

**COMMENTS OF EAGLE CREST ENERGY
ON THE CAISO DRAFT 2015-2016 TRANSMISSION PLAN
March 3rd, 2016**

Eagle Crest Energy (ECE) is developing the 1,300 MW Eagle Mountain Pumped Storage Project (the Project) in Riverside County, California. The Project has already been awarded an operating license by the Federal Energy Regulatory Commission (FERC).

The Project will be located at the inactive Eagle Mountain mine and will use two former mine pits as upper and lower reservoirs. The Project is designed as a closed-loop pumped hydro project, i.e., it would not be located on a perennial river or have a surface water connection to other bodies of water. By using the closed-loop process at this brownfield industrial site, the Project can provide California with 22,000 MWh of energy storage capacity with minimal environmental impacts.

ECE appreciates the opportunity to comment on the CAISO's draft 2015-2016 Transmission Plan (Plan). ECE's comments focus on two of the Special Studies in the Plan: The "Bulk Energy Storage Study with 40% RPS in 2024" (Storage Study) and the "50% RPS Study." ECE's recommendations are summarized below and explained further in the remainder of this document.

• **In this study cycle, CAISO should modify the Storage Study** to do the following:

- **Extend the analysis to reflect a 50% RPS**, to match 50% RPS Study findings and provide a longer time horizon to reflect development timing and asset life. If this cannot be done in the final Plan, the CAISO should issue a supplement soon after completion of the Plan.
- **Correct the study calculations to zero out Delivery Network Upgrade (DNU) costs**, which likely account for most of the transmission costs. The Project can provide all market services (including contingency reserves, Regulation, flexible ramping, voltage support, and frequency response) without Full Capacity Deliverability Status (FCDS), and the associated DNU costs to obtain FCDS. However, if the availability of the Project to the CAISO can reduce the need to procure Flexible RA capacity (as discussed further below), that attribute should be added as an economic benefit.
- **State the value of the gross system benefits provided by the storage facility** (e.g., curtailment avoidance), as well as the dollar amount of the merchant revenues the study found the facility would receive. Important policy decisions about storage procurement may depend on the system benefits figures that cannot be monetized through markets.

• **In the 2016-7 study cycle, the CAISO should do the following:**

- **Extend the Storage Study** to consider:
 - **Greater pumped-storage capacity.** The study this cycle says benefits were limited by the 500 MW assumed facility capacity. Several feasible facilities under development in California could provide more pumped storage capacity (individually or in total), so assessment of a greater level of storage capacity is warranted.
 - **Potential locational benefits.** There are only a limited number of known, feasible California pumped-storage locations. The value of storage to ratepayers is the sum of benefits from several kinds of attributes, and a system-level analysis underestimates total storage benefits. An assessment of locational benefits, such as congestion relief, is also needed to inform important policy decisions about bulk-storage procurement.

- **Extend the 50% RPS Study work to determine a feasible range of net exports.** It is not clear that system over-supply problems can be addressed through large quantities of exports, due to physical and operational limitations (e.g., required by reliability criteria), legacy contracts, and policy/political decisions of adjacent Balancing Authorities that collectively could restrict such exports in the study time horizon.

As noted, these recommendations are discussed in more detail below.

Storage Study

ECE appreciates the CAISO's willingness to study pumped storage in the Transmission Planning Process (TPP), and the study in the draft Plan is a reasonable start. However, further analytic work to measure the economic and renewable integration value of pumped storage is needed in order to inform important policy decisions (perhaps as soon as next year) regarding procurement, funding, and development of pumped storage. Specifically, the study should be enhanced and extended, in this cycle and the next, as described below.

- **Several basic assumptions should be updated.** The study is based on outdated assumptions from the 2014 CPUC Long-Term Procurement Proceeding (LTPP). Those LTPP assumptions pre-dated adoption of the 50% RPS in SB350, and so the study assumes a 40% RPS instead of the new 50% target. Furthermore, it does not consider the long development timeline (e.g., the need to make procurement decisions in the next year or two in order to preserve the likelihood of commercial operation in the 2024 timeframe) or useful life of bulk storage assets (far beyond 2030). The study also does not consider changes in key variables, like higher carbon emissions costs in the post-2024 timeframe.
- **Assumed transmission costs should be reduced.** The study assumes that the pumped storage facility would have FCDS for all of its capacity, with high transmission costs to achieve it but no revenues for that attribute. The \$16.50/kW-year transmission cost translates into about an \$8-10 million annual revenue requirement (depending on whether the multiplier is the 500 MW generation capacity or the 600 MW pumping capacity), which implies a transmission cost of about \$40-100 million. Most of this cost is likely associated with DNUs to provide FCDS.

There are several problems with this approach: (1) As noted above, all the project services and associated operational benefits could be provided without any RA deliverability; (2) this assumption is inconsistent with the reduced need for FCDS from new resources reflected in the 50% RPS Study; (3) no RA or Flexible RA revenues were assumed in the conclusions about merchant-revenue coverage; and (4) the facility developer would only be willing to pay for those upgrades if the expected RA revenue would exceed the cost.

