NAVIGANT

2013 California Energy Efficiency Potential and Goals Study

APPENDIX VOLUME III
Appendices O-T

Prepared for:
California Public Utilities Commission

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February 13, 2014

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California Energy Commission

DRAFT STAFF REPORT

ESTIMATES OF ADDITIONAL ACHIEVABLE ENERGY SAVINGS

Supplement to *California Energy Demand 2014-2024 Revised Forecast*

CALIFORNIA
ENERGY COMMISSION
Edmund G. Brown Jr., Governor

SEPTEMBER 2013
CEC-200-2013-005-SD

Appendix P Details on Additional Achievable Energy Efficiency Scenarios

The purpose of this appendix is to provide background and further detail on the five scenarios recommended by JASC, including (a) the scenario inputs that make up the mid case variations and high / low cases the relative MW impacts of these inputs; (b) a summary of stakeholder process and comments received on this issue, and (c) a timeline for incorporating these scenarios into the 2013 IEPR process.

Please note that the final AAEE scenarios are determined the CEC and may vary from the values provided this report, and so the AAEE graphs below should be considered illustrative.

P.1 Scenario Structure

Five additional achievable energy efficiency scenarios were structure around two types of uncertainty:

(1) Economic and demographic ("econ-demo") inputs: specifically, building stock growth rate, retail electricity rates, and avoided cost variables. These same variables are inputs to the IEPR base forecast;
(2) Non-econ-demo inputs: specifically, variables related to emerging technologies, code compliance, Title 24 code adoption dates, incremental measure cost, implied discount rate, marketing effect, cost-effectiveness ("Total Resource Cost") threshold, unit energy savings, word of mouth effect, and other variables. (See Section IV below for detailed descriptions of each of these variables.)

First, a set of three scenarios was constructed, varying the non-econ-demo inputs using the same mid-case IEPR base forecast assumptions for econ-demo inputs (See Section IV below for a description of the three variations on the mid-case.) Second, a set of two scenarios was constructed, varying the econ-demo inputs, using the mostly same non-econ-demo inputs as in the "mid-mid" case, with two exceptions. (See Section V below for a description of these high / low cases).

P.2 Stakeholder Process to Review Additional Achievable EE Forecast Scenarios

The Additional Achievable EE forecast scenarios were developed from the CPUC's Potential and Goals (P&G) Study model, prepared by Navigant Consulting. DAWG has been actively involved in the study since its inception in 2011, reviewing its methodology and inputs and providing quality control review of the publicly accessible model. Prior to the review process of the scenarios, Navigant had incorporated multiple iterations of stakeholder comments into the model.

In the Potential and Goals Study, Navigant originally proposed high, mid and low case scenarios. CEC ran four additional scenarios in order to prepare a sensitivity analysis and scenario options for JASC. The scenario analysis, which provided savings impacts, was presented to DAWG for written comments. Eight stakeholder groups submitted written comments: Efficiency Council, Natural Resources Defense Council, CAISO, Independent Energy Producers, PG&E, SCE, SDG&E, and SCG, which JASC reviewed and discussed in its deliberations over recommendations. The stakeholders coalesced around two out of the seven scenarios (Note: these were all slightly different from the 5 final JASC-recommended scenarios) to recommend a mid-case to JASC.

For the most part, stakeholders were in agreement that Navigant's assumptions were reasonable and based on the best available information. The discussion focused on two key components in the forecast that presented uncertainty. Besides IEP, all stakeholders agreed on all assumptions except for the following two components, which are presented in the following table and further described in the next section:

- Title 24 code compliance: NRDC, PG&E and SCE stated that 100% of emerging technology potential should be included in the mid case, which assumes that that risk factor discount in the potential model sufficiently reduces projected savings for emerging technologies. CAISO, IEP, SCG and SDG&E recommended reducing emerging technology savings by 50% in the mid case.
- Savings from emerging technologies: NRDC, PG&E and SCE stated that 100% of emerging technology potential should be included in the mid case, which assumes that that risk factor discount in the potential model sufficiently reduces projected savings for emerging technologies. CAISO, IEP, SCG and SDG&E recommended reducing emerging technology savings by 50% in the mid case.

P.3 Variations on the Mid Case Scenario

Table 1 below presents three variations on mid-case recommended by JASC, including a summary of scenario inputs and the modeled outputs (total GWh and MW). The table below contains an assessment of the MW impact of individual scenario components relative to the mid-case assumptions (See also Figure 1. Tornado Chart Showing Model Sensitivities to Changes in Key Variablesfrom Navigant's P&G Study characterizing the sensitivity analysis they conducted.)

Table 1. Proposed Mid-Case Scenarios for Additional Achievable Efficiency, 2013 IEPR Forecast

	Scenario Component Impact as % of EE forecast		Variations on the IEPR Mid Case Scenario In order of impact on impact on Scenario's Variables: Highest impact on top, Lowest impact on bottom)		
	% Impact of Scenario Component in	% Impact of Scenario Component in	Low EE penetration (Mid IEPR, low EE variables)	Mid EE penetration (Mid IEPR, mid EE variables)	High EE penetration (Mid IEPR, high EE variables)
Code compliance	-11.50%	1.80%	No Compliance Enhancements, 20% reduction	No Compliance enhancements	No Compliance enhancements
Incremental Costs	-9.50%	6.90%	Best Estimate in Mid Case plus 25%	Best Estimate from past evaluated results	Best Estimate in Mid Case minus 25%
Emerging Technologies	-8.30%	N/A[2]	50% of model results	100% of ET model results	150% of ET model results
Implied Discount Rate	-3.50%	7.40%	20%	18%	14%
Marketing Effect	-4.40%	5.00%	1%	2%	3%
TRC threshold	-6.80%	1.00%	2	0.85	0.75
Measure Densities	-1.40%	3.30%	Estimate plus 20%	Best Estimate Costs	Estimate minus 20%
Unit Energy Savings	-1.30%	1.90%	Best Estimate in Mid Case minus 25%	Best Estimate from past evaluated results	Best Estimate in Mid Case plus 25%
Title 24 Adoption Dates	N/A[2]	1.80%	2005, 2008, 2013	2005, 2008, 2013, 2016, 2019, 2022	2005, 2008, 2013, 2016, 2019, 2022
Word of Mouth Effect	-1.40%	1.20%	39%	43%	47%
Emerging Technology TRC	-0.10%	0.00%	0.85	0.5	0.4
Incentive Level	-	-	50% of incremental cost	50% of incremental cost	50% of incremental cost
2024 Savings (GWh)			12,645	20,935	33,307
2024 Savings (MW)			3,055	4,833	7,877

[1] *Scenario Component Impact is based on Navigant's sensitivity analysis, using GWH, except for mid-case variations, which are emerging technologies, code compliance and Title 24 adoptions dates. Navigant's sensitivity analysis is based on the impact of the component relative to market potential and was subsequently adjusted to reflect its impact on the mid-case forecast.*

[2] *Low case Title 24 updates and high case for emerging technologies were not included in the original sensitivity analyses, and thus not available in time for this memo.*

Definitions of Components

1) **Code Compliance:** The P&G study decrements savings from Title 24 and 20 codes, and federal appliance standards based on informed assumptions regarding code compliance. However, evaluation research on code compliance is limited, and the compliance rate varies by sector and measure groups, but the common default rate is 85%. The mid-case scenario has been run with the following variations:

   a) **Reduce code compliance by 20%:** This option produced a flat reduction to code compliance across all measure types and sectors, which results in an approximately 12% reduction in savings by 2024. DAWG stakeholders agreed that a 20% reduction on code compliance was not

appropriate for the mid-case scenario. JASC recommends one mid case option that includes reduced code compliance.

b) **Remove compliance enhancements:** Navigant developed a scenario option for "compliance enhancements," to meet the Strategic Plan goal to increase Title 24 compliance through aggressive statewide enforcement. This policy initiative is also reflective of compliance improvement having been identified as a "foundational strategy" in the CEC's draft AB 758 plan (Comprehensive Program for Existing Buildings EE Retrofits). The compliance enhancement option assumes that code compliance would increase to 100% over a period of 6 years for Title 24 codes, 10 years for Title 20 standards, and 5 years for federal appliance standards. Except for NRDC, all DAWG stakeholders agreed that the compliance enhancement assumption was not reasonable for the mid case. JASC does not consider the compliance enhancements assumption to be reasonable in the mid case scenario, but does include it in the high case scenario.

