of steam turbine generators directly related to electric production include, but are not limited to:

- stop valve repairs;
- throttle valve repairs;
- nozzle block repairs;
- intercept valve repairs.

(d) Maintenance Costs that cannot be included in a Market Seller's cost-based offer are preventative maintenance and routine maintenance on auxiliary equipment like buildings, HVAC, compressed air, closed cooling water, heat tracing/freeze protection, and water treatment.



## **4.2 Operating Costs**

(a) Operating Costs are expenses related to consumable materials used during unit operation and include, but are not limited to, lubricants, chemicals, limestone, trona, ammonia, acids, caustics, water injection, activated carbon for mercury control, and demineralizers usage. These operating costs not exhaustive. A Market Seller may include other operating costs in cost-based offers so long as they are operating costs that are directly attributable to the production of energy.

(b) Operating Costs may be calculated based on a fixed or rolling average of values from one to five years in length, reviewed (and updated if changed) annually, or a rolling average from twelve to sixty months in length, reviewed (and updated if changed) monthly.

## **4.3 Labor Costs**

Labor costs included in cost-based offers do not include straight-time labor costs and are limited to: (1) start-up costs for additional staffing requirements and (2) contractor labor or plant personnel overtime labor included in the Maintenance Adder associated with maintenance activities directly related to electric production. Straight time labor expenses may be included under an Avoidable Cost Rate in the RPM auction.

## **4.14 Review of Maintenance Adders & Operating Costs.**

(a) Maintenance Adders and Operating Costs must be submitted and reviewed at least annually by PJM and be changed if they are no longer accurate. Maintenance Adders and Operating Costs cannot include any costs that are included in the generation resource's Avoidable Cost Rate pursuant to Tariff, Attachment DD, section 6.8(c).

(b) Market Sellers must specify the maintenance history years utilized in calculating Maintenance Adders during the annual review.

(c) Market Sellers must specify the years used to calculate Operating Costs during the annual review. Market Sellers that elect to use a six month to twelve month rolling average must submit these costs for a monthly review.

(d) Market Sellers may submit Maintenance Adder and Operating Costs information to PJM and the Market Monitoring Unit as part of the information it submits during the annual Fuel Cost Policy review process, described in Operating Agreement, Schedule 2, section 2.6. The basis for the Market Monitoring Unit's review is described in Tariff, Attachment M-Appendix, section II.A.2. PJM shall consult with the Market Monitoring Unit, and consider any input and advice timely received from the Market Monitoring Unit, in its determination of whether to approve Maintenance Adders and Operating Costs.

## **5. OPPORTUNITY COSTS**

(a) For a generating unit that is subject to operational limitations due to energy or environmental limitations imposed on the generating unit by Applicable Laws and Regulations, the Market Participant may include a calculation of its “Opportunity Costs” which is an amount reflecting the unit-specific Energy Market Opportunity Costs expected to be incurred. Such unit-specific Energy Market Opportunity Costs are calculated by forecasting Locational Marginal Prices based on future contract prices for electricity using PJM Western Hub forward prices, taking into account historical variability and basis differentials for the bus at which the generating unit is located for the prior three year period immediately preceding the relevant compliance period, and subtract therefrom the forecasted costs to generate energy at the bus at which the generating unit is located, as specified in more detail in PJM Manual 15. If the difference between the forecasted Locational Marginal Prices and forecasted costs to generate energy is negative, the resulting Energy Market Opportunity Cost shall be zero. Notwithstanding the foregoing, a Market Participant may submit a request to PJM for consideration and approval of an alternative method of calculating its Energy Market Opportunity Cost if the standard methodology described herein does not accurately represent the Market Participant’s Energy Market Opportunity Cost.

