

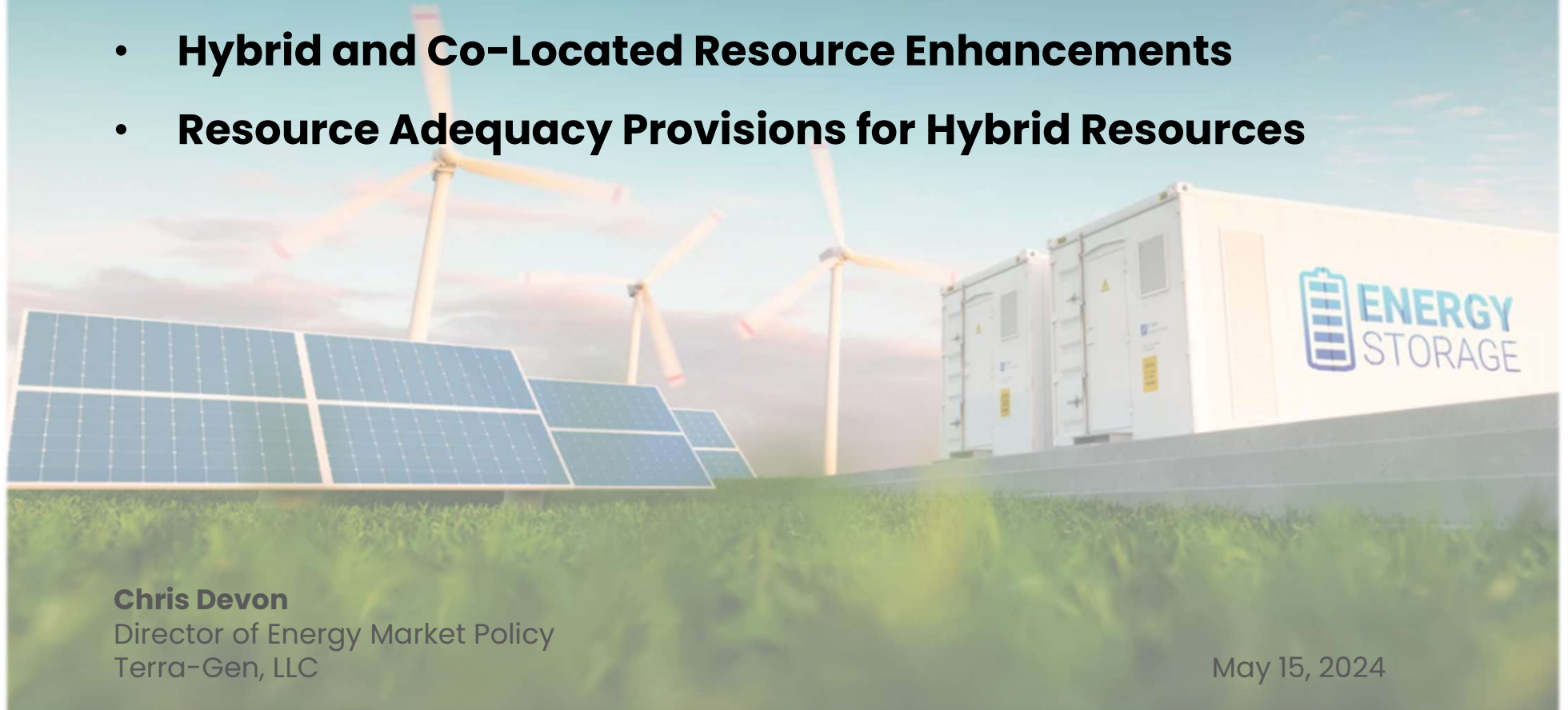
Terra-Gen, LLC



CAISO Annual Policy Initiatives Roadmap Process – 2024

Terra-Gen Policy Initiative Catalog Stakeholder Submissions:

- **Hybrid and Co-Located Resource Enhancements**
- **Resource Adequacy Provisions for Hybrid Resources**



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About Terra-Gen



Terra-Gen is a leader in the clean energy sector

We focus on bringing affordable clean energy and meaningful economic growth to the communities where we operate

- Established in 2007, Terra-Gen has successfully developed over 5,000 MW of utility-scale wind, solar, and energy storage assets throughout the United States and owns and operates several projects in California.
- Terra-Gen's assets located in California represent over **1,500 MW of energy storage**, with an additional 1,000 MW under construction, expected to come on-line in 2025.
- The initial phase of Terra-Gen's Edwards Sanborn project, located in Kern County, California, is currently the largest solar-plus-storage project in the world.
 - Phase 1 comprises 807 MWs of solar and 971 MWs of energy storage, with 3 GWh of storage capacity. When complete, the Edward Sanborn franchise will provide up to **3.35 GW** of solar-plus-storage to the CAISO grid.

