

**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 ALTON ENERGY
ON ASSIGNED COMMISSIONER'S RULING PROPOSING PROCUREMENT
TARGETS AND MECHANISMS AND NOTICING ALL-PARTY MEETING**

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In accordance with the provisions of the Rules of Practice and Procedure of the California Public Utilities Commission (“Commission”), Alton Energy hereby submits these reply comments to the *Assigned Commissioner Ruling Proposing Storage Procurement Targets and Mechanisms and Noticing All-Party Meeting*, issued on June 10, 2013 (“ACR”).

I. INTRODUCTION.

Our Reply Comments focus on three main points that are critical for consideration in this Proceeding:

- 1) **California has an urgent necessity to focus on meeting the ARB 2050 Goal¹** to reduce Emissions by 80%. Most gas generation will need to retire before 2050, or the State will fail to meet the ARB 2050 Emissions Goal. To meet this Goal, major new zero-carbon energy additions that are Firmed and Shaped by energy storage must be procured . Bulk Energy Storage, coupled with wind and solar, must be encouraged and allowed to compete in direct competition with any fossil energy procurement, starting now.
- 2) **To meet the ARB 2050 Emissions Goals, Distributed & Bulk Energy Storage, and specifically Pumped Hydro, must be included in any energy storage Procurement .** This will

¹ Governors Executive Order S3-05, now an ARB Goal to reduce Emissions by 80% from 1990 levels by 2050

enable wind and solar generation , including major solar roof additions ², to remain an effective and essential portion of the future clean energy mix. Large-scale energy storage will be needed to maintain strong integration capabilities of variable renewable energy as gas generation decreases.

- 3) **Cost-Effective Energy Storage needs to be allowed to compete on a Level Playing Field in all Procurement Mechanisms.** Parallel Proceedings, Forums, and Agencies must be brought together regarding the importance to plan for and facilitate clean energy with energy storage to be able to qualify and compete on a level playing field with fossil fueled power procurement, and not be blocked by Planning failures . There is a clear AB 2514 mandate to facilitate all cost-effective energy storage. The Loading Order dictates wind and solar before gas generation. Bulk energy storage, plus wind, plus solar is more cost-effective and a better fit than is new gas generation, even before adding in the huge exposure of gas to stranded costs and escalation. As an absolute minimum, this least-cost, best-fit clean energy must be fostered to compete, fairly.

