

# **Attachment L**

## **Variable Operations and Maintenance Cost Adders**

## **L.1 Introduction**

The purpose of Attachment L is to describe what variable operations and maintenance (VOM or variable O&M) adders are, how market participants can use them in the CAISO markets, and how market participants can establish the values of these adders for their resources.

The term VOM adder refers to any or all of three separate adders: the variable energy O&M adder, the variable minimum load O&M adder, and the variable start-up O&M adder. Each of these three adders is included in a generating resource's proxy costs; these adders represent the CAISO's estimate of the variable costs of generating resources. Proxy costs are used in either the bid caps for minimum load costs and start-up costs or the default energy bids for local market power mitigation.

VOM adders can be established in one of two ways: 1) market participants can use the predetermined default VOM adders based on resource technology type if they do not want to pursue the negotiated option ("the default option"), or 2) they can be negotiated between the market participant and the CAISO ("the negotiated option"). Using the default option suffices for many market participants and requires no actions from market participants; the CAISO simply assigns the value based on the characteristics of the resource as registered in the Master File. The negotiated option requires more effort from the market participant but can help them more accurately reflect their operations and maintenance (O&M) costs in their proxy costs. The negotiated option, by nature, involves a more complicated process relative to the default option and thus constitutes the majority of what is discussed in this Attachment L.

Section L.2 covers proxy costs in greater depth, establishes the "cost framework" of O&M costs, and defines some key terms. Section L.3 discusses the default option and states the default VOM adder values. Section L.4 is the main section for market participants to consult when pursuing the negotiated option. Finally, section L.5 covers some key timelines relevant to the transition from the O&M cost framework and default VOM adder values existing *prior to 2022* to the O&M cost framework and default VOM adder values effective *from 2022 onwards*.

## **L.2 Proxy Costs, O&M Cost Framework, and Definitions**

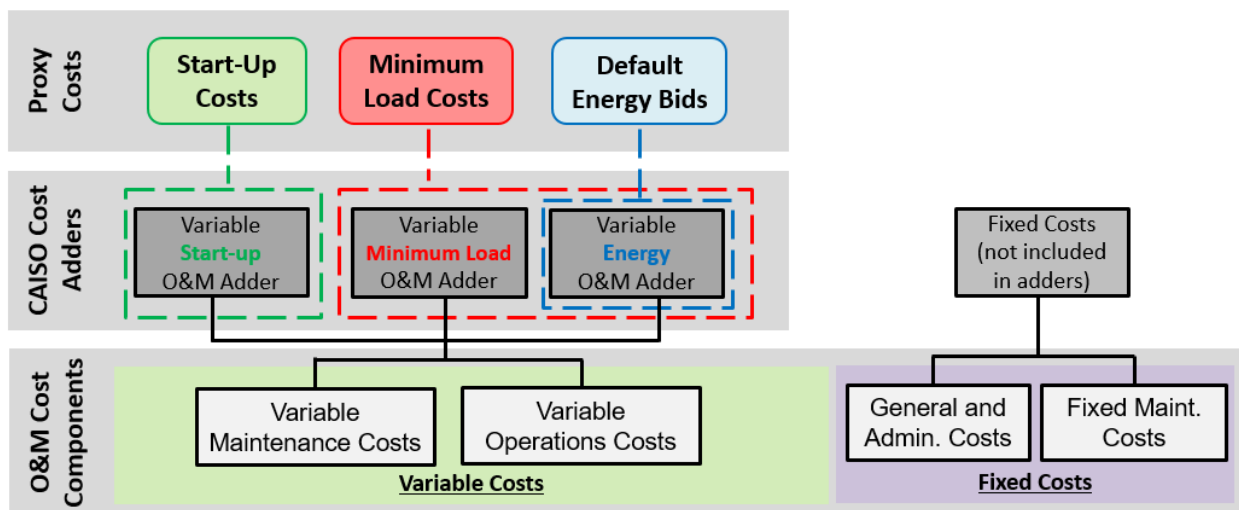
Proxy costs are discussed in much greater detail in other sections of the BPM for Market Instruments, particularly Attachments D and G, but for an easy reference the CAISO briefly summarizes them here. Proxy costs are the CAISO's estimates of the variable costs incurred by a generating resource that vary with electrical production. The three proxy costs are minimum load costs (\$/hour), start-up costs (\$/start), the variable-cost default energy bid (\$/MWh). Proxy costs are calculated using formulas set forth in the CAISO's tariff and the VOM adders are an additive component to these formulas. Minimum load costs (MLCs) and start-up costs (SUCs) are the basis of the default minimum load bid and the default start-up bid, respectively, which are used to cap the commitment cost components of market participants' bids. Default energy

bids (DEBs<sup>1</sup>) are used by the market when the generating resource’s energy bid is mitigated under the market power mitigation (MPM) process. The CAISO also uses DEBs when it must generate energy bids for resources.

Each of the three proxy costs has a corresponding VOM adder: the variable minimum load O&M (VOM-ML) adder corresponds to MLC, the variable start-up O&M (VOM-SU) adder corresponds to SUC, and the variable energy O&M (VOM-EN) adder corresponds to the DEB. The VOM adders allow market participants to reflect two cost components in their proxy costs: Variable Maintenance costs and Variable Operations costs, both of which are defined later in this section. There are some costs incurred by market participants, such as general and administrative costs and fixed maintenance costs, which are not included in the proxy costs because they are not variable in nature.

These three concepts – proxy costs, the VOM adders, and the cost components – form what the CAISO refers to as the O&M cost framework. Figure L-1 below is a visual representation of the O&M cost framework.

**Figure L-1 – O&M Cost Framework**



The base of the O&M cost framework is the two cost components of Variable Maintenance costs and Variable Operations costs. Because of the foundational nature of these cost components, the CAISO has developed principles to categorize these costs which are codified in the CAISO tariff:<sup>2</sup>

<sup>1</sup> Although Attachment D outlines multiple options that can be used to calculate DEBs, the option relevant for this Attachment L is the variable cost-based option, so the reader can assume that the term DEB refers to the variable-cost DEB throughout this Attachment L unless specified otherwise.

<sup>2</sup> Many of the terms used in the principles below are expanded upon in section L.4.4

**Variable Operations costs** are the costs of consumables and other costs that vary directly with electrical production (*i.e.*, Start-Up/Shut-Down, run-hours, or electricity output) of a resource. Variable operations costs exclude maintenance costs, auxiliary power costs, Greenhouse Gas Allowance Prices, fuel costs, grid management charges, Opportunity Costs, and other excluded costs.<sup>3</sup>

**Variable Maintenance costs** are the costs associated with the repair, overhaul, replacement, or inspection of a resource that meet the following conditions:

- (i) The costs must vary with the electrical production (*i.e.*, Start-Up/Shut-Down, run-hours, or electricity output) of the resource.
- (ii) The costs should reflect future maintenance costs that are expected to be incurred within the service life of a major component of plant or equipment.
- (iii) The costs should be consistent with Good Utility Practice
- (iv) The costs should not effect a substantial betterment of the resource.
- (v) If the item is a replacement, it cannot be a replacement of an existing major component of plant or equipment.<sup>4</sup>

## **L.3 Default Option**

The CAISO offers a set of predetermined default VOM adder values for use by market participants that do not wish to go through the negotiation process. Many market participants find that the default values are sufficient for their resources based on how they schedule their resources, the relative MW capacity of their resources, or their resources' cost profiles. The default VOM adder values were developed through an extensive stakeholder process and are intended to be sufficiently conservative while also being still attractive for use in lieu of negotiated VOM adder values. Once every three years, the CAISO reviews the default values to determine whether the values remain appropriate.

### **L.3.1 Default VOM adder values**

The CAISO assigns the default VOM adder values automatically based on the registered Master File characteristics of the resource. The CAISO uses the applicable fuel type and generation

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<sup>3</sup> CAISO tariff section 30.4.5.4.3.1(a) (effective Jan. 1, 2022). Unless otherwise specified, references in this Attachment L to sections of the CAISO tariff are to sections of the CAISO tariff as revised by the tariff amendment filed with by FERC in FERC Docket No. ER21-1266-000. FERC has not issued an order on the tariff amendment yet. The tariff amendment included three sets of tariff revisions: 1) a set that went into effect on May 17, 2021, 2) a set that will go into effect on January 1, 2022, and 3) a set that will go into effect on April 1, 2022.