More generally, pumped storage may not make sense as an RA Resource, particularly if the RA capacity is not needed. One benefit of pumped storage is its ability to maximize transmission utilization, while FCDS attainment is assumed here to trigger additional transmission upgrades.

Thus, at most, the net transmission cost should reflect only Interconnection Facilities and Reliability Network Upgrades, which for a facility of this size would be unlikely to exceed about \$8-10 million (\$2-3 million annual revenue requirement). In other words, the net DNU cost should conservatively assumed to be zero, i.e., the facility would either be Energy-Only (if the RA revenue would not justify paying for DNU) or FCDS with RA revenues at least high enough to cover the DNU costs.

- **The study should distinguish between “gross” system benefits and those covered by market revenues.** There are several reasons why this is important.

First, the study finds that CAISO market revenues would not sufficiently compensate pumped storage resources for the project revenue requirement. While market value is an important consideration, virtually no projects in California are developed, constructed or financed as merchant projects. Thus, as with new generation resources, at least some revenues should be assumed to come from sources other than CAISO market revenues, e.g., bilateral contracts or other compensation.

Second, one reason why financing new pumped storage facilities is difficult is that such facilities provide benefits that are not reflected in market revenues. For example, the benefits associated with reduced renewable-energy curtailment, emissions reductions, or need to overbuild the system to accomplish state RPS policy goals would not accrue to the storage facility owners but would be shared throughout the market, and in advancement of the State’s larger economic and clean energy goals.

The Study acknowledges that compensation for these non-market benefits is needed to make such facilities economic, stating (at p. 258 of the Plan), that “the net revenue from the market would not reasonably be the only revenue stream – consideration should also be given to how the storage resource would be compensated for the benefits it brings to the system.”

In order for the study results to inform these compensation policy decisions, the CAISO should clearly state which benefits would be covered through market revenues and which would have to be covered through some other source. To inform decisions about those other funding sources, the CAISO needs to consider and quantify all of the transmission-related benefits, including voltage support, frequency response, avoided transmission costs, congestion relief, and (depending on the funding structure) reduction in Flexible RA procurement needs.

Finally, this initial study covers only system benefits. As explained further below, a storage assessment should also reflect potential locational benefits.

- **The study should provide guidance about the optimal location and size of bulk storage facilities.**

As noted above, the economic and operational justification for large storage facilities will likely rely on the sum of different kinds of benefits, and the CAISO should not ignore important local benefits that can inform storage policy decisions going forward. There are only a small number of feasible locations for such facilities, and the CAISO should expand its bulk storage studies in the next planning cycle to explore available local benefits.

As the 50% RPS Study illustrates, there may be localized congestion or other problems that could be addressed by bulk storage facilities. For example, additional renewables development in high-potential renewables areas such as East Riverside, or imports from other areas (which may become part of an expanded west-wide ISO/RTO by joining with the CAISO), could be accommodated through locating bulk storage facilities there. The same may be true for possible pumped-storage locations in norther California.

The study also notes that, in many instances, the assumed 500 MW size of the facility limited the benefits provided. Far higher renewables curtailments (>13,000 MW) were seen in the 50% RPS Study, indicating that a larger facility could provide greater net benefits. Therefore, the CAISO should explore whether increasing the hypothetical bulk storage facility size (e.g., to at least 1,000-1,500 MW or more, or running sensitivities for various larger sizes) would provide a commensurate increase in benefits. A larger project is also likely to lower the per-MWh pumped storage costs due to economies of scale and thus increase the cost/ benefit analysis.

50% RPS Study

This study examines net-export scenarios between 2,000 and 8,000 MW. However, the study does not attempt to determine which export levels may be realistic, so it is not clear whether large quantities of exports are a viable long- term solution. The CAISO's ability to export is premised on the ability and willingness of neighboring regions to absorb its over-supply. That ability and willingness will depend on several factors:

- **The physical ability of adjacent/nearby regions to absorb excess energy when it is likely to be available.** Neighboring states have relatively small loads compared to California and their own resource fleets to manage, and many of their large native resources lack significant operating flexibility. This is exemplified by the issues surrounding the current inflexibility of “block” imports, which has actually been exacerbated since implementation of CAISO 15-minute markets.
- **The willingness of other regions to forego the economic and other benefits of developing renewable-energy facilities.** The entire west has abundant and economic renewable resource potential, and native development is an economic driver in many Western states. It's unclear why neighboring state would want to forego the economic benefits associated with native renewable development in favor of procuring excess California energy. On the contrary, many regions are considering joining the CAISO EIM and/or an expanded west-wide ISO/RTO because they desire expanded access to California markets to sell energy from high-potential renewables or other production in their own areas, to reap the associated jobs and other economic benefits from such development.
- **Legacy transmission agreements.** Many of these areas have less-flexible, long-term transmission agreements in place that could reduce the use of those assets by others.

If other western regions cannot absorb California's excess energy due to these or other factors, California will be forced to adopt new strategies. In the next planning cycle, the CAISO should attempt to determine which export levels would be realistic – probably not zero, but probably not in the upper ranges assumed either.