

**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)

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

Virinder Singh
Director—Regulatory & Legislative Affairs
EDF Renewable Energy
517 SW 4th Ave, Suite 300
Portland, Oregon 97212
Telephone: (503) 219-3166, x 1025
Email: virinder.singh@edf-re.com

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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 comments.

I. INTRODUCTION

EDF Renewable Energy appreciates the hard work put into the ACR by Commission staff and Commissioner Peterman. Headquartered in San Diego and directly employing over 300 employees in California in four offices through the state, EDF Renewable Energy is a developer, owner and operator of wind, solar, biomass, and biogas resources. In the U.S., EDF Renewable Energy has developed over 3,600 MW of wind projects, over 230 MW of solar photovoltaic projects, and 100 MW of biomass/biogas projects, including numerous wind and solar projects throughout California.

More specifically to this proceeding, EDF Renewable Energy is developing a pumped storage hydro project in southern Oregon that can directly benefit California ratepayers. Our comments below focus on the role of pumped storage hydro in the implementation of AB 2514,

and concludes that its inclusion in the program, in addition to the targets outlined in the ACR, best fulfills the goals of AB 2514, though requiring a procurement approach that is different from what the ACR proposes for the storage technologies that it has chosen up to now for inclusion in AB 2514 implementation.

II. PUMPED STORAGE HYDRO IS COVERED BY THE DIRECTIVES OF ASSEMBLY BILL 2514.

The ACR mentions pumped storage hydro in two places, as follows:

More well-established technologies and applications with proven benefits and the ability to participate in California markets today, such as pumped hydrological storage, may not face all of the same types of barriers and issues as those energy storage technologies being used in new ways that have not been demonstrated or deployed on a wider scale. [Footnote 5: *See* Pub. Util. Code § 2835(a)(4) (defining energy storage system eligible for procurement targets as those using “mechanical, chemical, or thermal processes”).]¹

All third-party owned energy storage resources as defined by law, except for pumped hydrological resources, would be eligible to bid into the energy storage reverse auctions. [Footnote 25: Pub. Util. Code § 2835(a)(1).]²

These references give the impression that the ACR has interpreted Public Utilities Code § 2835(a) as excluding pumped storage hydro from the storage systems that are eligible for procurement targets under AB 2514. In pertinent part, subsection (4)(A) of § 2835(a) provides:

An energy storage system shall do one or more of the following:

(A) Use mechanical, chemical, or thermal processes to store energy that was generated at one time for use at another time.

Pumped storage hydro systems use a mechanical process (pumping water from lower elevation) to store energy (in the form of the potential energy of water) that was generated at one

¹ ACR, pp. 4-5.

² ACR, p. 17.

time (off-peak hours) for use at a later time (on-peak hours). Pumped storage hydro systems thus fit squarely within the definition of eligible technologies set out in § 2835(a).

Moreover, the legislative history of AB 2514 strongly indicates that the Legislature's intent was to include technologies such as pumped storage hydro within the definition of storage systems that are eligible for procurement targets under the statute. As introduced, the definitional language in AB 2514 that is now codified in § 2835(a) provided:

An "energy storage system" shall, without substantial reliance on fossil fuels, do one of the following:

(A) Use electromechanical, electrochemical, or electrothermal processes to store energy for delivery as electricity to the transmission or distribution grid at a later time.³

Significantly, the Author's Comments set out in the Bill Analysis of AB 2514 prepared for to the Senate Energy, Utilities and Communications Committee stated:

4) Outstanding Issues - Potential Amendments. There are several issues with the bill which the committee and author may wish to address through amendments: ...

b) Definition of Storage - Eligible energy storage is limited to those mechanical, chemical or thermal processes that "do not substantially rely on fossil fuels." PG&E has a 300 MW demonstration project of compressed air storage which utilizes fossil-fueled generation to move the stored energy. PG&E is concerned that this bill would limit the eligibility of that technology.

The amendments made to AB 2514 immediately after the hearing at which the above-referenced Senate Committee Bill Analysis was presented deleted the bill language quoted in the Author's Comments, with it being a reasonable presumption that this was done to address PG&E's concerns which apply equally to pumped storage hydro projects.⁴ Accordingly, it would be contrary to the bill author's intent, and by extension the Legislature's, to interpret §

³ AB 2514, as introduced on February 19, 2010, sec. 3 (page 8, lines 7-11).

⁴ See AB 2514, as amended August 2, 2010, sec. 3 (page 5, lines 16-21).

2835(a) as excluding pumped storage hydro from the systems that are eligible for procurement targets under the bill.

III. PUMPED STORAGE HYDRO PROVIDES THE BENEFITS OF ENERGY STORAGE EMPHASIZED IN AB 2514, WHILE ALSO FACING CHALLENGES OUTLINED IN THE LEGISLATION. EXCLUSION OF PUMPED STORAGE HYDRO FROM THE PROGRAM AS OUTLINED IN THE ACR WILL HAVE THE UNINTENDED IMPACT OF LOCKING THE RESOURCE OUT OF THE CALIFORNIA ELECTRICITY MARKETPLACE DUE TO CURRENT BARRIERS.

