Resource Adequacy Load Forecast

A Report to the Resource Adequacy Advisory Committee

Tomás Morrissey

November 2013

Introduction

The Northwest Power and Conservation Council periodically conducts a regional loss of load probability assessment. This assessment is done through the Resource Adequacy Advisory Committee (formerly the Resource Adequacy Forum). The end product of the assessment is a percent value that estimates the yearly odds of the region experiencing a loss of load event. If the region has a less than a 5% yearly loss of load probability it is considered to be adequate.

One important driver of the assessment is the load forecast. The Council staff has recently developed a load forecast to be used in the assessment of the Northwest Power system for the year 2019.

The purpose of this report is to determine if the forecast is reasonable by comparing the Council forecast to the PNUCC 2013 Northwest Regional Forecast and the Bonneville Power Administration 2013 White Book forecast. This comparison is a first step in better understanding the Council's forecast that will be used in the upcoming loss of load probability analysis.

Forecast Comparison

The White Book and the Northwest Regional Forecast provide a single value for monthly one hour peak demand and monthly energy assuming normal weather. The Council forecast includes loads for every hour assuming 84 historic weather years. Average (mean) figures of Council forecast were calculated in order to compare it to the BPA and PNUCC forecasts.

Both the Council and PNUCC forecasts reflect expected savings due to ongoing and expected conservation programs. The BPA forecast is built with data containing embedded conservation but does not add any new conservation programs. Another difference is that the Council and BPA peak hour forecasts reflect a regional coincident peak whereas the PNUCC peak forecast reflects a non-coincident peak. Non-coincident peak values are typically higher than coincident peak values.

Attachment A compares the Council, BPA and PNUCC average monthly energy and peak hour forecasts for October 2018 to September 2019. The solid lines represent the average monthly energy. The dashed lines represent one hour peak for the month. The values shown for the Council's peak loads reflect the average of the highest load hour in each of the 84 weather years. The gray bars represent the range of one hour peak loads for the 84 weather years. The top of each gray bar represents the highest peak hour in the 84 weather years and the bottom of each gray bar represents the lowest peak value.

Attachment B was created in an attempt to compare load shapes directly. It shows each month's energy load as a percentage of the annual energy load.

Attachment C compares monthly load factors of each forecast. The load factor reflects ratio of the monthly energy value to the one hour peak.

Observations

Looking at *Attachment A*, the Council and PNUCC monthly energy forecasts are very similar. The Council is forecasting slightly higher energy values October to March, with the remaining months being nearly identical.

The Council average peak hour forecast is consistently lower than the PNUCC forecast especially during spring and summer months. This is partially due to the Council using a coincident peak whereas PNUCC uses a non-coincident peak.

Compared to the BPA, both the Council and PNUCC have energy and peak forecasts that are notably lower. This is likely due to higher load growth in the BPA forecast compared to the PNUCC forecast and slightly different load areas – BPA includes Rocky Mountain Power load whereas the 2013 Northwest Regional Forecast does not. PNUCC is unsure if the load territory used by the Council includes Rocky Mountain Power.

Looking at *Attachment B*, the load shape for the Council is slightly higher than BPA in the winter and lower than BPA in the summer. The Council and PNUCC seem to have a similar energy load shape throughout the year. All three agencies have a similar hour peak shape in the winter, with the Council having a relatively lower summer peak than BPA or PNUCC.

Examining *Attachment C*, the Council has an average load factor is 80%, whereas the BPA and PNUCC have an average load factor of 74%. The PNUCC load factor is likely somewhat low due to using a non coincidental peak.

Conclusion/Recommendations

Two main recommendations emerge from this comparison:

1. All three forecasts need to be adjusted to perform a better "apples to apples" comparison. This entails adjusting the forecast for:

    a. Load territory. If the Council is using the same territory as BPA then their forecast looks low in comparison. If the Council is using the same territory as PNUCC their forecast looks very similar except for spring and summer peak.

