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 ALTON ENERGY, INC. RESPONDING TO ADMINISTRATIVE LAW JUDGE'S RULING ENTERING INTERIM STAFF REPORT INTO RECORD AND SEEKING COMMENTS

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In accordance with the California Public Utilities Commission's ("Commission's") Rules of Practice and Procedure, the California Energy Storage Alliance ("Alton ")[1] hereby submits these comments on the *Administrative Law Judge's Ruling entering Staff Report Into Record and Seeking Comments*, issued by Administrative Law Judge Amy C. Yip-Kikugawa on January 18, 2013 ("ALJ's Ruling").

I. INTRODUCTION.

- As directed by the ALJ's Ruling, Alton Energy provides comments on the Interim Staff Report[2], addresses specific questions included in the Interim Staff Report, and provides comments pertaining to energy storage-specific recommendations raised in the Storage OIR Procurement Policy workshop held on January 14, 2013.

[1] Alton Energy, Inc is a Developing Member of the Bison Peak Pumped Storage Project, filing a request for Party Status.
[2] *Energy Storage Phase 2 Interim Staff Report*, issued January 4, 2013.

- Alton Energy, Inc. is engaged as a developing member of the 1,000 MW Bison Peak Pumped Storage Project, with an approved FERC Preliminary Permit, in Kern County, CA, located in the heart of the Tehachapi Renewable Transmission Project (TRTP) area. The project is very close to Whirlwind and Windhub 500 KV Substations, and near the huge and expanding large-scale wind and solar project developments. Alton Energy, representing Bison Peak Pumped Storage Project, appreciates the opportunity to participate in this proceeding.
- California has achieved great success with the installation of over 3,500 MW of near zero carbon wind and solar capacity in the TRTP Area and over 6,000 MW state wide, with substantial increases rapidly following. Bulk Energy Storage and Distributed Utility Scale Storage, in coordination with these near zero carbon wind and solar resources, can achieve the lowest cost of energy, and lowest net total GHG Emissions for the California energy portfolio.
- Pumped Hydro Storage (PHS) is a proven and reliable means of bulk energy storage, with 3,905 MW operating California, and ~127,000 MW installed worldwide. [3]
- Bulk Energy Storage converts the most cost-effective and often, the lowest carbon energy at it's lowest marginal cost into very fast responding dispatchable energy. It expands the flexible capacity available to the electric system operators by utilizing the most efficient energy qualities of the existing generation fleet, and converting it into capacity and ancillary services to be delivered responsively, on demand.

[3] National Hydro Association

- Energy storage minimizes energy costs and maximizes environmental benefits for the entire generation portfolio by shifting surplus energy from existing efficient and clean generators and displacing inefficient peaking generators, supplying energy, flexibility, and reserves.
- In California, in 2011, the most efficient of the combined cycle non-cogen gas generators (heat rate < 7,300) were utilized at only an approximate weighted average capacity factor of approximately 35%, contributing approximately 15% of total net generation.[4] By utilizing the un-used marginal output of these most efficient generators to charge efficient energy storage, it is possible to create dispatchable, cost-effective cleaner energy that could meet at least 10% of the state energy and capacity need, all delivered at the most valuable times.
- Successfully achieving this magnitude of bulk and distributed energy storage will take time and careful analysis to get the storage located at the most valuable and strategic locations. It is critical to start the implementation of substantial scale storage now, to send effective market signals, but most importantly to build an orderly and meaningful transition to a more clean energy future.

II. ALTON ENERGY'S RESPONSES TO SPECIFIC QUESTIONS POSED IN THE INTERIM STAFF REPORT.

Does Staff's priority listing of Policy Options accurately represent the most important issues facing storage in the identified proceedings?

- While we recognize and respect the amount of substantial effort and work that has

[4] SNL Energy

gone into the prioritization of Policy Options for this Proceeding, we feel that there are some significant points that have not been addressed to the extent necessary to set the priority, urgency, and legal justification for the procurement goals of this proceeding. The first of these points is pertaining to the quantifiable emissions reduction benefits of energy storage. A key part of this point is the in depth analysis that demonstrates the benefits of considering a Portfolio Approach to energy storage benefits, and strategic power plant dispatch.

