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ATTACHMENT 1

Energy Division Proposal for the Resource Planning

Energy Efficiency in the 2010 LTPP

This attachment is organized in the following sections: (I) background, (II) policy issues, (III) quantification of uncertainty; and (IV) conclusion. Parties are asked to comment on questions presented in Sections I through IV.

I. Background

Energy efficiency is California's first-choice to serve demand for electricity. PU Code § 454.5 states that an IOU's procurement plan must show that it "will first meet its unmet resource needs through all available energy efficiency [EE] resources and demand reduction measures that are cost effective, reliable and feasible."[1] In 2003, the state reinforced this policy by placing EE first in the Energy Action Plan (EAP) loading order.[2] Accordingly, the IOUs execute the EAP through the LTPP by "filling their net short position with preferred resources from the EAP loading order."[3] Thus, the Commission's oversight in the LTPP proceeding is to ensure system reliability, while verifying adherence to the EAP loading order.

In practice, this means that the IOUs should plan to a "managed forecast," which, in this context, is a base demand forecast (including some embedded EE), plus adjustments to represent incremental impacts of all "cost effective, reliable and feasible" demand-side resources. In interpreting the statute, the challenge for demand forecasters, IOU resource planners, and the Commission, is to estimate "cost-effect, reliable and feasible" levels of EE and determine what is "reasonably expect to occur."[4]

In the managed forecast, a unique challenge presents itself because procurement authorizations must consider longer timescales (about 5-7 years forward) than either utility or non-utility[5] EE initiatives, which mostly operate on three-year cycles (of program design, implementation/delivery, and evaluation). For the 2010 LTPP cycle, the CPUC will review procurement plans spanning the period 2010-2020 and most likely decide whether to construct new resources in the 2016-2020 timeframe.

The CPUC and Energy Commission, respectively, adopt specific new utility programs and non-utility standards every three years at a level of implementation detail. But, *both* processes are guided by longer-term policies (e.g. to strengthen building standards by 15 percent each cycle), goals (e.g. IOU EE goals out to 2020), and/or targets (e.g. 50 percent reduction in energy use by existing commercial buildings, as set forth in the CPUC's Energy Efficiency Strategic Plan). A similar situation occurs in procurement, where procurement authorizations are made 5-7 years

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[1] Pub. Util. Code § 454.5 at Subsection (b)(9)(C). Added by AB 57 (Wright, Chapter 850, Statutes of 2002). (Emphasis added.)

[2] CEC, CPUC, and CPCFA. (2003). *Energy Action Plan*, at p. 4; and CEC and CPUC. (2005) *Energy Action Plan II*, at p. 2. Available at http://www.energy.ca.gov/energy_action_plan/2005-09-21_EAP2_FINAL.PDF

[3] D.07-12-052, p. 3.

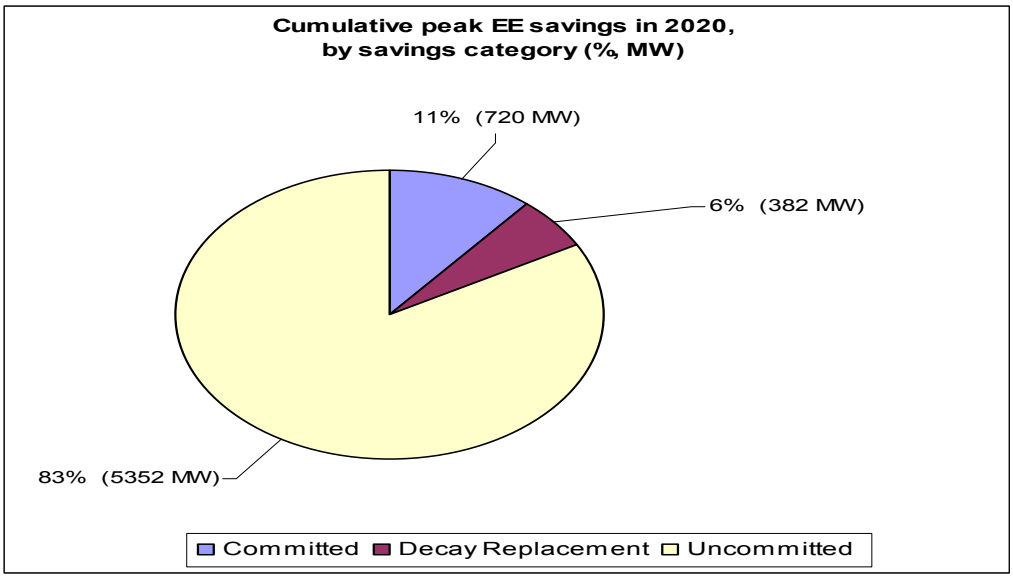
[4] Here, CPUC staff borrows from the "reasonable expected to occur" (RETO) concept that previously guided the CEC's electricity planning efforts under SB 1389 (Bowen, Chapter 568, Statutes of 2002). While the RETO concept was repealed from law under the current statute (P.R.C. §§ 2530 – 2532), it remains a familiar and useful criteria for resource planning because it entails a judgment by decision-makers regarding an acceptable level of uncertainty that specific amounts of EE will be available to serve load.

[5] Non-utility EE includes codes and standards.

forward, but specific resource additions get firmed up in later years. Thus, the CPUC's procurement decision must equally consider the likely composition of both supply and demand-side resource acquisitions.