2) **Emerging Technologies:** New energy efficiency technologies, systems, or practices that have significant energy savings potential but have not yet achieved sufficient market share (for a variety of reasons) to be considered self-sustaining or commercially viable. Emerging technologies include late stage prototypes or under-utilized but commercially available hardware, software, design tools or energy services that if implemented appropriately should result in energy savings. The single largest source of emerging technology savings is expected to be from LED lighting in the commercial sector. Navigant modeled the high end of efficiency for each measure group by identifying the technology that met the following criteria:

   a) Not commercially available in today's market, but expected to be available in the next three to five years
   b) Commercially available but representing less than 5 percent of the existing market share
   c) Measures that are currently not cost effective, but cost and/or performance are expected to substantially improve in the future.

   Since the energy savings potential is based on technologies that have not achieved significant market penetration and/or cost effectiveness, Navigant applied a risk factor to each measure to decrement the savings, which is captured in the mid-case scenario. Navigant further adjusts emerging technology savings in the low and high case scenarios through the Unit Energy Savings adjustment and the Emerging Technology Total Resource Cost (TRC) threshold, discussed in the next section.

   In the scenario review process, there was general consensus among all stakeholders that some level of emerging technologies should be included in the demand forecast. NRDC, PG&E and SCE stated that 100% of emerging technology potential should be included in the mid case, which assumes that that risk factor discount in the potential model sufficiently reduces projected savings for emerging technologies. CAISO, IEP, SCG and SDG&E recommended reducing emerging technology savings by 50% in the mid case. They go further to argue that the uncertainty regarding LEDs also has an upward effect, and there could be much greater savings from emerging technologies than was modeled. In response to comments, JASC set the mid case scenarios at 50% for mid case 1, 100%, for mid case 2 and 150% for mid case 3.

3) **Incremental Costs:** Incremental costs are the difference in costs between code level equipment and the high efficiency equipment. The incremental costs for efficient technologies are from Database on Energy Efficiency Resources (DEER) – the CPUC-approved database of energy savings parameter –

and the model adjusts the incremental costs across all technologies to account for changes over time. Adjustments to incremental costs between scenarios apply to all measures. JASC did not change Navigant's proposed assumptions to adjust the incremental costs by 25% for the low and high case scenarios.

4) **Implied Discount Rate:** The implied discount rate is the effective discount rate that consumers apply when making a purchase decision; it determines the amount the customer is willing to pay for an EE investment. The implied discount rate is much higher than the standard discount rate used for making investment decisions because it accounts for other market barriers which may impact the customer decision.

   The mid-case and the high and low variations were determined based on existing literature on the implied discount rate for energy efficiency adoption and the range of uncertainty. JASC did not change Navigant's proposed assumptions for the low and high forecast.

5) **Marketing Effect**: The base factors for market adoption are customer's willingness and awareness, which was derived from a regression analysis of technology adoptions from several studies on technology diffusion. Each end use in each sector was assigned marketing and word of mouth effectiveness factors corresponding to diffusion rates in the studies. The high and low scenario varies these customer adoption rates as part of scenario analysis to assess changes in the level and timing of customer adoption. JASC did not change Navigant's proposed assumptions for the low and high forecast.

6) **TRC Threshold:** The Total Resource Cost (TRC) is the primary cost-effectiveness methodology that the Commission uses to determine to set funding levels and adoption thresholds for energy efficiency. The TRC test measures the net resource benefits from the perspective of all ratepayers by combining the net benefits of the program to participants and non-participants.

   The benefits are the avoided costs of the supply-side resources avoided or deferred. A TRC Threshold of 1.0 is defined as the costs and benefits of a measure are equal. If the measure does not pass the threshold, it will not be counted for market potential. However, market potential is a further screen that considers the cost effectiveness of the measure, as part of the calculation of customer's willingness and awareness to adopt. The mid-case scenario set a cost-effectiveness threshold of 0.85 TRC since the overall energy efficiency portfolio can include less cost effective measures, for which their cost is offset by the more cost effective measures. A 0.85 TRC threshold is the established rule of thumb for screening energy efficiency measures, because the excess benefits of more cost effective measures in the portfolio subsidize the additional costs of certain measures that are close to being cost effective, but slightly below 1.0

   IEP recommended increasing the TRC threshold to 1 for the mid case scenario, however, this recommendation would effectively change existing CPUC policy. JASC did not change Navigant's proposed assumptions for this variable.

7) **Efficient Measure Density:** Measure density is defined as the number of units of a technology per unit area. Specifically, measure density is categorized as follows:

a) *Baseline measure density*: This is the number of units of a baseline technology per unit home for the residential sector, or per unit area for the commercial sector.
b) *Energy efficient measure density*: This is the number of energy efficient units existing per unit home for the residential sector, or per unit area for the commercial sector.
c) *Total measure density:* This is usually the sum of the baseline and efficient measure density. When two or more efficient measures compete to replace the same baseline measure, then the total density is equal to the sum of the baseline density and all applicable energy efficient technology densities.

Measure densities are initially set based on market data such as Residential Appliance Saturation Study (RASS) and Commercial End Use Survey (CEUS). We then make adjustments based on Evaluation, Measurement and Verification (EM&V) results for programs that have installed measures since the initial market studies were done. For example, RASS was updated in 2009 so we used this to help set densities, but also adjusted RASS numbers to account for the 2010, 2011, and 2012 programs. The final densities we settle on are different for each measure or measure category. The adjustment made to the model scenarios are simple multipliers of the densities used in the mid-case. JASC did not change Navigant's proposed assumptions for this variable.

8) **Unit Energy Savings:** Unit Energy Savings is the estimated difference in annual energy consumption between a measure, group of technologies or processes and baseline, expressed as kWh for electric technologies and therms for gas technologies. Adjustments to Unit Energy Savings to the high and low scenario apply only to emerging technology measures. Since savings estimates for emerging technologies can be uncertain, this multiplier allows the user to examine the effects of varying the calculated Unit Energy Savings for emerging technologies.

   The Unit Energy Savings values come from DEER. The scenarios simply increase or reduce the savings values by 25%.

9) **Future Code Updates:** Navigant's initial mid case scenario includes Title 20, 24 and federal appliance standards updates that were in the process of being adopted but not yet a law. These include 2005, 2008, 2013, and 2016. Navigant did not include the 2019 and 2022 Title 24 updates in the mid case scenario because they were based on very limited measure level analysis. While the early year code updates are mostly embedded in the forecast, and not part of the incremental EE savings, savings from past code accrue over the life of a measure, as the existing equipment is assumed to be replaced upon burnout.

   The impact of 2019 and 2022 codes is minimal because savings begin to accrue 3-4 years after the code update year. However, compliance dates and efficiency level have not been formally established.

10) **Emerging Technology TRC Threshold**: The Total Resource Cost (TRC) threshold – a cost-effectiveness screen – for emerging technologies is different than it is for other measures, because just as more highly cost effective measures subsidize less cost effective measures, they also do so for emerging technologies. These specific technologies have been identified to receive additional support in order to help drive their market adoption. The adjustment varies the cost-benefit threshold that emerging technology measures must meet.