Strategic Dispatch & Emissions Avoidance

- We agree with the general statements in this and other Proceedings that storage does take on the attributes of the charging energy and that the round trip efficiency losses must be accounted for. We also agree that gas is a meaningful portion of the energy mix in California. However, a comprehensive portfolio analysis of the operational characteristics of the wide range of gas power plants being dispatched in California reveals that this is the primary reason why Bulk Energy Storage enables significant emissions reduction. Bulk and distributed energy storage plants could be used to meet peak energy requirements with the energy attributes of the better Combined Cycle (CCGT) power plants rather than the inefficient and higher emissions attributes of the combustion turbines that are currently used.
- As variable wind and solar project development in California increases, more and more gas generation will be displaced, and energy storage will make the variable renewable energy much more valuable, particularly in scenarios beyond 33%

penetration of intermittent renewables. Energy Storage can eliminate any energy curtailment from wind or solar, further reducing emissions.

- In 2011, there was 6,500 MW of less efficient non -cogen gas power plants with a heat rate of 8,000 Btu/kWh or higher, which amount to over 33% of the total Non-Cogen gas plant fleet in California. [5] There is over 3,100 MW of non -cogen gas plants with heat rates high er than 11,000 Btu/kWh. There are still quite a few gas plants that are operating with extremely high heat rates ranging from 15,000 to over 20,000 Btu/kWh.[6]
- Conversely, there is approximately 9,700 MW of the more efficient CCGT plants in CA with a heat rate of 7,300 or less, with a 2011 weighted average capacity factor of that group of approximately 35%, and a total net generation in 2011 of over 30,100,000 MWh. Of these plants their weighted average heat rate was 7,197. This is not to mention the new Super Efficient CCGTs that are due to be built in the near future, nor to mention the advanced technologies that are entering the market for the retrofitting and upgrading of existing gas power plants.[7]
- Heat Rate, in this case, is Btu of gas per kWh that the plant generates. Therefore, there is a direct correlation with the efficiency (Heat Rate) of a gas plant, and the carbon emissions that it puts out.
- There is a huge opportunity for bulk energy storage, specifically pumped storage hydropower and strategically sited distributed storage, to replace a very significant

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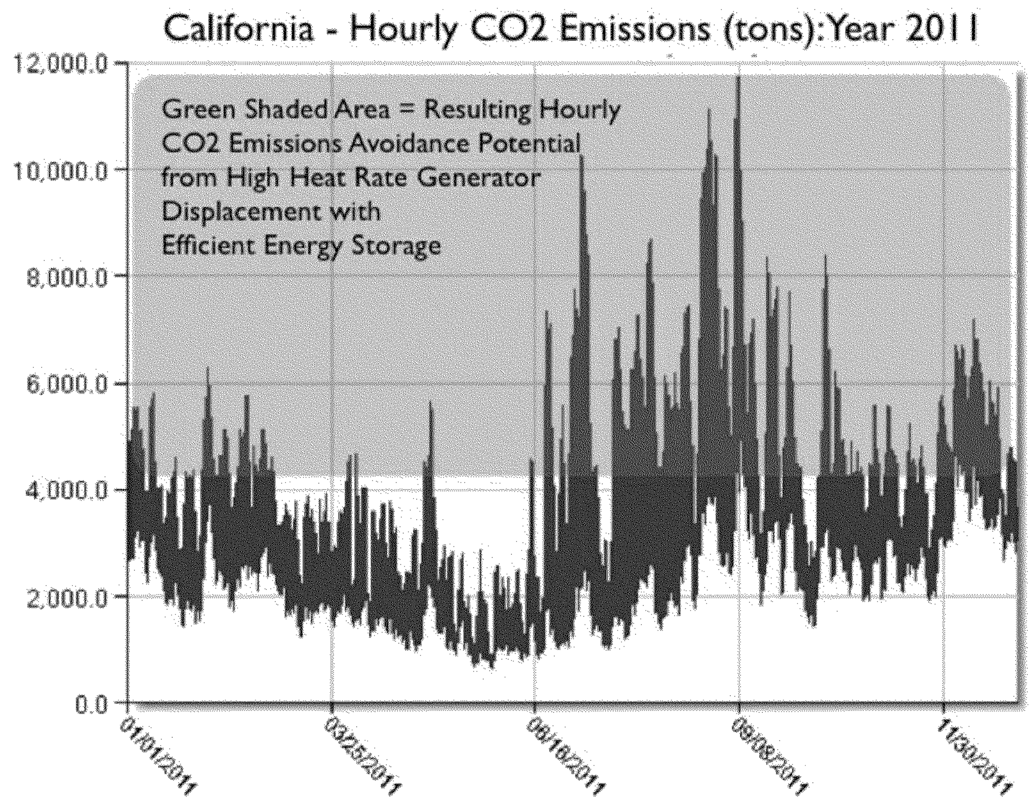
[5] There is a direct cor relation between efficiency (Heat Rate) of a gas plant, and the carbon emissions that it puts out. Improving efficiency (lowering the heat rate) also CO2 lowers emissions.
[6] SNL Energy
[7] Analysis of data sourced from SNL Energy.

portion of the inefficient high heat rate peaking plants, and also to displace the lesser efficient CCGT plants with energy from the efficient CCGT plants.

