

State-Adjusted Load Forecast: **California**

Review Table

Reviewed by	Date
Mike Jaske	7/16/2010
Commissioner Jeff Byron, SPSC Representative	7/19/10
Commissioner Dian Grueneich, SPSC Representative	7/19/10

This document presents the 2020 State-Adjusted Load Forecast recommended by the SPSC DSM Work Group, and describes the underlying analysis. The State-Adjusted Load Forecast will be used in the SPSC Reference Case, and will be the starting point in developing alternate load forecasts for the other scenarios in the SPSC study request. The State-Adjusted Load Forecast recommended by the DSM Work Group is intended to reflect the expected energy savings and peak demand savings from current energy efficiency policies and utility resource plans, based on the methodology and assumptions described in the Reference Case proposal from the DSM Work Group to the SPSC, and incorporating any subsequent guidance from each state/province’s designated DSM technical contact.¹

We seek approval from SPSC members of the State-Adjusted Load Forecasts shown in Column E of Tables 1 and 2. Please respond to Michael Wheeler (michael.wheeler@cpuc.ca.gov) by August 4th indicating whether the proposed forecast is acceptable, and if not, what specific changes are needed.

Given the limited time available for making revisions to this analysis, we request that revisions to the analysis be made only if they are likely to have a material impact on the load forecasts at the balancing authority level. Any questions about how the State-Adjusted Load Forecasts were developed that are not addressed within this document should be directed to Galen Barbose (gbarbose@lbl.gov, 510-495-2593).

A. Recommended State-Adjusted Load Forecast

Tables 1 and 2 present the SPSC DSM Work Group’s recommended State-Adjusted Load Forecast for each balancing authority in the state/province (Column E), compared to the forecasts that were submitted by the balancing authorities to WECC. The State-Adjusted Load Forecast for each balancing authority in California was derived from the CEC’s IEPR demand forecast (Column B), by deducting the estimated Incremental Reference Case Efficiency (Column D).

¹ See: “Proposed TEPPC Reference Case DSM Assumptions: Request for Review and Input from SPSC Members,” dated April 3, 2010.

As discussed further in the next section of this document, the decision to rely on the CEC’s IEPR demand forecast for all balancing authorities (rather than just for the CAISO) was driven, in part, by the fact that none of the publicly-owned utilities in California responded to the WECC LSE DSM Survey. Because load forecasts submitted to WECC were not used in developing the State-Adjusted Load Forecast, it was not necessary to estimate the amount of energy efficiency embedded within the load forecasts submitted to WECC; Column C in Tables 1 and 2 is thus marked “n/a” for all balancing authorities.

The remainder of this document provides details on the analysis underlying the estimates of the Incremental Reference Case Efficiency for each balancing authority. That discussion separately describes the approaches taken for the state’s investor-owned utilities (IOUs) and for the state’s publicly owned utilities (POUs).

Table 1. “State-Adjusted” Load Forecasts for Each California Balancing Authority (GWh)

Balancing Authority	A	B	C	D	E=B-D	F = E/A - 1
	Load Forecast Submitted to WECC	CEC IEPR Forecast	Energy Efficiency Embedded in WECC Load Forecast	Incremental Reference Case Efficiency	State-Adjusted Load Forecast	Percent Change from WECC Forecast
	(GWh)	(GWh)	(GWh)	(GWh)	(GWh)	(%)
CAISO	265,869	265,870	n/a	15,249	250,621	-6%
LADWP	32,597	32,437	n/a	2,940	29,498	-10%
SMUD	19,153	20,816	n/a	2,219	18,597	-3%
IID	4,707	4,828	n/a	234	4,593	-2%
TID	3,147	3,041	n/a	174	2,866	-9%
Total	325,473	326,991	n/a	20,816	306,175	-6%

Table 2. “State-Adjusted” Load Forecasts for Each California Balancing Authority (MW)

Balancing Authority	A	B	C	D	E=B-D	F = E/A - 1
	Load Forecast Submitted to WECC	CEC IEPR Forecast	Energy Efficiency Embedded in WECC Load Forecast	Incremental Reference Case Efficiency	State-Adjusted Load Forecast	Percent Change from WECC Forecast
	(MW)	(MW)	(MW)	(MW)	(MW)	(%)
CAISO	54,731	55,298	n/a	5,232	50,066	-9%
LADWP	6,778	6,912	n/a	590	6,322	-7%
SMUD	4,886	5,196	n/a	643	4,553	-7%
IID	1,242	1,256	n/a	68	1,188	-4%
TID	787	776	n/a	51	726	-8%
Total	68,424	69,439	n/a	6,584	62,855	-8%

