Energy Innovations

21 October 2013

Stephen St. Marie
Regulatory Analyst
Policy and Planning Division
California Public Utilities Commission
505 Van Ness Ave, San Francisco, CA 94102

Subject: Defining the Living Pilot

Dear Mr. St. Marie:

Thank you for the opportunity to contribute to the Symposium.

As founder of Energy Innovations I have provided due diligence, technical evaluation, and advice to Venture Capital, government agencies, and private firms in the U.S. and abroad. I have focused on innovation in the generation, storage, and use of electric power. I have been examining a range of systems and technologies in the context of various mandates [Renewable Portfolio Standards, Energy Storage, and CO2 emissions] to identify technologies that could be deployed at grid scale by 2020 in the context Long Term Procurement plans and retirements of SONGS, Once Through Cooling Units, reductions in coal-fired generation, and transmission constraints.

The Commission faces many challenges with deployment of technologies that will enable use of preferred resources. I urge the Commission to consider the various programmatic, technical and commercial synergies to be obtained by hybridization of preferred resources with gas. Gas hybridization is a form of leverage to increase the percentage of preferred resources in the mix. A pertinent example is the way in which hybrid automobiles, such as the Toyota Prius, have achieved faster adoption than pure electric vehicles because of a favorable mix of proven technologies to mitigate risk and deliver the required performance and operational characteristics at acceptable cost.

During my tenure as Senior Vice President, Engineering for AREVA Solar in Mountain View (through October 2012), I strongly advocated hybridization of solar thermal power in papers [Power Engineering, November 2010] and presentations [SolarPACES2011 and 2012, and CSPToday 2010-2012]. Solar thermal Hybridization can range from augmenting existing thermal power stations with additional solar-generated steam, to increasing the capacity factor of a stand-alone solar plant with a separate boiler, to increasing the efficiency of the Rankine cycle by raising the temperature of the live steam to the turbine. It also enhances performance by providing cloud ride-through, earlier startup, extended shutdown, etc.

The key take-away is that hybridization can reduce the Levelized Cost of Energy by reducing fossil fuel consumption, increasing utilization of a fixed asset, or reducing the capital cost per unit of generation by higher efficiency. Using appropriate systems disciplines, the overall level of risk can also be reduced, since substantial engineering and operational features associated with the gas-fired systems are well understood. This can help reduce the risk premium or the cost of guarantees needed to finance a system.

<u>Programmatic Synergies</u> are possible by viewing the various mandates in a holistic framework. Rather than requiring 'pure-play' solutions, hybridization can facilitate the deployment of storage at grid scale, with enhanced technical characteristics (power and energy), and at reduced cost.

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Technical synergies will arise from the additional degree of freedom that hybridization implies. For example, certain sizing or capacity constraints can be relieved (the 80:20 rule where most of the benefits can be obtained for a small marginal cost).

Commercial synergies will result from the improved price-performance characteristics compared to 'pure-play' alternatives. This will drive earlier and more rapid deployment, thereby advancing the experience curve to obtain further economies.

In my view, there are a host of technologies and applications that could benefit from hybridization and enable greater use of the preferred resources. This requires flexibility in the design of programs, policies and plans, to permit consideration of a range of alternative approaches.

I look forward to participating in the upcoming symposium on 6 November.

Sincerely,

/s/ William M. Conlon

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