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October 25, 2012

MEMORANDUM

TO: Council Members

FROM: John Fazio, Senior Systems Analyst

SUBJECT: 2017 Resource Adequacy Assessment

On October 26th, the Resource Adequacy Forum's steering committee will review the final resource adequacy assessment for 2017. It is anticipated that the committee will agree to forward that assessment to the Council. At its November 7th meeting, the Council will be briefed on the assessment and then vote to release the results to the public. A Council decision memo is attached.

The last official adequacy assessment, which was adopted as part of the Council's Sixth Power Plan, indicated that the power supply in 2015 was on the cusp of becoming inadequate. Since that assessment, resource and load data have been updated. The most significant change has been an increased uncertainty in the availability of the Southwest surplus market, which the Northwest depends on, mostly in winter, as an alternative to more expensive resources.

The Council measures adequacy as the probability that the power supply will not be able to meet electricity loads. This measure is referred to as a loss of load probability (LOLP) and the Council has set a maximum limit on that probability of 5 percent. The loss of load probability for 2017 is expected to be 6.6 percent - above the adequacy limit. This implies that counting only on existing resources and the expected energy efficiency savings (as outlined in the Council's Sixth Power Plan) will not be sufficient to keep the likelihood of curtailments below the agreed upon tolerance level.

The good news is that it would only take 350 megawatts of additional generation capacity or 300 average megawatts of additional energy efficiency to bring the adequacy level back within the tolerance limit. In aggregate, utility integrated resource plans show a much higher level of potential new resource development through 2017.

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October 25, 2012

DECISION MEMORANDUM

TO: Council members

FROM: John Fazio
Senior Systems Analyst

SUBJECT: Release of the 2017 Resource Adequacy Assessment

PROPOSED ACTION: Decide to release the Northwest Resource Adequacy Forum's final power supply adequacy assessment for 2017 and direct staff to prepare a summary document for public release.

SIGNIFICANCE:

- Release of the Forum's adequacy assessment for 2017 meets the requirements for action item ADQ-1 in the Council's Sixth Power Plan, namely "the Council, in collaboration with the Northwest Resource Adequacy Forum and others, will annually assess the adequacy of the regional power supply."
- Results from this analysis will be used in the Council's resource strategy methodology to ensure that future strategies will provide adequate power supplies.
- Results will be used by regional utilities to aid in the assessments of their own resource plans and by utility commissions to review those plans.
- Results will also be shared with other electricity industry planning entities, such as the Western Electricity Coordinating Council (WECC) and the North American Electric Reliability Corporation (NERC).

BUDGETARY/ECONOMIC IMPACTS:

There are no effects on the Council's budget. The assessment of the adequacy of the Northwest's power supply was made by Council staff, aided by members of the Forum. Preparing the final report will also be done in house with help from Forum members. There is no anticipated contract work to complete this task.

BACKGROUND:

Recent events such as the Western energy crisis of 2001, which led to both curtailments in California and to West-wide electricity price spikes, have forced utilities and regulators to

rethink their approach to planning and operating the power system. The crisis demonstrated that the public has little tolerance for high and volatile market prices over a prolonged period. It also became clear that the financial community will not lend money for power-plant construction unless developers have power contracts in hand and/or utilities have included the costs of those contracts in their rates.

In an environment where an increasing number of parties will be taking on the responsibility for acquiring resources to serve regional load, a resource adequacy standard is key to ensuring overall regional sufficiency of resources to meet load at reasonable costs. The Pacific Northwest is unique, not only in the predominately hydroelectric nature of its resources, but also in the ratio of public utilities to investor-owned utilities (IOUs). Resource adequacy is more difficult to achieve in the Northwest for the following reasons:

- The ability to rely on wholesale electricity markets and surplus hydroelectric generation (in most years) can mask a condition of resource deficiency.
- The capital risk of constructing new resources in a market with substantially varying supply levels from year to year may be deemed too great for many developers.
- There is a continuing lack of clarity about the responsibility for resource acquisition among public utilities, BPA and independent power producers.