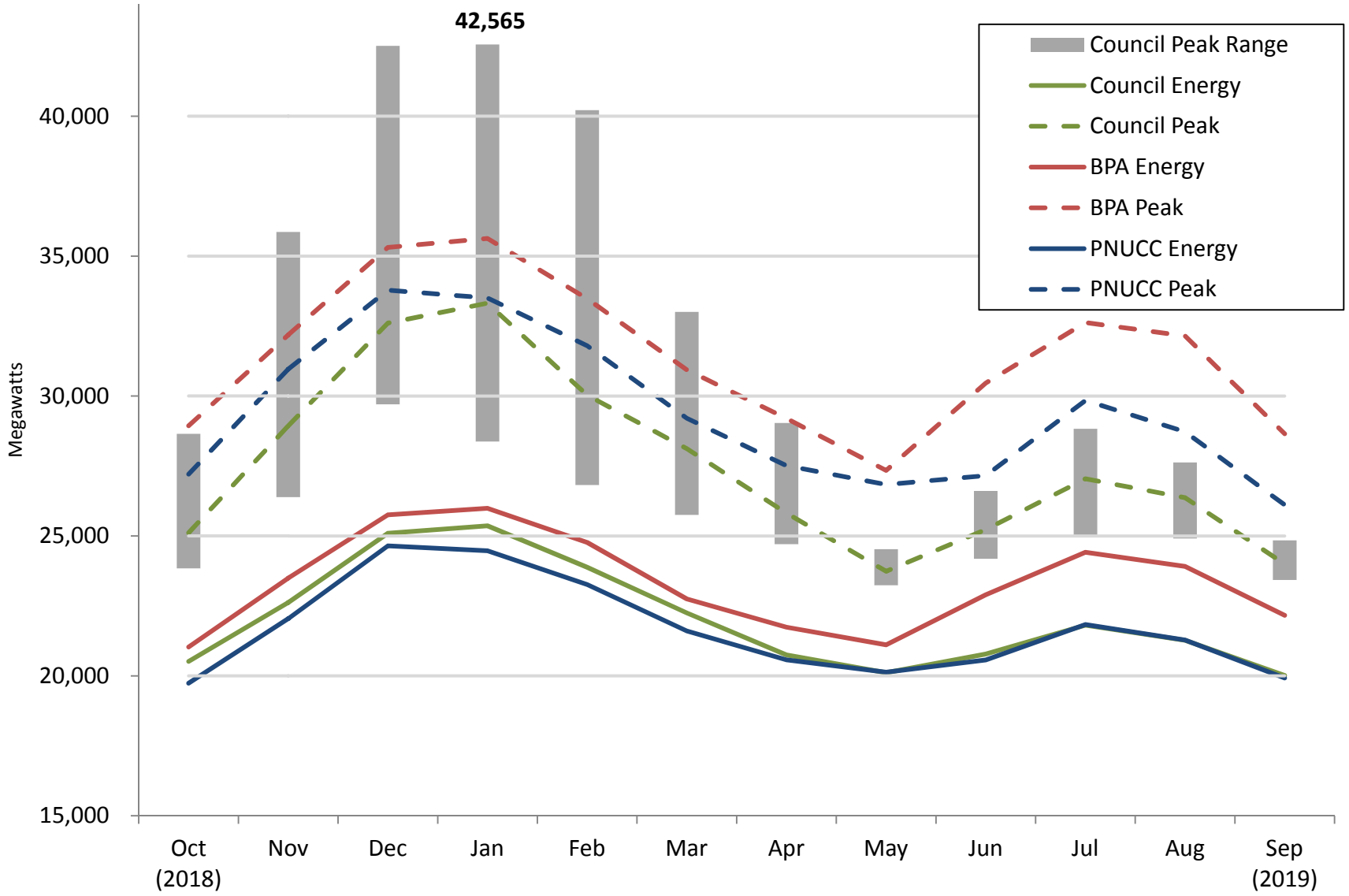
    b. Coincident/non-coincident peak. In the 1990 Northwest Regional Forecast it is estimated that that a January non-coincidence peak of 33,855 MW would be 626 MW higher than a January coincidence peak.

    c. Conservation. Both the Council and PNUCC forecast account for future conservation whereas the BPA forecast uses embedded past conservation but does not add any new conservation measures. This may require some adjustment for direct comparison.

