Executive Summary

Overview

The retirement of SONGS has created a need to take a fresh look at how supply-side and demand-side resources can more optimally be deployed in California, and to see whether new or underutilized technologies can be used to not only deal with a forecast resource shortfall, but to also use the occasion to simultaneously serve other needs.

As an example, California can use the need for additional electricity resources as an opportunity to make the critical facilities more immune from extended grid outages caused by severe natural or human-caused events (e.g., earthquakes, floods, terrorist attack).

Critical facilities include hospitals, police and fire stations, military bases, schools that can provide shelter to displaced populations, food and convenience stores, gas stations along freeways, water-supply and waste-treatment facilities, and large manufacturers, who serve a vital role in the state's economy.

Energy efficiency upgrades– especially those that reduce peak demand – should be aggressively pursued, as well as enrollments in Demand Response (DR) programs. Expanded use of incentives to encourage more use of gas-cooling in lieu of electricity for chillers, air conditioners, and water heating, and to encourage use of heat-pump water heaters, should likewise be part of an overall, comprehensive program applied in the region where electricity demand most needs to be reduced.

Smaller critical facilities should be incentivized to install backup generators that can be dispatched during DR events as well as to provide electricity during actual outages. For larger facilities, micro-grids that incorporate efficient Combined Heat and Power (CHP) systems; solar PV, solar-thermal systems for power generation, space cooling, and meeting thermal end-uses, should be strongly supported.

Many of the critical facilities have significant thermal as well as electrical end-uses, so CHP micro-grids are a highly economical solution to their day-to-day needs and reducing demand on the grid, as well as being vital for dealing with extended outages.

Electric to Natural Gas Fuel Switching

Fuel switching has been traditionally defined by electricity-to-gas equipment change-outs in all sectors, and the installation of CHP in the commercial and industrial sectors. Understandably, electric utilities are normally opposed to the inclusion of these measures in DSM programs. The impact of the early retirement of SONGS has created an abnormal need for load reductions in a well-defined region of the SCE territory. Therefore, it is appropriate to give the selective application of these measures a fresh look.

An area with enormous potential for fuel switching is in Commercial Heating, Ventilation and Air Conditioning (HVAC). Specific measures include the installation of natural gas fueled, reciprocating engine driven heat pumps as well as direct-fired absorption chillers. As well as eliminating kW load during on peak periods, the electric to gas conversions reduce overall carbon footprint. Gas converted to energy at the point of service is inherently more efficient when compared to gas burned in a merchant plant due to the line losses and efficiencies of large-scale, traditional, remote generation, transmission and distribution. Waste heat recovery can create a combined cycle effect to improve overall efficiency. Installation of Natural Gas Heat pumps also relieves peak load at the customer

location on their electrical distribution and switchgear allowing for plant expansion without adding transformer or distribution capacity. In green-field designs, it allows for a flat load profile for manufacturers.

Many chemical and glass production facilities have an abundance of low-grade waste heat. Traditionally all options to convert this waste heat to electricity have fallen due to poor economics and resistance to accept fuel switching or generation into incentive programs. An innovative addition to fuel switching is the integration of Organic Rankine cycle (ORC) electric generation capabilities. ORC is an emerging technology that allows electric generation through heat recovery from lower temperature sources.

Energy Efficiency

Energy efficiency (EE) continues to have a large potential for permanent peak-load reduction in all segments of the population. Particularly high potential exists in Federal facilities and in food processing facilities. We believe these markets are underserved for the following reasons. Federal facilities suffer from the internal lack of staff and budgets and ability to use incentives to drive projects. Food processing facilities are underserved due to the complexity of processes and the long-term requirements for commitments by the IOUs for incentives. Projects can have up to 24 to 36 month lead times and stretch the boundaries of the IOU's ability to make these long-term commitments

One more challenge and inconsistency in EE is in the calculation of customer incentives to offset the cost of implementing projects. EE Customers are losing confidence when the potential incentive is reduced due to the energy baseline calculations being determined by Codes and Standards (C&S) and Industry Standard Practice (ISP). Retrocommissioning (RCx) programs are not subject to the same requirement (the RCx baseline is the existing system/condition) yet both yield verifiable energy savings.

In order to provide incentive levels that will make large EE projects viable from the customer's perspective we suggest that the baseline for incentive calculation should be the existing system(s) targeted for improvement for both EE and RCx. The inconsistent imposition of C&S and ISP for the purpose of project eligibility and incentive calculation should be discontinued.

Demand Response

An innovative approach to broaden demand response (DR) penetration rates across all customer classes but in particular commercial and industrial classes is to implement a 'direct-to-device' solution whereby a signal can be sent from a Demand Response Management System (DRMS) directly to a device that enables the customer to either curtail load directly and remotely as well as allow the customer to opt-in to an event remotely.

Direct-to-device control is enabled by the implementation of a DRMS that serves as an autoDR server that can integrate to any building device that acts as an autoDR client through an OpenADR protocol as well as sending messages directly to various mobile platforms (e.g., mobile phones, tablets, smart phones) to customers. The DRMS can also accurately and reliably enroll, forecast and aggregate load across all customer classes including aggregators to maximize the capacity value of the DR and assure the load serving entity of meeting its preferred resource commitments. The DRMS can also perform measurement & verification (M&V) by receiving Advanced Meter Infrastructure (AMI) data to validate the actual load was curtailed by the device or by the customer. This M&V process allows the DRMS to further adjust the forecasting algorithms to more accurately forecast demand side load for future load commitments. Lastly the DRMS can use real-time device monitoring to assure that load control

devices are properly operating again ensuring that demand side resources can be accurately forecast and load curtailment commitments are met.

Permanent Load Shifting

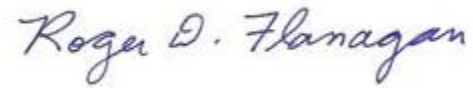
Making a customer's energy use more efficient has been the preferable path to peak load reduction. Another area with great potential is the shifting of demand to off-peak times. Permanent Load Shifting (PLS) can come in many forms including Thermal Energy Storage (TES), flywheels and storage batteries.

Industrial Customers and manufacturers often produce 24 hours a day, 7 days a week in order to maximize the usage of their capital equipment. Some of these manufacturers could produce more of their product off-peak if they had more production equipment. A revolutionary program would pay incentives to manufacturing customers to increase production off peak to allow for reduced load during peak hours. It may require rescheduling certain assemblies, stock in process, and increase shift work, but in some cases, this may be preferential for employee commutes etc. in addition to off peak operations.

Tailor Offerings to Target Large Non-Participants

A less traditional approach would be to leverage large industrial customers who have historically not participated in IOU programs with comprehensive energy solutions that include all components as contemplated under the Local Capacity Requirements (EE, DR, Distributed Generation). This will bring both energy surety to their manufacturing process and needed capacity to the state. This focused customer set has the greatest potential for participation with a fully engaged and supported energy solution that would bring immediate and long-term benefits to the ratepayers of CA. This effort will also bring needed resources to ensure CA holds a competitive business environment for attracting job creating industrial customers with a strong Green agenda.

Respectfully Submitted:



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