In recognition of demand-side uncertainties, the CEC's demand forecasting methodology distinguishes between "committed"[6] and "uncommitted"[7] effects in its accounting for energy efficiency in the load forecast. According to the CEC, "only the effects of committed programs are included in the demand forecast."[8] The Commission has directed that the LTPP must consider "energy efficiency savings from committed and uncommitted programs,"[9] or total energy efficiency savings, forecasted through 2020. Committed programs are those with first year savings through 2012; these are embedded in the 2009 IEPR forecast. Uncommitted programs extend from 2013 to 2020; these savings are not embedded in the 2009 IEPR forecast. The Commission has directed IOUs to maintain initial programs savings through replacement of decayed measures, which leads to an additional savings source due to decayed measure replacement, are also not embedded in the 2009 IEPR forecast. This distinction leads to only a small percentage of possible EE savings, approximately 11 percent, being embedded in the demand forecast in 2020 (larger shares in earlier years). The Commission's EE program savings within the LTPP planning horizon, as shown in Figure 1, are expected to largely occur in the uncommitted period over the years 2013-2020.

Figure 1 – Cumulative peak EE savings in 2020, by savings category, from CEC Incremental EE Report[10]



[6] "Committed programs are defined as programs that have been implemented or for which funding has been approved and include some form of program plan". (*CED 2007*. p. 25.)
[7] "Uncommitted effects are thus defined as the incremental impacts of the level of future programs (for example, savings associated with new equipment that exceeds current standards or early replacement of existing stock), impacts of new programs, and impacts from expansion of current programs." (*CED 2007*, p. 25.)
[8] *CED 2007*, p. 25.
[9] D.07-12-052 at pp. 2-3.
[10] Committed and uncommitted numbers are taken from the Itron Incremental EE Technical Report, Mid Case tables (Total All Sectors – CEC Total and Total All Sectors – Incremental Uncommitted) for each IOU: PG&E (Tables 7-6 and 7-8, pp. 141 & 142), SCE (Tables 8-6 and 8-8, pp. 152 & 153), and SDG&E (Tables 9-6 and 9-8, pp. 163 & 164). Decay Replacement numbers are from the CEC Incremental EE Report, Table 12, pp. 44 & 45.

In response to a request by the Energy Division in the 2008 IEPR Update proceeding, the CEC created the Demand Forecast Energy Efficiency Quantification Project (DFEEQP)[11] working group in 2008. The Energy Division's consultant on the 2008 Goals Study, Itron, Inc., was contracted to perform the technical analysis to support the CEC's Incremental EE Report. Since then, the DFEEQP's efforts have reduced a great deal of methodological uncertainty[12] regarding uncommitted EE. However, this raised new questions about the overall level of uncertainty in EE forecasts. Itron's technical report in support of the CEC's Incremental EE Report, *Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 IEPR Adopted Demand Forecast* (Itron Incremental EE Technical Report) highlighted five important analytical caveats and uncertainties embedded in the analysis: (1) electricity price, (2) differences in committed savings estimates, (3) annual savings trends, (4) savings decay from IOU programs, and (5) uncertainty associated with achieving the BBEES targets.[13] Each of these uncertainties are treated in Section III.

II. Policy Issues

When discussing possible EE assumptions for the LTPP system analysis, it is important to bear in mind that the EE goals adopted by the Commission serve the multiple purposes of (1) guiding portfolio planning, (2) serving as a benchmark for performance, and (3) informing procurement decisions. In the 2008 LTPP OIR (R.08-02-007), the Commission acknowledged:

> [A] distinction needs to be made between (1) loading order resource goals established in resource-focused proceedings that IOUs must work to achieve, and (2) prudent resource planning assumptions that affect need determination, procurement authority, and ultimately system reliability.

The assumptions embedded in the Commission-adopted EE goals represent a snapshot in time of the expected savings potential and were based on the best available information at the time. New information acquired through evaluation and changes in program design or changes in market conditions could affect the potential that is reflected in the static goal over time. However, when forecasting the need for additional supply-side resources, the LTPP must balance the current knowledge of demand-side and supply-side resources through a "managed" forecast out to 2020. The timing and need for new resources is a complex equation involving highly uncertain assumptions about retirement and load growth in addition to uncertainties about the performance of EE programs to meet the adopted goals.

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[11] The DFEEQP working group met between December 2008 and April 2010, and was convened in order to improve assessments of EE programs within demand forecasting.

[12] Methodological uncertainty relates to the data and modeling assumptions underlying the CEC's IEPR demand forecast and the CPUC's EE goals analyses. (For further discussion of these uncertainties, see Appendix C to the CEC Incremental EE Report).

[13] Itron Report, *Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 IEPR Adopted Demand Forecast*, Attachment A to the CEC Incremental EE Report, pp. 64-68.

Overview of Adopted EE Goals and the CEC Approach

The goals adopted in D.08-07-047 were based on analyses developed by Itron under contract to the Energy Division in 2008. Unlike the previous goals established in D.04-09-060, the new goals resulted from two major changes in approach. First, the goals were developed from a wide range of Demand Side Management delivery mechanisms (IOU programs, state or federal appliance and building standards, and impacts of policy initiatives with no legally-established implementation mechanism). Second, the goals were based on the "total market gross" concept rather than net IOU program savings. Four broad categories of savings were assessed:

- IOU programs (and naturally occurring savings)
- Codes and Standards
- Huffman lighting requirements (AB 1109)
- Big Bold initiatives

Conceptual program designs were established for a whole series of programs within each of these four groups, and the program designs were evaluated using alternative levels of stringency assumptions for elements of each conceptual program. Groupings of these alternative assumptions and their logical results were reported as three scenarios – low, mid, and high. D.08-07-047 adopted numeric values corresponding to the mid-case reported by Itron.