In its Fifth Power Plan, the Council recognized the importance of developing a resource adequacy standard and implementation framework. Action items ADQ-1 and ADQ-2 in that plan called for the establishment of resource information-gathering protocol and for the development of a resource adequacy standard for the Pacific Northwest. To achieve these goals, the Council and BPA instigated the Pacific Northwest Resource Adequacy Forum (Forum), with the intention that this group would develop a resource adequacy standard for the Northwest.

In December of 2011, the Council formally adopted the Forum's recommended resource adequacy standard. This assessment of the 2017 power supply adequacy would be the first official assessment since the new standard was adopted. It should help utilities and their regulators gauge whether they have enough resources to meet their loads under a regionally accepted measure of generation sufficiency.

ANALYSIS:

The Resource Adequacy Forum has been working on this task since early in 2012. Analysis and documents, including meeting notes, are posted on the Council's web site at <http://www.nwcouncil.org/energy/resource/Default.asp>. The Forum is comprised of a technical work group and a policy steering committee.

During this past year, the Forum has reviewed load forecast and resource data, including potential market supplies from both within the region and from the Pacific Southwest. These data are input to the GENESYS model, which simulates the hourly operation of the power supply over many different future conditions. The model calculates how many of those simulated yearly operations experience at least one occurrence of a failure to meet load. That number divided by the total number of simulated years yields the loss of load probability or LOLP, which must be 5 percent or less for the power supply to be deemed adequate.

ALTERNATIVES:

- One alternative is to delay the release of the Forum’s assessment until the Southwest market uncertainty is more clearly defined. This alternative would delay the completion of the mid-term review for the Sixth Power Plan, which is due at the end of November. It could also delay the beginning of work toward the Seventh Power Plan.
- A second alternative is to delay the release until certain improvements to the model can be made. Those improvements include the addition of more sub-regional “bubbles” to better address transmission limitations and to more thoroughly explore the issue of market “friction.” This alternative would make the model and results better but it would also effectively delay the release of the adequacy assessment until late 2013. The Forum has already agreed that this work should be done for the next assessment.

ATTACHMENTS:

There are no attachments at this time. Staff is working on a document to summarize the Resource Adequacy Forum’s 2017 assessment. However, completion of that document is pending based on the results of the Forum’s October 26th meeting.

Adequacy Assessment for the 2017 Pacific Northwest Power Supply



Northwest Power and Conservation Council Meeting
November 7, 2012
Couer d'Alene, Idaho

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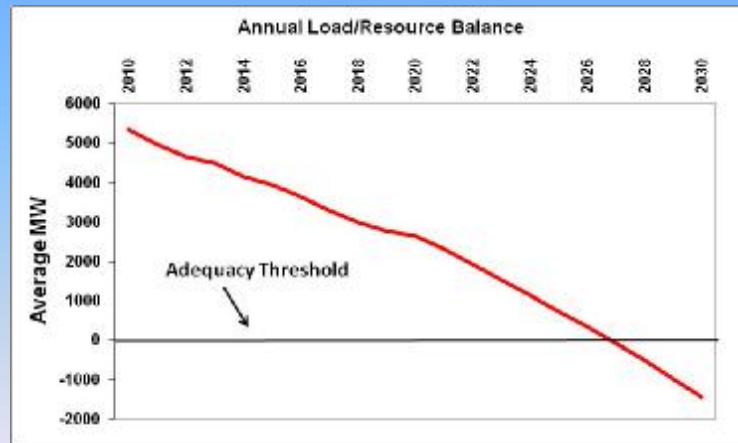
Outline

- § 2015 Adequacy Assessment
- § 2017 Adequacy Assessment
- § Making the Supply Adequate
- § Effects of Uncertainties

