As Submitted into CAISO Portal 11-5-2026

California ISO

Submit comment on 10/9 and 10/23 meeting
Initiative: Resource adequacy modeling and program design

1. Please submit your organization's overall feedback on the Resource Adequacy Modeling and Program Design (RAMPD) Track 2 meetings held on 10/9 and 10/23.

LSA and CalWEA's main impression about the meetings are as follows:

- **The Proposal fails to justify the need for a reformed RAAIM generally, and in particular, for continued RAAIM after Unforced Capacity (UCAP) is implemented**. As explained further below, imposition of both mechanisms will penalize resources twice for the same Forced Outages (or, given common PPA penalties for Forced Outages and related unavailability measures, these will actually be triple penalties).

- **The Proposal still fails to justify RAAIM exemption revocation for Variable Energy Resources (VERs).** No evidence has yet been presented showing that current market and PPA incentives are insufficient to incent high VER availability, that the original reasons forn the exemption no longer apply, or that that this additional penalty will increase VER availability. LSA's questions at the meeting on these topics were "answered" only with vague generalities, citing the mechanics (see below) and not substantive responses.

- **The Proposal does not address the numerous open substantive questions** about how CAISO proposes to apply RAAIM even to resources that are currently subject to it, as shown by: (1) the CESA presentation; (2) concerns expressed by many that the outage-reporting changes are beyond initiative scope, and that UCAP form and implementation should be more settled before RAAIM is modified. (LSA and CalWEA demonstrate below that the proposed methodology, as applied to VERs, is unjust and unreasonable.)

- **The Proposal still does not explain the need for revoking the RAAIM exemption for resources less than 1MW**, given the complexity and relative huge burden the proposal would impose on those resources. (See response to Q#11 below for further discussion.)

2. Please submit your organization's overall feedback on the second revised straw proposal that was posted on 10/2.

The Second Revised Straw Proposal is not responsive to any of the major concerns raised in earlier comment submittals. LSA and CalWEA strongly recommend:

- **Removal of the proposals revoking the VER RAAIM exemption**, because:
  - The CAISO "background data" do not actually present any VER data, or any evidence that VER availability is any concern at all. In other words, this proposal appears to be a solution in search of a problem, and the CAISO should not be proposing a "solution" to a problem it has not demonstrated.

- The Proposal materially mischaracterizes the rationale for the VER exemption, and does not address the main reasons for the exemption or present any evidence that those reasons have changed.

- The proposed methodology for applying RAAIM to VERs is fundamentally flawed (see response to Q#3 below).

- The CAISO has not yet addressed important issues related to resources already subject to RAAIM; it should do so before expanding RAAIM applicability.

- **Return to the CAISO's original position that RAAIM will be eliminated once UCAP is implemented.** The CAISO's earlier statements regarding duplication of penalties, where penalties are imposed for Forced Outages and then RA value is reduced for the same Forced Outages, are duplicative, creating higher cumulative penalties for the same outage. Thus, RA Resources should not be subject to both UCAP and RAAIM.

The reasons for these recommendations are further explained below.

VER exemption issues

The Proposal states (at p.25) that "VERs are currently categorically exempt from generic RAAIM, recognizing their limited ability to change output when wind or solar conditions constrain output." The Proposal goes on to propose a mechanical formula that supposedly addresses this lack of control (see response to Q#3 below).

However, this is a materially incomplete mischaracterization of the reasons for the current VER exemption. **Because the Proposal misstates the reasons for the current exemption, it fails to examine whether they continue to apply** (which they do).

CAISO's own earlier words state the rationale for the VER exemption from RAAIM much more accurately. For example, the October 14th, 2014 Reliability Services Initiative Second Revised Straw Proposal stated as follows:

