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California Independent System Operator

250 Outcropping Way, Folsom, CA 95630

CAISO Transmission Planning:

Vistra Corp. respectfully submits these comments in response to the CAISO's 2020-2021 Transmission Planning Process ("TPP") Preliminary Policy & Economic Assessment results posted on November 13, 2020 and discussed at a public stakeholder call on November 17, 2020. We appreciate the opportunity to provide our perspective as an energy storage developer in California. We are a leading, Fortune 275 integrated retail electricity and power generation company based in Irving, Texas, combining an innovative, customer-centric approach to retail supply with safe, reliable, diverse, and efficient power generation. The company brings its products and services to market in 20 states and the District of Columbia, including six of the seven competitive wholesale markets in the U.S., as well as markets in Canada and Japan. Serving nearly 5 million residential, commercial, and industrial retail customers with electricity and natural gas, Vistra is the largest competitive residential electricity provider in the country. Vistra is also the largest competitive power generator in the U.S. with a capacity of approximately 39,000 megawatts powered by a diverse portfolio, including natural gas, nuclear, solar, and battery energy storage facilities. Vistra provides retail natural gas products to California consumers as well as provides 1,185 MW electric generation capacity to the state via facilities located in Moss Landing and Oakland. Vistra recently announced plans to expand the size of the battery energy storage systems at its Moss Landing and Oakland sites, currently under development, bringing its total capacity to 436.25 MW/1,745 MWh of battery energy storage under contract in California, and we continue to explore further battery energy storage expansion opportunities.

We are committed to engaging with the CAISO to ensure the long-term planning processes result in transmission upgrades needed to support California's policy goals in a "least regrets" way. We look forward to receiving more information about the economic assessments. Vistra requests the CAISO include in its list of economic planning study requests received No. 6, "Economic Study Requests to Reduce Local Capacity Requirements (LCR) Using Power Flow Control" that was submitted by SmartWires for various locations including South Bay – Moss Landing sub-area. As we mentioned in previous comments, we support adopting a different potential alternative to maintain reliability criteria within the Greater Bay Area and sub-areas by upgrading certain limiting transmission facilities instead of curtailing energy storage to remain within the current limits. For example, the "Moss Landing-Las Aguilas 230 kV" constraint could be upgraded allow for higher line rating so that CAISO can significantly reduce the sub-area LCR, allow for additional capacity to meet the remaining LCR from storage within the local area, and support increased levels of renewable integration. While the SmartWires proposed project may differ from our previous suggestion, we see merit in exploring the economics of the proposed study. This approach both furthers reliability needs and advances state policies to reduce harmful emission from energy sector through increased renewable and storage penetration, which merits including the No. 6 submitted economic study in the

list of high-priority studies. We urge CAISO to closely evaluate whether upgrades to reduce LCR in local areas including the Moss-landing sub-area can be evaluated in the economic assessments as a high priority upgrade or study. With California's aggressive procurement and policies guiding development of new preferred and energy storage resources this is a critical study to assess to see if it identifies economic upgrades to ensure the build out of these resources is done in a way that the transmission system can reliably support their development.

While we recognize that the TPP methodology for modeling energy storage resources is set for the instant Phase 2 studies including the long-term LCR study, we continue to be concerned that the results are masking transmission upgrades needed to integrate storage resources being procured and developed in the near term. We continue to be concerned that the output of the economic study will undervalue the benefit side of the cost-benefit analysis in these studies until the modelling parameters can be improved to more realistically represent congestion costs. For example, we do not believe the current modelling approach accurately represents the savings that can be realized from resolving the cost of congestion from a transmission project because the modelled congestion costs are systemically lower than we expect actual congestion costs to be in various locations on the system, once a significant number of storage projects are operational.

Vistra urges CAISO to continue to consider feedback on how the storage modeling methods could be improved so that in the next iteration of the TPP the study results can more accurately identify need for transmission upgrades. We are concerned that the methodology being used to model energy storage resources in the 2020-2021 TPP studies does not adequately reflect the operational diversity within the set of storage assets being developed. Storage developers build energy storage resources to meet different use cases generally among three major types where the logic for when the resource would charge or discharge differs accordingly:

- Co-located storage: This configuration type is generally configured to allow the storage to store excess generation from renewable asset such as a solar resource to reduce curtailments and allow for renewable energy to be injected on the grid from stored energy during periods when the renewable is not producing due to its operational limitation. Under this scenario for charging logic, the CAISO can improve its co-located storage modelling by assuming that it will charge during hours where its co-located assets output exceeds its ability to inject on the CAISO controlled grid or during other hours for charging from the CAISO grid at prices less than $0/MWh. Under this scenario for discharging, the CAISO can improve its co-located storage modelling by assuming that the storage resource would discharge during the other periods when neither its co-located resource is producing energy or the energy prices are below $0/MWh.
- Stand-alone use-limited storage to provide ancillary services: This configuration type is generally configured to have the ability to charge when most economic and then to hold that charge on the battery until called for an Ancillary Service event. Under this scenario for charging and discharging logic, the CAISO can improve its modelling of use-limited stand-alone storage by assuming that the storage asset charges when energy prices are less than or equal to $0/MW and discharges when an AS event might be needed such as at energy prices greater than $200/MWh.
- Stand-alone storage to perform energy arbitrage: This configuration type is generally configured to have the ability to energy arbitrage where the primary purpose is to charge at prices just slightly less than the

expected discharge prices accounting for roundtrip efficiency. For example, if the storage asset efficiency rate is 85% and the storage has a duration of four hours during a day where the fourth highest modeled energy price across the twenty-four hours is $25/MWh, then the storage asset would be willing to charge during any hour with energy prices less than $21.25/MWh. Under this scenario, the CAISO can improve its modelling of stand-alone storage performing energy arbitrage by assuming the storage asset charges at energy prices less than or equal to the N-th lowest projected price during the day times its efficiency rate where N represents the duration hours of the asset. Similarly, the discharge logic would assume it discharges when energy prices are at least at the N-th highest projected price during the day.

In addition to these three general use cases, there are still many variations in how storage resources are developed, built to operate, and can enter into bilateral contracts to meet charging needs. As we raised in prior comments on the CAISO's 2022 Local Capacity Requirements study manual, the capability of a specific energy storage resource to recharge is highly dependent on its specific situation. A more complex scenario to those above is one where during times of grid disturbances where charging energy is not available, an energy storage resource that is located near another resource type with which it holds a commercial agreement may recharge its battery with the out-of-market energy from for example a co-located or geographically proximate resource based on that agreement. These types of transactions can be effectuated in the day-ahead or real-time markets through inter-scheduling trades between the two resources.

Specific to the final long-term LCR study results, Vistra thanks the CAISO for providing additional details on the methodology it is using to determine the maximum storage and maximum four-hour storage limits. Among the modelling assumptions explained at the November 17th call, Vistra found the static assumption of 85% efficiency would inaccurately reflect capabilities other than 85% and this value will be included in the Master File under ESDER4 and should be used in the planning studies once available. We respectfully request that the CAISO engage with storage developers and operators when developing its study assumptions for storage modeling to more accurately represent the expected operations of the asset as described below more fully.

In summary, Vistra respectfully requests the CAISO identify the No. 6 submitted economic study request to evaluate whether transmission upgrades are needed to reduce LCR in certain LCR areas or sub-areas as a high priority study and conduct an economic assessment of it. Further, we respectfully request the CAISO continue to work with stakeholders and consider storage developer and operators experience, including that provided above, when developing its study plan for the next iteration of the TPP.

Sincerely,

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