The Emerging Technology TRC Threshold was reduced to 0.5 for the mid case scenario and to 0.4 for the high case scenario. In the year that an emerging technology passes the Emerging Technology TRC threshold, the model begins to calculate technical and economic potential for that emerging technology. However, market potential for an emerging technology that barley passes a TRC would likely be low since awareness is low and willingness is low - willingness is correlated with TRC even though it is calculated differently. Over time, as avoided costs and energy prices increase, and as emerging technology equipment costs decrease, both the TRC and willingness/awareness will improve all resulting in increased market potential.

11) **Incentive Level:** The incentive level is a policy question for the CPUC to consider in the portfolio guidance proceeding. Program incentive levels have not been defined by established Commission requirements; IOUs may set incentive levels to best meet their goals. However, past goals were based on a flat incentive level of 50% across all measures. To meet these goals, the IOUs file a program portfolio application, which defines an incentive level for each measure and demonstrates that the sum of the incentive costs are cost effective in total. Based on this cost-effectiveness showing, the CPUC authorizes an EE budget that the IOU collects in their rates. While the IOUs may vary the incentive level from measure to measure, they must work within their authorized budget to maximize savings, so their incentives on average, balance out to be approximately 50% of the incremental cost. Navigant had originally proposed adjustments to the incentive level as an option in optimize savings. However the results of the analysis suggested that the current incentive level is the most cost effective option, so the CPUC is not going to consider this adjustment as a policy option in the next portfolio decision. Hence, there is no uncertainty in this component and all scenarios were set at 50% of incremental cost.

P.4 Low, Mid and High Case Scenarios

Table 2 outlines the components that were adjusted in order to generate the scenarios for the low, mid and high IEPR demand forecast. Except for where otherwise indicated, the variables used for the mid-case 1, 2 and 3 in the previous section correlate with the low, mid and high cases below. There are three additional variables in these scenarios, which are based on the 2011 IEPR demand forecast.

Table 2. Proposed Scenarios for Additional Achievable Efficiency, 2013 IEPR Forecast

	Scenario Component Impact as % of EE forecast		Variations on the IEPR Mid Case Scenario In order of impact on impact on Scenario's Variables: Highest impact on top, Lowest impact on bottom)		
	% Impact of Scenario Component in low case*	% Impact of Scenario Component in high case	Low EE penetration (Mid IEPR, low EE variables)	Mid EE penetration (Mid IEPR, mid EE variables)	High EE penetration (Mid IEPR, high EE variables)
Code compliance	-11.50%	1.80%	No Compliance Enhancements, 20% reduction	No Compliance enhancements	Compliance enhancements Included
Emerging Technologies	-8.30%	N/A2	25% of model results	100% of ET model results	150% of ET model results
Incremental Costs	-9.50%	0.069	Best Estimate in Mid Case plus 25%	Best Estimate from past evaluated results	Best Estimate in Mid Case minus 25%
Implied Discount Rate	-3.50%	7.40%	20%	18%	14%
Marketing Effect	-4.40%	5.00%	1%	2%	3%
TRC threshold	-6.80%	1.00%	1	0.85	0.75
Avoided Costs	-6.00%	0.30%	Mid case adjusted by the retail rates in high case scenario	Results of the E3 Avoided Cost Calculator	Mid case adjusted by the retail rates in low case scenario
Measure Densities	-1.40%	3.30%	Estimate plus 20%	Best Estimate Costs	Estimate minus 20%
Unit Energy Savings	-0.013	1.90%	Best Estimate in Mid Case minus 25%	Best Estimate from past evaluated results	Best Estimate in Mid Case plus 25%
Title 24 Adoption Dates	N/A2	1.80%	2005, 2008, 2013	2005, 2008, 2013, 2016, 2019, 2022	2005, 2008, 2013, 2016, 2019, 2022
Retail Energy Rates	-0.90%	1.70%	High retail energy rate scenario in most recent IEPR demand forecast	Mid retail energy rate scenario in most recent IEPR demand forecast	Low retail energy rate scenario in most recent IEPR demand forecast
Word of Mouth Effect	-0.014	0.012	0.39	0.43	0.47
Building Stock Growth Rate	-0.021	0.004	High growth in building stock in low case in most recent IEPR forecast	Mid growth in building stock in mid case in most recent IEPR forecast	Low growth in building stock in mid case in most recent IEPR forecast
Emerging Technology TRC	-0.10%	0.00%	85%	50%	40%
Incentive Level	-	-	50% of incremental cost	50% of incremental cost	50% of incremental cost
2024 Savings (GWh)	-0.57	0.33	12086	20935	33904
2024 Savings (MW)			2,952	4,833	8,095

[1] Scenario Component Impact is based on Navigant's sensitivity analysis, using GWH, except for mid-case variations, which are emerging technologies, code compliance and Title 24 adoptions dates. Navigant's sensitivity analysis is based on the impact of the component relative to market potential and was subsequently adjusted to reflect its impact on the mid-case forecast.

[2] Low case Title 24 updates and high case for emerging technologies were not included in the original sentivity analyses, and thus not available in time for this memo.

Definitions of Components

Unless otherwise indicated the same variables are applied to the proposed low mid and high IEPR demand forecasts as were the mid case options in the first section.

1) **Code Compliance:** The high case scenario includes the compliance enhancements discussed in the prior section.

2) **Emerging Technologies:** The low case scenario applies 25% of emerging technology savings instead of 50%.

3) **Avoided Costs:** Avoided costs refers to the incremental costs avoided by the investor-owned utility when it defers or avoids generation from existing/new utility supply-side investments or energy purchases in the market. Avoided costs also encompass the deferral or avoidance of transmission and distribution-related costs. Avoided costs are an essential component of the cost-effectiveness calculations, representing the primary part of the "benefit" side of the equation. This not only determines the economic potential for EE, but is a key factor in the market adoption calculation for market potential.

   The mid case avoided cost estimates were based on the 2012 vintage of the E3 avoided cost calculator. The Navigant team used the uncertainty (low and high variations) in the 2011 IEPR retail price forecast to calculate low and high ranges for the avoided costs. This assumes that the uncertainty about the avoided costs would correlate with the uncertainty about the 2011 IEPR retail price forecast.

4) **Retail Energy Rates**: The retail rates are the projected energy rates to the ratepayer. The P&G Study uses the high, mid and low retail rate forecast developed in the 2011 IEPR report for the EE potential scenarios. The JASC recommendation means that the 2011 IEPR high forecast would be used for developing the High EE building stock forecast and the 2011 IEPR low forecast would be used for the Low EE building stock forecast.

5) **Building Stock Forecast:** The building stock forecast provides scenario of growth in the state building stock based on variable economic conditions. Like the retail rate forecast, Navigant uses the scenarios developed in the 2011 IEPR demand forecast. The JASC recommendation means that the 2011 IEPR high forecast would be used for developing the High EE building stock forecast and the 2011 IEPR low forecast would be used for the Low EE building stock forecast.