(b) For a generating unit that is subject to operational limitations because it only has a limited number of starts or available run hours resulting from (i) the physical equipment limitations of the unit, for up to one year, due to original equipment manufacturer recommendations or insurance carrier restrictions, or (ii) a fuel supply limitation, for up to one year, resulting from an event of Catastrophic Force Majeure, the Market Participant may include a calculation of its “Opportunity Costs” which is an amount reflecting the unit-specific Non-Regulatory Opportunity Costs expected to be incurred. Such unit-specific Non-Regulatory Opportunity Costs are calculated by forecasting Locational Marginal Prices based on future contract prices for electricity using PJM Western Hub forward prices, taking into account historical variability and basis differentials for the bus at which the generating unit is located for the prior three year period immediately preceding the period of time in which the unit is bound by the referenced restrictions, and subtract therefrom the forecasted costs to generate energy at the bus at which the generating unit is located, as specified in more detail in PJM Manual 15. If the difference between the forecasted Locational Marginal Prices and forecasted costs to generate energy is negative, the resulting Non-Regulatory Opportunity Cost shall be zero.

## **65. PENALTY PROVISIONS**

### **56.1 Penalties.**

(a) If upon review of a Market Seller’s cost-based offer, PJM determines that the offer is not in compliance with the Market Seller’s PJM-approved Fuel Cost Policy or this Operating Agreement, Schedule 2 and the Market Monitoring Unit agrees with that determination, or the Market Monitoring Unit determines that the offer is not in compliance with the Market Seller’s PJM-approved Fuel Cost Policy and PJM agrees with the Market Monitoring Unit’s determination, or the Market Seller does not have a PJM-approved Fuel Cost Policy, or PJM determines that any portion of the cost-based offer is not in compliance with this Operating

Agreement, Schedule 2, the Market Seller shall be subject to the following penalty, which shall be greater than or equal to \$0, summed for each hour that the offer applied:

$$\sum \text{Penalty}_{dh} = \frac{\min(d, 15)}{20} \times \text{LMP}_h \times \text{MW}_h$$

where:

$d$  is the greater of one and the number of days since PJM first notified the Market Seller of PJM's and the Market Monitoring Unit's agreement regarding applicability of the penalty. If PJM notifies the Market Seller of its non-compliant cost-based offer after the Market Seller has ceased submitting non-compliant cost-based offers,  $d$  shall be equal to one (1).

$h$  is the applicable hour of the day for which the offer applies, commencing on the Operating Day that the Market Seller receives notice of its non-compliant cost-based offer. If PJM notifies the Market Seller of its non-compliant cost-based offer after the Market Seller has ceased submitting non-compliant cost-based offers,  $h$  is the applicable hours of the last Operating Day for which a non-compliant cost-based offer was submitted.

$\text{LMP}_h$  is the real-time LMP at the applicable pricing location for the resource for the hour

$\text{MW}_h$  is the available capacity of the resource for the hour

All charges collected pursuant to this provision shall be allocated to Market Participants based on each Market Participant's real-time load ratio share for each applicable hour, as determined based on the Market Participant's total hourly load (net of operating Behind The Meter Generation, but not to be less than zero) to the total hourly load of all Market Participants in the PJM Region.

(b) Market Sellers that are assessed a penalty for non-compliance with an approved Fuel Cost Policy or the cost-based offer is not in compliance with the Market Seller's PJM-approved Fuel Cost Policy or this Schedule 2 shall be assessed penalties until the day after PJM determines that the Market Seller's cost-based offers are in compliance with the Market Seller's approved Fuel Cost Policy or in compliance with this Schedule 2. Such penalties will be assessed for no less than one (1) Operating Day.

(c) Market Sellers that are assessed a penalty for not having an approved Fuel Cost Policy shall be assessed penalties until the day after PJM approves the Market Seller's submitted Fuel Cost Policy. Such penalties will be assessed for no less than one (1) Operating Day.

(d) If upon review of a Market Seller's cost-based offer PJM and the Market Monitoring Unit disagree about whether the offer is in compliance with the Market Seller's PJM-approved Fuel Cost Policy, PJM and/or the Market Monitoring Unit may confidentially refer the matter to FERC Office of Enforcement for resolution and determination whether the applicable penalties should be assessed.