- There are substantial CO2 emissions reductions, and increased economic value, by simply charging during off-peak hours and nominally increasing the capacity factor of the most efficient CCGTs that will be economically dispatched when needed. This avoids the on-peak emissions of the otherwise dispatched gas capacity that is normally highly polluting due to its very high heat rate, and inefficient dispatching cycles. The following chart[8] demonstrates the point that total emissions output varies greatly from hour by hour in California, in direct correspondence with peak load, and the inefficient dispatch of high heat rate generators on the margin:



[8] Chart generated SNL (w/ general conceptual storage overlay added – NOT intended to quantify actual emissions reductions)

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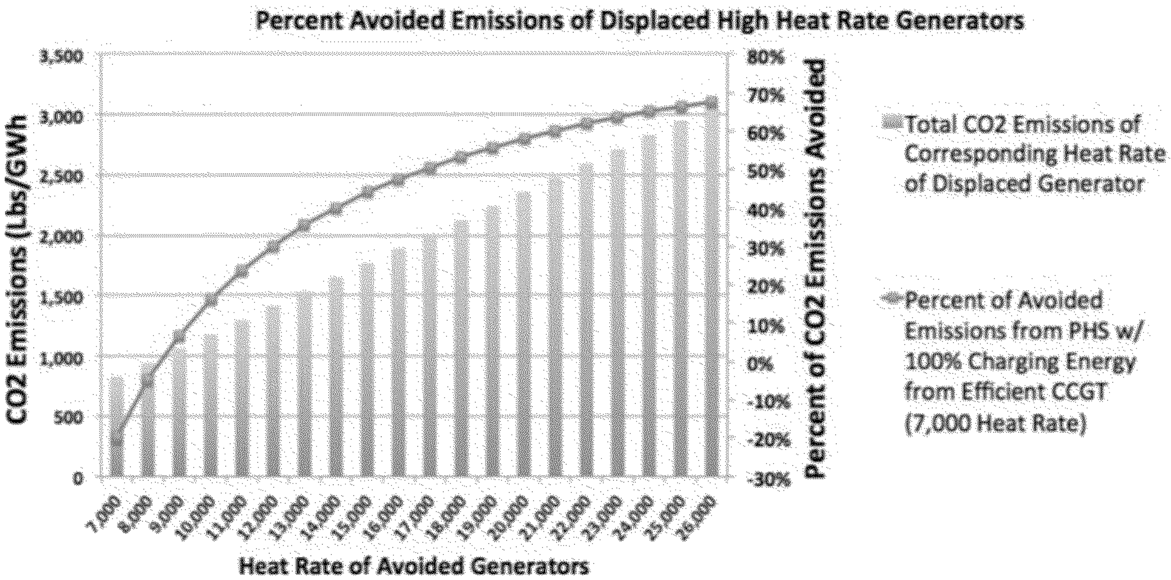
- Taking into consideration the round-trip efficiency loss of approximately 20% of a new pumped hydro storage plant, analysis shows that if it were to pump with electricity sourced from 100% gas power, specifically, sourced from the most efficient CCGTs with a heat rate of 7,000, this would provide substantial CO2 Emissions Avoidance compared with all other CA non-cogen gas plants with a heat rate of 9,000 or higher.
- This is demonstrated in the following chart.[9] This chart starts by assuming that 100% of the charging energy needed for the Pumped Hydro Storage plant to pump during off-peak hours has an efficiency loss of 20%. It assumes a scenario where the en ergy needed for pumping is sourced from 100% gas content, essentially increasing the capacity factor of the existing most efficient CCGTs with a heat rate of 7,000. Data for 2011 shows California generators in this heat rate had approximately 65% of their capacity not utilized.[10] The chart compares the emissions of the Pumped Hydro plant with that of the gas generators of equal or higher heat rate. The first point at the bottom of the curve shows a negative -20% emissions avoidance compared with if the PHS plant was to displace another gas generator with the same heat rate as that of the CCGT generator the PHS plant uses to charge. In this case, due to the round -trip efficiency loss of the PHS plant, it would create more emissions per MWh of output. As the Emissions Avoidance curve moves up and to the right, it compares the emissions of the PHS charging energy to that of the avoided energy that would have otherwise been dispatched

