




CONSENT CALENDAR

TO: HONORABLE CHAIRPERSON AND MEMBERS OF THE AZUSA UTILITY BOARD

FROM: GEORGE F. MORROW, DIRECTOR OF UTILITIES 

DATE: SEPTEMBER 25, 2017

SUBJECT: UPDATE OF THE 2014 ENERGY STORAGE FEASIBILITY STUDY PURSUANT TO CALIFORNIA ASSEMBLY BILL 2514 ON ESTABLISHING ENERGY STORAGE TARGETS

**SUMMARY:**

Assembly Bill 2514 (AB 2514) requires mandatory assessment and periodic reviews of energy storage devices and the economic feasibility of their implementation. As required, Azusa Light & Water (ALW) performed an energy storage applicability assessment in 2014, concluding that no cost-effective storage goals could be set for 2016 and 2021. Based on updated results of an energy storage technology, ALW similarly concludes and reports that there is no existing storage technology can satisfy Azusa needs in a cost-effective manner and thus the establishment of no storage targets remains appropriate. The proposed action adopts Resolution No. UB-13-2017 containing the results of ALW's mandatory tri-annual review of energy storage targets and recommendation that no energy storage targets be established at this time.

**RECOMMENDATION:**

Staff recommends the Utility Board approve the following:

- 1) Adopt Resolution No. UB-13-2017 containing the results of ALW's mandatory tri-annual review of energy storage targets and ALW's recommendation that no energy storage targets be established at this time.

**DISCUSSION:**

Assembly Bill 2514 (AB 2514), the Energy Storage Bill, was signed into law by Governor Schwarzenegger in 2010. It requires all electric load serving entities in California to undertake periodic studies and reviews of applicability of energy storing technologies and, *if cost effective*, set goals for procuring or installing such.

Section 2836.6 of the Public Utilities Code specifically states: “All procurement of energy storage systems by load-serving entity or local publicly owned electric utility *shall be cost effective*”. This means that the law does not require energy storage procurements or installations, if such were determined to be not cost-effective when compared to other alternatives.

AB 2514 required that California electric utilities undertake by 2014 studies of potential procurement and installation of energy storage devices by 12/31/2016 and 12/31/2021. Findings of said studies, along with established 2016 and 2021 targets, if any, had to be reported to the Utility Board and the CEC by 10/1/2014. Any originally established storage targets and/or recommendations need to be reviewed and, if needed, updated every three (3) years and their achievement reported to the Board and the CEC by 2017 and 2021, respectively. In 2014, an energy storage target of zero (0) was established for both 2016 and 2021.

In 2014, Staff identified a potential energy storage application at ALW’s Kirkwall substation. Kirkwall substation serves about 25% of Azusa’s load, mainly south of the State Highway (210 Freeway). The Kirkwall substation can serve up to approximately 16.8 MW load (continuous rating), when two identical units of 8.4 MVA 66kV/12kV transformers are operated in parallel. The summer peak load at Kirkwall Substation runs in a 12 MW to 16 MW range, but on some occasions can exceed 19 MW. As the electric load of the substation grows, ALW will at some point be faced with the prospect of having to upgrade the existing transformer bank by adding an additional 8.4 MVA transformer. Properly sized and operated energy storage device(s) could in theory defer the time at which continuous operation above 16.8 MVA would require upgrades. Additionally, such potential energy storage devices(s) could serve as short duration back-up power for loads stranded during forced Kirkwall outages and/or before such loads are transferred to another City of Azusa owned substation.

The objectives and parameters in the 2017 review were largely the same. First, Staff did not identify any new opportunities for potential energy storage application(s) in Azusa other than that identified in 2014. Accordingly, Staff re-evaluated the findings and recommendation of its original 2014 report focused on applicability and cost-effectiveness of differing distribution transformer upgrades which at the time lead to a 0 MW storage target. The 2017 re-evaluation was performed in the context of potentially new/improved storage technologies that may have become commercially viable since 2014 and/or lower prices of the existing, commercially and operationally viable, storage technologies.

**Approach:**

Staff assessed whether any new needs and/or opportunities to potentially apply energy storage came into existence. Having not identified any new needs or opportunities, Staff proceeded with re-evaluation of the previously identified need at Azusa’s Kirkwall Substation and established that a theoretical 3-5 MW (7-20 MWH energy capacity) storage device might be a “good-fit size-wise” for such potential application. The “good-fit size-wise” refers to both the 3-5 MW capacity and the 7-20 MWH of energy, as well as to the available physical space at Kirkwall property (one should note a typical 1 MW battery is the size of an average truck hauler container). In 2014, Staff elected to model 2 cases of energy storage and chose NaS (Sodium Sulfur) and Li-ion (Lithium ion)

batteries because of relative maturity of the technologies and extensive performance track record of similar storage devices.