## **56.2 Rebuttal Period To Challenge Revocation of Fuel Cost Policy.**

Market Sellers who have a Fuel Cost Policy revoked by PJM will be provided a three (3) Business Day rebuttal period, starting from the date of revocation, to submit supporting documentation to PJM demonstrating that the revoked Fuel Cost Policy accurately reflects the fuel source, transportation cost, procurement process used, applicable adders, or commodity cost for such generation resource such that the Fuel Cost Policy accurately reflects the Market Seller's fuel procurement practices and methodology for pricing fuel. During the rebuttal period, if the Market Seller does not have a PJM-approved Fuel Cost Policy, it may not submit a non-zero cost-based offer. The penalty will still apply during the rebuttal period. However, if, upon review of the Market Seller's supporting documentation, PJM determines that the revoked policy accurately reflects the Market Seller's actual methodology used to develop the cost-based offer that was submitted at the time of revocation and that the Market Seller has not violated its Fuel Cost Policy, then PJM will refund to the Market Seller the penalty payments and make whole the Market Seller via uplift payments for the time period for which the applicable Fuel Cost Policy had been revoked and the generation resource was mitigated to its cost-based offer.

# Attachment B

Revisions to the  
PJM Operating Agreement

(Clean Format)

## SCHEDULE 2 - COMPONENTS OF COST

### 1. GENERAL COST PROVISIONS

#### 1.1 Permissible Components of Cost-based Offers.

(a) Each Market Participant obligated to sell energy on the PJM Interchange Energy Market at cost-based rates may include the following components or their equivalent in the determination of costs for energy supplied to or from the PJM Region:

For generating units powered by boilers

Firing-up cost

Peak-prepared-for maintenance cost

For generating units powered by machines

Starting cost from cold to synchronized operation

For all generating units

Incremental maintenance cost

No-load cost during period of operation

Labor cost

Operating Costs

Opportunity Costs

Emission allowances/adders

Maintenance Adders

Ten percent adder

#### 1.2 Method of Determining Cost Components.

The PJM Board, upon consideration of the advice and recommendations of the Members Committee, shall from time to time define in detail the method of determining the costs entering into the said components, and the Members shall adhere to such definitions in the preparation of incremental costs used on the Interconnection.

#### 1.3 Application of Cost Components to Three-Part Cost-based Offers.

A cost-based offer, as defined in Operating Agreement, Schedule 1, section 1.2, is a three-part offer consisting of Start-up Costs, No-load Costs, and the Incremental Energy Offer. These terms are as defined in Operating Agreement, section 1.

The following lists the categories of cost that may be applicable to a Market Participant's three-part cost-based offer:

(a) For Start-up Costs

Fuel cost

Emission allowances/adders  
Maintenance Adders  
Operating Costs  
Labor costs

(b) For No-load Costs

Fuel cost  
Emission allowances/adders  
Maintenance Adders  
Operating Costs

(c) Incremental Costs in Incremental Energy Offers

Fuel cost  
Emission allowances/adders  
Maintenance Adders  
Operating Costs  
Opportunity Costs

(d) All fuel costs shall employ the marginal fuel price experienced by the Member.

## 2. FUEL COST POLICY

### 2.1 Approved Fuel Cost Policy Requirement for Non-Zero Cost-based Offer.

A Market Seller may only submit a non-zero cost-based offer into the PJM Interchange Energy Market for a generation resource if it has a PJM-approved Fuel Cost Policy consistent with each fuel type for such generation resource.

### 2.2 Fuel Cost Policy Approval Process.

(a) A Market Seller shall provide a Fuel Cost Policy to PJM and the Market Monitoring Unit for each generation resource that it intends to offer into the PJM Interchange Energy Market, for each fuel type utilized by the resource. The Market Seller shall submit its initial Fuel Cost Policy for a generation resource to PJM and the Market Monitoring Unit for review by no later than 45 days prior to the Market Seller's expected initial submittal of a cost-based offer for the resource and shall update existing Fuel Cost Policies consistent with the annual update requirements set forth below in Operating Agreement, Schedule 2, section 2.6. For each new generation resource for which the Market Seller does not have commercial operating data, the Market Seller shall submit a provisional Fuel Cost Policy, which describes the Market Seller's methodology to procure and price fuel and includes all available operating data, to PJM and the Market Monitoring Unit for review and approval by no later than forty five (45) calendar days prior to the Market Seller's expected initial submittal of a cost-based offer for the resource. Within ninety (90) calendar days of the commercial operation date of the generation resource, the Market Seller shall submit to PJM and the Market Monitoring Unit for review an updated Fuel Cost Policy reflecting actual commercial operating data of the resource. The basis for the

