

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking Pursuant to
Assembly Bill 2514 to Consider the
Adoption of Procurement Targets for Viable
and Cost-Effective Energy Storage Systems.

R.10-12-007
(Filed December 16, 2010)

**REPLY COMMENTS OF EDF RENEWABLE ENERGY
ON THE JUNE 10, 2013 ASSIGNED COMMISSIONER'S RULING
PROPOSING STORAGE PROCUREMENT TARGETS AND MECHANISMS**

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In accordance with the procedural schedule set out in the June 10, 2013 *Assigned Commissioner’s Ruling Proposing Storage Procurement Targets and Mechanisms and Noticing All-Party Meeting* (“ACR”), EDF Renewable Energy hereby submits these reply comments.

I. INTRODUCTION

Our review of the comments filed on June 3, 2013 finds many comments that call for pumped storage hydro in the final implementation of AB 2514, including findings similar to our’s pertaining to inclusion of pumped storage hydro in the statute’s definition of eligible storage technologies, as well as pointing out positive attributes and market barriers faced by pumped storage hydro that fall under the same themes outlined in the legislation as well as featured by other storage technologies included in the ACR. However, we also identified a small number of comments that supports the ACR’s exclusion of pumped storage hydro from AB 2514 implementation. We address some of those comments below.

II. PUMPED STORAGE HYDRO IS SEEN TO HAVE MANY OF THE SAME POSITIVE ATTRIBUTES AS THE STORAGE TECHNOLOGIES INCLUDED IN THE ACR, WHILE ALSO FACING SIMILAR BARRIERS.

We point to comments filed by the California Energy Storage Alliance (CESA), the Independent Energy Producers Association (IEP), the Center for Energy Efficiency and Renewable Technologies (CEERT), and the California Wind Energy Association (CalWEA) in support of inclusion of pumped storage hydro in AB 2514 implementation. These groups point to the potential value of pumped storage hydro in providing valuable bulk integration services for increasing variable generation in California, or observe that the ACR fails to identify any clear reason for its exclusion.¹

Of particular interest are comments by PG&E and SCE. PG&E points out that if targets for procuring energy storage are set, AB 2514 requires utilities to procure viable and cost-effective energy storage systems, of which pumped storage hydro is an obvious constituent.² They conclude, therefore, that the ACR's exclusion of pumped storage hydro is not in compliance with the provisions of AB 2514.³

SCE finds that pumped storage hydro may not face the same level of barriers related to technological maturity as do other technologies included in the ACR.⁴ They also point out, however, that maturity is only one of many barriers faced by emerging storage technologies; the remaining barriers apply equally to legacy technologies such as pumped storage hydro.⁵ In addition, SCE points out that pumped storage hydro faces its own set of barriers, including siting requirements and exceptionally challenging permitting requirements.⁶

¹ CESA Opening Comments, pp. 3 and 5; IEP Opening Comments, p. 8; CEERT Opening Comments, pp. 5-6; CalWEA Opening Comments, p. 7.

² PG&E Opening Comments, p. 14.

³ *Id.*

⁴ SCE Opening Comments, p. 6.

⁵ *Id.*

⁶ *Id.*

SCE concludes that pumped storage hydro is one of only a few technologies that can offer power and energy at a truly “bulk” scale.⁷ They find that including pumped hydro in the storage procurement targets is fair and is one way to broaden the range of potential storage projects for ratepayer benefit.

Indeed, several parties in addition to EDF Renewable Energy make convincing arguments that the ACR’s exclusion of pumped storage hydro is contrary to the Legislature’s intent. Besides the parties who share our view that pumped storage hydro falls squarely within the definition of eligible storage systems set forth in Pub. Util. Code §2835(a),⁸ Pilot Power Group and Nevada Hydro Company point out that nothing in any other part of AB 2514 suggests that the Legislature intended to exclude pumped storage hydro.⁹ And in addition to PG&E and SCE, a number of other parties, including Pilot Power Group, CalWEA, and Alton Energy, share the view that pumped storage hydro is one of only a few technologies that are likely to be able to satisfy the statute’s dual requirement that utility procured storage systems be both viable and cost effective.¹⁰

Finally, we note the importance of SCE’s point that current pumped storage hydro technology represents a significant advancement from the earlier generation technologies featured in existing projects in the state.¹¹ In particular, SCE’s note of new variable speed pump technology points to a new imperative to the state to be open to new pumped storage hydro projects in order to offer ratepayer benefit from the new variable speed technology. Such

⁷ SCE Opening Comments, pp. 4-5 and 6-7.