In the 2017 reevaluation effort, Staff first selected “best suited” storage options using the ES-Select model application designed by KEMA and licensed to Sandia and Pacific Northwest National Laboratories. Using feasibility, discharge duration, technology maturity, as well as installed costs per Kw and kwh of capacity the best potential technology options selected with assistance of the ES-Select model for distribution upgrade deferrals were: Lithium-ion and Sodium-sulfur.

For modeling, Azusa and several Southern California POUs commissioned an updated Navigant Consulting’s energy storage valuation model (the model was used previously in our 2014 modeling effort). The Navigant model tool has gone through extensive review and usage. Sandia National Labs and the US Department of Energy (DOE) conducted formal peer reviews of the underlying tool framework. The model was updated in 2017 to include latest commercially available battery technologies and also to reflect updated (lower) prices of mature battery technologies.

Despite some quirks, the Navigant storage modeling and assessment tool proved useful in identifying, quantifying, and monetizing benefits of various prospective energy storage applications. In the model, different potential benefits can be valued depending on the purpose of particular application and the hosting system characteristics (e.g., location on the grid or distribution, pertinent regulatory structure, and owner – utility, producer, customer). Particular benefits calculated by the model are realized by theoretically applying energy storage in four main categories - load leveling, grid operational support, renewables integration, and distribution applications. Within these categories, each application of energy storage can lead to different economic, reliability, and environmental benefits. The modeling itself was performed by Azusa Staff using the above Navigant-developed tool.

The following are staff’s key thoughts and findings on applicability of investigated energy storage technologies as well as conclusions from model runs for a potential opportunity of siting an energy storage device at Kirkwall Substation.

### **Results of the model runs:**

Staff investigated the costs & benefits of installing two operationally feasible battery technologies (one at a time) – with capacity of 3 MW and discharge duration of 3 and 18 hours in lieu of a Kirkwall transformer upgrade (i.e installation of a third 8.4 MVA transformer). Based on Staff’s investigation as well as consultants’ assessments, installation of an additional 3-phase 8.4 MVA transformer would cost about \$ 2 million. The expected useful life of such a transformer is 40 -50 years. Staff estimates that a third transformer would mitigate the relatively infrequently occurring (up to 50 times/year) overloads of the two currently operating transformers and provide a cushion of about 5.4 MVA for future load growth.

The results of the modeling were as follows:

- Modeling a 3 MW, 12 MWH NaS (Sodium Sulfur) battery with a 15 year useful lifespan vs. deferral installation of 8.4 MVA transformer rendered a **negative NPV of \$8.2 million**.
- Modeling a 3 MW, 7 MWH Li-I (Lithium Ion) battery with a 10 year useful lifespan vs. deferral installation of 8.4 MVA transformer rendered a **negative NPV of \$4.4 million**.

#### **Additional due diligence:**

In addition to the above referred storage applicability assessments using the Navigant model, Staff solicited proposals from vendors for technologies that in vendors' opinion might satisfy Azusa's needs. In response, Azusa received proposals from two reputable energy storage developers/installers, as follows:

S&C electric Company of Chicago, Il – 5 MW (20 MWH); **\$19,920,000** (the quote does not include recycling of batteries and any other remediation that may be required by law)

- Automotive-grade Lithium-ion (NMC chemistry) technology from LG Chem + S&C Pure Wave storage management and inverter system

Mesa Technical Associates of Cobleskill, NY – 5 MW (20 MWH); **\$12,950,000** (the quote does not include recycling of batteries and any other remediation that may be required by law)

- LG Chem's Lithium Nickel Manganese (LiMNC) + Eaton Corporation inverters

#### **Conclusion and Recommendation:**

In light of the above and the performed modeling, **Staff concludes that at this time still no available energy storage technologies are offered at an acceptable price** (i.e. they are still uneconomic) for the studied, and at this time the only known, potential Azusa application.

Accordingly, Staff recommends that the Utility Board adopt by resolution conclusions of Staff's 2017 review and reevaluation of the 2014 energy storage study, with the conclusion that no targets for energy storage installations on Azusa owned, operated, or controlled system be established.

Staff will continue monitoring the energy storage technologies and applications and perform thorough reviews/reevaluations at least every three years as mandated by statute.