Market Monitoring Unit's review is described in Tariff, Attachment M-Appendix. PJM shall consult with the Market Monitoring Unit, and consider any input and advice timely received from the Market Monitoring Unit, in its determination of whether to approve a Market Seller's Fuel Cost Policy. After it has completed its evaluation of the submitted Fuel Cost Policy, PJM shall notify the Market Seller in writing, with a copy to the Market Monitoring Unit, whether the Fuel Cost Policy is approved or rejected. If PJM rejects a Market Seller's Fuel Cost Policy, PJM shall include an explanation for why the Fuel Cost Policy was rejected in its written notification.

(b) PJM and the Market Monitoring Unit will have an initial thirty (30) Business Days for review of a submitted policy. Market Sellers shall have five (5) Business Days or an alternative deadline agreed to by PJM, to provide additional documentation or information on any request from PJM or the Market Monitoring Unit. If the Market Seller does not believe it can provide the information within five (5) Business Days, it can request an alternative deadline for submission of the data from PJM no later than one (1) Business Day before the due date of the request for additional data, and if PJM consents to extend the deadline, PJM will advise the Market Seller and the Market Monitoring Unit of the new deadline. If the Market Monitoring Unit makes a request directly to the Market Seller, the Market Monitoring Unit shall, within one (1) Business Day, inform PJM of such request at the time it is made. Failure to meet a data request deadline may result in PJM's rejection of the policy. If additional documentation or information has been requested by PJM or the Market Monitoring Unit, PJM has five (5) Business Days after the deadline for the Market Seller's submittal of such additional information or documentation to notify the Market Seller and Market Monitoring Unit of its approval or rejection of the Fuel Cost Policy.

### **2.3 Standard of Review.**

(a) PJM shall review and approve a Fuel Cost Policy if it meets the requirements set forth in subsections (a)(i) through (v) of this section. PJM shall reject Fuel Cost Policies that fail to meet such requirements and that do not accurately reflect the applicable costs, such as the fuel source, transportation cost, procurement process used, applicable adders, commodity cost, or provide sufficient information for PJM to verify the Market Seller's fuel cost at the time of the Market Seller's cost-based offer. If PJM rejects a Market Seller's Fuel Cost Policy, PJM shall include an explanation for why the Fuel Cost Policy was rejected in its written notification. A Fuel Cost Policy must:

(i) Provide information sufficient for the verification of the Market Seller's fuel procurement practices, as further described below and in PJM Manual 15, and how those practices are utilized to determine cost-based offers the Market Seller submits into the PJM Interchange Energy Market;

(ii) Reflect the Market Seller's applicable commodity and/or transportation contracts (to the extent it holds such contracts) and the Market Seller's method of calculating delivered fossil fuel cost, limited to inventoried cost, replacement cost or a combination thereof, that reflect the way fuel is purchased or scheduled for purchase, and set forth all applicable indices as a measure that PJM can use to verify how anticipated spot market purchases are utilized in determining fuel costs;



(iii) Provide a detailed explanation of the basis for and reasonableness of any applicable adders included in determining fuel costs in accordance with PJM Manual 15;

(iv) Account for situations where applicable indices or other objective market measures are not sufficiently liquid by documenting the alternative means actually utilized by the Market Seller to price the applicable fuel used in the determination of its cost-based offers, such as documented quotes for the procurement of natural gas; and

(v) Adhere to all requirements of PJM Manual 15 applicable to the generation resource.

(b) To the extent a Market Seller proposes alternative measures to document its fuel costs in its Fuel Cost Policy for a generation resource, the Market Seller shall explain how such alternative measures are consistent with or superior to the standard specified in subsection (a) of this section, accounting for the unique circumstances associated with procurement of fuel to supply the generation resource.

(c) If PJM determines that a Fuel Cost Policy submitted for review does not contain adequate support for PJM to make a determination as to the acceptability of any portion of the proposed policy consistent with the standards set forth above, PJM shall reject the Fuel Cost Policy. If PJM rejects the Fuel Cost Policy, the Market Seller's previously PJM-approved Fuel Cost Policy shall apply to all of the Market Seller's cost-based offers until such time as, subject to the review process set forth below in Operating Agreement, Schedule 2, section 2.6, PJM approves a new Fuel Cost Policy for the Market Seller.