In addition to the coverage of pumped storage hydro in the definition of eligible facilities in AB 2514, pumped storage hydro also provides the numerous benefits outlined in the legislation.⁵

- Integrating intermittent generation from eligible renewable energy into the reliable operation of the transmission and distribution grid.
- Allowing intermittent generation from eligible renewable energy resources to operate at or near full capacity.
- Reducing the need for new fossil-fuel powered peaking generation facilities by using stored electricity to meet peak demand.
- Reducing purchases of electricity generation sources with higher emissions of greenhouse gases.
- Eliminating or reduce transmission and distribution losses, including increased losses during periods of congestion on the grid.
- Reducing the demand for electricity during peak periods and achieve permanent load-shifting by using thermal storage to meet air-conditioning needs.
- Avoiding or delaying investments in transmission and distribution system upgrades.

⁵ See AB 2514, Cal. Statutes 2010, ch. 469, sec. 1.

- Providing the ancillary services otherwise provided by fossil-fueled generating facilities.

Pumped storage hydro's capabilities are based upon a unique ability to provide flexible generation, spinning reserves, and voltage regulation. Pumped storage hydro systems can enhance the resource portfolio by allowing existing thermal units to operate at optimum points for economics and reduced overall emissions. Furthermore, it has very strong intra-hour benefits compared to gas (quick ramp), and also provides a unique dual benefit as a source of load (energy shift and frequency regulation). A pumped storage hydro project that EDF Renewable Energy is developing has units that have a minimum capacity of 75 MW and a maximum capacity of 150 MW with the capability of bringing each unit from standstill to full load generation in less than five minutes.

Despite its numerous benefits, today pumped storage hydro faces many of the challenges outlined in the legislation, namely:

[I]nadequate evaluation of the use of energy storage to integrate renewable energy resources into the transmission and distribution grid through long-term electricity resource planning, lack of recognition of technological and marketplace advancements, and inadequate statutory and regulatory support.⁶

Pumped storage hydro features a long development lead time, from preparation of requirement documents in order to receive a permit from the Federal Energy Regulatory Commission (FERC), to engineering, design, and completion of construction. Another barrier stems from the current resource adequacy (RA) framework in California not targeting resources for seven years into the future. Instead, resources with shorter lead times but without the large-scale project characteristics of low-to-zero emissions and an ability to absorb energy as a load are inherently advantaged in the RA planning process. Consequently, this proceeding serves as a

⁶ AB 2514, sec. 1(f).

crucial venue for putting pumped storage hydro on a more even competitive playing field with natural gas-fired generation based on the former's numerous beneficial attributes, including the minimal to no emissions attributes that are a major focus of AB 2514.

Another material barrier to pumped storage hydro development is the lack of a defined interconnection process at the California ISO for bulk energy storage projects. The Large Generator Interconnection Process does not work for bulk energy storage projects, as it treats the storage project as a "generator" and does not model the benefits the "storage" part of the project adds to the system.

We assume that the ACR's reason for not including pumped storage hydro, namely, not including the resource because it is "well-established...with proven benefits...and the ability to participate in California markets today...[without facing] all of the same types of barriers and issues as those energy storage technologies being used in new ways that have not been demonstrated or deployed on a wider scale" is meant to comply with AB 2514's goal of targeting technologies facing "significant barriers" in the marketplace today as referenced above.⁷ However, as we mention above, pumped storage hydro does suffer from the lack of a long-term resource adequacy planning horizon in the state, and from the lack of near-term procurement experience amongst utilities. Furthermore, our foremost concern is that by not including pumped storage hydro in this program, the ACR would place the resource in a "no man's land" on the California utility procurement landscape, since pumped storage hydro:

- (a) Is not typically an RPS-eligible resource;
- (b) Is not amenable to the short-term RA planning horizons in California;
- (c) Is not subject to a defined interconnection process at CAISO; and

⁷ ACR, pp. 5 and 17.

(d) Would not be included in the AB 2514-driven storage program outlined in the ACR.

Consequently, it is very easy to expect that utilities will bypass pumped storage hydro absent any meaningful inclusion of the resource in the regulation-driven electricity marketplace in California.

We also assume that it is not the intent of the Commission to exclude pumped storage hydro from utility procurement considerations. Accordingly, our focus below is on how to include pumped storage hydro in the program outlined in the ACR, without commenting specifically on procurement policy for the storage technologies currently included in the ACR.

IV. THE LARGE-SCALE NATURE OF PUMPED STORAGE HYDRO PROJECTS, AND RECENT UTILITY PROCUREMENT EXPERIENCE WITH SUCH PROJECTS, RENDERS THEM UNSUITABLE FOR A STANDARD RAM-LIKE CONTRACT ALONGSIDE SMALL-SCALE STORAGE RESOURCES.

