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Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast

Attachment A - Technical Report

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Executive Summary

The primary objective of this study was to produce quantitative estimates of the electric energy and coincident peak demand savings from the “uncommitted” programmatic activities and delivery mechanisms included in Itron’s 2008 CPUC Goals Study that are incremental to those already embedded in the Energy Commission’s 2009 IEPR demand forecast. In order to accomplish this, the Energy Commission and the CPUC requested that Itron use the same modeling framework and scenarios from the 2008 CPUC Goals Study that were used to inform the interim savings goals for 2012 through 2020 adopted by the CPUC in D.08-07-047. To help frame the quantitative analysis presented here, the study uses the following definitions for the key quantities and terms of interest.

- *Committed programs* – current delivery mechanisms that exist and have been fully authorized and funded by the associated regulatory agency
- *Committed program period* – the time period through which committed programs are authorized and savings from those committed programs accumulate accordingly, specifically 2008 through 2012
- *Uncommitted programs* – future delivery mechanisms that have not been fully developed, authorized, and/or funded by the associated program administrator or regulatory agency as described and assessed in Itron’s 2008 CPUC Goals Study
- *Uncommitted program period* – the time period through which uncommitted programs are assumed to be implemented and savings from those uncommitted programs accumulate accordingly, specifically 2013 to 2020
- *Incremental uncommitted program savings* – cumulative savings from uncommitted programs (in both energy and peak demand terms) that are incremental to those embedded in the 2009 IEPR demand forecast

The first key step in the analysis was to calibrate the bottom-up, end-use energy and peak demand baselines developed for the 2008 CPUC Goals Study with the Energy Commission’s estimates of actual total sales in the base year (2006) and revise the forecasts of key energy service demand drivers (housing stock, commercial floor stock, and industrial load growth) assumed in the 2008 CPUC Goals study with those assumed in the 2009 IEPR demand forecast.¹ The next key step was to carefully assess the scope of the programs modeled in the Energy Commission’s 2009 IEPR demand forecast and Itron’s 2008 CPUC Goals Study over the two specific timeframes of interest for this study – the committed program period and the uncommitted program period. Table ES-1 shows the findings of this assessment, which was conducted by the study team in close collaboration with Energy Commission staff.

¹ The housing, commercial floor stock, and industrial load forecasts used in the 2008 CPUC Goals Study were derived from the values published in the CEC’s 2007 IEPR forecast.

Table ES-1: Assessment of All Delivery Mechanisms Modeled in the 2009 IEPR Demand Forecast and the 2008 CPUC Goals Study

	Committed Program Period	Uncommitted Program Period
2009 IEPR demand forecast	IOU programs	-
	Title 24 triggered retrofits in existing commercial buildings (primarily lighting)	-
	-	“Additional residential lighting savings” from AB1109 lighting standards
	Residential price effects	Residential price effects
	Commercial price effects	Commercial price effects
2008 CPUC Goals study	IOU programs	IOU programs
	Revisions to Title 24	Revisions to Title 24
	-	Revisions to federal appliance standards
	Implementation of AB1109 lighting standards	Implementation of AB1109 lighting standards
	Implementation of CPUC’s Big Bold Energy Efficiency Strategies (BBEES) ²	Implementation of CPUC’s Big Bold Energy Efficiency Strategies (BBEES)

Given this assessment, the third step was to transform the Energy Commission’s estimates of savings from each of the delivery mechanisms modeled in the 2009 IEPR forecast into quantities that could be used as scenario inputs into Itron’s SESAT model that were then comparable to the scenario inputs developed for the 2008 CPUC Goals Study.

Once the revised set of baseline inputs and scenario assumptions were incorporated into SESAT, the study team then generated a comparable set of savings forecasts for the delivery mechanisms included in the 2009 IEPR demand forecast and the delivery mechanisms that formed that basis of the Low, Mid, and High Goals Cases in the 2008 CPUC Goals Study. These results in turn formed the basis for calculating the key quantity in question – i.e. the portion of savings from uncommitted programs (as represented by those modeled in the 2008 Goals study) that is incremental to the savings already embedded in the 2009 IEPR demand forecast from 2013 forward.

The key step required to estimate incremental uncommitted savings is to identify the extent to which the programs modeled in the 2008 CPUC Goals Study overlap or duplicate the programs modeled in the 2009 IEPR forecast. Based on the assessments and methodological decisions of the study team and Energy Commission staff, we defined incremental uncommitted savings to be the cumulative savings from 2013 through 2020 from the delivery mechanisms included in the Low, Mid, and High Goals Cases in the 2008 CPUC Goals study, with the specific adjustments shown in Table ES-2 below.

² In D.07-10-032, the CPUC established targets for a set of programmatic initiatives referred to as the Big Bold Energy Efficiency Strategies, including complete penetration of zero net energy (ZNE) in the residential and commercial new construction markets by 2020 and 2030, respectively.

Table ES-2: Final Programmatic Scope of Incremental Uncommitted Savings Analysis (2013-2020)

Delivery mechanism:	Adjustments:
IOU residential programs	decremented by CEC's residential price effects
IOU commercial programs	naturally-occurring adoptions assumed to be already embedded in CEC forecast; incremental savings defined to be <i>net</i> savings from new IOU programs
IOU industrial programs	no adjustments
Implementation of AB1109 lighting standards	decremented by CEC's "additional residential lighting savings"
Future revisions to Title 24	no adjustments
Future revisions to federal appliance standards	no adjustments
Implementation of BBEES initiatives	no adjustments

In order to interpret the results of the incremental uncommitted savings analysis correctly, it is important to understand two specific aspects of how these savings were calculated. First, the calculation method used does not incorporate or account for any differences between the Energy Commission's estimates of savings from committed programs and savings in the CPUC Goals Cases through the end of the committed period, i.e. 2012. In other words, the "gap" or difference between the Energy Commission's estimates of savings from committed programs and savings in the CPUC Goals Cases through 2012 is not carried forward or included in the incremental uncommitted savings calculations in any way, either as a decrement or a source of additional, incremental savings. Second, the incremental uncommitted savings calculation methodology employed effectively treats savings from committed IOU programs as constant from 2013 forward rather than decaying (as modeled by Energy Commission staff and reflected in the 2009 IEPR forecast). This method reflects the decision by CPUC and Energy Commission staff to establish an accounting method that conforms to the CPUC's policy rules under which the IOUs are responsible for replacing decayed savings from previous program cycles. We thus considered such decayed savings-replacement to be associated with committed programs rather than uncommitted programs. Therefore, our estimates of incremental uncommitted savings do not interact with any assumed levels of measure savings decay from previous IOU program cycles.

Table ES-3 and Table ES-4 summarize and compare the estimates incremental uncommitted savings across all three Goals Cases. As these tables show, total cumulative incremental savings from uncommitted programs are estimated to range from 10,658 GWh and 4,034 MW of peak demand in the Low Goals Case scenario to 14,374 GWh and 6,484 MW of peak demand in the High Goals Case scenario. These levels of incremental uncommitted energy savings are equivalent to roughly 50% to 70% of the total growth in sales and 75% to 125% of the total in peak demand across the three IOU service territories as estimated in the 2009 IEPR forecast between 2012 and 2020.

Table ES-3 and Table ES-4 also summarize the composition of incremental uncommitted savings in each scenario. As Table ES-3 shows, expanded IOU programs account for the largest share of estimated incremental uncommitted energy savings across all three Goals Cases (42%-58%). In the Low Goals Case, savings from the AB 1109 lighting standards also account for a large share of total incremental uncommitted energy savings (34%), whereas savings from the BBEES initiatives for ZNE new homes and building accounts for large shares of total incremental uncommitted energy savings in the Mid and High Goals Cases (18%-21%).

Table ES-3: Summary of Incremental Uncommitted Energy Savings (GWh) across All Goals Cases

	2013	2014	2015	2016	2017	2018	2019	2020
Low Goals Case								
IOU programs	642	1,258	1,853	2,376	2,920	3,431	3,940	4,448
AB 1109 lighting standards	740	785	645	1,220	2,213	3,224	3,653	3,602
Title 24 & Fed Standards	28	75	143	261	380	516	656	798
BBEES	163	333	549	776	1,013	1,267	1,533	1,809
Total GWh	1,573	2,452	3,191	4,632	6,526	8,439	9,782	10,658
Mid Goals Case								
IOU programs	1,050	2,055	3,017	3,847	4,716	5,521	6,325	7,126
AB 1109 lighting standards	345	302	163	430	941	1,469	1,678	1,628
Title 24 & Fed Standards	55	133	254	437	624	844	1,071	1,304
BBEES	194	397	655	926	1,209	1,516	1,835	2,167
Total GWh	1,644	2,888	4,089	5,640	7,490	9,350	10,909	12,225
High Goals Case								
IOU programs	1,050	2,055	3,017	3,847	4,716	5,521	6,325	7,126
AB 1109 lighting standards	514	509	369	768	1,486	2,220	2,524	2,473
Title 24 & Fed Standards	79	187	356	606	864	1,168	1,482	1,805
BBEES	266	544	899	1,271	1,659	2,078	2,515	2,970
Total GWh	1,910	3,296	4,642	6,492	8,724	10,988	12,845	14,374

In contrast to the energy savings results, Table ES-4 shows that savings from the BBEES initiatives for ZNE new homes and buildings account for the largest share of total incremental uncommitted peak demand savings in all three Goals Cases (38%-43%). Expanded IOU programs account for the next largest share of total incremental uncommitted peak demand savings (32%-39%). Savings from the AB 1109 lighting standards, which contribute a significant share of incremental energy savings, account for only a relatively small share of total incremental uncommitted peak demand savings (4%-12%) due to the low levels of coincidence between lighting demand and system peak demand.

Table ES-4: Summary of Incremental Uncommitted Peak Demand Savings (MW) across All Goals Cases

	2013	2014	2015	2016	2017	2018	2019	2020
Low Goals Case								
IOU programs	189	373	554	723	895	1,063	1,230	1,396
AB 1109 lighting standards	102	110	93	172	307	445	504	498
Title 24 & Fed Standards	16	35	66	162	260	368	477	588
BBEES	132	271	455	647	849	1,073	1,308	1,552
Total MW	439	788	1,168	1,705	2,312	2,949	3,518	4,034
Mid Goals Case								
IOU programs	284	560	830	1,081	1,336	1,583	1,830	2,075
AB 1109 lighting standards	49	46	29	67	137	210	240	234
Title 24 & Fed Standards	36	76	143	294	448	623	803	987
BBEES	175	358	602	857	1,123	1,421	1,732	2,056
Total MW	544	1,039	1,604	2,298	3,045	3,839	4,605	5,352
High Goals Case								
IOU programs	284	560	830	1,081	1,336	1,583	1,830	2,075
AB 1109 lighting standards	72	74	57	112	211	312	355	349
Title 24 & Fed Standards	43	92	173	365	560	782	1,009	1,241
BBEES	241	492	827	1,177	1,543	1,951	2,377	2,820
Total MW	640	1,217	1,887	2,735	3,651	4,629	5,570	6,484

Table ES-3 and Table ES-4 also summarize the estimated trends of cumulative incremental uncommitted energy and peak demand savings over time. As both tables show, estimated savings from expanded IOU programs and future revisions to Title 24 and federal appliances standards grow fairly steadily over time. Indeed, savings from IOU programs grow more slowly towards the end of the period reflecting market saturation effects for some key measures, as well as interactions with the AB 1109 lighting standards that effectively eliminate CFL measures from utility program offerings by 2018. Savings from the AB 1109 lighting standards follow a slight “S” shape over time, with cumulative savings being fairly flat through 2016 and then increasing significantly through first two years of the new standards starting in 2018. In contrast to the temporal trends for IOU programs and new codes and standards, savings from the BBEES initiatives grow at increasingly higher rates over the entire uncommitted program period, reflecting steadily higher penetration rates of ZNE homes and buildings within the new construction segment, as specified in the targets established by the CPUC.

As with any study of this nature, there are inherent uncertainties in trying to reasonably predict outcomes from future actions. This particular study also faced the unique challenge of trying to interact the inputs and outputs from two different modeling platforms in a way that avoided systematic bias and ensured a reasonable level of internal consistency. Given the time and resources available for this effort, however, identifying and reconciling all of the differences between the Energy Commission’s 2009 IEPR forecast and the 2008 CPUC Goals Study was determined early on to be an unreasonable expectation and beyond the scope of this study. Rather, we focused our analytic efforts and priorities on identifying and reconciling as many of the most important differences in

key inputs, methodologies, and assumptions as possible within the project schedule. Specifically, our efforts focused on the following activities:

- 1) Reconciling key differences in baseline end-use characterizations (e.g. UECs and saturations) and adopting common forecasts of key energy service demand drivers (e.g. housing counts and commercial floor stock)
- 2) Framing cumulative savings using a common base year
- 3) Expressing savings in common metrics
- 4) Identifying areas of duplication and contradiction across the two forecasts and, where possible, developing methods to address such them

Despite these efforts, however, some differences do remain and therefore introduce an unknown level of overall uncertainty in the results. Quantifying the magnitude of all of these remaining uncertainties was not possible within the time and resource constraints of the current study. However, based on the knowledge gained over the course of this study and the collective professional judgment of the study team, we consider the five most important analytic caveats and uncertainties embedded in the current analysis to be:

- 1) Differences in assumptions about future trends in electricity prices which results, in principle, in different levels of naturally-occurring adoptions and other forms of price-sensitive customer behavior between the 2009 IEPR forecast and the 2008 Itron potential update study
- 2) Differences in committed savings estimates stemming from differences in the incentive levels assumed for IOU programs in the 2009 IEPR forecast and the 2008 Itron potential update study
- 3) Uncertainty in the year-to-year savings trends associated with implementation of the AB 1109 lighting standards
- 4) Uncertainty in the decay rate of savings from IOU programs (as currently reflected in the 2009 IEPR forecast) and the sensitivity of our incremental uncommitted savings estimates to the decision to consider the replacement of decayed savings as associated with committed programs rather than uncommitted programs, per CPUC policy rules
- 5) Uncertainty in the magnitude of future savings from the BBEES initiatives, particularly with respect to the likelihood of meeting the BBEES targets for ZNE new homes and commercial buildings

1

Introduction

This chapter briefly reviews and defines the objectives of this study and then provides an overview of Itron’s 2008 CPUC Goals Study, which serves as the primary starting point for the analysis conducted in this study. As part of this overview, we provide a brief summary of the SESAT modeling framework, the primary data sources, and the savings scenarios developed for the 2008 CPUC Goals Study.

1.1 Study Objectives

The primary objective of this study was to produce quantitative estimates of the electric energy and coincident peak demand savings from the “uncommitted” programmatic activities and delivery mechanisms included in Itron’s 2008 CPUC Goals Study that are incremental to those already embedded in the Energy Commission’s 2009 IEPR demand forecast. In order to accomplish this, the Energy Commission and the CPUC requested that Itron use the same modeling framework and scenarios from the 2008 CPUC Goals Study that were used to inform the interim savings goals for 2012 through 2020 adopted by the CPUC in D.08-07-047. To help frame the quantitative analysis presented here, the study uses the following definitions for the key quantities and terms of interest.

- *Committed programs* – current delivery mechanisms that exist and have been fully authorized and funded by the associated regulatory agency
- *Committed program period* – the time period through which committed programs are authorized and savings from those committed programs accumulate accordingly, specifically 2008 through 2012
- *Uncommitted programs* – future delivery mechanisms that have not been fully developed, authorized, and/or funded by the associated program administrator or regulatory agency as described and assessed in Itron’s 2008 CPUC Goals Study
- *Uncommitted program period* – the time period through which uncommitted programs are assumed to be implemented and savings from those uncommitted programs accumulate accordingly, specifically 2013 to 2020
- *Incremental uncommitted program savings* – cumulative savings from uncommitted programs (in both energy and peak demand terms) that are incremental to those embedded in the 2009 IEPR demand forecast

With these definitions in mind, the next section provides a brief summary of the Itron 2008 CPUC Goals Study, including an overview of the modeling approach, data sources, policy scenarios, and goals scenarios that were developed for that study.

1.2 Overview of Itron 2008 CPUC Goals Study

As part of its work assisting the Energy Division (ED) in updating the energy efficiency savings goals for 2012 and beyond, Itron conducted a set of scenario analyses estimating potential savings from a variety of future IOU, state, and federal programs and activities. The primary objective of these scenario analyses was to provide a comprehensive quantitative and qualitative assessment of energy savings potential from a variety of perspectives in order to help the CPUC frame and choose energy efficiency goals in a way that best meets the CPUC's policy objectives.

The 2008 Itron Potential Update Study

One of the primary objectives in conducting the Goals Study was to leverage, to the furthest extent possible, the detailed data, analysis, and results of Itron's 2008 *California Energy Efficiency Potential Study*.³ This study, referred to here as the 2008 Itron potential update study, was funded by California's four IOUs with the primary objective of forecasting the short-term (defined as 2016) and mid-term (defined as 2026) gross and net achievable market potential resulting from the installation of energy efficiency measures funded through publicly funded energy efficiency programs.

The 2008 Itron potential update study incorporated the latest estimates of baseline end-use equipment ownership and end-use load profiles, along with the latest estimates of efficiency measure costs, savings, and saturation across the service territories of California's four IOUs in order to assess the cost-effectiveness (from both a utility and customer perspective) of over 300 energy efficiency measures commercially available in California. This information was then used to forecast customer adoption of energy efficiency measures under different scenarios of program funding and incentive levels. The results of these forecasts produced estimates of the market potential that could be achieved through voluntary, incentive-based IOU efficiency programs through 2016 and 2026.

An important modeling assumption embedded in the results of the 2008 Itron potential update study is that there are no significant changes in program design and delivery going forward. Since goal-setting is in itself a policy choice, analysis to support goal-setting requires the assessment of how the energy efficiency resource – both from the perspective of the IOUs and society at large – could be affected by different policy choices and drivers that currently fall outside of the analytical framework of Itron's potential forecasting model ASSET and other bottom-up forecasting models. To this end, the approach developed for the Goals Study built upon, but was not limited to, the results of the 2008 Itron potential update study. Specifically, we developed a spreadsheet modeling tool that used the results of the 2008 Itron potential update study as the primary starting points for exploring alternative policy scenarios. Below, we describe the analytic framework, key equations, inputs, and caveats of this modeling approach.

³ The 2008 Itron potential update study is available at <http://www.calmac.org>.

Overview of the Scenario-Based Energy Savings Assessment Tool

The primary purpose of the spreadsheet tool developed by Itron, referred to as the Scenario-based Energy Savings Assessment Tool (SESAT), is to allow exploration of aspects of energy use and efficiency potential that are relevant to policymaking but currently fall outside of the analytic frameworks of bottom-up potential models, including Itron's own ASSET forecasting model. Specifically, we designed SESAT to introduce the following dimensions into the analysis of efficiency potential for goal-setting:

- 1) Interaction and comparison of the impacts of different sets of assumptions (i.e. scenario analysis) in a systematic, transparent, and internally-consistent fashion;
- 2) Explicit treatment of uncertainty (i.e. ranges rather than point estimates);
- 3) Exploration of the impact of alternative baseline assumptions (e.g. relative increases or decreases in energy service demand); and
- 4) Assessment of achievable potential that falls outside of the "voluntary utility program" framework (e.g. building codes, appliance standards, and other policy initiatives).

Another important aspect of SESAT is that the inputs, outputs, and principle calculations are organized at the end-use level (see Table 1-1 below). We chose this level of analysis in order to explicitly frame the analysis in terms of end-use market segments for which electricity and natural gas consumption are reasonably well understood. This approach avoids the uncertainties associated with forecasting measure-specific characteristics over time, while maintaining a level of technology detail that is meaningful and relevant for policy and planning.

In the discussion that follows, we present the principle equations and relationships that comprise the analytic framework used in the scenario analyses conducted for this study.

Table 1-1: Summary of SESAT Analysis Segmentation

Segment Name	Segment Definition		
IOU service territory	<ul style="list-style-type: none"> • PG&E (elec & gas) • SCE (elec only) • SDG&E (elec & gas) • SoCal Gas (gas only) 		
Sector	<ul style="list-style-type: none"> • Residential 	<ul style="list-style-type: none"> • Commercial 	<ul style="list-style-type: none"> • Industrial
Building type	<ul style="list-style-type: none"> • Single-family dwelling • Multi-family dwelling 	<ul style="list-style-type: none"> • College • Food Store • Health • Large Office • Lodging • Miscellaneous • Refrigerated Warehouse • Restaurant • Retail • School • Small Office • Unrefrigerated Warehouse 	<ul style="list-style-type: none"> • Manufacturing • Agriculture* • Construction* • Mining* • Transportation, Communications, & Utilities (TCU)*
Building vintage	<ul style="list-style-type: none"> • Existing construction • New construction 	<ul style="list-style-type: none"> • Existing construction • New construction 	<ul style="list-style-type: none"> • Existing construction
End use	<ul style="list-style-type: none"> • Space Cooling • Space Heating • Furnace Fan • Water Heating • Cooking • Refrigerator • Freezer • Clothes Dryer • Lighting • Pool Pump • Miscellaneous 	<ul style="list-style-type: none"> • Space Cooling • Space Heating • Ventilation • Water Heating • Commercial Cooking • Refrigeration • Exterior Lighting • Interior Lighting • Office Equipment • Miscellaneous 	<ul style="list-style-type: none"> • Process Heating • Process Cooling • Pumps • Fans • Compressed Air • Process Drives • Lighting • Refrigeration • Other

* End-use energy use and savings potential were not analyzed for these industrial subsectors.

In SESAT, total energy use is calculated in a bottom-up fashion as the product of end-use energy intensities (e.g. kWh/household or kWh/ft²), end-use equipment saturations, and the number of households (residential) or floor area (commercial) by building type. End-use contributions to coincident peak demand are calculated by multiplying end-use energy consumption estimates by peak-to-energy ratios derived from end-use load shape data. The primary calculations for total residential, commercial, and industrial energy use and coincident peak demand are shown below:

$$\text{Total residential energy use} = \sum_{ij} UEC_{ij} * SAT_{ij} * HH_j$$

$$\text{Total residential coincident peak demand} = \sum_{ij} UEC_{ij} * SAT_{ij} * HH_j * PeakFactor_{ij}$$

$$\text{Total commercial energy use} = \sum_{ik} EUI_{ik} * SAT_{ik} * FloorArea_k$$

$$\text{Total commercial coincident peak demand} = \sum_{ik} EUI_{ik} * SAT_{ik} * FloorArea_k * PeakFactor_{ik}$$

$$\text{Total industrial energy use} = \sum_{il} kWh_{il}$$

$$\text{Total industrial coincident peak demand} = \sum_{il} kWh_{il} * PeakFactor_{il}$$

where: i = end use

j = residential building type

k = commercial building type

l = industrial subsector

UEC = unit energy consumption by end use i in building type j (kWh/household)

SAT = end-use saturation (%)

HH = total number of building type j

EUI = unit energy intensity by end use i in building type k (kWh/ft²)

$FloorArea$ = floor area of building type k (ft²)

kWh = annual consumption by end use i in subsector l (kWh)

$PeakFactor$ = peak-to-energy ratio by end use i in building type j , k , or l (MW/GWh)

The baseline values for end-use saturations, UECs, EUIs, and end-use load shapes by IOU and building type were derived from the same key sources that were used in both the 2006 and 2008 Itron potential studies, namely the *California Statewide Residential Appliance Saturation Study* (CEC, 2004), the *California Commercial Building End-Use Survey* (CEC, 2006), and industrial end-use estimates developed as part of the *California Industrial Existing Construction Energy Efficiency Potential Study* (KEMA, 2006).⁴ Similarly, the baseline values for residential building stock and commercial floor stock by IOU and building type were derived from the same source used for the 2008 Itron potential update study, namely the estimates developed by Energy Commission staff for use in the *California Energy Demand 2008-2018, Staff Revised Forecast* (CEC, 2007a). The bottom-up estimates of total electricity consumption and peak electricity demand were then calibrated to the respective base-year values published by the Energy Commission (*ibid*).

To allow explicit analysis of energy efficiency potential, we further disaggregated the UEC and EUI variables so that the impact of changes in technical efficiency due to the installation of efficiency measures can be examined and tracked separately from impacts

⁴ The residential end-use load shapes used in the Goals Study and the 2008 Itron potential update study were based on the results of comprehensive building simulations using Itron's proprietary SitePro software, which uses DOE-2 as the primary simulation engine and incorporates results from numerous end-use metering studies conducted in the 1990s.

due to changes in energy service demand (e.g. hours of use). To do this, we introduced two dimensionless factors that represent the technical efficiency and energy service demand components, respectively, of end-use energy consumption into the principle energy use identity. This relationship is shown below:

$$UEC_{ijy} = UEC_{ijbase} * EffAdj_{ijy} * UseAdj_{ijy}$$

where: UEC_{ijy} = unit energy consumption for end-use i in building type j in year y
 UEC_{ijbase} = unit energy consumption for end-use i in building type j in the base year
 $EffAdj_{ijy}$ = technical efficiency for end-use i in year y relative to technical efficiency in base year (defined as 1.0 in the reference scenario)
 $UseAdj_{ijy}$ = energy service demand for end-use i in year y relative to energy service demand in base year (defined as 1.0 in the reference scenario)

In this analytic framework, any of the variables described above could be treated as parameters in a scenario analysis. For purposes of the Goals Study, we chose to focus our scenario analysis on the two variables with the most forecast uncertainty and the most relevance to establishing energy savings goals - the technical efficiency and energy service demand factors.

It is important to note that the analytic framework described above was not designed to estimate the cost-effectiveness of efficiency measures from a customer or utility perspective, nor was it designed to explicitly model the voluntary adoption of efficiency measures as is done in Itron's ASSET model. Indeed, the analytic framework in SESAT was designed to build upon the detailed cost-effectiveness assessments and adoption modeling produced by ASSET in such a way as to enable other, policy-driven "what if" scenarios to be layered on top of the latest ASSET results in an internally consistent manner. The rigor of the scenario forecasts produced in SESAT therefore depends entirely on the rigor applied to the development of the scenario inputs. As such, the bulk of our analytic efforts were dedicated to careful development of the scenario inputs. Below, we provide a brief overview of the policy scenarios that were developed for the Goals Study, as well as the set of three Goals "straw man" cases that were derived from them.

Policy Scenarios

The policy scenarios analyzed in the Goals Study were developed jointly by Itron and staff of the CPUC's Energy Division (ED). In the early stages of this task, Itron developed a memo for ED staff that described a variety of possible alternative scenarios for consideration in the goal-setting analysis. ED staff provided comments on the initial list of proposed alternative scenarios and assigned highest priority to three sets of policy-driven scenarios – the impacts of the CPUC's Big Bold Energy Efficiency Strategies (BBEES), the impacts of future codes & standards revisions, and the impacts of programs aimed at increasing building code compliance. These policy scenarios were then developed in more depth by Itron with consultation from ED staff. By the end of the process, the codes and standards scenario was split into two distinct scenarios – one that estimated the impacts of future codes and standards from the perspective of the IOUs (i.e. impacts on the IOU program portfolios), and one that estimated the impacts of future

codes and standards from the perspective of total savings to society. Additionally, the code compliance scenario was redefined as one of the components of the larger future codes and standards scenario (IOU perspective). The final scenarios selected to be developed and analyzed are summarized in Table 1-2 below.⁵

Table 1-2: Summary of Scenarios Developed and Analyzed for Goal-setting Analysis

Scenario Category	Scenario Components
Theoretical potential benchmarks	<ul style="list-style-type: none"> • Technical potential • Economic potential (TRC\geq1)
IOU program potential	<ul style="list-style-type: none"> • Full gross market potential (TRC\geq0.85) • Base gross market potential (TRC\geq0.85) • Naturally-occurring potential
Big Bold Energy Efficiency Strategies (BBEES) initiatives	<ul style="list-style-type: none"> • Small HVAC initiative • Residential new construction initiative • Commercial new construction initiative
Future codes & standards (IOU perspective)	<ul style="list-style-type: none"> • AB 1109 lighting standards • Strengthening of Title 24 • Code compliance programs
Future codes & standards (societal perspective)	<ul style="list-style-type: none"> • AB 1109 lighting standards • Strengthening of Title 24 • Revision of federal appliance standards

It is important to note that, with the exception of the scenarios estimating the impacts from the BBEES initiatives, all of the scenarios developed and analyzed for this study are based on the current suite of energy efficiency technologies and measures that are currently commercially available in California. Specifically, with the exception of the BBEES scenario, the scenario results produced in the Goals Study do not include any comprehensive assessment of or assumptions about emerging technologies.⁶ Similarly, the scenario results produced in the Goals Study do not attempt to estimate the impact of drastic changes in the current policy and regulatory regimes in California, e.g. a cap-and-trade market for greenhouse gas emissions stemming from implementation of AB32 that might affect rates, avoided costs, and technology markets. Including these two dimensions in our forecasts would increase technical potential (from emerging technologies), economic potential (from higher avoided costs, higher rates, and lower technology costs), and achievable potential (from stronger economic incentives to

⁵ The assumptions and data sources used to develop each of the inputs used in each of these scenarios are described and documented in detail in Chapter 3 of Itron’s 2008 CPUC Goals Study.

⁶ Itron’s 2008 potential update study includes analysis of a limited number of emerging technologies, including residential and commercial solar water heating, LED reflector lighting, night-time economizers, residential cool roofs, and condensing boilers. For detailed review of the emerging technologies that were analyzed in Itron’s 2008 update study, see measure descriptions labeled “CET” in Appendix A of the 2008 Itron potential update study report.

customers). However, the magnitude of these increases depends on a variety of factors that are currently unknown and/or highly uncertain, e.g. the market price of carbon emissions, innovation rates in current emerging technologies, and public and private investment in efficiency R&D.

Goals Straw Man Cases

After developing the individual policy scenarios, we then constructed three straw man cases in an attempt to produce a range of outcomes from different sets of policy choices. Our intent was to construct a series of straw man cases with internally-consistent policy criteria in order to provoke more discussion about the implications of these key choices on the likely level of savings that can be achieved. These estimates take into account the interactive effects between assumed levels of utility program efforts and the adoption of standards which in most cases reduce the level of savings attributed to the utility programs.

Constructing these straw man cases requires making choices related to the levels of savings expected from each savings mechanism. These choices are displayed in Table 1-3 below using subscripts to identify the low (_{low}), mid (_{mid}) and high (_{high}) savings estimates developed for each respective savings mechanism.

Table 1-3: Composition of Straw Man Cases by Savings Mechanism and Policy Choice

	Low	Mid	High
IOU program funding level?	Base _{mid}	Full _{mid}	Full _{mid}
Gross or net savings?	Gross	Gross	Gross
AB 1109 lighting standards?	Yes _{low}	Yes _{low}	Yes _{mid}
Title 24 & appliance standards?	Yes _{low}	Yes _{mid}	Yes _{high}
Code compliance programs?	No	Yes _{mid}	Yes _{high}
BBEES initiatives?	Yes _{low}	Yes _{mid}	Yes _{high}

The logic used to construct each of these straw man cases is described below.⁷

The Low Case

The Low Case was informed by the rebate levels and program designs used in the IOU program portfolios in 2004-2005 and early 2006, i.e. the base market potential scenario from the 2008 Itron update study. Note, however, that this level of savings from IOU programs is less than early reports of ex-ante savings by the IOUs for 2006 and 2007. The lower range of estimated savings from the AB 1109 lighting standards was selected to represent the possibility that compliance with lighting standards proves to be

⁷ The detailed results and policy implications of each of these straw man cases are presented and discussed in Chapter 6 in Itron's 2008 CPUC Goals Study.

challenging and that significant savings may be difficult to achieve for some lighting applications. The low range of estimated savings from codes and appliance standards was selected to represent the possibility that revisions to Title 24 will be modest going forward and that realized unit savings from revised federal appliance standards will be similarly modest. The lower range of estimated savings for the BBEES initiative was selected to represent the possibility that only modest progress will be made towards achieving the BBEES milestones over the forecast period. Finally, in line with modest expectations for Title 24 revisions, the Low Case assumes no new savings from programs designed to increase building code compliance.

The Mid Case

The Mid Case was constructed to reflect a more aggressive portfolio of IOU programs and rebate levels as well as higher but still tempered expectations for savings from codes and standards and market transformation efforts. IOU programs are assumed to offer aggressive rebates at or near 100% incremental measures costs, as assumed in the full market potential scenario in the 2008 Itron update study. The mid range of estimated savings from building codes and appliance standards was selected to represent the outlook that revisions to Title 24 and federal appliance standards will be more substantial than in the Low Case and that additional savings are captured through new code compliance programs. Similarly, the mid range of estimated savings from the BBEES initiatives was selected to represent significantly more progress towards achieving the BBEES milestones than is assumed in the Low Case. Importantly, however, the Mid Case retains a more tempered outlook for savings from the AB 1109 lighting standards, reflecting the expectation that compliance with the new lighting standards proves to be challenging and that significant savings may be difficult to achieve for some lighting applications.

The High Case

The High Case was constructed to reflect an aggressive portfolio of IOU programs and a highly coordinated and successful new codes and standards and market transformation efforts. IOU programs are assumed to offer aggressive rebates at or near 100% incremental measures costs, as assumed in the full market potential scenario in the 2008 Itron update study. The higher range of estimated savings for the full market scenario was not selected for the High Case because use of the full market scenario itself already pushes IOU programs to an approach that is likely to be extremely restrictive from a program design perspective and extremely challenging from a management perspective (e.g. having to mitigate unintended perverse outcomes such as measure price increases and consumer neglect of free products). With respect to codes and standards, the High Case uses the higher range of estimated savings for Title 24, federal appliance standards, and the AB 1109 lighting standards. In this sense, the High Case reflects the possibility of a highly aggressive and successful implementation of new codes and standards throughout the forecast period. Similarly, the higher range of estimated savings from the BBEES initiatives was selected in the High Case to represent the successful implementation of the BBEES initiatives during the forecast period such that all of the BBEES milestones are fully achieved.

