

State-Adjusted Load Forecast: **Wyoming**

This document presents the 2020 State-Adjusted Load Forecast recommended by the SPSC DSM Working 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 Working 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 Working 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 D 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

There are two balancing authorities whose footprints overlap with Wyoming: PacifiCorp-East (PACE) and Western Area Power Administration - Colorado-Missouri Region (WACM). Other than PacifiCorp, virtually all retail load in the state is within WACM.

Tables 1 and 2 present the SPSC DSM Working Group's recommended State-Adjusted Load Forecast for each balancing authority (Column D), compared to the forecasts that were submitted by the balancing authorities to WECC. The difference between these two sets of load forecasts reflects the difference between the reference case energy efficiency savings (Column B) and the amount of savings already embedded in the WECC load forecast (Column C). The remainder of this document provides details on the analysis underlying the values shown in Columns B and C.

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

Table 1. State-Adjusted Load Forecasts for 2020: Annual Electricity Consumption (GWh)

Balancing Authority (In-State Portion)	A	B	C	D = A - (B - C)	E = (D/A - 1)
	Load Forecast Submitted to WECC	Reference Case Efficiency Savings	Savings Embedded in WECC Load Forecast	State-Adjusted Load Forecast	Percent Change from BA Forecast
	(GWh)	(GWh)	(GWh)	(GWh)	(%)
PACE	13,844	696	584	13,732	-1%
WACM	10,124	387	236	9,974	-1%
State Total	23,968	1,082	821	23,706	-1%

Table 2. State-Adjusted Load Forecasts for 2020: Peak Demand (MW)

Balancing Authority (In-State Portion)	A	B	C	D=A-(B-C)	E = (D/A - 1)
	Load Forecast Submitted to WECC	Reference Case Efficiency Savings	Savings Embedded in WECC Load Forecast	State-Adjusted Load Forecast	Percent Change from BA Forecast
	(MW)	(MW)	(MW)	(MW)	(%)
PACE	1,871	150	125	1,846	-1%
WACM	1,581	82	53	1,552	-2%
State Total	3,452	232	178	3,398	-2%

B. Reference Case Energy Efficiency Savings

The reference case energy efficiency savings are associated with: (1) ratepayer-funded energy efficiency programs and (2) new federal appliance and lighting standards. Table 3 summarizes the DSM Working Group’s Reference Case projection of the expected energy and peak savings from each of these policy mechanisms. These projections represent the cumulative impact in 2020 from programs and policies implemented over the 2010-2020 time period; that is, they are incremental to impacts from programs or policies implemented prior to 2010.

Table 3. Reference Case Energy Efficiency Savings in 2020

Balancing Authority (In-State Portion)	Ratepayer-Funded Energy Efficiency		New Federal Lighting/ Appliance Standards		Total	
	GWh	MW	GWh	MW	GWh	MW
PACE	490	110	205	39	696	150
WACM	236	53	150	29	387	82
State Total	727	164	355	68	1,082	232

Ratepayer-Funded Energy Efficiency Program Savings

The DSM Work Group’s estimate of savings from ratepayer-funded energy efficiency programs is summarized in Table 4. For PacifiCorp, the savings estimates are based directly on the planned savings identified in the utility’s most recently filed IRP (dated March 2010). For Cheyenne Light, Fuel & Power, the savings projections are based on its most recent DSM program filing. For Lower Valley Electric, the

savings projections are based on the Northwest Planning and Power Council (NPCC)'s 6th Power Plan. For all publicly owned utilities other than Lower Valley, the savings projections are based on a set of generic assumptions. Further details on the underlying assumptions and data sources are described in the notes section below the table.

Table 4. Cumulative Savings from Ratepayer-Funded Energy Efficiency Programs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Energy Savings (GWh)											
PacifiCorp (Wyoming) ¹	31	79	128	178	227	270	313	357	402	446	490
Cheyenne Light, Fuel & Power ²	5	12	18	25	32	38	45	52	58	65	72
Lower Valley Electric ³	7	14	22	31	40	50	60	72	83	95	107
All Other POU ⁴	7	13	19	25	31	36	41	45	50	54	58
Peak Demand (MW)											
PacifiCorp (Wyoming) ⁵	9	19	29	41	53	62	71	80	90	100	110
Cheyenne Light, Fuel & Power ⁶	2	3	4	6	7	9	10	12	13	15	16
Lower Valley Electric ⁶	2	3	5	7	9	11	14	16	19	21	24
All Other POU ⁶	2	3	4	6	7	8	9	10	11	12	13

¹ Data source: PacifiCorp's 2008 IRP Update (dated March 2010), Table A.3. The savings numbers listed in the IRP are cumulative savings from programs starting in 2009. For the TEPPC reference case analysis, we must identify the cumulative savings from programs starting in 2010. Thus, we have deducted the estimated savings achieved in 2009 (48 GWh, equal to the incremental savings implied by the IRP for 2010) from the cumulative totals identified in the IRP. In addition, the forecast in the IRP extends only to 2019. For 2020, we assume that cumulative savings increase by the same amount as in 2019 (44 GWh).

