



Stakeholder Comments Template

Hybrid Resources Initiative: Straw Proposal

This template has been created for submission of stakeholder comments on the **Hybrid Resources Initiative, Straw Proposal** that was held on October 3, 2019. The meeting material and other information related to this initiative may be found on the initiative webpage at:

<http://www.caiso.com/informed/Pages/StakeholderProcesses/HybridResources.aspx>

Upon completion of this template, please submit it to initiativecomments@caiso.com. Submissions are requested by close of business on October 21, 2019.

Submitted by	Organization	Date Submitted
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Please provide your organization's comments on the following topics and indicate your organization's position on the topics below (Support, Support with caveats, Oppose, or Oppose with caveats). Please provide examples and support for your positions in your responses as applicable.

1. Hybrid Resource Definition

Please provide your organization's feedback on the Hybrid Resource Definition as described in the straw proposal.

First Solar (FSLR) supports the new definitions of hybrid resources and co-located projects. These add much-needed clarity to the process.

2. Hybrid Resources Business Drivers and Use Cases

Please provide your organization's feedback on the Hybrid Resources Business Drivers and Use Cases described in the straw proposal.

FSLR supports the identified business cases, and suggests including black start capability as an additional use case. As inverter-based resources replace fossil units on the grid, identifying new resources capable of black start will be key to ensuring quick recovery

from system events. Imperial Irrigation District successfully tested a battery system providing black start services in 2017.¹

3. Forecasting

Please provide your organization's feedback on the forecasting topic as described in the straw proposal.

While a predominant focus of this initiative rightly should be on the integration of on-site storage with a VER, FSLR believes that alternative hybrid structures will seek interconnection in the future. To that end, CAISO should clarify that hybrid resources composed of two separate VERs (e.g., solar + wind) will retain their status as EIR generating resources.

Additionally, while FSLR agrees with the concept that scheduling coordinators should have the capability to provide forecasts, we also believe there is no reason for CAISO to prohibit scheduling coordinators from accessing CAISO's forecasting capabilities for the VER component(s) of a hybrid resource. CAISO should clarify that it is willing to continue offering that as a service.

CAISO's belief that the storage asset can mitigate forecast variability is somewhat misplaced; such a strategy would harm that resource's ability to meet its forecast in subsequent hours of the day and, in particular, during system net load peak conditions. The result of this requirement would be a different cycling strategy of the battery, which may harm its long-term life and associated value proposition as an RA resource. FSLR understands CAISO's desire to treat hybrid resources as dispatchable. It should still be possible, however, to provide data visibility on the VER forecast, charging schedule, and net POI forecast such that weather intermittency can be identified. FSLR encourages the CAISO to review the data requirements it would need access to in order to facilitate hybrid resources being EIRs.

4. Markets and Systems

Please provide your organization's feedback on the markets and systems topic as described in the straw proposal.

FSLR seeks clarification on the forecasting/scheduling process. As way of example:

- The day ahead forecast for an operating interval is 100 MW
- In the 15 minute market, the forecast is 95 MW
- In the 5 minute market, the forecast is 97 MW
- Actual plant production for that 5 minute market interval has the potential to be 98 MW

Under this example:

¹ See <https://www.iid.com/Home/Components/News/News/557/30?backlist=%2F>.

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1. Does the scheduling coordinator have the ability to modify the resource's forecast (and schedule) based on the revised forecasts available?
2. Would the actual production of 98 MW be limited to 95 MW or 97 MW based on a revised UEL, or would the 100 MW day ahead schedule set the UEL?
3. What would the energy imbalance calculation be based upon?

FSLR raises these clarifying questions, as forecast accuracy improves significantly the closer it is given to the operating interval.

Separately, CAISO should acknowledge that forecast risk will result in a desire by scheduling coordinators to be conservative in their forecast submittal, particularly on a day ahead basis, and that this conservative forecast should not be considered economic withholding / attempts at market manipulation.