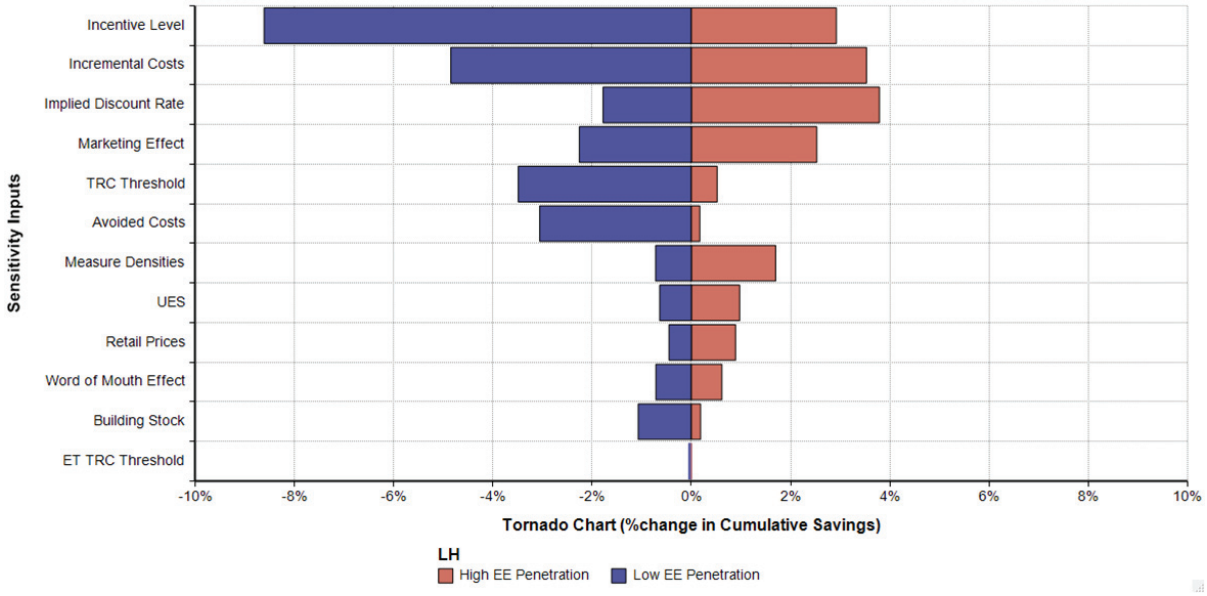
P.5 Timeline for 2013 IEPR Demand Forecast Completion (California Energy Demand 2014-2024)

Event/Task	Date
Energy Commission Business Meeting to adopt *2013 IEPR*	December 11
California Energy Demand 2014-2024 adopted as a Commission Report	December 11
California Energy Demand 2014-2024 published with any revisions	November 26
Executive Oversight Committee (EOC) decision on single, managed forecast	By November 2
JASC final recommendation to EOC on single, managed forecast	By November 15
**** [Expected dates above assume no changes are made to forecast scenarios after workshop]****	
Loop back in with Commissioner McAllister (Lead for IEPR) after comments received	By October 25
Workshop on Revised Forecast, including Additional Energy Efficiency Scenarios	October 1
Workshop on Draft *2013 IEPR*	September 25
Public release of draft Revised Forecast report	September 20
Draft Revised Forecast report completed and starts publication review	September 6
EOC decision on three additional efficiency (AEE) scenarios for forecast	By August 30
Loop back in with Commissioner McAllister	By August 30
JASC recommendation to EOC on three AEE scenarios for forecast	August 27
Loop back in with Commissioner McAllister on scenarios	By August 23
Comments from DAWG participants on scenarios	August 21
JASC discussion on scenario recommendation	August 10
DAWG Energy Savings Sub-Group to discuss revised scenarios and results	August 16
Loop in Commissioner McAllister on scenario changes	August 12
Re-run an additional scenario and any other changes	August 9

P.6 Tornado Chart in P&G Study

Figure 1 is a tornado chart was produced by Navigant for the P&G Study, to show the relative importance of several model inputs on the range of market potential from the scenarios. This chart was developed by varying one input assumption at a time, leaving the values of all other variables consistent with those in the Mid-Energy Efficiency Penetration scenario. The x-axis in the tornado chart shows the percent change in cumulative market potential in a specific year caused by changing the value of that single variable from the Mid to the High scenario (in red) or the Mid to the Low scenario (in purple). The variables with the bigger bars have a more significant impact on the results of the analysis. The chart only includes the original variables that Navigant adjusted for the high and low forecasts, and does not include the exclusion of Emerging Technologies, code compliance adjustments or inclusion of T24 2019 and 22 updates.

Figure 1. Tornado Chart Showing Model Sensitivities to Changes in Key Variables



Note: This chart shows results for the Commercial sector; results in the Residential sector are similar.
Source: PG Model release on 5/22/20

Appendix Q Additional Data Supporting the AAEE Scenarios

This appendix provides the savings results with data supporting JASC and IEPR low, medium and high additional achievable energy efficiency (AAEE). **The final AAEE scenarios are determined the CEC and may vary from the values provided this report, and so the AAEE graphs below should be considered illustrative.**

Q.1 All IOU territory, data supporting JASC and IEPR low, medium, and high AAEE scenarios

Table 3. GWh Savings in all IOU Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	334	334	531	531	544
2014	551	559	931	931	992
2015	1,979	2,010	3,027	3,361	3,449
2016	3,400	3,466	5,451	6,358	6,500
2017	4,822	4,940	7,749	9,588	9,824
2018	5,644	5,814	9,614	12,591	12,920
2019	6,786	6,996	11,528	15,815	16,286
2020	7,786	8,045	13,258	18,739	19,277
2021	8,768	9,100	15,095	22,056	22,662
2022	9,831	10,200	16,963	25,586	26,192
2023	11,017	11,470	18,965	29,404	30,036
2024	12,166	12,699	20,990	33,293	33,947

Figure 2. GWh Savings in all IOU Territory Supporting JASC and IEPR AAEE scenarios

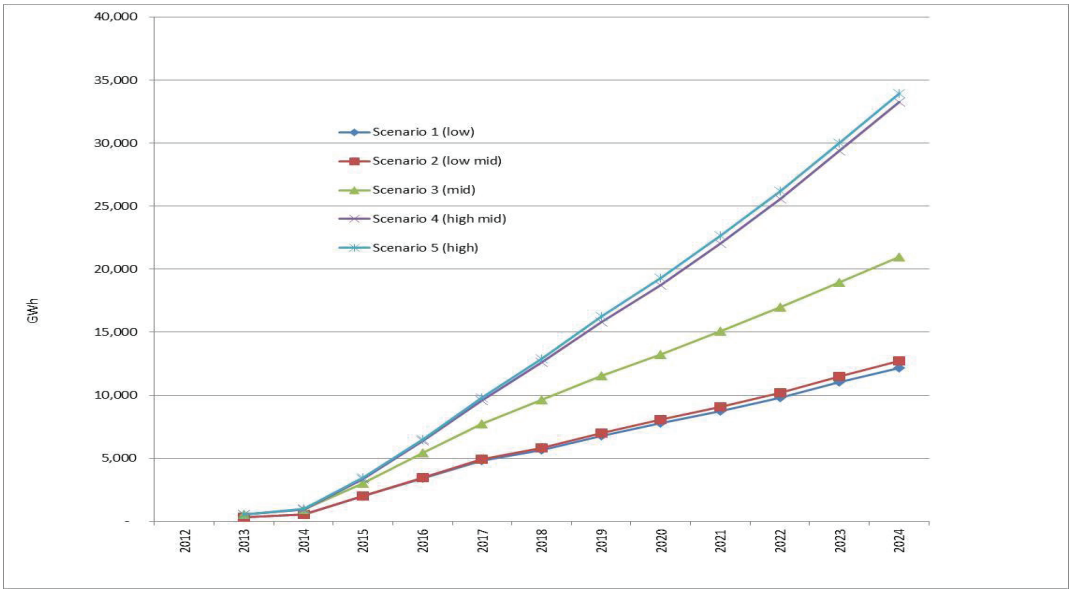


Table 4. MW Savings in all IOU Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	53	53	84	84	86
2014	106	107	171	171	181
2015	456	461	649	726	744
2016	806	817	1,212	1,466	1,499
2017	1,156	1,178	1,735	2,249	2,308
2018	1,408	1,442	2,235	3,046	3,131
2019	1,716	1,760	2,721	3,868	3,990
2020	1,992	2,046	3,168	4,654	4,807
2021	2,271	2,339	3,651	5,539	5,720
2022	2,566	2,641	4,152	6,482	6,685
2023	2,897	2,987	4,704	7,509	7,735
2024	3,222	3,330	5,264	8,563	8,810

Figure 3. MW Savings in all IOU Territory Supporting JASC and IEPR AAEE scenarios