B. Reliance on the CEC IEPR Demand Forecast for Each California Balancing Authority

The SPSC DSM Work Group's initial analysis plan envisioned that the State-Adjusted Load Forecast for each balancing authority in California would be developed by deducting from the balancing authority load forecast submitted to WECC the *incremental* reference case savings not already embedded within that forecast. In order to estimate the incremental savings, it would first be necessary to estimate the amount of energy efficiency savings already embedded within the balancing authority forecast. The load forecast that CAISO submitted to WECC is effectively identical to the CEC's IEPR forecast², and the energy efficiency savings embedded in the CEC's IEPR forecast are well-documented within the IEPR demand forecast report. However, the load forecasts submitted to WECC by the other California balancing authorities are not identical to the CEC's IEPR demand forecast, and thus further analysis would be required in order to estimate the energy efficiency savings embedded within those forecasts.

Members of the SPSC DSM Work Group and the TEPPC DSM Task Force developed a survey instrument to collect information from load serving entities (LSEs) regarding the energy efficiency and DSM assumptions incorporated into the load forecasts provided to WECC. WECC distributed this survey to LSEs on June 8th, requesting that they complete the survey by June 30th. To date, no California POU's have returned the survey. In lieu of survey responses, the SPSC DSM Work Group opted to develop State-Adjusted Load Forecasts by relying on the CEC IEPR forecasts for all balancing authorities in California (rather than doing so only for CAISO). This allows the incremental reference case savings to be estimated for each balancing authority, given the documentation provided in the CEC's IEPR report about which energy efficiency policies are not already incorporated into the IEPR forecasts.

C. Incremental Reference Case Energy Efficiency Savings: Investor-Owned Utilities

The CAISO control area includes all three electric IOUs, as well as some portion of the state's POU's. The IEPR demand forecast for the CAISO accounts for only "committed" energy efficiency program/policy savings. It does not account for "uncommitted" savings associated with:

- IOU programs implemented after 2012
- POU programs implemented after 2009
- The Huffman lighting efficiency bill (AB1109)
- The Big Bold energy efficiency initiatives
- Updates to state building codes and to federal appliance standards
- Additional IOU programs required to offset 50% of historical program savings lost to measure decay

The CEC's Incremental Impacts report contains three alternate projections (Low, Medium, and High) of incremental savings beyond what is captured within the IEPR forecast, for each of the state's three electric IOUs. The SPSC DSM Work Group estimates that, for the state's three IOUs, the incremental

² The CEC's IEPR forecast for CAISO is contained in Form 1.5a and 1.5b of the IEPR demand forecast report. The energy forecast submitted by CAISO to WECC is identical to the IEPR forecast. The peak demand forecast, however, is not identical (as evident in Table 2), although the growth rates are identical. One possible explanation is that the CAISO may use a different scaling factor than the CEC uses to calculate the coincident peak demand from the forecasted non-coincident peak demand of each individual utility.

reference case savings are equal to the Low Scenario projection in the CEC’s Incremental Impacts report (with several minor adjustments, as described in the notes section of Table 3).³ We also assume that the IOUs achieve *additional savings* equal to 50% of measure decay in each year, as required by the CPUC, based on the savings decay estimated within the CEC’s Incremental Impacts report. Table 3 itemizes the incremental reference case savings for California’s IOUs.

Table 3. Incremental Reference Case Energy Efficiency: Investor-Owned Utilities

Source of Savings	Cumulative Savings in 2020	
	GWh ³	MW ^{3,4}
IOU Programs (2012-2020) ¹	5,002	1,540
Huffman Bill (AB1109) ¹	4,051	550
Title 24 & Fed Stds. ¹	897	649
Big Bold Initiative ¹	2,034	1,713
Additional savings to offset measure decay ²	2,104	423
Total	14,089	4,875

¹ Data source: CEC Incremental Impacts Report, Table 7.

² Data source: CEC Incremental Impacts Report, Table 12.