<sup>4</sup> CAISO tariff section 30.4.5.4.3.1(b) (effective Jan. 1, 2022).

technology type to group the resource into one of several categories. Based on the resource’s assigned category, the resource will receive a default VOM-EN adder, default VOM-ML adder, default VOM-SU adder, or a combination of two of those default VOM adders as shown in table L-1 below. For example, if the resource is categorized as a geothermal resource, it will receive a default VOM-EN adder of \$1.16/MWh, whereas if the resource is categorized as a natural gas-fired combined-cycle resource, it will receive a default VOM-EN adder of \$0.59/MWh and a default VOM-ML adder of \$1.74/run-hour per MW of PMax capacity. Some categories do not receive any default VOM adder values. If the scheduling coordinator (SC) does not believe that the default VOM adder values are appropriate for their resource, the negotiated option is available to them.

The default VOM-ML and VOM-SU adders are expressed in \$/run-hour/MW and \$/start-up/MW units, respectively. To arrive at a resource-specific or configuration-specific default VOM adder, the CAISO will multiply the default value by the PMax of the resource or configuration. This results in the resource-specific default VOM-ML and VOM-SU adders ultimately being expressed in \$/run-hour or \$/start-up units, respectively. Section L.3.2 provides examples of how this calculation works.

During the development of the default VOM adder values, the CAISO identified the Variable Operations costs and Variable Maintenance costs separately for each resource category and assigned those costs to the respective adder types. The default VOM-EN adder is intended to capture Variable Operations costs (e.g., the costs of consumables) that vary with the MWh of generation of the resource. The default VOM-ML and VOM-SU adders are intended to capture Variable Maintenance costs that the CAISO understands mostly vary with the number of hours the resource is online or how frequently the resource starts/transitions to a higher configuration.

This default configuration may not be viable for all resources, e.g., a natural gas-fired combined-cycle resource may have Variable Maintenance costs that the SC believes vary with the MWh of generation, rather than the run-hours. In such cases, the negotiated option is available in lieu of the default VOM adders under the default option.

**Table L-1 – Default VOM adder values**

| <b>Technology Type</b>            | <b>Default VOM-EN Adder (\$/MWh)</b> | <b>Default VOM-ML Adder (\$/run-hour/MW)</b> | <b>Default VOM-SU Adder (\$/start/MW)</b> |
|-----------------------------------|--------------------------------------|--|---|
| <i>Default values represents:</i> | <i>Variable Operations Costs</i>     | <i>Variable Maintenance Costs</i>            | <i>Variable Maintenance Costs</i>         |
| Coal                              | 2.69                                 | -  | -   |
| Steam turbines                    | 0.33                                 | -  | -   |
| Natural gas-fired combined-cycle  | 0.59                                 | 1.74   | -   |
| Frame combustion turbines         | 0.97                                 | -  | 52.13                                     |

|  |      |      |   |
|--|------|------|---|
| Aeroderivative combustion turbines                           | 2.15 | 4.38 | - |
| Reciprocating internal combustion engines                    | 1.10 | -    | - |
| Nuclear  | 1.08 | -    | - |
| Biomass  | 1.65 | -    | - |
| Geothermal   | 1.16 | -    | - |
| Landfill gas   | 1.21 | -    | - |
| Hydroelectric  | -    | 0.65 | - |
| Solar  | -    | -    | - |
| Wind   | 0.28 | -    | - |
| Other (e.g., storage, non-generating resources, PDRs, RDRRs) | -    | -    | - |

### L.3.2 Illustrative calculations of resource-specific default VOM adder values

For the technology types shown in table L-1 above that have default VOM-ML and default VOM-SU adder values, the CAISO uses the capacity of the resource (*i.e.*, its PMax) to scale default VOM adders so that they can be used in the resource’s proxy costs. If the resource is a multi-stage generator (MSG), the CAISO calculates the resource-specific default VOM adder using the PMax of each configuration to reflect the additional costs of wear and tear of operating in each configuration. The resulting resource-specific default VOM adder calculation is performed as follows:

$$\text{Resource-specific default VOM adder} = \text{default VOM adder} * \text{Resource's PMax}$$

Or if the resource is a MSG:

$$\text{Configuration-specific default VOM adder} = \text{default VOM adder} * \text{Configuration's PMax}$$

To help illustrate how the resource-specific default VOM-ML and VOM-SU adders will be calculated, the CAISO includes some examples in tables L-2 and L-3 below:

**Table L-2 – Non-MSG Example**

| <b>Parameter</b>                          | <b>Value</b>      |
|---|-------------------|
| Technology type                           | Aeroderivative CT |
| PMax of resource (MW)                     | 50                |
| Default VOM-ML adder (\$/run-hour per MW) | 4.38              |

$$\begin{aligned} \text{Resource-specific default VOM-ML adder} &= \text{default VOM-ML adder} * \text{PMax of resource} \\ &= \$4.38 * 50 \text{ MW} \\ &= \$219/\text{run-hour} \end{aligned}$$

**Table L-3 – MSG Example**

| <b>Parameter</b>                          | <b>Value</b>      |
|---|-------------------|
| Technology Type                           | Aeroderivative CT |
| PMax of Configuration 1 (MW)              | 50                |
| PMax of Configuration 2 (MW)              | 100               |
| Default VOM-ML adder (\$/run-hour per MW) | 4.38              |

*Configuration 1*

Configuration-specific default VOM-ML adder = default O&M Adder \* PMax of Config 1  
 = \$4.38 \* 50 MW  
 = \$219/run-hour

*Configuration 2*

Configuration-specific default VOM-ML adder = default O&M Adder \* PMax of Config 2  
 = \$4.38 \* 100 MW  
 = \$438/run-hour

**L.3.3 Triennial review of default VOM adder values**

Starting in 2012 and every three years thereafter, the CAISO will review the default VOM adder values to determine whether the values remain appropriate. The CAISO does not expect these triennial reviews to require a full stakeholder process. Some reviews may need to be more extensive while others may be considerably abbreviated. The factors influencing the extent of the review include the amount of time elapsed since the default values were developed, changes to the technological landscape or cost profiles of resources, the inflation rate, etc. If any change is required as part of the triennial review, the CAISO will propose revisions to the default VOM adder values defined in the CAISO tariff in a tariff amendment filed with FERC. If FERC accepts the tariff revisions, the CAISO will implement those new default VOM adder values.

**L.4 Negotiated Option**

The CAISO recognizes that the default VOM adder values described in section L.3 may not be sufficient for all resources and thus offers an alternative option whereby SCs may negotiate resource-specific<sup>5</sup> VOM adder values. The negotiation option follows a general structure and is subject to certain timelines prescribed by the CAISO tariff. It also relies on several key steps such as data collection and submission, CAISO review, and implementation as described in this

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<sup>5</sup> VOM adders for MSGs are negotiated at the configuration level, rather than at the resource level. For simplicity's sake, in this Attachment L the CAISO will use the term "resource-specific" VOM adder values to mean both resource-level (non-MSG) and configuration-level (MSG) VOM adder values.

section L.4. This section also includes further information on situations where VOM adders are renegotiated.

### **L.4.1 Introduction to the structure of the negotiations**

The negotiations for VOM adders take place between the CAISO<sup>6</sup> and the resource's SC. They follow a general structure that is often adapted to the individual facts and circumstances of the resource:

1) Data collection and submission: Negotiations start with O&M cost information submissions by the SC which typically include resource-specific cost data, information on maintenance intervals, and supporting documentation such as vendor quotes. The O&M cost information that the SC submits is often referred to as the SC's "application". Section L.4.2 describes the data collection and submission activities performed by the SC.

