



California ISO

2026 Variable Operations and Maintenance Cost Review – Straw Proposal

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Market Analysis

Stakeholder Meeting
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Engagement Best Practices



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CAISO Policy Initiative Stakeholder Process



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Summary of the straw proposal

- CAISO has committed to reviewing the default Variable Operations and Maintenance (VOM) adders triennially
- The previous review occurred in 2023, making 2026 the next appropriate cycle for review
- CAISO proposes an 9.84% inflation increase to the default VOM adder values based on inflation from June 2023 to May 2026
- CAISO is proposing a new default variable operations costs for storage resources of \$14.74/MWh

Background on VOM adders

- Scheduling coordinators (SCs) register VOM adders with CAISO to reflect their resources' cost of operations (e.g., consumables) and maintenance (e.g., wear-and-tear) in CAISO markets
- VOM adders are used in the calculation of:
 - Default energy bids (DEBs), used to replace bids if resource is mitigated in the market power mitigation process
 - Default commitment costs, used to cap the minimum load cost, startup cost, and transition cost bids submitted by SCs
- VOM adders are set at “default” values or can be negotiated if the default values are insufficient
- Default VOM adders were established based on industry-wide cost studies and various external sources; the defaults have been reviewed and updated in each triennial review cycle
- In the 2023 review cycle, CAISO increased the default VOM adders by 18.73% based on inflation from December 2019 to June 2023

Key factors considered for default VOM adder review

- Inflation
 - Since the last review cycle, inflation has increased 9.84% from June 2023 to March 2026*
- Frequency of VOM negotiations
 - CAISO continues to conduct a steady amount of VOM negotiations with SCs
 - If default values were too low, there would be a high volume of VOM negotiations; if values were too high there would be infrequent VOM negotiations
 - Does not indicate whether an update is warranted
- Broader industry-wide study
 - Current default VOM adders sufficiently cover the range of technologies seen participating in the market; another cost study is not necessary

*Based on the US Bureau of Labor Statistics Consumer Price Index for All Urban Consumers (<https://www.bls.gov/cpi/data.htm>)

Overall stakeholder feedback supported the inflation adjustment

- Idaho Power Company (IPCO) requested additional transparency into the existing set of negotiated VOM adders
 - These adders are resource-specific and reflect unique characteristics thus may not be representative of the broader population
 - These adders are not the basis for the default VOM adder update
- IPCO suggested anchoring the inflation slightly higher in anticipation of expected increases till the next review cycle
 - Future inflation is particularly uncertain
 - However, CAISO has updated the inflation rate to reflect the most recent BLS CPI data

Proposed increase to default VOM adders

- CAISO proposes to adjust the default VOM adders based on Consumer Price Index data from the US Bureau of Labor Statistics from June 2023 to May 2026 (9.84% increase)

Current Values

Technology Type	Default VOM-EN Adder (\$/MWh)	Default VOM-ML Adder (\$/run-hour/MW)	Default VOM-SU Adder (\$/start/MW)
Coal	3.19	-	-
Steam turbines	0.39	-	-
Natural gas-fired combined-cycle	0.70	2.07	-
Frame combustion turbines	1.15	-	61.89
Aeroderivative combustion turbines	2.55	5.20	-
Reciprocating internal combustion engines	1.31	-	-
Nuclear	1.28	-	-
Biomass	1.96	-	-
Geothermal	1.38	-	-
Landfill gas	1.44	-	-
Hydroelectric	-	0.77	-
Solar	-	-	-
Wind	0.33	-	-

Inflation Adjusted Values

Technology Type	Default VOM-EN Adder (\$/MWh)	Default VOM-ML Adder (\$/run-hour/MW)	Default VOM-SU Adder (\$/start/MW)
Coal	3.50	-	-
Steam turbines	0.43	-	-
Natural gas-fired combined-cycle	0.77	2.27	-
Frame combustion turbines	1.26	-	67.98
Aeroderivative combustion turbines	2.80	5.71	-
Reciprocating internal combustion engines	1.44	-	-
Nuclear	1.41	-	-
Biomass	2.15	-	-
Geothermal	1.52	-	-
Landfill gas	1.58	-	-
Hydroelectric	-	0.85	-
Solar	-	-	-
Wind	0.36	-	-

Background on variable operations costs for storage resources

- The variable operations costs for storage resources is used to reflect costs associated with the battery operations, including cycling and cell degradation costs
- The variable operations cost is a component of the storage DEB which is available only to EDAM storage resources; WEIM storage resources can select a negotiated DEB which may include the variable operations cost as a component
- SCs may opt to negotiate a variable operations costs for storage resources. If the SC does not negotiate a variable operations cost, a value of \$0/MWh is used.
- Negotiating a value can be administratively burdensome, and with over 16,000 MW of batteries in the market, a default variable operations cost is warranted