⁸ See, e.g., Shell Energy Opening Comments, p. 6, and Brookfield Renewable Energy Opening Comments, p. 3.

⁹ Pilot Power Group Opening Comments, p. 8; Nevada Hydro Company Opening Comments, p. 3.

¹⁰ PG&E Opening Comments, p. 14; SCE Opening Comments, pp. 4-5; Pilot Power Group Opening Comments, p. 8; CalWEA Opening Comments, pp. 10-11; Alton Energy Opening Comments, p. 6.

¹¹ See SCE Opening Comments, p. 6.

technology provides the following material attributes beyond the older, constant-speed pump technology:

- Provides grid regulation service (network frequency and voltage) while in pumping mode.
- Operates closer to the turbines' optimal efficiency point by adjusting rotational speed, which results in a significant increase in global plant efficiency.
- Operates over a wider hydraulic head range, thereby increasing the availability and the generation flexibility of the plant.
- Creates instantaneous power output adjustment help to rectify sudden voltage disruptions/variations caused by network problems.
- Provides smoother operation (for example at partial load) and elimination of operation modes prone to hydraulic instability or cavitation, which in turn results in reduced civil engineering costs, improved reliability, reduced maintenance, and increased lifetime.

Consequently, new variable-speed pumping technology translates into innovative pumped storage hydro technology that both enhances the many positive ratepayer attributes of pumped storage hydro, while reducing overall costs. These qualities in turn correspond to higher cost-effectiveness for ratepayers per the explicit directive of the enabling statute. Deployment of variable-speed pumping technology has just begun—for example, the 600-MW Nant de Drance project in Switzerland—making potential exclusion of consideration of the technology in California a missed opportunity to leverage growing construction and operational experience with the technology around the globe. We would expect the bilateral procurement process, including appropriate Commission review, to elaborate on the benefit-cost balance of the technology for ratepayers.

III. COMMENTS IN SUPPORT OF THE EXCLUSION OF PUMPED STORAGE HYDRO FALL SHORT IN THEIR REASONING, WHICH TENDS TO FEATURE EFFORTS TO PROTECT THE TARGETS SET FOR OTHER TECHNOLOGIES RATHER THAN A COMPELLING ARGUMENT IN FAVOR OF EXCLUSION.

We note comments that support the ACR’s exclusion of pumped storage hydro. In particular, we point out comments by the Interstate Renewable Energy Council (IREC) who specialize in distribution-level resource issues. IREC states:

[T]here is likely to be a significant need for large-scale (*e.g.*, pumped storage) on the transmission side, in addition to the 1,325 MW that will be the subject of the proposed Procurement Targets. However, pumped storage projects to be owned by third parties would appear to be excluded from qualifying under the proposed Procurement Targets (*see*, page 17 of the ACR), and any major new pumped storage project would be so large that it would likely use up all or most of a utility’s Target. Indeed, several commenters at the June 25, 2013 workshop that was noticed in the ACR pointed out that California is likely to need several thousand additional megawatts of large-scale storage, in addition to the 1,325 MW recommended in the ACR, in the timeframe contemplated in the ACR (*i.e.*, by 2020). All of these considerations militate in favor of having most of the proposed Procurement Targets be dedicated to ESS that would be interconnected at the distribution level.¹²

IREC appears concerned that inclusion of pumped storage hydro could take up most of the demand directed in the ACR’s Procurement Targets. We reiterate our recommendation that pumped storage hydro be included as an eligible resource in such a way as to avoid a zero-sum impact on other eligible technologies, given in part its unique scale and permitting issues.