2) CAISO review and negotiation process: The CAISO then reviews the O&M cost information by assessing it using the cost categorization principles from section L.2 and ensuring that the calculations are mathematically appropriate. At this point, the CAISO typically has some questions and requests for additional information or supporting documentation. Depending on the complexity of the application, this process may iterate several times until the CAISO has sufficient information to complete its review of the application. Section L.4.3 describes the CAISO's review and negotiation process and section L.4.4 provides further information on the cost categorization principles.

3) CAISO implementation of the VOM adder values: Once the CAISO's review is completed, the CAISO will notify the SC that the values are accepted and request the SC's confirmation of the final values. Once confirmation is received, the CAISO will implement the VOM adder values in the CAISO systems and the VOM adder values will be included in the resource's proxy costs. This is described further in section L.4.3.

### **L.4.2 Data collection and submission**

SCs must inform the CAISO that they would like to negotiate a VOM adder. Otherwise, the CAISO assumes that the default VOM adder values are sufficient. Once the SC has determined that they would like to engage in negotiations for a VOM adder, the SC will need to collect the relevant O&M cost data and prepare their application submission.

The O&M cost data needed to support the application depends on the resource's circumstances. For example, some resources may contract with an original equipment manufacturer (OEM) to perform maintenance on their resources via a long-term service

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<sup>6</sup> The CAISO has engaged the CAISO Department of Market Monitoring (DMM) to serve as its agent in the negotiation of VOM adders, though the CAISO remains actively involved in the negotiation process. For simplicity's sake, this section L.4 will refer to the CAISO and DMM collectively as the "CAISO."



agreement (LTSA), while other resources may perform maintenance themselves. In the former case, excerpts from the LTSA would be relevant O&M cost information to support the application; in the latter case, historical invoices or vendor quotes may be more appropriate to support the application. Because of this diversity of potential supporting documentation, the CAISO utilizes a standard template as the basis of the application process. Below the CAISO discusses the O&M cost data that needs to be collected to support the initial application and then discusses the template and application submission process.

### **Data collection**

The data underlying each resource's application will be unique, so the CAISO does not request the detailed supporting documentation at the beginning of the process. That said, the SC can significantly expedite negotiations by performing the following actions during the SC's data collection efforts:

- Ensure that the O&M costs are consistent with the CAISO cost categorization principles. Only Variable Operations costs and Variable Maintenance costs can be included in the VOM adders. Therefore, SCs should gather data for costs that would be categorized as Variable Operations costs or Variable Maintenance costs. General and administrative costs, fixed maintenance costs, costs incurred to replace major components, etc. would not be categorized as Variable Operations costs or Variable Maintenance costs, so such costs should be excluded from the application and the SC's data submission efforts. These principles are described further in section L.4.4.
- Ensure that the cost data is appropriately summarized such that it can be reconciled to the amounts in the application template. As explained further below, the application template requests that certain cost amounts be provided. The easier it is for the CAISO to reconcile the O&M cost data with the application, the more quickly the application can be processed and the fewer questions the CAISO will have during the negotiation process.
- Ensure that the vendor quotes, OEM recommendations, and relevant contracts are readily accessible and are easily reconcilable with the application template. Vendor quotes and OEM recommendations often serve as supporting documentation for cost estimates or maintenance intervals, respectively. Contracts such as LTSAs or power purchase agreements (PPAs) are also common supporting documentation for applications. These can be gathered ahead of time in preparation of the application to ensure a smooth application process.
- Consider whether an application cover letter is worthwhile. Cover letters are often useful in situations where the SC thinks that its resource involves unusual circumstances or the SC would like to provide a narrative description in its application.

## **Application template and submission process**

Once the appropriate data is collected, the SC should enter the data into the application template. The application template can be found at: <http://www.caiso.com/Documents/Variable-Operations-and-Maintenance-Adder-Application-Template.xlsx>. The template is designed to help both SCs and the CAISO. It gives the SC a clear expectation of what information is required to aid in the SC's data collection and submission. It also provides the SC assurance that their application is processed consistently with other SCs' applications. Once completed, the template should be submitted as an attachment to a Customer Inquiry and Dispute Information (CIDI) ticket with Case Record Type "Negotiated Rate Application" and Application Type "MMA."

The template is spreadsheet-based with some built-in validations to ensure it is completed properly. Typically, O&M costs are based on two types of events: 1) extensive, infrequent actions requiring extended maintenance outages that occur at defined increments that are often based on OEM recommendations and 2) any other maintenance costs or variable operations costs that are incurred as a function of run-hours, starts, or MWh output. The former category, sometimes referred to as major maintenance, is incurred over longer time horizons and is typically based on the run-hours or starts of a resource. The latter category is either comprised of non-major maintenance costs or to the costs of chemicals or materials consumed in the production process. As such, the template is broken out in two separate sections – section A for major maintenance costs and section B for other costs. Completing both sections is voluntary; many SCs negotiate only the major maintenance costs in their VOM adder or vice versa.

### *Section A – Major maintenance costs:*

The template contains a section allowing market participants to list major maintenance actions grouped into distinct maintenance cycles. For each maintenance cycle, market participants should list the following data as applicable:

- Criteria meeting one of three options: 1) a single parameter (e.g., every 10,000 run-hours), 2) the earlier of multiple parameters (e.g., energy, 10,000 run-hours, or 1000 starts) or 3) a blend of multiple parameters (e.g., equivalent operating hours).
- A description of the primary factor or factors and equivalency between factors if applicable.

For each maintenance action listed, the market participant should identify the following:

- Maintenance cycle.
- Maintenance action name and description.

- A cost estimate, which may be either an historic value or an estimated future value. In either case, the cost should be reported with the year in which the cost is denominated so that values may be adjusted to the current year. Although the CAISO has a standard cost escalation methodology, the SC may also propose their own methodology.
- Year dollars, with the year that is specific to the costs being cited in the cost documentation. Note that this is likely not when the maintenance will actually occur.
- Incremental vs. total costs, *i.e.*, whether the costs are only the incremental amount of costs to perform the additional maintenance actions or the total cost of a maintenance action. For example, a resource may perform a hot gas path inspection every 24,000 hours and a major overhaul every 48,000 hours. The major overhaul in this case includes a hot gas path inspection as well as other maintenance actions. If the cost of the hot gas path inspection is \$2 million and the total cost of the major overhaul is \$10 million (including the hot gas path inspection), the incremental costs of the major overhaul would be \$8 million. Either presentation of the cost information is appropriate, but the SC should indicate which method was chosen.
- Incremental starts, operating hours, and/or production (MWh) as relevant. This value represents the estimated incremental number of starts, run-hours, and/or MWh at which this maintenance action is performed stated from the beginning of the maintenance cycle. For example, if an action is performed every 2,400 starts, the incremental contribution of this component of the VOM adder would be calculated by dividing the estimated cost of this action (denominated in current year dollars), by 2,400. Also see the additional discussion of increments and operating parameters below.
- Description of the source of cost data and reference to supporting documentation. Market participants should provide a documentation reference for each maintenance action. This reference indicates the source of the maintenance action cost and estimated incremental starts, operating hours, and/or MWh.

There are two situations in which the CAISO anticipates that SCs may not be able to provide the information requested in the maintenance actions schedule: 1) if major maintenance costs are performed under a LTSA, and 2) if the resource is tolled to a SC under a PPA. If either of these situations occurs, the SC should provide the maintenance cycle data supplemented by the following data entered in the Scheduling Coordinator Estimates section of the template:

- An estimate of the cost per start, run-hour, or MWh.
- An explanation of the derivation of the cost estimate.