#### **2.4 Revocation of Approved Fuel Cost Policies.**

If, after having approved a Fuel Cost Policy, PJM determines, with input and advice timely received from the Market Monitoring Unit, that the Market Seller's procurement practices or the method for determining other components of cost-based offers is no longer consistent with the approved Fuel Cost Policy, this Operating Agreement, Schedule 2 or PJM Manual 15, PJM may revoke its approval of the Fuel Cost Policy, and Market Seller shall be required to submit a new Fuel Cost Policy for approval pursuant to the process and deadlines set forth in PJM Manual 15. If PJM revokes a Market Seller's previously approved Fuel Cost Policy, PJM shall notify the Market Seller in writing, with a copy to the Market Monitoring Unit, and include an explanation for the revocation. Upon revocation of a Fuel Cost Policy, the penalty referenced in Operating Agreement, Schedule 2, section 5(a) below shall apply beginning on the day after PJM issues the written notification of revocation to the Market Seller, with no additional requirement for PJM to provide any further notice to the Market Seller.

#### **2.5 Information Required To Be Included In Fuel Cost Policies.**

(a) Each Market Seller shall include in its Fuel Cost Policy the following information, as further described in the applicable provisions of PJM Manual 15:

(i) For all Fuel Cost Policies, regardless of fuel type, the Market Seller shall provide a detailed explanation of the Market Seller's established method of calculating fuel costs, indicating whether fuel purchases are subject to a contract price and/or spot pricing, and specifying how it is determined which of the contract prices and/or spot market prices to use. The Market Seller shall include its method for determining commodity, handling and transportation costs.

(ii) For Fuel Cost Policies applicable to generation resources using a fuel source other than natural gas, the Market Seller shall adhere to the following guidelines:

1. Fuel costs for solar, Energy Storage Resources and run-of-river hydro resources shall be zero.
2. Fuel costs for nuclear resources shall not include in-service interest charges whether related to fuel that is leased or capitalized.
3. For Pumped Storage Hydro resources, fuel cost shall be determined based on the amount of energy necessary to pump from the lower reservoir to the upper reservoir.
4. For wind resources, the Market Seller shall identify how it accounts for renewable energy credits and production tax credits.
5. For solid waste, bio-mass and landfill gas resources, the Market Seller shall include the costs of such fuels even when the cost is negative.

(iii) Market Sellers shall report, for all of the generation resource's operating modes, fuels, and at various operating temperatures, the incremental, no load and start heat requirements, the method of developing heat inputs, and the frequency of updating heat inputs.

(iv) A Fuel Cost Policy shall include any applicable unit specific performance factors, and the method used to determine them, which may be modified seasonally to reflect ambient conditions.

(v) A Fuel Cost Policy shall include the cost-based Start Cost calculation for the generation resource, and identify for each temperature state the starting fuel (MMBtu), station service (MWh), start Maintenance Adder, and any Start Additional Labor Cost.

(vi) A Fuel Cost Policy shall also include any other incremental operating costs included in a Market Seller's cost-based offer for a resource, including but not limited to the consumables used for operation and the marginal value of costs in terms of dollars per MWh or dollars per unit of fuel, along with all applicable descriptions, calculation methodologies associated with such costs, and frequency of updating such costs.