II. ARB 2050 EMISSIONS REDUCTION GOALS: THERE IS A VERY LARGE NEED FOR FIRMED AND SHAPED NEAR ZERO-CARBON ENERGY

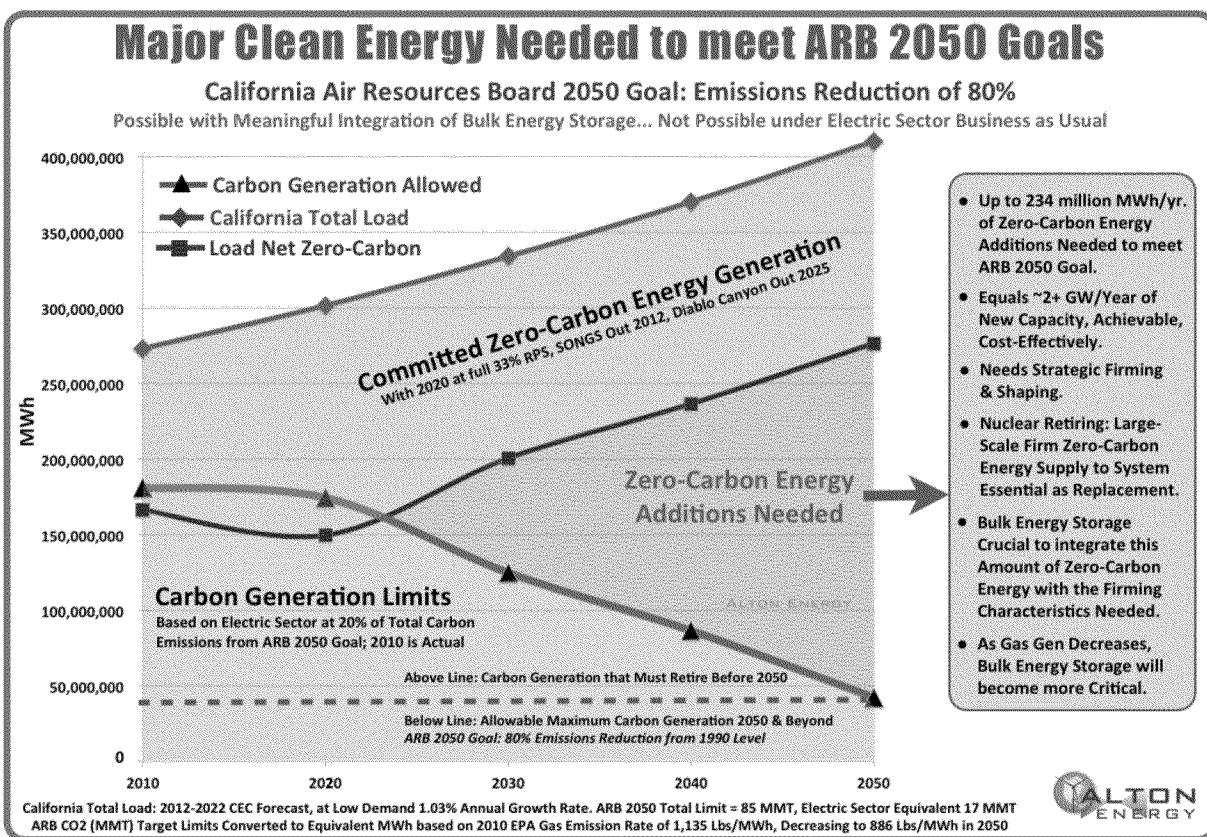
We commend the recent acknowledgement of more than 25 Parties, in their conclusion that GHG Emissions is an important point for consideration in this Proceeding.³ However, we believe the timing and magnitude of the need is widely underestimated, and the need is for early, aggressive procurement of future clean energy so that it is available in the volumes needed to meet established future Goals . Emissions reduction needs to be a critical core driver behind the architecture of any meaningful Procurement Target for energy storage. Unfortunately, only a few parties have highlighted the importance and significance of paying attention to the long-term California Air Resources Board (ARB) 2050

² We commend to Governor's Solar Roof Program, as an important element of the scale of zero-carbon energy needed to meet the ARB 2050 Goals.

³ Parties that noted the importance of Carbon Emissions in the July 3 Comments: Brightsource, CAISO, CESA, Clean Energy Coalition, Consumer Federation of California, IRA, Eagle Crest, EDF, ENBALA, Federal Executives Agencies, Friends of the Earth, Independent Energy Producers, Marin Energy Authority, Pilot Power Group, Primus Power, SDG&E, Shell, Stem and Solar City, California Hydrogen Business Council, GPI, Sierra Club, Nevada Hydro, CEERT, and SCE in previous Comments.

Emission Reduction Goal of 80% reduction from 1990 levels.⁴ Until now, only one Party has submitted the analysis that is necessary to demonstrate the State Goal's impact on the electric sector, and draws a simple conclusion that it is near-impossible to meet the ARB 2050 Goal without substantial and continued integration of carbon-free wind and solar that is firm and shaped by large utility-scale Bulk Energy Storage.

Alton Energy submits the below graphic to demonstrate the massive scale of the zero-carbon energy that is needed through 2050.⁵ The need is reasonably well accommodated through 2020 by the existing supply of Hydro and Nuclear, in combination with existing and committed renewable generation.



However, from 2020 to 2050, the need for additional new zero-carbon energy generation is substantial, about ~234 million MWh/year by 2050, requiring over 2,000 MW of new capacity per year

⁴ Parties referencing importance of the ARB 2050 80% Emissions Reduction Goal: Alton Energy, CESA, California Hydrogen Business Council, Green Power Institute, Sierra Club, and Nevada Hydro.