³ The energy and peak demand savings projections in the CEC’s Incremental Impacts report are expressed at the customer-meter. We “grossed up” the savings projections to the bus-bar, by multiplying the projected energy and peak demand savings at the customer-meter by a set of estimated, marginal T&D loss factors for energy and peak demand (see Section E of this document for further details).

⁴ The peak demand savings projections in the CEC’s Incremental Impacts report represent the reduction in each individual utility’s annual peak demand. We translated these non-coincident peak demand savings estimates into demand reduction coincident with the CAISO annual peak. To make that adjustment, we multiplied the reported non-coincident peak demand savings by 0.9761, which is the adjustment factor that the CEC uses to convert each utility’s non-coincident peak demand to its CAISO-coincident peak demand (see CEC IEPR demand forecast report, footnote 20).

D. Incremental Reference Case Energy Efficiency Savings: Publicly-Owned Utilities

The CEC IEPR forecast does not account for any savings from POU energy efficiency programs implemented beyond 2009. To estimate expected savings from POU programs implemented through 2020, the SPSC DSM Work Group relied on the preliminary 2011-2020 energy efficiency targets identified in the March 2010 report *Energy Efficiency in California’s Public Power Sector: a Status Report* (Appendix A).⁴ That report identifies the annual energy savings targets for each individual POU; the savings targets are identified as “preliminary”, because, at the time that the report was prepared and submitted to the CEC, the governing boards of many of the POUs had not yet formally adopted the 2011-2020 targets.

³ The decision to select the Low Scenario for the State-Adjusted Load Forecast is driven partially by the expectation that the High Scenario savings projection in the CEC’s Incremental Impacts report will be used separately in the TEPPC High DSM Scenario.

⁴ This report was prepared jointly by the Northern California Power Authority (NCPA), the California Municipal Utility Association (CMUA), and the Southern California Power Planning Authority (SCPPA), and was submitted to the CEC to comply with SB1307 reporting requirements.

Although the March 2010 POU energy efficiency target report included updated savings targets for most of the state’s POU, it did not include 2011-2020 targets for either LADWP or SMUD. LADWP’s current targets extend through 2016, and SMUD’s current targets extend through 2017. Thus, for both utilities, we rely on the current annual savings targets, and we assume that annual savings continue through 2020 at the same level as in the last year of the current target schedule, as shown in Tables 4 and 5.

Table 4. LADWP Annual Energy Efficiency Targets Extrapolated through 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
GWh	300	280	255	252	252	252	252	252	252	252	252
MW	57	55	53	53	53	53	53	53	53	53	53

Data source: *Energy Efficiency in California’s Public Power Sector: A Status Report*, p.125.

Table 5. SMUD Annual Energy Efficiency Targets Extrapolated through 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
GWh	175	180	192	195	197	199	206	208	208	208	208
MW	51	53	54	55	55	57	59	59	59	59	59

Data source: SMUD Board Policy, Policy Number SD-9, November 9, 2009 revision.

<http://www.smud.org/en/board/Documents/policy-pdfs/Policy%20SD-9-jan10.pdf>

In addition to excluding the impacts from future POU energy efficiency programs, the CEC IEPR forecast also does not account for any savings within the POU service territories that will occur as a result of:

- The Huffman lighting efficiency bill (AB1109)
- The Big Bold energy efficiency initiatives
- Updates to state building codes and to federal appliance standards

However, the SPSC DSM Work Group recommends that the expected savings from the above-set of policies *not* be explicitly incorporated into the projected incremental reference case savings for the POU. There is likely to be some overlap (and potentially a significant amount) between the POU energy efficiency program savings targets and the savings that will result from the Huffman bill, Big Bold Initiatives, and updates to codes and standards. Lacking any practical means for determining the degree of overlap, the conservative approach is to simply ignore any potential savings from this latter set of policies, and to base the incremental reference case savings for the POU *solely* on the POU energy efficiency savings targets.

Based on the data sources and approach described above, Table 6 presents the incremental reference case energy efficiency savings for the state’s POU, segmented by balancing authority. A number of adjustments to the underlying data were made, as described in the notes section of the table.