## **2.6 Periodic Update and Review of Fuel Cost Policies.**

On an annual basis, all Market Sellers will be required to either submit to PJM and the Market Monitoring Unit an updated Fuel Cost Policy that complies with this Operating Agreement, Schedule 2 and PJM Manual 15, or confirm that their currently effective and approved Fuel Cost Policy remains compliant, pursuant to the procedures and deadlines specified in PJM Manual 15. Market Sellers must submit such information by no later than June 15 of each year. PJM shall consult with the Market Monitoring Unit, and consider any input timely received from the Market Monitoring Unit, in its determination of whether to approve a Market Seller's updated Fuel Cost Policy. After it has completed its evaluation of the request, PJM shall notify the Market Seller in writing, with a copy to the Market Monitoring Unit, of its determination whether the updated Fuel Cost Policy is approved or rejected by no later than November 1. If PJM rejects a Market Seller's updated Fuel Cost Policy, in its written notification, PJM shall provide an explanation for why the Fuel Cost Policy was rejected. If a Market Seller desires to update its Fuel Cost Policy, or PJM determines either on its own or based on input received from the Market Monitoring Unit, that the Market Seller must update its Fuel Cost Policy outside of the annual review process, the Market Seller shall follow the applicable processes and deadlines specified in this Operating Agreement, Schedule 2 and the PJM Manual 15.

## **2.7 Market Monitoring Unit Review For Market Power Concerns.**

Nothing in this Operating Agreement, Schedule 2 is intended to abrogate or in any way alter the responsibility of the Market Monitoring Unit to make determinations about market power pursuant to Tariff, Attachment M and Attachment M-Appendix.

## **3. EMISSION ALLOWANCES/ADDERS**

### **3.1 Review of Emissions Allowances/Adders.**

(a) For emissions costs, Market Sellers shall report the emissions rate of each generation resource, the method for determining the emissions allowance cost, and the frequency of updating emission rates. Such adders must be submitted and reviewed at least annually by PJM and be changed if they are no longer accurate.

(b) Market Sellers may submit emissions cost information to PJM and the Market Monitoring Unit as part of the information it submits during the annual Fuel Cost Policy review process, described in Operating Agreement, Schedule 2, section 2.6. The basis for the Market Monitoring Unit's review is described in Tariff, Attachment M-Appendix, section II.A.2. PJM shall consult with the Market Monitoring Unit, and consider any input and advice timely received from the Market Monitoring Unit, in its determination of whether to approve emissions costs.

## **4. MAINTENANCE ADDERS & OPERATING COSTS**

### **4.1 Maintenance Adders**

Maintenance Adders are expenses directly related to electric production and can be a function of starts and/or run hours. Allowable expenses may include repair, replacement, and major inspection, and overhaul expenses including variable long term service agreement expenses. Maintenance Adders are calculated as the 10 or 20 year average cost of a unit's maintenance history, or all available actual maintenance history if a unit has less than 10 years of maintenance history. The major inspection and overhaul costs listed below in sections (a)-(c) are not exhaustive. A Market Seller may include costs in cost-based offers if those costs are similar to the costs outlined in this provision, so long as they are variable costs that are directly attributable to the production of electricity.

(a) Major inspections and overhauls of gas turbine and steam turbine generators include, but are not limited to, the following costs:

- turbine blade repair/replacement;
- turbine diaphragm repair;
- casing repair/replacement;
- bearing repair/refurbishment;
- seal repair/replacement and generator refurbishment;
- heat transfer replacement and cleaning;
- cooling tower fan motor and gearbox inspection;
- cooling tower fill and drift eliminators replacement;
- Selective Catalytic Reduction and CO Reduction Catalyst replacement;
- Reverse Osmosis Cartridges replacement;
- air filter replacement;
- fuel and water pump inspection/replacement;

(b) Major maintenance of gas turbine generators directly related to electric production include, but are not limited to:

- compressor blade repair/replacement;
- hot gas path inspections, repairs, or replacements.

(c) Major maintenance of steam turbine generators directly related to electric production include, but are not limited to:

- stop valve repairs;
- throttle valve repairs;
- nozzle block repairs;
- intercept valve repairs.

(d) Maintenance Costs that cannot be included in a Market Seller's cost-based offer are preventative maintenance and routine maintenance on auxiliary equipment like buildings, HVAC, compressed air, closed cooling water, heat tracing/freeze protection, and water treatment.

## **4.2 Operating Costs**

- (a) Operating Costs are expenses related to consumable materials used during unit operation and include, but are not limited to, lubricants, chemicals, limestone, trona, ammonia, acids, caustics, water injection, activated carbon for mercury control, and demineralizers usage. These operating costs not exhaustive. A Market Seller may include other operating costs in cost-based offers so long as they are operating costs that are directly attributable to the production of energy.
- (b) Operating Costs may be calculated based on a fixed or rolling average of values from one to five years in length, reviewed (and updated if changed) annually, or a rolling average from twelve to sixty months in length, reviewed (and updated if changed) monthly.