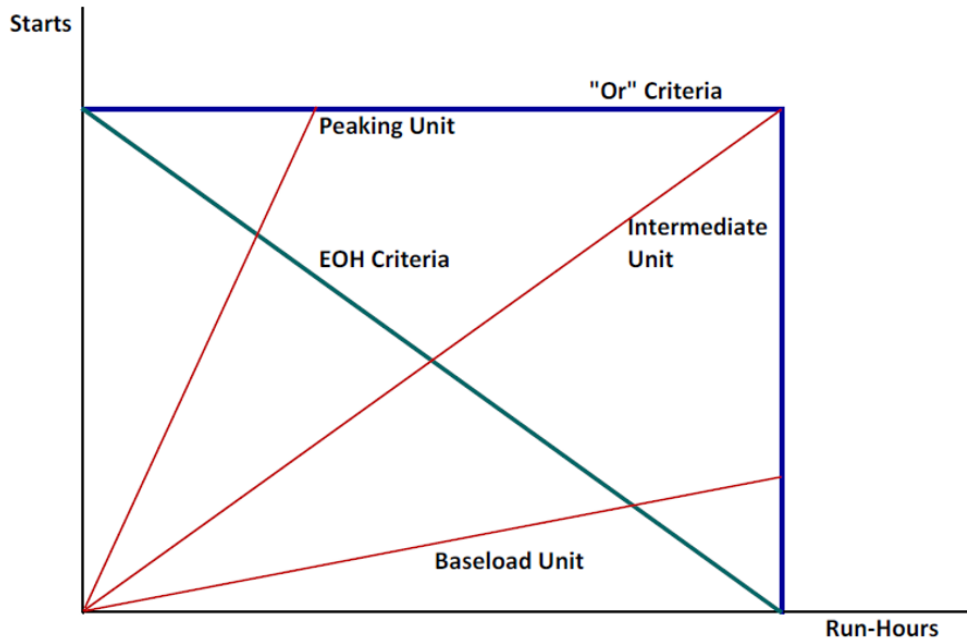
- Documentation reference, *i.e.*, the supporting documentation for the costs and a reference of where to find each estimated cost. If it is not clear from the documentation that the costs are specifically related to maintenance activities, the CAISO will usually request further explanation or supporting documentation.

All submitted applications should also contain the following descriptive information for each resource: contact information, resource identification including resource characteristics such as manufacturer make and model, and in-service date and capacity.

**Maintenance intervals and operating parameters**

The operating parameter to which major maintenance is assigned depends on the maintenance schedule and the operating profile of the resource. Maintenance schedules can vary significantly, which affects how the VOM adders would be calculated. This is illustrated in the following figure, which shows two types of maintenance schedules. The first schedule shown by the blue square is an example of where major maintenance is needed based on a maximum number of starts or a maximum number of run-hours, whichever comes first (referred in the figure as the “Or” criteria). Alternatively, some OEMs recommend major maintenance based on the number of starts and run-hours where each start is equivalent to a certain number of run-hours, *i.e.*, the equivalent operating hour (EOH) method. This is shown by the green line in figure L-2 below.

**Figure L-2 – Effects on major maintenance due to maintenance criteria and resource type**



Or Criteria

Under the Or criteria, the start criteria or the run-hour criteria may be binding for a unit depending on its average run-hours per start. The three red lines in the figure represent three types of units. The units have different operating profiles and, therefore, intersect the Or criteria at very different locations. For example, the top line shows a peaking resource that typically has a low number of run-hours per start (because its incremental energy costs are relatively high). For the peaking resource, the maintenance intervals are determined only based on the number of starts, so the maintenance adders should be applied to the starts. The starts are limiting for peaking resources because the failure mechanisms that are expected to limit the life of the equipment are based on thermal cyclic fatigue, which leads to crack propagation in hot gas path parts. Each start creates an additional thermal cycle.

However, for baseload resources (*i.e.*, resources for which run-hours per start are large), the maintenance intervals are primarily determined based on the run-hours, so the maintenance adders should primarily be applied to the run-hours. The run-hours are limiting for baseload resources because the failure mechanisms that are expected to limit the life of the equipment are based on the run-time-dependent conditions of creep, oxidation, and corrosion.

In some cases, the distribution of the maintenance adders based on the operating profile could cause the operating profile to change. For example, for a unit has been operating with a relatively low level of run-hours per start (like the peaking resource above), shifting the allocation of the VOM adders from run-hours to the start-up cost will raise the unit's SUC and lower its MLC, which will tend to increase the unit's average run-hours per start. This could shift the operating profile toward the line shown in figure L-2 for the intermediate unit. The advantage of this shift is that it will increase the utilization of the unit under the major maintenance schedule.

If it is likely that the resource will reach the run-hour criteria before it reaches the start criteria, the maintenance action will contribute to minimum load costs. If starts is more likely to trigger the maintenance, the maintenance action will contribute to start costs. There may be situations where either run-hours or starts may be equally as likely to trigger a maintenance action or this likelihood is unknown. In such cases, the CAISO supports a 50% allocation of major maintenance costs between starts and run-hours.

The application template has a field that the SC can use to indicate which factor is most likely to trigger the maintenance action. The SC may input run-hours, starts, or MWh in this field. The SC may also input 'equally likely or unknown' to allocate the costs equally to both run-hours or starts.

## EOH Criteria

Under the EOH criteria, the adders would be divided between start-up cost and minimum generation cost in the same ratio as the EOH criteria. For example, if one start is equivalent to 20 run-hours, the costs would be divided by the total run-hour in the maintenance cycle to establish the minimum generation cost adder while the VOM-SU adder would equal the VOM-ML adder times 20.

### *Section B – Other variable O&M costs:*

If SCs wish to have the CAISO consider other non-major maintenance costs or variable operations in their negotiated VOM adders, they can include those costs in this section. Costs included in this section are either comprised of non-major maintenance costs or of the costs of chemicals or materials consumed in the production process. Because of the diversity of costs that can be included in this section, the application template is relatively flexible. In cases when historical cost data is used, the CAISO typically requests that the SC provide at least 3 years of historical costs and operating data, though the CAISO may request more or less based on the circumstances.

To complete this section, SCs should provide the following data entered in the Scheduling Coordinator Estimates section of the template:

- An estimate of the cost per start, and/or run-hour, or MWh.
- An explanation of the derivation of the cost estimate.
- Documentation reference. SCs should provide the supporting documentation for the costs and provide a reference of where to find for each estimated cost.

### **L.4.3 CAISO review, negotiation, and implementation process**

Once the CAISO receives the CIDI ticket submitted by the SC, the CAISO will review the application and begin the negotiation process. The CAISO's review will consist of activities such as ensuring that the application contains sufficient information, is mathematically accurate, validating there is no double-counting of costs between maintenance actions or VOM adders, etc. The costs are also reviewed by comparison to the historic experience for the unit and by comparing it to other similar units based on technology, size, and age. A key step of the CAISO review is the CAISO's consideration of whether the costs in the application are consistent with the cost categorization principles. These cost categorization principles are discussed in greater detail in section L.4.4.

This is an iterative process typically handled via the CIDI system, though scheduled phone calls are also encouraged to work through more complex or contentious issues. As discussed further below, the CAISO is subject to certain time restrictions during this process to ensure that applications are handled on a timely basis.

Applications are rarely rejected by the CAISO outright; rather, the CAISO will typically need further information from the SC in order to approve the application. In most cases, additional information or supporting documentation is able to resolve disagreements. In cases when disagreements remain about the sufficiency or accuracy of information provided by the SC, the CAISO tariff provides a dispute resolution process.<sup>7</sup>

For a resource whose maintenance is conducted under an LTSA or PPA, the CAISO evaluates the consistency of the costs with the applicable LTSA or PPA and determines whether these costs are reasonable based on actual and estimated maintenance costs for similar resources.

Finally, for each cost item and schedule, the CAISO translates cost into real present-day dollars and uses this cost to calculate the individual components of the major maintenance cost adders. Although the CAISO has a standard cost escalation methodology, the SC may also propose its own methodology. If the SC initially proposes values that are agreeable to the CAISO, the CAISO will notify the SC if the values are accepted. Otherwise, the CAISO will notify the SC of the values the CAISO has calculated based on the information submitted by the SC and request the SC's confirmation of the final values. Once confirmation is received, the CAISO will implement the VOM adder values in the CAISO systems and the VOM adder values will be included in the resource's proxy costs. The CAISO will inform the SC of the implementation date, which is typically a few days after the final confirmation is received.