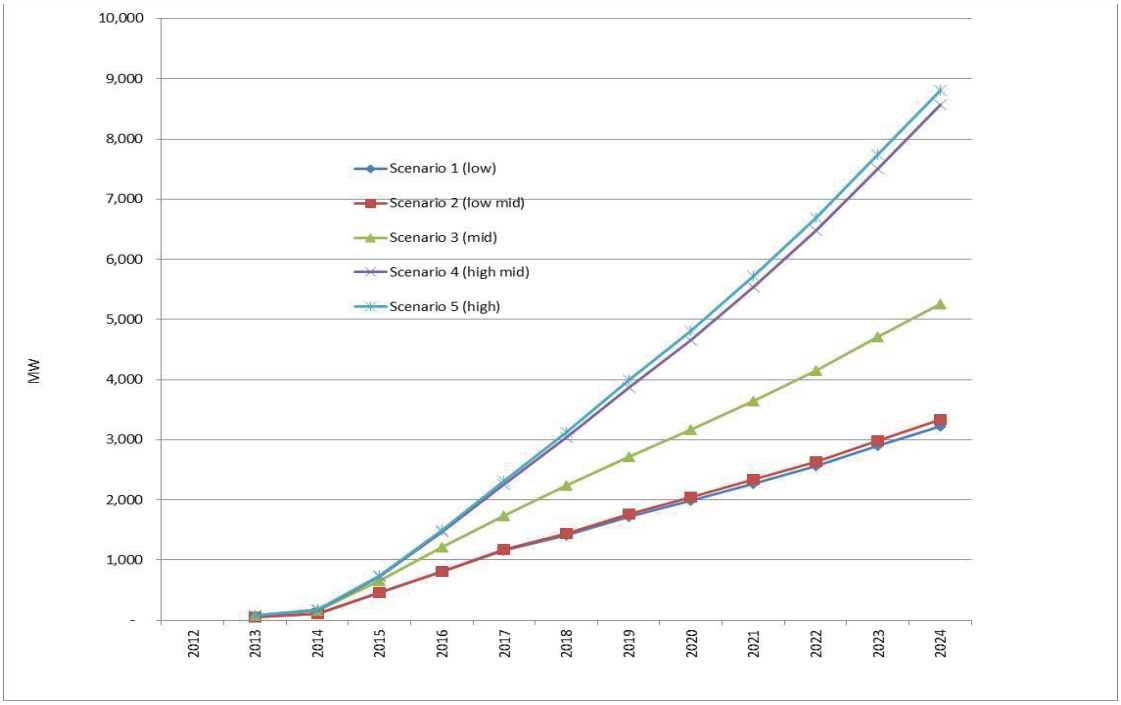
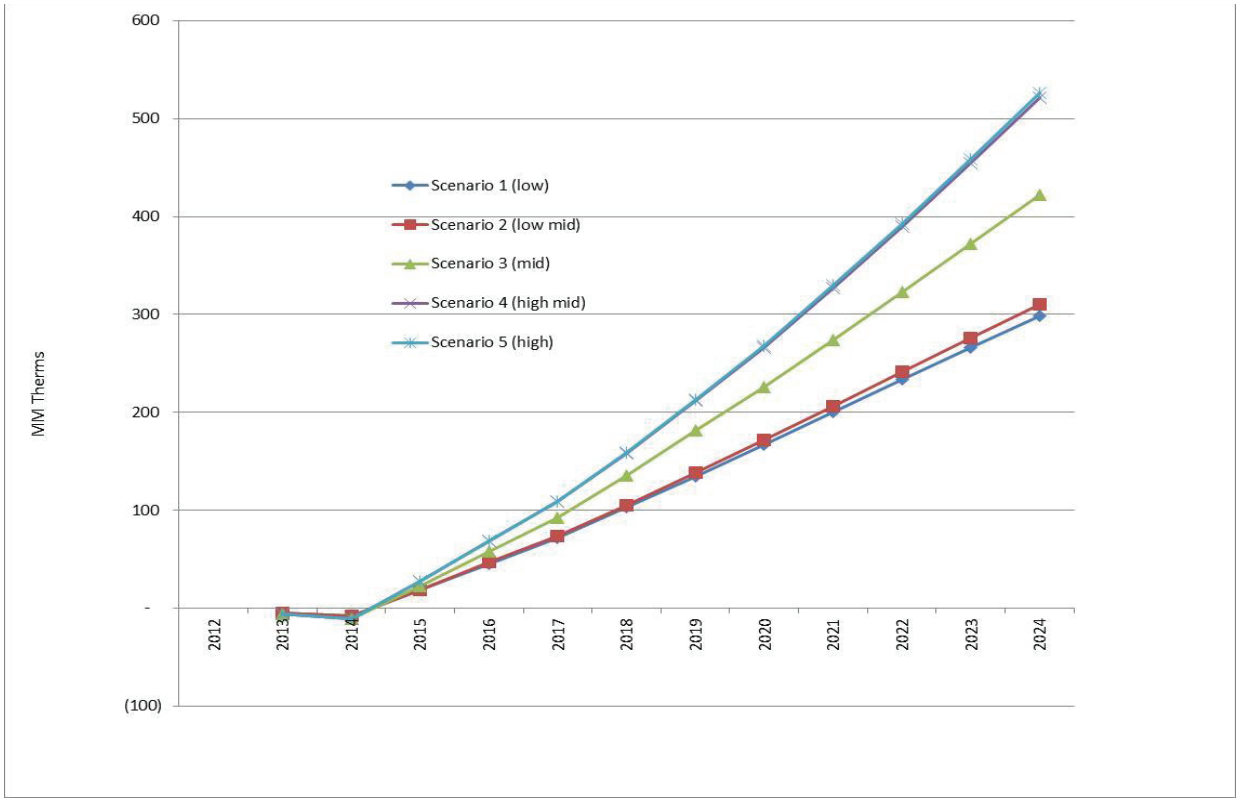


Table 5. MM Therm Savings in all IOU Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	-5	-5	-6	-6	-6
2014	-8	-8	-11	-11	-11
2015	18	19	22	27	27
2016	45	47	57	68	68
2017	72	74	92	109	109
2018	103	105	135	158	159
2019	135	139	182	212	213
2020	167	172	226	266	268
2021	200	206	274	327	330
2022	233	241	323	390	393
2023	266	276	372	455	458
2024	298	310	422	522	526

Figure 4. MM Therm Savings in all IOU Territory Supporting JASC and IEPR AAEE scenarios



Q.2 PG&E Territory savings with data supporting JASC and IEPR low, medium, and high AAEE scenarios

Table 6. GWh Savings in Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	138	138	225	225	230
2014	224	228	392	392	419
2015	844	858	1,294	1,446	1,489
2016	1,464	1,487	2,335	2,742	2,805
2017	2,084	2,128	3,331	4,152	4,255
2018	2,450	2,518	4,151	5,478	5,611
2019	2,961	3,049	4,998	6,906	7,102
2020	3,411	3,521	5,777	8,217	8,443
2021	3,846	3,987	6,595	9,682	9,938
2022	4,320	4,476	7,431	11,249	11,504
2023	4,837	5,029	8,316	12,932	13,200
2024	5,332	5,562	9,208	14,646	14,924

Table 7. MW Savings in PG&E Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	22	22	36	36	37
2014	44	45	73	73	77
2015	194	197	279	322	332
2016	345	349	522	651	669
2017	497	506	753	1,000	1,033
2018	607	621	976	1,361	1,406
2019	742	761	1,193	1,733	1,794
2020	864	888	1,399	2,093	2,169
2021	986	1,016	1,619	2,494	2,578
2022	1,115	1,148	1,847	2,920	3,013
2023	1,258	1,299	2,097	3,382	3,484
2024	1,398	1,447	2,348	3,855	3,964