Based on the three straw man cases summarized above, we then produced forecasts of energy and peak demand savings associated with each by end use, sector, and delivery mechanism over the 12-year forecast period defined for that study. We also provided an assessment of the implications of each straw man case across various policy-relevant factors such as program design flexibility, end-use diversity, rate impacts, and uncertainty.⁸

Following completion of Itron's 2008 CPUC Goals Study, the CPUC chose to adopt the results of the Mid Case as the basis for interim energy efficiency savings goals for 2012 through 2020 (D.08-07-047) and adopted the "total market gross" (TMG) savings metric that effectively expanded the scope of the CPUC's energy savings goals from only IOU programs to all delivery mechanisms that produce energy savings in a given service territory. A complete history of past and current CPUC energy efficiency savings goals, including the CPUC's definition and justification for the TMG goal structure and how the Mid Case results and resulting interim goals have since been modified, is provided in Attachment B.

The remainder of this report is organized as follows:

- Section 2 describes the overall approach developed and used for this study
- Section 3 presents the details of how each of the scenarios were developed
- Section 4 presents the results of the incremental uncommitted savings forecast and discusses key caveats and uncertainties and associated with these forecasts
- Section 5 provides the full set of baseline inputs used in this study
- Section 6 provides the full set of savings inputs used in this study
- Sections 7, 8, and 9 provide tables of the IOU-specific results for PG&E, SCE, and SDG&E, respectively

⁸ See Chapter 6 of Itron's 2008 CPUC Goals Study.

2

Study Approach

This section describes the overall approach developed and used in this study to estimate incremental uncommitted savings. We first review the analytic scope and boundaries defined for the study. We then describe the process used to integrate and reconcile inputs and results from the Energy Commission's and Itron's respective forecasting models in order to produce forecasts of incremental uncommitted savings using the SESAT modeling framework.

2.1 Define Analytic Scope and Boundaries

The first step in the study approach was to define a common base year. This step was required and indeed critical since the Energy Commission's demand forecasting model uses a very different base year or starting point for estimating energy savings (1975) than what was used in Itron's 2008 potential update study and 2008 CPUC Goals study (2006). For this study, the study team defined 2006 as the base year. This base year serves as the starting point for estimating cumulative savings from committed programs and as the "calibration year" for reconciling Itron's bottom-up, end-use load profiles with the Energy Commission's estimates of actual total sales and peak demand.

Apart from defining the common base year, it was also necessary to define two other key analytic boundaries for this study – the geographic scope and the programmatic scope of the uncommitted program savings forecast. The geographic scope of this study was limited to the service territories of California's three investor-owned electric utilities (IOUs) – Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E). This geographic scope (rather than a planning area or statewide scope) was chosen to maintain consistency with the geographic scope of the CPUC's energy savings goals and long-term procurement planning.

Defining the programmatic scope of the uncommitted program savings forecast was a more deliberate process and first required carefully assessing the scope of the delivery mechanisms modeled in the Energy Commission's 2009 IEPR demand forecast and Itron's 2008 CPUC Goals study over the two specific timeframes of interest for this study – the committed program period and the uncommitted program period. Table 2-1 shows the findings of this assessment, which was conducted by the study team in close collaboration with Energy Commission staff.

Table 2-1: Assessment of all Delivery Mechanisms Modeled in the 2009 IEPR Demand Forecast and the 2008 CPUC Goals Study

	Committed Program Period	Uncommitted Program Period
2009 IEPR demand forecast	IOU programs	-
	Title 24 triggered retrofits in existing commercial buildings (primarily lighting)	-
	-	“Additional residential lighting savings” from AB1109 lighting standards
	Residential price effects	Residential price effects
	Commercial price effects	Commercial price effects
2008 CPUC Goals study	IOU programs	IOU programs
	Revisions to Title 24	Revisions to Title 24
	-	Revisions to federal appliance standards
	Implementation of AB1109 lighting standards	Implementation of AB1109 lighting standards
	Implementation of CPUC’s Big Bold Energy Efficiency Strategies (BBEES)	Implementation of CPUC’s Big Bold Energy Efficiency Strategies (BBEES)

From the comparison shown in Table 2-1, the majority of the delivery mechanisms modeled in the 2008 CPUC Goals study over the uncommitted program period were not included in any way in the 2009 IEPR demand forecast. Specifically, IOU programs operating from 2013 forward, future revisions to Title 24 building codes, future revisions to federal appliance standards, and implementation of the BBEES initiatives were not modeled in the 2009 IEPR demand forecast and potential savings from those programs are thus considered to be strictly “incremental” to the savings embedded in the Energy Commission’s forecast.

However, Table 2-1 also shows that there are three areas where the uncommitted programs modeled in the 2008 CPUC Goals study appear to overlap, and in principle duplicate, savings from the delivery mechanisms modeled in the 2009 IEPR demand forecast – savings from AB1109 lighting standards, residential price effects, and commercial price effects. For these three areas, Itron again worked closely with Energy Commission staff to develop a detailed understanding of exactly how these savings were modeled by the Energy Commission and what those savings were meant to represent.

In the case of savings from AB1109 lighting standards, the 2008 CPUC Goals study assumes steady progress towards a 50% reduction in residential lighting intensity (measured as annual lighting consumption per household) and a 25% reduction in commercial lighting intensity. In contrast, the 2009 IEPR demand forecast assumes only that residential lighting intensities hold steady after 2012, i.e. that savings from IOU-administered lighting programs do not decay from 2013 forward due to new residential lighting standards stemming from AB1109. Itron and Energy Commission staff agreed that the Energy Commission’s estimates of savings from lighting standards were by

definition a subset of those quantified in the 2008 CPUC Goals study. Furthermore, Itron and Energy Commission staff agreed that the Energy Commission’s estimates of savings from lighting standards should thus be decremented from those quantified in the 2008 CPUC Goals study in order to determine the “incremental” uncommitted savings from AB1109 lighting standards.

In the case of residential price effects, Itron and Energy Commission staff determined that this term (as modeled by the Energy Commission) duplicated some, but not all, of the “naturally-occurring” savings in the residential sector estimated by Itron.⁹ In order to avoid double-counting these savings, therefore, Itron and Energy Commission staff agreed that the Energy Commission’s estimates of residential price effects should be decremented from Itron’s estimates of “naturally-occurring” savings in the residential sector for purposes of estimating “incremental” uncommitted savings.

In the case of commercial price effects, Itron and Energy Commission staff determined that this term duplicated, in principle, *all* of the “naturally-occurring” savings estimated by Itron in the commercial sector. As such, Itron and Energy Commission staff agreed that, for purposes of this study, “naturally-occurring” savings in the commercial sector (as quantified in the 2008 CPUC Goals study) *would not* be considered as “incremental” uncommitted savings relative to those embedded in the 2009 IEPR forecast.

Given the assessments and the methodological decisions summarized above, Table 2-2 summarizes the final scope of the specific uncommitted programs for which Itron then developed a forecast of “incremental” savings from 2013 through 2020.

Table 2-2: Final Programmatic Scope of Incremental Uncommitted Savings Analysis (2013-2020)

Delivery mechanism:	Adjustments:
IOU residential programs	decremented by CEC’s residential price effects
IOU commercial programs	naturally-occurring adoptions assumed to be already embedded in CEC forecast; incremental savings from net IOU program savings only
IOU industrial programs	no adjustments
Implementation of AB1109	decremented by CEC’s “additional residential lighting savings”
Future revisions to Title 24	no adjustments
Future revisions to federal appliance standards	no adjustments
Implementation of BBES initiatives	no adjustments

The detailed assumptions reflected in each of the uncommitted programs listed above are presented and discussed in detail in Chapter 3. In Chapter 4, we present and describe

⁹ The basis for Itron’s estimates of “naturally-occurring” savings is described in more detail in section 3.1 of this report. The approach used by the CEC to estimate residential and commercial price effects is described in more detail in section 4.5.

how “incremental” savings from these uncommitted programs were specifically calculated.

2.2 Baseline Calibration

Once the analytic scope and boundaries for this study were defined, the next key step in the approach was to calibrate the bottom-up, end-use energy and peak demand baselines with the Energy Commission’s estimates of actual total sales in the base year (2006) and revise the forecasts of key energy service demand drivers (housing stock, commercial floor stock, and industrial load growth) assumed in the 2008 CPUC Goals study with those assumed in the 2009 IEPR demand forecast.¹⁰ Table 2-3 presents a comparison of service demand drivers used in Itron’s 2008 CPUC Goals study and the revised values consistent with those used in the 2009 IEPR forecast. Note that while all of the revised service demand drivers are lower in 2020 compared to what was assumed in the 2008 CPUC Goals study, the differences are most important in the commercial and industrial sectors while those in the residential sector are insignificant.

Table 2-3: Comparison of Energy Service Demand Drivers Used in 2008 CPUC Goals Study and the Current Study (2020 Values)

Sector	units	2008 Goals Study	Current Study	difference
Residential	10e6 dwellings	11.77	11.76	-0.1%
Commercial	10e9 square feet	7.36	6.50	-13.3%
Industrial	10e6 kWh load	66.02	54.43	-21.3%

When interacted with the revised, the bottom-up, end-use energy and peak demand profiles developed for the 2008 Goals study were largely consistent with the Energy Commission’s estimates of actual total sales and system peak demand in each IOU service territory in the base year of the analysis (2006). In the case of system peak demand, is important to note that 2006 was an unusually hot summer, so for purposes of calibration, Itron and Energy Commission staff agreed to calibrate the bottom-up estimates of coincident peak demand with the Energy Commission’s forecasted system peak demand for 2009, which was based on “normal” weather year assumptions.

In order to calibrate the bottom-up sales and peak demand to within a reasonable range for purposes of this study (i.e. $\pm 5\%$), some minor revisions to certain baseline end-use variables were required, mostly in the residential sector. These revisions were informed largely through detailed comparisons of the base-year UEC and saturation assumptions that were used in the 2008 CPUC Goals study and the 2009 IEPR demand forecast, respectively. The specific changes to the end-use baseline data that were implemented during the baseline calibration process were:

- 1) revised the residential space heating and refrigeration UEC and saturation and saturation data with Energy Commission values; and

¹⁰ The housing, commercial floor stock, and industrial load forecasts used in the 2008 CPUC Goals study were derived from the values published in the CEC’s 2007 IEPR forecast.

- 2) revised the peak-to-energy ratios for all residential end uses with Energy Commission values.

These changes were made to the baseline data for all three IOUs. Additionally, we made the following revisions to the end-use baseline data for SDG&E:

- 1) revised the residential space cooling UECs and saturations with Energy Commission values; and
- 2) revised the peak-to-energy ratios for commercial interior lighting with Energy Commission values.

The final sales and coincident peak demand calibrations that reflect full set of bottom-up, end-use baseline data used in this study are shown in Table 2-4 below.

Table 2-4: Final Baseline Calibration Values by IOU Service Territory

	SESAT	CEC	difference
2006 sales (GWh)			
PG&E	83,300	84,652	-1.6%
SCE	89,900	89,366	0.6%
SDG&E	20,110	20,032	0.4%
All IOU	193,310	194,051	-0.4%
Forecasted 2009 coincident peak demand (MW)			
PG&E	18,723	18,209	2.8%
SCE	20,513	19,661	4.3%
SDG&E	4,176	4,125	1.2%
All IOU	43,412	41,994	3.4%

Final set of baseline data used in this study for each IOU service territory are provided in Section 5.

2.3 Transform CEC Savings Estimates into SESAT Inputs

The third key step in the study approach was to transform the Energy Commission’s estimates of program savings over both the committed and uncommitted program periods into quantities that could be used as inputs in the SESAT model. To do this, Itron requested and received the following data sets from Energy Commission staff:

- 1) Time series of average and marginal UECs saturations by end use, building type, and vintage for each IOU
- 2) Time series of average and marginal UECs saturations by end use, building type, vintage, and IOU with price effects artificially set to zero
- 3) Time series of GWh savings from IOU programs by end use and IOU
- 4) Time series of GWh savings from Title 24-triggered retrofits in existing commercial buildings
- 5) Time series of GWh savings from AB1109 lighting standards from 2013 forward

Providing the above data sets was not always a straightforward process for Energy Commission staff. In particular, Energy Commission staff conducted special model runs in order to isolate residential and commercial price effects and savings from Title 24-triggered retrofit events in existing commercial buildings. Furthermore, Energy Commission staff provided the original spreadsheets they used to develop their estimates of IOU program savings (including decay rate assumptions).

Once these data sets were received, all of the savings data were transformed from units of GWh savings into the savings metric used in SESAT, i.e. percent reductions in relevant base year end-use UEC. Importantly, we always used the Energy Commission's base year end-use UEC values when transforming GWh savings values into percent reductions in end-use UECs. This step was designed to ensure that the savings values from the 2009 IEPR demand forecast and the 2008 Goals study are expressed in common and comparable terms before being interacted in the SESAT modeling framework. This step was also designed to avoid systematic bias stemming from adding or subtracting results generated by multiple different modeling platforms, e.g. outcomes that exceed technical potential or result in load growth. While it is impossible to eliminate all sources of systematic bias under the time constraints of the current study, this normalization step was designed to eliminate the largest and most important sources of systematic bias. Final set of transformed energy savings values used in this study from delivery mechanisms modeled in the 2009 IEPR forecast are provided in section 6.

2.4 Estimate Incremental Uncommitted Savings

Once these steps were completed, the final step in the study approach was to re-run the SESAT model with the set of revised and additional inputs described above in order to generate comparable forecasts of energy and peak demand savings associated with the programs included in the Energy Commission's 2009 IEPR demand forecast and the Low, Mid, and High Goals scenarios. These results then formed the basis for estimating the energy and peak demand savings from uncommitted programs that are "incremental" to those already embedded in the 2009 IEPR forecast.

The results of these revised model runs and calculations leading to the final estimates of incremental uncommitted savings are presented and summarized in section 4 of this report. Before presenting the results, however, the next chapter provides a detailed overview of the specific definitions, assumptions, and input data sources used in each of the scenarios developed and analyzed in this study.

3

Scenario Definitions and Assumptions

In this section, we present a detailed overview of the definitions, assumptions, and input data sources used in each of the scenarios developed and analyzed for this study. To the extent possible, the critical assumptions in each scenario were vetted with Energy Commission and ED staff through a series of workshops and meetings at the CPUC and the Energy Commission.

In general, the quantitative assumptions used in each of the scenarios remained identical with those used in the 2008 CPUC Goals study. However, some assumptions were revised to reflect knowledge learned since the time the 2008 CPUC Goals study was conducted. Specifically, we revised the assumptions associated with the 2008 revision to Title 24 and the assumptions used to describe the impacts of the AB 1109 lighting standards.

In the case of Title 24, the original scenario of future Title 24 revisions assumed a fairly aggressive update of Title 24 becoming effective in 2008. However, the actual outcome of the 2008 Title 24 proceeding (concluded in December 2008) introduced very few significant new energy efficiency requirements, particularly in residential new construction. Additionally, the implementation date for the revised Title 24 codes was pushed out to 2010. To account for these realities, the assumptions for future Title 24 revisions used in this study were revised to exclude a significant revision in 2008. The other assumptions related to future Title 24 revisions remained unchanged from those used in the 2008 CPUC Goals study. The net impact of these changes was an overall decrease in estimated savings from future revisions to Title 24 compared to those estimated in the 2008 CPUC Goals study, with no new savings accumulating before 2012.

In the case of the AB 1109 lighting standards, the original scenario of how these standards would be implemented over time assumed steady, linear progress toward the AB 1109 targets for lighting energy use reductions between 2011 and 2020. Since the time of the 2008 Goals study, however, the Energy Commission has made specific modifications to Title 20 appliance standards to meet the requirements of AB 1109 with specific timelines. Again, to account for these realities, the assumptions used to describe the implementation of the AB 1109 lighting standards were revised to approximate the performance targets and timelines now specified in Title 20. Since these lighting standards interact with utility program offerings and program impacts, we also revised the estimated impacts of the AB 1109 lighting standards on utility lighting programs accordingly. It should be noted that these changes did not significantly impact estimated

cumulative savings from the AB 1109 lighting standards through 2020. Rather, the changes described above mostly impacted the annual savings trends forecasted for the interim years between when the new lighting standards begin to phased in (2011) and when the final standards take effect (2018).

The full set of assumptions used in each scenario analyzed for this study is described in more detail in the remainder of this chapter. First, we describe the scenarios that were based on the results of Itron’s 2008 update study and the ASSET modeling framework, i.e. achievable potential from IOU programs. We then describe the scenarios designed to estimate potential savings from implementation of the BBEES initiatives. Next, we describe the scenarios designed to estimate the potential impacts of future codes and standards from two distinct and important perspectives: 1) the perspective of the IOUs (i.e., impacts on the IOU program portfolios) and 2) the perspective of total savings to society. Finally, we describe how interactions between the various delivery mechanisms considered were modeled and provide illustrative examples of the magnitude of key interactions.

3.1 ASSET Scenarios

As discussed previously in Section 1.2, our study approach was explicitly designed to leverage the results of the 2008 Itron potential update study as the primary starting points for exploring alternative policy scenarios. In order to properly interpret and understand the results of the 2008 Itron potential update study and the related results in this study, it is important to explicitly recognize the scope of the energy efficiency measures that were assessed. Specifically, the 2008 Itron potential update study assessed the achievable market potential of IOU-administered incentive programs promoting retrofit, replace-on-burnout, and new construction measures that are currently commercially available in California and applicable to the residential, commercial, and industrial manufacturing sectors.¹¹ Itron’s 2008 potential update study also assessed the achievable market potential associated with a limited number of emerging technologies, specifically residential and commercial solar water heating, LED reflector lighting, night-time economizers, residential cool roofs, and condensing boilers.¹² In this sense, the results of the 2008 Itron potential update study reflect the achievable potential associated with the current suite of energy efficiency technologies and practices commercially available in California, with only very limited consideration of emerging technologies that are currently under development or have very small market shares.

In order to integrate the results of the 2008 Itron potential update study into the SESAT modeling framework, we aggregated the measure-level savings results from the latest ASSET analyses of technical, economic, market, and naturally-occurring potential into the end uses and segments shown in Table 1-1. We then calculated percent savings values at the end use and segment level, based on the ratio of GWh savings to baseline GWh

¹¹ As noted in Table 1-1, the 2008 Itron potential update study did not assess energy efficiency measures or opportunities in the agriculture, mining, construction, or TCU sectors.

¹² For detailed review of the emerging technologies that were analyzed in Itron’s 2008 update study, see measure descriptions labeled “CET” in Appendix A of the 2008 Itron potential update study report.

consumption. These percent savings values were then applied in SESAT as the $EffAdj_{ij}$ factors to essentially reproduce the GWh and MW savings estimated in the 2008 Itron potential update study but within the SESAT analytic framework.

Below we describe the particular ASSET analyses that were replicated in SESAT for purposes of the 2008 Goals Study and this study.

Market potential

Market potential refers to the amount of customer measure adoption and resulting savings that would occur in response to specific levels of program funding and measure incentive levels over time. Market potential takes into account a variety of factors such as participant cost-effectiveness or payback period, awareness, and willingness to adopt (which in turn depends on various market barriers such as risk perceptions, split incentives, limited rationality, and the characteristics of individual measures). Market potential is often defined as a direct subset of economic potential (i.e. measures with $TRC \geq 1$). In reality, however, some measures currently included in IOU program portfolios in California do not pass TRC, since current program rules allow such measures as long the TRC ratio for the entire portfolio greater than 1. In order to account for this dynamic but also allow for informative comparisons of market potential to economic potential (for benchmarking purposes), the market potential scenarios used in this study are “restricted” to the potential savings from measures with TRC greater than or equal to 0.85.

For this study, we leveraged the ASSET results of two market potential scenarios in particular – “full restricted” market potential and “base restricted” market potential. These two market potential scenarios differ only in the level of measure incentives assumed to be available. In the “full restricted” market potential scenario, we assume that incentives are set equal to the full incremental cost of the efficiency measure.¹³

The “base restricted” market potential scenario differs from the “full restricted” market potential scenario described above only in the level of incentives assumed to be offered. In the base restricted market potential scenario, we assume that incentive levels remain equal to the average incentives currently offered in IOU program portfolios. From this perspective, the base market potential scenario in some ways represents a “business-as-usual” scenario in this study – continuation of current programs at current incentive levels, assuming current forecasts of avoided costs and natural gas prices, and assuming no significant changes in building codes, appliance standards, or other efficiency-related policies going forward. However, this characterization is not strictly true since IOUs currently offer rebates for a host of measures that individually do not currently pass TRC and are thus not included in our base restricted market forecast.

¹³ For a conversion or retrofit measure, the incremental cost is the full installation cost of the measure including the labor cost to install it. For a replace-on-burnout measure, the incremental cost is the difference in equipment cost from the base measure to the high efficiency measure. Labor installation costs are not included in incremental costs for replace-on-burnout measures.

Naturally-occurring potential

Both the full restricted and base restricted market potential scenarios used in this study include potential savings from customer adoptions that may or may not have resulted directly from utility programs. In this respect, the market potential scenarios produce estimates of “gross” potential energy savings from voluntary IOU programs that include savings from natural market forces (i.e., “free-riders” a term originally meant to convey adoptions that would occur without the influence of any market interventions ever), participant and non-participant spillover (i.e., incremental adoptions attributable to programs that occur outside of direct program participation), program-induced energy efficiency market effects (i.e., permanent changes in markets that lead to self-sustaining increases in adoption of energy efficiency), and other dynamics that result in measure adoptions that would have occurred in the absence of program interventions (e.g., the effect of structural shocks such as the California energy crisis of 2000-2002).

As part of the 2008 Itron potential update study, Itron also produced estimates of “naturally-occurring” market potential to complement estimates of gross market potential. Naturally-occurring potential is defined as the potential savings from customer adoptions that would occur in the absence of *further* utility programs from the outset of the forecast period. Naturally-occurring potential thus includes savings from measure adoptions due to free-riders, participant and non-participant spillover, and longer-term market effects. The difference between “gross” market potential and naturally-occurring market potential therefore yields an estimate of “net” market potential from IOU programs.

In the ASSET modeling framework, naturally-occurring adoptions are driven by the cost-benefit characteristics and relative level of “market barriers” associated with the specific energy efficiency measure in question.¹⁴ In this framework, low market barriers and short payback periods, for example, lead to significant levels of naturally-occurring adoptions, whereas high market barriers and long payback periods lead to low levels of naturally-occurring adoptions. While the cost-benefit characteristics of energy efficiency measures are largely related to the incremental costs and performance characteristics of the specific technologies or practices, payback periods and other cost-benefit metrics also reflect the price of electricity assumed in the analysis in order to value the energy savings. In this respect, naturally-occurring adoptions as modeled in ASSET can also driven, in part, by the level and trajectory assumed for future electricity prices.

In the 2008 Itron potential update study, electricity prices were assumed to constant, in real terms, over the forecast period. Thus the results for naturally-occurring potential reflect adoptions driven only by the current cost-benefit characteristics of each energy efficiency measure analyzed and do not reflect adoptions driven by increases in electricity prices over time.

¹⁴ Examples of market barriers to energy efficiency are asymmetric information, split incentives, transaction costs, and bounded rationality. For more detailed information and discussion of market barriers, see Eto, Prael, and Schlegel (1997), Golove and Eto (1996), DeCanio (2000), and DeCanio (1998).

3.2 Big Bold Energy Efficiency Strategies

The first set of alternative policy scenarios estimate the potential energy savings from the implementation of a set of programmatic initiatives referred to as the Big Bold Energy Efficiency Strategies (BBEES). In her April 13, 2007 scoping ruling, assigned Commissioner Grueneich defined the BBEES initiatives as “strategies to promote maximum energy savings through the coordinated actions of utility programs, market transformation, and codes and standards” (CPUC, 2007b). As such, the BBEES initiatives represent a significant departure from the incentive-based voluntary programs that comprise the vast majority of the current IOU program portfolios.

Initially, the CPUC identified four programmatic areas for further consideration - residential new construction, commercial new construction, industrial programs and HVAC. The CPUC then held a series of workshops designed to solicit input and feedback regarding the feasibility, design and potential impact of strategies in these areas. After receiving written comments from stakeholders, the CPUC directed the utilities, as part of D.07-10-032, to include specific programs to support the implementation of three of the four BBEES initiatives in their 2009-2011 portfolio applications as well as their long-term Strategic Plans (CPUC, 2007c). These three initiatives are residential new construction, commercial new construction, and small HVAC.

In the remainder of this subsection, we present the definitions, key assumptions, modeling approach, and data sources used to estimate the potential savings from implementation of the three BBEES initiatives.

Residential new construction

Definition. We defined the “Big Bold” residential new construction (BB RNC) scenario following the CPUC’s definition in D.07-10-032 – by 2020, all new housing built in California’s IOU service territories will be built to consume “zero net energy” (*ibid*).¹⁵ Since the objective of this study is to support the CPUC’s decision-making related energy savings goals, we limited our definition of the BB RNC scenario to the energy efficiency component of the “zero net energy” target. As such, we leveraged the interim efficiency milestones defined by the CPUC for the BB RNC initiative, which use the Tier 2 energy efficiency requirements from the Energy Commission’s New Solar Home Partnership program (35% energy savings compared to homes meeting 2005 Title 24 performance standards) as the primary performance benchmark. We also incorporated a set of complimentary interim milestones related to the BB RNC initiative based on Tier 3 efficiency requirements (55% savings compared to 2005 Title 24) that were developed in the *California Energy Efficiency Strategic Plan (Draft)* (CPUC, 2007d). The complete set of interim milestones used in the BB RNC scenario for this study is shown in Table 3-1 below.

¹⁵ In D.07-10-032, zero net energy is defined as “the implementation of a combination of building energy efficiency design features and on-site clean distributed generation that result in no net purchases from the electricity or gas grid, at the level of a single “project” seeking development entitlements and building code permits”.

Table 3-1: Efficiency Level and Market Penetration Assumptions Used in BB RNC Scenario

Efficiency level:	Case:	Market Penetration:		
		2011	2015	2020
Tier 2 (35% reduction in HVAC and WH from 2005 Title 24 levels)	High ^a	40%	90%	100%
	Mid	30%	60%	80%
	Low	20%	30%	60%
Tier 3 (55% reduction in HVAC and WH from 2005 Title 24 levels)	High ^b	10%	40%	90%
	Mid	8%	25%	60%
	Low	5%	10%	25%

^a High values reflect milestones in D.07-01-032

^b High values reflect milestones in *California Energy Efficiency Strategic Plan (Draft)*

Note that we treated the interim market penetration milestones defined in D.07-10-032 and the draft residential *Strategic Plan* as the “high” savings case, consistent with some stakeholders characterizing the BB RNC milestones as “difficult but feasible” and the CPUC’s own characterization of the BB RNC milestones as requiring “an aggressive and creative action plan” (CPUC, 2007c). We then created more conservative “mid” and “low” savings cases based on trajectories of performance and market penetration milestones that were more modest and gradual over time.

Modeling assumptions. Due to the cross-jurisdictional nature of the BB EES initiative, it is difficult to forecast the potential savings attributable to particular actors or particular program mechanisms (e.g. IOUs, market effects, or codes and standards). As such, we chose to model savings in the BB RNC scenario as penetration-weighted technical potential, taking into account annual new construction rates over the forecast period. We assumed that this potential is limited to the water heating and HVAC end uses in new homes in order to avoid double-counting with the lighting and appliance measures in other scenarios and to maintain consistency with the current scope of Title 24.

Development of savings inputs. The key savings assumptions in the BB RNC scenario are based on the Tier 2 and Tier 3 performance levels – 35% and 55% energy savings compared to 2005 Title 24 new homes, respectively. We then adjusted these technical unit savings values to be incremental to the market potential associated with residential new construction programs in the 2008 Itron update study in order to avoid double-counting with the ASSET full and base gross market potential scenarios.¹⁶ After weighting these technical unit savings using the penetration milestones in Table 3-1 and the Energy Commission’s forecast of annual new construction rates, the penetration-weighted savings estimates were then applied to the baseline UECs for water heating and HVAC in new homes in each year of the forecast period.

¹⁶ The residential new construction programs modeled in the 2008 Itron update study are based on new homes with 15% energy savings compared to 2005 Title 24 new homes.

Uncertainty bounds. The uncertainty bounds in our BB RNC scenario reflect the range of assumed market penetration rates shown in Table 3-1 above. As discussed above, we treated the BB RNC market penetration milestones as the upper bound and created more modest penetration milestones to represent the middle case and the lower bound of potential savings. We did not adjust the technical unit savings or annual new construction assumptions across any of the BB RNC cases.

Commercial new construction

Definition. We defined the “Big Bold” commercial new construction (BB CNC) scenario following the CPUC’s definition in D.07-10-032 – by 2030, all new commercial buildings built in California’s IOU service territories will be built to consume “zero net energy” (*ibid*). As in our BB RNC scenario, we limited our definition of the BB CNC scenario to the energy efficiency component of the “zero net energy” target. Again, we leveraged the interim efficiency milestones defined by the CPUC for the BB CNC initiative, which use 30% energy savings compared to commercial buildings meeting 2005 Title 24 performance standards as the primary performance benchmark.¹⁷

Table 3-2: Efficiency Level and Market Penetration Assumptions Used in BB CNC Scenario

Efficiency level:	Case:	Market penetration:		
		2011	2015	2020
30% reduction in HVAC, WH, and lighting from 2005 Title 24 levels	High ^a	30%	50%	70%
	Mid	20%	35%	55%
	Low	10%	20%	40%

^a High values reflect milestones in D.07-01-032

Note also that we treated the interim market penetration milestones defined in D.07-10-032 as the “high” savings case, consistent with the CPUC’s own characterization of the BB CNC milestones as requiring “an aggressive and creative action plan” (CPUCa, 2007). We then created more conservative “mid” and “low” savings cases based on trajectories of performance and market penetration milestones that were more modest and gradual over time as shown in Table 3-2 above.

Modeling assumptions. Due to the cross-jurisdictional nature of the BBEES initiative, it is difficult to forecast the potential savings attributable to particular actors or particular program mechanisms (e.g. IOUs, market effects, or codes and standards). As such, we chose to model savings in the BB CNC scenario as penetration-weighted technical potential, taking into account annual new construction rates over the forecast period. We assumed that this potential is applicable to the water heating, HVAC, interior lighting,

¹⁷ D.07-10-032 did not list a 2020 penetration milestone associated with the 30% energy savings benchmark. The 70% penetration target shown in Table 3-2 is an assumption made by Itron in coordination with ED staff for purposes of this study.

and exterior lighting end uses, in order to maintain consistency with the current scope of Title 24.

Development of savings inputs. The key savings assumption in the BB CNC scenario is based on the performance milestone defined in D.07-10-032 – 30% energy savings compared to 2005 Title 24 new buildings. We then adjusted this technical unit savings value to be incremental to the market potential associated with commercial new construction programs in the 2008 Itron update study in order to avoid double-counting with the ASSET full and base gross market potential scenarios.¹⁸ After weighting technical unit savings using the penetration milestones in Table 3-2 and the Energy Commission’s forecast of annual new construction rates, the penetration-weighted savings estimates were then applied to the baseline EUIs for water heating, HVAC, interior lighting, and exterior lighting in new commercial buildings in each year of the forecast period.

Uncertainty bounds. The uncertainty bounds in our BB CNC scenario reflect the range of assumed market penetration rates shown in Table 3-2 above. As discussed above, we treated the BB CNC market penetration milestones as the upper bound and created more modest penetration milestones to represent the middle case and the lower bound of potential savings. We did not adjust the technical unit savings or annual new construction assumptions across any of the BB CNC cases.

Small HVAC

Definition. We defined the “Big Bold” HVAC (BB HVAC) scenario to follow the CPUC’s definition in D.07-10-032 – reshaping the residential and small commercial HVAC industry in California to promote retrofit/replacement with high-quality installations of optimally-sized, high-efficiency HVAC systems with low leakage ductwork. Unlike the BB RNC and BB CNC initiatives, however, the CPUC did not define specific performance or market penetration milestones for the BB HVAC initiative. As such, Itron developed a set of market penetration assumptions, in consultation with ED staff, in order to further define the BB HVAC scenario for purposes of this study.

The penetration assumptions were initially based upon the assumptions that drove Itron’s initial estimates of potential savings from the BB HVAC initiative that were prepared at the CPUC’s request as input to the BBEES workshops held June 5-12, 2007. We then adjusted these initial assumptions to take into account the scheduled revision of the federal efficiency standard for residential CAC (to SEER 15) in 2011.¹⁹ The final penetration assumptions applied in the BB HVAC scenario in this study are presented with the other key modeling assumptions below. Finally, it should be noted that we limited the BB HVAC scenario to only CAC systems in the existing residential building

¹⁸ The commercial new construction programs modeled in the 2008 Itron update study are based on new buildings with 15% energy savings compared to 2005 Title 24 new buildings.

¹⁹ The residential CAC rulemaking is scheduled to be finalized in 2011. We assume a typical implementation lag of four years, such that the revised standards take affect starting in 2016.

stock in order to avoid double-counting with the potential savings forecasted under the BB RNC scenario.