The ACR calls for an auction and standard contracting procurement process along the lines of the existing Renewable Auction Mechanism (RAM) for eligible renewable energy resources of 20 MW and less. We do not comment here on the suitability of a RAM procurement approach for the resources that the ACR intends to include in the program.

Rather, we point out that the RAM is designed to target resources with short development lead times without the many inherent development-based challenges of large-scale resources, whether it is a large-scale solar, wind, gas or hydro resource. It also targets the types of resources (e.g., solar photovoltaics) that had been similarly targeted by utility procurement programs just prior to the issuance of the RAM (e.g., PG&E's and SCE's Solar Photovoltaic Programs, or SPVPs). The RAM features up-front development deposits with firm timelines for commercial on-line dates (CODs) that are appropriate for many renewable energy resources up to 20 MW in capacity, which feature fewer development-related surprises than are faced by most

large-scale resources, regardless of the technology. Similarly, the standard contractual terms also reflect the more “cookie-cutter” nature of projects with short lead times and substantial, recent contracting and commercial operation experience.

The RAM appropriately does not target resources well above 20 MW, which in the case of eligible renewable resources in California are addressed by periodic utility request-for-offers and bilateral procurement. The RAM also has not resulted in the procurement of technologies in which utilities have not had substantial, recent contractual experience, which currently pumped storage hydro certainly suffers from.

Consequently, when including pumped storage hydro in this program, the Commission will need to consider an alternative procurement mechanism, independent of the design for procurement of smaller-scale storage resources. We propose just such an approach below.

V. **IN ADDITION TO INCLUDING PUMPED STORAGE HYDRO AS AN PROCUREMENT TARGET ELIGIBLE STORAGE SYSTEM, THE COMMISSION SHOULD ALLOW LOAD-SERVING ENTITIES TO ENTER INTO BILATERAL CONTRACTS WITH PUMPED STORAGE HYDRO RESOURCES WITH SUBSEQUENT COMMISSION REVIEW AS PER USUAL FOR BILATERAL CONTRACTING, WITH THE INTENT TO ALLOW AT A MINIMUM FOR EACH UTILITY TO ENTER INTO ONE BILATERAL EACH WITH A PUMPED STORAGE HYDRO RESOURCE IN COMPLIANCE WITH AB 2514.**

EDF Renewable Energy recommends that the Commission recognize both the contribution that pumped hydro can make to the future California electric grid as well as the market barriers that exist for third-party pumped hydro developers. We recommend that the Commission at a minimum encourage each of the investor-owned utilities to enter into at least one bilateral contract for a pumped storage hydro project, whether via third-party ownership or utility ownership, with the requisite Commission review of the contracts to determine prudence for California’s electric ratepayers.

Our focus on utilities rather than competitive service providers is based on the obvious role that the utilities have in grid operations, RA, and the bulk of variable resource procurement under the renewable portfolio standard. Including pumped hydro storage as an eligible system for the energy storage procurement targets adopted in this proceeding, and then encouraging each of the three investor-owned utilities to pursue procurement of pumped storage hydro, would populate the marketplace with sufficient buyers and encourage each utility to assess deeply the costs and benefits of pumped storage hydro. Such a process is particularly important given the utilities and the Commission's lack of near-term experience with pumped storage hydro procurement.

We note in particular that we are not calling for a mandate for procurement of pumped storage hydro, per the intent of the ACR not to create such mandates for energy storage procurement. Rather, our recommendation is consistent with the ACR in that the overarching goal is energizing the marketplace in a manner that can overcome current barriers to viable storage technologies for ratepayer benefit.

VI. CONCLUSION

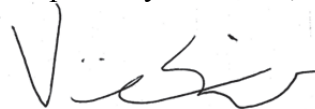
- Pumped storage hydro is covered by the directives of AB 2514.
- Pumped storage hydro provides the benefits of energy storage emphasized in AB 2514, while also facing challenges outlined in the legislation. Furthermore, exclusion of pumped storage hydro from the program as outlined in the ACR will have the unintended impact of locking the resource out of the California electricity marketplace due to current barriers.
- The large-scale nature of pumped storage hydro projects, and the lack of recent utility procurement experience with the resource, will not make the resource

suitable for a standard RAM contract alongside other resources chosen for inclusion in the ACR.

- In addition to including pumped storage hydro as an eligible resource under the procurement targets adopted in this proceeding, the Commission should allow LSEs to enter into bilateral contracts for such projects, which would then be subject to Commission review, with the explicit goal of allowing each investor-owned utility to enter into one bilateral contract each in compliance with the goals of AB 2514. This goal is not a mandate.

We appreciate the hard work put into the ACR by the Commission, and we look forward to working further with the Commission to ensure implementation of AB 2514 unlocks the opportunity for California ratepayers to benefit from the whole range of energy storage technologies available today.

Respectfully submitted,



Virinder Singh
Director—Regulatory & Legislative Affairs
EDF RENEWABLE ENERGY, INC.

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