

State-Adjusted Load Forecast: Colorado

Review Table

| Reviewed by | Date |
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| Howard Geller | 7/16/2010 |
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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 (galbarbose@lbl.gov, 510-495-2593).

A. Recommended State-Adjusted Load Forecast

Tables 1 and 2 present the SPSC DSM Working Group’s recommended State-Adjusted Load Forecast for each balancing authority in the state/province (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 estimated 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) | (%) |
| PSC | 49,663 | 5,957 | 5,957 | 49,663 | 0% |
| WACM | 19,652 | 1,278 | 404 | 18,778 | -4% |
| State Total | 69,315 | 7,235 | 6,361 | 68,441 | -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) | (%) |
| PSC | 9,320 | 1,443 | 1,443 | 9,320 | 0% |
| WACM | 3,070 | 276 | 110 | 2,905 | -5% |
| State Total | 12,390 | 1,719 | 1,554 | 12,225 | -1% |

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 |
| PSC | 3,749 | 1,025 | 2,209 | 418 | 5,957 | 1,443 |
| WACM | 404 | 110 | 874 | 165 | 1,278 | 276 |
| State Total | 4,153 | 1,136 | 3,082 | 583 | 7,235 | 1,719 |

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. The derivation and underlying data sources used to develop these projections are described in the notes section to the table.

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

| Balancing Authority: Utility | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| Annual Energy Savings (GWh) | | | | | | | | | | | |
| PSC: Xcel ¹ | 237 | 472 | 726 | 1,000 | 1,295 | 1,611 | 1,950 | 2,313 | 2,701 | 3,114 | 3,536 |
| PSC: Black Hills ² | 15 | 32 | 47 | 64 | 81 | 100 | 120 | 142 | 164 | 188 | 213 |
| WACM: Colorado Springs ³ | 11 | 22 | 33 | 44 | 55 | 66 | 77 | 89 | 101 | 112 | 124 |
| WACM: Fort Collins ⁴ | 15 | 29 | 44 | 59 | 73 | 88 | 103 | 117 | 132 | 147 | 161 |
| WACM: All other public utilities ⁴ | 11 | 21 | 32 | 43 | 54 | 64 | 75 | 86 | 97 | 107 | 118 |
| Peak Demand Savings (MW) | | | | | | | | | | | |
| PSC: Xcel ¹ | 39 | 108 | 184 | 263 | 348 | 437 | 532 | 633 | 739 | 852 | 967 |
| PSC: Black Hills ² | 2 | 7 | 12 | 17 | 22 | 27 | 33 | 39 | 45 | 52 | 58 |
| WACM: Colorado Springs ³ | 2 | 5 | 8 | 12 | 15 | 18 | 21 | 24 | 28 | 31 | 34 |
| WACM: Fort Collins ⁴ | 2 | 7 | 11 | 15 | 20 | 24 | 28 | 32 | 36 | 40 | 44 |
| WACM: All other public utilities ⁴ | 2 | 5 | 8 | 11 | 14 | 17 | 21 | 23 | 26 | 29 | 32 |

¹ Xcel's energy savings projection is based on the annual targets specified in Decision C08-0560, with the exception of an alternate value for 2010, which was provided by Sharon Podein (the designated SPSC DSM technical contact for Colorado). Peak demand savings were calculated, using the WECC DSM survey response data provided by Xcel, which included both energy and peak demand savings projections; that data was used to derive a peak-to-energy savings ratio, which was then applied to the energy savings targets in the table above, in order to calculate projected peak demand savings.

² Black Hills' projected energy savings for 2010 and 2011 is based on data provided by Sharon Podein (the designated SPSC DSM technical contact for Colorado). The energy savings for 2012-2020 was calculated by assuming the same savings as a percentage of retail sales as Xcel's targets for the same years. Peak demand savings were calculated from energy savings using the same peak-to-energy savings ratios as for Xcel.

³ Colorado Springs' energy savings projection was provided by Mark James (Colorado Springs Utility). Peak demand savings were calculated from energy savings using the same peak-to-energy savings ratios as for Xcel.

⁴ The energy savings projections for Fort Collins and all other public utilities (other than Colorado Springs) are based on the DSM targets specified in the Colorado PUC report, *Energy Efficiency and Colorado Utilities: How Far We've Come; How Far We Need to Go* (October 2009). Chart 2 of that report identifies the DSM goals of the state's public utilities for 2009-2020, in terms of the cumulative savings over that period. For the table above, those values were pro-rated for the years 2010-2020. Peak demand savings were calculated from energy savings using the same peak-to-energy savings ratios as for Xcel.

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.

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.

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 |
| PSC | 1,021 | 153 | 1,188 | 265 | 2,209 | 418 |
| WACM | 404 | 61 | 470 | 105 | 874 | 165 |
| State Total | 1,425 | 214 | 1,658 | 370 | 3,082 | 583 |

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

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.

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 |
|---|---------------------------------------|--|-------|
|---|---------------------------------------|--|-------|

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.

| | GWh | MW | GWh | MW | GWh | MW |
|--------------------|--------------|--------------|--------------|------------|--------------|--------------|
| PSC | 3,749 | 1,025 | 2,209 | 418 | 5,957 | 1,443 |
| WACM | 404 | 110 | 0 | 0 | 404 | 110 |
| State Total | 4,153 | 1,136 | 2,209 | 418 | 6,361 | 1,554 |

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, the DSM Working Group has received survey responses from Xcel and Platte River Power Authority (PRPA).

The survey response from Xcel Energy indicates that the utility fully accounted for the reference case savings projection for both ratepayer-funded energy efficiency programs and new federal appliance and lighting standards. Thus, the State-Adjusted Load Forecast for the PSC balancing authority is identical to the forecast submitted to WECC.⁴

For the WACM balancing authority, the only survey response received to date is from PRPA. This survey response indicates that PRPA's load forecast (which was rolled up into the overall WACM forecast) does account explicitly for expected ratepayer-funded energy efficiency program savings, but does not account for expected savings from new federal appliance and lighting standards. Lacking any further data about the energy efficiency savings assumptions underlying the WACM balancing authority forecast, the DSM Working Group's applies its default assumption that the forecast fully accounts for expected savings from ratepayer-funded energy efficiency programs, but does not account for any savings from new federal appliance and lighting standards.⁵

⁴ The PSC balancing authority includes additional load beyond Xcel's retail sales; most notably, it includes Black Hills' retail sales in Colorado. However, given that Xcel represents the large majority of load within the PSC balancing authority, we apply the same assumptions about embedded energy efficiency savings to the entire balancing authority as for the Xcel portion of the balancing authority.

⁵ 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.