In developing its approach for determining incremental savings relative to its baseline demand forecast, the CEC project team (CEC, Itron, Energy Division) returned to the fundamental analyses used to prepare the 2008 Goals Report rather than to focus simply on the final numeric values adopted in D.08-07-047. Thus, the fundamental question to be addressed was "What portion of the savings resulting from each of several specific conceptual program designs developed for the 2008 Goals Study is incremental to the adopted *2009 IEPR* demand forecast?" In addressing this question, the CEC Incremental EE Report describes a project that starts from the analytic tools used by Itron for the 2008 Goals Study, revises the fundamental economic/demographic input drivers to match *California Energy Demand (CED) 2009* assumptions, reconciles the analytic methods used by Itron to the *CED 2009* methodology to the extent allowed by time and funding constraints, adjusts for programs now considered committed and embedded in the adopted *CED 2009*, and generated new versions of each of the three alternative scenarios.

The CEC Incremental EE Report provides results for all three scenarios for each IOU, and also reports savings for each conceptual program within each of the four broad categories of programs for each IOU. At the February 3 and February 17, 2010 workshops conducted by the CEC leading to the final CEC Incremental Report, there was discussion that the results of the analyses could be used not only by selecting whole scenarios, but also by appropriately selecting elements within scenarios should uncertainty motivate one to use alternative groupings of the conceptual policy initiatives compared to the original design of scenarios as groupings of programs with alternative stringencies.[14]

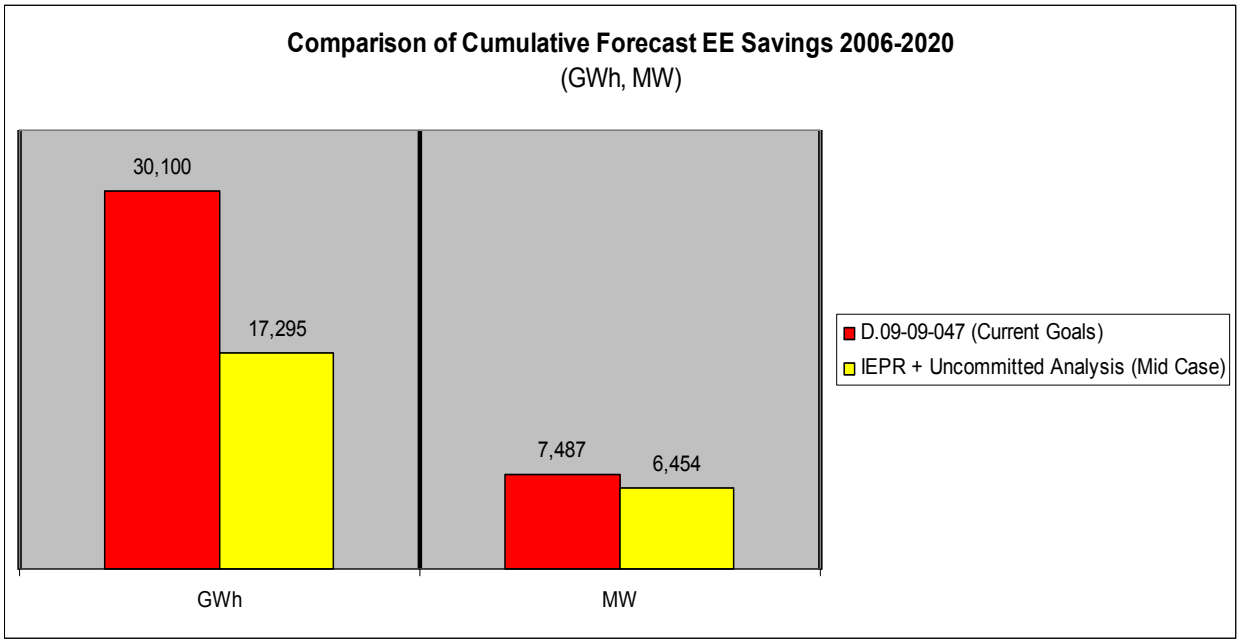
[14] CEC, *2009 IEPR* workshop, February 17, 2010, transcript, page 81.

Comparison of Results of the CED 2009 and CEC Incremental EE Report versus Current EE Goals

Figure 2 below provides a visual reference to compare various savings estimates of the cumulative impacts of the CPUC's EE goals in energy and capacity terms.

The current EE goals [15] are indicated by the red bar, which represents the current cumulative EE goals adopted for the three IOUs, while the yellow bar indicates the forecast cumulative goals from the Mid Case[16] of the Itron Incremental EE Technical Report with additional savings from the replaced measure decay in the CEC Incremental EE Report.[17] As shown in the figure, the recent CEC and Itron analyses of CPUC EE goals indicates EE impacts are reduced 40 percent for energy and 15 percent for capacity compared to the current goals. Potential reasons for these changes are outlined in later sections.

Figure 2 – Comparison of Cumulative Forecast EE Savings Goals and CEC analysis, 2006-2020



In order to estimate incremental savings, the analysis conducted for the CEC Incremental EE Report, reconciles the 2008 Goals Study analysis, which was based upon inputs from the *CED 2007*, with the committed EE estimates in the *CED 2009*[18]. The numbers presented in Figure 2 are calculated by combining the committed, uncommitted, and decayed savings replacement for the Mid Case scenario.[19] The results of the EE estimates in the *CED 2009* and the CEC Incremental EE Report reflect several changes since the 2008 Goals Study. Key among these are the following changes, which are discussed in turn below:

[15] D.08-07-047 as subsequently modified by D.09-05-037 and D.09-09-047.
[16] Itron Incremental EE Technical Report, Table 4-10, p. 54.
[17] CEC Incremental EE Report, Table 12, pp. 44 & 45.
[18] Residential, Commercial, and Industrial Energy Service Demand Drivers were calibrated. Itron Incremental EE Technical Report, p. 14.
[19] Itron Incremental EE Technical Report, Table 4-8 (Total All Sectors, CEC – Total, 2020); Table 4-10 (Total All Sectors, Incremental uncommitted, 2020); and CEC Incremental EE Report, Table 12 (Forecast Year 2020, Peak).

