Defining the SCE Living Pilot

Mitigating the Closure of SONGs

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1. Introduction

The sudden closure of San Onofre Nuclear Generating Station (SONGS) has put areas in the Southern California Edison Company (SCE) grid at risk of adequate capacity. SCE has proposed to the California Public Utility Commission (CPUC) a Preferred Resource "Living Pilot" under which SCE would procure and evaluate the ability of Preferred Resources to meet Local Capacity Requirements (LCR). The types of Preferred Resources may include energy efficiency (EE), demand response (DR), distributed generation (DG), storage, and interconnection.

In this proposal we will describe activities that have been proven to provide electrical resources when properly implemented. Further, we will describe an approach to analyze and evaluate the effectiveness of the various program components.

2. A Multi-Pronged Approach

No single Preferred Resource can meet LCR. DNV KEMA proposes to use a portfolio of resource acquisition approaches, including the above mentioned Preferred Resources, plus the combination of elements that result in Net Zero Energy (NZE) buildings. The key to success of these elements is effective targeting, both within the grid (to ensure the LCR is met) and targeting customers (to ensure optimal resource acquisition from each participant). The following subsections provide an overview of each of the program elements.

The primary level of targeting is to focus on the key target areas referenced the Defining the Living Pilot message sent by the CPUC September 26, 2013, namely the customers served by the Johanna and Santiago substations. The secondary targeting is to identify customers that will yield maximum benefit of the Preferred Resource.

The first step is to conduct a market assessment of the targeted areas to determine the potential for applicable technologies and programs for the Living Pilot based on the market characteristics and conditions. The market assessment will help guide the initial targeting efforts that will be help optimize the programs' impacts.

2.1 Energy Efficiency and Demand Response

The core SCE programs for energy efficiency and demand response will be the basis of operations for the Living Pilot. Energy efficiency will be one of the key areas for obtaining cost effective resources.

DNV KEMA has conducted numerous assessments for energy efficiency and demand response for IOUs in California, including SCE. This experience would be leveraged to help determine criteria for targting customers as the portfolio of programs unfolds from the market assessment.

We would explore partnership opportunities with local governments to leverage their relationship with their constituents.

2.2 Net Zero Energy for Existing Buildings or New Construction

Net Zero Energy (NZE) buildings have been part of the discussion of long term energy planning for some time now. Recently, DNV KEMA has been involved with several such buildings that have met the criteria for NZE. One office building in San Diego a renovation of an existing building where the facility was modified to take advantage of ambient conditions and a photovoltaic system was properly sized to meet the loads without oversizing. This building has been designated a NZE building. A second office building in Phoenix has been certified as a Net-Zero Energy Building (NZEB) from the International Living Future Institute (ILFI) through its Living Building Challenge(SM) program, only the second in the Nation to be so-certified. A third building in Newport Beach still in construction but is projected to be NZE once the facility is in operation,

One of the keys to a successful NZE building is the selection of the location, which then influences the design. Since there has been demonstrated success with renovation of existing buildings we would strive to identify candidate facilities for NZE. Once candidates are identified then the effort will shift to gaining participation.

Where there is the opportunity we will leverage our work in the SCE's Sustainable Communities program to support the construction of NZE buildings and sustainable community developments.

2.3 Distributed Generation

Distributed generation in the targeted areas may face some technological hurdles. We will work with our renewables group (including GL Garrard Hassan) to explore opportunities to install DG in the targeted areas. GL Garrad Hassan is the world's largest renewable energy consultancy, offering independent technical and engineering services, products, and training courses to the onshore and offshore wind, wave, tidal and solar sectors. The feasibility of such activities will be integrated with the planning for Energy Storage.

2.4 Energy Storage

DNV KEMA has a group that has been focused on the various facets of energy storage. Our storage group investigates the feasibility of the full range of storage technologies including compressed air (including underground), battery, thermal, and flywheel. Energy storage can help compensate for the shortfall of renewable energy sources due to the variable delivery characteristics of many distributed generation installations. Storage can help with a number of grid issues including: short term balancing of the grid, stable voltage levels, remove bottlenecks on the grid, and provide secure supply at peak demand. Our energy storage group will participate in the assessment of the storage requirements and feasibility needed for the Living Pilot.

3. Analysis Of The Living Pilot Using Microgrid Concepts

The analysis and evaluation of Preferred Resources must be done in a holistic manner to capture all impacts simultaneously on the utility grid. DNV KEMA has developed a suite of tools that allow for the interactive effects of a range of resources from energy efficiency to energy storage. This can be done effectively by looking at the targeted areas as microgrids. For example, those areas served by the Johanna and Santiago substations would be the microgrids. We can then do the analysis of these microgrids and the implementation of the Preferred Resources to understand the economics of developing and operating the microgrids in detail and the performance of the microgrids in response to the evolving market as a result of the Preferred Resource implementation. "In detail" means just that – understanding how a portfolio of energy assets: generation, storage and load management will interact to respond to market conditions including price signals, load and weather conditions.

Because there are numerous technology options for generating resources, energy storage, smart meters, transformers, control system architecture, and communication networks, microgrid planning is a complicated exercise in investment optimization. The impact of each of these choices on the system cost and return on investment (ROI) is not obvious. DNV KEMA's proprietary Microgrid Cost/Benefit Analysis model evaluates the financial decisions for a range of technologies including generation, energy storage, building efficiency, load automation, thermal load management, distributed system infrastructure, telemetry and controls. The location-specific optimization tool allows the evaluation of the cost, ROI, emissions performance, reliability, and occupancy rate (i.e. for mixed use developments) while evaluating uncertainty and risks associated with climate, technology costs, energy prices, and changing demand. As technical parameters, up-front costs including incentives, and operating costs are adjusted for energy assets, the sensitivity of optimal investment and operating decisions to individual component parameters and costs can be clearly evaluated. Such optimization tools help identify long-term investment approaches, track energy balances, and quantify the duration of support for critical loads. In addition for making the business case, microgrid optimization models can also inform policymaking by comparing the impacts of different rate structures, incentives, and new technologies.

4. Next Steps

The next steps are:

- Organize the Living Pilot Team
    - SCE
    - CPUC
    - DNV KEMA
- Conduct market assessment to understand how to match programs with the targeted markets
- Match target markets, technologies and program concepts
- Conduct a DNV KEMA Microgrid Analytic framework to "holistically" evaluate and analyze the various programmatic opportunities