

# Summary of VOM Operating Agreement & Manual 15 Changes

Roger Cao  
Performance Compliance  
Cost Development Subcommittee  
September 29, 2022

- CDS is proposing the following changes/improvements be implemented for Variable Operating & Maintenance costs (VOM):
  - Add the option of using default minor maintenance adder and default operating costs adder as an alternative of submitting unit-specific minor maintenance and operating costs.
  - Add the definitions of major maintenance and minor maintenance to more clearly define what costs can be included.
  - Revise Manual 15 Cost Development Guidelines to provide more guidance to Market Sellers on specifics of maintenance adders, maintenance history, operating costs, supporting documentation, etc.

- Requirements for submitting major maintenance and unit-specific minor maintenance or using the default minor maintenance adder:

## 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 20 years of maintenance history. Maintenance Adders are comprised of major maintenance and minor maintenance. Market Sellers that wish to include major maintenance and/or unit-specific minor maintenance in the Maintenance Adder shall submit and receive approval of the requested adder from the Office of Interconnection, prior to the inclusion of such adder (or prior to the expiration of a previously approved adder) in cost-based offers. Notwithstanding, Market Sellers may utilize the default minor maintenance adder provided in this section 4.5 in lieu of submitting unit-specific minor maintenance adder. 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.

- Definition and examples of major maintenance:

(a) ~~Major maintenance are overhaul, repair, or refurbishment that requires disassembly to complete of boiler, reactor, heat recovery steam generator, steam turbine, gas turbine, hydro turbine, generator, or engine. Major inspections and overhauls of gas turbine and steam turbine generators maintenance~~ include, but are not limited to, the following costs:

- turbine blade repair/replacement;
- turbine diaphragm repair;
- turbine casing repair/replacement;
- turbine bearing repair/refurbishment;
- turbine 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;~~
- sSelective cCatalytic rReduction and carbon monoxide CO rReduction cCatalyst 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:~~

- steam stop valve repairs;
- steam throttle valve repairs;
- steam nozzle block repairs;
- steam intercept valve repairs;-
- ~~• generator stator or rotor rewind, refurbishment, or replacement;~~
- ~~• scrubber refurbishment;~~
- ~~• water wall panel replacement;~~
- ~~• pendant or super heater replacement;~~
- ~~• economizer replacement;~~
- ~~• diesel/reciprocating engine overhaul;~~
- ~~• reactor refueling;~~
- ~~• steam generator overhaul/replacement.~~

- Definition and examples of minor maintenance and unallowable expenses:

(b) Minor maintenance are repair or refurbishment on equipment and components directly related to electric production and not otherwise classified as major maintenance, such as main steam, feed water, condensate, condenser, cooling towers, transformers, gas turbine inlet air and exhaust, and fuel systems. Minor maintenance include, but are not limited to, the following costs associated with the aforementioned systems:

- heat transfer replacement and cleaning;
- cooling tower fan motor and gearbox inspection;
- cooling tower fill and drift eliminators replacement;
- air filter replacement;
- repair and replacement of valves and piping components, control equipment, pumps, motors, condenser components, transformers, cabling, breakers, motor control centers, switch gear, fuel and ash handling, selective catalytic reduction and scrubber emission control equipment and components, mills burners, boiler components, fan components, reactor recirculation components, hydraulic control rod drive system components and reactor components.

(c) Maintenance Costs that cannot be included in a Market Seller's cost-based offer are time based or annual maintenance or preventative maintenance and routine maintenance on auxiliary any equipment. Also unallowable are any maintenance costs that do not vary with the electric production, such as like-buildings, HVAC, compressed air, closed cooling water, heat tracing/freeze protection, reactor safety system and plant water treatment systems.

- Requirements for submitting unit-specific operating costs or using the default operating costs adder:

## 4.2 Operating Costs

(a) Operating cCosts 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

(b) Operating cCosts 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.

(c) Market Sellers that wish to include unit-specific operating costs shall submit and receive approval of the requested unit-specific fixed average adder or the most recent month rolling average adder from the Office of Interconnection prior to the inclusion of such adder (or prior to the expiration of a previously approved adder) in cost-based offers. Notwithstanding, Market Sellers may utilize the default operating costs adder provided in this section 4.5 in lieu of submitting unit-specific operating costs adder.