Aside of the conclusions and recommendation, Staff advises that Azusa has presently thirty eight (38) thermal energy storage units implemented with a combined storage capacity of approximately 0.9 MW. Azusa is currently in a process of adding two (2) more thermal storage devices which will result in a total of 40 units installed with an approximate cumulative storage capacity of 1 MW (about 1.4% of Azusa's all-time peak load or 1.5% of Azusa's average 10-year average peak load). By comparison, the CPUC requirement for non-IOU load serving entities operating under the CPUC's jurisdiction is 1% of peak load by year 2020.

**FISCAL IMPACT**

There is no fiscal impact associated with the recommended action.

Prepared by:

Yarek Lehr, P.E.  
Assistant Director of Resource Management

Reviewed and Approved:

George F. Morrow  
Director of Utilities

Reviewed and Approved:

Don Penman  
Interim City Manager

Attachment:

- 1) Resolution No. UB-13-2017

RESOLUTION NO. UB-13-2017

A RESOLUTION OF THE AZUSA UTILITY BOARD ADOPTING FINDINGS AND RECOMMENDATIONS REGARDING FIRST TRI-ANNUAL REVIEW OF THE 2014 ESTABLISHED ENERGY STORAGE TARGETS PURSUANT TO REQUIREMENTS OF THE CALIFORNIA ASSEMBLY BILL (AB) 2514

WHEREAS Azusa Light & Water (ALW), is a publicly-owned utility (POU) and in that capacity provides reliable, low cost, and environmentally responsible power to residents and businesses of the Azusa community; and

WHEREAS, ALW, owns, maintains, operates and/or contracts for certain electric generation and power delivery and distribution systems for the purpose of furnishing electricity to residents and businesses of the City of Azusa (“Azusa”); and

WHEREAS, the Azusa Utility Board is the governing body of ALW; and

WHEREAS, State Assembly Bill (AB) 2514 required each publicly-owned utility (POU) governing board to determine by October 1, 2014 any cost-effective and viable energy storage technologies for its utility systems and to set implementation targets, if any, for 2016 and 2021; and

WHEREAS, Staff performed in 2014 required re-evaluation of feasibility and cost-effectiveness of various storage devices in the context of potential Azusa applications and reported to the Board that reviewed commercially available energy storage technologies, although technically feasible, were not cost-effective at present.

WHEREAS, On September 22, 2014, based on Staff’s evaluation and recommendation, the Board resolved that adoption of energy storage procurement targets for either December 31, 2016 or December 31, 2021 was not appropriate due to lack of cost effectiveness (0 MW/ no storage targets).

WHEREAS, State Assembly Bill (AB) 2514 requires each POU to re-evaluate the 2014 established storage targets and their appropriateness every three (3) years.

WHEREAS, in 2017 ALW undertook the law required and Board authorized re-evaluation of the September 22, 2014 established energy storage targets and reported to the Board that reviewed commercially available energy storage technologies, although technically feasible, are still not cost-effective at present and thus recommended not establishing any storage targets (0 MW targets)

**NOW, THEREFORE, THE UTILITY BOARD/CITY COUNCIL OF THE CITY OF AZUSA DOES HEREBY FIND AS FOLLOWS:**

Section 1. The Utility Board/City Council of the City of Azusa hereby accepts the findings and recommendations of the Staff Report.

Section 2. Based on the foregoing, the Utility Board of the City of Azusa determines that adoption of energy storage procurement targets is not appropriate due to lack of cost effectiveness.

Section 3. The Director of Utilities, or his designee, is hereby authorized and directed to prepare, execute, submit, or administer any documents and take any actions that may be prudent or required in connection with the determination made herein.

**PASSED, APPROVED AND ADOPTED** this 25<sup>th</sup> day of September, 2017.

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Joseph Romero Rocha, Mayor

ATTEST:

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Jeffrey Lawrence Cornejo, Jr.  
City Clerk

STATE OF CALIFORNIA )  
COUNTY OF LOS ANGELES ) ss.  
CITY OF AZUSA )

I HEREBY CERTIFY that the foregoing Resolution No. UB-13-2017 was duly adopted by the Utility Board/City Council of the City of Azusa at a regular meeting of the Azusa Light & Water Utility Board on the 25th day of September, 2017.

AYES: COUNCILMEMBERS:  
NOES: COUNCILMEMBERS:  
ABSENT: COUNCILMEMBERS:

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Jeffrey Lawrence Cornejo, Jr.  
City Clerk

APPROVED AS TO FORM:

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Best Best & Krieger, LLP  
City Attorney