- Economic/demographic drivers;
- Title 24;
- Title 20 changes & Huffman bill implementation; and
- Peak-to-energy ratio assumptions.

Economic/Demographic Assumptions

A significant driver of EE savings estimates are economic and demographic assumptions, which have changed since the *CED 2007*. Economic and demographic indicators directly impact key drivers of energy service demand in the residential sector (i.e., housing stock, personal income, and unemployment), commercial sector (i.e., commercial floor stock), and industrial sector (i.e., industrial output). In the years between the *CED 2007* and the *CED 2009*, economic conditions declined along with expectations for the future, with lower forecast personal income growth, employment, industrial output, and commercial floor space. As a result, beginning in 2009, there is a dip in forecasted electricity consumption.[20]

A comparison of the effects of these changes is in Table 1 below.[21] In the table, 2018 is chosen as it is the farthest-forward common year in the *CED 2007* and *CED 2009*. Overall, the CEC has forecasted that in 2018, consumption is down 5.36 percent for energy and 3.68 percent for peak. The CEC explains these decreases are due to the impacts of increased committed energy efficiency savings in the *CED 2009* over the *CED 2007,* and the impacts of the economic downturn.[22]

Table 1 – Consumption Growth Rates (Source: CED 2007, CED 2009) [23]

Years	CED 2007 GWh	CED 2009 GWh		CED 2007 MW	CED 2009 MW
2008-2010	1.39%	-1.04%		1.43%	0.51%
2010-2018	1.21%	1.22%		1.31%	1.30%

Based on this information, parties are asked to comment on the following questions:

Q 1 - Is it reasonable for the LTPP analysis to use updated economic/demographic drivers, even if they differ from those employed in the 2008 Goals Study? If so is the CED 2009 an appropriate source?

Q 2 - Is it reasonable for the LTPP analysis to use updated consumption and peak growth rates, even if they differ from those employed in the goals analysis? If so is the CED 2009 appropriate?

[20] *CED 2009*, p. 2.
[21] *CED 2009*, Table 3.
[22] *CED 2007*, p. 48; *CED 2009*, p. 48.
[23] *Id*.

The 2008 Goals Study assumed that 2008 Title 24 would require a 15 percent efficiency improvement compared to 2005 Title 24. D.09-09-047 emphasizes that the residential new construction milestones are aggressive.[24] However, the 2008 Title 24 proceeding, which concluded after the 2008 Goals Study, pushed out implementation of the new standards by a year in addition to having fewer new energy efficiency requirements.[25] This results in a lower estimate of efficiency savings than were assumed in the 2008 Goals Study.

Title 20 & Huffman Bill Implementation

In response to the Huffman Bill (AB 1109),[26] the CEC revised the Title 20 appliance standards to meet new requirements for lighting. This impacts the attribution of savings between IOU programs and appliance standards because the new codes and standards encroach upon the savings currently attributed to IOU lighting programs.[27]

Another change is in the implementation timeframe for AB 1109, as specified in Title 20. The 2008 Goals Study assumed steady linear progress towards AB 1109 targets between 2011 and 2020. The adopted Title 20 regulations identify two distinct lighting products with two distinct implementation timelines.[28] This introduces new uncertainty due to implementation of the two different products, such as the phase-out rates of older, less efficient lighting products. The uncertainty of modeling these impacts is discussed later in Section IV, under quantification of uncertainty.

Based on this information, parties are asked to comment on the following question:

> **Q 3 - Is it reasonable to use updated Title 20 and Title 24 assumptions based current information? If so, how should the updated assumptions be employed in the 2010 LTPP?**

Changes to Peak-to-energy Ratio

The traditional method of estimating peak savings in EE potential and goal studies is to start from energy savings and convert to peak savings using a peak-to-energy ratio for each end-use or measure. Peak-to-energy ratios are derived from end-use load shape data multiplied by consumption estimates.

The 2008 Goals Study is based upon a peak-to-energy ratio from 2004, which was a historically *mild* weather year. Both the *CED 2009* and CEC Incremental EE Report were based on *average* weather data, derived from average temperatures over the last 30 years.[29] A change in this peak-to-energy ratio from a mild to normal (or for mild to extreme) results in an increase in the amount of peak energy savings given constant GWh savings. For example, in the CEC

[24] D.09-09-047, p. 159.
[25] Itron Incremental EE Technical Report, p. 17.
[26] The California Lighting Efficiency and Toxics Reduction Act, 2007.
[27] D.08-07-047, pp. 12-13 shows forecast savings and preliminary assumptions regarding AB 1109 and Title 24.
[28] Itron Incremental EE Technical Report, p. 27.
[29] CEC Incremental EE Report, p. 39.

Incremental EE report, forecast energy savings are down by approximately 40 percent, whereas capacity savings have decreased by much less.

In response to parties' comments on the draft report issued February 17, 2010, the CEC Incremental EE report provides results for mild peak-to-energy ratios, as well as normal peak-to-energy ratios.[30]

Based on this information, parties are asked to comment on the following questions:

> **Q 4 - Is it reasonable to use different peak-to-energy ratios than in the 2008 Goals Study? If so, which peak-to-energy ratios should be employed in the 2010 LTPP?**
>
> **Q 5 – Please provide any quantitative analysis to support the use of a specific peak-to-energy ratio assumption (e.g., mild, normal, or extreme).**

IV. Quantification of Uncertainty Issues

There are many uncertainties in the quantification of prospective EE policy initiatives. Methodological uncertainties are distinct from the policy uncertainties, previously discussed in Section III. The Itron Incremental EE Technical Report identified five key uncertainties or analytical caveats.[31] In addition, the Draft Evaluation Report includes information regarding the past accomplishments of the utilities with respect to the adopted goals.