² Data source: Cheyenne Light, Fuel & Power 3-Year Energy Efficiency Plan (April 30, 2010). This plan provides a 3-year savings projection. We assume that the savings during the years 2010-2012 follow the 3-year schedule in the plan, and that savings during the years 2013-2020 will continue to accrue at the same rate as in 2012 (6.7 GWh per year).

³ The estimated energy savings for Lower Valley Electric are equal to the utility's pro-rated share of the annual conservation targets in the NPCC's 6th Power Plan (as identified in the NPCC's data file, "UtilityTargetCalc_v2.0_6thPlan.xls").

⁴ The energy savings for all POU^s other than Lower Valley were estimated based on the assumption that incremental annual energy savings would equal 0.1% of retail sales per year over the forecast period. This assumption was used throughout the DSM Work Group's analysis for small utilities, where information on planned ratepayer-funded energy efficiency program activity is not readily available.

⁵ These values are based on the peak demand savings identified in Table ES-1 of PacifiCorp's 2008 IRP Update. That table identifies the peak savings for all of PacifiCorp-East. We estimate the peak demand savings in Wyoming by pro-rating the total peak demand savings in PacifiCorp-East, based on the proportion of energy savings occurring in Wyoming (as indicated by Table A.3). In addition, as with the energy savings projection, we assume that incremental peak demand savings in 2020 are the same as in 2019.

⁶ Peak demand savings was estimated from energy savings, based on the peak-to-energy savings ratio implied by the energy and peak demand savings projections for PacifiCorp.

New Federal Lighting and Appliance Standards

In developing its projection of savings from federal lighting and appliance standards, the DSM Working Group focused exclusively on the impact of *new* (or relatively recent) standards², including:

- Standards established directly by Congress through the Energy Independence and Security Act of 2007 (EISA), the most significant of which being the lighting standard;
- Standards established by DOE since 2009 through its normal rulemaking process, or scheduled to be established by January 2013.

The projected state-level energy and peak demand savings from those new standards are summarized in Table 5. These projections derive largely from secondary data sources, as described in the notes section of the table. For some standards, the data sources directly provided state-level savings estimates, based on state-specific demographic and end-use data. For other standards, the data sources provided only national estimates, and the DSM Working Group estimated the state-level impacts, based on the projected savings from standards for similar standards for which both state and national savings estimates were available. Within each state, savings were allocated to individual balancing authorities in proportion to their projected 2020 load.

Table 5. Projected Savings from New Federal Appliance and Lighting Standards in 2020

Balancing Authority (In-State Portion)	EISA ¹		DOE ²		Total	
	GWh	MW	GWh	MW	GWh	MW
PACE	94	14	112	25	205	39
WACM	68	10	82	18	150	29
State Total	162	25	193	44	355	68

¹ Data Source: Andrew deLaski, executive director of the Appliance Standards Awareness Project (ASAP), provided a spreadsheet with his analysis of the expected savings from each EISA standard. This is an updated version of an analysis previously published jointly by ASAP and ACEEE, and includes only the savings from those standards directly established by EISA. This data source provided only national impacts.

² Data Sources: For new standards that DOE has *scheduled* but not yet established, we rely on the savings projections estimated in Neubauer et al. (2009).³ That report provides estimates of the expected national savings from each individual standard for which DOE expects to complete its rulemaking by January 2013. State-level estimates are not contained within the report, but are published on ASAP's website, at the following URL: http://www.standardsasap.org/state/2009%20federal%20analysis/ka-BOOM_overview.html. For new standards that DOE has *already* established, since July 2009, we rely on the DOE technical support documentation associated with the final rule, rather than on the projections in Neubauer et al. (2009).

C. Energy Efficiency Savings Embedded in the WECC Load Forecasts

² The DSM Working Group's decision to focus exclusively on the impact of *new* standards was predicated on the assumption that, in general, the load forecasts submitted by balancing authorities to WECC will already adequately account for the future impact of *existing* standards, by virtue of the econometric load forecasting methods commonly used.

³ Max Neubauer, Andrew deLaski, Marianne DiMascio & Steven Nadel . 2009. *Ka-BOOM! The Power of Appliance Standards Opportunities for New Federal Appliance and Equipment Standards*. Washington, DC: American Council for an Energy-Efficient Economy (ACEEE) and the Appliance Standards Awareness Project (ASAP). Report Number ASAP-7/ACEEE-A091.