We also find IREC’s assumption that “there is likely to be a significant need for [pumped storage hydro] on the transmission side” encouraging, but not when coupled with an implicit assumption that such need will naturally translate into procurement outside of AB 2514

¹² IREC Opening Comments, p. 6, fn. 3.

implementation. Indeed, we along with other parties such as SCE and Eagle Crest Energy outline the very real barriers in the marketplace for pumped storage hydro,¹³ including:

- Long development lead times
- Incompatibility with the short-term focus on resource adequacy planning
- Lack of a defined interconnection process at CAISO

Indeed, we also reiterate that, due to the above barriers, and in spite of the potential need for pumped storage hydro as mentioned by IREC above, exclusion of pumped storage hydro from the Commission's AB 2514 implementation would *de facto* put pumped storage hydro in a "no man's land" on the California electricity marketplace landscape. PG&E's and SCE's comments in particular expressing concern about the resource's exclusion in the ACR should be sufficient in showing that utility procurement of pumped storage hydro would be in critical condition without an affirmative inclusion of the resource in AB 2514 implementation.

Finally, we note the misperception best stated by Sierra Club and California Environmental Justice Alliance (CEJA) that the mere existence of pumped storage hydro in California today should exclude the resource from AB 2514 so as to prefer resources without such a presence in the state.¹⁴ We are dismayed by this interpretation of history. Pumped storage hydro projects such as Castaic, Helms, O'Neill and Thermalito were essentially a byproduct of the unique period of intensive dam and hydropower construction in the state in the 1960s and 1970s. The characteristics of the state's electricity marketplace at that time have no resemblance to today's marketplace, including permitting of hydropower and the need for associated environmental safeguards, the lack of independent power producers, the relative lack of variable resources in the state's electricity mix, the role of regulatory oversight of investor-

¹³ See SCE Opening Comments, p. 6.

¹⁴ See Sierra Club-CEJA Opening Comments, p. 26.

owned utilities, and many other market factors. We also note that we are well past a generation of utility employees well versed in how to invest in and construct pumped storage hydro, which poses an institutional challenge for developers and utilities alike. To extrapolate from that unique period of time to today in claiming that pumped storage hydro is on par in the marketplace with other forms of conventional generation would ignore the very different circumstances we face in the marketplace today.

IV. CONCLUSION: THE IMPORTANCE OF GIVING PUMPED STORAGE HYDRO A CHANCE TO COMPETE IN THE CURRENT CALIFORNIA MARKETPLACE FOR STORAGE AND INTEGRATION RESOURCES

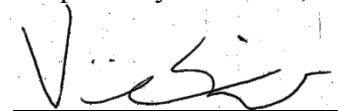
We note in conclusion that pumped storage hydro is not excluded by AB 2514 as an eligible resource, and faces very real market barriers including those referenced by the legislation. At the same time, pumped storage hydro with variable-speed pumping technology provides the wide range of benefits also outlined in the legislation.

We finally note that comments supporting exclusion of pumped storage hydro from AB 2514 extrapolate much too loosely from past investment in in-state pumped storage hydro, which in turn occurred in a marketplace barely recognizable today. The associated assumption that pumped storage hydro can essentially materialize regardless of its treatment in AB 2514 implementation is well off the mark. The assumption is particularly troubling since it can create an unintended consequence of locking a viable storage technology from the California marketplace at a time when California badly needs a variety of solutions to address integration of variable resources while meeting its pioneering greenhouse gas goals for decades into the future.¹⁵

¹⁵ Significantly, the potential for new pumped storage hydro to play a critical role in helping to integrate intermittent renewable generation and system regulation was noted a number of times at the CPUC-CEC Joint Workshop on

In our comments we called for the allowance of one bilateral procurement of pumped storage hydro by each of the three major investor-owned utilities. We reiterate that recommendation here, such that (1) it does not eat away at the goal for other technologies included in the ACR, and (2) does not constitute a hard mandate. Our second point is particularly important: by allowing bilateral contracting for pumped storage hydro as an eligible resource in the Commission's AB 2514 implementation, with the requisite Commission review and approvals, the approach would strongly encourage exploration and institutional learning among the utilities, developers and the Commission itself in assessing the net value of pumped storage hydro to California ratepayers. In contrast, excluding pumped storage hydro from the Commission's implementation of AB 2514 would do the opposite: guarantee the continued dormancy of pumped storage hydro in California, without clear ratepayer benefit.

Respectfully submitted,



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