Modeling assumptions. Due to the cross-jurisdictional nature of the BB EES initiative, it is difficult to forecast the potential savings attributable to particular actors or particular program mechanisms (e.g. IOUs, market effects, or codes and standards). As such, we chose to model savings in the BB HVAC scenario as penetration-weighted technical potential, taking into account expected replace-on-burnout (ROB) rates in the residential CAC market segment over the forecast period. We assumed an average effective useful life (EUL) of 15 years for residential CAC systems, which translates to a 7% per year stock turnover rate. When combined with current CAC ownership levels, this stock turnover rate determines the annual ROB market for CAC systems. Finally, we developed a set of market penetration assumptions over time that would represent a significant acceleration of the SEER 15 CAC market in advance of the incoming federal standard in 2016. The final market penetration values implemented in the BB HVAC scenario were the following: 10% in 2009, 50% in 2015, 75% in 2016 (first year of anticipated SEER 15 federal standard), and 100% through 2020.

Development of savings inputs. The key savings assumptions in the BB HVAC scenario relate to the technical unit savings associated with high-efficiency CAC systems optimized for performance in California climates and duct sealing measures. First, we adopted the results of recent field tests of conducted for the Energy Commission PIER program that quantified the energy savings from residential CAC systems that had been modified for optimal performance in California’s hot-dry climates (Proctor Engineering, 2007). This study provided a range of potential energy savings for hot-dry optimized CAC systems (HDAC) relative to standard SEER 13 CAC systems. Second, we adopted estimates of the average energy savings associated with duct sealing measures from the 2005 Database for Energy Efficient Resources (CPUC, 2005).²⁰ Finally, we used two different assumptions regarding the current share of homes with CAC systems that have leaky ducts.²¹ These key savings assumptions were then combined to produce a range of total technical unit savings associated with the BB HVAC initiative, as shown in Table 3-3 below.

Table 3-3: Summary of the Savings Assumptions Used in the BB HVAC Scenario

BB HVAC case	HDAC savings	Duct sealing savings	Duct sealing incomplete
High	29%	14% - SFD 11% - MFD	50%
Mid	20%		50%
Low	17%		25%

²⁰ Specifically, we used the average savings from the 28% leakage reduction measure in 2005 DEER.

²¹ This assumption was required due to the lack of statewide estimates regarding the share of homes in need of duct repair.

The range of total technical unit savings were then weighted according to the ROB market penetration assumptions described previously. These penetration-weighted savings were then applied to the baseline UECs for existing homes with CAC in each year of the forecast period.

Note that high-efficiency CAC measures currently do not pass TRC and thus are not included in the current ASSET estimates of economic or market potential. Therefore, the forecasted potential savings associated with the BB HVAC scenario can be treated as incremental to the ASSET market potential savings estimates for the existing residential sector.

Uncertainty bounds. The uncertainty bounds in our BB HVAC scenario reflect the actual range of unit savings achieved in the recent PIER-funded field tests of hot-dry optimized CAC systems and the range of share of homes with CAC systems assumed to have leaky ducts. We did not adjust the market penetration or stock turnover assumptions in any of the BB HVAC cases.

3.3 Codes & Standards (IOU Perspective)

The second set of alternative policy scenarios estimates the potential impacts of future codes and standards on the energy efficiency resource available to be captured through voluntary IOU programs. The Energy Commission is charged with periodically revising both Title 24 building codes and Title 20 appliance standards. These revisions often obviate IOU programmatic efforts for related measures that are subsumed by Title 24 code or Title 20 standards. In the absence of new efficiency measures and programs to replace the savings previously captured with these programs, the impact of revisions to Title 24 and Title 20 is a relative decrease in the achievable energy efficiency resource available to be captured by voluntary IOU programs going forward. Frequent and significant revisions to Title 24 and Title 20, therefore, could have potentially important impacts on the achievable market potential available to IOUs, especially in the absence of an influx of new, cost-effective efficiency measures and technologies. To this end, we reviewed the outlook for significant revisions to Title 24 and Title 20 going forward and developed a set of scenarios to estimate the potential impacts of future codes and standards on the energy efficiency resource available to be captured by voluntary IOU programs.

In the remainder of this subsection, we present the definitions, key assumptions, modeling approach, and data sources used in these scenarios.

AB 1109 lighting standards

Definition. We defined the “AB 1109 (IOU perspective)” scenario as the implementation of the *California Lighting Efficiency and Toxics Reduction Act*, otherwise known as Assembly Bill 1109, signed into law on October 12, 2007. With respect to efficiency, the AB 1109 requires the state to set standards for general service lamps so as to achieve specific reductions in “average” residential and commercial lighting consumption by

2018 by 50% and 25%, respectively, compared to current (then 2007) levels.²² On August 9, 2009, the Energy Commission incorporated new efficiency standards for general service incandescent lamps into Title 20 in order to meet the requirements of AB 1109. These new standards require that all general service incandescent lamps sold in California after December 31, 2017 perform with a minimum efficiency of 45 lumens per watt. The new standards also require interim efficiency levels equivalent to roughly 20 lumens per watt to be phased in starting in 2011.²³ These interim efficiency levels are identical to the revised federal standards for general service incandescent lamps promulgated in the Energy Independence and Security Act of 2007. Importantly, however, these interim standards are phased in one year earlier compared to the revised federal standards.

In order to estimate the impact of this important revision to Title 20 on the achievable energy efficiency resource available to be captured by voluntary IOU programs going forward, we used general service CFLs as the proxy for the IOU program measures that would be obviated when the new lighting standards take effect. Indeed, the current generation of general service CFLs is the only measure currently offered in IOU programs in California that demonstrates luminous efficacy levels equivalent to the levels now specified in Title 20.

Modeling assumptions. We modeled the implementation of the AB 1109 (IOU perspective) scenario as a phase-out of general service CFLs from IOU program portfolios over the 2011-2018 time period. This time frame is consistent with the phase-in period now defined in Title 20. We modeled varying degrees of aggressiveness associated with the phase-out of IOU CFL programs, i.e. frontloaded phase-out compared to more gradual phase-out. The phase-out-weighted impacts on the achievable lighting potential available to IOUs were then applied to the full and base market potential estimates for lighting in existing and new buildings in the residential sector. In commercial, the phase-out-weighted impacts were only applied to the market potential estimates for lighting in existing buildings. This was done in order to avoid double-counting with the potential associated with commercial lighting in the Title 24 scenarios, since nearly all lighting in new commercial buildings is regulated under Title 24, whereas only a small portion of residential lighting is regulated under Title 24.

Development of savings inputs. The key savings assumptions in the AB 1109 (IOU perspective) scenario were derived from a measure-level analysis of ASSET's full and base gross market potential forecasts for residential and commercial lighting. Specifically, we took ASSET's year-by-year forecast of achievable savings from general service CFL measures and then adjusted the annual savings over 2011-2018 to reflect a phase-out of those programs, while maintaining ASSET's forecast of annual achievable savings from all other lighting measures throughout the forecast period. We then re-aggregated the annual savings forecasts across all lighting measures to arrive at a total

²² AB 1109 specifies that standards shall be adopted for "general purpose lights" and explicitly excludes "specialty" lamps, including reflector lamps, from the scope of the mandate.

²³ These interim efficiency levels vary slightly across the various lumen output ranges defined in Title 20.

lighting potential forecast that was adjusted for the impacts of the AB 1109 lighting standards from the IOU program perspective.

Uncertainty bounds. The uncertainty bounds in the AB 1109 (IOU perspective) scenario reflect primarily reflect the uncertainty in the forecasted adoption levels of general service CFLs in the ASSET full and base gross market potential forecasts at the time of the assumed program phase-out. To a lesser degree, the uncertainty bounds also reflect the range in possible program phase-out rates (i.e. frontloaded vs. gradual phase-out) that were considered in the analysis.

Strengthening of Title 24

Definition. We defined the “Title 24 (IOU perspective)” scenario as the implementation of revisions to Title 24 building codes that obviate current voluntary programs administered by the IOUs targeting new residential and commercial construction designs that exceed 2005 Title 24 performance levels.²⁴

Modeling assumptions. We modeled the implementation of Title 24 (IOU perspective) scenario as the phase-out of the current IOU new construction programs. These programs offer incentives for the design and construction of new buildings that exceed 2005 Title 24 requirement by 15% or better. Given the typical one-year lag between final rulemaking and implementation, we assumed that current IOU new construction programs will be effectively phased-out in 2012 due to implementation of revised 2011 Title 24 standards.

Development of savings inputs. The key savings assumptions in the Title 24 (IOU perspective) scenario were derived from a measure-level analysis of ASSET’s full and base gross market potential forecasts for IOU residential and commercial new construction programs. Specifically, we took ASSET’s year-by-year forecast of achievable savings from IOU new construction programs and adjusted the annual savings to reflect a complete phase-out of current programs in 2009. We then applied these impacts to the baseline UECs for water heating and HVAC in new residential buildings and the baseline EUIs for water heating, HVAC, and lighting in new commercial buildings in each year of the forecast period.

Uncertainty bounds. The uncertainty bounds in the Title 24 (IOU perspective) scenario primarily reflect the uncertainty in the forecasted adoption levels of voluntary, IOU new construction programs in the ASSET full and base gross market potential forecasts at the time of the assumed program phase-out.

²⁴ It is likely that with each revision to Title 24, the IOUs will adjust their new construction programs accordingly to always promote performance that exceeds Title 24 levels. However, because the SESAT modeling framework was not designed to estimate cost-effectiveness or forecast adoption of voluntary IOU programs, we did not attempt to forecast the achievable savings potential that would be associated with future revisions to IOU new construction programs that are likely to coincide with Title 24 revisions. For reference, new construction programs account for slightly less than 10% of the total full and base gross market potential forecasted in the 2008 Itron update study.

IOU code compliance programs

Definition. We defined the “IOU Code Compliance” scenario as the establishment and implementation of IOU programs to minimize non-compliance with Title 24 in the residential new construction segment, starting in 2009. Currently, the IOUs do not administer any programs focused on increasing compliance with Title 24 in the new construction segment. However, in light of the latest residential new construction baseline study which estimated significant levels of non-compliance with Title 24 and the likelihood that non-compliance levels will interact with future revisions to Title 24, ED staff felt it is was important to assess the possible size of the associated energy efficiency resource that might be available to IOU programs that increase compliance levels. It should be noted that savings from such code compliance programs would be fundamentally different from the savings IOU are eligible to claim from code advocacy efforts.²⁵

Modeling assumptions. We modeled savings in the IOU Code Compliance scenario as penetration-weighted technical potential, taking into account assumptions about annual Title 24 noncompliance rates, the share of program-eligible savings potential captured through IOU code compliance programs, and annual residential new construction rates.²⁶

Development of savings inputs. The key savings assumptions used in the IOU Code Compliance scenario relate to assumptions about the annual non-compliance rate and the share of program-eligible potential savings captured by IOU code compliance programs. As starting points, we leveraged the results of the latest residential new construction baseline study, which estimated both the overall non-compliance rate and the average non-compliance margin (in energy terms) at the time of the study (Itron, 2004). We then assumed that these non-compliance rates would decline gradually over time as a result of IOU programmatic efforts but would increase to “starting” levels following revisions to Title 24. Next we assumed a range of different performance levels for IOU code compliance programs, defined as the share of eligible savings captured through increases in code compliance (75% in the high case, 50% in the mid case, and 33% in the low case). Finally, the resulting penetration-weighted savings estimates were then applied to the baseline UECs for water heating and HVAC in new residential buildings in each year of the forecast period.

Uncertainty bounds. The uncertainty bounds in the IOU Code Compliance scenario primarily reflect the range of program performance assumed for code compliance

²⁵ Code compliance programs as modeled here represent the approximate amount of savings that could be captured by increasing compliance with existing codes. In contrast, IOU efforts to help the development and implementation of new codes, i.e. code advocacy, allows the IOUs to claim a share of the savings ultimately captured by those new codes and standards. For reference, CPUC internal estimates of the magnitude of savings credited to IOUs from pre-2006 code advocacy work is approximately 5% of current IOU savings goals for PY 2006-2008 (CPUC, 2008).

²⁶ We did not model code compliance programs in the commercial sector based on findings from the most recent commercial new construction baseline study that nearly 90% of new commercial buildings comply with Title 24 requirements and that, on average, new commercial buildings in California exceeded Title 24 requirements by 10-20% (RLW, 1999).

programs and the frequency of Title 24 revisions assumed (see the next subsection for details about the Title 24 assumptions).

3.4 Codes & Standards (Societal Perspective)

Finally, in order to complement the codes and standards scenarios described above, we developed a third set of alternative policy scenarios that estimate the potential savings from future codes and standards from the perspective of society at large. The societal perspective on energy savings potential is relevant to goal-setting for a number of reasons, but perhaps the most important of which, from CPUC's perspective, is the central role that estimates of societal savings potential play in resource procurement planning and GHG mitigation planning. In each of those planning contexts, the most relevant savings metric is the total savings potential for society at large, independent of whether the savings are derived through IOU programs, state codes and standards, or federal codes and standards. In the context of this study, developing estimates of potential savings from codes and standards from a societal perspective was also necessitated due to the Energy Commission's policy of only forecasting future impacts of "committed" efficiency programs, i.e. those with secured funding (CEC, 2007a).

To this end, we constructed scenarios of the most significant future codes and standards that are likely to be implemented at the state and federal level over the forecast period. To do this, we drew upon an extensive review of the available grey literature from the Energy Commission and the USDOE, as well as input from ED staff. In order to support comparative analysis, we structured the inputs and outputs of the codes and standards (societal perspective) scenarios to be incremental to the codes and standards (IOU perspective) scenarios. In this way, the results across the two sets of scenarios can also be summed to provide estimates of total savings potential from a societal perspective. In the remainder of this subsection, we present the definitions, key assumptions, modeling approach, and data sources used in the codes and standards (societal perspective) scenarios in this study.

AB 1109 lighting standards

Definition. We defined the "AB 1109 (societal perspective)" scenario as the implementation of the *California Lighting Efficiency and Toxics Reduction Act*, signed into law on October 12, 2007. As the in IOU-perspective version of this scenario, we used general service CFLs as the proxy for the IOU program measures that would be obviated when the new lighting standards take effect. Indeed, the current generation of general service CFLs is the only measure currently offered in IOU programs in California that demonstrates luminous efficacy levels equivalent to the levels now specified in Title 20.

Modeling assumptions. We modeled the AB 1109 (societal perspective) scenario as the phase-out of general service CFLs from IOU portfolios over 2011-2018 and the concurrent implementation of efficiency standards for general service lamps that meet the luminous efficacy standards now specified in Title 20, including the interim efficacy levels scheduled to take effect starting in 2011.

Development of savings inputs. The key savings assumptions used in the AB 1109 (societal perspective) scenario were derived from the savings targets stipulated in AB 1109, i.e. 50% reduction in the 2007 residential lighting UEC and 25% reduction in the 2007 commercial lighting EUI by 2020. We then estimated the penetration rates implied by those targets in order to calculate penetration-weighted savings. These penetration-weighted savings were then applied to the baseline UECs for lighting in existing and new residential buildings and the baseline EUIs for interior and exterior lighting in existing commercial buildings in each year of the forecast period. Note that we excluded savings in new commercial buildings due to AB 1109 in this scenario in order to avoid double-counting with lighting savings estimated in Title 24 scenarios.

Uncertainty bounds. The uncertainty bounds in the AB 1109 (societal perspective) scenario primarily reflect the uncertainty in the estimated technical potential of residential and commercial lighting, which in turn reflects the findings from the results of KEMA's recent CFL metering study which showed that as CFL installations increase CFLs tend to be installed in lower-use areas, such as closets and hallways (KEMA, 2005).

Strengthening of Title 24

Definition. We defined the "Title 24 (societal perspective)" scenario as the implementation of significant revisions to Title 24 building codes over the forecast period.

Modeling assumptions. We modeled the Title 24 (societal perspective) scenario as the phase-out of current IOU voluntary NC programs in 2012 and concurrent phase-in of higher Title 24 performance levels, followed by further revisions to Title 24 at various points going forward. We modeled a "high" case where Title 24 is revised three times over the forecast period, a "mid" case with two revisions, and a "low" case with one revision. Note that we assume the typical 1-year lag between rulemaking and implementation of Title 24 revisions. We modeled savings from Title 24 revisions as penetration-weighted technical potential, taking into account annual new construction rates over the forecast period. We assumed that this potential is applicable to the water heating and HVAC end uses in new residential buildings and the water heating, HVAC, interior lighting, and exterior lighting end uses in new commercial buildings, in order to maintain consistency with the current scope of Title 24.

Development of savings inputs. The key savings assumptions used in the Title 24 (societal perspective) scenario leveraged the results of Architectural Energy Corporation's recent analysis conducted for the Energy Commission that estimated the potential impact of the draft 2008 Title 24 revisions (AEC, 2007), along with results from a similar study conducted for the Energy Commission by Eley Associates in support of the 2005 Title 24 revisions (CEC, 2003). Together, these estimates served as starting points for developing assumptions about the level and range of relative savings that are reasonable to expect from each future revision to Title 24.

For the technical unit savings associated with each future revision to Title 24, we discounted AEC’s impact estimates for residential buildings by 50%. This assumption reflects the fact that AEC’s residential savings estimates represent uncalibrated building simulation results scaled to the population level, without adjustments for real-world diversity in occupant behavior. Note that AEC’s impact estimates for commercial buildings are not as significant as those for residential, and we applied those estimates across all cases in the Title 24 scenarios for commercial new construction. Table 3-4 provides a summary of all the key assumptions used in the Title 24 (societal perspective) scenario.

Table 3-4: Summary of Technical Unit Savings and Revision Periodicity Assumptions Used in the Title 24 (Societal Perspective) Scenario

Title 24 case	Technical unit savings (relative to previous code)*	Periodicity
	2011-2020	
Residential:		
High	10%	2011, 2014, 2017 (3 revisions)
Mid	10%	2011, 2014 (2 revisions)
Low	10%	2014 (1 revision)
Commercial:		
High	5%	2011, 2014, 2017 (3 revisions)
Mid	5%	2011, 2014 (2 revisions)
Low	5%	2014 (1 revision)

* Units savings applied to HVAC and water heating in new residential homes and HVAC, water heating, and lighting in new commercial buildings.

Uncertainty bounds. The uncertainty bounds in the Title 24 (societal perspective) scenario primarily reflect the range in the number and timing of Title 24 revisions assumed to occur over the forecast period.

Revision of federal appliance standards

Definition. We defined the “Federal Appliance Standards” scenario as the implementation of revised minimum energy efficiency standards following the rulemaking schedule listed in the *Five-Year Schedule of Issuance of Appliance Rulemakings* (USDOE, 2006). Specifically, we modeled the implementation of scheduled revisions to standards for the following appliances: clothes dryers, dishwashers, residential central air conditioners (CAC), residential room air conditioners (RAC), commercial packaged terminal air conditioners (PTAC), and commercial packaged terminal heat pumps (PTHP).

Modeling assumptions. We modeled savings in the Federal Appliance Standards scenario as penetration-weighted technical potential, taking into account expected replace-on-burnout (ROB) rates in the in-scope market segments over the forecast period. We used EULs from the DEER database and current saturation rates from the statewide RASS and CEUS studies to estimate the size of the annual ROB market for each in-scope appliance type. We then assumed 100% market penetration in the annual ROB market starting in the first year of implementation and continuing through the end of the forecast period. Table 3-5 summarizes the EUL values used in the Federal Appliance Standards scenario, along with the scheduled dates of final rulemaking and the assumed implementation dates, which reflect the typical 5-year lag between final rulemaking and implementation of federal standards.

Development of savings inputs. The key savings assumptions used in the Federal Appliance Standards scenario drew from a variety of sources. For clothes dryers, commercial PTACs, and commercial PTHPs, we developed technical unit savings based on the performance levels of the lowest lifecycle cost products currently available in those appliance categories as identified by recent USDOE analyses.²⁷ The efficiency levels of the lowest lifecycle cost products on the market are normally used as the starting point for choosing future standards levels and thus serve as reasonable proxies for future standard levels. For clothes dryers, the USDOE data implies an increase from the current 3.09 MEF standard to a 3.39 MEF standard. For PTACs and PTHPs, the USDOE data implies an increase from the current EER 8.5 standard to an EER 10 standard.²⁸ For dishwashers, we assumed an increase from the current 0.48 EF standard to a 0.68 EF standard based on current ENERGY STAR product criteria. Similarly for residential RAC, we assumed an increase from the current EER 9.7 standard to an EER 10.7 standard based on current ENERGY STAR product criteria. For residential CAC, we assumed an increase from the current SEER 13 standard to a SEER 15 standard.

The technical unit savings described above (and summarized in Table 3-5 below) were weighted to take into account stock turnover rates, ROB market penetration, and the periodicity of each respective standard. The penetration-weighted savings were then applied to the respective baseline UECs for existing residential and commercial buildings in each year of the forecast period. Note that we did not apply savings from these revised federal standards to the respective end uses in the new construction segment in order to avoid double-counting with savings estimated in the Title 24 (societal perspective) scenario.

Finally, it should be noted that high-efficiency clothes dryers, dishwashers, residential CAC, residential RAC, commercial PTAC, and commercial PTHP measures currently do not pass the TRC test in California and thus are not included in ASSET estimates of

²⁷ The respective analyses for clothes dryers and PTACs/PTHPs are *Energy Conservation Standards Rulemaking Framework Document for Residential Clothes Dryers and Room Air Conditioners* (USDOE, 2007) and *Proposed Rules - Efficiency Standards for Commercial Heating, Air-Conditioning and Water Heating Equipment* (USDOE, 2008).

²⁸ The USDOE specifies EER levels for PTAC/PTHP by unit capacity. The EER levels shown above are rough capacity-weighted averages.

economic or market potential. As such, the savings in Federal Appliance Standards scenario can thus be treated as incremental to ASSET market potential savings estimates.

Uncertainty bounds. The uncertainty bounds in the Federal Appliance Standards scenario primarily reflect the uncertainty in the EULs and stock turnover rates for each in-scope appliance type as well as uncertainty in the target standard levels assumed for each in-scope appliance type.

Table 3-5: Summary of Technical Unit Savings, EUL, and Periodicity Assumptions Used in the Federal Appliance Standards Scenario

	Unit savings	EUL	Periodicity	
			Rulemaking	Implementation
Clothes dryers	13%	18 years	2011	2016
Dishwashers	48%	13 years	2009	2014
Residential CAC	12% - SFD 15%- MFD	15 years	2011	2016
Residential RAC	10%	12 years	2011	2016
Commercial PTAC	18%	15 years	2008	2013
Commercial PTHP	18%	15 years	2008	2013

3.5 Interactions between Delivery Mechanisms

The two previous sections described how interactions between IOU programs and codes and standards (primarily the AB 1109 lighting standards) were accounted for specifically in this study. To complement these methodological descriptions, this section provides quantitative illustrations of the magnitude of these interactions. We also provide illustrations of another important interaction between delivery mechanisms that was included in this study – those between the BBEES initiatives and Title 24.

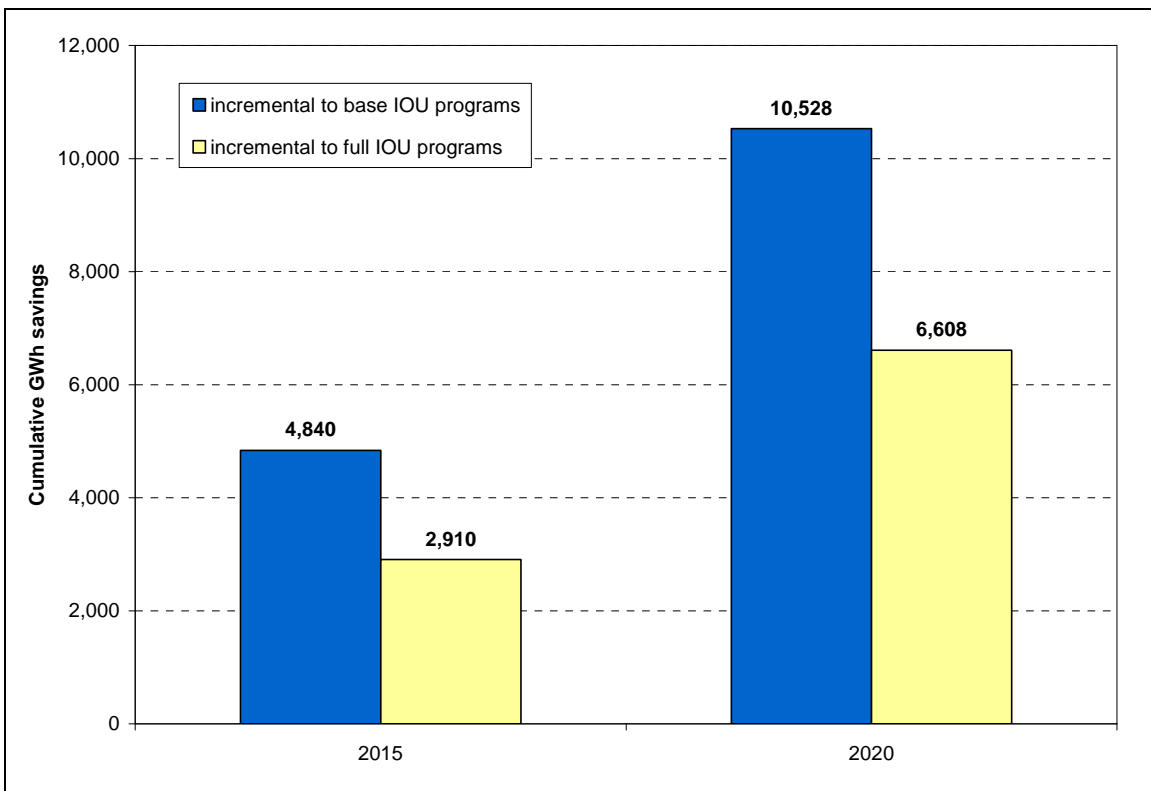
In both of the interactions discussed below, the analytic issue is the same – how to attribute and account for savings from multiple delivery mechanisms that target the same energy efficiency resource (e.g. general service lighting or new residential homes) in an internally-consistent manner that avoids double-counting. As such, it is important to emphasize here that the interactions across delivery mechanisms quantified and presented below do not affect our estimates *total* societal savings in any given scenario, but rather the *relative* contributions of each delivery mechanism to total societal savings.

IOU programs and new codes and standards

Figure 3-1 illustrates the range of savings estimated from the adoption of new building codes and federal appliance standards that are incremental to savings from two different IOU program portfolios – a portfolio based on “base” measure rebate levels and a portfolio based on “full” measure rebate levels (as described previously in Section 3.1). The figure shows that the level of incremental, societal energy savings associated with

new codes and standards relative to the “base” funding case for IOU programs is higher than incremental savings relative the “full” funding case by roughly 4,000 GWh by 2020. This result reflect the fact that the higher level of customer measure adoptions estimated with the full-funding case for IOU programs leads to higher saturations of energy efficiency measures *before* the assumed standards take effect, compared to the base-funding case for IOU programs. Higher saturation of efficiency measures in the full-funding case for IOU programs, in turn, leads to lower overall levels of energy savings attributed to the adoption of a standard at time *t* compared to those in the base case for IOU programs.

Figure 3-1: Estimated Savings from Codes and Standards, Incremental to Savings from IOU Programs

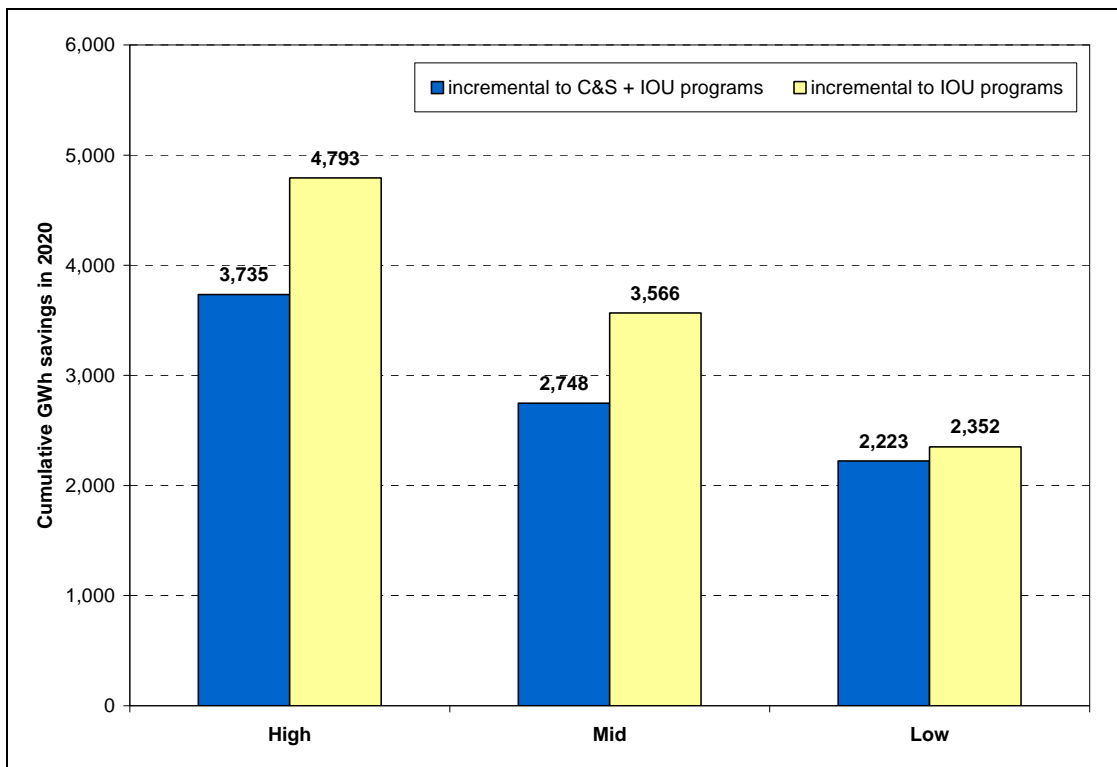


In the particular case of the AB 1109 lighting standards, the incremental savings attributable to the implementation of the revised Title 20 lighting standards will be higher relative to the base-funding case for IOU programs compared to those relative to the full-funding case for IOU programs. This is because the base market potential scenario for utility programs produces a cumulative CFL measure saturation level of ~40% by 2011 (and cumulative savings of 5,095 GWh) as opposed to the higher CFL saturation of ~70 % by 2011 and cumulative savings of 9,034 GWh in the full market potential scenario. Thus, the incremental savings that result from increasing CFL saturations from 40% to 100% (through implementation of the new standards) is necessarily larger than those from increasing CFL saturation from 70% to 100%.

BBEES initiatives and Title 24

Figure 3-2 illustrates the range of savings from the BBEES initiatives estimated to be incremental to those from IOU programs compared to those estimated to be incremental to savings from both IOU programs and future codes and standards.²⁹ The figure shows how the incremental savings estimates for the BBEES initiatives were adjusted downward to account for incremental savings from future revisions to Title 24 implemented during the forecast period. The savings in the yellow bars represent the BBEES savings without the impacts of new Title 24 standards while the blue bars show the estimated incremental savings from the BBEES initiatives assuming that Title 24 is revised significantly, which serves to reduce the incremental savings realized from achieving the BBEES targets for residential and commercial new construction. Accounting for this effect leads to a significant reduction in the incremental savings attributed to BBEES as more societal savings are attributed to Title 24. As noted previously, however, these interactions do not reduce total societal savings estimated to result from Title 24 and the BBEES initiatives combined.

Figure 3-2: Estimated Range of Potential Savings from BBEES Initiatives



The final set of savings inputs used in this study for each of the scenarios presented above are provided in section 6. Note that these savings inputs reflect the adjustments made to account for the interactive effects between IOU programs, future codes and standards, and the BBEES initiatives described above.

²⁹ The incremental savings from the BBEES initiatives shown in Figure 3-2 are based on the presumption that the underlying utility program case chosen was the base market potential.

4

Results and Comparisons

The final step in the study approach was to re-run the SESAT model with the final set of revised and additional inputs in order to generate comparable forecasts of energy and peak demand savings associated with the delivery mechanisms included in the Energy Commission’s 2009 IEPR demand forecast and those included in the Low, Mid, and High Goals scenarios. These results then formed the basis for estimating the energy and peak demand savings from the uncommitted programs reflected in the CPUC’s energy savings goals that are “incremental” to those already embedded in the 2009 IEPR forecast.

Once the revised set of baseline inputs and scenario assumptions described previously were incorporated into SESAT, the study team then generated a revised set of results for each of the individual scenarios described previously in Chapters 2 and 3. These individual scenario results (e.g. IOU programs, AB 1109 lighting standards, Title 24, etc) were then combined according to the same criteria used to construct the Low, Mid, and High Goals cases in the 2008 CPUC Goals Study and reflected in CPUC D.08-07-047.³⁰ These criteria are shown below in Table 4-1. The subscripts identify whether the low (_{low}), mid (_{mid}) or high (_{high}) savings estimates were assumed for each respective savings mechanism.