[9] Lbs/GWh = (Heat Rate x 1,000) x (CO2 Rate/1,000,000)
[10] SNL Generation Data

from the higher heat rate generators that it is displacing. The chart shows if the PHS plant were displacing a generator with a 13,000 heat rate it would avoid the equivalent of 35% of the per unit CO2 emissions of that 13,000 heat rate generator. The left of the chart shows the corresponding total emissions in pounds per GWh of that generator with a 13,000 heat rate.[11]



- It is clear that we are rapidly approaching a new era of significant integration of intermittent carbon-free renewables, quickly approaching the RPS target of 33%, and possibly more in the near future. Additionally, California already has a very meaningful portion of its total net electricity generation from near-zero carbon sources. In 2011, non-hydro renewable contributed approximately 13% of the total net generation from utility-scale power, hydro at 21%, and nuclear at

[11] Percent Emissions Avoidance = 1-((Charging Energy Emissions Lbs per GWh*(1+PHS Efficiency Loss)*(1-% of Zero Carbon Mix))/Comparative per GWh Emissions of Higher Heat Rate Generator)

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approximately 18%. This amounts to over 52% of the total net generation of utility-scale power plants being sourced from near-zero carbon plants.[12]

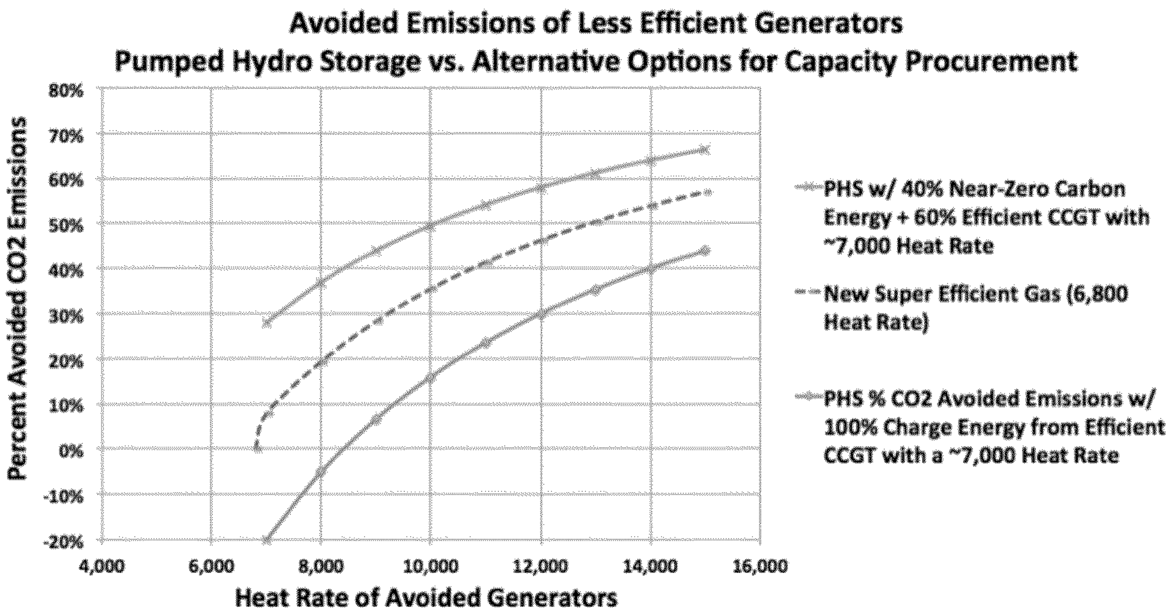
- While bulk energy storage can avoid substantial CO2 emissions in a scenario of 100% gas power sourced for its charging, in the evolving Califor nia energy mix scenario, with significant integration of carbon free renewables, energy storage's contribution towards reducing California's GHG Emissions can be substantially enhanced. This is particularly the case as long-term planning procedures account for the increased capacity value available from renewables if substantial energy storage is deployed, and thus encourage the continued development of renewables as a fundamental value towards capacity and reserves. Storage can help integrate additional variable renewables. Not only by using the excess energy but also by providing response and reserves as the renewables displace conventional generation, as a result of their increased capacity value.
- Additionally, there are the numerous capacity and ancillary benefits that storage provides to the evolving electric grid. Thus far, these ample benefits have been thoroughly focused upon in this Proceeding, more so than the very meaningful Emissions Reductions benefits. We urge the Commission to consider Bulk Energy Storage, as well distributed storage, combined to form a powerful Cost-Effective Emissions Reduction Preferred Resource, and create the bridge to California's clean energy future.