Table 6. Incremental Reference Case Energy Efficiency: Publicly-Owned Utilities

Balancing Authority	Utilities	Cumulative Savings in 2020 ⁴	
		GWh	MW

CAISO	All POU's in CAISO ¹	1,160	357
LADWP	LADWP ²	2,743	550
	Burbank, Glendale ¹	197	40
SMUD	SMUD ³	1,908	553
	Modesto, Redding, Roseville ¹	311	90
IID	IID ¹	234	68
TID	Turlock, Merced ¹	174	51
Total		6,727	1,709

¹ Data source: *Energy Efficiency in California's Public Power Sector: A Status Report*, Appendix B.

² Data source: *Energy Efficiency in California's Public Power Sector: A Status Report*, p.125.

³ Data source: SMUD Board Policy, Policy Number SD-9, November 9, 2009 revision.

<http://www.smud.org/en/board/Documents/policy-pdfs/Policy%20SD-9-jan10.pdf>

⁴ The follow adjustments were made to the POU annual savings targets. First, for all POU's other than LADWP and SMUD, the savings targets began in 2011; in calculating the cumulative savings achieved from 2010-2020, we assumed that savings achieved in 2010 are equal to the 2011 savings target. Second, to convert the reported annual savings to cumulative savings in 2020, we assumed that 20% of all savings achieved over the 2010-2020 timeframe would be lost to measure decay by 2020 (see Section E for further details on how this assumption was derived). Third, for all POU's other than LADWP and SMUD, the savings targets consist of only energy savings, but not peak demand savings. To estimate the peak demand savings for those utilities, we applied assumed peak-to-energy savings ratios (see Section E of this document for further details). For POU's in CAISO, the peak demand savings were then translated from non-coincident savings to CAISO-coincident savings, following the same procedure as for the IOUs, as described in the notes section to Table 3. Finally, each POU's energy and peak demand savings targets were grossed up to the bus-bar, following the same procedure as for the IOUs, as described in the notes section to Table 3.

E. Miscellaneous Assumptions and Methodological Details

This section presents several key technical assumptions and methodological details referenced elsewhere in this document.

Table 7 presents the marginal T&D loss factors used to gross-up savings from the customer-meter to the bus-bar. The marginal loss factors were calculated from the average loss factors shown in the table, as reported in the CEC IEPR demand forecast report on p. 50. We assumed that marginal T&D loss factors are equal to 1.5 times the corresponding average loss factor, based on a draft report provided to members of the SPSC DSM Work Group by Jim Lazar.

Table 7. Estimated Marginal T&D Loss Factors

Planning Area	Average		Marginal	
	Peak	Energy	Peak	Energy
PG&E	1.097	1.096	1.146	1.144
SMUD	1.077	1.064	1.116	1.096
SCE	1.076	1.068	1.114	1.102
LADWP	1.112	1.135	1.168	1.203
SDG&E	1.096	1.0709	1.144	1.106
Burbank & Glendale	1.051	1.064	1.077	1.096

Pasadena	1.051	1.064	1.077	1.096
IID	1.06	1.128	1.090	1.192
DWR	1.06	1.038	1.090	1.057

The POU energy efficiency savings targets are expressed in terms of annual incremental savings (i.e., the first-year savings from measures implemented in a given year). In order to translate those savings targets into cumulative savings in 2020, it was necessary to employ some assumption about measure decay.

The CEC provided its estimate of measure decay from committed IOU energy efficiency programs implemented over the 2006-2012 period, summarized in condensed form in Table 8.⁵ This analysis indicates that, after seven years of program implementation (i.e., 2006-2012, inclusive), 12.5% of the savings achieved over that time frame will have decayed by the end of 2012. Or, in other words, 87.5% of the savings achieved over that period (12,811 GWh out of 14,648 GWh) would still be in place at the end of 2012.