## **4.3 Labor Costs**

Labor costs included in cost-based offers do not include straight-time labor costs and are limited to: (1) start-up costs for additional staffing requirements and (2) contractor labor or plant personnel overtime labor included in the Maintenance Adder associated with maintenance activities directly related to electric production. Straight time labor expenses may be included under an Avoidable Cost Rate in the RPM auction.

## **4.4 Review of Maintenance Adders & Operating Costs.**

- (a) Maintenance Adders and Operating Costs must be submitted and reviewed at least annually by PJM and be changed if they are no longer accurate. Maintenance Adders and Operating Costs cannot include any costs that are included in the generation resource's Avoidable Cost Rate pursuant to Tariff, Attachment DD, section 6.8(c).
- (b) Market Sellers must specify the maintenance history years utilized in calculating Maintenance Adders during the annual review.
- (c) Market Sellers must specify the years used to calculate Operating Costs during the annual review. Market Sellers that elect to use a six month to twelve month rolling average must submit these costs for a monthly review.
- (d) Market Sellers may submit Maintenance Adder and Operating Costs information to PJM and the Market Monitoring Unit as part of the information it submits during the annual Fuel Cost Policy review process, described in Operating Agreement, Schedule 2, section 2.6. The basis for the Market Monitoring Unit's review is described in Tariff, Attachment M-Appendix, section II.A.2. PJM shall consult with the Market Monitoring Unit, and consider any input and advice timely received from the Market Monitoring Unit, in its determination of whether to approve Maintenance Adders and Operating Costs.

## **5. OPPORTUNITY COSTS**

(a) For a generating unit that is subject to operational limitations due to energy or environmental limitations imposed on the generating unit by Applicable Laws and Regulations, the Market Participant may include a calculation of its “Opportunity Costs” which is an amount reflecting the unit-specific Energy Market Opportunity Costs expected to be incurred. Such unit-specific Energy Market Opportunity Costs are calculated by forecasting Locational Marginal Prices based on future contract prices for electricity using PJM Western Hub forward prices, taking into account historical variability and basis differentials for the bus at which the generating unit is located for the prior three year period immediately preceding the relevant compliance period, and subtract therefrom the forecasted costs to generate energy at the bus at which the generating unit is located, as specified in more detail in PJM Manual 15. If the difference between the forecasted Locational Marginal Prices and forecasted costs to generate energy is negative, the resulting Energy Market Opportunity Cost shall be zero. Notwithstanding the foregoing, a Market Participant may submit a request to PJM for consideration and approval of an alternative method of calculating its Energy Market Opportunity Cost if the standard methodology described herein does not accurately represent the Market Participant’s Energy Market Opportunity Cost.

(b) For a generating unit that is subject to operational limitations because it only has a limited number of starts or available run hours resulting from (i) the physical equipment limitations of the unit, for up to one year, due to original equipment manufacturer recommendations or insurance carrier restrictions, or (ii) a fuel supply limitation, for up to one year, resulting from an event of Catastrophic Force Majeure, the Market Participant may include a calculation of its “Opportunity Costs” which is an amount reflecting the unit-specific Non-Regulatory Opportunity Costs expected to be incurred. Such unit-specific Non-Regulatory Opportunity Costs are calculated by forecasting Locational Marginal Prices based on future contract prices for electricity using PJM Western Hub forward prices, taking into account historical variability and basis differentials for the bus at which the generating unit is located for the prior three year period immediately preceding the period of time in which the unit is bound by the referenced restrictions, and subtract therefrom the forecasted costs to generate energy at the bus at which the generating unit is located, as specified in more detail in PJM Manual 15. If the difference between the forecasted Locational Marginal Prices and forecasted costs to generate energy is negative, the resulting Non-Regulatory Opportunity Cost shall be zero.