Table 8. MM Therm Savings in PG&E Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	-2	-2	-2	-2	-2
2014	-3	-3	-4	-4	-4
2015	8	8	9	12	12
2016	18	19	24	29	28
2017	29	30	38	45	45
2018	43	44	57	67	67
2019	57	59	78	91	91
2020	72	74	98	115	116
2021	87	90	119	143	143
2022	102	105	141	171	171
2023	117	121	162	199	199
2024	131	137	184	229	229

Q.3 SCE Territory savings with data supporting JASC and IEPR low, medium, and high AAEE scenarios

Table 9. GWh Savings in SCE Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	174	174	264	264	269
2014	296	300	469	469	496
2015	965	970	1,445	1,589	1,619
2016	1,624	1,647	2,579	2,981	3,037
2017	2,281	2,327	3,648	4,473	4,574
2018	2,663	2,728	4,512	5,854	6,009
2019	3,167	3,244	5,378	7,310	7,525
2020	3,603	3,698	6,151	8,626	8,870
2021	4,039	4,162	6,975	10,129	10,402
2022	4,500	4,637	7,806	11,713	11,985
2023	5,032	5,199	8,709	13,440	13,721
2024	5,554	5,748	9,628	15,205	15,492

Table 10. MW Savings in SCE Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	27	27	41	41	42
2014	55	55	84	84	88
2015	217	218	303	330	336
2016	380	383	562	663	674
2017	540	548	799	1,014	1,034
2018	656	669	1,024	1,369	1,400
2019	794	810	1,239	1,732	1,779
2020	916	936	1,433	2,077	2,135
2021	1,041	1,066	1,643	2,469	2,539
2022	1,173	1,199	1,860	2,886	2,964
2023	1,323	1,354	2,102	3,342	3,429
2024	1,471	1,508	2,349	3,814	3,908

Q.4 SDG&E Territory savings with data supporting JASC and IEPR low, medium, and high AAEE scenarios

Table 11. GWh Savings in SDG&E Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	22	22	42	42	44
2014	30	32	70	70	77
2015	171	182	288	326	341
2016	313	332	538	634	658
2017	456	485	770	964	995
2018	531	568	951	1,258	1,300
2019	658	703	1,152	1,598	1,659
2020	772	826	1,330	1,896	1,963
2021	884	951	1,525	2,244	2,322
2022	1,011	1,088	1,727	2,624	2,703
2023	1,149	1,242	1,940	3,031	3,115
2024	1,280	1,389	2,154	3,442	3,530

Table 12. MW Savings in SDG&E Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	4	4	7	7	7
2014	7	7	14	14	15
2015	44	46	66	74	76
2016	81	84	127	152	157
2017	118	124	183	234	241
2018	145	152	236	316	325
2019	180	189	289	403	418
2020	212	222	337	483	503
2021	244	257	390	576	603
2022	278	294	445	676	708
2023	316	335	506	784	822
2024	353	375	567	895	938

Table 13. MM Therm Savings in SDG&E Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	-0.2	-0.2	-0.2	-0.2	-0.2
2014	-0.3	-0.3	-0.4	-0.4	-0.4
2015	1.2	1.4	1.5	1.8	1.8
2016	2.7	3	3.4	4.1	4.2
2017	4.2	4.6	5.3	6.4	6.6
2018	6.3	6.7	8	9.8	10
2019	8.5	9	11.2	13.7	14.2
2020	10.8	11.5	14	17.6	18.4
2021	13.1	14	17.2	22.3	23.5
2022	15.5	16.7	20.7	27.4	29
2023	17.9	19.3	24.3	32.7	34.7
2024	20.2	22	27.9	38.3	40.6

Q.5 SCG Territory savings with data supporting JASC and IEPR low, medium, and high AAEE scenarios

Table 14. MM Therms Savings in SCG Territory Supporting JASC and IEPR AAEE scenarios

	Scenario 1 (low)	Scenario 2 (low mid)	Scenario 3 (mid)	Scenario 4 (high mid)	Scenario 5 (high)
2012					
2013	-3	-3	-4	-4	-4
2014	-5	-5	-6	-6	-7
2015	10	10	11	14	14
2016	24	25	30	36	36
2017	39	40	49	57	57
2018	54	55	70	81	82
2019	69	71	93	107	108
2020	84	86	114	133	134
2021	100	103	138	162	163
2022	116	119	162	192	193
2023	131	135	185	222	224
2024	147	152	210	254	256

Appendix R Recommended 2013-2014 EM&V Support Activities

This report includes the results of analysis based on the best available data at the time of analysis. Wherever possible, the analysis relied on existing data that had been previously vetted through other stakeholder processes and proceedings. The Demand Analysis Working Group (DAWG) provided a forum for providing additional vetting of the data sources in the context of the PGT project. The Navigant team considered these factors in determining the best path forward for each data input and in developing the analytical design for the model.

That said, more current data or data more tailored to the needs of the potential study could enhance the outputs of the model. Some of the previously vetted data is several years old (e.g., CEUS published in 2006 and RASS published in 2009). In other cases, the PGT Model conducted analysis at a more granular level than the level at which data was collected (e.g., analysis at the climate zone and building type level compared to density data at the state level).

The Navigant team developed the potential model in the midst of an ongoing data collection effort by CPUC and its contractor teams. The Navigant team acknowledges that some data available at the time of publication were not included in the analysis presented in the report. The volume of evaluation, monitoring, and verification (EM&V) studies and timing of their delivery made it impossible to sequence data collection and the development of the potential study; the level of QC applied to any data used in the model prior to presenting results requires sometimes significant lead time between data availability and inclusion in the results. As such, the Navigant team used the most current data feasible to develop the results presented in the report.

Refining the relationship between CPUC's EM&V studies and future revisions to the potential study is an important next step. It can occur as results are finalized from the 2010-2012 EM&V evaluation cycle and as planning for the 2013-2014 cycle continues.

The Navigant team has identified opportunities for enhancing the model results in several categories:

1. Collect/update additional measure-level data
    a. Measure-level technical data
        i. Incorporate baseline energy consumption by measure into DEER
        ii. Track current saturation and density by DEER Climate Zone and building type
        iii. Update study with final data from DEER, CSS, and CLASS
    b. Market data
        i. Collect building stock and customer count data by DEER Climate Zone and building type
        ii. Non-cost and non-energy attributes and benefits that affect consumer choice
2. Conduct more research and collect more data on code compliance rates
    a. Track compliance rates over time (codes likely have lower rates in the first year compared to later years)
3. Emerging technologies
    a. Track adoption of CFLs and LEDs and related savings
    b. Review and update savings from ET and risk factors as better data becomes available
4. Whole building

a. Whole-house retrofits
    i. More data on cost, savings, and market applicability is needed for Energy Upgrade California (EUC).
    ii. Need to asses *true incremental cost* of whole house retrofits; EUC data tracks full cost, not incremental cost.
b. ZNE
    i. Better assessment of ZNE incremental costs
    ii. Consideration and quantification of non-energy benefits of whole building retrofits and ZNE buildings
    iii. Role of efficiency in ZNE applications relative to renewables
c. Building stock data
    i. Segment the building stock by age, size, energy consumption in each service territory in order to identify opportunities