The final VOM adder values can be viewed in the Master File user interface. They will not, however, show up as a separate component of the Default Energy Bid Curves or Default Commitment Cost reports in the Customer Market Results Interface (CMRI). The VOM adder values will be included in the calculation resulting in the amounts displayed in CMRI but will not be broken out separately.

#### **L.4.4 Cost categorization principles and interpretive guidance**

As discussed in section L.2, only Variable Operations costs and Variable Maintenance costs can be included in VOM adders. The CAISO tariff provides categorization principles for these costs,<sup>8</sup> and this section L.4.4 provides interpretive guidance regarding the costs categories. This information can be consulted by SCs during negotiations but will also inform the CAISO's triennial review of the default VOM adders discussed in section L.3.3.

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<sup>7</sup> CAISO tariff section 30.4.5.4.3.2 (effective Jan. 1, 2022 and revised effective Apr. 1, 2022).

<sup>8</sup> CAISO tariff section 30.4.5.4.3.1 (effective Jan. 1, 2022).

## **Variable Operations costs**

*Variable Operations costs are the costs of consumables and other costs that vary directly with the electrical production (i.e., Start-Up/Shut-Down, run-hours, or electricity output) of a resource, specifically excluding maintenance costs, auxiliary power costs, greenhouse gas allowance costs, fuel costs, grid management charges, opportunity costs, and other excluded costs.*<sup>9</sup>

Pursuant to this principle set forth in the CAISO tariff, Variable Operations (VO) costs arise directly as a result of operating the resource but do not include maintenance and other non-operational costs. Examples of VO costs include consumable materials, production-based fees such as royalties paid to landowners, and costs associated with the energy needed to cool critical components. These costs also exclude existing costs in proxy costs such as the grid management charge and opportunity cost adders.

The following are a few specific examples to further help define appropriate VO costs:

- Consumables specifically include raw and demineralized water, boiler chemicals, cooling tower chemicals, and ammonia.
- Production-based fees such as royalties paid to landowners. The CAISO would expect to see these fees spelled out explicitly in a contract such as a PPA, in enacted regulation (e.g., fees due to FERC or other regulatory authorities or entities), or some other contractual document.
- VO costs also include cost of consumables and other costs related to pre-start, start, and shutdown activities, and return to pre-start standby conditions as long as the costs can be clearly demonstrated as variable.

## **Variable Maintenance costs**

Variable Maintenance (VM) costs include costs that are incurred when repairing, overhauling, and inspecting a generating resource. Costs of replacing equipment may also be included under specific circumstances such as replacing a non-major component due to the wear and tear of operating the component. Examples of VM activities include hot gas path inspections, combustion inspections, and major overhauls. Routine maintenance, including standby maintenance performed during off-peak periods, may also be VM as long as the maintenance activities vary with the electrical production of the unit.

The CAISO stresses that these costs must vary with the electrical production of the unit; they arise due to the wear and tear on the resource because it is engaged in the production of electricity. Further, these must be costs incurred to maintain the resource, not to substantially alter it beyond its original characteristics.

This section provides interpretative guidance on the components of the principles for the categorization of VM costs. As a reminder, the principles for the categorization of VM costs as

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<sup>9</sup> CAISO tariff section 30.4.5.4.3.1 (effective Jan. 1, 2022).



set forth in the CAISO tariff are included below; any underlined terms are discussed in further detail below.

*Variable Maintenance costs are the costs associated with the repair, overhaul, replacement, or inspection of a Generating Facility that adhere to the following conditions:*

- 1) *Such costs must vary with the electrical production (i.e., Start-Up/Shut-Down, run-hours, or electricity output) of the resource.*
- 2) *Such costs should reflect future maintenance costs that are expected to be incurred within the service life of the major component of plant or equipment.*
- 3) *Such costs should be consistent with Good Utility Practice.*
- 4) *Such costs should not effect a substantial betterment to the Generating Facility.*
- 5) *If the item is a replacement, it cannot be a replacement of an existing major component of plant or equipment.<sup>10</sup>*

#### Costs must vary with the electrical production

This is the core principle of variable costs and is often the deciding factor in determining whether a cost is VM. For the purposes of O&M costs, the CAISO analyses electrical production in three ways: 1) the electricity output of the resource measured in terms of MWh, 2) the length of time that the unit is committed and producing electricity at or above its minimum load measured in terms of run-hours, and 3) the frequency of starting up the resource or, if the resource is a MSG, transitioning to higher configurations. This means that, for a maintenance cost to be considered variable, it must vary with respect to one of these three measures. Costs that are incurred regardless of these measures are, by definition, fixed. Fixed costs are not recoverable via the CAISO's spot energy markets. The CAISO recognizes that there are sometimes situations where the maintenance initially appears to be calendar-based, but is actually production-based; this is discussed in more detail below.

#### Start-Up/Shut-Down

VM costs also include cost of repair, overhaul, replacement, or inspection related to pre-start, start, and shutdown activities, and return to pre-start standby conditions as long as the costs can be clearly demonstrated as variable.

#### Resource

The CAISO interprets this term to be consistent with the term Generating Facility as defined in Appendix A to the CAISO tariff as “[a]n Interconnection Customer's Generating Unit(s) used for the production and/or storage for later injection of electricity identified in the Interconnection Request, but shall not include the Interconnection Customer's Interconnection Facilities.” For the purposes of negotiating VOM adders, this will broadly include the major components of the

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<sup>10</sup> CAISO tariff section 30.4.5.4.3.1(b) (effective Jan. 1, 2022).

Generating Unit and any plant or equipment in the Generating Facility whose maintenance activities can be shown to vary with electrical production. It will exclude any costs related to the interconnection facilities of the plant.

#### Future maintenance costs

This term means that the costs must be reasonably expected to be incurred at some point in the future. Historical (*i.e.*, sunk) costs cannot be included in the VOM adder. However, historical costs are often useful in estimating future costs. In this case, historical costs can be used as a starting point in estimating future maintenance costs as long as the costs are reasonably expected to be incurred in the future. For example, resources may discover the need for unplanned maintenance during an inspection. If the maintenance has already been performed, the cost to repair these specific issues cannot be included in the VOM adder. However, these unplanned maintenance activities may be an indication that the resource can expect to incur more unplanned maintenance costs in the future. If so, and the market participant can demonstrate that the remaining conditions of the principles are met, the estimate of the costs for unplanned maintenance to be performed in the future would be considered VM costs.

#### Service life (and maintenance intervals)

##### Service life understanding:

This term is used by the CAISO consistent with how it is used in FERC's Uniform System of Accounts (USoA) (18 C.F.R. Part 101) and is assessed at the major component level (see further discussion below). Service life means the period between the date that property is placed in service and the expected date of its replacement or retirement. Because the major component is an integral part of the Generating Facility, the service life of a major component cannot exceed the service life of the Generating Facility as a whole.

Major components' service life may be defined in terms of production or in terms of calendar time. In the former case, service life can be presented in terms of run-hours, start-ups/shut-downs, MWh of production, a permutation of these factors (*e.g.*, factored hours), or a blend of these factors. Service life may also be defined in terms of calendar time.

As a Generating Facility approaches the end of its service life, the SC and resource owner will be confronted with the decision to either perform maintenance actions or retire the resource. This decision will be made based on a variety of regulatory, operational, and financial factors into which the CAISO will not have clear transparency. In these cases, it may not be obvious that the maintenance actions included in the application will be performed prior to the resource reaching the end of its life.

In such situations, the CAISO will ask the SC to support its claim that it will perform the maintenance activities in its application. Such support could include letters from plant engineers about the SC's expectation to perform maintenance outside of the OEM recommendation, future expectations of how frequently the resource will cycle, etc. Because of the uncertainty around retirement decisions, the CAISO will not assess *how well* the

documentation supports the SC's claim but rather only *whether or not* it supports the SC's claim. In other words, if the SC provides reasonable business assumptions, the CAISO will not substitute our assumption for the SC's. In cases where the SC is unable to support their claim that maintenance activities included in the application are indeed expected to be performed, the CAISO will not consider the wear and tear due to the operation of the resource as a VM cost. In other words, reductions in the value of the resource due to the operation of the resource arising from wear and tear that will never be repaired or remediated are not considered a VM cost.