Table 4-1: Composition of Goals Cases by Savings Mechanism

	Low	Mid	High
IOU program funding level?	Base _{mid}	Full _{mid}	Full _{mid}
Gross or net savings?	Gross	Gross	Gross
AB 1109 lighting standards?	Yes _{low}	Yes _{low}	Yes _{mid}
Title 24 & appliance standards?	Yes _{low}	Yes _{mid}	Yes _{high}
Code compliance programs?	No	Yes _{mid}	Yes _{high}
BBEES initiatives?	Yes _{low}	Yes _{mid}	Yes _{high}

Below we present and summarize the results associated with the Low, Mid, and High Goals Cases and highlight key findings. We then summarize and compare the overall results of the incremental uncommitted savings analyses across the three Goals Cases. Finally, we describe and discuss the key analytic caveats and uncertainty issues related to

³⁰ Note that these individual scenario results take into account the interactive effects between assumed levels of utility program efforts, the adoption of new codes and standards, and the BBEES initiatives.

this study and particular results. Before presenting the results of the Low, Mid, and High Goals Cases and the incremental uncommitted savings analyses, however, it is important to note the following:

First, all of the results shown in the chapter are expressed in terms of gross savings and have been aggregated across the three IOU service territories. IOU-specific versions of all the results are provided in Appendices C, D, and E.

Second, in order to simplify data presentation, the results shown in the figures below for savings from residential and commercial price effects as modeled by the Energy Commission also include savings from “additional residential lighting savings” (from 2013 forward). Additionally, the results shown for savings from IOU programs as modeled by the Energy Commission also include savings from Title 24-triggered lighting retrofits in existing commercial buildings.

Third, readers should be aware that the results of Goals Cases do not exactly match the goals adopted in CPUC D.08-07-047, since current results use revised forecasts of demand drivers (housing stocks, etc.), a recalibrated peak demand baseline for the residential sector, as well as slightly revised scenario assumptions, specifically for future revisions to Title 24 and the specification of the AB 1109 lighting standards.

Finally, it is important to note that the savings estimates shown below represent the savings from programs *introduced and operated* over the forecast period and do not include any attempt to estimate savings from programs or standards adopted prior to 2006, since savings from past programs and standards are already embedded in the 2009 IEPR forecast. As such, our estimates of the relative magnitude of the cumulative future savings contributed by utility programs and standards are not directly comparable with the cumulative savings charts shown in the 2009 IEPR demand forecast report which show the relative impacts of utility programs and state codes and standards from 1975 to the present.

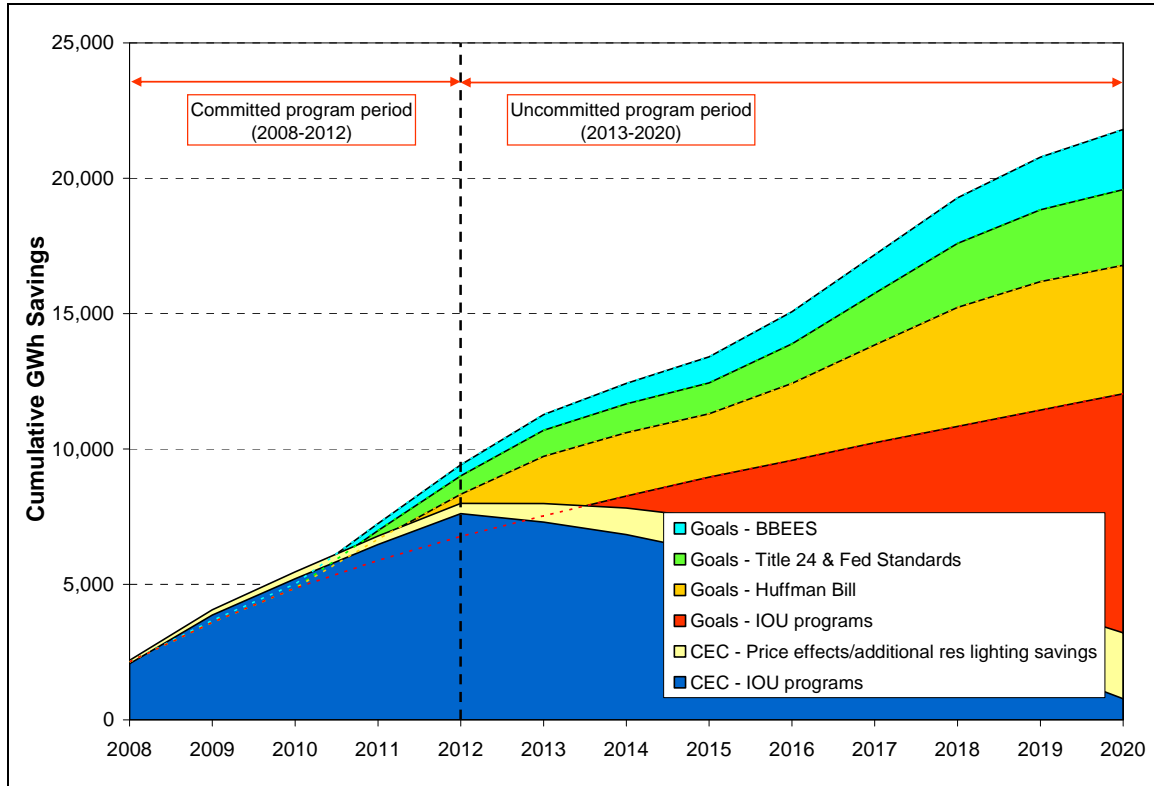
4.1 Low Goals Case

Figure 4-1 and Figure 4-2 present summaries of the estimated energy and peak demand savings, respectively, from the delivery mechanisms included in the 2009 IEPR demand forecast compared to those from the delivery mechanisms included in the Low Goals Case scenario of the 2008 CPUC Goals study.

Figure 4-1 shows that, for new programmatic activities implemented during the committed program period (2008-2012), total energy savings are derived almost entirely from IOU programs. Overall, the Energy Commission’s estimates of cumulative savings from IOU programs are slightly higher than savings from IOU programs estimated in the Low Goals Case scenario. This result primarily reflects the fact that the measure rebate levels assumed in the Low Goals Case scenario (based on Itron’s estimate of base restricted market potential as discussed in Section 3.1) are lower on average compared to what the IOUs actually offered or have proposed to offer over the committed program period. Therefore, the total level of program participation (and resultant savings)

reflected in the Low Goals Case scenario is lower than the total level of program participation embedded in the 2009 IEPR demand forecast.

Figure 4-1: Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - Low Goals Case



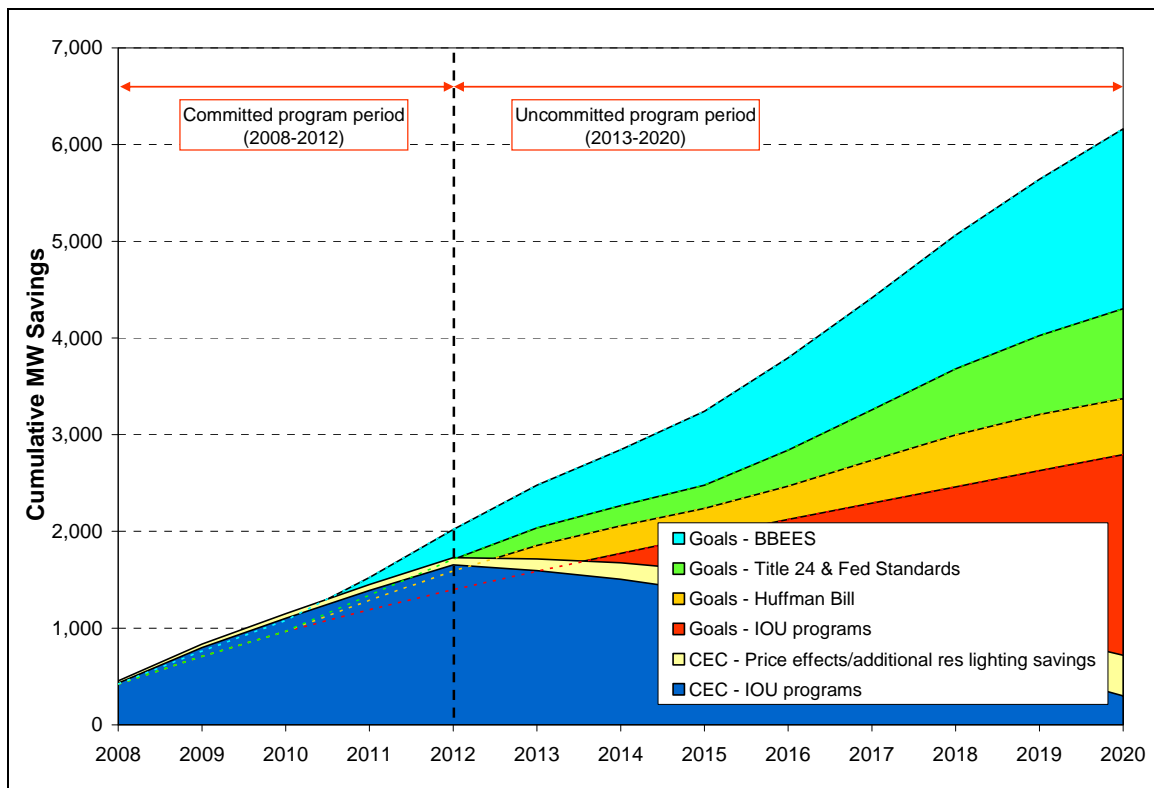
Over the uncommitted program period from 2013 forward, Figure 4-1 shows that the Energy Commission’s estimates of cumulative energy savings from IOU programs decline steadily through the end of the forecast period, reflecting significant and steady decay of savings from measures previously-adopted through IOU programs. This result reflects the convention used by the Energy Commission that committed programs are assumed to produce energy efficiency adoptions through the end of the committed program period (2012), after which there is a theoretical absence of efforts to replace previously-adopted efficiency measures when they reach the end of their respective useful lives.

In contrast, Figure 4-1 shows that the cumulative energy savings in the Low Goals Case continues to grow from 2013 forward, driven primarily from energy savings from implementation of the AB 1109 lighting standards and new IOU programs. Note that the forecast of cumulative savings from the AB 1109 lighting standards exhibits a slight “S” shape over time. This temporal dynamic reflects the level and periodicity of the efficiency benchmarks for general service lighting that are now specified in Title 20, including interim efficiency levels that take effect in 2011 and 2013 and the final efficiency levels that take effect in 2018. Figure 4-1 also shows significant contributions

to the growth in energy savings from future revisions to Title 24 building codes and federal appliance standards as well as significant assumed progress towards the BBEES targets for zero net energy (ZNE) new homes and buildings.

Figure 4-2 summarizes the analogous results for peak demand savings. As the figure shows, for new programmatic activities implemented during the committed program period (2008-2012), total peak demand savings are again driven principally by savings from IOU programs. Again, the Energy Commission’s estimates of cumulative peak demand savings from IOU programs are slightly higher than those from IOU programs in the Low Goals Case scenario, reflecting the lower levels of measure rebates assumed in the Low Goals Case scenario compared to what the IOUs actually offered or have proposed to offer over the committed program period.

Figure 4-2: Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - Low Goals Case



As was the case for energy savings, Figure 4-2 shows that the Energy Commission’s estimates of cumulative peak demand savings from IOU programs decline steadily from 2013 through the end of the forecast period, reflecting significant and steady decay of savings from measures previously-adopted through IOU programs. Again, this result reflects the convention used by the Energy Commission that committed programs are assumed to produce energy efficiency adoptions through the end of the committed program period (2012), after which there is a theoretical absence of efforts to replace

previously-adopted efficiency measures when they reach the end of their respective useful lives.

In the Low Goals Case, Figure 4-2 shows that, like energy savings, cumulative peak demand savings continue to grow from 2013 forward. However, in contrast to energy savings, growth in cumulative peak demand savings is driven primarily from significant assumed progress towards the BBEES targets for ZNE new homes and buildings, with savings from the implementation of the AB 1109 lighting standards accounting for a much smaller (compared to energy savings) but still significant share of total savings growth. Estimated peak demand savings from future revisions to Title 24 building codes and federal appliance standards again account for significant shares of the total growth in savings from 2013 forward.

Table 4-2 and Table 4-3 present the results for cumulative energy and peak demand savings from committed and uncommitted programs broken out by both program type (e.g. IOU programs, codes & standards, etc.) and end-use sector (e.g. residential, commercial, and industrial). Again, the results shown in these tables have been aggregated across the three IOU service territories. Sections 7, 8, and 9 provide similar tables of IOU-specific results tables for PG&E, SCE, and SDG&E, respectively.

Table 4-2: Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - Low Goals Case

3 IOU Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	2,073	3,871	5,210	6,474	7,618	7,306	6,844	6,197	5,353	4,324	3,158	1,941	773
CEC - Price effects/addt'l res lighting savings	126	188	250	312	374	680	979	1,263	1,535	1,788	2,024	2,240	2,435
CEC - Total	2,200	4,059	5,460	6,786	7,992	7,986	7,823	7,460	6,888	6,112	5,182	4,181	3,208
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	1,103	2,205	3,108	3,308	3,308	4,010	5,113	6,215	6,716	6,716
Goals - Title 24 & Fed Standards	0	0	0	0	26	54	101	169	287	406	542	682	824
Goals - BBEES	0	79	162	258	414	577	747	964	1,190	1,427	1,681	1,947	2,223
Goals - Total	2,140	3,669	5,017	7,249	9,419	11,272	12,420	13,408	15,073	17,176	19,274	20,783	21,804
Total Residential													
CEC - IOU programs	1,164	2,282	3,142	3,949	4,671	4,451	4,125	3,668	3,077	2,368	1,582	785	54
CEC - Price effects/addt'l res lighting savings	25	36	47	58	70	232	387	527	654	764	855	928	978
CEC - Total	1,188	2,318	3,189	4,007	4,740	4,683	4,512	4,195	3,732	3,132	2,437	1,713	1,032
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	779	1,559	2,196	2,338	2,338	2,834	3,613	4,393	4,747	4,747
Goals - Title 24 & Fed Standards	0	0	0	0	8	15	41	73	152	232	316	402	489
Goals - BBEES	0	32	66	105	177	252	331	435	545	659	786	919	1,057
Goals - Total	996	1,709	2,309	3,554	4,750	5,730	6,217	6,580	7,439	8,601	9,758	10,495	10,883
Total Commercial													
CEC - IOU programs	910	1,589	2,068	2,525	2,948	2,855	2,719	2,529	2,276	1,956	1,576	1,156	719
CEC - Price effects	101	152	203	254	304	448	592	736	880	1,024	1,168	1,313	1,457
CEC - Total	1,011	1,741	2,271	2,779	3,252	3,303	3,311	3,265	3,156	2,981	2,745	2,468	2,176
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	323	647	911	970	970	1,176	1,499	1,823	1,970	1,970
Goals - Title 24 & Fed Standards	0	0	0	0	18	39	60	97	135	174	226	280	336
Goals - BBEES	0	47	96	153	237	325	416	528	645	768	896	1,029	1,167
Goals - Total	865	1,472	2,010	2,788	3,553	4,216	4,667	5,083	5,679	6,411	7,142	7,705	8,129
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs													
Goals - Title 24 & Fed Standards	279	489	698	907	1,117	1,326	1,536	1,745	1,954	2,164	2,373	2,583	2,792
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	279	489	698	907	1,117	1,326	1,536	1,745	1,954	2,164	2,373	2,583	2,792

Table 4-3: Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - Low Goals Case

3 IOU Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	431	799	1,102	1,389	1,654	1,594	1,505	1,380	1,217	1,016	785	539	298
CEC - Price effects/addt'l res lighting savings	24	36	49	61	73	122	171	218	263	306	347	386	422
CEC - Total	456	836	1,150	1,450	1,727	1,716	1,676	1,598	1,480	1,323	1,132	925	720
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	149	297	419	446	446	540	689	837	905	905
Goals - Title 24 & Fed Standards	0	0	0	0	15	31	50	81	177	275	383	492	603
Goals - BBEES	0	56	114	183	309	441	580	764	956	1,158	1,383	1,617	1,861
Goals - Total	421	762	1,079	1,523	2,020	2,478	2,846	3,243	3,796	4,416	5,064	5,642	6,163
Total Residential													
CEC - IOU programs	249	481	653	814	958	917	856	770	657	518	361	200	49
CEC - Price effects/addt'l res lighting savings	3	4	5	6	7	27	46	63	78	92	103	111	117
CEC - Total	252	485	658	820	966	945	902	833	735	610	464	311	167
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	95	190	268	286	286	346	441	537	580	580
Goals - Title 24 & Fed Standards	0	0	0	0	10	21	34	56	143	231	325	421	518
Goals - BBEES	0	44	90	145	250	360	476	632	795	966	1,159	1,360	1,570
Goals - Total	187	359	518	763	1,061	1,336	1,556	1,806	2,183	2,604	3,052	3,457	3,827
Total Commercial													
CEC - IOU programs	182	318	449	576	696	676	648	610	560	498	424	339	249
CEC - Price effects	22	33	43	54	65	95	125	155	185	215	245	275	305
CEC - Total	204	350	492	630	761	771	773	765	745	713	668	614	553
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	53	107	150	160	160	194	247	301	325	325
Goals - Title 24 & Fed Standards	0	0	0	0	5	10	15	25	34	44	57	71	85
Goals - BBEES	0	12	24	38	59	81	104	132	161	192	224	257	291
Goals - Total	187	321	443	605	769	916	1,029	1,140	1,280	1,443	1,608	1,746	1,861
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs													
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	47	83	119	154	190	226	261	297	332	368	404	439	475

The previous tables and figures presented the estimated savings from delivery mechanisms included in the 2009 IEPR demand forecast and the delivery mechanisms included in the 2008 CPUC Goals study using the revised set of baseline inputs and scenario assumptions described in Chapter 2. These results in turn form the basis for calculating the key quantity in question – i.e. the portion of savings from uncommitted programs (as represented by those modeled in the 2008 Goals study) that is incremental to the savings already embedded in the 2009 IEPR demand forecast from 2013 forward.

As described in Section 2.1, the key step required to estimate incremental uncommitted savings is to identify the extent to which the programs modeled in the 2008 CPUC Goals study overlap or duplicate the programs modeled in the 2009 IEPR forecast. Based on the assessments and methodological decisions of the study team and Energy Commission staff, we defined incremental uncommitted savings to be the cumulative savings from 2013 through 2020 from the delivery mechanisms modeled in the 2008 CPUC Goals study with the specific adjustments shown in Table 4-4 below.³¹

Table 4-4: Final Programmatic Scope of Incremental Uncommitted Savings Analysis (2013-2020)

Delivery mechanism:	Adjustments:
IOU residential programs	decremented by CEC's residential price effects
IOU commercial programs	naturally-occurring adoptions assumed to be already embedded in CEC forecast; incremental savings defined to be <i>net</i> savings from new IOU programs
IOU industrial programs	no adjustments
Implementation of AB1109	decremented by CEC's "additional residential lighting savings"
Future revisions to Title 24	no adjustments
Future revisions to federal appliance standards	no adjustments
Implementation of BBEES initiatives	no adjustments

Using the results shown previously in Table 4-2 and Table 4-3, we then calculated the incremental savings from uncommitted programs from 2013 through 2020 based on the programmatic scope and adjustments shown in Table 4-4. For example, the incremental savings in year 2020 from implementation of the AB 1109 lighting standards in the residential sector were calculated as the energy and peak savings from the AB 1109 lighting standards (as estimated in the Low Goals Case) projected to accumulate between 2013 and 2020, less Energy Commission's estimates of "additional residential lighting savings". Referring to the values in Table 4-2, this translates to 4,747 GWh (2020 value) minus 1,559 GWh (2012 value) or 3188 GWh. Following the adjustment described in Table 4-4 above, in order to avoid double-counting the savings from the Energy Commission's estimates of "additional residential lighting savings" already embedded in the 2009 IEPR forecast, we then decremented this result by 908 GWh, which the

³¹ See Section 2.1 for more detailed discussion of the rationale for each.

cumulative savings from “additional residential lighting savings” between 2020 (978 GWh) and 2012 (70 GWh). This yields an estimate of incremental uncommitted savings from the AB 1109 lighting standards in the residential sector of 2279 GWh (3188 GWh minus 908 GWh).³² Using the same approach, we calculated incremental uncommitted savings from all of the other delivery mechanisms included in the 2008 GPUC Goals Study following the same process described above and the mechanism-specific adjustments shown in Table 4-4.

In order to interpret the results of these calculations correctly, it is important to understand two specific aspects of the incremental uncommitted savings calculation methodology described above. First, this accounting method does not incorporate or account for any differences between the Energy Commission’s estimates of savings from committed programs and savings in the Low Goals Case through the end of the committed period, i.e. 2012. In other words, the “gap” between the Energy Commission’s estimates of savings from committed programs and savings in the Low Goals Case through 2012 (as shown in Figure 4-1 and Figure 4-2) is not carried forward or included in the incremental uncommitted savings calculations in any way, either as a decrement or a source of additional, incremental savings.

Second, the incremental uncommitted savings calculation methodology described above effectively treats savings from committed IOU programs (as estimated by the Energy Commission) as constant from 2013 forward rather than decaying (as shown in Figure 4-1 and Figure 4-2). This method reflects the decision by CPUC and Energy Commission staff to establish an accounting method that conforms to the CPUC’s policy rules under which the IOUs are responsible for replacing decayed savings from previous program cycles. We thus considered such decayed savings-replacement to be associated with committed programs rather than uncommitted programs. Therefore, our estimates of incremental uncommitted savings do not interact with any assumed levels of measure savings decay from previous IOU program cycles. The sensitivity and uncertainty associated with this assumption relative to our estimates of total incremental uncommitted savings is discussed in more detail in Section 4.5.

Table 4-5 and Table 4-6 present the results of the incremental uncommitted savings calculations following the programmatic scope summarized above with respect to the Low Goals Case scenario. Again, the results shown in these tables have been aggregated across the three IOUs. Sections 7, 8, and 9 provide similar tables of IOU-specific results tables for PG&E, SCE, and SDG&E, respectively.

³² Note the final result is corrected for rounding errors that occur when strictly using the results shown in Table 4-2.

Table 4-5: Summary of Incremental Uncommitted Energy Savings (GWh) Under Low Goals Case

3 IOU Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	642	1,258	1,853	2,376	2,920	3,431	3,940	4,448
AB 1109 lighting standards	740	785	645	1,220	2,213	3,224	3,653	3,602
Title 24 & Fed Standards	28	75	143	261	380	516	656	798
BBEES	163	333	549	776	1,013	1,267	1,533	1,809
Incremental uncommitted	1,573	2,452	3,191	4,632	6,526	8,439	9,782	10,658
Total Residential								
IOU programs	260	501	727	902	1,091	1,257	1,421	1,584
AB 1109 lighting standards	476	462	322	691	1,361	2,048	2,330	2,279
Title 24 & Fed Standards	8	34	65	144	224	309	395	481
BBEES	75	154	258	368	482	609	742	880
Incremental uncommitted	818	1,150	1,373	2,104	3,158	4,223	4,887	5,224
Total Commercial								
IOU programs	173	339	498	637	782	918	1,053	1,188
AB 1109 lighting standards	265	323	323	529	853	1,176	1,323	1,323
Title 24 & Fed Standards	20	42	78	116	156	207	261	317
BBEES	88	179	291	408	531	658	792	930
Incremental uncommitted	545	883	1,190	1,691	2,322	2,959	3,429	3,758
Total Industry								
IOU programs	209	419	628	838	1,047	1,256	1,466	1,675
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	209	419	628	838	1,047	1,256	1,466	1,675

As shown in Table 4-5, total incremental uncommitted energy savings associated with the Low Goals Case are estimated to be 1,573 GWh in 2013 growing to 10,658 GWh by 2020. Relative to the growth in sales estimated in the 2009 IEPR forecast, this level of incremental uncommitted energy savings is equivalent to roughly 50% of the total growth in consumption estimated in the 2009 IEPR demand forecast between 2012 and 2020.

Across program types, Table 4-5 shows that IOU programs and the AB 1109 lighting standards account for the largest shares of total incremental uncommitted energy savings associated with the Low Goals Case (42% and 34%, respectively), followed by the BBEES initiatives (17%), and Title 24 and federal appliance standards (7%). Importantly, Table 4-5 also shows that nearly 85% of total incremental uncommitted savings are derived from delivery mechanisms targeting the residential and commercial sectors, while only 15% are derived from delivery mechanisms targeting the industrial sector. This result reflects the fact that energy savings from the AB 1109 lighting standards, Title 24 revisions, new federal appliance standards, and the BBEES initiatives are assumed to occur exclusively in the residential and commercial sectors, while only IOU programs produce incremental uncommitted savings the industrial sector.

Table 4-6: Summary of Incremental Uncommitted Peak Demand Savings (MW) Under Low Goals Case

3 IOU Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	189	373	554	723	895	1,063	1,230	1,396
AB 1109 lighting standards	102	110	93	172	307	445	504	498
Title 24 & Fed Standards	16	35	66	162	260	368	477	588
BBEES	132	271	455	647	849	1,073	1,308	1,552
Incremental uncommitted	439	788	1,168	1,705	2,312	2,949	3,518	4,034
Total Residential								
IOU programs	76	150	223	288	355	421	486	549
AB 1109 lighting standards	58	57	40	85	167	251	286	280
Title 24 & Fed Standards	11	24	46	133	221	315	411	508
BBEES	110	226	382	545	716	909	1,110	1,320
Incremental uncommitted	256	456	690	1,051	1,459	1,896	2,292	2,656
Total Commercial								
IOU programs	77	152	225	292	362	428	495	562
AB 1109 lighting standards	44	53	53	87	141	194	218	218
Title 24 & Fed Standards	5	11	20	30	40	53	66	81
BBEES	22	45	73	102	132	164	198	232
Incremental uncommitted	148	261	371	511	675	839	977	1,092
Total Industry								
IOU programs	36	71	107	142	178	214	249	285
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	36	71	107	142	178	214	249	285

Table 4-6 shows that total incremental uncommitted peak demand savings associated with the Low Goals Case are estimated to be 439 MW in 2013 growing to 4,034 MW by 2020. Relative to the growth in peak demand estimated in the 2009 IEPR forecast, this level of incremental uncommitted energy savings is equivalent to roughly 75% of the total load growth estimated in the 2009 IEPR demand forecast between 2012 and 2020.

Across program types, Table 4-6 shows that, in contrast to the energy savings results, progress towards the BBEES target for ZNE new homes and buildings accounts for the largest share of total incremental uncommitted peak demand savings associated with the Low Goals Case (38%), followed by IOU programs (35%), with savings from the AB 1109 lighting standards and Title 24 and federal appliance standards accounting for the smallest shares (~15% each). These results reflect the relative peak demand impacts of the measures emphasized in each program type. Since the savings associated with the Title 24 and the BBEES initiatives are assumed to be largely concentrated in HVAC (whose savings are highly coincident with system peak demand), the relative peak demand savings from those programs are significantly higher on a per-unit basis compared to savings associated with the AB 1109 lighting standards and IOU programs.

Table 4-6 also shows that over 90% of total incremental uncommitted peak demand savings are derived from measures and programs targeting the residential and commercial sectors, while less than 10% are derived from industrial measures and programs. Again, this result reflects the fact that energy savings from Title 24 revisions, new federal appliance standards, and the BBEES initiatives are assumed to occur exclusively in the

residential and commercial sectors, while only IOU programs produce incremental uncommitted savings the industrial sector. Moreover, the HVAC-centric nature of savings from Title 24 and the BBEES initiatives also helps to explain why total incremental uncommitted peak demand savings are so heavily concentrated in the residential and commercial sectors.

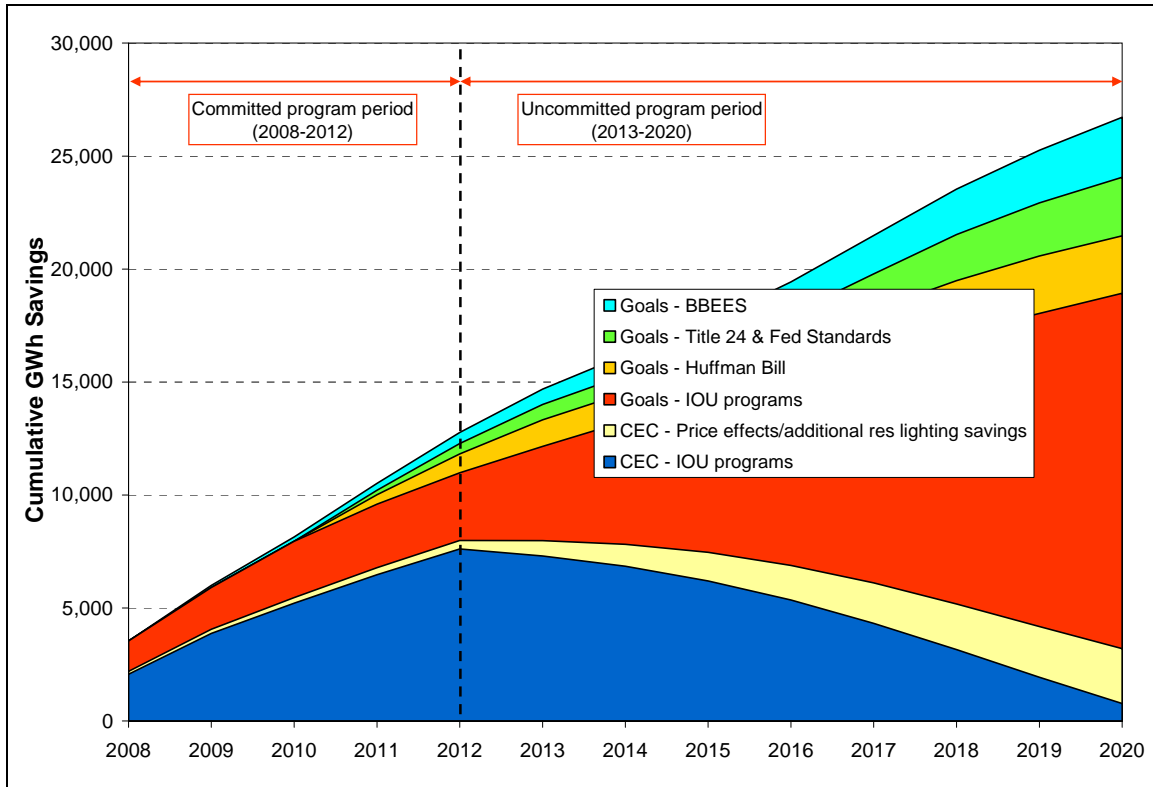
4.2 Mid Goals Case

Figure 4-3 and Figure 4-4 present summaries of the estimated energy and peak demand savings, respectively, from efficiency programs included in the 2009 IEPR demand forecast compared to those from the programs included in the Mid Goals Case scenario of the 2008 CPUC Goals study.

As Figure 4-3 shows, for new programmatic activities implemented during the committed program period (2008-2012), total energy savings are derived almost entirely from IOU programs. Overall, the Energy Commission's estimates of cumulative savings from IOU programs are lower than savings from IOU programs estimated in the Mid Goals Case scenario. This result appears to mostly reflect differences in net-to-gross savings accounting between the Energy Commission forecasting model and Itron's ASSET model with respect to savings from IOU programs, particularly for residential programs, although some differences can again be traced to differences in the measure rebate levels assumed in the Mid Goals Case scenario and the 2009 IEPR forecast. In this case, the measure rebate levels assumed in the Mid Goals Case scenario (based on Itron's estimate of full restricted market potential as discussed in Section 3.1) are slightly higher on average compared to what the IOUs actually offered or have proposed to offer over the committed program period.

Over the uncommitted program period from 2013 forward, Figure 4-3 shows that the Energy Commission's estimates of cumulative energy savings from IOU programs decline steadily through the end of the forecast period, reflecting significant and steady decay of savings from measures previously-adopted through IOU programs. This result again reflects the convention used by the Energy Commission that committed programs are assumed to produce energy efficiency adoptions through the end of the committed program period (2012), after which there is a theoretical absence of efforts to replace previously-adopted efficiency measures when they reach the end of their respective useful lives.

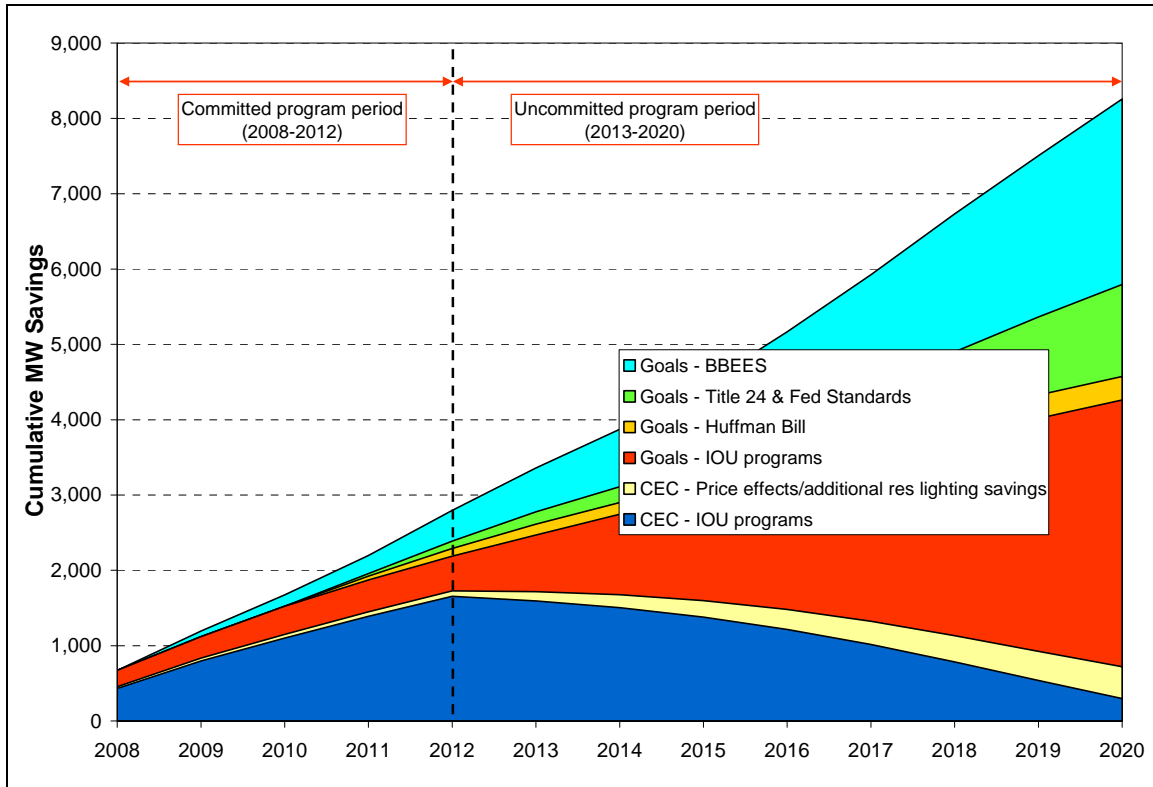
Figure 4-3: Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - Mid Goals Case



In contrast, Figure 4-3 shows that the cumulative energy savings in the Low Goals Case grows strongly from 2013 forward, driven primarily from energy savings expanded IOU programs, with savings from the implementation of the AB 1109 lighting standards, future revisions to Title 24 building codes and federal appliance standards, and progress towards the BBEEs targets for zero net energy (ZNE) new homes and buildings each contributing smaller but significant shares of total energy savings growth over the uncommitted period.