The State-Adjusted Load Forecasts were developed by deducting from the load forecast that each balancing authority submitted to WECC the *incremental* reference case savings not already embedded within that forecast. The incremental reference case savings is equal to the difference between the total reference case savings (as described in the previous section) and the energy savings from the same programs/policies that are already embedded within the load forecast. Table 6 presents the DSM Working Group’s estimates of the energy efficiency program/policy savings already embedded in the balancing authority load forecasts. Further details on the underlying analysis are presented in the remainder of this section.

Table 6. Energy Efficiency Savings Embedded in the WECC Load Forecasts (2020)

Balancing Authority (In-State Portion)	Ratepayer-Funded Energy Efficiency		New Federal Lighting/ Appliance Standards		Total	
	GWh	MW	GWh	MW	GWh	MW
PACE	490	110	94	14	584	125
WACM	236	53	0	0	236	53
State Total	727	164	94	14	821	178

Members of the SPSC DSM Working 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, PacifiCorp is the only LSE within Wyoming to have submitted a survey response.

PACE

PacifiCorp’s response to the WECC DSM Survey indicates that the load forecast that PacifiCorp submitted to WECC *does* account for the impact of planned energy efficiency programs, but it does not account for new federal lighting and appliance standards.

For further confirmation, we also compared the PACE balancing authority load forecast with the load forecast for PacifiCorp-East in PacifiCorp’s 2008 IRP Update (see Table 7).⁴ The comparison focuses on the years from 2013 to 2019, as that is the period of overlap between the two forecasts.⁵ The PACE load forecast submitted to WECC includes some smaller utilities within the balancing authority. Thus, the load forecasts should be compared in terms of the *compound annual growth rate (CAGR)*, rather than in terms of the absolute load. As shown, the two load forecasts have similar growth rates over this period (i.e., annual energy growth rates of 2.4% and 2.3%, respectively). It is therefore reasonable to assume that the load forecast that PACE submitted to WECC embodies a similar set of energy efficiency assumptions as PacifiCorp’s 2008 IRP Update load forecast.

⁴ As noted in the IRP, the load forecast was prepared in October 2009.

⁵ The WECC load forecast spans the period 2010-2020, but the data for 2010-2012 is confidential. The PacifiCorp IRP load forecast spans the period 2010-2019.

Table 7. Comparison of PACE Balancing Authority Forecast and PacifiCorp 2008 IRP Update Forecast

	Annual Energy (GWh)			Peak Demand (MW)		
	2013	2019	CAGR	2013	2019	CAGR
PACE Load Forecast	47,671	55,047	2.4%	9,347	10,637	2.2%
PacifiCorp 2008 IRP Update Forecast ¹ (PacifiCorp-East)	43,636	49,930	2.3%	7,351	8,215	2.2%

¹ Source: PacifiCorp 2008 IRP Update, Tables A.1 and A.2. Those tables provide forecast by state; the load forecast for PacifiCorp-East was calculated as the sum of the forecasts for Idaho, Wyoming, and Utah.

PacifiCorp’s 2008 IRP Update indicates that the load forecast does explicitly account for the savings from planned energy efficiency programs (consistent with the response to the WECC survey). In addition, PacifiCorp’s original 2008 IRP (dated May 29, 2009) indicates that the utility’s load forecast also accounts for the impact of the federal lighting standard established by EISA. Thus, we assume that the PACE load forecast submitted to WECC also accounts for those standards. However, there is no evidence to suggest that either the balancing authority forecast or the IRP forecast accounts for savings from new federal lighting and appliance standards that DOE plans to establish in the future. Thus, that portion of the reference case energy efficiency savings is assumed to not be included in the PACE balancing authority forecast.

WACM

No LSEs within WACM submitted a DSM survey to WECC, and none of these LSEs have issued IRPs that are recent enough to be useful for benchmarking the WACM load forecast submitted to WECC. The DSM Working Group thus has insufficient information to estimate the amount of energy efficiency embedded within the WACM load forecast. In such situations, the DSM Working Group has adopted the default assumption that the load forecast fully accounts for the impacts of planned ratepayer-funded energy efficiency programs, but does not account for any impacts from new federal appliance and lighting standards.⁶ We therefore employ this default assumption to the WACM balancing authority, and thus the only adjustment to load forecast that WACM submitted to WECC is to deduct the expected savings from new federal appliance and lighting standards.

⁶ Load forecasts that are developed through econometric methods and calibrated to historical data may implicitly assume that savings from federal lighting appliance standards will continue to accrue at the same rate as in the past. The analysis in Neubauer et al. (2009) suggests that existing federal standards generated savings at a rate of 0.5% of U.S. retail sales per year over the 2000-2010 period, and will continue to generate additional savings at the same rate over the 2010-2020 period. Thus, the savings from new federal standards represent an increase in the rate at which federal standards will accrue energy savings, and this effect is unlikely to be captured by load forecasts that do not explicitly model the savings from these new standards.