ITEM NO. _____

STAFF REPORT

DATE: SEPTEMBER 16, 2014
TO: HONORABLE MAYOR AND CITY COUNCIL
FROM: TIM McHARGUE, ACTING CITY MANAGER
PREPARED BY: DAVID X. KOLK, Ph.D., ELECTRIC UTILITY DIRECTOR
SUBJECT: TARGET FOR ENERGY STORAGE SYSTEMS

RECOMMENDED ACTION

It is recommended that the Colton City Council approve Resolution No. R-87-14 determining that a target for the Colton Electric Department to procure energy storage systems is not appropriate at this time due to lack of cost-effective alternatives.

GOAL STATEMENT

The proposed action will support the City's goal to provide safe, reliable, affordable and environmentally sustainable electric service.

BACKGROUND

California Assembly Bill 2514 (AB 2514) requires the governing board of each publicly-owned utility (POU) to determine appropriate targets, if any, for the utility to procure viable and cost-effective energy storage systems. Each governing board must make its initial determination on target energy storage levels by October 1, 2014 and no more than every three years thereafter.

Energy storage systems include large batteries, compressed air systems, thermal energy storage that produces ice during the off-peak periods to be used for air conditioning during the on-peak periods, and other technologies. Energy storage systems not considered under AB 2514 include hydroelectric pumped-storage systems.

Electric storage systems use less expensive energy for charging and storing energy to be used during periods when energy costs are higher. Typically this means charging during off-peak periods and releasing energy into the grid during high cost periods, generally the on-peak periods or morning ramp periods when energy demand is increasing rapidly.

The financial analysis of electric storage systems is very dependent upon the expected use of the system. Storage often makes financial sense for a retail customer who can charge their storage system with off-peak energy that can be used during the on-peak period, reducing high on-peak energy charges and cutting demand costs. Storage system may also make financial sense for intermittent generators, such as wind and solar producers, who want to deliver a firm, known quality of energy to its wholesale customers. Storage systems do not make financial sense for a utility that has excess generation capacity available to meet unexpected energy demand, such as the Colton Electric Department (CED).

ISSUES/ANALYSIS

The large amount of intermittent renewable generation coming online during the next few years to meet California's renewable energy standards (RPS) requirements is stressing energy systems in the western states. The demand for traditional thermal resources is actually declining during the early afternoon hours but increasing in the late afternoon and early evening hours when solar PV production declines and customer demand remains high.

Requiring thermal resources to be available to back-up intermittent resources is expensive. A gas-fired generator (such as the Agua Mansa Power Plant) may cost $3,000 to $5,000 to start to generate for just a few hours. Many gas-fired generators that cannot be started in a few hours are backed down to minimum operating levels and generate surplus energy during low load periods. To address the problems with intermittent resources, California is requiring investor-owned utilities to acquire 1,325 MW of energy storage by 2020. POU's are required to periodically investigate the cost-effectiveness of energy storage and, once found cost-effective, to establish a procurement target.

Energy storage systems allow intermittent generators to smooth out their delivery of energy. Rather than generate above average amounts during a few hours and below average amounts during other hours, the generator would deliver energy into a battery or other storage system during the night, or other low-demand periods, and then withdraw energy at a constant rate during the day. Storage systems could also be used to meet demand on local systems that have a high, short peak or in areas where additional transmission capacity is required.

It is difficult to analyze storage systems because their value is very dependent upon the specific use of the storage system being considered. The major problem with storage systems is they are very expensive. Large batteries cost $1 million to $2 million per MW with the average cost of energy between $200 and $400/MWh. For comparison, the cost of energy from AMPP is around $180/MWh when capacity, energy and O&M costs are included.

Utilities, such as CED, can currently rely on the CAISO to meet moment to moment fluctuations in demand for a cost of around $50/MWh (although during some short periods the cost could be much higher). There is no need to invest in new storage systems when a utility is over-resourced and can generate less expensively than purchasing a new storage system.

A key point however, is that there are situations where storage systems make sense from the customer's viewpoint. For example, if a customer is away from home during the day and uses a solar PV system to charge their storage system, they could essentially meet their entire energy needs for the cost of the solar PC system and storage system. Currently the equipment would cost around $25,000 to $50,000 but might be more affordable in the next few years.

CED performed an analysis of the cost of meeting one additional MW of load on its system and compared the cost of purchasing additional Resource Adequacy (RA) capacity for three months of the year and meeting the additional load with its own resources the remainder of the year with the cost for a lithium ion battery storage system. The lithium ion technology is currently the least expensive storage system (other than pumped-storage) available. CED can purchase three months of RA capacity for approximately $15,000 plus energy charges of $18,400 (for a four-hour daily block) or about $33,400. A comparable cost of Lithium – Ion batteries would be around $220,000. However, this analysis ignores that the lithium – Ion battery would be available all 365 hours of the year. If the battery were priced for just three months, the cost would be around $54,000, just about $19,000 (or almost 60% more) more than the cost of just purchasing capacity and energy.

The difficulty with making an analysis is that the battery cannot be shaped to meet CED's annual requirements. Any purchase results in excess capacity that just exacerbates CED's surplus energy position for the next few years for the non-summer months. This analysis also assumes that a 1 MW battery costs proportionately the same as a 4 MW battery (or a 1 MW battery costs one-fourth as much as a 4 MW battery which currently is not true).

A more viable alternative at this time is thermal energy storage (TES). TES uses off-peak energy to create ice that is used for air conditioning needs during the day. TES systems are close to being cost-effective for certain customer uses (such as a new fitness center) especially if the customer faces real-time pricing. TES systems may make financial sense from the customer's viewpoint but not from the CED's viewpoint at this time. CED may want to encourage TES systems by offering rebates or special off-peak charging rates to assist customers to install TES systems.

Because of this financial analysis, CED recommends that the City Council not establish storage targets for the CED at this time, but revisit the economic feasibility in three years as required by the law. Staff's analysis and recommendation was presented to the Colton Utilities Commission (Commission) at their Regular Meeting on September 8, 2014. The Commission made a recommendation that City Council adopt a Resolution determining it is inappropriate for CED to establish a target for the procurement of energy storage at this time due to the lack of cost-effective alternatives.

FISCAL IMPACT

Adopting this Resolution will not have a financial impact since the recommendation is not to set storage goals and not invest in storage systems at this time.

ALTERNATIVES

The City Council may:

1. Adopt Staff's recommendation to adopt Resolution R-87-14 to not set a target for ESS procurement..
2. Direct Staff to investigate other storage alternatives and return to Council with a proposed target capacity for storage systems.

ATTACHMENTS

1. Proposed Resolution No. R-87-14.