Figure 4-4 summarizes the analogous results for peak demand savings with respect to the Mid Goals Case. As the figure shows, for new programmatic activities implemented during the committed program period (2008-2012), total peak demand savings are again driven principally by savings from IOU programs. Again, the Energy Commission’s estimates of cumulative peak demand savings from IOU programs are slightly lower than those from IOU programs in the Mid Goals Case scenario, reflecting net-to-gross accounting differences between the Energy Commission forecasting model and Itron’s ASSET model, as well as slightly higher measure rebates assumed in the Mid Goals Case scenario compared to what the IOUs actually offered or have proposed to offer over the committed program period.

Figure 4-4: Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - Mid Goals Case



As was the case for energy savings, Figure 4-4 shows that the Energy Commission’s estimates of cumulative peak demand savings from IOU programs decline steadily from 2013 through the end of the forecast period, reflecting significant and steady decay of savings from measures previously-adopted through IOU programs. In contrast, Figure 4-4 shows that in the Mid Goals Case, cumulative peak demand savings (like energy savings) grow strongly from 2013 forward. This growth in cumulative peak demand savings is driven both by expanded IOU programs and significant assumed progress towards the BBES targets for ZNE new homes and buildings. Estimated peak demand savings from future revisions to Title 24 building codes and federal appliance standards again account for a smaller but significant share of the total growth in savings from 2013 forward, whereas savings from the implementation of the AB 1109 lighting standards account for only a small share of total estimated growth in peak demand savings.

Table 4-7 and Table 4-8 present the results for cumulative energy and peak demand savings from committed and uncommitted programs broken out by both program type (e.g. IOU programs, codes & standards, etc.) and end-use sector (e.g. residential, commercial, and industrial). Again, the results shown in these tables have been aggregated across the three IOU service territories. Sections 7, 8, and 9 provide similar tables of IOU-specific results tables for PG&E, SCE, and SDG&E, respectively.

Table 4-7: Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - Mid Goals Case

3 IOU Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	2,073	3,871	5,210	6,474	7,618	7,306	6,844	6,197	5,353	4,324	3,158	1,941	773
CEC - Price effects/addt'l res lighting savings	126	188	250	312	374	680	979	1,263	1,535	1,788	2,024	2,240	2,435
CEC - Total	2,200	4,059	5,460	6,786	7,992	7,986	7,823	7,460	6,888	6,112	5,182	4,181	3,208
Goals - IOU programs	3,543	5,909	7,956	9,599	10,986	12,154	13,272	14,343	15,269	16,238	17,137	18,034	18,929
Goals - AB 1109 lighting standards	0	0	0	620	1,240	1,747	1,860	1,860	2,255	2,875	3,495	3,777	3,777
Goals - Title 24 & Fed Standards	0	0	0	0	51	106	184	304	487	675	895	1,122	1,355
Goals - BBEES	0	93	190	304	489	683	885	1,144	1,415	1,698	2,004	2,324	2,655
Goals - Total	3,543	6,002	8,145	10,522	12,766	14,690	16,202	17,652	19,426	21,486	23,531	25,256	26,716
Total Residential													
CEC - IOU programs	1,164	2,282	3,142	3,949	4,671	4,451	4,125	3,668	3,077	2,368	1,582	785	54
CEC - Price effects/addt'l res lighting savings	25	36	47	58	70	232	387	527	654	764	855	928	978
CEC - Total	1,188	2,318	3,189	4,007	4,740	4,683	4,512	4,195	3,732	3,132	2,437	1,713	1,032
Goals - IOU programs	1,827	3,074	4,108	4,875	5,472	5,924	6,342	6,730	7,021	7,340	7,613	7,885	8,155
Goals - AB 1109 lighting standards	0	0	0	418	836	1,178	1,254	1,254	1,520	1,938	2,356	2,546	2,546
Goals - Title 24 & Fed Standards	0	0	0	0	18	37	78	134	250	367	496	628	761
Goals - BBEES	0	45	91	146	246	350	458	602	753	911	1,086	1,269	1,459
Goals - Total	1,827	3,119	4,200	5,439	6,572	7,488	8,132	8,720	9,543	10,556	11,551	12,327	12,921
Total Commercial													
CEC - IOU programs	910	1,589	2,068	2,525	2,948	2,855	2,719	2,529	2,276	1,956	1,576	1,156	719
CEC - Price effects	101	152	203	254	304	448	592	736	880	1,024	1,168	1,313	1,457
CEC - Total	1,011	1,741	2,271	2,779	3,252	3,303	3,311	3,265	3,156	2,981	2,745	2,468	2,176
Goals - IOU programs	1,333	2,165	2,891	3,480	3,982	4,412	4,825	5,221	5,569	5,932	6,270	6,608	6,947
Goals - AB 1109 lighting standards	0	0	0	202	404	570	606	606	735	937	1,139	1,231	1,231
Goals - Title 24 & Fed Standards	0	0	0	0	33	69	106	171	238	308	399	494	594
Goals - BBEES	0	48	98	157	243	333	427	542	662	788	919	1,055	1,197
Goals - Total	1,333	2,213	2,989	3,839	4,663	5,383	5,964	6,539	7,203	7,964	8,727	9,389	9,968
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	383	670	957	1,244	1,531	1,818	2,105	2,392	2,679	2,966	3,253	3,541	3,828
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	383	670	957	1,244	1,531	1,818	2,105	2,392	2,679	2,966	3,253	3,541	3,828

Table 4-8: Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - Mid Goals Case

3 IOU Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	431	799	1,102	1,389	1,654	1,594	1,505	1,380	1,217	1,016	785	539	298
CEC - Price effects/addt'l res lighting savings	24	36	49	61	73	122	171	218	263	306	347	386	422
CEC - Total	456	836	1,150	1,450	1,727	1,716	1,676	1,598	1,480	1,323	1,132	925	720
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	84	168	237	252	252	306	390	474	512	512
Goals - Title 24 & Fed Standards	0	0	0	0	34	70	110	177	328	482	657	837	1,021
Goals - BBEEES	0	74	150	241	408	583	766	1,009	1,264	1,531	1,829	2,140	2,463
Goals - Total	672	1,194	1,675	2,197	2,797	3,360	3,874	4,456	5,166	5,926	6,731	7,506	8,259
Total Residential													
CEC - IOU programs	249	481	653	814	958	917	856	770	657	518	361	200	49
CEC - Price effects/addt'l res lighting savings	3	4	5	6	7	27	46	63	78	92	103	111	117
CEC - Total	252	485	658	820	966	945	902	833	735	610	464	311	167
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	51	102	144	154	154	186	238	289	312	312
Goals - Title 24 & Fed Standards	0	0	0	0	25	50	80	129	261	395	544	697	853
Goals - BBEEES	0	61	126	201	347	499	659	874	1,099	1,334	1,599	1,876	2,164
Goals - Total	316	595	849	1,134	1,494	1,834	2,148	2,525	3,015	3,539	4,104	4,656	5,197
Total Commercial													
CEC - IOU programs	182	318	449	576	696	676	648	610	560	498	424	339	249
CEC - Price effects	22	33	43	54	65	95	125	155	185	215	245	275	305
CEC - Total	204	350	492	630	761	771	773	765	745	713	668	614	553
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	33	66	92	98	98	119	152	185	200	200
Goals - Title 24 & Fed Standards	0	0	0	0	9	19	30	48	67	87	113	140	168
Goals - BBEEES	0	12	25	39	61	83	107	136	166	197	230	264	300
Goals - Total	292	486	663	853	1,043	1,217	1,370	1,526	1,697	1,884	2,075	2,250	2,413
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs													
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	65	114	162	211	259	308	357	405	454	503	551	600	649

Table 4-9 and Table 4-10 present the results of the incremental uncommitted savings calculations following the programmatic scope and adjustments shown in Table 4-4 and discussed in the previous section. Again, the results shown in these tables have been aggregated across the three IOUs. Sections 7, 8, and 9 provide similar tables of IOU-specific results tables for PG&E, SCE, and SDG&E, respectively.

Table 4-9: Summary of Incremental Uncommitted Energy Savings (GWh) Under Mid Goals Case

3 IOU Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	1,050	2,055	3,017	3,847	4,716	5,521	6,325	7,126
AB 1109 lighting standards	345	302	163	430	941	1,469	1,678	1,628
Title 24 & Fed Standards	55	133	254	437	624	844	1,071	1,304
BBEES	194	397	655	926	1,209	1,516	1,835	2,167
Incremental uncommitted	1,644	2,888	4,089	5,640	7,490	9,350	10,909	12,225
Total Residential								
IOU programs	452	870	1,257	1,548	1,867	2,141	2,413	2,683
AB 1109 lighting standards	180	100	-39	99	408	734	852	801
Title 24 & Fed Standards	19	60	116	232	349	478	610	743
BBEES	104	213	357	508	665	840	1,023	1,213
Incremental uncommitted	754	1,243	1,691	2,387	3,290	4,194	4,897	5,440
Total Commercial								
IOU programs	312	612	899	1,150	1,413	1,658	1,902	2,147
AB 1109 lighting standards	165	202	202	331	533	735	827	827
Title 24 & Fed Standards	36	73	138	205	275	366	462	561
BBEES	90	184	299	419	544	675	812	954
Incremental uncommitted	603	1,071	1,537	2,105	2,765	3,434	4,002	4,488
Total Industry								
IOU programs	287	574	861	1,148	1,435	1,722	2,009	2,297
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	287	574	861	1,148	1,435	1,722	2,009	2,297

As shown in Table 4-9, total incremental uncommitted energy savings associated with the Mid Goals Case are estimated to be 1,644 GWh in 2013 growing to 12,225 GWh by 2020. Relative to the growth in sales estimated in the 2009 IEPR forecast, this level of incremental uncommitted energy savings is equivalent to roughly 60% of the total growth in consumption estimated in the 2009 IEPR demand forecast between 2012 and 2020.

Across program types, Table 4-9 shows that expanded IOU programs account for the largest share of total incremental uncommitted energy savings associated with the Mid Goals Case (58%), followed by the BBEES initiatives (18%) and the AB 1109 lighting standards (13%), with savings from Title 24 and federal appliance standards accounting for the remainder (11%). Table 4-9 also shows that roughly 80% of total incremental uncommitted savings are derived from measures and programs targeting the residential and commercial sectors, while just over 20% are derived from industrial measures and programs. This result again reflects the fact that energy savings from the AB 1109 lighting standards, Title 24 revisions, new federal appliance standards, and the BBEES initiatives are assumed to occur exclusively in the residential and commercial sectors, while only IOU programs produce incremental uncommitted savings the industrial sector.

Table 4-10: Summary of Incremental Uncommitted Peak Demand Savings (MW) Under Mid Goals Case

3 IOU Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	284	560	830	1,081	1,336	1,583	1,830	2,075
AB 1109 lighting standards	49	46	29	67	137	210	240	234
Title 24 & Fed Standards	36	76	143	294	448	623	803	987
BBEES	175	358	602	857	1,123	1,421	1,732	2,056
Incremental uncommitted	544	1,039	1,604	2,298	3,045	3,839	4,605	5,352
Total Residential								
IOU programs	120	236	349	449	552	652	750	847
AB 1109 lighting standards	22	13	-4	13	51	91	106	100
Title 24 & Fed Standards	26	55	104	236	370	520	673	829
BBEES	152	312	527	752	987	1,252	1,529	1,817
Incremental uncommitted	321	615	976	1,450	1,961	2,515	3,057	3,593
Total Commercial								
IOU programs	115	227	336	437	540	640	739	839
AB 1109 lighting standards	27	33	33	54	87	119	134	134
Title 24 & Fed Standards	10	21	39	58	78	104	130	158
BBEES	23	46	75	105	136	169	203	239
Incremental uncommitted	174	326	482	653	841	1,032	1,207	1,370
Total Industry								
IOU programs	49	97	146	195	243	292	341	389
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	49	97	146	195	243	292	341	389

Table 4-10 shows that total incremental uncommitted peak demand savings associated with the Mid Goals Case are estimated to be 544 MW in 2013 growing to 5,352 MW by 2020. Relative to the growth in peak demand estimated in the 2009 IEPR forecast, this level of incremental uncommitted energy savings is equivalent to roughly 100% of the total load growth estimated in the 2009 IEPR demand forecast between 2012 and 2020.

Across program types, Table 4-10 shows that, in contrast to the energy savings results, progress towards the BBEES target for ZNE new homes and buildings accounts for a nearly identical share of total incremental uncommitted peak demand savings associated with the Mid Goals Case as IOU programs (~38% each). Peak demand savings from Title 24 and federal appliance standards account for a smaller but significant share (18%), with savings from the AB 1109 lighting standards accounting for the smallest share (4%). These results again reflect the relative peak demand impacts of the measures emphasized in each program type. Since the savings associated with the Title 24 and the BBEES initiatives are assumed to be largely concentrated in HVAC (whose savings are highly coincident with system peak demand), the relative peak demand savings from those programs are significantly higher on a per-unit basis compared to savings associated with the AB 1109 lighting standards and IOU programs. This difference in the relative peak demand savings across uncommitted programs also helps to explain the result, as shown in Table 4-10, that over 90% of total incremental uncommitted peak demand savings are derived from measures and programs targeting the residential and commercial sectors, while less than 10% are derived from industrial measures and programs.

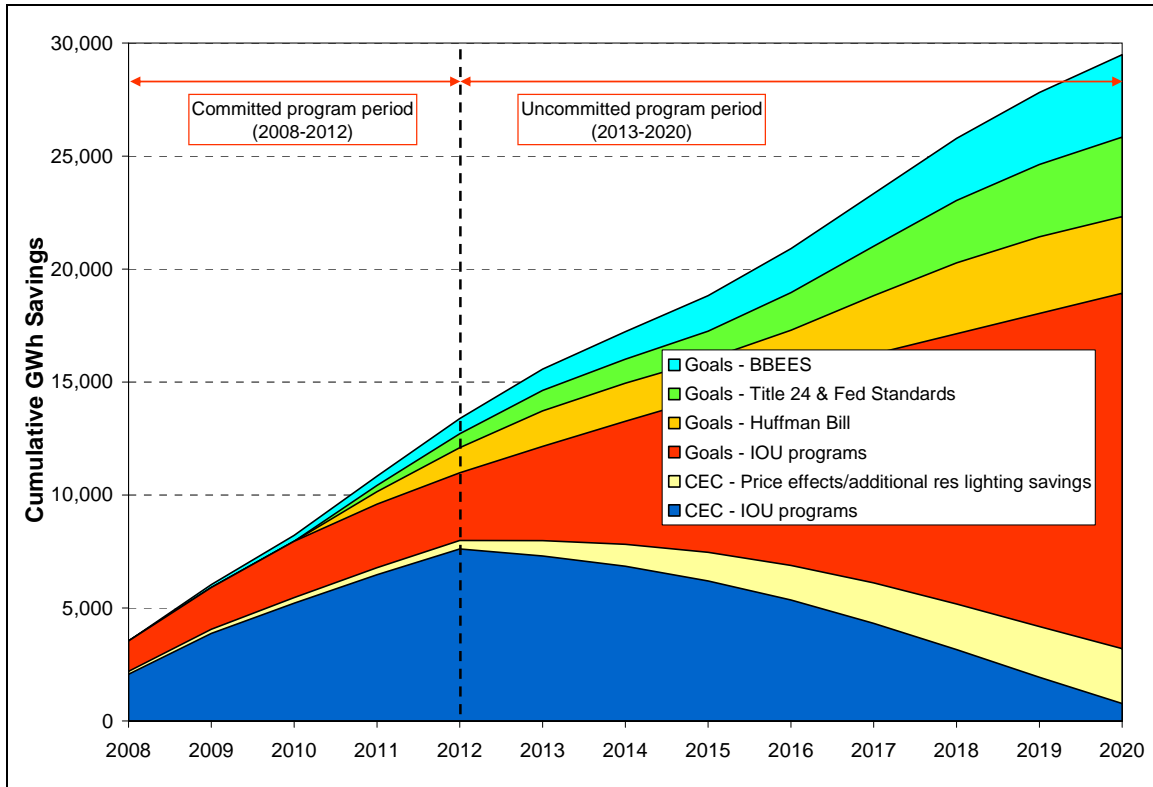
4.3 High Goals Case

Figure 4-5 and Figure 4-6 present summaries of the estimated energy and peak demand savings, respectively, from efficiency programs included in the 2009 IEPR demand forecast compared to those from the programs included in the High Goals Case scenario of the 2008 CPUC Goals study.

As Figure 4-5 shows, for new programmatic activities implemented during the committed program period (2008-2012), total energy savings are derived almost entirely from IOU programs. Overall, the Energy Commission's estimates of cumulative savings from IOU programs are slightly lower than savings from IOU programs estimated in the High Goals Case scenario. As discussed earlier, this result appears to mostly reflect differences in net-to-gross savings accounting between the Energy Commission forecasting model and Itron's ASSET model with respect to savings from IOU programs, particularly for residential programs, although some differences can again be traced to differences in the measure rebate levels assumed in the High Goals Case scenario and the 2009 IEPR forecast. In this case, the measure rebate levels assumed in the High Goals Case scenario (based on Itron's estimate of full restricted market potential as discussed in Section 3.1) are slightly higher on average compared to what the IOUs actually offered or have proposed to offer over the committed program period.

Over the uncommitted program period from 2013 forward, Figure 4-5 shows that the Energy Commission's estimates of cumulative energy savings from IOU programs decline steadily through the end of the forecast period, reflecting significant and steady decay of savings from measures previously-adopted through IOU programs. This result again reflects the convention used by the Energy Commission that committed programs are assumed to produce energy efficiency adoptions through the end of the committed program period (2012), after which there is a theoretical absence of efforts to replace previously-adopted efficiency measures when they reach the end of their respective useful lives.

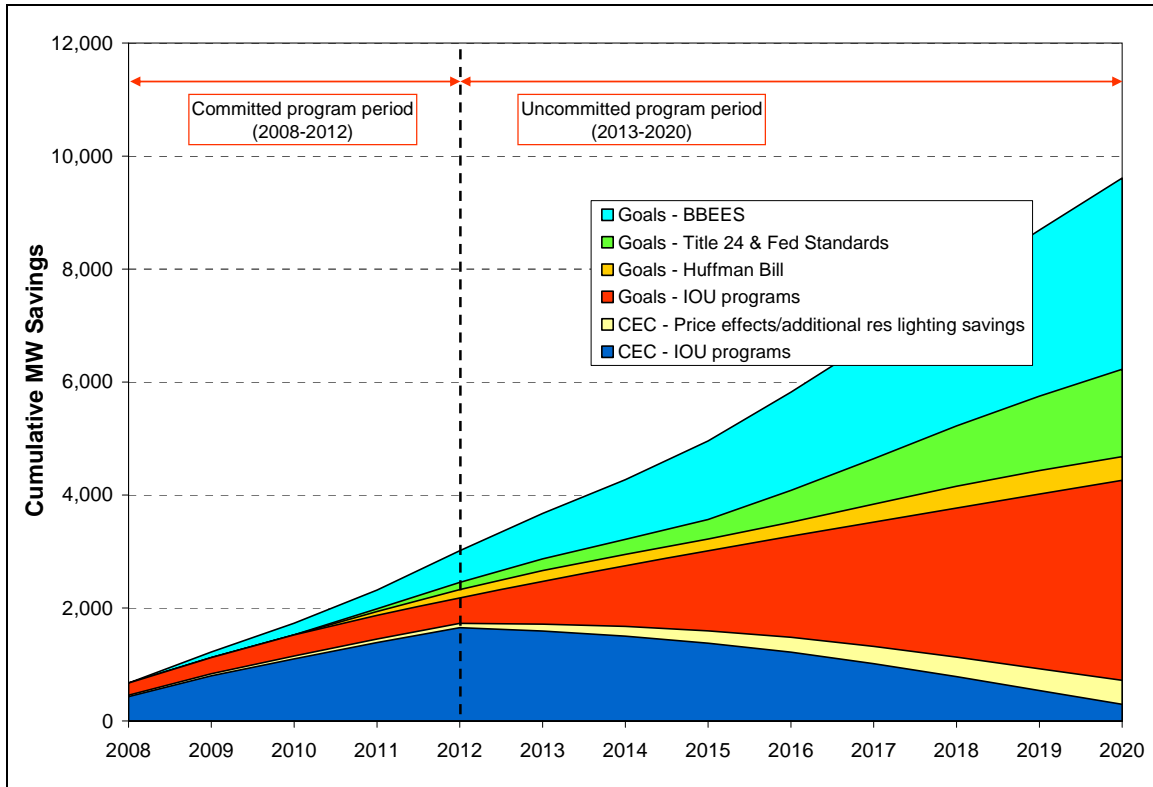
Figure 4-5: Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - High Goals Case



In contrast, Figure 4-5 shows that the cumulative energy savings in the High Goals Case grows strongly from 2013 forward, driven primarily from expanded IOU programs, with savings from the implementation of the AB 1109 lighting standards, future revisions to Title 24 building codes and federal appliance standards, and progress towards the BBES targets for zero net energy (ZNE) new homes and buildings each contributing smaller but significant shares of total savings growth.

Figure 4-6 summarizes the analogous results for peak demand savings with respect to the High Goals Case. As the figure shows, for new programmatic activities implemented during the committed program period (2008-2012), total peak demand savings are again driven principally by savings from IOU programs. Again, the Energy Commission's estimates of cumulative peak demand savings from IOU programs are slightly lower than those from IOU programs in the High Goals Case scenario, reflecting net-to-gross accounting differences between the Energy Commission forecasting model and Itron's ASSET model, as well as slightly higher measure rebates assumed in the High Goals Case scenario compared to what the IOUs actually offered or have proposed to offer over the committed program period.

Figure 4-6: Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - High Goals Case



As was the case for energy savings, Figure 4-6 shows that the Energy Commission’s estimates of cumulative peak demand savings from IOU programs decline steadily from 2013 through the end of the forecast period, reflecting significant and steady decay of savings from measures previously-adopted through IOU programs. In contrast, Figure 4-6 shows that in the High Goals Case, cumulative peak demand savings (like energy savings) grow strongly from 2013 forward. This growth in cumulative peak demand savings is driven principally by significant assumed progress towards the BBES targets for ZNE new homes and buildings. Estimated peak demand savings from expanded IOU programs and future revisions to Title 24 building codes and federal appliance standards account for slightly smaller but significant share of the total growth in savings from 2013 forward, whereas savings from the implementation of the AB 1109 lighting standards account for only a small share of total estimated growth in peak demand savings.

Table 4-11 and Table 4-12 present the results for cumulative energy and peak demand savings from committed and uncommitted programs broken out by both program type (e.g. IOU programs, codes & standards, etc.) and end-use sector (e.g. residential, commercial, and industrial). Again, the results shown in these tables have been aggregated across the three IOU service territories. Sections 7, 8, and 9 provide similar tables of IOU-specific results tables for PG&E, SCE, and SDG&E, respectively.

Table 4-11: Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - High Goals Case

3 IOU Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	2,073	3,871	5,210	6,474	7,618	7,306	6,844	6,197	5,353	4,324	3,158	1,941	773
CEC - Price effects/addt'l res lighting savings	126	188	250	312	374	680	979	1,263	1,535	1,788	2,024	2,240	2,435
CEC - Total	2,200	4,059	5,460	6,786	7,992	7,986	7,823	7,460	6,888	6,112	5,182	4,181	3,208
Goals - IOU programs	3,543	5,909	7,956	9,599	10,986	12,154	13,272	14,343	15,269	16,238	17,137	18,034	18,929
Goals - AB 1109 lighting standards	0	0	0	827	1,653	2,330	2,480	2,480	3,006	3,833	4,660	5,035	5,035
Goals - Title 24 & Fed Standards	0	0	0	0	74	153	261	429	680	937	1,242	1,556	1,879
Goals - BBEES	0	128	261	418	672	938	1,217	1,571	1,943	2,331	2,750	3,187	3,642
Goals - Total	3,543	6,037	8,217	10,843	13,385	15,575	17,230	18,824	20,898	23,339	25,788	27,812	29,485
Total Residential													
CEC - IOU programs	1,164	2,282	3,142	3,949	4,671	4,451	4,125	3,668	3,077	2,368	1,582	785	54
CEC - Price effects/addt'l res lighting savings	25	36	47	58	70	232	387	527	654	764	855	928	978
CEC - Total	1,188	2,318	3,189	4,007	4,740	4,683	4,512	4,195	3,732	3,132	2,437	1,713	1,032
Goals - IOU programs	1,827	3,074	4,108	4,875	5,472	5,924	6,342	6,730	7,021	7,340	7,613	7,885	8,155
Goals - AB 1109 lighting standards	0	0	0	557	1,115	1,570	1,672	1,672	2,026	2,584	3,141	3,394	3,394
Goals - Title 24 & Fed Standards	0	0	0	0	20	41	89	153	295	439	595	754	916
Goals - BBEES	0	62	127	203	340	484	634	832	1,040	1,256	1,497	1,748	2,009
Goals - Total	1,827	3,136	4,235	5,635	6,947	8,020	8,737	9,387	10,382	11,619	12,847	13,782	14,474
Total Commercial													
CEC - IOU programs	910	1,589	2,068	2,525	2,948	2,855	2,719	2,529	2,276	1,956	1,576	1,156	719
CEC - Price effects	101	152	203	254	304	448	592	736	880	1,024	1,168	1,313	1,457
CEC - Total	1,011	1,741	2,271	2,779	3,252	3,303	3,311	3,265	3,156	2,981	2,745	2,468	2,176
Goals - IOU programs	1,333	2,165	2,891	3,480	3,982	4,412	4,825	5,221	5,569	5,932	6,270	6,608	6,947
Goals - AB 1109 lighting standards	0	0	0	269	539	759	808	808	980	1,249	1,519	1,641	1,641
Goals - Title 24 & Fed Standards	0	0	0	0	54	112	172	276	385	498	646	801	963
Goals - BBEES	0	66	134	215	332	454	583	739	903	1,074	1,253	1,439	1,633
Goals - Total	1,333	2,231	3,025	3,964	4,907	5,737	6,388	7,044	7,836	8,754	9,688	10,490	11,184
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	383	670	957	1,244	1,531	1,818	2,105	2,392	2,679	2,966	3,253	3,541	3,828
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	383	670	957	1,244	1,531	1,818	2,105	2,392	2,679	2,966	3,253	3,541	3,828

Table 4-12: Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - High Goals Case

3 IOU Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	431	799	1,102	1,389	1,654	1,594	1,505	1,380	1,217	1,016	785	539	298
CEC - Price effects/addt'l res lighting savings	24	36	49	61	73	122	171	218	263	306	347	386	422
CEC - Total	456	836	1,150	1,450	1,727	1,716	1,676	1,598	1,480	1,323	1,132	925	720
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	112	224	316	336	336	408	520	632	683	683
Goals - Title 24 & Fed Standards	0	0	0	0	41	84	133	214	406	601	823	1,049	1,281
Goals - BBEEES	0	102	208	333	563	804	1,055	1,390	1,740	2,106	2,514	2,940	3,383
Goals - Total	672	1,223	1,733	2,318	3,015	3,675	4,271	4,958	5,821	6,750	7,739	8,689	9,609
Total Residential													
CEC - IOU programs	249	481	653	814	958	917	856	770	657	518	361	200	49
CEC - Price effects/addt'l res lighting savings	3	4	5	6	7	27	46	63	78	92	103	111	117
CEC - Total	252	485	658	820	966	945	902	833	735	610	464	311	167
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	68	137	193	205	205	248	317	385	416	416
Goals - Title 24 & Fed Standards	0	0	0	0	27	56	89	145	309	476	660	848	1,039
Goals - BBEEES	0	85	175	280	480	690	909	1,205	1,514	1,837	2,201	2,580	2,975
Goals - Total	316	618	898	1,229	1,665	2,079	2,460	2,923	3,541	4,202	4,918	5,614	6,298
Total Commercial													
CEC - IOU programs	182	318	449	576	696	676	648	610	560	498	424	339	249
CEC - Price effects	22	33	43	54	65	95	125	155	185	215	245	275	305
CEC - Total	204	350	492	630	761	771	773	765	745	713	668	614	553
Goals - IOU programs													
Goals - AB 1109 lighting standards	0	0	0	44	88	123	131	131	159	203	247	266	266
Goals - Title 24 & Fed Standards	0	0	0	0	13	28	43	70	97	126	163	201	242
Goals - BBEEES	0	16	34	54	83	114	146	185	226	269	313	360	408
Goals - Total	292	491	672	878	1,091	1,287	1,454	1,629	1,826	2,045	2,270	2,475	2,663
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs													
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	65	114	162	211	259	308	357	405	454	503	551	600	649

Table 4-13 and Table 4-14 present the results of the incremental uncommitted savings calculations following the programmatic scope and adjustments shown in Table 4-4 and discussed in Section 4.1. Again, the results shown in these tables have been aggregated across the three IOUs. Sections 7, 8, and 9 provide similar tables of IOU-specific results tables for PG&E, SCE, and SDG&E, respectively.

Table 4-13: Summary of Incremental Uncommitted Energy Savings (GWh) Under High Goals Case

3 IOU Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	1,050	2,055	3,017	3,847	4,716	5,521	6,325	7,126
AB 1109 lighting standards	514	509	369	768	1,486	2,220	2,524	2,473
Title 24 & Fed Standards	79	187	356	606	864	1,168	1,482	1,805
BBEES	266	544	899	1,271	1,659	2,078	2,515	2,970
Incremental uncommitted	1,910	3,296	4,642	6,492	8,724	10,988	12,845	14,374
Total Residential								
IOU programs	452	870	1,257	1,548	1,867	2,141	2,413	2,683
AB 1109 lighting standards	294	240	100	327	775	1,241	1,421	1,371
Title 24 & Fed Standards	21	69	133	275	419	575	734	896
BBEES	144	294	492	699	916	1,157	1,408	1,669
Incremental uncommitted	910	1,472	1,983	2,850	3,977	5,113	5,976	6,618
Total Commercial								
IOU programs	312	612	899	1,150	1,413	1,658	1,902	2,147
AB 1109 lighting standards	220	269	269	441	710	980	1,102	1,102
Title 24 & Fed Standards	58	118	222	331	445	593	748	909
BBEES	123	251	407	571	743	921	1,108	1,301
Incremental uncommitted	713	1,250	1,798	2,494	3,311	4,152	4,860	5,460
Total Industry								
IOU programs	287	574	861	1,148	1,435	1,722	2,009	2,297
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	287	574	861	1,148	1,435	1,722	2,009	2,297

As shown in Table 4-13, total incremental uncommitted energy savings associated with the High Goals Case are estimated to be 1,910 GWh in 2013 growing to 14,374 GWh by 2020. Relative to the growth in sales estimated in the 2009 IEPR forecast, this level of incremental uncommitted energy savings is equivalent to roughly 70% of the total growth in consumption estimated in the 2009 IEPR demand forecast between 2012 and 2020.

Across program types, Table 4-13 shows that expanded IOU programs account for the largest share of total incremental uncommitted energy savings associated with the High Goals Case (50%), followed by the BBEES initiatives (21%) and savings from the AB 1109 lighting standards (17%), with Title 24 and federal appliance standards accounting for the remainder (13%). As in the other Goals cases, Table 4-13 also shows that more than 80% of total incremental uncommitted savings are derived from measures and programs targeting the residential and commercial sectors, while less than 20% are derived from industrial measures and programs. This result again reflects the fact that energy savings from the AB 1109 lighting standards, Title 24 revisions, new federal appliance standards, and the BBEES initiatives are assumed to occur exclusively in the residential and commercial sectors, while only IOU programs produce incremental uncommitted savings the industrial sector.