[12] SNL

- **Pumped Hydro Storage is already a widely deployed and proven technology, both globally and in California, that is already providing these aforementioned benefits to the electric system, through the use of the existing fleet of pumped storage projects and large reservoir storage hydropower projects.**
- Long-term procurement planning and other economic evaluation needs to consider the overall economics of energy storage, beyond just the calculation of its capacity and ancillary benefits.
  - For example, energy storage, at scale, can have significant downwar d impact on the price of electricity during high demand period, when it is replacing the most expensive and highest polluting generators. During periods of low demand price elasticity is generally flat, and thus the charging of energy storage may have slight upward pressure on prices during those periods, and may also allow a more favorable mix of efficient generators to remain online. However, the favorable benefits to ratepayers during the peak hours will dominate, and overall there is likely to be significant economic benefit to users and ratepayers by enabling a lower cost of energy.
  - In addition to comparing the cost-effectiveness of new capacity, to capacity prices of a new combustion turbine, we encourage the further analysis of the Levelized Cost of Energy Storage as an important cost/benefit factor. While many storage technologies, such as bulk energy storage, are proven to have competitive capital costs to that of new fossil fuel generators, it should be noted that the levelized cost of energy from energy storage can be substantially lower when compared with the

very high variable costs and low average utilization rate of a gas combustion turbine. Especially due to the very long life and mature nature of pumped hydro storage at 75 to 100 year and more, the long-term value can be monetized and seen through lower levelized rates.

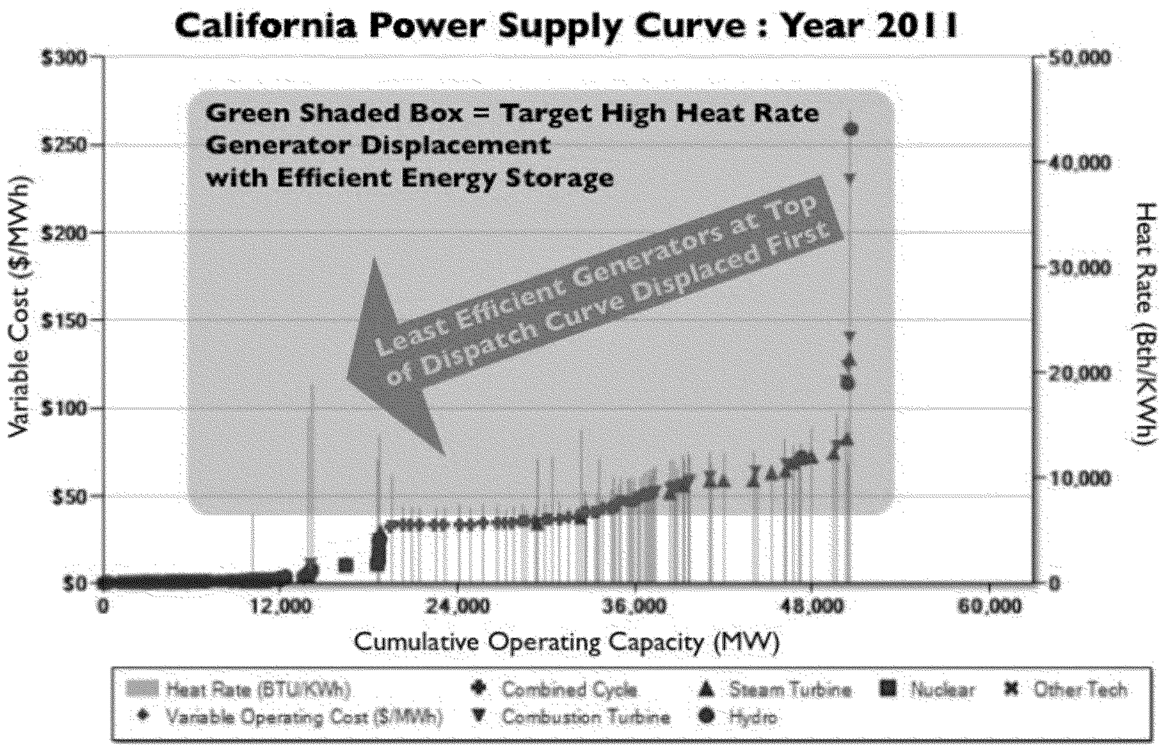
- Similar to the previous Avoided Emissions chart, the blue curve on the following chart shows the potential avoided emissions of a pumped hydro storage plant that uses 100% Efficient CCGT Gas for its charging. Recognizing the option for new gas capacity as an alternative, the red dotted line demonstrates that a Super Efficient Gas generator also has meaningful potential to avoid emissions of the inefficient existing gas peaker fleet. But, an overall Portfolio Analysis will clearly show that procuring only new gas is self-defeating in California, due to the substantial benefits already achieved, and continued benefits in creating a lower carbon overall energy mix. Energy storage has the unique opportunity to charge during off-peak hours, when although gas may still be meaningful portion of the energy mix, there may be a significant penetration of carbon free generation in the mix available to the energy storage facility. When taken into consideration, the avoided carbon emissions from a pumped hydro storage plant may shift, as capacity value or renewables increases, as energy storage is coupled directly with renewables, or particularly as storage is able to pick up curtailment of renewables. The following chart demonstrates an example of this scenario, and shows that the reduced carbon energy curve has the highest possible avoided emissions out of the three curves. The California energy portfolio mix is already over 50% near-zero carbon energy, and rapidly evolving to change the paradigm of how variable renewable energy procurement takes into consideration the ultimate potential and increased capacity credit of this high value carbon free energy. It is critical that bulk energy storage be used to create the flexible efficient capacity value of California portfolio energy mix, instead of adding new gas, which will cap the ultimate potential gain for many years.