For co-located projects, FSLR requests the CAISO create an option where the storage component's ability to charge from the grid would be limited to either explicit MWh limitations, or restricted outright, for the first roughly 6 years of asset life. Independent dispatch of the VER and storage components has a strong likelihood of adversely impacting the project's ITC. FSLR disagrees with the assertion made during the stakeholder meeting that there is an accounting solution to solve this issue. The data exists today to compare, on an interval-by-interval basis, the VER production against the battery's charging and discharging. Any audit conducted would immediately recognize when grid charging occurred and likely result in a reduction in ITC benefit. ITC risk is a bright line for hybrid resource development. FSLR believes it is reasonable to include a limitation on grid charging for co-located resources, which would be lifted after the ITC has been fully monetized (roughly year 6). After that time, the battery could be dispatched independently.

5. Ancillary Services

Please provide your organization's feedback on the ancillary services topic as described in the straw proposal. (Please indicate Support, Support with caveats, Oppose, or Oppose with caveats)

FSLR supports the creation of Plant Potential and State-of-Charge data points. To ease understanding here, FSLR suggests that Plant Potential be renamed Headroom to recognize that CAISO is particularly interested in monitoring the potential incremental energy the plant can dispatch (up to its POI).

Related to the provision of frequency regulation service, the dispatch signals received in one interval have a direct impact on the state-of-charge available in the subsequent interval. For this reason, both Headroom and State-of-Charge may need to be dynamic data points so that CAISO can monitor in real time the availability of the hybrid resource.

FSLR requests the CAISO provide additional details on the ancillary services no pay provisions and associated reporting obligations for situations where a dramatic change in Headroom and/or State-of-Charge occurs due to a sudden change in solar / wind availability. As an example, what process does CAISO envision when significant

variability in one operating interval impacts the Headroom and/or State-of-Charge for an awarded ancillary service in a subsequent operating interval?

6. Metering and Telemetry

Please provide your organization's feedback on the metering and telemetry topic as described in the straw proposal.

FSLR has no comments at this time.

7. Resource Adequacy

Please provide your organization's position on the Resource Adequacy topic as described in the straw proposal.

FSLR supports the RA counting approach to hybrid resources articulated in the straw proposal, including using it as the default NQC for hybrid resources while the CPUC develops its own QC methodology for hybrids. Considering the CPUC has not yet implemented a QC for hybrid resources, this will bridge a current gap in the RA program.

Looking at the counting approach itself, ELCC + the 4 hour sustained capability of the battery (capped at POI) accurately represents the resource's availability during likely peak periods and aligns with current state policy on the individual components. ELCC accounts for the contribution of the VER resource's contribution to RA. On peak days, the hybrid resource would first prioritize charging the battery component. During the evening peak, the VER's production would still occur, plus the battery's contribution.

FSLR highlights that there are several configurations at play, and the CAISO should not use Pmax for the battery in this context.² The battery could be designed for 2.5 hours (or similar) maximum output. Spread over a 4 hour window, its RA capacity would be lower.

- Example 1: 40 MW, 100 MWh battery
 - Battery Pmax = 40 MW
 - RA capacity = 25 MW
- Example 2: 40 MW, 160 MWh battery
 - Battery Pmax = 40 MW
 - RA capacity = 40 MW

Additional comments

Please offer any other feedback your organization would like to provide on the Hybrid Resources Initiative.

FSLR has the following additional comments and questions:

² As was shown on slide 58 of the straw proposal presentation.

CAISO

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- FSLR recommends the CAISO and CPUC conduct a joint workshop on hybrid resource RA and related issues in Q4 2019. It is imperative that all parties are on the same page for these issues, particularly as procurement is imminent for 2021-2023 RA resources.
- What is the CAISO's expectation for reporting availability on hybrid and co-located resources? Assuming a 50 MW solar asset coupled with a 50 MW battery (50 MW POI), if 50% of the solar resource is out of service is the new overall resource availability then limited to 25 MW, or does the battery's 50 MW capacity still reflect that resource's total availability?