Uncertainties Identified in the CEC's Incremental Impacts of Energy Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast

Electricity Price Assumptions and Customer Response

There is an underlying difference between the methodologies that model customer response to price, and electricity price projections, between Itron's ASSET model used to develop the original 2008 Goals Study analyses and the CEC Staff's *CED 2009*. The *CED 2009* assumes a 15 percent increase in electricity rates for electricity between 2010 and 2020.[32] The *CED 2009* uses a traditional price elasticity, but at the end-use level, to model customer response to price. The analysis for the 2008 Goals Study assumed that electricity prices remain constant in real terms over the same period, but Itron's ASSET model projects customer adoption of more efficient measures using a complex choice algorithm that predicts some adoption even with no price increase. Finally, since the 2008 Goals Study used ASSET-based analyses only to project impacts from future IOU programs, the differences in method and electricity price assumptions are limited to the IOU program/naturally occurring component of the adopted goals.
Based on this information, parties are asked to comment on the following questions:

> **Q 6 - Despite any disparity between the methods used to develop adopted goals, the CEC incremental uncommitted analysis, and the CED 2009, are the composite of**

[30] *Id*, Tables 45 and 46, pp. 45 & 46.
[31] Itron Incremental EE Technical Report, p. 64.
[32] *CED 2009*, p. 26.

IOU program savings/naturally occurring reported in the CEC Incremental EE Report a reasonable estimate of total EE savings from these two sources?

Q 7 - While there may be important reasons to differentiate between IOU program impacts, naturally occurring savings, and customer response to price, given the "total market gross" orientation of the adopted goals, is it necessary to pursue these attribution questions further within the context of the 2010 LTPP?

Differences in Committed Savings Estimates

When estimating committed EE savings, there were differences between the CEC Incremental EE Report and the *CED 2009* savings estimates between 2006 and 2012. For the Low Goals case, savings in the *CED 2009* were higher than the committed savings estimated in the Incremental EE Report, whereas the opposite effect was found in the Mid and High Goals Case.[33] Itron stated that an explanatory factor could be that the measure rebate levels assumed in the *CED 2009* are known to be *higher* than those assumed in the Low Goals case, and *lower* than those assumed in the Mid and High Goals Cases.[34]

Other differences can be attributed to different realization rate assumptions[35], net-to-gross accounting[36], and make-up of committed savings shortfalls.[37] However, these impacts only affect the committed savings through 2012, and do not affect uncommitted savings from 2013-2020 since the uncommitted savings were calculated to be incremental to those savings already embedded in the *CED 2009*.[38] However, this could affect the level of committed savings considered embedded in the IEPR forecast.

Based on this information, parties are asked to comment on the following questions:

Q 8 - What is a reasonable base case assumption for the amount (GWh and MW) of committed savings shortfall (from years prior to 2012) that the IOUs would be expected to make up in the uncommitted period?

Q 8.a – What are reasonable high and low assumptions?
Q 8.b - What probability would you assign to these three estimates?
Q 8.c – What justification or documentation supports these estimates?

Annual Savings Trends

According to Itron's Incremental EE Technical Report, the 2008 Goals Study model was designed for robust end-point outcomes, not necessarily year-to-year trends. This can lead to uncertain levels of year-to-year measure savings forecast, such as the savings attributable to AB

[33] Itron Incremental EE Technical Report, p. 65.
[34] Id.
[35] The CEC assumes a 70% realization rate across all IOU programs and measures. Itron's ASSET model used measure-specific data from past accomplishments to forecast future adoption rates.
[36] The CEC applies a universal net-to-gross assumption in 2010-2012 to account for free-riders.
[37] For more information on the logic of EE program savings shortfall, see D.07-10-032, and http://www.energy.ca.gov/2009_energypolicy/documents/2010-02-17_workshop/presentations/02_Best_Carmen_Summary_of_CPUC_EE_Goals.pdf
[38] CEC Incremental EE Report, p. 2.

1109 lighting standards due to the revised implementation of Title 20. These changes create some uncertainty in year-to-year savings estimates in the incremental uncommitted analysis.[39] On the other hand, any improved year-to-year forecast may not significantly affect the overall analysis of the available quantity of energy efficiency.

Based on this information, parties are asked to comment on the following questions:

> **Q 9 – Does the uncertainty in year-to-year trends pose a significant risk for procurement purposes in the 2010 LTPP? If so, what should be done about it, if anything?**

Treatment of Savings Decay

Traditionally, the IEPR forecast has treated first-year EE savings as decaying, or not being replaced, once the energy efficient technology or action has expired.[40] This leads to significant decay of savings from committed programs post-2012. Commission policy, as defined in D.09-09-047, is that 50 percent of measure decay must be replaced by the IOUs starting in program year 2006. Regardless of the analytical approaches, the fundamental behavioral assumptions and market influence guiding the future replacement of expired efficient technologies with more efficient technologies introduces "considerable uncertainty associated with modeling and predicting measure savings decay…"[41] However, in order to address this concern, the CEC conducted a special analysis in parallel with the original activities for the incremental, uncommitted report. The CEC has forecast that 50 percent decay replacement as described would increase cumulative committed savings by approximately 1,800 GWh and 380 MW by 2020, based on the Commission's current measure decay replacement policy for the IOUs.[42] The CEC has provided an annual series of values for each IOU service area if the Commission desires to make this adjustment to the *CED 2009* results.[43] This revision, since the initial modeling efforts in the February 2010 draft report, has reduced the quantity of cumulative measure savings decay leading to more energy efficiency savings by 2020 than initially forecast.