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**CATALOG SUBMISSION:
HYBRID AND CO-LOCATED RESOURCE
ENHANCEMENTS**

Revisiting Hybrid Resource Participation Rules

- CAISO has not openly discussed the appropriate use of hybrid or co-located resource market participation and related operational tools, and the interactions with other processes, including bidding and provision of Ancillary Services (AS), and other related provisions and procedures.
 - CAISO's Hybrid Resources Revised Final Proposal policy paper includes a very brief section on AS that indicates hybrid resources may provide AS but provides little detail or specific expectations for aspects of AS provision or AS market participation approaches. (See CAISO [Revised Final Proposal, Oct. 2020](#) at pp. 17).
 - CAISO has provided general guidance on its expectations for bidding and the use of Dynamic Limits through simplified examples that only include energy market participation. The only examples that CAISO has provided do not address AS market participation or the provision of AS by hybrid resources. (See CAISO Revised Final Proposal, Oct. 2020 at pp. 19-23).
- Current provisions and possible enhancements related to hybrid resource operations and AS provision should be explored in further detail to provide needed guidance and possible clarifications.

Provision of Regulation by Hybrid Resources

- In the case of provision of Regulation, CAISO has not provided adequate opportunity for open discussion on the appropriate use of outage submissions versus the utilization of the Dynamic Limits concept.
 - CAISO has provided sporadic guidance to SCs to utilize outage submissions to indicate AS operating capability limitations during challenging conditions. In these instances, CAISO operators may block these units providing AS and from AS market participation for an extended period. (See CAISO Operating Procedure [2210D Ancillary Service Blocking and Disqualification](#)).
- During the prior stakeholder initiative effort, CAISO acknowledged issues regarding the problematic nature of requiring the use of outages; these included timing concerns as well as overly-burdensome processes for SC submission. (See CAISO Revised Final Proposal, Oct 2020 at pp. 3-4, 9-10, and 20).
 - The timeframe for SCs to provide the submission of outages through OMS and subsequent lag in their application through the market systems causes a delay in effective operating capability CAISO's systems and operators observe.

Hybrid resource operational limitations are best addressed through use of Dynamic Limits

Hybrid and Co-Located Resources – Open Issues



- CAISO has not openly discussed more complex hybrid and co-located resource market participation issues in a formal stakeholder initiative setting since it concluded its initial efforts in 2020-21.
 - During prior stakeholder discussions, CAISO committed to follow up on more complex and difficult issues (AS Provisions, Grid-Charging Restrictions, and Resource Adequacy) after concluding its initial stakeholder efforts.

Hybrid resource participation refinements should not be considered discretionary

- In the pending energy storage enhancements initiative, CAISO should consider improvements to hybrid and co-located resource models to enable them to operate more effectively within the CAISO markets.
 - Supports CAISO's Strategic Objectives #1, #2, and #3.

CAISO should prioritize this item as a prior commitment to continue the development of hybrid participation models



**CATALOG SUBMISSION:
RESOURCE ADEQUACY PROVISIONS FOR
HYBRID RESOURCES**

Hybrid Resource – RA Provisions

- Hybrid resource policy for Resource Adequacy (RA) were never thoroughly discussed during CAISO’s prior 2020–21 stakeholder initiative.
 - CAISO revised final proposal only included a brief section regarding RA and significant RA issues were descoped or never thoroughly addressed. (See CAISO [Revised Final Proposal, Oct. 2020](#) at pp. 25–27).
- CAISO provided hybrid resource bidding examples, and proposed system/generic RA RAIM exemption for hybrids. CAISO also reviewed general Must Offer Obligation issues, such as 24 by 7 bidding requirements.
 - Some of these items were never formalized in CAISO’s tariff language drafting process and have not been fully reflected in the CAISO Tariff and BPMs. (See CAISO [Tariff Section 40](#); Sections 40.6, 40.9, and 40.10, and CAISO [Reliability Requirements BPM](#) Section 7.1.1.).
 - It is also important that CAISO further review grid-charging restrictions impacts on hybrid resources, interactions with RA provisions, and bidding and operational expectations. These aspects have not been fully vetted or discussed in an open stakeholder process.

Formalizing Additional Hybrid Resource RA Provisions

- CAISO should provide an opportunity to review and openly discuss the treatment of hybrid resource RA related rules and procedures to address any concerns with applicable RA provisions.
 - CAISO should review hybrid resource RA provisions related to generic/system and flexible RA and discuss the application of flexible RA RAAIM, as well as formalizing Must Offer Obligation provisions in the CAISO Tariff and BPMs.
- CAISO should address the prior omissions and align its Tariff and BPM provisions with its existing guidance and practices for hybrid resources providing RA and discuss additional issues that may be identified.
- Initial information provided by CAISO to inform the effort should include a formal review of existing applicable provisions and gap analysis.

Hybrid Resource RA Issues

- CAISO has not openly discussed hybrid resource RA provision in a formal stakeholder initiative setting since it concluded its initial efforts in 2020–21.
 - During prior stakeholder discussions, CAISO committed to follow up on more complex and difficult issues (AS Provision, Grid Charging Restrictions, and Resource Adequacy) after concluding initial stakeholder efforts.

Review of hybrid resource RA provisions should not be considered discretionary

- In the pending energy storage enhancements initiative, CAISO should consider discussing clarifications for hybrid resource RA provisions to enable them to operate effectively within the CAISO markets.
 - Supports CAISO's Strategic Objectives #1, #2, and #3.

CAISO should prioritize this item as a prior commitment to clarify hybrid resource RA provisions