Northwest Power and Conservation Council

July 31, 2008

MEMORANDUM

TO: Power Committee

FROM: John Fazio, Senior System Analyst

SUBJECT: Further Discussion of the Resource Adequacy Assessment

The Northwest Resource Adequacy Standard, adopted by the Council earlier this year, calls for an annual assessment of the region's power supply three and five years out. The attached draft report summarizes the results for 2011 and 2013 and is being reviewed by the Resource Adequacy Forum. Key findings show that:

- Counting existing resources only, the region has access to ample supplies to avoid significant power curtailments.
- Taking utility planned resources into account makes the situation look even better.
- Since last year's assessment, the gap between accessible generating capability and load has decreased, primarily because of higher load forecasts.
- The gap between generating capability and load is shrinking faster over summer months, due to more rapid load growth and increasing competition for summer capability.
- Regional resource acquisition activities should continue in order to minimize exposure to the risk of high prices, to satisfy state mandated renewable resource portfolio requirements and to provide for other utility needs.

Once the Forum has reviewed and approved the adequacy report, it will be presented to the Council and released to the public. Time has been set aside during this Power Committee meeting for committee members to review the draft report and to ask questions regarding the adequacy standard and the assessment. Background information on the standard can be found at the Council's website at http://www.nwcouncil.org/energy/resource/Default.asp.

Attachment

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Northwest Power and Conservation Council

Pacific Northwest Resource Adequacy Assessment 2011 and 2013

Summary

The Northwest Resource Adequacy Standard (http://www.nwcouncil.org/library/2008/2008-07.pdf) calls for an annual assessment of the region's power supply three and five years out. This report summarizes the results for 2011 and 2013. Key findings are summarized below.

- Based on existing resources (and those under construction) the region has ample supplies over the next five years to avoid significant power curtailments. For details go to http://www.nwcouncil.org/energy/resource/Default.asp.
- Taking utility planned resources into account makes the situation look even better.
- Since last year's assessment, the gap between accessible generating capability and load has decreased primarily because of higher load forecasts.
- A cursory look at the gaps between accessible resources and loads seems to indicate that the region is more likely to face a summer peaking shortage than a winter peaking or annual energy problem.
- The standard makes reference to a higher "economic" threshold, which takes into account economic risk, carbon emissions and other factors. A regional resource acquisition strategy that addresses these issues will be developed for the Council's 6th power plan (due out in 2009).
- Current regional resource acquisition activities appear to be consistent with the strategy in the Council's 5th power plan but will be reassessed as the 6th plan is developed.

Background

In 2007, the Northwest Power and Conservation Council adopted a resource adequacy standard for the regional power supply based on recommendations from the Resource Adequacy Forum. The term "standard" in this context does not mean mandatory compliance nor does it imply an enforcement mechanism. Rather, it is meant to be a gauge used to assess whether the power supply is adequate in a physical sense -- that is, in terms of "keeping the lights on."

Every year the Council will look ahead three and five years to assess the adequacy of the power supply. Should resources fall below the standard's thresholds, this would signal an unacceptably high risk of shortages. In this sense, the standard can be viewed as an early warning system.

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The adequacy standard calls for the average annual energy capability to at least equal the average annual demand. It also calls for the system's peaking capability to be able to meet expected peak hour demands and to have sufficient surplus to cover operating reserves[1], prolonged generator forced outages and demand deviations due to extreme temperatures.

This year's assessment, which includes only existing resources and those currently under construction, is summarized in Table 1 below. The annual average energy surplus is well above the minimum threshold for both 2011 and 2013. Annual average regional loads for 2011 and 2013 are 22,900 and 23,600 average megawatts, respectively. Available resources for reliability considerations include a portion of out-of-region market supplies, non-firm hydro and uncommitted independent regional resources.

Winter and summer capacity reserve margins are also estimated to be above the minimum thresholds as shown in Table 1 below. The five percent gap between the assessed reserve margin for the summer of 2013 and the minimum threshold translates into about 1,400 megawatts, which is smaller than the annual energy surplus. This would seem to indicate that the region is more likely to face a summer capacity shortage before it faces a winter peaking or annual energy problem.