Based on this information, parties are asked to comment on the following questions:

> **Q 10 - Should the supplemental information on savings decay (i.e. 1,800 GWh and 380 MW by 2020) reported by the CEC, and consistent with D.09-09-047, be used to make a adjustment to the adopted 2009 IEPR base line demand forecast in developing managed demand forecasts for procurement purposes in the 2010 LTPP?**
>
> > **Q 10.a – How should uncertainty associated with modeling and predicting measure savings decay be accounted for?**

BBEES Accomplishment Uncertainty

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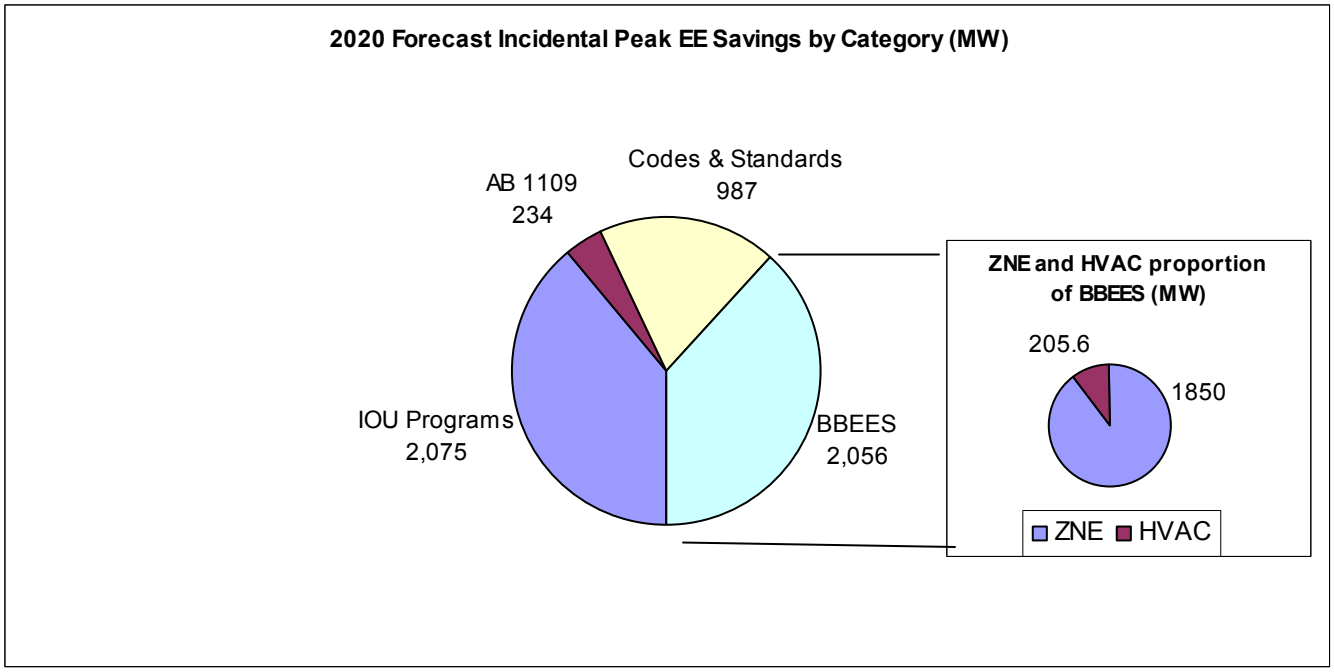
[39] Itron Incremental EE Technical Report, p. 66.
[40] CEC Incremental EE Report, p. 43.
[41] Itron Incremental EE Technical Report, p. 67.
[42] *Id*.
[43] CEC Incremental EE Report, Table 11, p. 49.

Big Bold Energy Efficiency Strategies (BBEES) are "strategies… to promote maximum energy savings through coordinated actions of utility programs, market transformation, and codes and standards."[44] Specifically, the BBEES are: 1) all new residential construction in California will be Zero Net Energy (ZNE) by 2020; 2) all new commercial construction will be ZNE by 2030; and 3) Heating, Ventilating, and Air Conditioning will be transformed to ensure that its energy performance is optimized for California's climate. At the time of the 2008 Goals Study and the CEC Incremental EE Report, there were no specific delivery mechanisms for BBEES, which required modelers to estimate "the potential energy and peak demand savings from the BBEES as penetration-weighted technical potential".[45] As such, Itron described the "outcomes associated with the BBEES initiatives for ZNE home and buildings as highly uncertain."[46] Since then the Commission has approved, in D.09-09-047, $28.1 million worth of IOU ZNE programs in the 2010-2012 EE program cycle.[47] While BBEES programs have a modest share of *energy* savings in 2020, the *peak* impacts of BBEES programs in 2020 are approximately 40 percent of forecast peak incremental uncommitted EE savings, as illustrated in Figure 3.[48] A large majority of these savings are from the ZNE goals.

Figure 3 - 2020 Forecast EE Savings Attribution, from Itron Incremental EE Technical Report



Based on this information, parties are asked to comment on the following questions:

[44] D.07-10-32, p. 35.
[45] Itron Incremental EE Technical Report, p. 68.
[46] *Id*.
[47] D.09-09-047, OPs 19, 20, 26-29.
[48] Itron Incremental EE Technical Report, p. 69.

Q 11 - Given that BBEES are in the early stages of developing specific delivery mechanisms, should these savings be considered more uncertain that other components of the incremental EE forecast?

Q 11.a – What is a reasonable base case assumption for EE savings (GWh, MW) from BBEES?

Q 11.b – High and Low case assumptions?

