

SCE LIVING PILOT:

Mitigating SONGS through Water and Wastewater Energy Management – *An Integrated EE/DR/RE/ES Solution*

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Challenge:

San Onofre Nuclear Generating Station's (SONGS) permanent closure has resulted in a capacity loss of 2.2 GW in Southern California. Of particular concern are addressing demand peaks in an already congested region. In addition to proposed new generation, Southern California Edison has proposed to initiate a Living Pilot which would target Preferred Resources (e.g. energy efficiency, demand response, distributed generation, interconnection, and storage) to meet local capacity. This must however be done in a fashion that ensures grid stability and resiliency.

Objective:

- Maximize the replacement of the gap created by the SONGS closure with preferred resources consistent with reliability needs.
- Develop and implement an aggressive pilot targeted in south Orange County to procure competitively priced preferred resources to meet local reliability needs while ensuring grid stability and resiliency.
- Include near-term "managed load" efforts to reduce or eliminate need for conventional generation at Johanna and Santiago substations.

Proposition:

Lincus and GEI Consultants propose to implement a comprehensive Preferred Resource program focused on Water and Energy Conservation leading to demand savings and/or shift of as much as **185 MW in the region**. The program will:

- Identify local, reliable and easily verified load that can be optimized, reduced, generated and permanently or temporarily shifted.

- Work with SCE, water agencies and local governments to implement and manage this new source of stable and resilient energy while ensuring dependable water services to Southern California.

Context:

In California, water distribution and treatment is estimated to consume 19% of the state's electricity, 30% of its natural gas and 88 billion gallons of diesel fuel each year. In working with water system operators, Lincus has developed strategies that deliver significant energy savings, typically 25% to 30% in water distribution systems alone. Water conservation will further reduce energy needs for the region. In addition, distributed water storage can be used to permanently or temporarily shift the need for energy during peak hours while renewable energy sources (such as in-conduit systems and biogas in treatment plants) can be used to further meet local reliability needs. Finally, Demand Response will address significant load curtailment needs.

Approach:

In this strategy proposal by Lincus and GEI, we intend to inform electric system operators, transmission planners, and procurement entities about the ability and availability of Preferred Resources to perform where and when they are needed. The proposed Preferred Resources to meet local reliability, while ensuring grid stability and resiliency include:

1. Energy and demand savings
2. On-peak to off-peak demand shifting
3. Distributed renewable generation
4. Demand response events

Based on our high level analysis, Lincus believes that it can provide competitively priced preferred resources through Water and Energy conservation programs implemented in Southern California. Our initial estimate of demand savings and/or shift is as much as 185 MW of the 2,200 MW. The main market segment Lincus is proposing to expand its existing EE and DR programs with SCE is the Water and Wastewater distribution systems and treatment facilities. In this sector, there is significant and immediate potential for savings through:

1. Water infrastructure system efficiency
2. Water conservation
3. Water storage

Lincus believes that EE and DR savings can be achieved through the joint effort with SCE, Local Government Partnerships and Special Water Agencies located throughout Southern California.

The program will be completed in two phases. The first phase will be a resource assessment that will calculate the energy intensity of the regional water system and evaluate the potential for regional water system conservation, efficiency improvements, operational improvements and renewable generation. Based primarily on the outcome of the resource assessment, the Lincus Team will develop high potential opportunities for SCE to leverage the water-energy nexus to mitigate the capacity loss due to SONGS. The Lincus Team intends to implement and achieve the results through the combination of following programs:

- (1) **Water Infrastructure Systems Efficiency (WISE program) Optimization:** Lincus can expand this fully developed program to assist all local water and wastewater utilities as well as municipal and private water departments affected by the SONGS closure. Lincus will assist in the implementation of both short and long-term energy optimization of their facilities to replace as much as 80 MW of on-peak power. In this program, we propose to work with key stakeholders in developing a program implementation plan for pressure management, water leak-loss including detection and remediation. Please note that our existing program software has the capability of identifying and keeping track of energy and demand reduction opportunities by each utility substation. The program will also look at distributed generation opportunities.
- (2) **Water Energy Nexus Program:** By developing joint program between SCE and water utilities to take advantage of “Embedded Energy” savings in water conservation. This program will include immediate benchmarking of water utility end uses as well as developing and assisting water utilities in the implementation of integrated water and energy conservation programs. Our high level estimate for this option is as much as 60 MW of demand reduction or shift to off peak hours.
- (3) **Water Storage Program:** There are significant amounts of economically viable opportunities to add incremental water storage tanks and reservoirs in Southern California to provide 45 MW of demand reduction for 8 hour durations. Energy costs for water utilities is about 35% of their costs and is often the second biggest expense after labor costs. Water and wastewater utilities however often neglect energy efficiency resulting in increased investment requirements for power plants as well as transmission and distribution system assets. In our approach, the Lincus Team will assist selected water and wastewater customers by incorporating energy efficiency into existing and planned water systems infrastructure systems.

Through this proposal, Lincus and GEI will develop a program design and a commercialization strategy to cost effectively deliver energy, demand and water conservation and related savings. The Lincus Team proposes to develop a methodology for computing water-related embedded energy and will demonstrate clear and actionable energy savings, demand reduction and water system benefits for system reliability and efficiency in Southern California.