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March 3, 2011

MEMORANDUM

TO: Power Committee Members

FROM: John Fazio, Senior System Analyst

SUBJECT: Status Report on Power Supply Adequacy

The Council created the Resource Adequacy Forum in 2005 and in April of 2008, adopted its recommended resource adequacy standard for the Pacific Northwest. Every year the Forum reassesses the adequacy of the power supply 3 and 5 years out, to provide an early warning should resource development fall short.

In 2010, the Forum's assessment indicated that the power supply will continue to be adequate through 2015 but that the summer *energy* adequacy index was getting close to the standard's limit. This result triggered a series of actions that included a reevaluation of the data and methods used to assess resource adequacy. The work was split into two phases. The first phase was to review some of the key assumptions used to assess adequacy. The second phase was to reevaluate the underlying methodology.

In phase one, three key assumptions were reviewed; 1) contingency resources, 2) out-of-region markets and 3) the use of borrowed hydro. Contingency resources include interruptible contracts and non-declared resources. Borrowed hydro is energy derived from drafting below the drafting rights elevation (and then replacing it later). After a careful review, it was decided that current assumptions about the market and borrowed hydro were reasonable. The contingency resource assumptions were modified to reflect more current data. Contingency resource *capacity* capability was reduced in both winter and summer periods. However, contingency resource *energy* capability was increased for both periods.

The result of readjusting these assumptions shows that the power supply will remain adequate through 2015 and that the summer energy adequacy index is no longer near the standard's limit.

The second phase, which is to reevaluate the underlying methodology, is nearing completion.

STATUS REPORT ON POWER SUPPLY ADEQUACY

Power Committee GoToMeeting
March 3, 2011

How Adequacy is Assessed

- ▣ Assume only existing generating resources
- ▣ Assume 6th Plan conservation level
- ▣ Simulate power supply dispatch over many different future conditions
- ▣ Power supply is adequate if the Loss of Load Probability (LOLP) is 5% or less.
- ▣ Measure LOLP for:
 - Winter Energy and Capacity needs
 - Summer Energy and Capacity needs

Previous Assessment for 2015

LOLP (%)	Winter Cap	Winter Eng	Summer Cap	Summer Eng
Old Base	1.0	2.9	0.0	4.8

Assessment indicated an adequate supply but:

1. Close to the energy limit for summer
2. Results are very sensitive to
 - Electricity demand
 - Biological Opinion Hydro Constraints
 - Contingency Resources
 - Out-of-Region Market Supply
 - Borrowed Hydro
3. **Task** – to review and update sensitive parameters and reassess adequacy

Effects of Revised Load

LOLP (%)	Winter Cap	Winter Eng	Summer Cap	Summer Eng
Old Base	1.0	2.9	0.0	4.8
+ New Load	0.0	2.4	0.0	3.8

- Load forecasts for adequacy assessments come from the Council's Short-term Model (STM).
- For the previous assessment, STM forecasts were calibrated to the Council's Long-term Model (LTM) values used to develop the 6th power plan, which were higher for 2015.
- This reassessment of adequacy uses the non-calibrated STM forecasts, which are more appropriate.

Effects of New BiOp

LOLP (%)	Winter Cap	Winter Eng	Summer Cap	Summer Eng
Old Base	1.0	2.9	0.0	4.8
+ New Load	0.0	2.4	0.0	3.8
+ New BiOp	0.0	2.4	0.0	4.3

BiOp hydro constraints were updated to reflect more current operations.

The new operation affects both monthly and hourly hydro generating capability.

The “New BiOp” case will be labeled “Rev Base” in subsequent slides.

Contingency Resources

	Winter Cap	Winter Eng	Summer Cap	Summer Eng
Current	3,000 MW	28,800 MW-hr	3,000 MW	28,800 MW-hr
Proposed	1,217 MW	90,300 MW-hr	2,052 MW	90,300 MW-hr

- Include interruptible loads and non-declared resources
- Winter and summer capacity limits are for ANY single hour (the proposed cap limits are for an 18-hour sustained-peak and should be adjusted to reflect the single hour max)
- Winter/summer energy limits are for TOTAL dispatch/season:
 - **Current:** 1,200 MW for no more than 24 hours
 - **Proposed:** 903 MW for no more than 100 hours

Effects of Contingency Resources

LOLP (%)	Winter Cap	Winter Eng	Summer Cap	Summer Eng
Rev Base	0.0	2.4	0.0	4.3
100 Hours	1.9	0.5	0.5	1.0
50 Hours	1.9	1.9	0.5	1.9

“100 Hours” case uses the assumptions on the previous slide.

“50 Hours” case assumes energy contingency resources can be run a maximum of 50 hours per season.

Proposal is to use the “100 Hours” case assumptions for contingency resources.

Out-of-Region Market

- ▣ Current Assumptions:
 1. December through February:
3,000 MW maximum any hour
 2. July through September:
None available
 3. Task is to examine reductions in winter market availability

Effects of Out-of-Region Market

LOLP (%)	Winter Cap	Winter Eng	Summer Cap	Summer Eng
Rev Base	0.0	2.4	0.0	4.3
2000 Winter	1.0	2.9	0.0	4.3
1000 Winter	2.4	3.4	0.0	4.3

BPA has reviewed out-of-region market availability and has concluded that current assumptions are reasonable.

Shoulder months are not currently assessed for adequacy but if they were, market assumptions for those months should be lower.

Proposal is to use current assumptions for winter and summer.

Effects of Borrowed Hydro

LOLP (%)	Winter Cap	Winter Eng	Summer Cap	Summer Eng
Rev Base	0.0	2.4	0.0	4.3
500 MWa BH	0.5	2.4	0.0	7.7
0 MWa BH	1.4	2.9	6.2	23.1

Borrowed hydro is energy derived from drafting below the drafting rights elevation. Borrowed hydro can be used up to the monthly energy limit and is replaced as soon as possible by dispatching available non-hydro resources or with out-of-region purchases.

“Rev Base” case includes a 1000 MWa limit.

Proposal is to assume a maximum of 1000 MWa.

Effects of Various Combinations

LOLP (%)	Winter Cap	Winter Eng	Summer Cap	Summer Eng
Rev Base	0.0	2.4	0.0	4.3
+ CR	1.9	0.5	0.5	1.0
CR + 500 BH	1.9	1.0	1.9	1.4
CR + 0 BH	3.4	1.4	12.0	10.6

The “Rev Base” case includes updated loads and BiOp operation but the old assumptions for contingency resources, out-of-region market supply and borrowed hydro.

CR = New contingency resource assumptions

BH = Borrowed Hydro assumptions

Revised Adequacy Assessment

LOLP (%)	Winter Cap	Winter Eng	Summer Cap	Summer Eng
Rev Base	0.0	2.4	0.0	4.3
New Base	1.9	0.5	0.5	1.0

The “New Base” case includes the updated load and BiOp assumptions (same as in the “Rev Base”).

It also includes the same assumptions regarding out-of-region market supply and use of borrowed hydro.

The “New Base” case, however, includes new assumptions regarding contingency resources (as shown on slide 6)

Conclusions

1. Power Supply will remain adequate through 2015
2. The current method of assessing adequacy may be limited and is currently being peer reviewed
3. The adequacy assessment is in no way intended to be used as a resource planning target

Next Steps

1. **March:** Technical and Steering committees must review proposed assumptions.
2. **May:** Based on a peer review of the current adequacy methodology, develop a revised standard.
3. **August?:** Technical and Steering committees must approve the revised standard.
4. **October?:** Council review and adoption of new standard.