PACIFIC GAS AND ELECTRIC COMPANY
Energy Efficiency 2018-2025 Rolling Portfolio Business Plan
Application 17-01-015
Data Response

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		Requester:	Thomas A. Enslow

SUBJECT: APPLICATION OF SOUTHERN CALIFORNIA EDISON COMPANY (U338E) FOR APPROVAL OF ENERGY EFFICIENCY ROLLING PORTFOLIO BUSINESS PLAN AND RELATED MATTERS. CCE-DR01

QUESTION 11

Do energy savings and cost-effectiveness calculations for *downstream* energy efficiency programs take into account the risk of lost energy savings due to poorly installed energy efficiency measures? If yes, please describe and provide documentation showing: (a) how and where this is taken into account, (b) in what programs this is taken into account, (c) what adjustment factors (if any) were applied, and (d) the basis for the adjustment factor.

ANSWER 11

Please note that PG&E is providing a single, two-part response to questions 9-11.

Energy savings calculations take a reduction to account for the risk of lost energy savings due to factors such as equipment not being installed, not functioning properly and operating in conditions that affect energy consumption. Quality of installation typically is verified by either commissioning agents working for business owners and/or by permitting inspections (Acceptance Testing Technicians as part of Title 24 Section 6). These risk factors for degradation of the performance of energy efficiency (EE) measures are factored into the installation rates found in workpapers (see below) and subsequently updated in DEER as Gross Savings Installation Adjustments (GSIA). Energy savings (with deductions for installation rates) are one input into cost-effectiveness calculations, so these installation rate reductions are reflected in cost effectiveness calculations as well.

This is the case for all energy efficiency measures in all program delivery channels (upstream, midstream, and downstream). However how these reductions are made depends on whether the measures are in custom projects, are deemed measures, or are in programs using billing analysis (that is, are measuring savings at the meter). Note that any given measure may be incorporated into custom projects, into programs comprised of deemed measures, and/or into programs that use billing analysis to

calculate energy savings. More details are provided below to elucidate how these deductions in energy savings are calculated.

Additionally PG&E verifies installations of energy efficiency measures in both residential and non-residential facilities to ensure that rebated equipment is installed and functioning. For example, PG&E pulls a sample of deemed projects and conducts inspections to verify that the measure has been installed, that the measure is located at the correct site address, and that the quantity, make, and model number matches PG&E's records. Common reasons for inspection failures include measures not being installed, the incorrect address being provided to the inspector, and partial installation of measures. Customers who frequently fail inspections are required to have mandatory inspections until their pass rate stabilizes. In addition, PG&E conducts mandatory inspections for all projects that satisfy a certain dollar threshold.

Additionally there are specific energy efficiency programs (such as HVAC QA/QC) that seek to improve the quality of installations. Other programs (such as Workforce Education and Training) seek to improve the knowledge and quality of energy efficiency equipment installers generally.

If yes, please describe and provide documentation showing: (a) how and where this is taken into account, (b) in what programs this is taken into account, (c) what adjustment factors (if any) were applied, and (d) the basis for the adjustment factor.

Measures in Custom Projects. For measures in custom projects, a reduction of 10% is used for ex ante savings estimates (resulting in an ex ante Gross Realization Rate (GRR) of 0.9) to adjust for the variety of factors that tend to reduce energy savings. These factors include issues surrounding changes in operating conditions, baseline determinations, calculation methods, and project type (that is, whether equipment was determined to have been replaced on burnout or an early replacement of functioning equipment). There have been 15 or more impact evaluations of our custom programs since 2000, and independent impact evaluators have not examined poor installation as a factor to evaluate. This can be verified by examining the final impact evaluation reports, which can be found at www.calmac.org. The GRR is subject to further adjustments on an ex post basis as a result of new information from on-site visits to facilities where equipment has been installed (from impact evaluations and metering studies, for example).

Deemed Measures. In accordance with the Energy Efficiency Policy Manual (version 5, July 2013), workpapers set the initial values for installation rates for deemed measures, and these values are stored in the Database of Energy Efficiency Resources (DEER). When writing workpapers, IOUs are directed to utilize the latest information available about energy savings and adjustments to reflect all significant risk factors such as poor installation, operating conditions, and similar risks. This includes findings from any research (for example, from metering studies that measure energy use *in situ* to provide verification of actual energy used, and from impact evaluations that verify installation rates).

Installation rates in DEER are updated periodically to reflect the ratio of the number of verified installations of a given measure (as found in impact evaluations) to the number

of claimed installations rebated by the utility during a claim period. In certain studies, verification of installations includes metering *in situ* to determine whether an adjustment of installation rate is warranted. The installation rate is reported separately in claims and is not included in the reported savings for the measure. Periodically gross savings installation adjustments (GSIA) are made in DEER to reflect findings of impact evaluations or other studies, and those adjusted values are used for new ex ante estimates of the installation rate of a measure. Projects that are subject to on-site verification as part of impact evaluations are selected by evaluators using a weighted stratified sample so that projects that contribute more to savings claims are more likely to be sampled. Within each strata, project selection is done on a random basis and therefore reflect "typical," non-idealized installations that should account for the variety of installations of the measure. Consequently, the adjustments made to GSIA will account for degradations on the basis of their contribution to energy savings claims and be representative of the entirety of measure savings.

For example, a measure for residential duct sealing (see PG&E workpaper PGE3PHVC159, "Duct Sealing (Total Leakage Reduced from (25/24%) to (15/12%))") has a GSIA of 0.49 that reflects impact evaluation findings and other best available information. The attached file contains a listing of all the EE measures with a GSIA of less than 1. To sort by delivery channel, you may use the values found in column AD.

Measures in programs measured at the meter. For measures included in programs in which savings is determined at the meter, savings claims directly reflect any degradation of savings attributable to any cause (including poor installation and operating conditions, for example). Because savings are measured in their entirety, it is not possible to isolate energy savings degradation due to inadequate installation or other factors. This includes programs such as Home Energy Reports (which employs a randomized control trial experimental design), "whole house" programs, and programs for which energy savings are calculated by observing changes in weather-normalized energy consumption at the meter (as provided for in the High-Opportunity Programs and Projects ("HOPPS") implementation phase of the Assembly Bill 802).