

SCHEDULE 2 - COMPONENTS OF COST

(a) Each Market Participant required to submit cost-based energy offers to the PJM Interchange Energy Market may include the following components reflecting short run marginal costs for energy supplied to or from the PJM Region:

- i. Fuel costs, including transportation
- ii. Consumables used for operation, including chemicals, additives, lubrication, and water injection
- iii. Emissions allowances, including opportunity costs
- iv. Start fuel and power costs required for synchronization
- v. Incremental energy and no load fuel costs
- vi. Other short run marginal costs
- vii. Opportunity costs due to operational limitations

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 (as defined in the PJM Tariff), 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.

- (b) All fuel costs shall employ the marginal fuel price experienced by the Member.
- (c) Prior to submittal of cost-based offers, the Market Seller shall submit to PJM and the Market Monitor information sufficient for the validation of cost-based offers. The information shall include, among other data, heat inputs, descriptions of how spot fuel prices and/or contract prices are used to calculate fuel costs, variable fuel transportation and handling costs, emissions costs, start costs, opportunity costs, and other short run marginal costs.
 - i. For fuel costs, Market Sellers shall provide the Market Monitor and PJM with a verifiable, algorithmic, and systematic explanation of their fuel cost policy, indicating whether fuel purchases are subject to a contract price and/or spot pricing and specifying the determination of the contract price and/or referenced spot market prices. Any included fuel transportation and handling costs must be short run marginal costs only.
 - ii. For heat inputs, Markets Sellers shall report the incremental, no load, and start heat requirements, the method of developing heat inputs, and the frequency of updating heat inputs.
 - iii. For emissions costs, Market Sellers shall report the emissions rate of each of their units, the method for determining the emissions allowance cost, and the frequency of updating emission rates.
 - iv. For variable operations costs, Market Sellers shall report the consumables used for operation, the frequency of updating such costs, and the marginal value of costs in terms of dollars per MWh or dollars per unit of fuel, reflecting short run marginal costs only.
 - v. For any negative opportunity costs created when a unit does not produce output, as in the case of a renewable energy subsidy, Market Sellers shall report the method for determining the short run marginal cost and the frequency of updating such costs.
- (d) PJM shall validate the completeness of all data and fuel cost policies for a resource, as described in (c), prior to accepting cost based offers for the resource.

(e) The Market Monitor shall review the level of all cost data submitted, as described in (c), and the level of all cost based offers. The Market Monitor shall perform the validation described in Attachment M E-1 and – Attachment M – Appendix II.A.

In the case that the Market Monitor determines that the level of a resource’s cost based energy, start-up, no load, regulation capability, regulation performance, or synchronized reserve offer, for any hour of the operating day, does not comply with (a), (b), or (c), PJM shall impose the following penalty:

$$Penalty_{dh} = \frac{\max(d, 15)}{10} \times LMP_h \times MW_h$$

where:

d is the greater of one and the number of days since the Market Monitor or PJM first notified the Market Seller of the penalty.

h is the applicable hour of the day for which the offer applies.

LMP_h is the generating unit LMP for the hour.

MW_h is the available capacity of the unit for the hour.

(f) 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 short run marginal costs used on the Interconnection.