> **6.13.2. Wind and solar resources**
>
> If wind or solar resource is shown as system or local RA, the ISO proposes to exempt the resource from the availability incentive mechanism for two reasons. First, wind and solar resources typically are procured under contracts that either provide payments for energy produced or have severe penalties for under-performance. In their September 5, 2014 comments LSA stated, "…virtually all PPAs for wind/solar resources provide payments only for energy produced, i.e., there is no capacity payment and all PPA revenues are completely dependent on maximum equipment availability and production. Moreover, these PPA contain multipliers that provide for higher payments (and thus even greater availability/production incentives) during hours that are designed to be highly correlated with system needs."
>
> Additionally, the ISO has reviewed the recent drafts of the Investor Owned Utilities' 2014 pro forma contracts for renewables awaiting approval by the CPUC. The ISO's understanding of at least some of these contracts is that they have provisions for non-performance. Given that these contracts are specific to wind and solar and are extremely standardized (unlike contracts for other resource types) the ISO potentially would be penalizing renewables for non-performance without this exemption.
>
> Second, the only way to assess wind and solar under the proposed methodology is to use the resource's forecast as a baseline for comparison….

The CAISO's May 29th, 2015 Reliability Services Initiative tariff filing at FERC (https://www.caiso.com/documents/may29_2015_tariffamendment_implement_phase1a_reliabilityservicesinitiative_er15-1825.pdf), which resulted from this initiative, echoed and expanded on these VER policies (at pp.75-77 of the cover note) (highlights added).

b. Exemptions from RAAIM Provisions Applicable to only Local and System Resource Adequacy Capacity

Four categories of resources will be exempt from the RAAIM provisions applicable to only local and system resource adequacy capacity. These exemptions ensure that resources are not double-penalized for poor performance….

(i) Variable energy resources

Variable energy (primarily wind and solar) resources will be exempt from the local and system RAAIM provisions. There are several reasons for this exemption. The amount of resource adequacy capacity variable energy resources may provide is dependent on historical performance. The expectation is not that the resource will be able to meet this performance level in every hour, but that on average the resource will be able to provide this much capacity.

Unlike an energy bid for thermal generation, the forecast may exceed the variable energy resource's resource adequacy capacity value. It also is expected that it would be less than this value because the forecast is merely an average over a long period of time and not an hourly expected minimum value. Therefore, it would be overly punitive to assess variable energy resources similar to thermal generation and hold them responsible in every hour up to their local or system resource adequacy capacity values.

One alternative would be to assess a variable energy resource under the RAAIM using the resource's forecast as a baseline for comparison. However, such an alternative approach would be problematic for several reasons.

First, the forecast to some extent captures outages. This is because it is unlikely the entire variable energy resource will go on outage and instead a single turbine or panel may not be working. This will simply lower the forecast for the resource or potentially not impact the forecast at all… In practice, variable energy resources very rarely entirely go on outage, and their outages are typically outages that would exempt them from the RAAIM anyway (e.g., due to testing, CAISO equipment malfunction, etc.)

Creating this functionality for variable energy resources would be overly burdensome for the CAISO settlements process and would not provide any useful incentives to variable energy resources...

…Finally, the variable energy resource community pointed out that variable energy resources typically are procured under contracts that either provide payments for energy produced or have severe penalties for under-performance. This is consistent with the investor-owned utilities' pro forma contracts that the CAISO reviewed, as approved by the CPUC, which include provisions for nonperformance. Inasmuch as these contracts are specific to wind and solar and are extremely standardized (unlike contracts for other resource types) the CAISO potentially would be double-penalizing renewables for non-performance without this exemption.

The CAISO's language throughout this (and later) initiatives cites, as reasons for the VER exemption: (1) a lack of benefit from imposing RAAIM on VERs; (2) the complexity and burden of doing so fairly and accurately; and (3) the strong incentives already provided contractually for high availability.

None of the reasons in the earlier CAISO documents for the current VER exemption related to VER "limited ability to change output when wind or solar conditions constrain output," as stated in the Proposal. The CAISO's own words argue that there would be little benefit, and much cost and complexity, to imposing RAAIM on VERs, and the Proposal presents no evidence that any of these factors are any different than they were in 2014-2015.

Finally, none of CAISO's cited outage analysis demonstrates a VER availability problem. The resource-type forced-outage table addresses batteries, thermal units, and hybrids—not standalone wind or solar—and the September 2022 analysis identifies thermal and storage concerns. Whatever that evidence may demonstrate for other resource classes (see below), it does not support revoking the VER exemption.