Q 11.c – Please provide probability of occurrence for the three cases.

2006-2008 Draft Energy Efficiency Evaluation Report

The Commission directed Energy Division to evaluate the 2006-2008 EE programs and verify the resulting energy savings and demand reductions. The aggregate results of this evaluation were compiled in the draft 2006-2008 EE Evaluation Report released on April 15th.[49] Evaluated EE savings estimates were developed from measurements taken after the efficiency technologies or measures were installed. Consequently, the evaluated savings reflect the conditions observed in the field during or shortly after program completion and data analysis for representative samples of program participants. The savings estimates presented in the 2006-2008 EE Evaluation Report differ from the savings estimates reported by the utilities.[50] Utility reported savings were based on assumptions developed prior to the implementation of the 2006-2008 program cycle. The energy savings impacts presented in the report are limited to the direct savings impacts that resulted from the program activities and by the Commission rules that guided the evaluations. It does not include indirect impacts from education and training or statewide marketing campaigns. Impacts that were quantified from pre-2005 codes and standards advocacy work and low income EE are presented in Table 3, but not in Table 2.

Table 2 - Savings Impacts from 2006-2008 IOU Energy Efficiency Investments[51]

	Annual Impact	
	Gross	**Net**
GWh	6,494	4,093
MW	1,175	779

Gross Versus Net Savings

The evaluated EE savings in the 2006-2008 EE report include the net and gross savings. Measuring *gross* savings means establishing the savings that were achieved by all of the measures that were installed, regardless of the influence of the program on customer decision. In comparison *net* savings is a reflection of the EE programmatic impacts after removing the savings achieved by free-ridership.[52] Annual savings represent the energy impacts of the installed technologies for the year in which they are installed. The distinction between net and

[49] 2006-2008 Energy Efficiency Draft Summary Report available here: http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/2006-2008+Energy+Efficiency+Evaluation+Report.htm

[50] Utility-reported savings estimates are posted on the Commission's Energy Efficiency Groupware Application (EEGA) website www.eega2006.cpuc.ca.gov.

[51] For more information, see page ii of the 2006-2008 EE Evaluation Report.

[52] Free riders (Free Ridership) are program participants who would have installed the program measure or equipment in the absence of the program. Energy Efficiency Policy Manual, Version 4.0 (July 2008).

gross savings is relevant to procurement decisions to the extent that it clarifies the savings available on the grid (gross) and what portion would not likely have occurred without the intervention of the programs (net). In the 2006-2008 program period, the net savings represented about two-thirds of the gross savings, as shown in Table 2 above.

Evaluated Savings Compared to the Reported Savings and Goals

In the course of the evaluations, differences between reported savings and evaluated savings (both gross and net) are expected. Reported savings are estimates of savings provided by the utilities, based on their tracking data, using planning assumptions for the savings attributable to specific technologies that are installed. Evaluated savings are a further refinement of reported savings that have been verified and measured through tracking data review, verification of installation, and field measurement. While these values are not expected to be equal; closer alignment of these values will only be achieved if ex-post evaluated results continue to be incorporated into planning assumptions.

As shown in Table 3 below, for the 2006-2008 program cycle, the evaluated net EE savings are 70 percent of the net GWh goals established for this period and 63 percent of the net MW goal. These figures include the impacts of codes and standards advocacy work and low income programs. There were no gross goals established for this time period. The evaluated gross savings are 52 percent of the reported GWh savings and 57 percent of the reported MW savings. The evaluated net savings are 41 percent of the reported GWh savings and 46 percent of the reported MW savings. For both gross and net savings it is important to emphasize that reported savings are based on savings assumptions embedded in the original program plans and in only a few cases were updated during the course of the program's implementation. In addition the 2006-2008 programs were highly focused on interior lighting measures for which planning assumptions for the hours of use were overly optimistic, and market influence has been making these technologies more accessible to customers without direct program interventions.

Table 3 - Comparative of Program Cycle 2006-2008 Evaluated Results to Goals (April 22nd Correction Draft Evaluation Report, Table 23)

	PGE	SCE	SDGE[53]	Total
Savings Goals (Net)		**PY 2006-2008**		
Cumulative Savings (GWH)	2,826	3,135	638	6,599
Peak Savings (MW)	613	672	122	1,407
EE Portfolio Savings (Net Reported)		**PY 2006-2008**		
Cumulative Savings (GWH)	5,251	3,898	850	9,999
Peak Savings (MW)	845	690	147	1,682
EE Portfolio Savings (Net Evaluated)		**PY 2006-2008**		
Cumulative Savings (GWH)	1,766	1,959	364	4,089
Peak Savings (MW)	320	383	72	776
50% C&S Savings (Net Evaluated)**		**PY 2006-2008**		
Cumulative Savings (GWH)	157	162	37	356
Peak Savings (MW)	30	31	7	68
EM&V Adjusted LIEE* Savings		**PY 2006-2008**		
Cumulative Savings (GWH)	79	74	16	169
Peak Savings (MW)	16	16	4	36
Performance against 2006-2008 goal				
Percent of GWH Goal	71%	70%	65%	70%
Percent of MW Goal	60%	64%	69%	63%

*LIEE = Low Income Energy Efficiency Programs
**Codes and Standards Savings from pre-2005 advocacy work

Trends

The gap between reported and evaluated savings has been increasing since the 2002-2003 evaluation cycle as indicated in Table 4 below. The utilities and the Commission established energy savings targets or goals for each program cycle. Using these goals as a benchmark, over the course of the last three program cycles the gap between reported savings and the goals increased, and the difference between evaluated savings and those same goals has also widened, suggesting far lower levels of actual savings. This trend, illustrated in Table 4, suggests that updated savings estimates based on evaluation results are not being incorporated into projected savings estimates in a timely enough fashion. It may also suggest some level of diminishing returns in incremental benefits available from the programs due to rising baseline efficiency level and a general increase in EE awareness among consumers in the marketplace, as compared to earlier planning assumptions.