Table 4-14: Summary of Incremental Uncommitted Peak Demand Savings (MW) Under High Goals Case

3 IOU Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	284	560	830	1,081	1,336	1,583	1,830	2,075
AB 1109 lighting standards	72	74	57	112	211	312	355	349
Title 24 & Fed Standards	43	92	173	365	560	782	1,009	1,241
BBEES	241	492	827	1,177	1,543	1,951	2,377	2,820
Incremental uncommitted	640	1,217	1,887	2,735	3,651	4,629	5,570	6,484
Total Residential								
IOU programs	120	236	349	449	552	652	750	847
AB 1109 lighting standards	36	30	13	41	96	153	176	170
Title 24 & Fed Standards	29	62	117	282	448	633	821	1,012
BBEES	210	429	725	1,034	1,357	1,720	2,100	2,494
Incremental uncommitted	395	756	1,203	1,805	2,454	3,158	3,846	4,523
Total Commercial								
IOU programs	115	227	336	437	540	640	739	839
AB 1109 lighting standards	36	44	44	72	115	159	179	179
Title 24 & Fed Standards	15	30	56	84	112	149	188	229
BBEES	31	63	102	143	186	230	277	325
Incremental uncommitted	196	363	538	735	954	1,179	1,383	1,572
Total Industry								
IOU programs	49	97	146	195	243	292	341	389
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	49	97	146	195	243	292	341	389

Table 4-14 show that total incremental uncommitted peak demand savings associated with the High Goals Case are estimated to be 635 MW in 2013 growing to 6,420 MW by 2020. Relative to the growth in peak demand estimated in the 2009 IEPR forecast, this level of incremental uncommitted energy savings is equivalent to roughly 125% of the total load growth estimated in the 2009 IEPR demand forecast between 2012 and 2020.

Across program types, Table 4-14 shows that, in contrast to the energy savings results, progress towards the BBEES target for ZNE new homes and buildings accounts for the largest share of total incremental uncommitted peak demand savings associated with the High Goals Case (43%), followed by IOU programs (32%) and Title 24 and federal appliance standards (19%), with savings from the AB 1109 lighting standards accounting for the smallest share (5%). These results again reflect the relative peak demand impacts of the measures emphasized in each program type. Since the savings associated with the Title 24 and the BBEES initiatives are assumed to be largely concentrated in HVAC (whose savings are highly coincident with system peak demand), the relative peak demand savings from those programs are significantly higher on a per-unit basis compared to savings associated with the AB 1109 lighting standards and IOU programs. This difference in the relative peak demand savings across uncommitted programs also helps to explain the result, as shown in Table 4-14, that over 90% of total incremental uncommitted peak demand savings are derived from measures and programs targeting the residential and commercial sectors, while less than 10% are derived from industrial measures and programs.

4.4 Summary

Table 4-15 and Table 4-16 summarize and compare the estimates incremental uncommitted savings across all three Goals Cases. As these tables show, total cumulative incremental savings from uncommitted programs are estimated to range from 10,658 GWh and 4,034 MW of peak demand in the Low Goals Case scenario to 14,374 GWh and 6,484 MW of peak demand in the High Goals Case scenario. These levels of incremental uncommitted energy savings are equivalent to roughly 50% to 70% of the total growth in sales and 75% to 125% of the total in peak demand across the three IOU service territories as estimated in the 2009 IEPR forecast between 2012 and 2020.

Table 4-15 and Table 4-16 also summarize the composition of incremental uncommitted savings in each scenario. As Table 4-15 shows, expanded IOU programs account for the largest share of estimated incremental uncommitted energy savings across all three Goals Cases (42%-58%). In the Low Goals Case, savings from the AB 1109 lighting standards also account for a large share of total incremental uncommitted energy savings (34%), whereas savings from the BBEES initiatives for ZNE new homes and building accounts for large shares of total incremental uncommitted energy savings in the Mid and High Goals Cases (18%-21%).

Table 4-15: Summary of Incremental Uncommitted Energy Savings (GWh) Across All Goals Cases

	2013	2014	2015	2016	2017	2018	2019	2020
Low Goals Case								
IOU programs	642	1,258	1,853	2,376	2,920	3,431	3,940	4,448
AB 1109 lighting standards	740	785	645	1,220	2,213	3,224	3,653	3,602
Title 24 & Fed Standards	28	75	143	261	380	516	656	798
BBEES	163	333	549	776	1,013	1,267	1,533	1,809
Total GWh	1,573	2,452	3,191	4,632	6,526	8,439	9,782	10,658
Mid Goals Case								
IOU programs	1,050	2,055	3,017	3,847	4,716	5,521	6,325	7,126
AB 1109 lighting standards	345	302	163	430	941	1,469	1,678	1,628
Title 24 & Fed Standards	55	133	254	437	624	844	1,071	1,304
BBEES	194	397	655	926	1,209	1,516	1,835	2,167
Total GWh	1,644	2,888	4,089	5,640	7,490	9,350	10,909	12,225
High Goals Case								
IOU programs	1,050	2,055	3,017	3,847	4,716	5,521	6,325	7,126
AB 1109 lighting standards	514	509	369	768	1,486	2,220	2,524	2,473
Title 24 & Fed Standards	79	187	356	606	864	1,168	1,482	1,805
BBEES	266	544	899	1,271	1,659	2,078	2,515	2,970
Total GWh	1,910	3,296	4,642	6,492	8,724	10,988	12,845	14,374

Table 4-16: Summary of Incremental Uncommitted Peak Demand Savings (MW) Across All Goals Cases

	2013	2014	2015	2016	2017	2018	2019	2020
Low Goals Case								
IOU programs	189	373	554	723	895	1,063	1,230	1,396
AB 1109 lighting standards	102	110	93	172	307	445	504	498
Title 24 & Fed Standards	16	35	66	162	260	368	477	588
BBEES	132	271	455	647	849	1,073	1,308	1,552
Total MW	439	788	1,168	1,705	2,312	2,949	3,518	4,034
Mid Goals Case								
IOU programs	284	560	830	1,081	1,336	1,583	1,830	2,075
AB 1109 lighting standards	49	46	29	67	137	210	240	234
Title 24 & Fed Standards	36	76	143	294	448	623	803	987
BBEES	175	358	602	857	1,123	1,421	1,732	2,056
Total MW	544	1,039	1,604	2,298	3,045	3,839	4,605	5,352
High Goals Case								
IOU programs	284	560	830	1,081	1,336	1,583	1,830	2,075
AB 1109 lighting standards	72	74	57	112	211	312	355	349
Title 24 & Fed Standards	43	92	173	365	560	782	1,009	1,241
BBEES	241	492	827	1,177	1,543	1,951	2,377	2,820
Total MW	640	1,217	1,887	2,735	3,651	4,629	5,570	6,484

In contrast to the energy savings results, Table 4-16 shows that savings from the BBEES initiatives for ZNE new homes and buildings account for the largest share of total incremental uncommitted peak demand savings in all three Goals Cases (38%-43%). Expanded IOU programs account for the next largest share of total incremental uncommitted peak demand savings (32%-39%). Savings from the AB 1109 lighting standards, which contribute a significant share of incremental energy savings, account for only a relatively small share of total incremental uncommitted peak demand savings (4%-12%) due to the low levels of coincidence between lighting demand and system peak demand.

Table 4-15 and Table 4-16 also summarize the estimated trends of cumulative incremental uncommitted energy and peak demand savings over time. As both tables show, estimated savings from expanded IOU programs and future revisions to Title 24 and federal appliances standards grow fairly steadily over time. Indeed, savings from IOU programs grow more slowly towards the end of the period reflecting market saturation effects for some key measures, as well as interactions with the AB 1109 lighting standards that effectively eliminate CFL measures from utility program offerings by 2018. Savings from the AB 1109 lighting standards follow a slight “S” shape over time, with cumulative savings being fairly flat through 2016 and then increasing significantly through first two years of the new standards starting in 2018. In contrast to the temporal trends for IOU programs and new codes and standards, savings from the BBEES initiatives grow at increasingly higher rates over the entire uncommitted program period, reflecting steadily higher penetration rates of ZNE homes and buildings within the new construction segment, as specified in the targets established by the CPUC.

4.5 Caveats and Uncertainty

As with any study of this nature, there are inherent uncertainties in trying to reasonably predict outcomes from future actions. This particular study also faced the unique challenge of trying to interact the inputs and outputs from two different modeling platforms in a way that avoided systematic bias and ensured a reasonable level of internal consistency. Given the time and resources available for this effort, however, identifying and reconciling all of the differences between the Energy Commission's 2009 IEPR forecast and the 2008 CPUC Goals study was determined early on to be an unreasonable expectation and beyond the scope of this study. Rather, we focused our analytic efforts and priorities on identifying and reconciling as many of the most important differences in key inputs, methodologies, and assumptions as possible within the project schedule. Specifically, our efforts focused on the following activities:

- 1) Reconciling key differences in baseline end-use characterizations (e.g. UECs and saturations) and adopting common forecasts of key energy service demand drivers (e.g. housing counts and commercial floor stock)
- 2) Framing cumulative savings using a common base year
- 3) Expressing savings in common metrics
- 4) Identifying areas of duplication and contradiction across the two forecasts and, where possible, developing methods to address such them

Despite these efforts, however, some differences do remain and therefore introduce an unknown level of overall uncertainty in the results. Quantifying the magnitude of all of these remaining uncertainties was not possible within the time and resource constraints of the current study. However, based on the knowledge gained over the course of this study and the collective professional judgment of the study team, we present and describe below what we judge to be the five most important analytic caveats and uncertainties embedded in the current analysis.

Electricity price assumptions

One of the basic assumptions in the 2009 IEPR demand forecast is that electricity prices increase ~15%, in real terms, from 2010 to 2020. In contrast, electricity prices were assumed to be constant, in real terms, in the 2008 Itron potential update study, which formed the basis of the IOU program savings estimates in the 2008 CPUC Goals study and the Goals Cases analyzed in this study. This difference in assumptions about future trends in electricity prices results, in principle, in different levels of naturally-occurring adoptions and other forms of price-sensitive customer behavior between the 2009 IEPR forecast and the 2008 Itron potential update study. While it is straightforward mechanically to incorporate the Energy Commission's electricity price forecasts into Itron's estimates of achievable market potential from IOU programs, such an effort would require revising the inputs to Itron's ASSET model and rerunning the market potential scenarios conducted previously. However, both of these steps (particularly the latter) require a significant amount of time and resources and were deemed to be beyond the scope and schedule of the current study.

Differences in committed savings estimates

As shown in Sections 4.1 through 4.3, the Energy Commission's estimates of total cumulative savings from committed IOU programs through 2012 exhibit some significant differences with the IOU program savings estimated under the three Goals Cases. Specifically, the Energy Commission's estimates of IOU program savings are higher than those in the Low Goals Case but lower than those in the Mid and High Goals Cases. As discussed earlier, one important explanatory factor for these differences is that the measure rebate levels assumed in the 2009 IEPR forecast (based on actual incentive levels through 2009 and utility-proposed incentive levels for 2010-2012) are known to be higher than those assumed in the Low Goals case (which were based largely on the average incentives used in the 2004-2005 program cycle) and lower than those assumed in the Mid and High Goals Cases (which were based on incentives equivalent to 100% of incremental measure costs).

As is the case with electricity price assumptions, it is rather straightforward to consider incorporating the measure rebate assumptions assumed in the 2009 IEPR forecast into Itron's estimates of achievable market potential from IOU programs. However, such an effort would require significant amount of time and resources and was deemed to be beyond the scope and schedule of the current study.

Another important factor that helps explain the differences between the Energy Commission's estimates of savings from IOU programs and those estimated in the Goals Cases is related to differences in realization rate assumptions and net-to-gross accounting. In the case of realization rates, the Energy Commission forecast assumes a universal 70% realization rate across all IOU programs and measures to discount IOU program claims and approximate actual, expected program performance. Itron's ASSET model attempts to do a similar type of adjustment but with a different approach. Specifically, Itron's ASSET model uses measure-specific data on past program accomplishments to calibrate forecasted adoptions to observed adoption rates. In this respect, the approach embedded in Itron's ASSET model takes a measure-specific approach based on historical program data in order to produce an expected value forecast of future adoptions, whereas the Energy Commission forecast uses top-down assumptions to accomplish the same task. This difference in modeling approaches, therefore, could potentially lead to significant differences in estimated savings at the measure-specific level and potentially explain some of the aggregate differences observed to date.

The Energy Commission forecast also applies a universal net-to-gross assumption from 2010-2012 for program free-riders that, in principle, are already accounted for in the Energy Commission's estimate of naturally-occurring savings. The Energy Commission's estimates of naturally-occurring savings, in turn, are based on an assumed level of price elasticity defined for broad customer classes (residential, commercial, and industrial). In contrast, Itron's ASSET model produces estimates of both gross program savings and naturally-occurring savings, where naturally-occurring adoptions are based on the cost-benefit characteristics of individual measures without considering utility rebates or incentives. The difference between gross program savings and naturally-

occurring savings then forms the estimate of net program savings. As with effective realization rates, the approach embedded in Itron's ASSET model takes a measure-specific approach to estimating net program savings, whereas the Energy Commission forecast uses a more top-down approach to accomplish the same task. Despite these differences, the Energy Commission's estimates of naturally-occurring savings from commercial customers are roughly consistent with both Itron's naturally-occurring estimates and the free-ridership rates implied in the Energy Commission's net-to-gross assumption for 2010-2012. However, in the case of the residential sector, the Energy Commission's estimates of naturally-occurring are well below both Itron's estimates of residential naturally-occurring savings and the free-ridership rates implied in the net-to-gross assumptions applied to residential measures.

Unlike the efforts required to reconcile difference in measure rebate assumptions that would require significant additional time and resources, reconciling the most significant differences in net-to-gross and realization rate assumptions is an area that could be potentially addressed in a more timely fashion. Ideally, such an effort would leverage the full set of CPUC 2006-2008 ex-post program evaluation studies once they become available, since neither the Energy Commission nor Itron were able to incorporate the results of those ex-post evaluations into the 2009 IEPR forecast, the 2008 CPUC Goals Study, or this study.

It is important to keep in mind, however, these differences in net-to-gross accounting and assumed realization rates only affect the respective estimates of savings from committed programs through 2012 and do not, by definition, affect the estimates of incremental savings from uncommitted programs presented in this report.

Annual savings trends

The SESAT modeling framework itself was designed to focus primarily on producing robust end-point outcomes (in this case, outcomes in the year 2020) and leveraging the results of stock turnover modeling done outside of the model to estimate year-to-year trends (e.g. the detailed stock turnover modeling embedded in Itron's ASSET model). Depending on the source of the annual savings estimates, some of the year-to-year dynamics replicated in the SESAT framework are more uncertain than others. In this study, the temporal dynamics of savings from the AB 1109 lighting standards are the most uncertain across all of the delivery mechanisms assessed. This uncertainty in the year-to-year savings trends from the Huffman is associated with the way that the new lighting standards have been specified in Title 20. Specifically, interim efficiency levels were specified for two distinct product segments defined by lumen output. Additionally, two different interim dates were established for these two product segments, respectively. Currently, sufficient market data is not readily available that allows the residential and commercial lighting markets to be reasonably segmented according to lumen output. As such, Itron was not able to directly estimate the expected temporal dynamics associated with the new lighting standards, particularly over the period covered by the interim standards, and relied on indirect proxies and simplifying assumptions. Additionally, compared to other Title 20 and federal appliance standards, the new lighting standards realistically face potentially significant issues associated with non-compliance or savings

“leakage” due to the sheer volume and diversity of manufacturers and products affected. Such leakage could significantly impact the actual load impacts from the new standards over time.

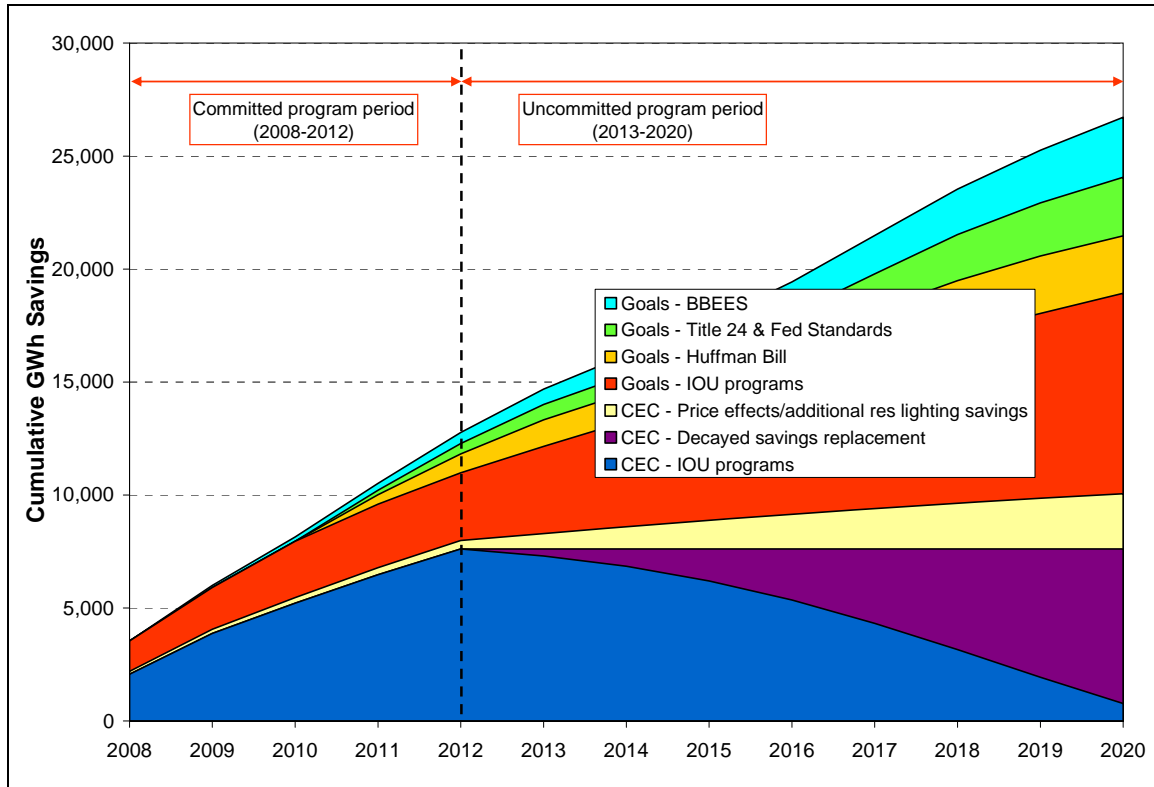
Savings decay from IOU programs

In the results presented and described above, cumulative savings from IOU programs through 2012 (as estimated by the Energy Commission) are shown to decay significantly from 2013 forward (see Figure 4-1 through Figure 4-6). As stated previously, this savings decay trend represents the theoretical absence of efforts to replace efficiency measures at the end of their useful lives as assumed in the 2009 IEPR forecast. However, for purposes of estimating incremental savings from uncommitted programs, CPUC and Energy Commission staff agreed to effectively treat savings from committed IOU programs as *constant* from 2013 forward in order to conform to the CPUC’s policy rules under which IOUs are responsible for replacing decayed savings from previous program cycles. We thus considered such savings-replacement to be associated with committed programs rather than uncommitted programs. Therefore, our estimates of incremental uncommitted savings do not interact with any assumed levels of measure savings decay from previous IOU program cycles from 2013 forward.

If replacing decaying savings from previous IOU program cycles were to be considered as uncommitted program savings, this would increase our estimates of incremental uncommitted savings from IOU programs significantly. The sensitivity of this dynamic is illustrated in Figure 4-7 which shows a quantitative example of the impact of considering decayed savings-replacement activities as uncommitted program savings rather than committed program savings (using the Mid Goals Case). As the figure shows, the size of the decayed savings replacement wedge (shown in purple) grows from roughly 300 GWh in 2013 to over 6,000 GWh by 2020 – a level that is roughly equivalent to our current estimate of incremental uncommitted savings from IOU programs in the Mid and High Goals Cases.

Note, however, that there is also considerable uncertainty associated with modeling and predicting measure savings decay, and the decay rates used by the Energy Commission and reflected in the 2009 IEPR forecast currently depend on assumptions (informed by the data available during spring to later summer 2009) rather than observed behavior. In this respect, whether the replacement of decayed savings from previous IOU program cycles is considered as committed or uncommitted program savings, there is clearly a need for comprehensive, quantitative assessments of measure savings decay across a wide range of measures being offered through IOU programs in order to reliably estimate measure savings decay in aggregate. Examples of the types of comprehensive, quantitative assessments that would be required include market saturation studies (conducted on a regular basis), panel studies of program participants, and detailed analyses of ex-post program evaluation results over multiple program cycles (including the complete set of 2006-2008 ex-post evaluations, once available).

Figure 4-7: Impact of Considering Decayed Savings Replacement as Committed Program Savings (Mid Goals Case)



Uncertainty associated with achieving the BBEES targets

Across the delivery mechanisms assessed the 2008 CPUC Goals study and consequently this study, all of the programmatic activities modeled are well established with the key exception of the BBEES initiatives, for which no specific delivery mechanisms currently exist. As described earlier in Section 3.2, the BBEES initiatives were defined by the CPUC as “strategies to promote maximum energy savings through the coordinated actions of utility programs, market transformation, and codes and standards” (CPUC, 2007b). As such, the BBEES initiatives represent a significant departure from the incentive-based voluntary programs that comprise the vast majority of the current IOU program portfolios or the current procedures and mandates that govern Title 20 and Title 24. Due to the absence of a specific delivery mechanism to simulate, we estimated the potential energy and peak demand savings from the BBEES initiatives as penetration-weighted technical potential, as described in Section 3.2. However, regardless of the assumed delivery mechanism, achieving the specific market penetration rates for ZNE new construction reflected in the BBEES targets requires, by the CPUC’s own characterization, “an aggressive and creative action plan” (CPUC, 2007c). Relative to IOU programs, Title 24, the AB 1109 lighting standards, and federal appliance standards, therefore, it is reasonable to describe the outcomes associated with the BBEES initiatives for ZNE homes and buildings as highly uncertain.

Given this significant relative uncertainty, it is important to consider the share of total incremental uncommitted savings from the BBEES initiatives and the sensitivity of total incremental uncommitted savings to different expectations for achieving the BBEES targets. With respect to energy savings, the BBEES initiatives account for a relatively modest share of total incremental uncommitted savings by 2020 (~20%). With respect to peak demand savings, however, the BBEES initiatives account for nearly half of total incremental uncommitted savings by 2020. In this sense, the current estimates of total incremental uncommitted energy savings are only moderately sensitive to expectations for achieving the BBEES targets, whereas the current estimates of total incremental uncommitted peak demand savings are highly sensitive to one's expectations about whether and to what extent the BBEES targets can be achieved. More specifically, the current estimates of total incremental uncommitted peak demand savings are highly sensitive to one's expectations about meeting the BBEES targets for ZNE homes and buildings, since those two initiatives account for approximately 40% and 50%, respectively, of the total savings from the BBEES initiatives estimated in this study. Since experience with actual ZNE homes and buildings is currently limited to a small number of demonstration projects and pilot projects, these expectations apply equally to all aspects of the ZNE market, e.g. technology costs, performance, builder capacity and expertise, equipment vendor capacity, customer acceptance, etc.

Due to the significant relative uncertainty of the future savings from the BBEES initiatives and their assumed role in meeting the CPUC savings goals, it is critical to actively monitor the development of all aspects of the ZNE market in order to assess actual progress towards the BBEES targets and the evaluate likelihood of achieving the BBEES milestones on a regular and timely basis.

5

Baseline Data

6

Final Savings Inputs

7

Results for PG&E

Table 7-1. Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - Low Goals Case

PG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	939	1,686	2,209	2,699	3,140	3,004	2,805	2,529	2,178	1,759	1,291	802	325
CEC - Price effects/addt'l res lighting savings	-27	-41	-54	-68	-82	50	180	302	420	529	631	725	809
CEC - Total	912	1,646	2,154	2,631	3,058	3,054	2,984	2,831	2,597	2,288	1,922	1,527	1,135
Goals - IOU programs	840	1,417	1,921	2,333	2,687	2,991	3,283	3,565	3,813	4,072	4,314	4,556	4,797
Goals - AB 1109 lighting standards	0	0	0	508	1,016	1,431	1,524	1,524	1,847	2,355	2,863	3,094	3,094
Goals - Title 24 & Fed Standards	0	0	0	0	11	22	43	72	122	173	232	291	352
Goals - BBEES	0	34	69	110	175	244	315	406	500	599	705	815	930
Goals - Total	840	1,451	1,990	2,951	3,889	4,688	5,165	5,566	6,282	7,199	8,113	8,756	9,173
Total Residential													
CEC - IOU programs	489	949	1,344	1,715	2,048	1,946	1,794	1,586	1,323	1,016	684	352	48
CEC - Price effects/addt'l res lighting savings	5	8	10	13	15	86	155	218	275	324	365	399	422
CEC - Total	494	956	1,354	1,728	2,063	2,032	1,950	1,804	1,598	1,340	1,049	750	470
Goals - IOU programs	415	698	935	1,113	1,253	1,362	1,463	1,557	1,630	1,710	1,779	1,848	1,916
Goals - AB 1109 lighting standards	0	0	0	375	750	1,057	1,125	1,125	1,363	1,738	2,113	2,284	2,284
Goals - Title 24 & Fed Standards	0	0	0	0	4	8	20	36	72	109	148	187	227
Goals - BBEES	0	16	32	52	85	120	157	205	255	307	364	424	486
Goals - Total	415	714	967	1,539	2,092	2,547	2,765	2,923	3,320	3,863	4,404	4,743	4,913
Total Commercial													
CEC - IOU programs	450	738	865	984	1,092	1,058	1,010	943	855	742	607	451	278
CEC - Price effects	-32	-48	-65	-81	-97	-36	24	85	145	206	266	327	387
CEC - Total	418	689	800	903	995	1,022	1,034	1,028	1,000	948	873	777	665
Goals - IOU programs	295	492	662	799	915	1,013	1,107	1,197	1,275	1,357	1,433	1,509	1,584
Goals - AB 1109 lighting standards	0	0	0	133	266	375	399	399	484	617	750	810	810
Goals - Title 24 & Fed Standards	0	0	0	0	7	14	22	36	50	65	84	104	125
Goals - BBEES	0	18	36	58	90	124	158	201	246	292	341	391	444
Goals - Total	295	510	699	991	1,278	1,526	1,687	1,833	2,054	2,331	2,607	2,814	2,963
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	130	227	324	421	518	616	713	810	907	1,005	1,102	1,199	1,296
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	130	227	324	421	518	616	713	810	907	1,005	1,102	1,199	1,296

Table 7-2. Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - Low Goals Case

PG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	170	292	396	494	586	564	533	492	439	376	306	230	153
CEC - Price effects/addt'l res lighting savings	-6	-9	-12	-15	-18	4	25	45	64	83	100	116	132
CEC - Total	165	283	384	480	568	568	558	536	503	459	406	347	285
Goals - IOU programs	173	292	401	498	588	670	751	831	906	982	1,057	1,131	1,205
Goals - AB 1109 lighting standards	0	0	0	68	136	191	203	203	246	314	382	413	413
Goals - Title 24 & Fed Standards	0	0	0	0	7	14	22	36	74	114	157	201	246
Goals - BBEES	0	24	50	80	133	189	247	324	405	489	582	680	781
Goals - Total	173	317	451	646	863	1,064	1,224	1,394	1,632	1,899	2,178	2,425	2,645
Total Residential													
CEC - IOU programs	79	146	210	270	325	311	290	261	226	184	139	92	49
CEC - Price effects/addt'l res lighting savings	1	1	1	2	2	11	20	27	35	41	46	50	53
CEC - Total	80	147	211	271	327	321	309	289	260	225	185	143	102
Goals - IOU programs	86	145	198	243	284	321	357	393	425	458	490	522	554
Goals - AB 1109 lighting standards	0	0	0	47	95	133	142	142	172	219	267	288	288
Goals - Title 24 & Fed Standards	0	0	0	0	5	10	16	26	61	96	134	173	212
Goals - BBEES	0	20	40	64	109	156	205	271	339	411	491	575	662
Goals - Total	86	164	238	354	493	620	720	831	997	1,184	1,383	1,559	1,717
Total Commercial													
CEC - IOU programs	91	146	186	225	261	254	244	230	213	192	167	138	105
CEC - Price effects	-7	-10	-13	-16	-20	-7	5	17	29	42	54	66	78
CEC - Total	84	136	173	208	241	246	249	248	243	234	221	204	183
Goals - IOU programs	61	102	139	171	199	225	251	276	299	322	345	368	390
Goals - AB 1109 lighting standards	0	0	0	20	41	58	61	61	74	95	115	124	124
Goals - Title 24 & Fed Standards	0	0	0	0	2	4	6	10	14	18	23	28	34
Goals - BBEES	0	5	10	16	24	33	42	54	66	78	91	104	118
Goals - Total	61	107	148	207	266	320	360	400	452	513	574	625	667
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	26	46	65	85	104	124	143	163	183	202	222	241	261
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	26	46	65	85	104	124	143	163	183	202	222	241	261

Table 7-3. Summary of Incremental Uncommitted Energy Savings (GWh) under Low Goals Case

PG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	269	528	777	997	1,225	1,440	1,654	1,868
Huffman Bill	344	367	305	572	1,030	1,497	1,694	1,671
Title 24 & Fed Standards	12	32	61	111	163	221	280	341
BBEES	68	140	230	325	423	529	640	754
Incremental uncommitted	693	1,067	1,373	2,004	2,842	3,687	4,269	4,634
Total Residential								
IOU programs	108	209	304	377	456	526	595	663
Huffman Bill	235	234	172	354	680	1,013	1,150	1,127
Title 24 & Fed Standards	4	16	32	68	105	144	183	223
BBEES	35	72	119	169	221	279	338	401
Incremental uncommitted	383	532	627	968	1,462	1,961	2,267	2,413
Total Commercial								
IOU programs	63	124	181	231	283	331	379	427
Huffman Bill	109	133	133	218	351	484	544	544
Title 24 & Fed Standards	8	15	29	43	58	77	97	118
BBEES	33	68	111	155	202	251	301	354
Incremental uncommitted	213	340	454	647	893	1,142	1,321	1,443
Total Industry								
IOU programs	97	194	292	389	486	583	681	778
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	97	194	292	389	486	583	681	778

Table 7-4. Summary of Incremental Uncommitted Peak Demand Savings (MW) under Low Goals Case

PG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	83	163	243	318	394	469	543	617
Huffman Bill	46	50	42	78	140	202	229	226
Title 24 & Fed Standards	7	15	29	68	107	151	195	240
BBEES	56	114	191	272	356	449	547	648
Incremental uncommitted	192	343	506	736	997	1,271	1,514	1,731
Total Residential								
IOU programs	37	73	108	141	174	206	238	270
Huffman Bill	30	30	22	45	86	128	145	142
Title 24 & Fed Standards	5	11	21	56	91	129	168	208
BBEES	47	96	162	230	302	382	466	554
Incremental uncommitted	119	209	313	472	653	846	1,018	1,173
Total Commercial								
IOU programs	26	51	76	99	123	146	168	191
Huffman Bill	17	20	20	33	54	74	84	84
Title 24 & Fed Standards	2	4	8	12	16	21	27	32
BBEES	9	18	30	41	54	67	80	94
Incremental uncommitted	54	94	134	186	247	308	359	401
Total Industry								
IOU programs	20	39	59	78	98	117	137	156
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	20	39	59	78	98	117	137	156

Table 7-5. Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - Mid Goals Case

PG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	939	1,686	2,209	2,699	3,140	3,004	2,805	2,529	2,178	1,759	1,291	802	325
CEC - Price effects/addt'l res lighting savings	-27	-41	-54	-68	-82	50	180	302	420	529	631	725	809
CEC - Total	912	1,646	2,154	2,631	3,058	3,054	2,984	2,831	2,597	2,288	1,922	1,527	1,135
Goals - IOU programs	1,378	2,312	3,117	3,760	4,299	4,751	5,182	5,594	5,948	6,319	6,662	7,005	7,346
Goals - AB 1109 lighting standards	0	0	0	306	613	864	919	919	1,114	1,421	1,727	1,867	1,867
Goals - Title 24 & Fed Standards	0	0	0	0	21	44	78	129	207	287	381	478	577
Goals - BBEES	0	41	83	133	212	296	383	493	608	729	859	994	1,135
Goals - Total	1,378	2,352	3,200	4,199	5,146	5,954	6,562	7,135	7,878	8,757	9,630	10,343	10,925
Total Residential													
CEC - IOU programs	489	949	1,344	1,715	2,048	1,946	1,794	1,586	1,323	1,016	684	352	48
CEC - Price effects/addt'l res lighting savings	5	8	10	13	15	86	155	218	275	324	365	399	422
CEC - Total	494	956	1,354	1,728	2,063	2,032	1,950	1,804	1,598	1,340	1,049	750	470
Goals - IOU programs	791	1,332	1,778	2,106	2,360	2,549	2,724	2,885	3,004	3,135	3,245	3,355	3,465
Goals - AB 1109 lighting standards	0	0	0	206	411	579	617	617	747	953	1,158	1,252	1,252
Goals - Title 24 & Fed Standards	0	0	0	0	9	18	39	66	120	174	235	296	359
Goals - BBEES	0	22	45	72	118	167	217	283	352	424	503	585	671
Goals - Total	791	1,354	1,823	2,384	2,898	3,314	3,597	3,851	4,223	4,686	5,141	5,489	5,746
Total Commercial													
CEC - IOU programs	450	738	865	984	1,092	1,058	1,010	943	855	742	607	451	278
CEC - Price effects	-32	-48	-65	-81	-97	-36	24	85	145	206	266	327	387
CEC - Total	418	689	800	903	995	1,022	1,034	1,028	1,000	948	873	777	665
Goals - IOU programs	410	671	897	1,079	1,232	1,362	1,486	1,605	1,708	1,815	1,915	2,015	2,115
Goals - AB 1109 lighting standards	0	0	0	101	202	284	303	303	367	468	569	615	615
Goals - Title 24 & Fed Standards	0	0	0	0	12	25	39	63	87	113	147	182	218
Goals - BBEES	0	19	38	61	94	129	165	210	256	305	356	409	464
Goals - Total	410	690	935	1,241	1,541	1,801	1,993	2,180	2,418	2,702	2,987	3,220	3,411
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	177	309	442	574	707	839	972	1,104	1,237	1,369	1,502	1,634	1,767
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	177	309	442	574	707	839	972	1,104	1,237	1,369	1,502	1,634	1,767

