

RMATS LOAD FORECAST PROCESS

The following is a description of the process followed by RMATS in obtaining load forecast data, the modeling assumptions used for load data manipulation, and a summary of the RMATS load data.

I. RMATS Load Process and Data Manipulation

➤ Data Sources

- Power flow for WI split into 33 areas (RMATS six SSG-WI bubbles expanded to eighteen RMATS bubbles) - Load data was obtained as follows:
- Within Rocky Mountain sub-region, updated load forecasts were obtained from LFWG members based on the eighteen bubbles
- Outside Rocky Mountain sub-region, intent was to use SSG-WI forecasts
 - WECC 2003 L&R Report was now available - Energy loads were higher, some changes to peaks – Report contained:
 - Six WI Regions (NWPP-Canada, NWPP-US, RMPA, AZ/NM/s.NV, California, Mexico)
 - Monthly data: for last year (2002), projection of current year (2003), and forecast of next year (2004)
 - 10 year forecast for Winter Peak, Summer Peak, and Annual Energy
 - For RMATS purposes, RMATS loads that were part of NWPP-US were split out of NWPP-US and added to RMPA
 - SSG-WI Modeling in 2003 used WECC 2002 L&R data – RMATS modeling updated load data outside of RMATS to WECC 2003 L&R data

➤ Derivation of 2008 and 2013 monthly estimates -Within RMATS

- Add up forecasts from LFWG by area

➤ Derivation of 2008 and 2013 monthly estimates -Outside of RMATS region

- Assembled SSG-WI monthly forecast (revised to WECC 2003 L&R) into regions
- Scaled SSG-WI monthly forecast (revised to WECC 2003 L&R) to hit annual energy and Winter/Summer Peaks by region

➤ Issues identified after January 26, 2004 technical review

- No forecast of WAPA loads in Montana
- Some 2013 area monthly peaks and two area monthly energy numbers were below 2008 monthly estimate.
 - Entirely outside of region
 - Only spring months (Feb-May) and September
 - This problem was also present in the SSG-WI data
 - Summer and Winter peak and total Annual Energy matches

➤ Suggested and implemented fixes to 2008 Load Forecast

- WAPA Upper Missouri loads have now been taken from SSG-WI forecast
- Added to Montana bubbles by the ratio of SSG-WI WAUM power flow bus loads

➤ Suggested fixes to 2013 Load Forecast for next round of studies

- Outside of RMATS

- Move some energy to low months so no month is negative
- Check monthly peak MW estimates to make sure that 2013 is at least 105% of 2008 by month by area (only changes spring months and September)

➤ **Get SSG-WI to work on better load forecasts for 2004 planning effort**

- Better data checking
 - No negative peak or energy growth without explanation

II. **RMATS Load Data Basis Summary**

➤ Black Hills (Vance Crocker)

The Black Hills energy loads and peak demand were rolled into the RMR load bubble and were consistent with the loads that submitted to WECC for the 2004 L&R Report. The load data that we submitted for RMATS had a 2% growth rate /year and was based on our latest load growth projections. We used net generation plus net imports to determine losses.

DSM/Efficiency - DSM was included in the numbers submitted to RMATS; however, we only have 2 MW. Conservation/efficiency was not taken into account.

(See CO Load data– *Colorado Loads WAPA.xls*)

➤ Tri-State (Marianne Ramos/Mike Stortz)

The Energy loads and peak demand that were submitted by Tri-State were from its 2002 Power Requirement Study which represents the last "approved" forecast by RUS. Therefore it matched the data submitted to WECC for the 2003 L&R Report. The load forecasts are jointly prepared by Tri-State and each of its members. Each customer class, for each member, is individually evaluated and forecast using econometric analysis, member judgment or individual large customer projections, as appropriate for each class. The forecasts have been reviewed and approved by each of the 44 member Boards of Directors, and by Tri-State's Board of Directors. Both transmission and distribution losses were included in the Tri-State data submitted for RMATS.

DSM/Efficiency - According to section 3606c (II) on page 28 of Tri-State's Electric Least Cost Resource Plan as presented to the Colorado Public Utilities Commission, and dated October 2003: "The econometric method used to prepare the forecasts accommodates changes in technology or customer preferences that impact the energy use per account through the use of time-trend variables. There is not sufficient data to explicitly model these impacts. Tri-State sponsors an 'Energy Efficiency Credits' program, which encourages certain levels of building insulation efficiency and/or provide incentives for the purchase of high-efficiency motors. It is not possible to quantify with confidence the amount of load reduction as a result of these programs."

(See CO Load data– *Colorado Loads WAPA.xls*)

➤ WAPA (John Greenlaw)

Our demand/energy forecasts are updated as we receive inputs from load serving entities within the control area. Therefore our forecasts are dynamic and can change daily. Our approximate growth from 2008 to 2013 is about 2%/ year, peak and energy.

Load serving entities within WACM account for DSM and Conservation/Efficiency in the data they submit to us. We do not have the means to breakout this data.

(See CO Load data– Colorado *Loads WAPA.xls*)

➤ Xcel Energy (Mark McGree)

PSCO re-evaluates and updates their demand/energy forecast approximately every 3 to 4 months. Therefore, the forecasted demands/energy submitted to the RMATS will be in between the data submitted to WECC for the 2003 L&R Report and that submitted for the 2004 L&R Report. Losses were included in the demands and energy that was submitted to the RMATS. Forecasted demand losses were approximately 2.5% and forecasted energy losses approximately 7%.

DSM/Efficiency - DSM was included in the demands and energy that was submitted to the RMATS. Conservation/Efficiency measures have been in place long enough that the affects are imbedded in the data used to develop the forecast. No estimates of reductions in MWh or MW due to conservation/efficiency measures were developed or separately added to data submittals.

(See CO Load data– Colorado *Loads WAPA.xls*)

➤ PACE (Reed Davis)

Our forecast is based on detailed econometric and end-use models. Model drivers are obtained from Company survey instruments and economic forecasts provide by Global Insights (formerly DRI).

The energy loads and peak demand that were submitted to RMATS were consistent with data submitted to WECC for the 2004 L&R Report. Retail sales are forecast at customer meter level and losses are added to take load to generation level.

DSM/Efficiency – Current DSM programs are included in the data that we submitted to RMATS. We assume that the trend of historical conservation that has occurred is in continuing in the future and it is included in the historical data we use for forecasting.

(See UT, ID & WY Load data – *Utah Loads PAC RD %.xls, Idaho Loads PAC RD.xls, Wyoming Loads PAC RD.xls*)

➤ NWE (John Leland)

NWE's control area load forecast is developed using (1) regression analysis for 90% of the load and (2) trend analysis for some large loads, about 10% of the load. The 10+ year forecast that was made in 2003 used 14 years of historical data. The regression analysis

independent variable data set included temperature, population, load step change variable and a dependent variable lag that captures historical economic and growth trends. The trend analysis used an average historical growth for 14 years of historical data.

The 2008 to 2013 growth averaged about 0.75% per year.

(See Mt Load data – *Montana Loads – JL.xls*)

➤ IPC (Ron Schellberg)

(See ID Load data– *Idaho Loads PAC RD.xls*)