[53] SDGE goals reflect updates in D. 09-09-047; September 24, 2009. Available at http://docs.cpuc.ca.gov/PUBLISHED/GRAPHICS/107829.PDF

Table 4 - Reported and Evaluated Net Savings as a Percentage of Savings Goals since 2002 [54] *

Program Cycle	kWh		kW	
	Reported	Evaluated	Reported	Evaluated
2002-2003	118%	104%	104%	86%
2004-2005	127%	79%	133%	75%
2006-2008	151%	62%	122%	55%

*In this table the 2002-2003 and the 2004-2005 accomplishments are compared to IOU program specific goals; and in 2006-2008 the CPUC adopted goal is the point of comparison.

The net EE goals for the last two program cycles (2004-2005 and 2006-2008), were developed from analyses conducted in 2002 to 2004. As a result, there are inconsistencies between the savings estimates from the most recent evaluation results and the assumptions and data underlying the original EE forecasts used to support the CPUC's efficiency goals. New information on EE market penetration, end user adoption rates, and per unit savings levels developed through evaluations and other research conducted since the original goals adopted in 2004 were developed and this information should inform future updates to the goals. The CPUC deliberately set challenging EE goals for the IOUs' 2006-2008 programs, and it appears that market forces are contributing to a larger share of energy savings than were forecasted in the studies used to inform the current CPUC's goals.

Steps are being taken to close the gap in reported and evaluated savings estimates. IOU program managers and Energy Division staff are currently meeting to ensure that the results of the specific evaluation studies are being considered for improving savings estimates and program design for the 2010-2012 program portfolios.

The CEC recognized the long standing tradition of evaluation of the IOU programs, and consequently applied several universal assumptions to IOU programs in the spring/summer of 2009 when the analysis for the *2009 IEPR* demand forecast was being developed.[55] Key amongst these assumptions is an average realization rate of 70 percent, "to adjust for *real world* effects."[56]The CEC similarly applied these universal realization rates to IOU program savings for the 2009-2012 vintage of programs for which there are no *ex post* EM&V results. In the final demand forecast, the CEC staff adjusted its projected realization rates down from those assumed in the draft demand forecast as a result of adverse criticism, which asserted that assuming improvements in program performance in the future is unrealistic.

Based on this information, parties are asked to comment on the following questions:

[54] Correction to Draft EE Evaluation Report, Table 3, p. viii. This revised table reflects corrections on April 22, 2010 to Tables 23 & 24 and a pending correction to remove the low income and codes & standards from the totals.
[55] *CED 2009*, Chapter 8.
[56] *CED 2009*, p. 247.

Q 12 - There is a difference between the 2006-2008 EE Evaluation Report results for IOU programs and the assumptions used by the CEC[57] for savings in the 2006-2008 period. Given access to EM&V data, are these reasonable assumptions used to quantify IOU program savings through time?

Q 12.a – Do the differences between these two assumptions values have a significant impact on the committed savings?

Q 12.b - In light of IOU program savings decay assumed in the CEC demand forecast, and the proposed "make up" of this decay to satisfy Commission policy direction, are any differences between alternative assumptions for realization rates significant?

Q 13 - Does the historic trend of goal achievement for IOU programs have bearing on the likelihood of achieving overall goals in the future?

Q 13.a – How should procurement planning consider this source of uncertainty for IOU programs (e.g. Huffman Bill, BBEES, Codes and Standards)?

V. Conclusion

Given the recent analyses (originally requested in D.07-12-052), ED staff seeks input from parties regarding appropriate base case energy efficiency assumptions and appropriate high and low case assumptions.

Based on parties' responses to previous questions, parties are asked to comment on the following global question:

Q 14 - Assuming that the CED 2009 is the required base case demand forecast for system need analyses, should the numerical value of TMG goals adopted in D.08-07-047 (as modified in subsequent decisions), be required as the base case assumption for total EE (committed + uncommitted savings) in the minimum required analyses ordered in the Track I Scoping Memo?

Q 14.a – If not, should the numerical value of TMG goals adopted in D.08-07-047 (as modified subsequently modified), be required as a sensitivity case assumption for total EE? If so, which case?

Based on parties' responses to the previous questions, parties are asked to provide comment on their overall position on appropriate EE assumptions <u>for each IOU</u>. Parties are asked to respond, using the template provided in Attachment 2, to the following questions and/or propose alternative assumptions for the Assigned Commissioner to consider. Parties should provide justification for such proposals.

Q 15 – What is a reasonable *base case* assumption for incremental EE relative to the 2009 IEPR forecast in GWh and MW for PG&E, SCE, and SDG&E?

Q 15.a – What is this assumption based on?

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[57] *CED 2009*, Table 37, p. 248. Contains net-to-gross ratios and realization rates across IOU EE program cycles.

Q 15.b – What probability of occurrence would you assign to this assumption and why?

Q 16 - What is a reasonable *high case* assumption for incremental EE relative to the 2009 IEPR forecast in GWh and MW for PG&E, SCE, and SDG&E?

Q 16.a – What is this assumption based on?

Q 16.b – What probability of occurrence would you assign to this assumption and why?

Q 17 - What is a reasonable *low case* assumption for incremental EE relative to the 2009 IEPR forecast in GWh and MW for PG&E, SCE, and SDG&E?

Q 17.a – What is this assumption based on?

Q 17.b – What probability of occurrence would you assign to this assumption and why?

(END OF ATTACHMENT 1)