- Default adder values:

## 4.5 Default Adder

A Market Seller may elect to utilize a default minor maintenance adder or submit unit-specific minor maintenance costs to the Office of Interconnection and the Market Monitoring Unit. All major maintenance costs on a unit-specific basis must be submitted to the Office of Interconnection and the Market Monitoring Unit.

A Market Seller may include a default operating costs adder in the cost-based energy offer in lieu of submitting unit-specific operating costs for review and approval.

The default adders (calculated from 2020 data escalated for 2021) are as follows:

<u>Technology Type</u>	<u>Default Minor Maintenance Adders (\$/MWh)</u>	<u>Default Operating Costs Adders (\$/MWh)</u>
<u>Combined Cycle</u>	<u>0.98</u>	<u>0.40</u>
<u>Combustion Turbine</u>	<u>3.59</u>	<u>0.75</u>
<u>Reciprocating Engine</u>	<u>4.03</u>	<u>1.62</u>
<u>Fossil Steam</u>	<u>1.71</u>	<u>2.87</u>

The default adders shown above shall be escalated for use beginning with the 2024 calendar year and annually for the subsequent years utilizing the Handy Whitman Index and shall be posted annually by the Office of Interconnection and the Market Monitoring Unit.

- Section 2.6
  - Overview of VOM
  - Guidelines for submitting major maintenance
  - Guidelines for using default minor maintenance adder or submitting unit-specific minor maintenance
  - Guidelines for using default operating costs adder or submitting unit-specific operating costs
  - New submission and review timelines
- Section 2.6.1
  - Definitions and examples of major maintenance, minor maintenance and unallowable expenses
- Section 2.6.11
  - Default adder values

- Section 2.6 – Overview of VOM

## 2.6 Variable Operating and Maintenance Cost

**Variable Maintenance cost** is the parts and labor expenses of maintaining equipment and facilities in satisfactory operating condition.

$$\begin{aligned}
 \text{TotalMaintenanceCost}_{\text{NextYear}} = & \\
 & \left( \text{AnnualMaintenanceCost} * \frac{\text{EscalationIndex}_{\text{NextYear}}}{\text{EscalationIndex}_{\text{CurrentYear}}} \right) + \\
 & \left( \text{AnnualMaintenanceCost} * \frac{\text{EscalationIndex}_{\text{NextYear}}}{\text{EscalationIndex}_{\text{LastYear}}} \right) + \\
 & \left( \text{AnnualMaintenanceCost} * \frac{\text{EscalationIndex}_{\text{NextYear}}}{\text{EscalationIndex}_{\text{LastYear} - 1}} \right) + \\
 & \dots + \left( \text{AnnualMaintenanceCost} * \frac{\text{EscalationFactor}_{\text{NextYear}}}{\text{EscalationIndex}_{\text{LastYear}} - (\text{Maintenance Period} - 1)} \right)
 \end{aligned}$$

There are three components in Variable Operating & Maintenance costs: major maintenance, minor maintenance and Operating Costs. These costs must be submitted to PJM/IMM for review and approval prior to the inclusion of such adder (or prior to the expiration of a previously approved adder) in cost-based offers. Notwithstanding, Market Sellers may elect to utilize the default minor maintenance adder and/or default operating costs adder.

- **Major Maintenance:** The Market Seller must submit major maintenance costs (see 2.6.1.1) to PJM/IMM for review and approval when new major maintenance costs added or previous costs rolled off maintenance history. Major maintenance must be approved before they can be included in the cost-based energy offer.
- **Minor Maintenance:** The Market Seller may use the default adder specified in OA, Schedule 2 (see 2.6.11) for unit's technology type if available. The default minor maintenance adder is calculated to represent the minor maintenance costs (see 2.6.1.2). In the alternative, the Market Seller may submit unit-specific minor maintenance to PJM/IMM for review if default adder is not available for unit's technology type or the Market Seller elects not to use the default minor maintenance adder. Minor maintenance other than default adder must be approved before they can be included in the cost-based energy offer.
- **Operating Costs:** The Market Seller may use the default adder specified in OA, Schedule 2 (see 2.6.11) for unit's technology type if available. Otherwise, the Market Seller may submit Operating Costs (see 2.6.8) to PJM/IMM annually for review. Operating Costs other than default adder must be approved before they can be included in the cost-based energy offer.

