California ISO

Stakeholder Comments Template

Variable Operations and Maintenance Cost Review

This template has been created for submission of stakeholder comments on the Variable Operations and Maintenance Cost Review straw proposal. The proposal, stakeholder meeting presentation, and other information related to this initiative may be found on the initiative webpage at: http://www.caiso.com/StakeholderProcesses/Variable-operations-maintenance-cost-review.

Upon completion of this template, please submit it to initiativecomments@caiso.com. Submissions are requested by close of business on **January 21, 2020**.

Submitted by	Organization	Date Submitted
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Please provide your organization's comments on the following issues and questions.

1. Proposal Component A: Establish definitions for the O&M cost components

Please provide your organization's feedback on establishing definitions for the O&M cost components as described in section 4.1. Please explain your rationale and include examples if applicable.

APS is supportive of the definitions in section 4.1, but would like to propose the following for consideration. We believe that the straw proposal disallows all predictive and preventive maintenance as it is labeled as fixed cost in Table 1. It is APS' belief that predictive and preventive maintenance related to run hours or start-ups should be allowed as variable costs. For example, we perform preventive maintenance overhauls on pulverizers at intervals of 3,000 run hours. We agree that predictive and preventive maintenance that is strictly time based would not be considered as a variable cost. Many in the industry will continue to progress from a time based predictive and preventive maintenance approach to a "meter" based approach, with the "meter's" signal based upon starts, run hours, product throughput, etc. and should be allowed to categorized such maintenance as variable cost.

Please provide your specific feedback on adding the following condition to the definition of Variable Maintenance Costs (as per page 10 of the straw proposal): "*Such costs should not represent significant upgrades to the unit or significantly extend the life of the unit.*"

APS is supportive of excluding capital projects that upgrade the unit. APS believes the "betterment" definition discussed on the call may be an acceptable definition of these activities. APS is supportive of the intent to not allow infrequent upgrades or additionality to units' capabilities that do not vary with production of electricity. Costs for routine or major maintenance required to maintain the unit's ability to operate should be allowed as variable maintenance costs, both during and beyond the unit's original design life. Costs to upgrade the unit which are specifically intended to extend the life for example, additional emissions control equipment, should not be included in variable maintenance costs.

Please provide your organization's position on establishing definitions for the O&M cost components as described in section 4.1. (Please indicate Support, Support with caveats, Oppose, or Oppose with caveats)

Support with caveats discussed in sections above.

2. Proposal Component B: Refine Variable Operations Adders

Please provide your organization's feedback on the ISO's proposal to refine variable operations adders as described in section 4.2. Please explain your rationale and include examples if applicable.

APS supports the concept to re-categorize from VOM to VO as proposed in the document, with the variable maintenance adder being recovered via $/start-up, $/run hour and/or $/MWh. In review of the values proposed for VO for advanced CT's we calculated a higher amount of VO dollars per MWh than is proposed. The cause of this could be differences in unit age (even if same model) and initial build quality of the resources. It could be appropriate to adjust for the age of units and or initial build quality in calculation of default VO and MA values.

Please provide your specific feedback on the updated technology groups proposed in section 4.1. Specifically, please provide your feedback on the relative merits of greater accuracy in the estimation of default VO adders versus the complexity and burden of assigning resources to the more-detailed technology groups.

The technology groups listed are sufficient in APS' view to cover most units, most of the time. We also agree that the advanced definitions seem appropriate for the CC and CT technology types. The only additional comment would be the consideration to

add battery storage depending on the outcome of the ESDER initiative, as was discussed on the stakeholder call.

Please provide your organization's position on the ISO's proposal to refine variable operations adders as described in section 4.2. (Please indicate Support, Support with caveats, Oppose, or Oppose with caveats)

Support.

3. Proposal Component C: Calculate Default Maintenance Adders

Please provide your organization's feedback on calculating default maintenance adders as described in section 4.3. Please explain your rationale and include examples if applicable.

APS believes that this section requires the most refinement in the proposal. The regressions performed showed a low explanatory value of the PMax to the variable maintenance costs incurred. In terms of converting the representative unit to the resource specific unit we believe that a better way (if possible) would be by estimating the difference in run-hours or start-ups between the representative unit and the resource specific unit. This belief is based on the assumption that start-ups/run hours drive variable maintenance and not the PMax.

An additional solution to avoid the need to scale by PMax is to develop buckets of representative resources for each technology in which Pmax and efficiency of units is considered. To accomplish this an analysis may need to be performed to establish buckets that are representative of different quartiles of resources in the market. The utilization of efficiency of unit will allow for the bucket to better align with drivers of variable maintenance costs (run hours and start-ups).

If the MA must utilize a formula based on the resource specific Pmax vs. the representative unit PMax, then we would propose determining the scalar factor (60% proposed), by utilizing the actual regression slope of the line for each technology type. Also, the validity of the data utilized for the original straw proposal calculation should be evaluated as the Pmax for the combined cycle technology type appear not to be representative of units currently participating in the market (component vs configurations). In addition, the current scalar formula provided in the straw proposal applies a 60% reduction to the maintenance adder for all Pmax adjustments, not working as discussed in the workshop to reduce the impact of the Pmax ratio.

Our internal analysis on advanced CT costs drivers showed that starts accounted for roughly 90% of variable maintenance with run hours accounting for the remaining 10%. Although there is engineering subjectivity involved in assigning cost drivers we wanted to propose CAISO and stakeholders to look closer at the current 50/50 split between starts and run-hours in the straw proposal as part of the stakeholder process.

As renewable integration increases, peaker type advanced CT's will likely see their run profiles shift to more starts and shorter run times. We request that the underlying data be released if allowed, or those with subscriptions to S&P be directed to what was used in the proposal, so that we could analyze the data to see if we can determine a better correlation.

Please provide any additional sources of O&M cost information (cost estimates, OEM recommendations, etc.) which you think would be appropriate for the ISO to review during this stakeholder process. If you would like to provide resource-specific data, the ISO can receive this information confidentiality.

In reviewing the cost information utilized to calculate the default maintenance adder we wanted to propose that it may be more accurate to consider maintenance cycles rather than annual maintenance costs. The basis for this recommendation is that some large variable maintenance costs may not be incurred on an annual basis and would not be represented. A shift to a maintenance cycle would allow for better alignment of variable costs to be spread over the cost driver (run hours/starts per maintenance cycle). An approach to achieve this may be to compile the maintenance schedules (outage to outage) as defined by the unit OEMs and representative costs for the recommended maintenance activities plus an adder for some level of corrective maintenance. Alternatively, if using historic cost data, it must be over a larger time period than a single year. An outage to outage cycle time period would capture the costs associated with maintenance more accurately. The cost data must align with consistent operational data (starts, run hours) to provide a meaningful maintenance rate ($/start or $/run hour).

Please provide your organization's position on calculating default maintenance adders as described in section 4.3. (Please indicate Support, Support with caveats, Oppose, or Oppose with caveats)

Oppose with caveats.

4. Implementation of Proposal

Please provide your organization's feedback on the suggested implementation details described in section 5. Please explain your rationale and include examples if applicable.

APS believes the implementation plan is reasonable and that those resources that have been negotiated prior to 1/1/2020 should be allowed to keep the current negotiated rates with caveats outlined in BPM on Market Instruments. APS would

support the change to 15 business day response time for MA negotiations and questions.

Please provide your organization's position on the suggested implementation details described in section 5. (Please indicate Support, Support with caveats, Oppose, or Oppose with caveats)

Support

Additional comments

Please offer any other feedback your organization would like to provide on the Variable Operations and Maintenance Cost Review straw proposal.