California ISO

Stakeholder Comments Template

Hybrid Resources Initiative: Straw Proposal

This template has been created for submission of stakeholder comments on the **Hybrid Resources Initiative, Revised Straw Proposal** that was held on December 17, 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 January 14, 2019**.**

Submitted by	Organization	Date Submitted
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Please provide your organization's comments on the following topics and indicate your orginzation'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. Terms and Defintions

Hybrid Resource. We believe that CAISO's proposed definition still lacks an essential element of hybrid storage resources: that one of the fuel-types must be electricity stored from the CAISO grid.

We also believe the "combination of multiple generation technologies" is confusing. Does technology refer to types of electrical machinery for creating AC electricity (inverters, synchronous and induction generators, etc.) or types of prime movers or collectors of energy (gas turbines, steam turbines, wind turbines, hydro turbine, PV modules). And what about hybrid systems that use storage to displace fuel or use storage with multiple types of electrical and/or systems?

More specially with respect to storage, is storage characterized as fuel type or as a technology? And would the various storage technologies be distinguished? Perhaps the tdistinguishing characteristinc is the storage medium (various kinds of electrolyte, elevated water or mass, compressed air, liquefied air, high temperature salt, oil, or solids). Or perhaps the technology is distinguished by the charging and discharging processes.

We believe the "combination of multiple generation technologies is confusing and prefer the following definition:

> *Hybrid Resource: A resource type comprised of mixed fuels, one of which is electric energy stored from the CAISO grid, which generates electric power behind a single point of interconnection ("POI"), is physically and electrically controlled by a single owner/operator and Scheduling Coordinator that participates in the CAISO markets as a single resource with a single market resource ID."*

We acknowledge that this definition restricts hybrid resources to those incorporating storage, but believe this is consistent with the motivation in the first paragraph of the executive summary.

We would also highlight that our proposed definition permits charging the storage from non-CAISO resources, such as on-site generation, via a separate electrical connection, as transmission connected load or from the distribution side, as well as non-electrical charging of storage, such as solar thermal energy stored in molten salt.

As with conventional generation, we believe that it is the owner/operator, not CAISO, the procures the primary energy used to produce power. The same should be true for procurement of energy that is stored for subsequent conversion to power.

With this definition, CAISO would be focused on the interaction of the hybrid resource with the CAISO market, while freeing owner/operators to focus on fuel procurement, in whatever form (sunlight, wind, gas, heat, electricity, etc.) and from whatever source (CAISO, DSOs, self- or co-generation, non-market participants, pipelines and tankers, etc.)

Moreover, this generalized definition would facilitate storage of electricity as electrolytic hydrogen, for subsequent conversion to electric power, which would support State efforts to decarbonize the power supply and the gas supply.

We urge CAISO to adopt a more general and technology agnostic definition.

2. Forecasting

CAISO appears to be focused on aspects of forecasting VERs charging of the co-located storage component of a hybrid resource, which is consistent with the relative short look-ahead window of the day-ahead and real-time markets. Our earlier comments noted the challenge of forecasting for long-duration storage that might straddle multiple days of market operation.

Even without considering VERs, and independent of the storage duration, there would appear to be challenges for SCs to provide a net-to-grid operational forecast because:

- Energy for charging may not be available at an acceptable price from CAISO
- More or less energy may be available from other charging sources

The ability to provide a net-to-grid operational forecast may also depend on the total storage duration available at the hybrid resource.

- Short duration storage (eg., 4 hours) may be very dependent on forecast VERs, as well as market conditions, to have reasonable confidence in the state-of charge forecast
- Long duration storage (eg., 24 hours) may be largely indifferent to the DAM if the state of charge is say 8 or more hours at the beginning of the forecast period.

If net-to-grid operational forecasts are required of all hybrid resources, we believe these other aspects need to be considered.

3. Markets and Systems

We urge CAISO to expand Table 2 to permit out-of-market charging of the storage elements of a hybrid resource.

Resources capable of out-of-market charging (for example solar+storage, or one of the many other fuel sources described above) would in our view need to report their operating capability (Power and Duration) as part of the net-to-grid operational forecast.

4. Ancillary Services

No comments at this time

5. Metering and Telemtry

No comments at this time

6. Resource Adequacy

On page 46, the straw proposal states: “For hybrid resources without VER components (and no forecasting requirement) their RA offer obligation will be set at the shown RA MW value for all hours similar to a traditional generator.”

This has the effect of obligating owners/operators to maintain enough state of charge in the storage resource to deliver rated capacity for the 4-hour RA requirement.

Yet hybrid resources with VERs would not be obligated to maintain state of charge (by charging from the grid in the event the VER was insufficient to meet the capacity obligation).

This appears to be discriminatory in favor of VERs. We believe that all hybrid resources should have the same MOO.

Additional comments

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