Table 7-6. Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - Mid Goals Case

PG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	170	292	396	494	586	564	533	492	439	376	306	230	153
CEC - Price effects/addt'l res lighting savings	-6	-9	-12	-15	-18	4	25	45	64	83	100	116	132
CEC - Total	165	283	384	480	568	568	558	536	503	459	406	347	285
Goals - IOU programs	265	445	607	748	877	993	1,106	1,217	1,320	1,425	1,527	1,629	1,730
Goals - AB 1109 lighting standards	0	0	0	42	83	117	125	125	151	193	234	253	253
Goals - Title 24 & Fed Standards	0	0	0	0	15	31	48	78	140	203	276	350	427
Goals - BBEES	0	32	66	105	176	250	328	430	537	649	773	902	1,037
Goals - Total	265	477	673	895	1,151	1,391	1,607	1,850	2,148	2,470	2,810	3,135	3,447
Total Residential													
CEC - IOU programs	79	146	210	270	325	311	290	261	226	184	139	92	49
CEC - Price effects/addt'l res lighting savings	1	1	1	2	2	11	20	27	35	41	46	50	53
CEC - Total	80	147	211	271	327	321	309	289	260	225	185	143	102
Goals - IOU programs	142	239	324	395	457	510	561	611	655	701	745	788	831
Goals - AB 1109 lighting standards	0	0	0	26	52	73	78	78	94	120	146	158	158
Goals - Title 24 & Fed Standards	0	0	0	0	11	23	36	59	113	168	230	293	358
Goals - BBEES	0	27	56	89	151	216	284	374	468	567	678	793	913
Goals - Total	142	266	380	510	671	822	959	1,121	1,331	1,556	1,799	2,032	2,260
Total Commercial													
CEC - IOU programs	91	146	186	225	261	254	244	230	213	192	167	138	105
CEC - Price effects	-7	-10	-13	-16	-20	-7	5	17	29	42	54	66	78
CEC - Total	84	136	173	208	241	246	249	248	243	234	221	204	183
Goals - IOU programs	88	144	195	239	279	316	351	386	418	452	483	515	547
Goals - AB 1109 lighting standards	0	0	0	16	31	44	47	47	57	72	88	95	95
Goals - Title 24 & Fed Standards	0	0	0	0	4	8	12	20	28	36	46	57	69
Goals - BBEES	0	5	10	16	25	35	44	56	69	82	95	109	124
Goals - Total	88	149	205	271	339	402	455	509	571	641	713	777	835
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	35	62	88	114	141	167	193	220	246	272	299	325	352
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	35	62	88	114	141	167	193	220	246	272	299	325	352

Table 7-7. Summary of Incremental Uncommitted Energy Savings (GWh) under Mid Goals Case

PG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	416	814	1,194	1,520	1,861	2,176	2,491	2,805
Huffman Bill	179	166	104	242	499	764	870	846
Title 24 & Fed Standards	23	56	107	186	266	360	457	556
BBEES	83	170	281	396	517	646	782	922
Incremental uncommitted	701	1,207	1,686	2,343	3,143	3,947	4,600	5,130
Total Residential								
IOU programs	189	364	525	643	774	885	995	1,104
Huffman Bill	97	65	3	77	233	397	457	433
Title 24 & Fed Standards	9	30	57	111	165	226	287	350
BBEES	48	99	165	234	306	385	467	553
Incremental uncommitted	344	558	750	1,065	1,479	1,893	2,207	2,441
Total Commercial								
IOU programs	95	185	272	346	424	496	568	640
Huffman Bill	83	101	101	165	266	367	413	413
Title 24 & Fed Standards	13	27	50	75	101	134	169	206
BBEES	35	71	116	162	211	262	315	369
Incremental uncommitted	225	384	539	749	1,002	1,259	1,465	1,629
Total Industry								
IOU programs	133	265	398	530	663	795	928	1,060
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	133	265	398	530	663	795	928	1,060

Table 7-8. Summary of Incremental Uncommitted Peak Demand Savings (MW) under Mid Goals Case

PG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	116	229	340	443	548	651	752	853
Huffman Bill	25	24	16	35	71	107	122	119
Title 24 & Fed Standards	16	34	63	125	188	261	336	412
BBEES	74	152	254	361	473	597	726	861
Incremental uncommitted	231	438	674	965	1,280	1,615	1,935	2,245
Total Residential								
IOU programs	53	104	154	199	244	288	331	374
Huffman Bill	12	8	0	10	29	50	58	55
Title 24 & Fed Standards	12	25	47	102	157	219	282	347
BBEES	65	133	223	317	416	527	642	762
Incremental uncommitted	142	270	425	627	847	1,084	1,313	1,538
Total Commercial								
IOU programs	36	72	107	139	172	204	236	268
Huffman Bill	13	16	16	26	41	57	64	64
Title 24 & Fed Standards	4	9	16	24	32	42	53	65
BBEES	9	19	31	43	56	70	84	99
Incremental uncommitted	63	115	169	232	302	373	438	496
Total Industry								
IOU programs	26	53	79	105	132	158	185	211
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	26	53	79	105	132	158	185	211

Table 7-9. Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - High Goals Case

PG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	939	1,686	2,209	2,699	3,140	3,004	2,805	2,529	2,178	1,759	1,291	802	325
CEC - Price effects/addt'l res lighting savings	-27	-41	-54	-68	-82	50	180	302	420	529	631	725	809
CEC - Total	912	1,646	2,154	2,631	3,058	3,054	2,984	2,831	2,597	2,288	1,922	1,527	1,135
Goals - IOU programs	1,378	2,312	3,117	3,760	4,299	4,751	5,182	5,594	5,948	6,319	6,662	7,005	7,346
Goals - AB 1109 lighting standards	0	0	0	409	817	1,152	1,226	1,226	1,486	1,895	2,303	2,489	2,489
Goals - Title 24 & Fed Standards	0	0	0	0	30	62	108	178	284	392	519	651	786
Goals - BBEES	0	56	114	182	291	405	524	675	833	998	1,176	1,361	1,553
Goals - Total	1,378	2,368	3,231	4,351	5,438	6,370	7,040	7,674	8,551	9,604	10,661	11,505	12,174
Total Residential													
CEC - IOU programs	489	949	1,344	1,715	2,048	1,946	1,794	1,586	1,323	1,016	684	352	48
CEC - Price effects/addt'l res lighting savings	5	8	10	13	15	86	155	218	275	324	365	399	422
CEC - Total	494	956	1,354	1,728	2,063	2,032	1,950	1,804	1,598	1,340	1,049	750	470
Goals - IOU programs	791	1,332	1,778	2,106	2,360	2,549	2,724	2,885	3,004	3,135	3,245	3,355	3,465
Goals - AB 1109 lighting standards	0	0	0	274	548	772	822	822	997	1,271	1,545	1,669	1,669
Goals - Title 24 & Fed Standards	0	0	0	0	10	21	44	76	141	207	279	353	428
Goals - BBEES	0	31	63	100	164	231	301	392	487	586	695	809	927
Goals - Total	791	1,362	1,841	2,481	3,082	3,573	3,891	4,175	4,628	5,198	5,764	6,186	6,488
Total Commercial													
CEC - IOU programs	450	738	865	984	1,092	1,058	1,010	943	855	742	607	451	278
CEC - Price effects	-32	-48	-65	-81	-97	-36	24	85	145	206	266	327	387
CEC - Total	418	689	800	903	995	1,022	1,034	1,028	1,000	948	873	777	665
Goals - IOU programs	410	671	897	1,079	1,232	1,362	1,486	1,605	1,708	1,815	1,915	2,015	2,115
Goals - AB 1109 lighting standards	0	0	0	135	269	379	404	404	489	624	759	820	820
Goals - Title 24 & Fed Standards	0	0	0	0	20	42	64	103	143	185	240	298	358
Goals - BBEES	0	25	51	82	127	174	223	283	346	412	481	552	626
Goals - Total	410	696	949	1,296	1,649	1,957	2,177	2,395	2,686	3,037	3,395	3,685	3,919
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	177	309	442	574	707	839	972	1,104	1,237	1,369	1,502	1,634	1,767
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	177	309	442	574	707	839	972	1,104	1,237	1,369	1,502	1,634	1,767

Table 7-10. Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - High Goals Case

PG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	170	292	396	494	586	564	533	492	439	376	306	230	153
CEC - Price effects/addt'l res lighting savings	-6	-9	-12	-15	-18	4	25	45	64	83	100	116	132
CEC - Total	165	283	384	480	568	568	558	536	503	459	406	347	285
Goals - IOU programs	265	445	607	748	877	993	1,106	1,217	1,320	1,425	1,527	1,629	1,730
Goals - AB 1109 lighting standards	0	0	0	55	111	156	166	166	202	257	312	338	338
Goals - Title 24 & Fed Standards	0	0	0	0	18	37	58	93	171	251	341	434	529
Goals - BBES	0	45	91	146	243	345	452	592	739	893	1,063	1,240	1,425
Goals - Total	265	489	699	950	1,248	1,531	1,782	2,069	2,432	2,825	3,244	3,641	4,021
Total Residential													
CEC - IOU programs	79	146	210	270	325	311	290	261	226	184	139	92	49
CEC - Price effects/addt'l res lighting savings	1	1	1	2	2	11	20	27	35	41	46	50	53
CEC - Total	80	147	211	271	327	321	309	289	260	225	185	143	102
Goals - IOU programs	142	239	324	395	457	510	561	611	655	701	745	788	831
Goals - AB 1109 lighting standards	0	0	0	35	69	98	104	104	126	160	195	211	211
Goals - Title 24 & Fed Standards	0	0	0	0	12	25	41	66	132	200	276	354	433
Goals - BBES	0	38	77	124	209	299	392	517	647	783	934	1,093	1,257
Goals - Total	142	277	402	553	748	932	1,098	1,297	1,560	1,845	2,150	2,445	2,732
Total Commercial													
CEC - IOU programs	91	146	186	225	261	254	244	230	213	192	167	138	105
CEC - Price effects	-7	-10	-13	-16	-20	-7	5	17	29	42	54	66	78
CEC - Total	84	136	173	208	241	246	249	248	243	234	221	204	183
Goals - IOU programs	88	144	195	239	279	316	351	386	418	452	483	515	547
Goals - AB 1109 lighting standards	0	0	0	21	42	59	62	62	76	97	117	127	127
Goals - Title 24 & Fed Standards	0	0	0	0	5	11	17	28	39	50	65	80	97
Goals - BBES	0	7	14	22	34	47	60	76	93	110	129	148	167
Goals - Total	88	151	209	282	360	432	491	552	625	708	794	870	938
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	35	62	88	114	141	167	193	220	246	272	299	325	352
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	35	62	88	114	141	167	193	220	246	272	299	325	352

Table 7-11. Summary of Incremental Uncommitted Energy Savings (GWh) Under High Goals Case

PG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	416	814	1,194	1,520	1,861	2,176	2,491	2,805
Huffman Bill	263	268	206	409	768	1,135	1,288	1,264
Title 24 & Fed Standards	32	78	148	254	362	489	621	756
BBEES	114	233	384	542	707	885	1,069	1,262
Incremental uncommitted	825	1,393	1,932	2,724	3,699	4,686	5,469	6,087
Total Residential								
IOU programs	189	364	525	643	774	885	995	1,104
Huffman Bill	153	134	71	189	414	646	737	714
Title 24 & Fed Standards	11	34	65	131	197	269	343	418
BBEES	67	137	228	323	422	531	645	763
Incremental uncommitted	419	668	890	1,286	1,807	2,331	2,720	2,999
Total Commercial								
IOU programs	95	185	272	346	424	496	568	640
Huffman Bill	110	135	135	220	355	489	551	551
Title 24 & Fed Standards	22	44	83	123	165	220	278	338
BBEES	47	96	156	219	285	353	425	499
Incremental uncommitted	273	460	645	908	1,229	1,559	1,822	2,028
Total Industry								
IOU programs	133	265	398	530	663	795	928	1,060
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	133	265	398	530	663	795	928	1,060

Table 7-12. Summary of Incremental Uncommitted Peak Demand Savings (MW) Under High Goals Case

PG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	116	229	340	443	548	651	752	853
Huffman Bill	36	38	30	58	107	157	178	175
Title 24 & Fed Standards	19	40	76	153	233	323	416	512
BBEES	102	209	349	496	650	820	997	1,182
Incremental uncommitted	273	516	795	1,151	1,538	1,951	2,344	2,722
Total Residential								
IOU programs	53	104	154	199	244	288	331	374
Huffman Bill	19	17	9	24	52	82	93	90
Title 24 & Fed Standards	13	28	53	120	188	264	341	420
BBEES	89	183	307	437	573	725	883	1,048
Incremental uncommitted	175	332	524	780	1,058	1,359	1,649	1,933
Total Commercial								
IOU programs	36	72	107	139	172	204	236	268
Huffman Bill	17	21	21	34	55	76	85	85
Title 24 & Fed Standards	6	12	22	33	45	60	75	91
BBEES	13	26	42	59	76	94	114	133
Incremental uncommitted	72	131	192	265	348	434	510	578
Total Industry								
IOU programs	26	53	79	105	132	158	185	211
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	26	53	79	105	132	158	185	211

Table 7-13. Summary of Incremental Uncommitted Energy Savings (GWh) Across All Goals Cases

PG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Low Goals Case								
IOU programs	269	528	777	997	1,225	1,440	1,654	1,868
Huffman Bill	344	367	305	572	1,030	1,497	1,694	1,671
Title 24 & Fed Standards	12	32	61	111	163	221	280	341
BBEES	68	140	230	325	423	529	640	754
Total GWh	693	1,067	1,373	2,004	2,842	3,687	4,269	4,634
Mid Goals Case								
IOU programs	416	814	1,194	1,520	1,861	2,176	2,491	2,805
Huffman Bill	179	166	104	242	499	764	870	846
Title 24 & Fed Standards	23	56	107	186	266	360	457	556
BBEES	83	170	281	396	517	646	782	922
Total GWh	701	1,207	1,686	2,343	3,143	3,947	4,600	5,130
High Goals Case								
IOU programs	416	814	1,194	1,520	1,861	2,176	2,491	2,805
Huffman Bill	263	268	206	409	768	1,135	1,288	1,264
Title 24 & Fed Standards	32	78	148	254	362	489	621	756
BBEES	114	233	384	542	707	885	1,069	1,262
Total GWh	825	1,393	1,932	2,724	3,699	4,686	5,469	6,087

Table 7-14. Summary of Incremental Uncommitted Peak Demand Savings (MW) Across All Goals Cases

PG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Low Goals Case								
IOU programs	83	163	243	318	394	469	543	617
Huffman Bill	46	50	42	78	140	202	229	226
Title 24 & Fed Standards	7	15	29	68	107	151	195	240
BBEES	56	114	191	272	356	449	547	648
Total MW	192	343	506	736	997	1,271	1,514	1,731
Mid Goals Case								
IOU programs	116	229	340	443	548	651	752	853
Huffman Bill	25	24	16	35	71	107	122	119
Title 24 & Fed Standards	16	34	63	125	188	261	336	412
BBEES	74	152	254	361	473	597	726	861
Total MW	231	438	674	965	1,280	1,615	1,935	2,245
High Goals Case								
IOU programs	116	229	340	443	548	651	752	853
Huffman Bill	36	38	30	58	107	157	178	175
Title 24 & Fed Standards	19	40	76	153	233	323	416	512
BBEES	102	209	349	496	650	820	997	1,182
Total MW	273	516	795	1,151	1,538	1,951	2,344	2,722

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Results for SCE

Table 8-1. Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - Low Goals Case

SCE Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	901	1,751	2,429	3,071	3,656	3,510	3,294	2,989	2,587	2,091	1,526	935	375
CEC - Price effects/addt'l res lighting savings	117	175	233	291	349	485	618	743	863	974	1,076	1,170	1,253
CEC - Total	1,019	1,926	2,662	3,362	4,005	3,995	3,912	3,733	3,450	3,065	2,602	2,105	1,628
Goals - IOU programs	1,095	1,830	2,472	2,996	3,446	3,831	4,202	4,559	4,874	5,202	5,509	5,815	6,121
Goals - AB 1109 lighting standards	0	0	0	455	910	1,283	1,366	1,366	1,655	2,111	2,566	2,773	2,773
Goals - Title 24 & Fed Standards	0	0	0	0	12	26	48	79	135	192	256	323	391
Goals - BBEES	0	39	80	128	207	289	374	484	598	718	847	982	1,122
Goals - Total	1,095	1,869	2,552	3,580	4,575	5,429	5,989	6,488	7,262	8,221	9,178	9,892	10,406
Total Residential													
CEC - IOU programs	575	1,136	1,538	1,915	2,251	2,149	1,998	1,783	1,501	1,155	767	370	5
CEC - Price effects/addt'l res lighting savings	18	26	35	43	51	125	196	259	317	366	406	438	459
CEC - Total	593	1,162	1,573	1,957	2,302	2,275	2,194	2,043	1,818	1,521	1,173	808	464
Goals - IOU programs	507	853	1,141	1,356	1,525	1,655	1,775	1,888	1,974	2,068	2,149	2,230	2,310
Goals - AB 1109 lighting standards	0	0	0	302	604	850	905	905	1,097	1,399	1,701	1,838	1,838
Goals - Title 24 & Fed Standards	0	0	0	0	3	7	18	32	69	106	145	185	226
Goals - BBEES	0	15	30	48	83	119	157	208	261	317	380	445	514
Goals - Total	507	868	1,171	1,706	2,215	2,631	2,856	3,033	3,401	3,890	4,375	4,699	4,888
Total Commercial													
CEC - IOU programs	326	615	891	1,156	1,405	1,361	1,296	1,206	1,086	936	759	565	370
CEC - Price effects	99	149	199	248	298	360	422	484	546	608	670	732	794
CEC - Total	425	764	1,089	1,404	1,703	1,721	1,718	1,690	1,633	1,544	1,429	1,297	1,164
Goals - IOU programs	452	740	992	1,199	1,378	1,532	1,680	1,823	1,950	2,082	2,206	2,330	2,454
Goals - AB 1109 lighting standards	0	0	0	153	307	433	460	460	558	712	865	935	935
Goals - Title 24 & Fed Standards	0	0	0	0	9	19	30	47	66	86	111	137	165
Goals - BBEES	0	24	50	80	124	169	217	275	337	400	467	536	608
Goals - Total	452	764	1,042	1,433	1,817	2,153	2,388	2,607	2,911	3,280	3,649	3,938	4,162
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	136	237	339	441	543	645	746	848	950	1,052	1,153	1,255	1,357
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	136	237	339	441	543	645	746	848	950	1,052	1,153	1,255	1,357

Table 8-2. Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - Low Goals Case

SCE Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	222	433	605	768	917	883	833	762	667	548	410	263	122
CEC - Price effects/addt'l res lighting savings	23	35	47	58	70	93	114	136	156	175	193	211	227
CEC - Total	245	469	652	826	987	976	948	898	823	723	603	474	349
Goals - IOU programs	205	341	464	571	667	754	838	922	999	1,077	1,153	1,229	1,304
Goals - AB 1109 lighting standards	0	0	0	63	127	178	190	190	230	293	357	385	385
Goals - Title 24 & Fed Standards	0	0	0	0	7	15	24	39	89	140	195	251	309
Goals - BBEES	0	28	57	91	155	223	293	387	485	588	702	822	947
Goals - Total	205	369	521	725	956	1,170	1,345	1,537	1,803	2,098	2,407	2,688	2,946
Total Residential													
CEC - IOU programs	155	305	404	496	578	553	517	464	393	305	203	98	1
CEC - Price effects/addt'l res lighting savings	2	3	3	4	5	14	22	30	37	42	47	51	53
CEC - Total	156	308	407	500	583	567	539	494	430	347	250	149	54
Goals - IOU programs	85	143	193	234	271	302	332	362	388	414	440	465	490
Goals - AB 1109 lighting standards	0	0	0	37	74	104	111	111	134	171	208	225	225
Goals - Title 24 & Fed Standards	0	0	0	0	5	11	17	27	73	119	168	218	269
Goals - BBEES	0	22	46	73	128	185	244	325	409	498	598	702	811
Goals - Total	85	165	239	345	478	601	704	825	1,004	1,202	1,414	1,611	1,795
Total Commercial													
CEC - IOU programs	67	128	201	272	340	330	317	298	274	243	207	165	122
CEC - Price effects	22	32	43	54	65	79	92	106	119	133	146	160	173
CEC - Total	89	161	244	326	405	409	409	403	393	376	353	325	295
Goals - IOU programs	100	165	223	274	319	360	400	440	476	514	550	585	621
Goals - AB 1109 lighting standards	0	0	0	26	53	74	79	79	96	122	148	160	160
Goals - Title 24 & Fed Standards	0	0	0	0	2	5	7	12	16	21	27	33	40
Goals - BBEES	0	5	11	18	28	38	49	62	76	90	105	120	137
Goals - Total	100	170	234	318	402	477	535	592	664	746	830	899	958
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	19	34	48	63	77	91	106	120	135	149	164	178	192
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	19	34	48	63	77	91	106	120	135	149	164	178	192

Table 8-3. Summary of Incremental Uncommitted Energy Savings (GWh) Under Low Goals Case

SCE Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	321	629	926	1,187	1,459	1,715	1,969	2,223
Huffman Bill	298	310	247	479	886	1,300	1,476	1,454
Title 24 & Fed Standards	14	35	67	122	179	244	310	378
BBEES	82	168	277	391	511	640	775	916
Incremental uncommitted	715	1,142	1,517	2,181	3,035	3,899	4,530	4,971
Total Residential								
IOU programs	130	250	363	449	542	624	705	785
Huffman Bill	173	157	94	228	481	742	848	827
Title 24 & Fed Standards	4	15	28	65	103	142	182	222
BBEES	36	74	125	179	234	297	363	431
Incremental uncommitted	342	496	610	921	1,360	1,805	2,097	2,265
Total Commercial								
IOU programs	89	175	258	332	408	480	552	624
Huffman Bill	126	153	153	251	405	558	628	628
Title 24 & Fed Standards	10	21	38	57	76	102	128	156
BBEES	46	93	152	213	277	343	413	485
Incremental uncommitted	270	443	602	853	1,166	1,483	1,721	1,892
Total Industry								
IOU programs	102	204	305	407	509	611	712	814
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	102	204	305	407	509	611	712	814

Table 8-4. Summary of Incremental Uncommitted Peak Demand Savings (MW) Under Low Goals Case

SCE Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	87	171	255	332	410	486	562	637
Huffman Bill	43	46	38	72	129	188	213	211
Title 24 & Fed Standards	8	17	32	82	132	188	244	301
BBEES	67	137	231	329	432	547	667	792
Incremental uncommitted	205	372	556	815	1,104	1,409	1,686	1,941
Total Residential								
IOU programs	31	61	91	117	143	169	194	219
Huffman Bill	21	20	12	29	60	92	105	103
Title 24 & Fed Standards	5	12	22	68	114	163	213	264
BBEES	57	116	197	282	370	470	574	683
Incremental uncommitted	115	209	322	495	687	894	1,087	1,269
Total Commercial								
IOU programs	41	81	121	157	195	230	266	302
Huffman Bill	22	26	26	43	69	96	108	108
Title 24 & Fed Standards	2	5	9	14	19	25	31	38
BBEES	10	21	34	48	62	77	93	109
Incremental uncommitted	75	134	190	262	345	428	498	557
Total Industry								
IOU programs	14	29	43	58	72	87	101	115
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	14	29	43	58	72	87	101	115

Table 8-5. Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - Mid Goals Case

SCE Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	901	1,751	2,429	3,071	3,656	3,510	3,294	2,989	2,587	2,091	1,526	935	375
CEC - Price effects/addt'l res lighting savings	117	175	233	291	349	485	618	743	863	974	1,076	1,170	1,253
CEC - Total	1,019	1,926	2,662	3,362	4,005	3,995	3,912	3,733	3,450	3,065	2,602	2,105	1,628
Goals - IOU programs	1,754	2,912	3,919	4,733	5,427	6,017	6,582	7,126	7,601	8,096	8,558	9,019	9,479
Goals - AB 1109 lighting standards	0	0	0	249	499	703	748	748	907	1,156	1,406	1,519	1,519
Goals - Title 24 & Fed Standards	0	0	0	0	24	51	87	143	230	320	425	533	644
Goals - BBEES	0	43	88	141	230	322	418	543	673	809	957	1,111	1,272
Goals - Total	1,754	2,956	4,007	5,124	6,180	7,092	7,836	8,560	9,411	10,381	11,345	12,182	12,914
Total Residential													
CEC - IOU programs	575	1,136	1,538	1,915	2,251	2,149	1,998	1,783	1,501	1,155	767	370	5
CEC - Price effects/addt'l res lighting savings	18	26	35	43	51	125	196	259	317	366	406	438	459
CEC - Total	593	1,162	1,573	1,957	2,302	2,275	2,194	2,043	1,818	1,521	1,173	808	464
Goals - IOU programs	821	1,381	1,846	2,191	2,461	2,667	2,857	3,033	3,167	3,313	3,439	3,564	3,688
Goals - AB 1109 lighting standards	0	0	0	168	336	474	504	504	611	779	947	1,023	1,023
Goals - Title 24 & Fed Standards	0	0	0	0	8	17	34	59	113	168	227	288	350
Goals - BBEES	0	21	42	67	115	165	218	288	362	439	525	615	709
Goals - Total	821	1,401	1,888	2,426	2,921	3,322	3,613	3,885	4,252	4,698	5,138	5,490	5,770
Total Commercial													
CEC - IOU programs	326	615	891	1,156	1,405	1,361	1,296	1,206	1,086	936	759	565	370
CEC - Price effects	99	149	199	248	298	360	422	484	546	608	670	732	794
CEC - Total	425	764	1,089	1,404	1,703	1,721	1,718	1,690	1,633	1,544	1,429	1,297	1,164
Goals - IOU programs	745	1,202	1,603	1,931	2,213	2,456	2,691	2,917	3,117	3,325	3,520	3,715	3,909
Goals - AB 1109 lighting standards	0	0	0	81	163	229	244	244	296	377	459	496	496
Goals - Title 24 & Fed Standards	0	0	0	0	16	34	53	84	118	152	197	245	294
Goals - BBEES	0	23	46	74	114	157	201	255	311	370	432	496	563
Goals - Total	745	1,225	1,649	2,086	2,506	2,876	3,188	3,500	3,841	4,225	4,608	4,951	5,262
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	188	329	470	612	753	894	1,035	1,176	1,317	1,458	1,600	1,741	1,882
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	188	329	470	612	753	894	1,035	1,176	1,317	1,458	1,600	1,741	1,882

Table 8-6. Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - Mid Goals Case

SCE Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	222	433	605	768	917	883	833	762	667	548	410	263	122
CEC - Price effects/addt'l res lighting savings	23	35	47	58	70	93	114	136	156	175	193	211	227
CEC - Total	245	469	652	826	987	976	948	898	823	723	603	474	349
Goals - IOU programs	323	535	724	887	1,032	1,163	1,290	1,415	1,529	1,646	1,759	1,872	1,984
Goals - AB 1109 lighting standards	0	0	0	34	69	97	103	103	125	160	194	210	210
Goals - Title 24 & Fed Standards	0	0	0	0	17	34	53	86	163	242	331	423	517
Goals - BBES	0	37	75	120	205	294	386	511	641	777	929	1,088	1,253
Goals - Total	323	571	799	1,041	1,323	1,588	1,833	2,115	2,458	2,825	3,214	3,592	3,964
Total Residential													
CEC - IOU programs	155	305	404	496	578	553	517	464	393	305	203	98	1
CEC - Price effects/addt'l res lighting savings	2	3	3	4	5	14	22	30	37	42	47	51	53
CEC - Total	156	308	407	500	583	567	539	494	430	347	250	149	54
Goals - IOU programs	132	221	299	362	417	463	508	551	589	627	665	701	737
Goals - AB 1109 lighting standards	0	0	0	21	41	58	62	62	75	95	116	125	125
Goals - Title 24 & Fed Standards	0	0	0	0	12	25	39	64	132	202	279	358	439
Goals - BBES	0	31	64	102	177	256	338	449	566	688	825	969	1,119
Goals - Total	132	253	363	485	648	803	947	1,126	1,362	1,612	1,885	2,154	2,420
Total Commercial													
CEC - IOU programs	67	128	201	272	340	330	317	298	274	243	207	165	122
CEC - Price effects	22	32	43	54	65	79	92	106	119	133	146	160	173
CEC - Total	89	161	244	326	405	409	409	403	393	376	353	325	295
Goals - IOU programs	165	266	358	437	508	572	634	696	752	810	866	922	977
Goals - AB 1109 lighting standards	0	0	0	14	28	39	42	42	50	64	78	84	84
Goals - Title 24 & Fed Standards	0	0	0	0	4	9	14	22	31	40	52	65	78
Goals - BBES	0	5	11	18	27	38	48	61	75	89	104	119	135
Goals - Total	165	272	369	468	567	657	738	821	908	1,003	1,100	1,190	1,274
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	27	47	67	88	108	128	148	168	188	209	229	249	269
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	27	47	67	88	108	128	148	168	188	209	229	249	269

Table 8-7. Summary of Incremental Uncommitted Energy Savings (GWh) Under Mid Goals Case

SCE Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	525	1,028	1,511	1,933	2,372	2,782	3,191	3,599
Huffman Bill	130	105	41	143	343	552	634	613
Title 24 & Fed Standards	26	63	119	206	295	400	508	620
BBEES	92	189	313	443	579	727	882	1,042
Incremental uncommitted	773	1,384	1,985	2,725	3,590	4,462	5,215	5,874
Total Residential								
IOU programs	205	395	572	705	851	977	1,102	1,226
Huffman Bill	63	23	-40	9	129	256	301	279
Title 24 & Fed Standards	8	26	51	105	159	219	280	342
BBEES	50	103	173	246	323	410	500	594
Incremental uncommitted	327	547	756	1,066	1,463	1,862	2,183	2,441
Total Commercial								
IOU programs	178	350	516	663	815	958	1,101	1,244
Huffman Bill	67	81	81	133	215	296	333	333
Title 24 & Fed Standards	18	36	68	101	136	181	228	277
BBEES	42	86	140	197	256	317	382	448
Incremental uncommitted	305	555	806	1,094	1,422	1,753	2,044	2,303
Total Industry								
IOU programs	141	282	423	565	706	847	988	1,129
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	141	282	423	565	706	847	988	1,129

Table 8-8. Summary of Incremental Uncommitted Peak Demand Savings (MW) Under Mid Goals Case

SCE Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	131	258	382	497	614	727	839	951
Huffman Bill	19	17	10	25	53	83	95	93
Title 24 & Fed Standards	18	37	69	147	226	315	406	500
BBEES	89	181	306	436	572	724	883	1,049
Incremental uncommitted	256	493	767	1,104	1,465	1,849	2,224	2,593
Total Residential								
IOU programs	46	91	134	172	210	248	284	320
Huffman Bill	8	3	-4	2	17	33	38	36
Title 24 & Fed Standards	13	27	51	120	190	267	346	427
BBEES	79	161	272	389	510	648	792	941
Incremental uncommitted	146	282	453	682	927	1,195	1,460	1,724
Total Commercial								
IOU programs	64	127	188	244	302	358	414	470
Huffman Bill	11	14	14	23	37	50	57	57
Title 24 & Fed Standards	5	10	18	27	36	48	60	73
BBEES	10	21	34	47	61	76	92	108
Incremental uncommitted	90	171	253	341	436	533	622	707
Total Industry								
IOU programs	20	40	61	81	101	121	141	162
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	20	40	61	81	101	121	141	162

