

# Energy Storage Enhancements April Working Group Meeting

Vistra Corp.  
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# Focus on accurately reflecting physical reality of energy storage in the market



- Non-Generator Resource (NGR) model should be enhanced as a first priority and any physical modeling improvements applied to any new model.
  - Any active storage participation model should be enhanced to accurately reflect physical characteristics of storage as a function of state of charge
- CAISO should phase enhancements to more accurately reflect storage:
  - First phase, model well-known foldback issue where Pmin and Pmax levels change as a function of State of Charge (SOC)
  - Once above enhancement is active and experience with its impact is gained, identify whether adding ramp rate as function of state of charge is still necessary to improve market outcomes and if so, there must be two ramp rate curves as function of state of charge: (1) charge ramp rate when binary variable indicates charge state and (2) discharge ramp rate when in discharge state. Otherwise, no additional enhancements needed.
- Storage with cycle limitations due to environmental restrictions or design considerations (includes warranty specifications) should be able to register these use limitations and if approved be able to access use limit reached outage cards and to seek an opportunity cost (OC) adder
  - See DR and Storage Action Plan - <http://www.caiso.com/Documents/ActionPlan-CommitmentCostEnhancementsPhase3-Redlined.pdf>

# Focus on answering stakeholder questions and providing design details for any new model



- CAISO is using terms in its papers that individually mean something to storage operators but it is not intuitive what the CAISO means by them as used.
  - CAISO should provide a glossary of terms and clearly define key terms (i.e. elements) of the Energy Storage Resource proposal
  - CAISO should hold a workshop dedicated to responding to written questions submitted by stakeholders
- Vistra now understands the ESR model design originates from a Columbia University model\* designed to identify optimal bidding of storage assets from an academic perspective (profit maximization problem)
  - Vistra has been cautiously optimistic that ESR model with SOC bidding may have value as an optional participation model to NGR
  - ESR model will only have value if designed not only with a theoretical view but also with input from storage operators to ensure we can use the model to effectively manage our assets
- Vistra recommends CAISO take a step back and invite all Scheduling Coordinators (SC) managing storage to discuss with the CAISO the SC's needs and approach to managing these complex assets. We recognize CAISO also wants to make the best use of the entire storage fleet.
  - CAISO should develop design details for a model and illustrate how it addresses SC and CAISO needs
  - Any new model should better address the asset management needs of Scheduling Coordinators, if not focus should remain on the NGR model

\*Cite: [https://bolunxu.github.io/assets/files/Xu\\_Storage\\_CAISO.pdf](https://bolunxu.github.io/assets/files/Xu_Storage_CAISO.pdf) 3