Key factors considered for default variable operations cost

- The ISO explored four options based on existing negotiated values
- Existing values are based on different types of supporting documentation, and fall into different OEM groups

Supporting Document Type	Number of resources with active negotiated value	Average Value (\$/MWh)	Median Value (\$/MWh)
LTSA	39	17.87	14.74
PPA	6	28.23	31.20
Projection	16	34.48	30.82
Total	61	23.25	19.43

OEM Group	Number of resources <i>with active negotiated value</i>	Average Value (\$/MWh)	Median Value (\$/MWh)
OEM 1	10	22.32	25.00
OEM 2	24	22.82	16.00
OEM 3	14	20.84	28.05
OEM 4	13	27.36	14.74
Total	61	23.25	19.43

Overview of the four options for a default variable operations cost

- Option 1: Long-term service agreements (LTSA)-based values
 - LTSA = contractual arrangement between a resource owner/operator and a service provider; maintenance is predefined based on Original Equipment Manufacturer (OEM) recommendations
 - LTSA provides a reliable and contractually supported basis for cost estimation across most registered cases
 - Currently 39 of 61 (64%) of registered variable operations costs are based on LTSA
 - The median value from LTSA-based variable operations cost applications is \$14.74/MWh; the mean value is \$17.87/MWh
 - The CAISO's recommended option is the median value of \$14.74/MWh since it is reflective of actual variable operations costs directly from OEM and not skewed by outliers

Overview of the four options for a default variable operations cost

- Option 2: All active negotiated values
 - This option reflects the full set of active negotiated values which includes values based on Power Purchasing Agreements (PPAs) or future cost projections
 - The median variable operations cost from all active negotiated values is \$19.43/MWh; mean value is \$23.25/MWh
 - This option is not recommended because PPA-based and projected cost-based do not provide visibility into the costs covered and if any inappropriate costs are included

Overview of the four options for a default variable operations cost

- Option 3: Manufacturer-based values
 - Due to variations in cost structure across different OEMs, this approach introduces different values according to the manufacturer
 - This approach is conceptually similar to VOM categorization based on fuel and technology type
 - At current stage, the dataset is not large enough to support robust categorization and validation, this option is not recommended
 - CAISO plans to keep gathering information to refine this option for future review cycles

Overview of the four options for a default variable operations cost

- Option 4: Status quo values
 - Keep the existing process where the variable operations cost used is \$0/MWh if no value is registered
 - Continuing to evaluate incoming negotiations to allow for the development of a more comprehensive dataset over time
 - Over time, having a larger dataset may provide a more representative cost but would require SCs to continue to negotiate a value

Overall stakeholder feedback did not oppose CAISO recommended Option 1

- Idaho Power and NV Energy indicated that Option 2 would be preferred option
 - Option 2 includes PPA-based and projected cost-based values neither of which reflect the actual costs, compared to LTSA-based values
 - PPA-based values do not provide transparency into what types of operations costs are covered such that CAISO cannot assess whether they are reflective of actual costs; projected cost-based values are future projections which are not actual costs
- Idaho Power suggested the mean for Option 1 is more appropriate than the median if the dataset has already been vetted
 - Even if the values were reviewed and approved, there may still be outlier values that are specific to individual resources
 - A mean value would be skewed by the outliers and misrepresent variable operations costs of the broader storage resource fleet

Overall stakeholder feedback did not oppose CAISO recommended Option 1

- CESA suggested an inflation adjustment for the default variable operations cost
 - The underlying dataset of existing negotiated values includes inflation already
 - Performing an inflation adjustment may misrepresent the values negotiated by SCs

Proposed value for default variable operations cost

- The CAISO's recommended option is the median value of \$14.74/MWh since it is reflective of actual variable operations costs directly from OEM and not distorted by outliers

Current Values

Variable Operations Costs for Storage Resources	0
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Proposed Values

Variable Operations Costs for Storage Resources	Option 1	Option 2	Option 3	Option 4
	14.74	19.43	By manufacturer	0

Next Steps

- Stakeholders are encouraged to submit comments using the commenting tool no later than July 23
- Publish Final Proposal and Draft Tariff Language by August 6
- <https://stakeholdercenter.caiso.com/RecurringStakeholderProcesses/2026-Variable-operations-maintenance-cost-review>
- Contact us at Stakeholder Affairs at ISOStakeholderaffairs@caiso.com or bmarquez@caiso.com

Please note that the dates above are tentative until the CAISO publishes a notice formally confirming them

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