5. AIMS
    a. Vetting of Greenhouse and Agricultural energy savings, inputs/sources, and assumptions
        i. Define typical greenhouse design in California
        ii. M & V studies of greenhouse/ agricultural measures (e.g., irrigation pumps) to understand uncertainties and program performance (realization rates)
        iii. Verification of industry-accepted tools and calculators (including Virtual Grower) used to develop ex-ante estimates
    b. Industrial Market Characterization
        i. Energy intensity driven by production versus other factors; characterizing the link between production and energy consumption
        ii. Motor studies/ industrial motor characteristics (e.g., size (hp) characteristics). Mote baseline efficiency and type of drive (vsd, manual, etc.) are critical
    c. Industrial Standard Practice
        i. Industrial baseline characterization by NAICS and industry subsector
        ii. Participant vs. non-participant practices
        iii. Codes and Standards impacts, including ARB performance standards
    d. Continuous Energy Improvement Programs
        i. Energy impact of these programs versus "typical" energy efficiency programs
        ii. Measure makeup for these against other custom programs
        iii. Market presence by industry subsector and facility size
        iv. Market characterization of practices, strategies, and goals
6. Financing
    a. Effect of different financing terms (e.g., interest rate, term of the loan, OBF vs. OBR) on adoption

b. Implied discount rates – update, consider differences by customer segment level (e.g., small/medium/large residential customers, small/medium commercial vs. large commercial)
c. Effect of reducing market barriers on customer decision making (and the implied discount rate)
d. Impact of financing offerings when offered together with or independent of rebate programs
e. Levels of adoption of financing based on pilot programs

7. Behavior (from behavior memo)
    a. CPUC may consider creating an intervention-based residential behavior potential model for the 2014/2015 research phase. Such a model would calculate potential for each of several types of behavioral programs (e.g, home energy reports, in-home monitors, web portals, home surveys, etc.). Types of potential could include:
        i. Technical potential: identify households that would be technically able to participate in the intervention (e.g., have an individual meter, have access to an online account)
        ii. Economic potential: determine number of households that would be cost-effective to reach with the intervention
        iii. Achievable potential: identify and remove households that would not likely participate in the intervention or those that would be removed due to intervention design (e.g., randomized control-trial, opt-in participation propensity)
    b. Key steps in this research would include:
        i. Identify types of interventions to be included in the model. This step would include talking with CPUC, the IOUs, and other industry stakeholders to understand what types of residential behavioral programs are possible and planned within each territory. Acceptable interventions would need to fall within the CPUC's definition of acceptable behavioral programs.
        ii. Establish appropriate parameters for each intervention, based on available research. Likely to include:
            1. Penetration and/or participation propensity (depending on whether the program is opt-in or opt-out)
            2. Savings
            3. Measure life (persistence of savings with and without intervention)
            4. Program costs
    c. Calculation of technical, economic and achievable potential via modeling in Analytica (similar to the 2011 and 2013 PGT processes) for each individual intervention, each IOU territory, and total across the state.

Appendix S DEER and Work Paper Sourcing

This appendix sources the DEER version and IOU work papers that were used to develop savings and cost data for measures included in the PG model. DEER was the priority source for the data inputs and IOU work papers were used for measures that were not included in the DEER database. At the time of analysis, Navigant received work papers from PG&E and SCE. Similar climate zone data or a weighted average of savings was used from the work papers on file for other IOUs. The work papers listed below were the most up to date versions provided to Navigant at the time of analysis.

S.1 DEER

DEER: Database for Energy-Efficient Resources - Version 2011 4.01. California IOU 2013-14 Energy Efficiency Planning (http://www.deeresources.com/index.php/deer2011-for-13-14)

S.2 IOU Work Papers

S.2.1 PG&E Sourced Work Papers

PG&E, Work Paper ENOVITY-B12a, *New Burner Fan*, Revision 0.0, June 2009

PG&E, Work Paper PGECOLTG125, *Cold Cathode Fluorescent Lamp*, Revision 2, March 2010

PG&E, Work Paper PGECOFST116, *Commercial Kitchen Demand Ventilation Controls*, Rev. # 2, March 2010

PG&E, Work Paper PGEGPREF004, *Door Gaskets,* Revision # 1, August 2009

PG&E, Work Paper PGECOFST102, *Commercial Fryer Gas and Electric*, Revision 3, July 2011

PG&E, Work Paper PGECOFST103, *Commercial Griddle Gas and Electric*, Revision 3, July 2010

PG&E, Work Paper PGECOFST112, *GTO Production Line-Electric,* Revision # 2, March 2010

PG&E, Work Paper PGECOBLD102, *Attic Insulation Non-Res,* Revision # 2, December 2009

PG&E, Work Paper PGECOBLD106, *Wall Insulation Non-Res*, Revision # 1, May 2009

PG&E, Work Paper PGECOLTG113, *Interior Induction Fixtures*, Revision # 2, March 2010

PG&E, Work Paper PGECOCOM104, *LCD Computer Monitor*, Revision # 3, August 2011

PG&E, Work Paper PGEGPLTG025, *Permanent T12 Lamp Removal (Delamping),* Revision # 1, August 2009

PG&E, Work Paper PGECOLTG120, *Wall/Ceiling Occupancy Sensors*, Revision # 2, March 2010

PG&E, Work Paper PGECOLTG110, *Energy Star Interior CFL Fixture*, Revision # 2, March 2010

PG&E, Work Paper PGECOCOM102, *Desktop Computers*, Revision # 2, Feb 2010

PG&E, Work Paper PGECOREF101, *Night Covers for Display Cases*, Revision # 2, August 2009

PG&E, Work Paper PGECOFST101, *Commercial Convection Oven Gas and Electric*, Revision # 3, July 2011

PG&E, Work Paper PGCOALL101, *Occupancy Sensor Plug Load*, Revision # 2, August 2011

PG&E, Work Paper PGECOREF111, *Vending Machine Controller*, Revision # 2, March 2010

PG&E, PECI Work Paper *Thermostat Replacement*, Revision 2, Nov. 2008

PG&E, Work Paper PGECOAPP100, *Reflective Window Film*, Revision # 2, March 2010

PG&E, Work Paper PGEGPBLD003, *Attic Insulation Residential*, Revision # 1, March 2010

PG&E, Work Paper PGECOLTG158, *Exterior Induction Fixtures*, Revision # 2, Jan 2010

PG&E, Work Paper PGEGPLTG012, *Wall/Ceiling Occupancy Sensors*, Revision # 1, July 2009

PG&E, Work Paper PGECOHVC134, *Whole House Fans*, Revision # 2, March 2010

PG&E, Work Paper PGECOLTG126, *LED Seasonal Lights*, Revision # 2, March 2010

PG&E, Work Paper PGECOPUM102, *Variable Speed Pool Pump*, Revision # 2, March 2010

PG&E, Work Paper PGEGPLTG013, *LED Nightlight*s, Revision # 1, Feb 2010

PG&E, Work Paper PGEGPDHW008, *Gas Water Heater or Boiler Controller*, Revision # 1, August 2009

PG&E, Work Paper PGECOLTG109, *Compact Fluorescent Exterior Fixture,* Revision # 2, March 2010

S.2.2 SCE Sourced Work Papers

SCE Work Paper WPSCNRRN0001, *Door Gaskets for Main Door of Walk-in Coolers and Freezers*, Revision 5, March 2011

SCE Work Paper WPSCNRCC0004, *Electric Fryers*, Revision 3, April 2011

SCE Work Paper WPSCNRCC0005, *Electric Griddles*, Revision 3, June 2011

SCE Work Paper WPSCNRCC0010, *Grill to Order Production Line*, Revision 3, June 2011

SCE Work Paper WPSCNRCC0011, *Convection Oven*, Revision 2, July 2011

SCE Work Paper Work Paper WPSCN0004, *Door Gaskets for Glass Doors of Walk-in Coolers*, Revision 3, March 2009

SCE Work Paper WPSCNRRN0005, *Night Covers for Open Vertical and Horizontal Low-Temperature Display Cases*, Revision 4, July 2010

SCE Work Paper WPSCNRRN0014, *Night Covers for Open Vertical Medium-Temperature Display Cases*, Revision 4, April 2011

SCE Work Paper WPSCNRLG0085, *Interior Compact Fluorescent Fixture,* Revision 5, August 2011