⁵ Alton Energy Analysis of ARB Emissions Goals through 2050, added to multiple past CPUC filings by Alton Energy

(wind and solar, with storage) to meet this widening gap. There are limited viable solutions to meet the increasingly stringent ARB 2050 Emission Goals. However, such is possible with meaningful integration of bulk energy storage coupled with clean zero-carbon energy (wind + solar), but it will not be possible under Business as Usual. If gas power continues to be procured as the default, the emissions impact will preclude the possibility of reaching ARB 2050 Emissions Reduction Goals and cause substantial stranded cost from the gas generation as Procurement Planning awakens and shifts to a zero-carbon focus.

The renewable energy (in the Green Band in the above chart) is currently being integrated at low costs by coordination with Hydro Generation, and with CCGT and CT Gas Turbines (included in the Carbon Generation band of the graphic). Although it has been argued in CAISO and CPUC Forums that the 33% RPS generation in the system by 2020 may be adequately integrated with existing system resources, this perspective fails to adequately consider longer-term ARB 2050 Goal impacts. As California progresses down the path to reduced carbon emissions in the generation mix, it becomes clear that the ability of gas turbines to respond to the increasing need to integrate intermittent renewables will be extremely limited, and very expensive.

Bulk Energy Storage, and specifically Pumped Hydro, is the most cost-effective, proven, reliable technology to meet this need. However, there are major market barriers that prevent bulk energy storage from being built in California, and until such barriers are removed there will not be energy storage of the magnitude that is needed to help transform the electric sector to meet ARB Goals. Time is of the essence.

We strongly agree with the Sierra Club in their position that “to achieve California’s goal of an 80% reduction in carbon emissions by 2050, the amount of storage on the grid will have to increase dramatically.”⁶ Their reference to President Peevey’s statement at the CPUC Energy Storage Workshop should be highlighted and enforced:

“I believe the Commission’s energy storage policy is the bridge to our long-term future, not only 10 years from now, but 40 years from now and beyond. And we must start building that bridge or we will never reach our 2050 goals to reduce greenhouse emissions by 80% from 1990 levels.” – President Peevey

⁶ Sierra Club July 3 Opening Comments, pg. 3

Southern California Edison (SCE) importantly comments that “pumped hydro is one of only a few technologies that can offer power and energy at a truly ‘bulk’ scale.”⁷ Calpine reiterates this point, commenting that “CAISO has repeatedly expressed a need for resources that can sustain their output for three hours or more.”⁸ CESA points out that “large scale energy storage resources can cost -effectively address Use Cases in the Transmission category, including energy generation shifting, seasonal storage, GHG emission reductions, and renewables integration, among other services.”⁹ Distributed storage has a very important role in the market, and we do not advise minimizing its potential. However, it is crucial in order to integrate the magnitude of clean near zero-carbon energy that will be necessary to meet the ARB emissions goals, that it be firm and shaped by Bulk Energy Storage that has an adequate dispatch duration that is able to provide large volumes of load-following energy.

CESA recommends that “eligibility proposed in the ACR be expanded to apply to all energy storage technologies, including pumped hydroelectric; and that the overall procurement target be expanded to 4,325 MW by 2020, with the additional 3000 MW added onto the transmission procurement bucket for 2020 procurement cycle.”¹⁰ CESA goes on to express that they have “major concerns regarding the exclusion of pumped hydroelectric energy storage from the proposed target scheme.”¹¹ We agree with CESA’s position, but due to the magnitude of the need demonstrated in the above ARB 2050 Emissions Reduction chart and other analyses, we recommend that this Procurement Target be considered just as the first step in the right direction, and that much more bulk energy storage will be required in the near future. To accomplish the increased Goal, some or all of the 3,000 MW could come as a part of competitive solicitations combined with wind and solar to meet the clean firm energy supply needed in a solicitation.