#### Maintenance intervals understanding:

Although not explicitly included in the principle above, the CAISO will refer to maintenance intervals as they are related conceptually to service life. In practice, the maintenance interval is usually defined in terms of either production or calendar time. If the maintenance interval is defined in terms of production (*e.g.*, perform a hot gas path inspection once every 25,000 hours), the costs vary with production and, thus, will be considered VM, subject to the other conditions of the principles.

If the maintenance interval is defined in terms of calendar time (*e.g.*, perform a hot gas path inspection every 10 years), the situation may be more complicated. If the maintenance will be performed regardless of production at the end of the maintenance interval, the costs are not VM costs. However, there are sometimes situations where the maintenance initially appears to be calendar-based, but is actually production-based. For example, a 10-year maintenance interval may be initially defined in terms of calendar time. However, implicit in the estimate of the 10 years is an expectation of how many hours per year the major component will be used (*e.g.*, 2,500 hours per year for 10 years) because of the wear and tear on the unit. In this case, treating the maintenance interval as defined in terms of production (in this example, 25,000 hours) may be appropriate.

#### Major component

The CAISO uses the term "major component" in two situations: 1) in considering the unit of account for assessing service life, and 2) in considering whether a replacement is a VM cost or not. The major component is the "unit of account" on which the CAISO considers these two issues. The unit of account is the level at which the CAISO groups plant and equipment during the negotiation process. For example, for frame combustion turbines, the CAISO defines the major components, and thus the units of account, to be 1) the gas turbine and 2) the generator. The CAISO understands that the individual facts and circumstances of plants vary and thus these major component classifications are only a starting point.

Generally, during VOM adder negotiations, the CAISO assesses the service life at the major component level unless a valid reason can be supplied for an alternative treatment.

During VOM adder negotiations, the CAISO *does not* consider replacement of *major components* to be VM. However, the CAISO does consider replacement of *the constituent parts*

of the major component to be VM, provided that they meet the remaining conditions of the principles outlined above. For example, if the entire turbine needs to be replaced, the costs associated with this are not considered to be VM costs. The rationale for this is that the replacement is not serving to return the major component to a state similar to its original condition (*i.e.*, maintaining it) but rather replacing it entirely. However, the replacement of the compressor would qualify because the compressor is a constituent part of the major component and thus would be a VM cost (assuming the other conditions in the principles are met). The replacement of the constituent part (*i.e.*, the compressor) is performed in order to bring the major component (*i.e.*, the turbine) back to its original condition; in other words, the replacement was performed to maintain the turbine. The unit of account distinction is crucial here because the CAISO needs to be able to distinguish the treatment of the turbine from the treatment of the turbine blade. Table L-4 below shows the list of typical major components by technology:

**Table L-4 – Typical major components by technology**

|   |   |
|---|---|
| <p>- <u>Frame and Aero-derivative CTs</u></p> <ul style="list-style-type: none"> <li>• Gas turbine</li> <li>• Generator</li> </ul>  | <p>- <u>Combined-Cycle Gas Turbines</u></p> <ul style="list-style-type: none"> <li>• Gas turbine</li> <li>• Steam turbine</li> <li>• Generator</li> <li>• Heat recovery steam generator</li> </ul>  |
| <p>- <u>Biomass</u></p> <ul style="list-style-type: none"> <li>• Turbine</li> <li>• Generator</li> <li>• Feedwater system/condensate</li> <li>• Boiler</li> </ul>   | <p>- <u>Geothermal</u></p> <ul style="list-style-type: none"> <li>• Steam turbine</li> <li>• Generator</li> <li>• Feedwater system/condensate</li> </ul>  |
| <p>- <u>Coal and Steam Turbines</u></p> <ul style="list-style-type: none"> <li>• Steam turbine</li> <li>• Generator</li> <li>• Feedwater system/condensate</li> <li>• Boiler</li> <li>• Pulverizer</li> </ul> | <p>- <u>Hydro</u></p> <ul style="list-style-type: none"> <li>• Turbine</li> <li>• Generator</li> <li>• Penstock/intake structure</li> <li>• Penstock control gates</li> <li>• Trash racks</li> <li>• Power house</li> <li>• Reservoir/dams</li> </ul> |
| <p>- <u>Nuclear</u></p> <ul style="list-style-type: none"> <li>• Steam turbine</li> </ul>   | <p>- <u>Internal Combustion Engines</u></p> <ul style="list-style-type: none"> <li>• Engine</li> </ul>  |

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Generator</li> <li>• Steam generators</li> <li>• Feedwater system</li> <li>• Reactor vessel</li> <li>• Reactor cooling pumps</li> </ul> | <ul style="list-style-type: none"> <li>• Generator</li> </ul> |
|--|---|

Other technology types: No defined major components, these will be assessed during individual negotiations

Good Utility Practice

Appendix A to the CAISO tariff defines “Good Utility Practice” in relevant part as

- Any practices, methods, or acts engaged in or approved by a significant portion of the electric utility industry, or
- Any practices, methods, or acts which, in the exercise of reasonable judgement, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practice, reliability, safety, and expedition.

Substantial betterment

FERC’s USoA explains that a substantial betterment is an action “*the primary aim of which is to make the property affected more useful, more efficient, of greater durability, or of greater capacity.*”<sup>11</sup> Substantial betterments improve a resource, not maintain it, and thus are not VM costs.

The USoA also notes that “[w]hen a minor item of depreciable property is replaced independently of the retirement unit of which it is a part, the cost of replacement shall be charged to the maintenance account appropriate for the item, except that if the replacement effects a substantial betterment ..., the excess cost of the replacement over the estimated cost at current prices of replacing without betterment shall be charged to the appropriate electric plant account.”<sup>12</sup> Applying this logic to the CAISO’s principles, this means that some of the costs of a maintenance action that results in a substantial betterment may be considered VM costs and some may not. The “*excess cost of the replacement over the estimated cost at current prices of replacing without betterment*” will not be VM costs, while the remaining costs will be.

Table L-5 below maps the enumerated criteria in the substantial betterment definition to the corresponding Master File/generator resource data template (GRDT) fields. This table is not intended to be exhaustive but rather illustrative.

<sup>11</sup> USoA, Electric Plant Instructions, section 10(C)(3).

<sup>12</sup> *Id.*

**Table L-5 – Mapping of substantial betterment criteria to Master File/GRDT fields**

| <b>Criteria</b>    | <b>Master File field</b> | <b>Examples of substantial betterments</b>   |
|--------------------|--------------------------|--|
| More useful        | FUEL_TYPE                | Allows the resource to burn multiple types of fuel   |
|                    | CONFIGURATION            | Allows the resource to operate as a MSG, e.g., by creating steam augmentation or duct-firing capability  |
| More efficient     | HEAT_RATE                | Decreases the average heat rate of the resource/segment beyond its original operating characteristics    |
|                    | AVERAGE_COST             | Decreases the average cost of the non-gas resource/segment beyond its original operating characteristics |
| Greater durability | N/A                      | Increases the service life of the major component beyond its original design                             |
| Greater capacity   | MAX_GEN                  | Action increases the PMax of the resource beyond its original design                                     |

Although determining whether a substantial betterment has occurred and how it should be treated may seem simple in concept, it can be more challenging in practice. Some activities serve both to bring the resource back to its original condition and to improve the resource. In this case, some of the costs can be VM costs while some are not. The CAISO provides the following hypothetical scenarios which may help determine how to treat substantial betterments of a resource, and proposes some potential cost allocation methodologies. These scenarios presuppose that the other conditions under the VM principles are also met.