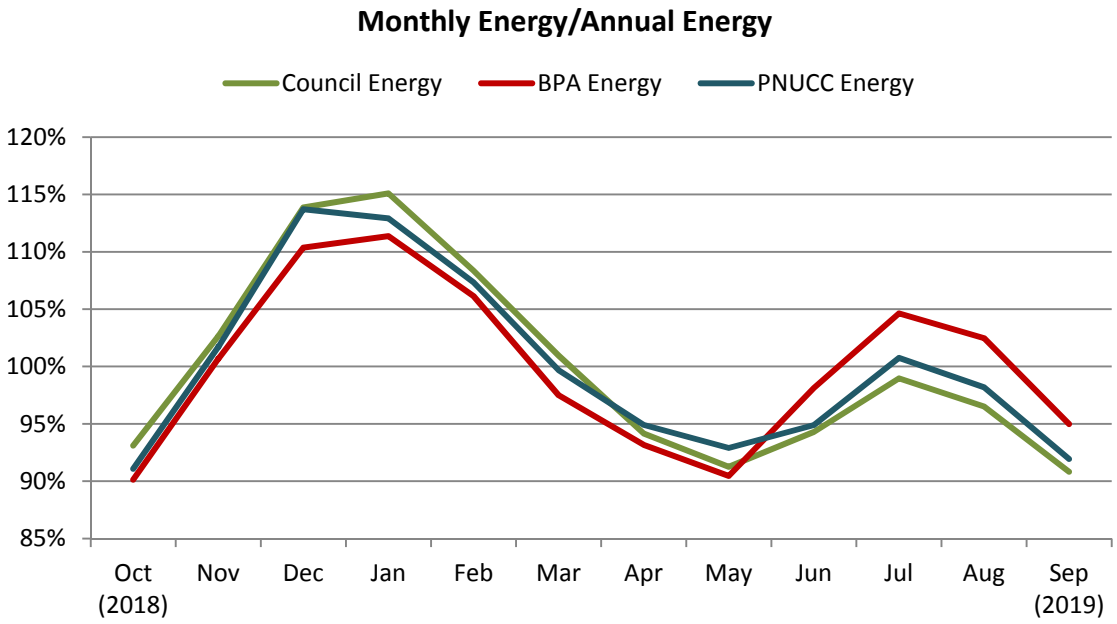
2. The difference in load shape and load factor between the three organizations needs to be examined.

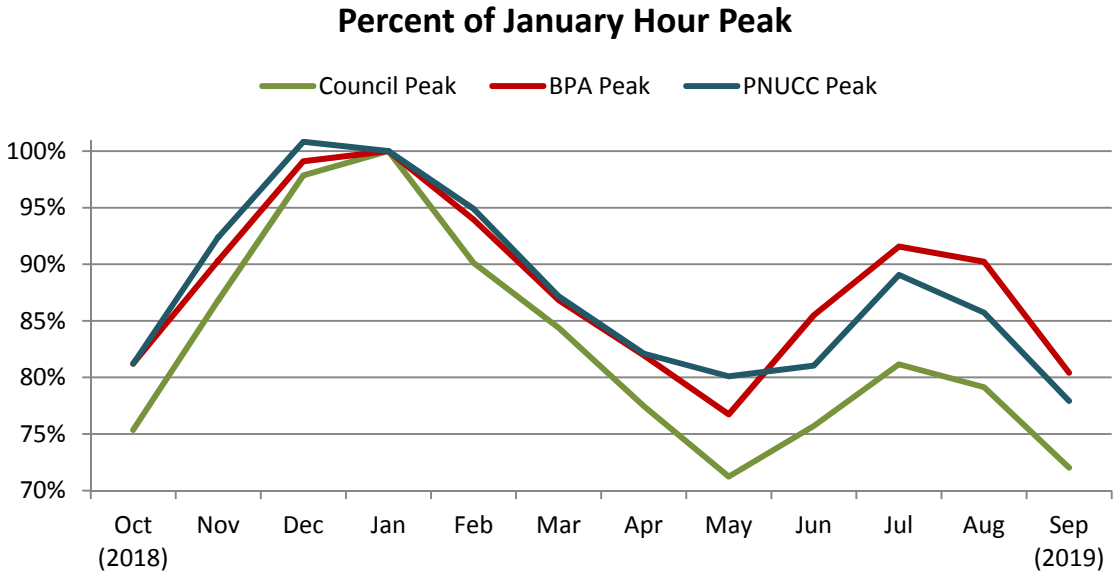
It is recommended that staff from the Council, BPA and PNUCC schedule a time to meet and discuss the above issues.

Attachment A: Northwest 2018 - 2019 Load Forecasts, Energy and Peak Hour



Attachment B – Load Shape Comparisons





Attachment C – Load Factor Comparison