SDG&E comments that “if targets are adopted, they should be related to a specific need or solve a specific problem... Energy storage is a means to an end, not an end unto itself. It is a tool in the toolbox

⁷ Southern California Edison July 3 Opening Comments, pg. 6-7

⁸ Calpine July 3 Opening Comments, pg. 5, referencing to See, e.g., *R.11-10-023, Resource Adequacy and Flexible Capacity Procurement Joint Parties’ Proposal (Joint Parties’ Proposal), Attachment A to Phase 2 Scoping Memo*

⁹ CESA July 3 Opening Comments, pg. 14

¹⁰ CESA July 3, pg. 3

¹¹ CESA at 5

to solve multiple problems currently facing the electric grid. There will be instances when energy storage is the best solution to solve a problem but it needs to be examined against other methods in order to make that determination.”¹²

We support these statements by SDG&E and would like to emphasize the importance of bulk energy storage, specifically pumped hydro, to be evaluated on a level playing field in this Proceeding and all other procurement Proceedings to be able to compete fairly with all forms of capacity and generation. Indeed, there will be instances when other technologies have their appropriate place in the energy mix; but when barriers are broken down, bulk energy storage proves itself to be a very cost-effective solution to solve many of the issues facing the evolving electric grid, especially when coupled with large volumes of carbon-free energy. Bulk energy storage, and specifically pumped hydro, has the ability to transform the electric sector at the scale needed, as a means to an end of a carbon intensive industry that is environmentally and economically destructive.

We suggest that utilities honor these Goals by immediately working to consider and procure cost-effective clean energy solutions with energy storage, in place of their current efforts to procure new gas generation that certainly appears likely to be stranded before it is set to retire.

III. INCLUSION OF BULK ENERGY STORAGE, PUMPED HYDRO.

To meet the ARB 2050 Emissions Goals, Distributed & Bulk Energy Storage, and specifically Pumped Hydro, must be included in any Energy Storage Procurement. This will enable wind and solar generation, including major solar roof additions ¹³, to remain an effective and essential portion of the future clean energy mix. Large -scale energy storage will be needed to maintain strong integration capabilities of variable renewable energy as gas generation decreases. We should not exclude what EPRI and many other Parties have noted as the most cost-effective form of bulk energy storage, Pumped Hydro.

¹² SDG&E, July 3, pg. 2, 4

¹³ We commend to Governor’s Solar Roof Program, as an important element of the scale of zero-carbon energy needed to meet the ARB 2050 Goals.

We strongly support the following eleven Parties in their questioning of the basis for excluding Pumped Hydro Storage from the potential Procurement goals established in this Proceeding: Southern California Edison (SCE), Pacific Gas & Electric (PG&E), Brookfield, CalWEA, CESA, Eagle Crest, EDF, IREC, Nevada Hydro, Pilot Power Group, and Shell Energy.

SCE states that “to accomplish the goal of market transformation as efficiently as possible and avoid unnecessary costs, the Commission should allow utilities significant flexibility to pursue the broadest possible range of potential storage projects. This will ensure that utilities can select and procure the most cost-effective storage.”¹⁴ We strongly agree with SCE’s view, and believe that if the utilities will work diligently with the clean energy developers to facilitate firm clean energy projects, as alternatives to current gas generation plans, that ratepayers will benefit enormously with lower costs and cleaner energy.

There are still many barriers for Pumped Hydro Storage to enter the market. SCE clarifies, “it is inappropriate to exclude pumped hydro technologies as contemplated by the ACR. Technological maturity is only one of the many barriers faced by emerging storage technologies; the remaining barriers apply equally to legacy technologies such as pumped hydro.”¹⁵ The many barriers for Pumped Hydro are very well summarized by both EDF Renewables¹⁶ and Eagle Crest Energy¹⁷ in their Comments.