Need for this RAAIM reform proposal generally

The Proposal continues to be based on the assumption, without valid supporting evidence, that RA Resources will not be available when needed unless the CAISO provides some incentive for doing so (or, more applicable to the proposed mechanism, a penalty for not doing so). The Proposal ignores strong incentives already applied through market contract mechanisms included in Power Purchase Agreements (PPAs), as well as tools the CAISO already uses to protect reliability during vulnerable periods.

The data on which the need for the proposal is based is highly flawed. It is largely based on 2022 data – four years old – when little storage was even on the system, and it ignores likely better results based on newer projects and technology. It mixes planned and forced outages, and thus does not demonstrate whether or by how much Forced Outages have increased. The Proposal admits that there are other valid reasons why Forced Outages might have increased but does not investigate or quantify those other impacts, jumping to the unsupported conclusion that lack of financial incentives must be the problem.

Double penalties with UCAP and RAAIM

Aside from these unsupported conclusions, LSA and CalWEA object strongly to continued imposition of RAAIM after UCAP implementation. (Many LSA and CalWEA members have Mixed Fuel Resources (MFRs) with both solar/wind and storage resources, so this matter is of high interest to LSA and CalWEA as well.) All CAISO UCAP proposals (in the earlier RA Enhancements Initiative) stated that UCAP would replace RAAIM, to avoid double-penalization for the same Forced Outages.

CAISO's own words, in the 2015 filing referenced above (where a resource-specific Exceedance method was used to determine VER QC), said as much in 2015, citing a CPUC ruling that it clearly supported:

> Applying an availability incentive penalty to these resources, in addition to their facing a reduction in the amount of capacity they can offer as a result of prior outages, would essentially result in a double penalty for these resources…the Commission recognized that "it would be a harsh result to apply the same availability standards, which are designed to penalize poor performance, to resources already subject to qualifying capacity adjustments..."

(In 2021, FERC accepted a RAAIM exemption because capacity-value discounting plus RAAIM created a risk of double penalization, and FERC declined to revisit the VER exemption even after adoption of a class-based ELCC methodology for determining Qualifying Capacity.)

The inherent unfairness of penalizing any resource twice for the same Forced Outage (a triple penalty if Power Purchase Agreements (PPAs) also contains such penalties, which most do), renders retention of RAAIM after UCAP implementation both unjust and unreasonable. CAISO itself initially recognized this unfairness in its own UCAP proposals but appears to have lost its way, instead immersing its recent efforts in this complex and unnecessary proposal.

3. Please provide your organization's overall feedback on the discussion regarding the revised RAAIM and resource type application.

As noted above, LSA and CalWEA strongly objects to RAAIM imposition on VERs.

Aside from that fundamental disagreement, the simplistic formula in the Proposal to apply RAAIM to VERs violates the principles in the CAISO's language in its 2015 filing, excerpted above, in several ways and is highly flawed. Among other things, the penalty design will penalize VERs for known availability features inherent in their technologies.

Even when triggered by a documented forced or urgent equipment outage, the proposed proportional formula can assign an unavailable-RA quantity that bears little relationship to the outage impact on output during the assessed hour. CAISO says it will not directly penalize weather-driven variability, but it would effectively do much the same thing by applying a Pmax-based outage percentage to static shown RA, without measuring the outage's hour-specific effect on expected production. This is because:

- **It is based on "shown RA," and not forecasted or actual output capability.** The Proposal (at p.26) admits that any unavailability measure would ideally be geared to VER forecasts but then resorts to a sub-optimal application because of complications in doing it more accurately, stating:

  > The ISO's current forecasting system does not provide the separate estimate needed for a forecast based assessment. Developing that capability or establishing a consistent method for using proxy resource would introduce additional implementation complexity which is currently not feasible.

  However:

  - "Shown RA" for solar projects is 0.1MW for six months of the year (and below 2% for another month), and for wind projects is below 10% for five months of the year, meaning that this "incentive" would essentially be meaningless in all those those months.
  - Even if the formula was forecast-based, forecasts may be inaccurate, especially for individual resources and especially on an hour-by-hour basis. CAISO used to regularly release granular forecast-accuracy data for its Participating Intermittent Resource Program (PIRP), but it has not done so for many years, so we have no way of knowing the current CAISO forecast accuracy statistics even overall, much less for specific projects in high-output hours and months.

