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VIA E-MAIL DOCKET@ENERGY.CA.GOV

California Energy Commission
Dockets Office, MS-4
Re: Docket No. 14-BSTD-01
1516 Ninth Street
Sacramento, CA 95814-5512

Re: 2016 Building Energy Efficiency Standards: Comments of Pacific Gas and Electric Company on the Update of Time Dependent Valuation Life Cycle Cost Methodology

I. INTRODUCTION

Pacific Gas and Electric Company ("PG&E") appreciates the opportunity to provide comments on the California Energy Commission's ("CEC" or "Commission") July 9 Lead Commissioner Workshop ("July 9 Workshop") to update the CEC's Time Dependent Valuation ("TDV") and Life Cycle Cost ("LCC") Methodology.[1] The July 9 Workshop follows an April 29 Workshop ("April 29 Workshop") on the same subject. As the author of the 2005 code change proposal for the TDV methodology in the 2005 Building Energy Efficiency Standards update, PG&E supports the Energy Commission's continued use of TDV-LCC methodology as part of the cost-effectiveness calculation for energy efficiency measures in its building standards updates.[2]

The CEC hired Energy and Environmental Economics, Inc. ("E3") to complete the analyses required for updating the existing TDV and LCC methodology. At the April 29 Workshop the CEC and E3 presented the research, analysis, and justification for proposed revisions to TDV factors and the LCC methodology ("TDV update"). Based on the information, presented at the April 29 Workshop, PG&E believes that the updates that the CEC and E3 presented appear reasonable based on available data and will provide a good foundation for

[1] McAllister, Andrew (2014). Notice of Lead Commissioner Workshop Update of Time Dependent Valuation and Life Cycle Cost Methodology. California Energy Commission. Retrieved from: http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/2014-07-09_workshop/2014-07-09_workshop_notice.pdf

[2] Pacific Gas & Electric Company (2005). Code Change Proposal – Time Dependent Valuation (TDV) – Economics Methodology. Heschong Mahone Group. Retrieved from http://h-m-g.com/projects/tdv/TDV%20Econ%20CASE%20rpt.pdf

evaluating energy efficiency measures in the 2016 building standards update. PG&E looks forward to reviewing the CEC's and E3's final analysis at the July 9 Workshop.

Additionally, PG&E recognizes that the data presented did not address whether the TDV update will include the Additional Achievable Energy Efficiency ("AAEE") scenarios from the CEC's 2013 Integrated Energy Policy Report ("IEPR").[3] PG&E recommends that energy savings from the AAEE scenarios be excluded from the TDV update to ensure that the value of future codes and standards and voluntary program energy savings are not unintentionally discounted when the TDV factors are applied to proposed measures for the 2016 Building Energy Efficiency Standards.

Finally, while PG&E realizes that the purpose of the April 29 and July 9 Workshops are to update TDV from an energy efficiency perspective, in Section III, PG&E discusses relevant considerations for valuing distributed generation ("DG"). DG is expected to play a growing role in California's building standards program and it is essential that the CEC begin development of a methodology for evaluating DG. To that end, PG&E recommends that the CEC hold a separate workshop as part of the 2016 Building Energy Efficiency Standards update to identify data analyses that stakeholders can collaboratively undertake ahead of the 2019 Building Energy Efficiency Standards update to fill critical knowledge gaps for understanding the implications of California's evolving energy landscape on the new construction market and electric grid.

II. UPDATED DATA SOURCES AND FORECASTING PEAK REDUCTION

While PG&E looks forward to reviewing the final results at the July 9 Workshop, it believes that the major updates to TDV, as presented by the CEC and E3 at the April 29 Workshop, are reasonable based on available data and will form a sound basis for evaluating energy efficiency measures in the 2016 building standard update. The update includes incorporating relevant gas and electric rate forecasts and other assumptions from the IEPR, as well as energy pricing results from PLEXOS analyses, and electric transmission and distribution ("T&D") capacity values from the electric utilities' general rate cases. Utilizing the best available data in the update process is critical to pursuing reasonable 2016 TDV values.

Additionally, PG&E believes that the AAEE cases in the IEPR should not be considered in the TDV update. The AAEE scenarios estimate prospective energy savings from future codes and standards and voluntary programs. Embedding these savings into the TDV factors may unintentionally discount the value of the TDV factors when applied to similarly prospective measures for the 2016 Building Energy Efficiency Standards. PG&E recommends that the TDV update only include the IEPR Baseline Cases and exclude the AAEE scenarios to ensure that the value of these savings is not unintentionally discounted.