Brookfield references AB 2514, and highlights that “in fact, section 2385(f) “specifically provides that ‘nothing in this chapter, and no action by the Commission, shall discourage or disadvantage development of an energy storage system by an electric corporation. ’ Excluding pumped storage from procurement framework and failing to accommodate its unique development requirements would discourage and disadvantage development of pumped storage projects.”¹⁸ Comments by the Independent

¹⁴ Southern California Edison July 3 Opening Comments, pg. 6

¹⁵ SCE July 3, pg. 6

¹⁶ EDF July 3 Opening Comments, pg. 5

¹⁷ Eagle Crest Energy July 3 Opening Comments, pg. 5

¹⁸ Brookfield July 3, pg. 4

Energy Producers Association expressed concern that “the ACR’s treatment of pumped storage may be inconsistent with statutory language.”¹⁹

CAISO stated that they “expressed agreement with the two basic principles expressed in the initial [CPUC] Staff Proposal: 1) removing market barriers so that energy storage can participate on a *technology-neutral, level playing field* with other resources; and 2) focusing on potential energy storage “end uses,” to the extent that this policy focus is on specific and well-defined operational needs.”²⁰

It is strongly encouraged that all forms of Bulk Energy Storage, such as Pumped Hydro, be included in all Procurement Goals in this Proceeding. It is also important that this Proceeding send the message to all other parallel Proceedings that Bulk Energy Storage, when cost-effective, should be allowed to compete fairly with all forms of conventional fossil generation. Shell Energy highlights that “Pumped Hydro meets the statutory definition [of AB 2514]... and if the Commission is going to impose a storage procurement mandate, the Commission may not lawfully pick “winners and losers” among energy storage technologies.”²¹ PG&E also “believes that all storage projects should be included to count towards procurement targets, including pumped hydro... If targets for procuring energy storage are set, AB 2514 requires utilities to procure viable and cost-effective energy storage systems, which would include pumped hydro. Thus, this exclusion [in the ACR] is not in compliance with the statutes of AB 2514.”²²

CalWEA comments that by “excluding proven storage technologies, such as pumped hydro storage, from any targets, as the ACR proposes, would compound the problems [of potential risk of uneconomic procurements]. Indeed, pumped hydro storage is likely the least-cost, and potentially the most-competitive, form of storage available today... Pumped hydro storage has also been found to be far less energy-intensive, on a life-cycle basis, than advanced batteries and compressed air energy storage.”²³

¹⁹ Independent Energy Producers Association, July 3, pg. 8

²⁰ CAISO July 3 Opening Comments, pg. 2

²¹ Shell Energy July 3 Opening Comments, pg. 6

²² PG&E July 3 Opening Comments, pg. 14

²³ CalWEA July 3 Opening Comments, pg. 10-11

We respectfully request to the Commission that Pumped Hydro be considered for inclusion in this Energy Storage Proceeding to assist in removing substantial market barriers, providing a means towards financing and construction, and for sending a productive message to other parallel Proceedings of the positive benefits of Bulk Energy Storage, such as Pumped Hydro. A primary objective of this Proceeding should be to eliminate obstacles to the cost-effective procurement of energy storage with wind and solar to compete directly and fairly against new gas generation.

Most importantly, if California is to have any realistic chance of meeting the ARB 2050 Emissions Goals, it is crucial that Bulk Energy Storage, and specifically Pumped Hydro, be included in any energy storage Procurement Process.

IV. COST-EFFECTIVE BULK ENERGY STORAGE TO COMPETE ON A LEVEL PLAYING FIELD IN ALL PROCUREMENT MECHANISMS

It is critical that in order for California to meet its state environmental goals, that this Proceeding needs to send a positive and productive message to other parallel Proceedings and Forums (including LTPP, RA, LCR, Flexible Capacity, and RPS procurement) regarding the process and importance for cost-effective energy storage to be able to compete on a level playing field with fossil fueled power procurement. This is especially the case where energy storage directly facilitates large-scale integration of renewable energy.

There is a clear AB 2514 mandate to facilitate all cost-effective energy storage. The Loading Order dictates wind and solar before gas generation. Bulk energy storage, plus wind, plus solar is more cost-effective and a better fit than is new gas generation, even before adding in the huge exposure of gas to stranded costs and escalation. As an absolute minimum, this least-cost, best-fit clean energy must be fostered to compete, fairly.