## **6. PENALTY PROVISIONS**

### **6.1 Penalties.**

(a) If upon review of a Market Seller’s cost-based offer, PJM determines that the offer is not in compliance with the Market Seller’s PJM-approved Fuel Cost Policy or this Operating Agreement, Schedule 2 and the Market Monitoring Unit agrees with that determination, or the Market Monitoring Unit determines that the offer is not in compliance with the Market Seller’s PJM-approved Fuel Cost Policy and PJM agrees with the Market Monitoring Unit’s determination, or the Market Seller does not have a PJM-approved Fuel Cost Policy, or PJM determines that any portion of the cost-based offer is not in compliance with this Operating

Agreement, Schedule 2, the Market Seller shall be subject to the following penalty, which shall be greater than or equal to \$0, summed for each hour that the offer applied:

$$\sum \text{Penalty}_{dh} = \frac{\min(d, 15)}{20} \times \text{LMP}_h \times \text{MW}_h$$

where:

$d$  is the greater of one and the number of days since PJM first notified the Market Seller of PJM's and the Market Monitoring Unit's agreement regarding applicability of the penalty. If PJM notifies the Market Seller of its non-compliant cost-based offer after the Market Seller has ceased submitting non-compliant cost-based offers,  $d$  shall be equal to one (1).

$h$  is the applicable hour of the day for which the offer applies, commencing on the Operating Day that the Market Seller receives notice of its non-compliant cost-based offer. If PJM notifies the Market Seller of its non-compliant cost-based offer after the Market Seller has ceased submitting non-compliant cost-based offers,  $h$  is the applicable hours of the last Operating Day for which a non-compliant cost-based offer was submitted.

$\text{LMP}_h$  is the real-time LMP at the applicable pricing location for the resource for the hour

$\text{MW}_h$  is the available capacity of the resource for the hour

All charges collected pursuant to this provision shall be allocated to Market Participants based on each Market Participant's real-time load ratio share for each applicable hour, as determined based on the Market Participant's total hourly load (net of operating Behind The Meter Generation, but not to be less than zero) to the total hourly load of all Market Participants in the PJM Region.

(b) Market Sellers that are assessed a penalty for non-compliance with an approved Fuel Cost Policy or the cost-based offer is not in compliance with the Market Seller's PJM-approved Fuel Cost Policy or this Schedule 2 shall be assessed penalties until the day after PJM determines that the Market Seller's cost-based offers are in compliance with the Market Seller's approved Fuel Cost Policy or in compliance with this Schedule 2. Such penalties will be assessed for no less than one (1) Operating Day.

(c) Market Sellers that are assessed a penalty for not having an approved Fuel Cost Policy shall be assessed penalties until the day after PJM approves the Market Seller's submitted Fuel Cost Policy. Such penalties will be assessed for no less than one (1) Operating Day.

(d) If upon review of a Market Seller's cost-based offer PJM and the Market Monitoring Unit disagree about whether the offer is in compliance with the Market Seller's PJM-approved Fuel Cost Policy, PJM and/or the Market Monitoring Unit may confidentially refer the matter to FERC Office of Enforcement for resolution and determination whether the applicable penalties should be assessed.

## **6.2 Rebuttal Period To Challenge Revocation of Fuel Cost Policy.**

Market Sellers who have a Fuel Cost Policy revoked by PJM will be provided a three (3) Business Day rebuttal period, starting from the date of revocation, to submit supporting documentation to PJM demonstrating that the revoked Fuel Cost Policy accurately reflects the fuel source, transportation cost, procurement process used, applicable adders, or commodity cost for such generation resource such that the Fuel Cost Policy accurately reflects the Market Seller's fuel procurement practices and methodology for pricing fuel. During the rebuttal period, if the Market Seller does not have a PJM-approved Fuel Cost Policy, it may not submit a non-zero cost-based offer. The penalty will still apply during the rebuttal period. However, if, upon review of the Market Seller's supporting documentation, PJM determines that the revoked policy accurately reflects the Market Seller's actual methodology used to develop the cost-based offer that was submitted at the time of revocation and that the Market Seller has not violated its Fuel Cost Policy, then PJM will refund to the Market Seller the penalty payments and make whole the Market Seller via uplift payments for the time period for which the applicable Fuel Cost Policy had been revoked and the generation resource was mitigated to its cost-based offer.