Table 1
Annual Energy and Sustained Period[2] Capacity Assessments for 2011 and 2013

	2011	**2013**	**Threshold**
Annual Energy	2,600 MWa	1,900 MWa	0 MWa
Winter Capacity	46 %	40 %	23 %
Summer Capacity	34 %	29 %	24 %

As called for in the adequacy standard's implementation plan, the Forum's technical and steering committees have met to discuss these results. The committees have laid out a work plan to reevaluate the assessment and its underlying assumptions and will issue a report should the review uncover different findings.

As an early warning system for the Northwest's power supply, this resource adequacy assessment indicates that there is a very low likelihood of a serious power curtailment over the next five years due to a lack of supply.

However, the assessment against the minimum physical standard does not address economic, environmental and other factors taken into consideration when planning for new resources. For example, the current assessment compared to the implied resource development in the Council's

[1] Operating reserves currently do not include additional regulating or load following reserves anticipated to be needed to integrate large amounts of new wind generation into the regional power grid primarily because these reserves have not yet been quantified. In addition, this assessment only includes existing wind facilities and those currently under construction.

[2] The sustained peak period is defined as the six highest demand hours of the day for three consecutive days. The reserve margin is calculated based on the average load and the average generating capability over the 18-hour sustained peak period.

5th power plan indicates that the region may not have sufficient ***existing*** resources to avoid potentially high prices five years into the future. However, the current rate of investment in conservation, renewable and other types of resources appears more than adequate to achieve future price stability. Most Northwest utilities, including the Bonneville Power Administration, are actively assessing their own resource needs and are taking actions to comply with recently adopted renewable resource portfolio requirements in Oregon, Washington and Montana and to address any resource deficiencies in their systems. The Council is in the process of developing its 6th power plan, which will also address these issues.

Comparison to Last Year's Assessment

A comparison of this year's adequacy assessment to last year's (Appendix A) reveals that surplus resource capability over the minimum thresholds for both energy and capacity has decreased substantially. In particular, for 2013 the annual energy surplus above the minimum has dropped from 4,000 average megawatts to 1,900 average megawatts. The bulk of this change is due to an adjustment in the Council's short-term load model, which shows nearly a 2,000 average megawatt greater load for 2013 than last year's forecast for the same year. The same effect is seen in the capacity assessment.

Last year, the Council's short-term load model was under-forecasting loads because of a lack of recent historical load data, which is the main driver for the model. To correct for lack of recent data, the short-term model was calibrated to the Council's long-term model, which uses a different methodology. The resulting load forecasts for 2011 and 2013 are higher and are more in line with other regional forecasts. It is recommended that more current historical hourly load data be acquired to update the short-term model.

The comparison of the capacity assessment is more difficult because the sustained peaking period was redefined from a 50-hour duration to an 18-hour duration. Generally, 50-hour averages for both loads and hydro generation will be lower than 18-hour values. So, a side-by-side comparison does not offer much insight. However, by converting the gap between the reserve margin percentage and the minimum threshold percentage into a megawatt value, a better sense of the magnitude of the problem can be identified. For 2013, the 5 percent summer gap converts into about a 1,400 megawatt capacity surplus above the required minimum over an 18-hour period. Last year's assessment indicated almost a 4,300 megawatt surplus above the minimum for a 50-hour period.

Comparison to Other Northwest Reports

As part of the Council's Regional Resource Adequacy Assessment, a side-by-side comparison of loads and resources is made between the latest Resource Adequacy Assessment and the current Northwest Regional Forecast. The comparison is made for the annual energy assessment for the year 2013. This annual assessment and comparison of data provides an excellent opportunity for synchronizing our information, identifying inadvertent errors, and highlighting planning assumptions that may need further discussion. Differences in planning concepts (e.g. 1,300 average megawatts of planning adjustment) are not part of this comparison. A more detailed description of this comparison is provided in Appendix B.

