Pacific Gas and Electric Company

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June 27, 2014

**VIA E-MAIL DOCKET@ENERGY.CA.GOV**

California Energy Commission
Dockets Office, MS-4
Re: CEC-200-2014-003-SD
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Comments of Pacific Gas and Electric Company on the California Energy Commission Draft Staff Report: Estimated Cost of New Renewable and Fossil Fueled Generation in California and 2014 Cost of Generation Model (COG) update

## I. INTRODUCTION

Pacific Gas and Electric Company ("PG&E") appreciates the opportunity to provide comments on the California Energy Commission ("CEC") Draft Staff Report, *Estimated Cost of New Renewable and Fossil Fueled Generation in California*.

PG&E first would like to acknowledge the hard work of the CEC Staff. There are significant improvements in the report and Cost of Generation ("COG") model. Overall, PG&E finds that the report is instructive and provides a useful overview of cost trends for likely utility-scale generation technologies for the 10-year planning horizon. However, some of the costs estimates and trends seem to be out-of-step with current trends going forward, especially for solar photovoltaic ("PV") and Wind. Additionally, providing a range of generation costs is most useful when estimated on a going forward basis and when modeling is informed by historical trends.

While utility-scale estimates of generator costs are useful, the types of potential generation are evolving in this period of rapid innovation. The recent boom of rooftop PV and storage technologies (2-4-6 hour battery storage; compressed-air storage) are prime examples. PG&E encourages the CEC to provide timely updates on cost of existing technologies as well as those of likely emerging resources. Furthermore, information on the operational flexibility capability of all resources would be useful.

Finally, in our comments today, PG&E is outlining a few specific issues that deserve further review and analysis, and areas of agreement and concern related to the COG Model. It should be understood however, given the volume and complexity of information in the draft

report and updated COG model, PG&E is limiting its comments to high level observations. To facilitate further stakeholder review, the CEC may wish to create a COG Model Working Group and provide an overview of the key enhancements to the COG model and specific areas were feedback is most needed.

## II. ISSUES THAT DESERVE FURTHER REVIEW AND ANALYSIS

In addition to PG&E's comments above, PG&E has the following specific comments and recommendations about aspects of the CEC Draft Staff Report and the 2014 COG Model update, as listed below:

- **Merchant Installed Capital Cost of Solar PV:** The 2014 installed capital costs (dollars per kilowatt [$/kW]) appear to be outdated. In addition, the report assumes PV costs for both fixed-mount and single-axis systems decline through 2024, up to 51 percent in real dollars. While the basis for this forecast is not entirely clear, the use of historical information to develop forecasts of solar PV costs is problematic. Although the price of modules and inverters may continue to decline as technological advances are made and incentives continue, the cost of labor, materials, available land and other costs will increase with inflation.

- **"Market-Driven" distribution connected Solar PV:** The report ignores distribution level generation, such as solar PV (5 – 20 megawatts [MW]) that can typically be financed, constructed and interconnected more quickly and efficiently to meet locational demands. The levelized cost of energy of distribution level technologies (10-20 MW) is generally lower than solar PV single axis 100 MW when considering the cost of the transmission upgrades and interconnection. Given the potential strong development of distribution level solar PV technology in California, the CEC should closely follow the development and costs of these technologies.

- **Project Must Be Financeable.** A project should be financeable to be considered a case alternative. Financeable projects include reasonable capital costs, quality materials, attractive economic and risk profiles, and competitive prices. The model calculations and inputs should be aligned with the financial models and parameters required by investors to ensure the projects are financeable and can be built.

- **Combined Cycle Generators ("CCGT"):** PG&E's understanding is that the combined cycle cost estimates do not include dry cooling. Given the scarcity of water in California, PG&E recommends that the CCGT cost estimates include the cost of dry cooling. In addition, PG&E suggests that the CEC augment its methodology of developing "bookends" (assumptions that align all key variables) by presenting how changes in these key variables impact the levelized cost of energy over the Mid-cost estimate. Understanding the sensitivity of key variables is often more important than they outside cases.

- **Gas Turbines:** PG&E finds that the range used for the high and low estimates for capital costs of the 49.9 and 100 MW gas turbines as being too extreme. In addition, the report should include additional documentation on the derivation of the cost of advanced gas turbine and its comparability to the cost of conventional gas turbines.

- **IOU "Self Scheduling" Resources:** PG&E strongly disagrees with the draft report's assertion that because the IOU's may self-schedule, IOU resources are effectively removed from competition. This simply is not true. This discussion is out of scope for the report and should be removed.

- **Use of Cost Estimates:** PG&E recommends adding a section report on proper use of the costs estimates, cautions, caveats and how other costs such as integration costs, system operational flexibility requirements, and environmental costs need to be taken into consideration in resource investment decisions.

## III. CONCLUSION

PG&E remains committed to continuing to work with CEC Staff and stakeholders to assess the COG Model and CEC estimates of the cost of generations. The improvements captured in the report are positive ones, and we look forward to continued, incremental improvements in the COG Model and estimation of generation costs.

Sincerely,

/s/

Matthew Plummer

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