- **The calculation is not hour-specific:** Although revised RAAIM would apply only during identified Tier-event hours, the quantity assessed is not hour-specific and does not reflect the output the unavailable equipment would reasonably have produced during that interval. Thus, for example, it does not recognize that high-solar-output hours (typically in the afternoon) typically do not occur during the early-evening hours when grid reliability concerns are typically greatest (the reason the CAISO uses much lower values in its On-Peak Deliverability Assessments than the CPUC solar QC values).

> For example, the hypothetical 500MW VER in the example on p.26 of the Proposal may have a July NQC of around 365MW (73% - NorCal, Solar Tracking technology) but forecasted output in HE 18 of around 50MW (10%, similar to CAISO assumptions in its deliverability assessments). If that resource had outages that actually reflected 150MW of the 500MW in POI output, and assuming "shown" RA equals NQC, the CAISO's proposal would impose penalties for (30% x 365MW =) 109.5MW.
>
> In other words, this resource would be penalized for 109.5MW of unavailability in an hour when its entire forecasted output was only 50MW, and when a proportional 30% availability reduction might reduce output by only (30% x 50MW =) about 15MW. This penalty far exceeds the impact of the outage on the system and, therefore, cannot be either just or reasonable.

Before changing the existing VER exemption, CAISO should conduct and publish a retrospective, resource-specific analysis using historical wind and solar outage data. The analysis should identify qualifying equipment outages that intersect hypothetical Tier 1 or Tier 2 hours, estimate the output that would have occurred but for each outage, calculate the resulting charges, and demonstrate what avoidable reliability harm the proposed incentive would have prevented.

This analysis is particularly important for wind and solar facilities, where individual turbine or inverter outages are reported in nameplate MW even though the energy and reliability capability actually lost depends on contemporaneous wind conditions. If CAISO cannot establish a reliable but-for capability, the existing exemption should remain in place, or CAISO should first conduct nonbinding shadow settlements.

Again, the CAISO has simply not put in the work or consideration to determine whether this VER proposal is just and reasonable, aside from the lack of need for it in the first place.

4. Please provide your organization's overall feedback on the discussion regarding the tier assessment. *

LSA and CalWEA have no comments at this time.

5. Please provide your organization's overall feedback on the discussion regarding charges, payments, and bounded penalty exposure. *

LSA and CalWEA have no comments at this time.

6. Please provide your organization's overall feedback on the discussion regarding the bidding requirements. *

LSA and CalWEA have no comments at this time.

7. Please provide your organization's overall feedback on the discussion regarding substitution and outage definitions.

LSA and CalWEA request clarification on how the proposal would treat high-wind cutout (for wind), icing, wildfire restrictions, environmental curtailments, transmission outages, telemetry failures, collector-system outages, and manufacturer-directed safety derates.

8. Please submit your organization's overall feedback on the Calpine Stakeholder Presentation on 10/9.

LSA and CalWEA have no comments at this time.

9. Please submit your organization's overall feedback on the CESA Stakeholder Presentation on 10/23.

CESA's presentation made many valid points, including unfair penalization for inherent operating characteristics of the storage resource type. LSA's criticisms of the Proposal in response to question #3 above are based on the same flaw, but for VERs.

10. Please submit your organization's overall feedback on the group Stakeholder Presentations given on 10/23.

This seems to be the same question as #9 above, since CESA was the only presenter at that meeting.

11. Please submit any additional feedback not already captured.

The Proposal continues to provide no rationale for elimination of exemptions for resources smaller than 1MW. The CAISO's 2015 filing, referenced above, at least included data about the number and capacity of such resources, but as with VERs, the "data" provided to support this proposal does not even bother to do that. The Proposal provides no information demonstrating any benefit to the system, or any data at all for these resources, nor examined the cost of imposing these new requirements on these small projects.

These resources were exempted originally because the administrative complexity would be unduly onerous and likely yield little benefit. The Proposal presents no evidence to the contrary.

Moreover, it is highly unlikely that these extremely small resources, which do not usually have the capability to track CAISO stakeholder processes, are even aware of this considerable additional burden that could apply to them. At a minimum, the CAISO should at least reach out to these resources, and any relevant trade associations representing them, to inform them of this initiative and allow them a voice here.