Appendix A

Table A-1
Comparison of Last Year's 2013 Assessment to this Year's

	June '07	June '08	Change
Annual Energy (MWa)			
Net Demand	21,672	23,625	1,953
Resources	25,639	25,504	(135)
Surplus above Min	**3,967**	**1,879**	**(2,088)**
January Capacity (MW)	**50 hour**	**18 hour**	
Net Demand	26,684	29,974	
Resources	39,532	41,842	
Total Surplus	12,848	11,895	
Reserve Margin	48%	40%	
Minimum Threshold	25%	23%	
Gap	23%	17%	
Surplus above Min	**6,137**	**5,096**	
July Capacity (MW)	**50 hour**	**18 hour**	
Net Demand	25,005	27,349	
Resources	33,942	35,297	
Total Surplus	8,937	7,948	
Reserve Margin	36%	29%	
Minimum Threshold	19%	24%	
Gap	17%	5%	
Surplus above Min	**4,250**	**1,367**	

Appendix B
Comparison to Other Northwest Reports

Some initial observations and recommendations for next steps are summarized below. A side-by-side comparison of the data is provided in Table B-1.

1. Timing – The Resource Adequacy Assessment includes approximately 650 MWa of generation not included in the Northwest Regional Forecast. This is primarily due to the timing of when the data was collected and reported. For example, the Chehalis Generating Facility is included as a firm resource at 443 MWa in the Resource Adequacy Assessment and the NRF does not include the project.

- **Recommendation:** The 2009 Northwest Regional Forecast will ensure that this new information is reflected in next year's report.

2. Source of Data – The approximately 700 MWa of difference in existing firm contract and generating resource information due to the source of information used. For example, the two studies differ by about 40 MWa on existing cogeneration information.

- **Recommendation:** The Resource Adequacy Technical Committee should address the issue and decide if any changes are warranted in the Resource Adequacy Assessments.

3. Non Utility Industrial Load – The Resource Adequacy Assessment includes 800 MWa of industrial load that was formerly served by BPA as Direct Service Industry. A small portion of that load continues to be served by BPA and some is served with mid-Columbia hydropower. The Assessment does not reflect all of the firm resources (presumably firm contracts) dedicated to meet the total non-utility industrial load.

- **Recommendation:** The Resource Adequacy Technical Committee should address the issue and decide if any changes are warranted in the Resource Adequacy Assessments.

4. Errors and Omissions – There are approximately 1,200 MWa of existing firm contracts and generating resources that have been included in one study, but not both.

- **Recommendation:** Staff from PNUCC, BPA and the Council should continue to reconcile this data and make changes where needed.

Table B-1
Comparison of NRF and Forum Data

				Flagged		
Annual Energy (MWa)	**NRF**	**Forum**	**Diff**	**Source**	**E & O**	**Concepts**
Date Completed	**4/2008**	**5/28/08**				
Requirements						
Load	22,577	22,643	66			
DSI	180	818	638		638	
Exports	810	904	94	2	257	-
Total	**23,567**	**24,364**	**797**	**2**	**895**	**-**
Resources						
Hydro						
Critical Hydro	11,330	11,943	613			
Coulee Pumping		(117)	(117)			
Klamath Hydro		39	39			
Small Hydro - NUG	228	111	(117)	138	58	-
Total Hydro	**11,558**	**11,975**	417			
Small Thermal & Misc.	24	41	17	3	-	20
Combustion Turbines	2,045	3,274	1,229	213	-	1,183
Renewables	1,050	799	(251)	157	174	-
Cogeneration	724	1,058	334	40	12	328
Imports	713	858	145	2	612	-
Large Thermal	4,443	4,128	(315)	302	118	-
Non-NRF Resources		643	643	3	1	3
PNW Uncontracted		2,171	2,171			2,171
Planning Adjustment		1,300	1,300			1,300
Total Resources	**20,558**	**26,248**	**5,690**	**721**	**916**	**5,005**
Surplus(deficit)	**(3,009)**	**1,884**	**4,893**			
Total Flagged				**723**	**1,812**	**5,005**