Table 8-9. Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - High Goals Case

SCE Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	901	1,751	2,429	3,071	3,656	3,510	3,294	2,989	2,587	2,091	1,526	935	375
CEC - Price effects/addt'l res lighting savings	117	175	233	291	349	485	618	743	863	974	1,076	1,170	1,253
CEC - Total	1,019	1,926	2,662	3,362	4,005	3,995	3,912	3,733	3,450	3,065	2,602	2,105	1,628
Goals - IOU programs	1,754	2,912	3,919	4,733	5,427	6,017	6,582	7,126	7,601	8,096	8,558	9,019	9,479
Goals - AB 1109 lighting standards	0	0	0	305	611	861	916	916	1,111	1,416	1,722	1,860	1,860
Goals - Title 24 & Fed Standards	0	0	0	27	90	150	205	285	422	572	746	909	1,064
Goals - BBEES	0	60	122	195	317	444	577	748	927	1,114	1,317	1,529	1,750
Goals - Total	1,754	2,972	4,041	5,261	6,445	7,471	8,281	9,075	10,060	11,199	12,342	13,317	14,153
Total Residential													
CEC - IOU programs	575	1,136	1,538	1,915	2,251	2,149	1,998	1,783	1,501	1,155	767	370	5
CEC - Price effects/addt'l res lighting savings	18	26	35	43	51	125	196	259	317	366	406	438	459
CEC - Total	593	1,162	1,573	1,957	2,302	2,275	2,194	2,043	1,818	1,521	1,173	808	464
Goals - IOU programs	821	1,381	1,846	2,191	2,461	2,667	2,857	3,033	3,167	3,313	3,439	3,564	3,688
Goals - AB 1109 lighting standards	0	0	0	224	448	631	672	672	815	1,039	1,263	1,365	1,365
Goals - Title 24 & Fed Standards	0	0	0	0	9	19	39	68	134	202	275	349	425
Goals - BBEES	0	29	58	93	159	228	300	397	498	604	722	846	974
Goals - Total	821	1,409	1,904	2,508	3,078	3,545	3,868	4,170	4,614	5,157	5,698	6,123	6,451
Total Commercial													
CEC - IOU programs	326	615	891	1,156	1,405	1,361	1,296	1,206	1,086	936	759	565	370
CEC - Price effects	99	149	199	248	298	360	422	484	546	608	670	732	794
CEC - Total	425	764	1,089	1,404	1,703	1,721	1,718	1,690	1,633	1,544	1,429	1,297	1,164
Goals - IOU programs	745	1,202	1,603	1,931	2,213	2,456	2,691	2,917	3,117	3,325	3,520	3,715	3,909
Goals - AB 1109 lighting standards	0	0	0	81	163	229	244	244	296	377	459	496	496
Goals - Title 24 & Fed Standards	0	0	0	27	81	131	166	217	288	371	471	559	639
Goals - BBEES	0	31	64	102	158	216	277	351	429	510	595	684	775
Goals - Total	745	1,233	1,666	2,141	2,614	3,033	3,378	3,729	4,129	4,583	5,044	5,453	5,819
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	188	329	470	612	753	894	1,035	1,176	1,317	1,458	1,600	1,741	1,882
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	188	329	470	612	753	894	1,035	1,176	1,317	1,458	1,600	1,741	1,882

Table 8-10. Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - High Goals Case

SCE Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	222	433	605	768	917	883	833	762	667	548	410	263	122
CEC - Price effects/addt'l res lighting savings	23	35	47	58	70	93	114	136	156	175	193	211	227
CEC - Total	245	469	652	826	987	976	948	898	823	723	603	474	349
Goals - IOU programs	323	535	724	887	1,032	1,163	1,290	1,415	1,529	1,646	1,759	1,872	1,984
Goals - AB 1109 lighting standards	0	0	0	46	92	129	138	138	167	213	259	279	279
Goals - Title 24 & Fed Standards	0	0	0	0	20	41	65	104	203	303	416	532	651
Goals - BBEES	0	51	104	166	283	405	533	703	882	1,068	1,277	1,495	1,722
Goals - Total	323	586	828	1,099	1,427	1,739	2,025	2,360	2,781	3,231	3,711	4,178	4,636
Total Residential													
CEC - IOU programs	155	305	404	496	578	553	517	464	393	305	203	98	1
CEC - Price effects/addt'l res lighting savings	2	3	3	4	5	14	22	30	37	42	47	51	53
CEC - Total	156	308	407	500	583	567	539	494	430	347	250	149	54
Goals - IOU programs	132	221	299	362	417	463	508	551	589	627	665	701	737
Goals - AB 1109 lighting standards	0	0	0	27	55	77	82	82	100	127	155	167	167
Goals - Title 24 & Fed Standards	0	0	0	0	14	28	44	71	157	244	340	438	537
Goals - BBEES	0	43	89	142	245	353	466	619	779	946	1,134	1,331	1,536
Goals - Total	132	265	388	532	731	922	1,100	1,324	1,624	1,945	2,293	2,637	2,977
Total Commercial													
CEC - IOU programs	67	128	201	272	340	330	317	298	274	243	207	165	122
CEC - Price effects	22	32	43	54	65	79	92	106	119	133	146	160	173
CEC - Total	89	161	244	326	405	409	409	403	393	376	353	325	295
Goals - IOU programs	165	266	358	437	508	572	634	696	752	810	866	922	977
Goals - AB 1109 lighting standards	0	0	0	18	37	52	55	55	67	86	104	113	113
Goals - Title 24 & Fed Standards	0	0	0	0	6	13	20	33	46	59	76	95	114
Goals - BBEES	0	7	15	24	38	52	66	84	103	122	143	164	186
Goals - Total	165	274	373	480	589	689	777	868	968	1,077	1,189	1,293	1,389
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	27	47	67	88	108	128	148	168	188	209	229	249	269
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	27	47	67	88	108	128	148	168	188	209	229	249	269

Table 8-11. Summary of Incremental Uncommitted Energy Savings (GWh) Under High Goals Case

SCE Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	525	1,028	1,511	1,933	2,372	2,782	3,191	3,599
Huffman Bill	176	161	97	234	491	756	863	842
Title 24 & Fed Standards	60	116	195	332	483	656	819	974
BBEES	127	260	431	610	797	1,000	1,212	1,433
Incremental uncommitted	888	1,564	2,235	3,109	4,143	5,194	6,085	6,848
Total Residential								
IOU programs	205	395	572	705	851	977	1,102	1,226
Huffman Bill	109	79	16	101	276	460	530	509
Title 24 & Fed Standards	10	30	58	125	193	266	340	416
BBEES	69	141	238	339	444	563	686	815
Incremental uncommitted	393	646	884	1,270	1,764	2,265	2,659	2,965
Total Commercial								
IOU programs	178	350	516	663	815	958	1,101	1,244
Huffman Bill	67	81	81	133	215	296	333	333
Title 24 & Fed Standards	51	85	136	207	290	390	479	558
BBEES	58	119	193	271	353	438	526	618
Incremental uncommitted	354	636	927	1,274	1,673	2,082	2,439	2,753
Total Industry								
IOU programs	141	282	423	565	706	847	988	1,129
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	141	282	423	565	706	847	988	1,129

Table 8-12. Summary of Incremental Uncommitted Peak Demand Savings (MW) Under High Goals Case

SCE Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	131	258	382	497	614	727	839	951
Huffman Bill	29	29	21	44	84	125	142	140
Title 24 & Fed Standards	21	45	84	183	283	396	512	631
BBEES	122	250	420	599	785	994	1,212	1,439
Incremental uncommitted	303	581	908	1,322	1,766	2,242	2,706	3,160
Total Residential								
IOU programs	46	91	134	172	210	248	284	320
Huffman Bill	14	10	3	13	35	58	66	64
Title 24 & Fed Standards	14	30	58	144	231	326	424	523
BBEES	108	221	374	534	701	889	1,086	1,290
Incremental uncommitted	182	352	568	862	1,177	1,521	1,860	2,198
Total Commercial								
IOU programs	64	127	188	244	302	358	414	470
Huffman Bill	15	18	18	30	49	67	76	76
Title 24 & Fed Standards	7	14	26	39	53	70	88	107
BBEES	14	29	46	65	85	105	126	148
Incremental uncommitted	100	188	279	379	488	600	704	801
Total Industry								
IOU programs	20	40	61	81	101	121	141	162
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	20	40	61	81	101	121	141	162

Table 8-13. Summary of Incremental Uncommitted Energy Savings (GWh) Across All Goals Cases

SCE Results	2013	2014	2015	2016	2017	2018	2019	2020
Low Goals Case								
IOU programs	321	629	926	1,187	1,459	1,715	1,969	2,223
Huffman Bill	298	310	247	479	886	1,300	1,476	1,454
Title 24 & Fed Standards	14	35	67	122	179	244	310	378
BBEES	82	168	277	391	511	640	775	916
Total GWh	715	1,142	1,517	2,181	3,035	3,899	4,530	4,971
Mid Goals Case								
IOU programs	525	1,028	1,511	1,933	2,372	2,782	3,191	3,599
Huffman Bill	130	105	41	143	343	552	634	613
Title 24 & Fed Standards	26	63	119	206	295	400	508	620
BBEES	92	189	313	443	579	727	882	1,042
Total GWh	773	1,384	1,985	2,725	3,590	4,462	5,215	5,874
High Goals Case								
IOU programs	525	1,028	1,511	1,933	2,372	2,782	3,191	3,599
Huffman Bill	176	161	97	234	491	756	863	842
Title 24 & Fed Standards	60	116	195	332	483	656	819	974
BBEES	127	260	431	610	797	1,000	1,212	1,433
Total GWh	888	1,564	2,235	3,109	4,143	5,194	6,085	6,848

Table 8-14. Summary of Incremental Uncommitted Peak Demand Savings (MW) Across All Goals Cases

SCE Results	2013	2014	2015	2016	2017	2018	2019	2020
Low Goals Case								
IOU programs	87	171	255	332	410	486	562	637
Huffman Bill	43	46	38	72	129	188	213	211
Title 24 & Fed Standards	8	17	32	82	132	188	244	301
BBEES	67	137	231	329	432	547	667	792
Total MW	205	372	556	815	1,104	1,409	1,686	1,941
Mid Goals Case								
IOU programs	131	258	382	497	614	727	839	951
Huffman Bill	19	17	10	25	53	83	95	93
Title 24 & Fed Standards	18	37	69	147	226	315	406	500
BBEES	89	181	306	436	572	724	883	1,049
Total MW	256	493	767	1,104	1,465	1,849	2,224	2,593
High Goals Case								
IOU programs	131	258	382	497	614	727	839	951
Huffman Bill	29	29	21	44	84	125	142	140
Title 24 & Fed Standards	21	45	84	183	283	396	512	631
BBEES	122	250	420	599	785	994	1,212	1,439
Total MW	303	581	908	1,322	1,766	2,242	2,706	3,160

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Results for SDG&E

Table 9-1. Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - Low Goals Case

SDG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	234	433	573	704	823	792	745	679	588	474	342	203	73
CEC - Price effects/addt'l res lighting savings	36	53	71	89	107	145	182	218	252	285	316	345	372
CEC - Total	269	487	644	793	930	936	927	896	840	759	658	549	445
Goals - IOU programs	206	343	462	559	641	711	778	843	899	958	1,012	1,067	1,121
Goals - AB 1109 lighting standards	0	0	0	140	279	393	419	419	507	647	786	850	850
Goals - Title 24 & Fed Standards	0	0	0	0	3	6	11	19	30	41	54	68	82
Goals - BBEES	0	8	16	26	42	58	75	96	118	141	166	192	219
Goals - Total	206	351	479	725	965	1,168	1,283	1,376	1,554	1,787	2,019	2,177	2,272
Total Residential													
CEC - IOU programs	100	197	260	319	372	356	333	299	253	196	131	63	1
CEC - Price effects/addt'l res lighting savings	1	2	2	3	4	20	36	50	63	74	84	92	97
CEC - Total	101	199	263	322	375	376	368	349	316	271	215	155	98
Goals - IOU programs	74	125	168	201	228	249	269	288	304	320	335	350	364
Goals - AB 1109 lighting standards	0	0	0	103	205	289	308	308	373	476	578	625	625
Goals - Title 24 & Fed Standards	0	0	0	0	0	1	3	5	11	17	23	30	36
Goals - BBEES	0	2	3	5	9	13	17	23	29	35	42	49	57
Goals - Total	74	127	171	309	442	552	597	624	717	848	979	1,054	1,082
Total Commercial													
CEC - IOU programs	134	236	313	385	451	436	413	380	335	278	211	140	72
CEC - Price effects	34	52	69	86	103	125	146	168	189	211	232	254	275
CEC - Total	168	288	381	471	554	560	559	547	524	488	443	394	347
Goals - IOU programs	118	194	260	313	358	396	432	467	498	530	559	589	618
Goals - AB 1109 lighting standards	0	0	0	37	74	104	111	111	134	171	208	225	225
Goals - Title 24 & Fed Standards	0	0	0	0	3	5	8	13	19	24	31	38	46
Goals - BBEES	0	6	13	21	33	45	58	73	89	106	124	142	162
Goals - Total	118	200	273	371	467	550	609	665	740	831	922	995	1,051
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	14	24	35	45	56	66	76	87	97	108	118	129	139
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	14	24	35	45	56	66	76	87	97	108	118	129	139

Table 9-2. Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - Low Goals Case

SDG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	39	74	101	127	151	146	138	127	111	92	69	45	22
CEC - Price effects/addt'l res lighting savings	7	10	14	17	20	26	32	38	43	49	54	59	64
CEC - Total	46	84	115	144	172	172	170	165	155	141	124	104	86
Goals - IOU programs	44	73	99	123	144	163	182	200	217	235	251	268	285
Goals - AB 1109 lighting standards	0	0	0	18	35	49	53	53	64	81	99	107	107
Goals - Title 24 & Fed Standards	0	0	0	0	1	2	4	6	14	22	30	39	48
Goals - BBEES	0	4	8	12	21	31	40	54	68	83	99	117	135
Goals - Total	44	77	107	152	201	245	278	313	363	420	480	531	575
Total Residential													
CEC - IOU programs	15	30	39	48	56	54	50	45	38	30	20	10	0
CEC - Price effects/addt'l res lighting savings	0	0	0	0	0	2	4	6	7	8	9	10	11
CEC - Total	15	30	40	48	56	56	54	51	45	38	29	20	11
Goals - IOU programs	16	27	37	46	55	63	71	78	86	93	100	108	115
Goals - AB 1109 lighting standards	0	0	0	11	22	31	33	33	40	51	62	67	67
Goals - Title 24 & Fed Standards	0	0	0	0	1	1	2	3	10	16	23	30	37
Goals - BBEES	0	2	4	7	13	20	27	37	47	57	70	83	97
Goals - Total	16	29	42	64	91	115	132	151	182	217	255	287	315
Total Commercial													
CEC - IOU programs	24	44	62	79	95	92	88	82	73	62	50	36	22
CEC - Price effects	7	10	13	17	20	24	28	32	36	41	45	49	53
CEC - Total	31	54	75	96	115	116	116	114	110	103	94	85	75
Goals - IOU programs	26	42	57	69	80	90	99	108	116	125	133	141	149
Goals - AB 1109 lighting standards	0	0	0	7	13	18	20	20	24	30	37	40	40
Goals - Title 24 & Fed Standards	0	0	0	0	1	1	2	3	5	6	8	9	11
Goals - BBEES	0	2	3	5	8	11	14	17	21	25	29	34	38
Goals - Total	26	44	60	81	102	120	134	148	166	186	206	224	238
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	2	4	5	7	9	10	12	14	15	17	18	20	22
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	2	4	5	7	9	10	12	14	15	17	18	20	22

Table 9-3. Summary of Incremental Uncommitted Energy Savings (GWh) Under Low Goals Case

SDG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	52	102	150	192	236	276	317	357
Huffman Bill	98	107	93	169	297	427	483	477
Title 24 & Fed Standards	3	8	16	27	38	52	65	79
BBEES	16	33	54	76	100	124	150	177
Incremental uncommitted	169	251	313	464	671	879	1,015	1,091
Total Residential								
IOU programs	21	41	60	76	92	107	122	136
Huffman Bill	68	70	56	108	200	293	332	326
Title 24 & Fed Standards	0	3	5	11	17	23	29	35
BBEES	4	8	14	20	26	33	41	48
Incremental uncommitted	93	123	136	215	335	456	523	546
Total Commercial								
IOU programs	20	40	58	74	91	107	122	138
Huffman Bill	30	37	37	60	97	134	151	151
Title 24 & Fed Standards	3	6	11	16	21	29	36	44
BBEES	12	25	40	57	73	91	110	129
Incremental uncommitted	66	107	146	207	283	361	419	461
Total Industry								
IOU programs	10	21	31	42	52	63	73	83
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	10	21	31	42	52	63	73	83

Table 9-4. Summary of Incremental Uncommitted Peak Demand Savings (MW) Under Low Goals Case

SDG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	19	38	56	73	91	108	125	141
Huffman Bill	13	14	12	22	38	55	62	61
Title 24 & Fed Standards	1	3	5	13	21	29	38	47
BBEES	9	19	33	47	62	78	96	114
Incremental uncommitted	42	74	107	155	211	270	320	363
Total Residential								
IOU programs	8	16	24	31	38	46	53	60
Huffman Bill	7	7	6	11	21	31	35	34
Title 24 & Fed Standards	1	1	3	9	16	22	29	36
BBEES	7	13	23	33	44	57	70	83
Incremental uncommitted	22	38	55	85	119	155	187	214
Total Commercial								
IOU programs	10	19	28	36	44	52	60	68
Huffman Bill	5	7	7	11	17	24	27	27
Title 24 & Fed Standards	1	1	3	4	5	7	9	11
BBEES	3	6	10	13	17	22	26	31
Incremental uncommitted	19	33	47	64	84	105	122	136
Total Industry								
IOU programs	2	3	5	6	8	10	11	13
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	2	3	5	6	8	10	11	13

Table 9-5. Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - Mid Goals Case

SDG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	234	433	573	704	823	792	745	679	588	474	342	203	73
CEC - Price effects/addt'l res lighting savings	36	53	71	89	107	145	182	218	252	285	316	345	372
CEC - Total	269	487	644	793	930	936	927	896	840	759	658	549	445
Goals - IOU programs	411	685	920	1,106	1,259	1,387	1,508	1,623	1,720	1,823	1,917	2,011	2,104
Goals - AB 1109 lighting standards	0	0	0	64	128	181	192	192	233	297	361	391	391
Goals - Title 24 & Fed Standards	0	0	0	0	5	11	20	32	50	68	89	111	134
Goals - BBEES	0	9	18	29	47	65	84	109	134	160	189	218	249
Goals - Total	411	694	938	1,199	1,440	1,644	1,804	1,956	2,137	2,348	2,556	2,731	2,878
Total Residential													
CEC - IOU programs	100	197	260	319	372	356	333	299	253	196	131	63	1
CEC - Price effects/addt'l res lighting savings	1	2	2	3	4	20	36	50	63	74	84	92	97
CEC - Total	101	199	263	322	375	376	368	349	316	271	215	155	98
Goals - IOU programs	214	361	485	577	651	708	761	811	850	893	930	966	1,003
Goals - AB 1109 lighting standards	0	0	0	44	89	125	133	133	161	206	250	270	270
Goals - Title 24 & Fed Standards	0	0	0	0	1	2	5	9	17	25	34	43	52
Goals - BBEES	0	2	4	7	12	18	23	31	39	48	58	68	78
Goals - Total	214	364	489	629	753	853	923	985	1,068	1,172	1,272	1,348	1,404
Total Commercial													
CEC - IOU programs	134	236	313	385	451	436	413	380	335	278	211	140	72
CEC - Price effects	34	52	69	86	103	125	146	168	189	211	232	254	275
CEC - Total	168	288	381	471	554	560	559	547	524	488	443	394	347
Goals - IOU programs	179	292	391	470	537	594	648	700	745	792	835	879	922
Goals - AB 1109 lighting standards	0	0	0	20	39	56	59	59	72	92	111	120	120
Goals - Title 24 & Fed Standards	0	0	0	0	5	10	15	24	33	43	55	68	82
Goals - BBEES	0	7	14	22	35	47	61	77	94	112	131	150	171
Goals - Total	179	299	405	512	616	706	783	860	944	1,038	1,133	1,218	1,295
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	18	31	45	58	72	85	98	112	125	139	152	165	179
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	18	31	45	58	72	85	98	112	125	139	152	165	179

Table 9-6. Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - Mid Goals Case

SDG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	39	74	101	127	151	146	138	127	111	92	69	45	22
CEC - Price effects/addt'l res lighting savings	7	10	14	17	20	26	32	38	43	49	54	59	64
CEC - Total	46	84	115	144	172	172	170	165	155	141	124	104	86
Goals - IOU programs	84	141	193	238	278	315	351	386	419	452	484	516	548
Goals - AB 1109 lighting standards	0	0	0	8	16	23	24	24	29	37	46	49	49
Goals - Title 24 & Fed Standards	0	0	0	0	2	5	8	13	25	36	50	64	78
Goals - BBES	0	5	9	15	27	39	51	69	87	106	127	150	173
Goals - Total	84	146	202	261	323	381	434	492	559	631	707	779	848
Total Residential													
CEC - IOU programs	15	30	39	48	56	54	50	45	38	30	20	10	0
CEC - Price effects/addt'l res lighting savings	0	0	0	0	0	2	4	6	7	8	9	10	11
CEC - Total	15	30	40	48	56	56	54	51	45	38	29	20	11
Goals - IOU programs	42	73	100	124	147	167	187	207	225	244	263	281	299
Goals - AB 1109 lighting standards	0	0	0	5	9	13	14	14	17	22	27	29	29
Goals - Title 24 & Fed Standards	0	0	0	0	1	2	4	7	16	25	35	46	56
Goals - BBES	0	3	6	10	18	27	37	50	64	79	96	114	132
Goals - Total	42	76	106	139	176	210	242	278	323	370	421	469	517
Total Commercial													
CEC - IOU programs	24	44	62	79	95	92	88	82	73	62	50	36	22
CEC - Price effects	7	10	13	17	20	24	28	32	36	41	45	49	53
CEC - Total	31	54	75	96	115	116	116	114	110	103	94	85	75
Goals - IOU programs	39	64	86	104	120	135	148	162	174	186	198	210	221
Goals - AB 1109 lighting standards	0	0	0	3	7	9	10	10	12	16	19	20	20
Goals - Title 24 & Fed Standards	0	0	0	0	1	3	4	6	9	11	14	18	22
Goals - BBES	0	2	3	5	8	11	14	18	22	27	31	36	41
Goals - Total	39	65	89	113	137	158	177	196	217	240	262	284	304
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	3	5	7	9	11	13	15	17	19	22	24	26	28
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	3	5	7	9	11	13	15	17	19	22	24	26	28

Table 9-7. Summary of Incremental Uncommitted Energy Savings (GWh) Under Mid Goals Case

SDG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	109	213	312	395	482	562	642	722
Huffman Bill	36	32	18	45	98	153	174	169
Title 24 & Fed Standards	6	14	27	45	63	84	106	129
BBEES	18	37	62	87	113	142	171	202
Incremental uncommitted	170	297	418	572	757	941	1,094	1,222
Total Residential								
IOU programs	57	111	160	199	242	279	315	352
Huffman Bill	20	12	-2	13	46	81	94	88
Title 24 & Fed Standards	1	4	8	16	24	33	42	51
BBEES	5	11	19	27	36	46	56	66
Incremental uncommitted	83	138	185	256	348	439	507	558
Total Commercial								
IOU programs	39	76	111	142	174	203	233	262
Huffman Bill	16	20	20	32	52	72	81	81
Title 24 & Fed Standards	5	10	19	28	38	51	64	78
BBEES	13	26	43	60	78	96	116	136
Incremental uncommitted	73	132	193	262	341	422	493	557
Total Industry								
IOU programs	13	27	40	54	67	80	94	107
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	13	27	40	54	67	80	94	107

Table 9-8. Summary of Incremental Uncommitted Peak Demand Savings (MW) Under Mid Goals Case

SDG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	37	73	108	140	174	206	238	270
Huffman Bill	5	5	3	7	13	20	23	23
Title 24 & Fed Standards	3	6	11	22	34	48	61	75
BBEES	12	25	42	60	79	100	123	146
Incremental uncommitted	56	107	163	229	300	374	446	514
Total Residential								
IOU programs	20	41	60	79	98	116	134	153
Huffman Bill	2	1	0	1	5	8	10	9
Title 24 & Fed Standards	1	3	5	15	24	34	44	55
BBEES	9	18	32	46	60	78	95	114
Incremental uncommitted	33	63	97	141	187	236	284	330
Total Commercial								
IOU programs	14	28	41	53	66	77	89	101
Huffman Bill	3	3	3	5	9	12	14	14
Title 24 & Fed Standards	1	3	5	7	10	13	17	20
BBEES	3	6	10	14	18	23	28	32
Incremental uncommitted	21	40	60	80	103	126	147	167
Total Industry								
IOU programs	2	4	6	8	10	13	15	17
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	2	4	6	8	10	13	15	17

Table 9-9. Summary of Energy Savings (GWh) from Committed and Uncommitted Programs - High Goals Case

SDG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	234	433	573	704	823	792	745	679	588	474	342	203	73
CEC - Price effects/addt'l res lighting savings	36	53	71	89	107	145	182	218	252	285	316	345	372
CEC - Total	269	487	644	793	930	936	927	896	840	759	658	549	445
Goals - IOU programs	411	685	920	1,106	1,259	1,387	1,508	1,623	1,720	1,823	1,917	2,011	2,104
Goals - AB 1109 lighting standards	0	0	0	86	171	241	257	257	311	396	482	521	521
Goals - Title 24 & Fed Standards	0	0	0	0	8	17	29	48	73	99	130	162	195
Goals - BBEES	0	12	25	40	64	89	115	148	182	218	257	297	339
Goals - Total	411	697	945	1,231	1,503	1,734	1,908	2,075	2,286	2,536	2,785	2,990	3,159
Total Residential													
CEC - IOU programs	100	197	260	319	372	356	333	299	253	196	131	63	1
CEC - Price effects/addt'l res lighting savings	1	2	2	3	4	20	36	50	63	74	84	92	97
CEC - Total	101	199	263	322	375	376	368	349	316	271	215	155	98
Goals - IOU programs	214	361	485	577	651	708	761	811	850	893	930	966	1,003
Goals - AB 1109 lighting standards	0	0	0	59	118	167	178	178	215	274	334	361	361
Goals - Title 24 & Fed Standards	0	0	0	0	1	2	6	10	20	31	41	52	63
Goals - BBEES	0	3	6	10	17	25	32	43	54	66	80	94	108
Goals - Total	214	364	491	646	787	901	977	1,043	1,140	1,264	1,384	1,473	1,535
Total Commercial													
CEC - IOU programs	134	236	313	385	451	436	413	380	335	278	211	140	72
CEC - Price effects	34	52	69	86	103	125	146	168	189	211	232	254	275
CEC - Total	168	288	381	471	554	560	559	547	524	488	443	394	347
Goals - IOU programs	179	292	391	470	537	594	648	700	745	792	835	879	922
Goals - AB 1109 lighting standards	0	0	0	26	53	74	79	79	96	122	148	160	160
Goals - Title 24 & Fed Standards	0	0	0	0	7	15	24	38	53	68	88	109	131
Goals - BBEES	0	9	19	30	47	64	83	105	128	152	177	204	231
Goals - Total	179	302	410	527	644	747	833	921	1,021	1,134	1,249	1,352	1,445
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	18	31	45	58	72	85	98	112	125	139	152	165	179
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	18	31	45	58	72	85	98	112	125	139	152	165	179

Table 9-10. Summary of Peak Demand Savings (MW) from Committed and Uncommitted Programs - High Goals Case

SDG&E Results	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors													
CEC - IOU programs	39	74	101	127	151	146	138	127	111	92	69	45	22
CEC - Price effects/addt'l res lighting savings	7	10	14	17	20	26	32	38	43	49	54	59	64
CEC - Total	46	84	115	144	172	172	170	165	155	141	124	104	86
Goals - IOU programs	84	141	193	238	278	315	351	386	419	452	484	516	548
Goals - AB 1109 lighting standards	0	0	0	11	22	30	32	32	39	50	61	66	66
Goals - Title 24 & Fed Standards	0	0	0	0	3	6	10	17	32	48	65	83	101
Goals - BBEES	0	6	13	21	37	53	71	94	119	145	174	205	237
Goals - Total	84	148	206	269	339	405	464	529	609	694	784	870	952
Total Residential													
CEC - IOU programs	15	30	39	48	56	54	50	45	38	30	20	10	0
CEC - Price effects/addt'l res lighting savings	0	0	0	0	0	2	4	6	7	8	9	10	11
CEC - Total	15	30	40	48	56	56	54	51	45	38	29	20	11
Goals - IOU programs	42	73	100	124	147	167	187	207	225	244	263	281	299
Goals - AB 1109 lighting standards	0	0	0	6	13	18	19	19	23	29	36	38	38
Goals - Title 24 & Fed Standards	0	0	0	0	1	3	5	8	19	31	44	57	70
Goals - BBEES	0	4	9	14	26	38	51	69	88	108	132	156	181
Goals - Total	42	77	109	144	186	226	262	303	356	413	474	532	589
Total Commercial													
CEC - IOU programs	24	44	62	79	95	92	88	82	73	62	50	36	22
CEC - Price effects	7	10	13	17	20	24	28	32	36	41	45	49	53
CEC - Total	31	54	75	96	115	116	116	114	110	103	94	85	75
Goals - IOU programs	39	64	86	104	120	135	148	162	174	186	198	210	221
Goals - AB 1109 lighting standards	0	0	0	4	9	13	13	13	16	21	25	27	27
Goals - Title 24 & Fed Standards	0	0	0	0	2	4	6	9	13	16	21	26	32
Goals - BBEES	0	2	5	7	11	15	20	25	30	36	42	49	55
Goals - Total	39	66	90	116	142	166	187	209	233	259	286	312	335
Total Industry													
CEC - IOU programs	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Price effects	0	0	0	0	0	0	0	0	0	0	0	0	0
CEC - Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - IOU programs	3	5	7	9	11	13	15	17	19	22	24	26	28
Goals - Title 24 & Fed Standards	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - BBEES	0	0	0	0	0	0	0	0	0	0	0	0	0
Goals - Total	3	5	7	9	11	13	15	17	19	22	24	26	28

Table 9-11. Summary of Incremental Uncommitted Energy Savings (GWh) Under High Goals Case

SDG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	109	213	312	395	482	562	642	722
Huffman Bill	54	53	39	80	155	231	262	256
Title 24 & Fed Standards	9	21	40	65	90	121	153	186
BBEES	25	51	84	118	155	193	233	275
Incremental uncommitted	197	339	475	658	882	1,108	1,291	1,440
Total Residential								
IOU programs	57	111	160	199	242	279	315	352
Huffman Bill	32	27	13	37	85	135	154	149
Title 24 & Fed Standards	1	5	9	19	30	40	51	62
BBEES	8	15	26	38	49	63	77	91
Incremental uncommitted	98	158	209	294	406	517	597	654
Total Commercial								
IOU programs	39	76	111	142	174	203	233	262
Huffman Bill	22	26	26	43	69	96	108	108
Title 24 & Fed Standards	8	16	30	45	61	81	102	124
BBEES	17	36	58	81	105	131	157	184
Incremental uncommitted	86	154	226	311	409	511	600	678
Total Industry								
IOU programs	13	27	40	54	67	80	94	107
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	13	27	40	54	67	80	94	107

Table 9-12. Summary of Incremental Uncommitted Peak Demand Savings (MW) Under High Goals Case

SDG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Total All Sectors								
IOU programs	37	73	108	140	174	206	238	270
Huffman Bill	7	7	6	11	21	30	34	34
Title 24 & Fed Standards	3	7	14	29	44	62	80	98
BBEES	17	34	57	82	108	137	168	200
Incremental uncommitted	64	121	184	263	347	436	520	602
Total Residential								
IOU programs	20	41	60	79	98	116	134	153
Huffman Bill	3	3	1	4	9	14	16	15
Title 24 & Fed Standards	1	3	6	18	30	42	55	68
BBEES	12	25	44	63	83	106	131	156
Incremental uncommitted	38	72	111	163	219	279	336	392
Total Commercial								
IOU programs	14	28	41	53	66	77	89	101
Huffman Bill	4	4	4	7	12	16	18	18
Title 24 & Fed Standards	2	4	7	11	15	20	25	30
BBEES	4	8	14	19	25	31	37	44
Incremental uncommitted	24	45	67	91	117	144	169	193
Total Industry								
IOU programs	2	4	6	8	10	13	15	17
Title 24 & Fed Standards	0	0	0	0	0	0	0	0
BBEES	0	0	0	0	0	0	0	0
Incremental uncommitted	2	4	6	8	10	13	15	17

Table 9-13. Summary of Incremental Uncommitted Energy Savings (GWh) Across All Goals Cases

SDG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Low Goals Case								
IOU programs	52	102	150	192	236	276	317	357
Huffman Bill	98	107	93	169	297	427	483	477
Title 24 & Fed Standards	3	8	16	27	38	52	65	79
BBEES	16	33	54	76	100	124	150	177
Total GWh	169	251	313	464	671	879	1,015	1,091
Mid Goals Case								
IOU programs	109	213	312	395	482	562	642	722
Huffman Bill	36	32	18	45	98	153	174	169
Title 24 & Fed Standards	6	14	27	45	63	84	106	129
BBEES	18	37	62	87	113	142	171	202
Total GWh	170	297	418	572	757	941	1,094	1,222
High Goals Case								
IOU programs	109	213	312	395	482	562	642	722
Huffman Bill	54	53	39	80	155	231	262	256
Title 24 & Fed Standards	9	21	40	65	90	121	153	186
BBEES	25	51	84	118	155	193	233	275
Total GWh	197	339	475	658	882	1,108	1,291	1,440

Table 9-14. Summary of Incremental Uncommitted Peak Demand Savings (MW) Across All Goals Cases

SDG&E Results	2013	2014	2015	2016	2017	2018	2019	2020
Low Goals Case								
IOU programs	19	38	56	73	91	108	125	141
Huffman Bill	13	14	12	22	38	55	62	61
Title 24 & Fed Standards	1	3	5	13	21	29	38	47
BBEES	9	19	33	47	62	78	96	114
Total MW	42	74	107	155	211	270	320	363
Mid Goals Case								
IOU programs	37	73	108	140	174	206	238	270
Huffman Bill	5	5	3	7	13	20	23	23
Title 24 & Fed Standards	3	6	11	22	34	48	61	75
BBEES	12	25	42	60	79	100	123	146
Total MW	56	107	163	229	300	374	446	514
High Goals Case								
IOU programs	37	73	108	140	174	206	238	270
Huffman Bill	7	7	6	11	21	30	34	34
Title 24 & Fed Standards	3	7	14	29	44	62	80	98
BBEES	17	34	57	82	108	137	168	200
Total MW	64	121	184	263	347	436	520	602