SCE Work Paper WPSCRELG0007, *Exterior CFL Fixture*, Revision 8, August 2011

SCE Work Paper WPSCNRLG0095, *Fluorescent De-Lamping*, Revision 5, August 2011

SCE Work Paper WPSCNRLG0046, *Interior PSMH Fixtures*, Revision 4, January 2010

SCE Work Paper WPSCNRLG0084, *Exterior Pulse-Start Metal Halide Fixture*, June 2010

SCE Work Paper WPSCNRHC0002, *Reflective Window Film*, Revision 7, September 2011

SCE Work Paper WPSCREHC0013, *Direct Evaporative Coolers*, Revision 4, June 2010

SCE Work Paper WPSCNRLG0102, *Exterior Induction Lighting*, Revision 1, July 2010

SCE Work Paper WPSCREHC0005, *Whole House Fan*, Revision 5, October 2011

SCE Work Paper WPSCREWP0001, *Variable Speed Swimming Pool Pump*, Revision 4, December 2010

SCE Work Paper WPSCRELG0034, *LED Holiday Lights*, Revision 4, April 2011

SCE Work Paper WPSCREOE0001, *Residential LCD Monitors*, Revision 3, June 2010

SCE Work Paper WPSCREWH0001, *Heat Pump Water Heater*, Revision 0, October 2010

SCE Work Paper WPSCRELG0078, *High Efficiency Halogen Lamps*, Revision 1, October 2010

Appendix T Adjustments for Industry Standard Practices

As discussed in the February 2014 report section 1.1, Key Issues and Updates Since the November 2013 Draft Study Release, Navigant engaged stakeholders in a review of estimates of potential for the agricultural, industrial, and mining sectors (collectively referred to as the AIM sectors). Specifically, Navigant was requested to review and adjust potential to account industry standard practices[1],[2] (ISPs) and select operations and maintenance (O&M) activities that are not allowed under current program guidelines.

This review of ISP and O&M activities required that certain activities be disallowed (or 'de-rated') and this derating resulted in a downward adjustment of market potential for the AIM sector. The following tables provide details on the specific sector ISP de-rate values and impact.

T.1 AIM Electric Energy Derating (GWh)

Sector	IOU	February 2014 Final Report Incremental Market Potential for 2015 (GWh)	November 2013 Draft Report Incremental Market Potential for 2015 (GWh)	Derating Factor	GWH Reduction
AIM Total	Statewide	232.1	354.4	34.5%	(122.3)
	PG&E	119.6	190.9	37.4%	(71.4)
	SCE	104.0	151.2	31.2%	(47.1)
	SCG	0.0	0.0	0.0%	0.0
	SDG&E	8.5	12.3	30.8%	(3.8)
Industrial	Statewide	129.9	183.5	29.2%	(53.6)
	PG&E	61.4	87.5	29.8%	(26.1)
	SCE	62.0	86.6	28.5%	(24.6)
	SCG	0.0	0.0	0.0%	0.0
	SDG&E	6.5	9.3	30.8%	(2.9)
Agriculture	Statewide	89.8	129.2	30.5%	(39.4)
	PG&E	52.4	75.4	30.6%	(23.0)
	SCE	35.4	50.9	30.5%	(15.5)
	SCG	0.0	0.0	0.0%	0.0
	SDG&E	2.0	2.9	30.7%	(0.9)
Mining	Statewide	12.5	41.7	70.1%	(29.2)
	PG&E	5.8	28.0	79.4%	(22.2)
	SCE	6.7	13.7	51.0%	(7.0)
	SCG	0.0	0.0	0.0%	0.0
	SDG&E	0.0	0.0	0.0%	0.0

[1] ISP Guide Industry Standard Practice Revision 0x. Southern California Gas Company, October 14, 2013

[2] ISPs are defined as follows; Businesses utilize a series of technologies to process or produce a product or provide certain service. For each step in the series, there are one or more technologies that can be utilized to perform that particular step. Although any of these technologies may be suitable, more often than not, there is one technology that is commonly installed. This commonly installed technology would be considered to be standard practice within for an application.

T.2 Street Lighting Electric Derating (GWh)

Sector	IOU	February 2014 Final Report Incremental Market Potential for 2015 (GWh)	November 2013 Draft Report Incremental Market Potential for 2015 (GWh)	Derating Factor	GWh Reduction
Statewide	Street Lighting	17.1	35.6	52.0%	(18.5)
PG&E	Street Lighting	10.9	14.8	26.3%	(3.9)
SCE	Street Lighting	3.5	19.7	82.4%	(16.2)
SCG	Street Lighting	0.0	0.0	0.0%	0.0
SDG&E	Street Lighting	0.9	1.1	19.0%	(0.2)

T.3 Electric Demand Derating (MW)

IOU	Sector	February 2014 Final Report Incremental Market Potential for 2015 (MW)	November 2013 Draft Report Incremental Market Potential for 2015 (MW)	Derating Factor	MW Reduction
Statewide	AIM	17.81	32.05	44.42%	(14.2)
PG&E	AIM	9.16	17.53	47.77%	(8.4)
SCE	AIM	7.98	13.41	40.51%	(5.4)
SCG	AIM	0.00	0.00	0.00%	0.0
SDG&E	AIM	0.68	1.11	38.68%	(0.4)
Statewide	Industrial	11.36	16.94	32.92%	(5.6)
PG&E	Industrial	5.57	8.30	32.89%	(2.7)
SCE	Industrial	5.23	7.77	32.70%	(2.5)
SCG	Industrial	0.00	0.00	0.00%	0.0
SDG&E	Industrial	0.57	0.87	35.21%	(0.3)
Statewide	Agriculture	5.02	10.35	51.44%	(5.3)
PG&E	Agriculture	2.93	6.04	51.46%	(3.1)
SCE	Agriculture	1.98	4.08	51.40%	(2.1)
SCG	Agriculture	0.00	0.00	0.00%	0.0
SDG&E	Agriculture	0.11	0.23	51.59%	(0.1)
Statewide	Mining	1.42	4.76	70.10%	(3.3)
PG&E	Mining	0.66	3.20	79.41%	(2.5)
SCE	Mining	0.76	1.56	51.01%	(0.8)
SCG	Mining	0.00	0.00	0.00%	0.0
SDG&E	Mining	0.00	0.00	0.00%	0.0

T.4 AIM Gas Derating (MM Therms)

IOU	Sector	February 2014 Final Report Incremental Market Potential for 2015 (MM Therms)	November 2013 Draft Report Incremental Market Potential for 2015 (MM Therms)	Derating Factor	MM Therms Reduction
Statewide	AIMS	14.98	23.89	37.30%	(8.9)
PG&E	AIMS	5.89	9.50	38.03%	(3.6)
SCE	AIMS	0.00	0.00	0.00%	0.0
SCG	AIMS	8.88	14.10	37.01%	(5.2)
SDG&E	AIMS	0.21	0.29	27.61%	(0.1)
Statewide	Industrial	11.88	18.97	37.37%	(7.1)
PG&E	Industrial	5.50	8.91	38.26%	(3.4)
SCE	Industrial	0.00	0.00	0.00%	0.0
SCG	Industrial	6.21	9.84	36.84%	(3.6)
SDG&E	Industrial	0.17	0.22	25.24%	(0.1)
Statewide	Agriculture	1.32	2.06	35.92%	(0.7)
PG&E	Agriculture	0.38	0.59	34.58%	(0.2)
SCE	Agriculture	0.00	0.00	0.00%	0.0
SCG	Agriculture	0.89	1.41	36.53%	(0.5)
SDG&E	Agriculture	0.05	0.07	35.06%	(0.0)
Statewide	Mining	1.78	2.86	37.80%	(1.1)
PG&E	Mining	0.00	0.00	37.80%	(0.0)
SCE	Mining	0.00	0.00	0.00%	0.0
SCG	Mining	1.77	2.85	37.80%	(1.1)
SDG&E	Mining	0.00	0.00	0.00%	0.0