Why should Energy Storage be considered a "preferred resource"?

- The important thing to remember is that in long-term procurement planning, there are many options. **If carbon emissions reduction is an important goal, then it is imperative that energy storage be considered a Preferred Resource for this very reason.** The same reason that Renewables, Energy Efficiency, and Demand Response are currently considered by the state as a Preferred Resource in the Loading Order. They all reduce GHG Emissions.

- **Energy Storage is needed to maximize the benefits of the intent behind this Loading Order.** The following diagram is the California Power Supply Curve,[13] which shows the highest variable cost generators with the high heat rates to the right of the Curve. The overlay demonstrates the displacement of the least efficient, more costly, and highest polluting generators first.



- **The primary point is that all gas plants cannot be lumped into the same category regarding their carbon emissions.** There is a drastic difference in carbon emissions per MWh between an Efficient CCGT and a Combustion Turbine or Inefficient CCGT with a heat rate ranging all the way up to 15,000 or more.

[13] SNL Energy Power Supply curve (w/ storage target overlay area added)

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- **Storage has the ability, even if sourced by Efficient gas generation during the charging hours, to significantly reduce carbon emissions.**
- The bottom line, and most importantly, is that we have an energy mix in California with a very significant portion covered by near-zero carbon sources. Our RPS eligible renewable content is quickly approaching 33%, and likely to go higher. There is significant Once Through Coolin g capacity scheduled to come off-line in the near future. There is a massive amount of aging carbon-free nuclear energy that will no longer be contributing to the mix. Overall, the California energy mix is heading toward a scenario with a very significant penetration of near-zero carbon resources, that needs to be planned for with urgent action and optimum solutions to maximize its Flexible Capacity value, and not with the mistake of a bias toward conventional fossil generators.
- There is over 17,000 MW of Once Through Cooling plants in California.[14] As stated in the CPUC LTPP 2012 Proposed Decision:
- *"The main driver of local capacity requirements is that around 4,900 MW of OTC plants in the local transmission-constrained areas of the LA Basin may retire in the next several years, as well as other OTC plants in the Big Creek/Ventura and San Diego local areas because of the State Water Resources Control Board (SWRCB) regulations. By 2021, approximately 7,000 MW of OTC capacity is expected to retire in the LA Basin local area and Big Creek/Ventura local area."*[15]