**Scenario 1 – Steam turbine**

Service Life: Partially complete (20,000 hours left)

Replacement: Sub-component of a major component (e.g., compressor)

Effects a betterment?: No

Treatment: Cost of replacement is a VM cost

**Scenario 2 – Steam turbine**

Service Life: Complete

Replacement: Major component (e.g., entire turbine)

Effects a betterment?: N/A – turbine is no longer serviceable

Treatment: Cost of replacement is not a VM cost

### **Scenario 3 – Steam turbine**

Service Life: Partially complete (10,000 hours left)

Replacement: Major component (e.g., entire turbine)

Effects a betterment?: N/A – turbine is being replaced

Treatment: Cost of replacement is not a VM cost

### **Scenario 4 – Steam turbine**

Service Life: Partially complete (20,000 hours left, turbine efficiency has decreased by 5% due to operation of the unit)

Replacement: N/A – applying a new coating

Effects a betterment?: Yes, the primary aim of applying the new coating is to make the turbine more efficient (i.e., decrease its heat rate).

Treatment: Some of the costs are VM costs while some are not. Only the costs of the coating that restored the resource are considered VM costs while the remainder are not.

### **Labor Costs**

The cost of labor can be included in any of the cost components discussed above. The primary issue faced by the SC and the CAISO during negotiations is how to categorize the labor costs into fixed and variable components. Consistent with the CAISO's proposed approach for non-labor variable costs, labor costs should be considered variable if they vary with the production of the resource. To determine this, the CAISO links the labor costs with their associated O&M activity.

For example, regular, salaried staff may be involved in the performance of maintenance work on a turbine blade that needs to be repaired due to wear and tear caused by starting the unit. In this case, the actual dollar value of the labor cost would not fluctuate with output, run-hours, or starts because the employee is salaried. However, because the turbine blade needed to be replaced due to the variable operation of the unit, the component of the salaried worker's pay related to this repair should be considered variable and thus included in VM costs. If a contractor were brought in to perform this same work, the cost of the contractor would also be considered a VM cost for the same reason.

Conversely, suppose a contractor or personnel from another plant are brought in to perform routine, annual maintenance on the road leading to the facility (the wear and tear on which can be reasonably expected to *not* vary with MWh of output, run-hours, or starts of the resource). Because the associated maintenance activity is not affected by the operation of the unit, these costs would be considered to be fixed maintenance costs and not VM costs.

## L.4.5 Negotiation timelines

During the negotiation process, the CAISO is subject to timelines prescribed by the CAISO tariff that are intended to ensure that the negotiation is progressing in a timely manner. Although the tariff specifies a number of timelines, the two most relevant from the SC's perspective are:

- The 15-business-day window that will go into effect on April 1, 2022, during which window the CAISO will review the VOM adder application to determine whether the information provided by the SC is sufficient and accurate to determine a reasonable negotiated VOM adder.<sup>13</sup> This means that, for each iteration of information submitted by the SC, the CAISO will respond within 15 business days with either further requests for information, notification that the information submitted by the SC is sufficient and accurate, or notification that the values proposed by the SC are accepted accompanied by a request that the SC confirm the final values.
- The 10-day window (effective January 1, 2022) and the 10-business-day window (effective April 1, 2022) during which the CAISO will determine a reasonable negotiated VOM adder.<sup>14</sup> In certain cases, the CAISO needs more time than the 15-business-day window discussed above to determine a reasonable negotiated VOM adder. In these cases, the CAISO will notify that sufficient and accurate information exists but will not provide the final values to the SC. After that notification is provided, the CAISO will have 10 days (effective January 1, 2022) or 10 business days (effective April 1, 2022) to provide the final values to the SC and request confirmation from the SC.

## L.4.6 Renegotiation scenarios

All negotiated VOM adders approved are only applicable to the specific resource or configuration (if the resource is a MSG) that is active in the Master File and the associated SC that negotiated the VOM adder. Under the circumstances described below, the CAISO will review negotiated VOM adders to determine whether a potential renegotiation or termination of the negotiated VOM adder is appropriate:

1. *Change in SC*
  - a. resource switches from the SC that negotiated the VOM adder to another SC
  - b. resource is acquired by a different SC through a merger or acquisition but keeps the same SC identifier in the Master File.
2. *Change in resource attributes*

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<sup>13</sup> From May 17, 2021 until April 1, 2022, there will be no window in which the CAISO must perform the review described above. CAISO tariff section 30.4.5.4.3.2 (effective May 17, 2021). Starting on April 1, 2022, the 15-business-day window will go into effect. CAISO tariff section 30.4.5.4.3.2 (effective Apr. 1, 2022). The CAISO discusses its review procedures during this interim period further in section L.5.2 below.

<sup>14</sup> CAISO tariff section 30.4.5.4.3.2 (effective Jan. 1, 2022); CAISO tariff section 30.4.5.4.3.2 (effective Apr. 1, 2022).



- a. resource changes ID/name in the Master File
  - b. resource switches to a MSG from a non-MSG or vice versa
  - c. resource PMin/PMax changes
  - d. resource or a configuration within a MSG retires<sup>15</sup>
  - e. resource changes generation technology or fuel type in Master File
3. *Change in Variable Operations costs or Variable Maintenance costs*
    - a. conditions underlying a resource's original negotiated VOM adder application are no longer applicable or accurate
  4. *Change in any other material item which might affect the approved negotiated VOM adder.*

It is the responsibility of the SC to ensure that the conditions and data underlying any negotiated VOM adder for a resource accurately reflect current conditions and to notify the CAISO of any changes that may affect the SC's negotiated VOM adder. To the extent that any negotiated VOM adder for the resource requires modification or reinstatement after termination, the corresponding SC for the resource should submit an updated VOM adder application to the CAISO. To the extent that the CAISO identifies a situation that require the termination of negotiated VOM adder values, the SC will also be responsible for submitting a new or updated application as appropriate if the SC desires. As noted above, SC changes require termination of negotiated VOM adders that were negotiated by previous SC. In such cases, the CAISO will set the resources VOM adder values to the default values discussed in section L.3.

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<sup>15</sup> See the retirement scenarios contained in section 12 of the BPM for Generator Management. For the purposes of these renegotiations, scenarios 1-3 will be considered retirements. Changes in status from scenario 4 to scenario 1, 2, or 3 will also be considered retirements. Although these scenarios technically only apply to resources in the CAISO balancing authority area, the CAISO will attempt to apply a similar methodology to resources that participate in the Energy Imbalance Market (EIM).

## L.5 Negotiations during transition period

*Note: this section will only be relevant until 4/1/2022, at which time it should be considered to have been removed from the BPM.*

The purpose of this section L.5 is twofold: 1) to clarify the treatment of any existing major maintenance adders (MMA) and negotiated VOM adders as of 12/31/2021, and 2) to explain the set of de-activation and activation dates for CAISO tariff provisions regarding negotiated VOM adders.

### L.5.1 Treatment of existing MMA and negotiated VOM values

In general, the CAISO will allow SCs to grandfather in existing MMA values and negotiated VOM adder values. On 1/1/2022, a resource’s existing MMAs will automatically convert to being VOM-ML adders and/or VOM-SU adders, keeping the same \$/run-hour or \$/start values. Similarly, on 1/1/2022, existing negotiated VOM adders (\$/MWh) will automatically convert to being VOM-EN adders, keeping the same \$/MWh values.

Upon implementation of the O&M cost framework described herein, some participants with resources that have grandfathered VOM adders (*i.e.*, legacy MMAs or negotiated VOM adders) may wish to negotiate the VOM adders under the new cost framework and categorization principles. In such cases, the CAISO will allow SCs to elect one of two options: 1) negotiate all VOM adders as a package<sup>16</sup> and terminate the grandfathered VOM adders, or 2) negotiate a subset of VOM adders under the new cost framework and categorization principles, as elected by the SC, with the remaining VOM adders being set to the new default VOM adder values. These two options will eliminate the risk of double-counting of costs between the grandfathered VOM adders and the new VOM adders that may arise from the proposed changes to the cost framework and categorization principles.