[3] California Energy Commission. (2014). Additional Achievable Energy Efficiency. Retrieved from http://www.energy.ca.gov/2013_energypolicy/documents/demand-forecast_CMF/Additional_Achievable_Energy_Efficiency/January_2014_files/

Finally, PG&E supports utilizing the Effective Load Carrying Capacity ("ELCC") values from the CPUC's Net Energy Metering Ratepayer Impact Evaluation[4] to estimate capacity savings for energy efficiency. As increasing levels of solar photovoltaic generation interconnect to California's electric grid, California's peak electric load will gradually shift over time, which should be reflected in the 2016 TDV values. The incorporation of ELCC values in the TDV update is an important improvement over the prior method as demonstrated in E3's comparison of the two methods during their April 29 presentation.

PG&E believes that leveraging best available data, incorporating an ELCC analysis in the TDV update, and excluding AAEE cases will enhance the accuracy and viability of the 2016 TDV values.

III. METHODOLOGY FOR VALUING DISTRIBUTED GENERATION PRODUCTION

Valuing energy produced by DG systems, particularly Retail DG, represents a new paradigm for the building standards process. Unlike energy efficiency, customers using rooftop solar to achieve ZNE will of necessity be exporting to the grid. The existing TDV-LCC methodology was designed for energy efficiency measures and does not include a method to account for the impacts to the grid from these exports, such as interconnection costs, or system upgrades necessitated by the rooftop installation. The existing TDV-LCC methodology also does not account for the additional operational challenges, and resulting integration costs, associated with additional intermittent DG penetration. These costs should be analyzed to fulfill the Warren-Alquist Act's requirement that building measures be cost effective.

The following subsections discuss relevant considerations for valuing DG production. PG&E recommends these be used as a starting point in the development of a separate methodology for evaluating DG in the 2016 Building Standards Update.

A. Energy Value for Distributed Generation

To avoid overestimating the benefits of DG production, the energy value for DG production should be based on the energy benefits to all customers, DG owners and non-DG owners. The proper energy savings to all customers is represented by the utility's avoided energy costs. Subsidies, such as incentives, tax credits, modified depreciation, fee exemptions, prepaid leasing, among others, that are transfers between participant (DG owners) and non-participant should be excluded from the calculations.

In addition, PG&E does not believe that statewide electric utility revenues are a reasonable proxy for the costs of electricity for DG production. While the revenue neutrality adjustment, which is intended to bring the cost of energy into line with the statewide electric

[4] Energy and Environmental Economics, Inc. (2013). California Net Energy Metering Ratepayer Impacts Evaluation. California Public Utilities Commission. Retrieved from http://www.cpuc.ca.gov/PUC/energy/Solar/nem_cost_effectiveness_evaluation.htm

utility revenues, is appropriate for energy efficiency, it is based on the assumption that utilities will recover costs through a purely volumetric rate. Changes in rate design are anticipated through 2018, including the possible inclusion of a fixed customer charge and the development of a new rate structure for Net Energy Metering ("NEM") customers. Once these changes take place, the utility revenue requirement will not provide a reasonable proxy for the future avoided energy costs of DG measures. Further collaboration and analysis among relevant stakeholders will be needed to address this issue.

B. Capacity Value for Distributed Generation

The CEC should also correctly account for the capacity value of DG. PG&E supports utilizing the Effective Load Carrying Capacity ("ELCC") values from the CPUC's Net Energy Metering Ratepayer Impact Evaluation[5] for evaluating DG' capacity value or contribution to resource adequacy.

C. Interconnection Impacts on Transmission and Distribution Values

The CEC should further account for the impact of DG systems on the distribution and transmission grids. While these costs have not been systematically calculated statewide, a recent study by Southern California Edison[6] estimated that interconnecting 4,800 megawatts of DG and appropriately upgrading their distribution system to accommodate the generation would cost $1.3 billion and could result in $1 billion to $3.2 billion in additional costs incurred to their transmission system[7]. PG&E notes that while these figures cannot be used to extrapolate statewide impacts due to differences between utility systems, the study's examination of actual circuit performance is a promising step toward accurately estimating these impacts for forecasting purposes, including the appropriately valuing DG.[8] Moreover, the CEC's ongoing work[9] to validate and expand upon the study's findings further demonstrates the need for a statewide version of this analysis.

To that end, systematic statewide values at the level of DG penetration envisioned by the state's residential and commercial Zero Net Energy ("ZNE") goals – estimated at over 300

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[5] Energy and Environmental Economics, Inc. (2013). California Net Energy Metering Ratepayer Impacts Evaluation. California Public Utilities Commission. Retrieved from http://www.cpuc.ca.gov/PUC/energy/Solar/nem_cost_effectiveness_evaluation.htm

[6] Distribution Engineering and Advanced Technology. (2012). The Impact of Localized Energy Resources on Southern California Edison's Transmission and Distribution System. Southern California Edison. Retrieved from http://www.energy.ca.gov/2013_energypolicy/documents/2013-08-22_workshop/SCE_Local_Energy_Resources_Study.pdf

[7] Ibid, pp. 34.