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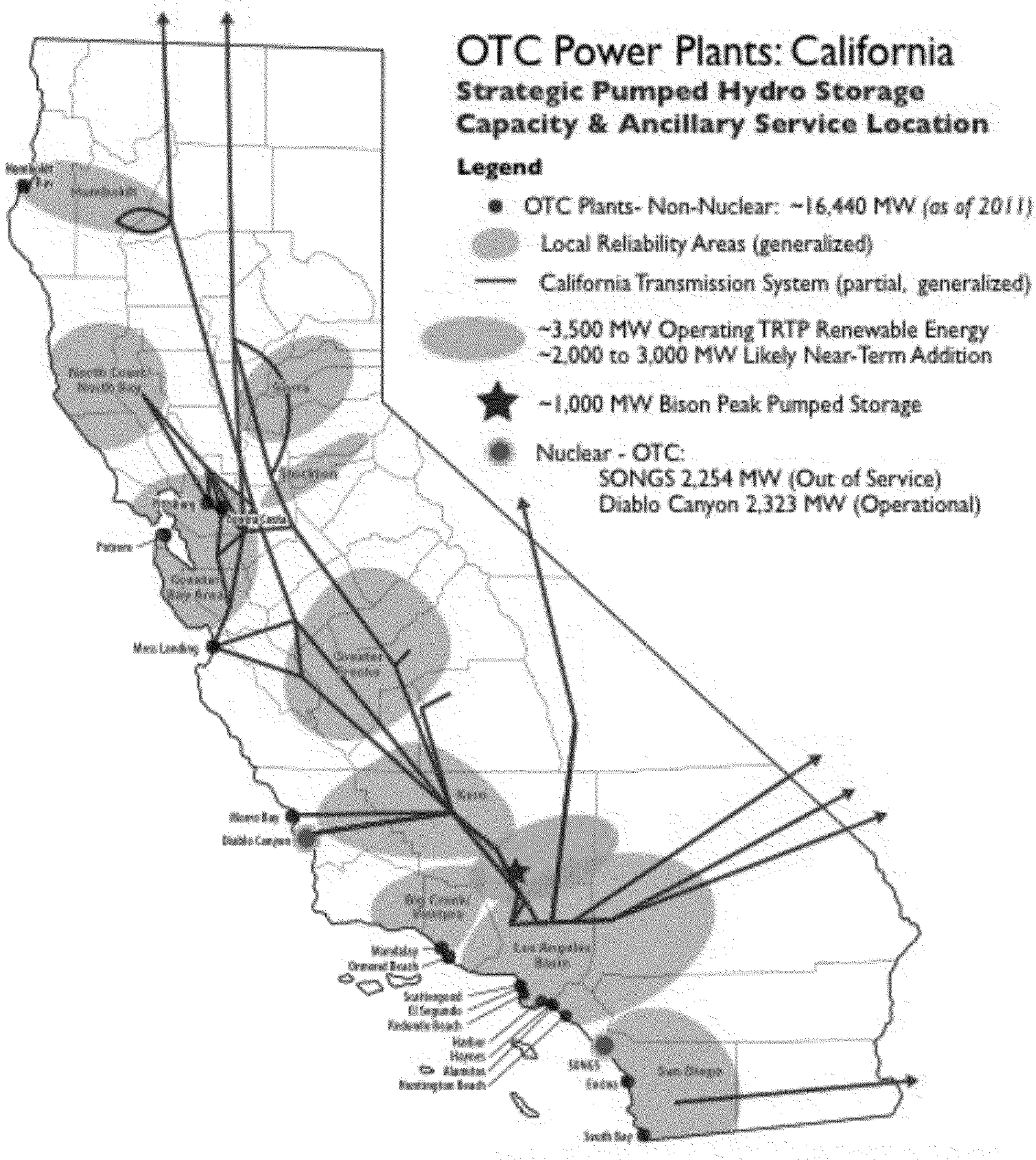
[14] California Energy Commission IEPR 2011
[15] CPUC Long Term Procurement Plan (LTPP) 2012 Proposed Decision

- *CPUC states that" it is reasonable to accept as a fact that, based on information available today, OTC plants will close as per the SWRCB schedule in Table 1 (of LTPP 2012 Proposed Decision).* [16]
- **Energy Storage can strategically and cost-effectively compete to replace this to-be-retired OTC capacity. The procurement policies and practices for energy and capacity in California provide bulk energy storage a serious and fair opportunity to compete on a level playing field achieve this end.**
- We encourage cost-effective utility-scale bulk and distributed energy storage to be a primary and meaningful portion of both the procurement goals of this Proceeding, and within the CPUC Long Term Procurement Planning Process.
- The following is a map of the OTC plants in California. In addition, this map shows Bison Peak Pumped Storage Project, of at least 1,000 MW in capacity, and it's strategic location in the heart of the Tehachapi Renewable Transmission Project area, able to utilize and add value to the massive investment in the already in - service extra high-voltage (EHV) transmission facilities, and the huge and expanding wind and solar intermittent renewable energy generation installations. These EHV transmission facilities, with minor planned upgrades, can deliver unprecedented value in firm dispatchable clean energy directly to the LA Basin Load Center.