- Section 2.6 – Guidelines for submitting major maintenance

A Market Seller who elects to use a default minor maintenance adder specified in OA, Schedule 2 (see 2.6.11) may only submit unit-specific major maintenance costs for review. The major maintenance costs shall be submitted when major maintenance costs are added to or removed from the maintenance period. Regardless of when the maintenance is completed, the major maintenance adder shall include a minimum of 10 years of operating history. PJM will specify an expiration date upon approval of the major maintenance adder. Market Sellers that are using the default minor maintenance adder for black start service units shall not use 1% of the total maintenance dollars as part of their black start service annual revenue requirement.

- Section 2.6 – Guidelines for using default minor maintenance adder or submitting unit-specific minor maintenance

A Market Seller may submit a unit-specific minor maintenance if the unit does not have a default minor maintenance adder available for its technology type or the Market Seller elects not to use the default minor maintenance adder. A Market Seller with tolling agreement must use zero for the default minor maintenance adder, but may include the variable tolling fees in the Maintenance Adder. The default minor maintenance adder may be included in the cost-based energy offer.

- Section 2.6 – Guidelines for using default operating costs adder or submitting unit-specific operating costs

A Market Seller may include a default operating costs adder (see 2.6.11) in the cost-based energy offer and shall not be required to submit Operating Costs for review. If the Market Seller elects not to use the default operating costs adder, or the unit does not have a default operating costs adder available for its technology type, the Market Seller may submit ~~the~~ Operating Costs ~~must be submitted~~ to PJM and the MMU for review annually, in accordance with Operating Agreement Schedule 2 Section 4. Market Sellers may only use the PJM-approved unit-specific Operating Costs in their unit's cost-based offer. ~~Approved Operating Costs expire December 31 of the year following acceptance.~~ PJM will provide the expiration date of a PJM-approved Operating Costs upon approval of the Operating Costs. Upon the transfer of ownership to a new Market Seller, the new Market Seller must submit a new Operating Costs for PJM review if a non-~~zero~~ default o Operating c Costs adder is desired.

- Section 2.6 - New submission and review timelines

The Maintenance Adder ~~must~~ may be submitted to PJM and the MMU for review annually, in accordance with Operating Agreement Schedule 2 Section 4. Market Sellers may only use the PJM-approved unit-specific Maintenance Adder in their unit's cost-based offer. ~~Approved Maintenance adders expire December 31 of the year following acceptance.~~ PJM will specify an expiration date upon approval of the Maintenance Adder. Upon the transfer of ownership to a new Market Seller, the new Market Seller must submit a new Maintenance Adder for PJM review if a non-zero ~~major m~~ Maintenance a ~~Adder~~ and/or unit-specific minor maintenance adder is desired.

Operating Agreement Schedule 2 Section 4. Market Sellers may only use the PJM-approved unit-specific Operating Costs in their unit's cost-based offer. ~~Approved Operating Costs expire December 31 of the year following acceptance.~~ PJM will provide the expiration date of a PJM-approved Operating Costs upon approval of the Operating Costs. Upon the transfer of ownership to a new Market Seller, the new Market Seller must submit a new Operating Costs for PJM review if a non-~~zero~~ default o ~~Operating c~~ Costs adder is desired.

The Maintenance Adder or Operating Costs and corresponding supporting documentation shall be submitted to the MMU by March 31 of the year that adder expires; PJM shall provide final approval decisions by December 31.

- Section 2.6
  - Supporting documentation required for all costs
  - Guidelines for multiple maintenance adders
  - Guidelines for maintenance adder for similar units
- Section 2.6.5
  - Guidelines for the use of cyclic factors
- Section 2.6.7
  - Clarifications for maintenance costs, operating costs and operating history for immature units and mature units transferred ownership
- Section 2.6.8
  - Examples of operating costs and rolling average operating costs submission
- Section 2.6.9
  - Requirements for supporting documentation
- Section 2.6.10
  - Clarifications for maintenance adder with LTSA

- 9/7/22 MIC – Approved
- 9/29/22 CDS – Review OA and M15 Revisions
- 10/6/22 MIC – Review OA and M15 Revisions
- 10/24/22 MRC – First read
- 11/16/22 MRC – Vote

Presenters:

Roger Cao, [roger.cao@pjm.com](mailto:roger.cao@pjm.com)

SME:

Performance Compliance Department

[FuelCostPolicyAnalysis@pjm.com](mailto:FuelCostPolicyAnalysis@pjm.com)

**Summary of VOM OA & M15 Changes**



**Member Hotline**

(610) 666 – 8980

(866) 400 – 8980

[custsvc@pjm.com](mailto:custsvc@pjm.com)