[8] Plummer, M. (2013). 2013 Integrated Energy Policy Report: Distributed Generation Integration Cost Study: Analytical Framework—Comments of Pacific Gas and Electric Company. Pacific Gas and Electric Company.

[9] Shlatz, E., Buch, N., & Chan, M. (2013). Distributed Generation Integration Cost Study: Analytical Framework (CEC-200-2013-007). California Energy Commission. Retrieved from http://www.energy.ca.gov/2013publications/CEC-200-2013-007/CEC-200-2013-007.pdf

megawatt ("MW") of new DG annually by 2020 and over 1 gigawatt ("GW") of new DG annually by 2030[10] – are needed to inform various forecasting processes, such as the T&D values in the 2019 TDV update.

Additionally, the transmission and distribution systems will likely require separate analysis due to differences in the design of the systems. For example, PG&E's transmission system is designed to accommodate generation in a loop flow with high reliability. In contrast, PG&E's distribution system is designed for radial flow in a tree configuration. The radial configuration allows the distribution system to serve a large area of local load at the lowest cost. Consequently, intermittent generation systems, such as solar photovoltaic (PV) systems, impact PG&E's transmission and distribution systems differently.

Moreover, PG&E's distribution conductors are mostly small and designed to serve a local load for a short distance whereas the transmission conductors are mostly large conductors for transporting power long distance. Distribution voltage is regulated to plus or minus 5 percent of nominal voltage to meet the load equipment needs. Transmission voltage does not need to be tightly regulated since the distribution voltage is regulated. However, when generators are installed on the distribution system, and on the load side of the voltage regulators, the feeder voltage regulation becomes problematic and mitigation measures, such as replacing the small conductors, put upward pressure on distribution costs.

Due to the differences described above, the impacts of DG systems on the distribution system are distinct from the impacts of generators on the transmission system. The resultant costs associated with DG impacts on electric service reliability, power quality, and system protection are also different.

D. Integration Costs

Increases in intermittent DG also result in additional integration costs. Integration costs are the fixed and variable cost of flexible generation are needed to manage the increased forecast uncertainty and variability of load net of intermittent DG generation that is not already captured in its energy and capacity values explained above.

Specifically, DG's integration costs include the additional fixed cost to procure operationally flexible capacity, and increased variable costs such as commitment and inefficient dispatch of resources used to cover the increased forecast deviations and within-the-hour variability, and multi-hour increases in ramping introduced by DG. Additionally, integration costs include disposing of energy not needed to serve load, known as over generation, including

[10] "Technical Feasibility of ZNE Buildings in California (ZNE Technical Feasibility)", Arup, December 2012, Table 17, pp. 43.

paying to dispose of surplus energy. The future needs for flexible generation were identified by the California Independent System Operator ("CAISO") in 2012[11].

Finally, today's low DG penetration environment represents only the early stages of DG integration. The ZNE goals suggest increased DG penetration through a new PV requirement for all new construction in California. In this context, higher DG penetration will require robust integration activities, such as utility planning and the procurement of operationally flexible resources. To PG&E's knowledge there has not been a statewide investigation into the integration impacts associated with the uncapped DG penetration sought by the state's ZNE goals.

D. Recommendations for Collaborative Research

Statewide research to systematically quantify the value of DG production and its interconnection and integration impacts over a reasonable time period has not been completed. Thus, PG&E believes the CEC should begin developing a methodology for DG production in the 2016 Building Energy Efficiency Standards update, with the understanding that it will need extensive refinement in the 2019 update. Therefore, PG&E recommends that the CEC hold a workshop as part of the 2016 Building Energy Efficiency Update to identify data analyses that stakeholders can collaboratively undertake.

Finally, additional exploration into estimating the value of DG production and forecasting its impacts at the level of penetration envisioned by the ZNE goals is critical to understanding the costs and benefits associated with the uncapped mandate for DG penetration on the T&D systems that the ZNE goals represent. Moreover, such analysis requires a host of statewide stakeholders to inform the research projects. The 2016 Energy Efficiency Standards Update process presents an opportunity to map out the data needs and relevant stakeholders – including the CPUC, CEC, CAISO, and utilities – for future IEPR forecasts that will inform future TDV updates as well as future CPUC Long Term Procurement Plans and CAISO Transmission Planning Processes.

[11] California Independent System Operator (2012). "R.11-10-023: RA Flexibility Workshop: Flexible Capacity Procurement Proposal."

I. CONCLUSION

PG&E is happy to meet with CEC staff to discuss these important topics.

Sincerely,

/s/

Matthew Plummer

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