Table 8. CEC Estimate of Savings Decay from IOU Committed Programs

Year	A	B	C	D	E	F = D/C
	Annual Savings Added	Annual Savings Decay	Cumulative Savings without Decay	Cumulative Decay	Cumulative Savings net of Decay	Cumulative Decay (%)
2006	1022	37	1022	37	985	3.6%
2007	2334	88	3356	124	3232	3.7%
2008	3263	214	6620	338	6282	5.1%
2009	2298	288	8918	626	8292	7.0%
2010	1910	353	10828	979	9849	9.0%
2011	1910	411	12738	1390	11348	10.9%
2012	1910	446	14648	1836	12811	12.5%

To apply these results to the POU annual savings targets, we simply extrapolated the cumulative decay percentage out to 11 program implementation years (to correspond to the period, 2010-2020, inclusive), as shown in Figure 1. That extrapolation suggests that, after 11 program implementation years, approximately 20% of the cumulative savings will have decayed. Thus, when calculating the cumulative savings for POU energy efficiency programs, we took the sum of the annual savings targets for 2010-2020, and then deducted 20% to account for assumed measure decay. The DSM Work Group recognizes that this is a relatively simplistic approach, and ignores any differences in measure mix between the IOUs and POU, and between the 2006-2012 period and the 2010-2020 period.

⁵ The analysis that the CEC provided was disaggregated by measure type and utility. The DSM Work Group assembled the results into the form shown in Table 8, and calculated the values shown in Columns C, D, and F.

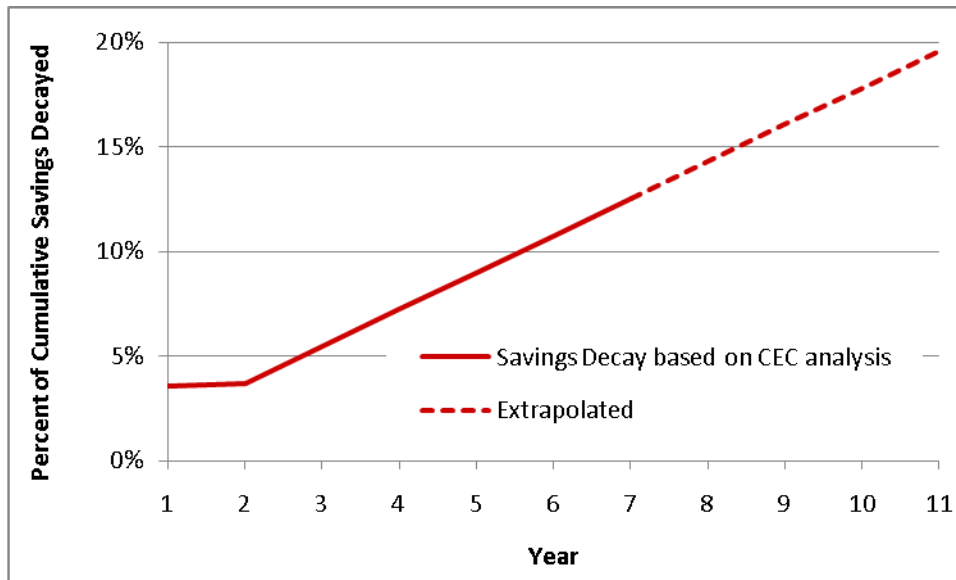


Figure 1. Assumed Rate of Cumulative Savings Decay

Other than LADWP and SMUD, the POU energy efficiency savings targets consist of only annual energy savings targets. To estimate the corresponding peak demand savings, we applied an assumed ratio of peak demand savings to annual energy savings, based on the balancing authority within which each POU resides. These ratios are summarized in Table 9, and the derivation of these values is described in the notes section of the table.

Table 9. Assumed Ratio of BA-Coincident Peak Demand Savings to Annual Energy Savings

Balancing Authority	MW/GWh
CAISO ¹	0.31
LADWP ²	0.20
SMUD ³	0.29
IID ⁴	0.29
TIDC ⁴	0.29

¹ Calculated from the Low Scenario estimate in the CEC Incremental Impacts report (Table 7) for energy and peak demand savings from new IOU energy efficiency programs. Prior to calculating the MW-to-GWh ratio, the savings targets were grossed-up to the bus-bar, based on the assumed marginal T&D loss factor, and the peak demand savings were translated to CAISO-coincident peak demand savings.

² Based on LADWP’s adopted energy efficiency targets, which specify both energy and peak demand savings. Prior to calculating the MW-to-GWh ratio, the savings targets were grossed-up to the bus-bar, based on the assumed marginal T&D loss factor.

³ Based on SMUD’s adopted energy efficiency targets, which specify both energy and peak demand savings. Prior to calculating the MW-to-GWh ratio, the savings targets were grossed-up to the bus-bar, based on the assumed marginal T&D loss factor.

⁴ Assumed to be the same as for SMUD.