CalWEA “urges the Commission to focus first on taking aggressive steps to ensure that any storage technologies that are potentially competitive are fully considered prior to any procurement of fossil-fuel resources in the holistic context of various short- and long-term system needs... Such planning will enable the utilities to optimize overall procurement and enable storage providers to more effectively

compete directly with fossil-fuel and other alternatives to simultaneously provide a spectrum of identified long-term needs.”²⁴ Brookfield (and many other Parties) reiterates this point by asking for the important consideration of a “procurement channel that would allow pumped storage to be evaluated and compete against other technologies if it is determined to meet defined electric grid requirements.”²⁵

SCE comments that “the Commission should apply lessons learned from the Renewable Portfolio Standard (“RPS”) program and target storage procurement over multiple years...”²⁶ It is crucial that this Proceeding be considered as just the first step toward establishing a long sustainable industry. This will ensure that energy storage is able to successfully address the long-term policy and regulatory goals to reduce emissions from the electric sector, by facilitating the increasing integration of carbon-free energy, and displacing and avoiding the unneeded dispatch of inefficient high heat rate gas generation.

The most appropriate procurement channel for energy storage may be through specific Benefits-Focused RFOs, via Bilateral Negotiation, or a Zero-Carbon Firm Energy Feed-In-Tariff (ZCE-FIT) for when the procured cost-effective product is a composite of energy storage and zero-carbon energy.

Regarding the Reverse Auction Mechanism (RAM) for energy storage procurement proposed in the ACR, we agree with the 27 or more Parties²⁷ that question the effectiveness or oppose the RAM procurement methodology that was proposed. We feel the same types of procurements that have been so successfully used for large-scale procurement of long-lead major projects is appropriate for the need here.

In this Proceeding or other Proceedings, Bulk Energy Storage can essentially be procured in a way that is not that different from gas power procurement. The core difference is that the barriers are removed for bulk energy storage and a procurement process is initiated so that it can compete for the market need that is established. Bilateral negotiation will likely be helpful for more effective early procurement of bulk energy storage, due to the diversity of the alternative technologies and scale, with

²⁴ CalWEA July 3, pg. 3

²⁵ Brookfield July 3, pg. 7

²⁶ SCE July 3, pg. 3

²⁷ Parties that question the effectiveness or oppose the RAM for storage Procurement: Gravity Power, IREC, TURN, Brightsource, CEERT, CESA, DRA, EDF, Friends of the Earth, GPI, Independent Energy Producers, Large Scale Solar Association, SEIA, Marin Energy Authority, Nevada Hydro, PG&E, Primus Power, SCE, SDG&E, Shell, Sierra Club, SolarReserve, Stem and Solar City, TAS Energy, Brookfield, Clean Energy Coalition

lack of a recent procurement history, to enable standardized terms and conditions to be worked out in a meaningful and timely way. Proper Terms and Conditions are a major factor in gaining cost-effectiveness.

Longer term contracts, in line with the long proven life (75 -100 years) of pumped hydro, can allow for even lower long-term levelized cost of capacity and generation procurement. Such long-term contracts are typically performance and milestone based, need not be front-loaded, and are reviewed and approved by the Commission. We believe 30+ year contracts are best, 25 years as a minimum, and even longer contracts have substantial potential to produce the lowest costs when projects are able to organize and structure to take advantage of longer terms, which serve to benefit ratepayers.

Whether it is through portfolio planning such as LTPP or via direct procurement targets, such should consider bulk energy storage requirements, such as pumped hydro. A framework is needed that considers the longer lead-time requirements for such large projects to be able to compete with other technologies that may have shorter development cycles. This will allow for many of the most cost-effective projects in California to get financed and built.

In order to cost-effectively convert the best technologies and projects to reality and into the California Energy Mix, in our competitive environment, we need both long-term financeable procurement and an appropriate scale of procurement if we are to successfully achieve our desired clean energy future. Long-term procurement with bilateral negotiation and project lead-time consideration of at least 4-7 years is important to achieve the lowest cost and lowest carbon energy for California, which can only be achieved through meaningful procurement of bulk energy storage. We urge the Commission in this Proceeding to take all possible steps now, to help facilitate the State meeting ARB's 2050 Goals, so that the citizens of California benefit from the cleaner energy supply that can ultimately be achieved, cost-effectively.