[16] [http://www.waterboards.ca.gov/publications_forms/publications/factsheets/docs/oncethroughcooling0811.pdf



Source: SWRCB (w/ TRTP Resource Overlay added)

- Over the next 10 years in California, we do not have an energy supply shortage. We have a flexible capacity need, and the requirement for fast-ramping characteristics for an evolving electric grid. Most importantly, we have an urgent need to mitigate the carbon emissions of our future power sector. There is no possible way for the energy mix of California to ultimately be lower in carbon emissions without either large-scale energy storage plus intermittent renewables, or massive high cost, un-proven at scale, and environmentally questionable long-term carbon capture and sequestration.

- We do not need new gas capacity with a comparably high carbon output if we can accelerate the integration of the next generation solution that is able to offer the same value of operational characteristics, and is cost-effective. At most, if there is any need for additional new gas generation, it must be limited in quantity, short contract duration, and extremely high efficiency.
- Bulk and Distributed Energy Storage is that next generation solution, and there is an urgent need to incorporate substantial new storage capacity into the California energy mix. When taking into consideration the Diversified Portfolio of our existing and future generation mix, energy storage will indeed take on the characteristics of the energy it requires to charge. It is agreed, that even if energy storage does take on the characteristics of its charging energy, even if it has a round-trip efficiency loss, operational data shows energy storage is viable and proven, and has a very significant contribution to achieving our carbon emissions reduction goals. Energy Storage is the one and very best solution to a flexible, reliable, and low risk clean energy future.

Are suggested actions for resolution of barriers the best approach to advancing energy storage deployment?

- Many of the barriers are thoroughly addressed. However, we feel there are some crucial critical barriers to the financing viability and off-take structuring regarding large utility-scale bulk energy storage development projects, as explained below.

Long-Term Off-Take Contract Execution Timing for Utility-Scale Projects:

- Regarding the procurement methodology for longer lead-time utility-scale, bulk energy project, such as a pumped hydro storage facility, there are some timing issues that are crucial for consideration. It is encouraged to structure a procurement methodology that facilitates executed long-term off-take contracts in rational way with reasonable timing.

Off-Take Contract Negotiation Process:

- Bulk Energy Storage, specifically Pumped Hydro Storage, is proven at scale, both globally and operationally within California. There are a number of sites in California that offer solid potential to achieve cost-effective large-scale bulk energy storage benefits of this proven and reliable technology. In addition, some of the distributed storage technologies are fast emerging in a complementary way to assist in replacing the need for gas turbine peakers where they are needed in the system. California is at a unique position of opportunity to take advantage of these combined, extremely valuable benefits.
- Bison Peak Pumped Storage Project, and other strategically located distributed storage projects, need the Commission to move forward promptly to facilitate orderly and cost-effective procurement, at substantial scale, for the timely construction and operation of these highly valuable resources.

- We urge the Commission to move forward promptly to facilitate orderly and cost-effective procurement, at substantial scale, for the timely construction and operation of these highly valuable resources.
- The current range of energy storage procurement options is extremely diverse, ranging from small behind the meter applications, to very large robust utility-scale projects. While public RFP processes can create productive competition for certain distributed applications, it may not be the most suitable at this time for longer lead - time very large utility-scale developments.
- Bilateral negotiations, instead of inflexible RFP mandates, may be the best way to capture highest value of good projects with features that are acceptable to the major stakeholders. We agree with SCE's suggestion in the LTPP 2012, that they be allowed discretion in how they best see fit to procure capacity, but with strong guidance and oversight by the Commission to achieve highest value for all stakeholders, including the ratepayers of California.
- We feel that through constructive bilateral interaction with the utilities, that large - scale bulk energy storage projects can be structured in a manner that pro vide the highest value to the ratepayers, a rational return on investment to utilities, and a means to allow for viable financing arrangements to expeditiously bring the very large capacity of bulk energy storage to construction and operation. Through rational procurement contract structuring for utility -scale projects, the long life of capacity, ancillary benefits, and energy value can be maximized for all stakeholders.

- We encourage procurement goals that send strong market signals to both small scale distributed storage companies, and large utility scale developers. This message needs to communicate that California will be a dependable and consistent market that encourages companies to continue to make the substantial investments necessary to advance the proven benefits of energy storage.

III. CONCLUSION.

We thank the Commission for consideration of these Comments. We look forward to collaborating in this Proceeding to help facilitate a timely and meaningful framework for the successful implementation of a long-term energy storage opportunity in California.

Respectfully submitted,

/s/

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Date: February 4, 2013