The options available to SCs effective 1/1/2022 are summarized in table L-6 below:

**Table L-6 – Implementation approaches**

| Situation                               | Implementation Options  |
|---|---|
| Resources <u>with no</u> negotiated MMA | On 1/1/2022, unless the resource negotiates resource-specific values during the transition period discussed below, the CAISO will <i>automatically</i> assign these resources a resource-specific default VOM-ML or VOM-SU adder based on the resource’s technology |

<sup>16</sup> For example, suppose a SC has a resource with a legacy negotiated VOM adder but with no legacy MMAs. Under this option, if the SC wishes to negotiate a VOM-ML adder, the SC would be required to negotiate both the VOM-ML adder and a new VOM-EN adder to “replace” the legacy negotiated VOM adder.

|   |   |
|---|---|
|   | <p>type, PMax, and the default VOM adder values presented in table L-1 above.</p>   |
| <p>Resources <u>with</u> a negotiated MMA</p>     | <p>The CAISO will allow these resources to keep their existing MMA values. The CAISO will not automatically switch any resources with a previously negotiated MMA over to the new <i>default</i> VOM-ML or VOM-SU adders. Instead, the MMA values will be “converted” to <i>negotiated</i> VOM-ML or VOM-SU adders. This means that their VOM-ML or VOM-SU adders under the new framework will have the same values as their legacy minimum load or start-up MMAs.</p> <p>However, as noted in section L.4.6, circumstances may arise that would trigger a review or renegotiation of a legacy MMA. This includes situations such as changing from a non-MSG to a MSG, changes in technology type, change of SCs, etc. In such cases, the CAISO has the discretion to terminate the existing negotiated value and negotiations would then take place under the new cost principles. This is explained in further detail in section L.5.2.</p> <p>If the participant wishes to use the new default VOM-ML or VOM-SU adders, it can contact the CAISO to switch over to the new values. The negotiations after that point would be carried out under either of the two options described above in this section L.5.1.</p> |
| <p>Resources with a <u>default</u> VOM adder</p>  | <p>On 1/1/2022, unless the resource negotiates resource-specific values during the transition period discussed below, these resources will be <i>automatically</i> assigned to the default VOM-EN adder value based on their technology type.</p>   |
| <p>Resources with <u>negotiated</u> VOM adder</p> | <p>These resources will be allowed to keep their existing negotiated VOM adder values. The CAISO will not <i>automatically</i> switch any resources with a previously negotiated VOM adder over to the new <i>default</i> VOM-EN adder. Instead, the VOM values will be “converted” to a <i>negotiated</i> VOM-EN adder. This means that their VOM-EN adder under the new framework will have the same value as their legacy negotiated VOM adder.</p> <p>However, as noted in section L.4.6, circumstances may arise that would trigger a review or renegotiation of a legacy negotiated VOM adder. This includes situations such as changing from a non-MSG to a MSG, changes in technology type, etc. In such cases, the CAISO has the discretion to terminate the existing negotiated value and negotiations would then take place under the new cost principles.</p> <p>If the participant wishes to use the new default VOM-EN adder, it can contact the CAISO to switch over to the new value. The negotiations after that point would be carried out under either of the two options described above in this section L.5.1.</p>   |

## **L.5.2 Transition period between previous and new cost framework and categorization principles**

This section outlines the CAISO's plan to handle the potential influx of negotiations requests before and immediately after the new default VOM adder values go into effect on 1/1/2022.

The CAISO tariff provisions that apply to sections L.1 – L.4 will be effective on 1/1/2022, with the exception of the negotiation timelines discussed in section L.4.5 which will be effective on 4/1/2022. At the time of publication of this version of the BPM for Market Instruments (mid-2021), except for the provisions regarding the negotiation timelines (CAISO tariff section 30.4.5.4.2 as revised effective 5/17/2021), the tariff provisions relating to the previous O&M cost framework will remain in place. Beginning on 5/17/2021, the negotiation timelines will be suspended until 4/1/2022 to allow time for the CAISO to complete negotiations under the new framework and updated cost categorization principles. The CAISO will refer to the period from 5/17/2021 to 4/1/2022 as the “transition period.”

The CAISO breaks the transition period into several shorter phases as described below. During each phase of the transition period, different sets of timelines and rules will apply. The CAISO will use the remainder of this section to clarify its expectations of SCs during each phase. The phases are:

### **Phase 1 negotiations (5/17/2021 to 6/18/2021)**

In Phase 1, participants will have a time window between 5/17/2021 and 6/18/2021 to apply for VOM adder values under the new cost framework and categorization principles.<sup>17</sup> Phase 1 is when the CAISO prefers most applications to be handled, as this will reduce the pressure on the CAISO and SCs by spreading the negotiations over a multi-month period. For applications submitted during this period, CAISO will aim to complete negotiations before 1/1/2022, the date on which the new default VOM adder values go into effect. This assumes no major disputes are raised in the negotiation process. Any Phase 1 negotiations successfully completed before 12/17/2021 will go into effect on 1/1/2022. Any negotiations completed after 12/17/2021 will go into effect as soon as practicable.

To submit an application for VOM adders under the new cost framework and categorization principles, SCs should follow the process outlined in sections L.4.2 and L.4.3. The application process is very similar to how applications for MMAs and negotiated VOM adders take place currently. The CAISO requests that SCs follow the guidance below to differentiate between

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<sup>17</sup> As discussed above, for those resources with an existing negotiated MMA and VOM adder, the CAISO will permit those resources to negotiate an entire package of VOM adders under the new framework or a subset of the VOM adders, with the remaining adders being set to the default values specified in the CAISO tariff.

applications under the currently existing (as of mid-2021) cost framework and applications under the new cost framework:

- For applications under the new framework, SCs should add the text – “NEW O&M FRAMEWORK - in the CIDI ticket description. These negotiations will be handled on a first-come first-served basis. Applications that do not have this text in them will be treated as applications under the current framework. With the potential for a higher volume of negotiations, for Phase 1 the CAISO has eliminated the 15-day CAISO review period as discussed in section L.4.5.
- For applications under the current framework, the SC should add the text “CURRENT O&M FRAMEWORK – in the CIDI ticket description. The previously existing Attachment L should guide negotiations under the current framework, not this updated Attachment L. The CAISO will work to handle these applications in a timely manner, ideally in line with the CAISO tariff timelines that existed prior to 5/17/2021. The CAISO expects that applications under the current framework will only be submitted for a limited set of circumstances: resources changing SCs, recurring/annual adjustments for factors such as inflation, changes to the underlying O&M costs of the resource, etc. Applying for MMAs or negotiated VOMs under the current framework is not a “back door” for SCs to use with the intent of having their values be grandfathered in under the new framework.

### **Phase 2 negotiations (6/19/2021 to 12/31/2021)**

Phase 2 will apply to applications submitted between 6/19/2021 and 12/31/2021. For applications submitted during this period, *the CAISO gives no assurance that negotiations will be completed by 1/1/2022*. This is the difference between Phase 1 and Phase 2. Although the CAISO will do its best to work with market participants to complete negotiations before 1/1/2022, the potentially large number of negotiation requests that the CAISO anticipates receiving during this period may make it administratively infeasible for the CAISO to complete negotiations before 1/1/2022.

Similar to Phase 1, these negotiations will be handled on a first-come first-served basis and would not be subject to the 15-day period discussed in section L.4.5. The same CIDI ticket guidance from Phase 1 also applies during Phase 2.

### **Phase 3 negotiations (1/1/2022 to 3/31/2022)**

Phase 3 negotiations are effectively the same as Phase 2 negotiations with one exception. As there will be only one relevant O&M cost framework, no applications under the previous O&M cost framework (*i.e.*, the framework that existed prior to 1/1/2022) will be considered. Starting on 4/1/2022, negotiations will be handled according to the negotiation timelines required by the CAISO tariff as discussed in section L.4.5.

### **L.5.3 Guidance for entities joining the CAISO EIM in 2022**

Entities that are joining the EIM in 2022 will negotiate all of their VOM adders under the new framework that is effective 1/1/2022. The CAISO encourages these entities to review section L.2 to better understand the relevance of proxy costs to their participation in the EIM. After that, the CAISO recommends reviewing the default VOM adder values from section L.3 as these may help the EIM entity avoid some time-intensive negotiations prior to EIM go-live.