- § Council Decision

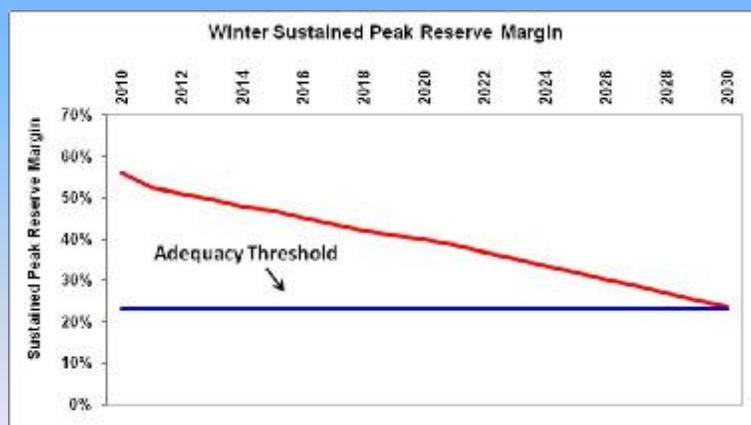
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2015 Adequacy Assessment Annual Energy



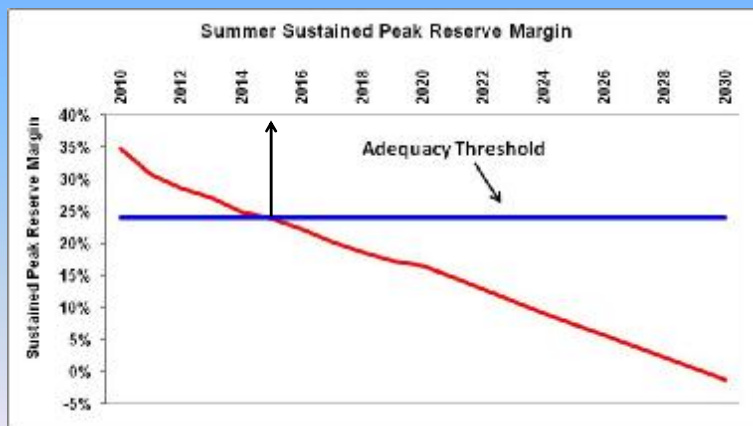
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2015 Adequacy Assessment Winter Capacity



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2015 Adequacy Assessment Summer Capacity



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2015 Adequacy Assessment

- § Power supply is adequate
- § No energy shortfall
- § Winter capacity reserve margin above adequacy threshold
- § Summer capacity reserve margin is at the limit by 2015
- § Implies a 5% LOLP

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Adequacy Standard changed in 2011

- § **Metric:** Loss-of-load probability (LOLP)
- § **Threshold:** Maximum of 5 percent

- § LOLP is the probability that extraordinary actions would have to be taken in a future year to avoid curtailment of electricity service
- § Calculated assuming existing resources only and expected efficiency savings

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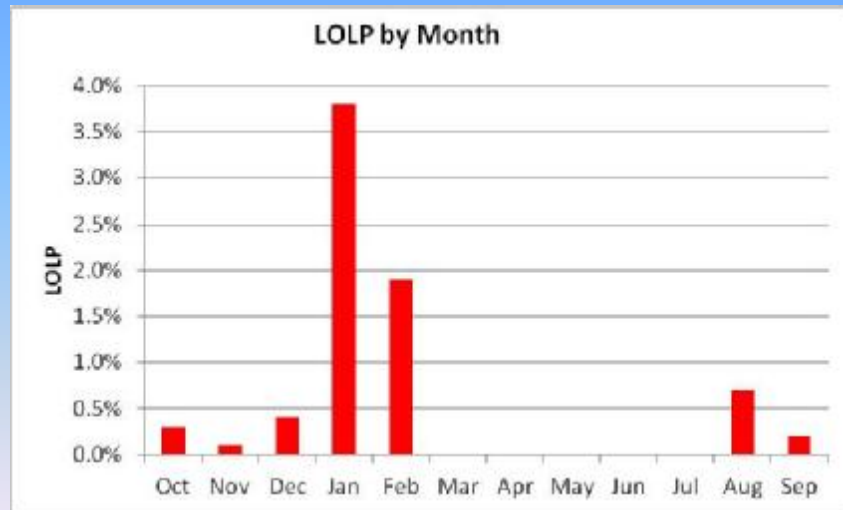
2017 Assessment

- § The expected LOLP is 6.6%
- § LOLP value driven more by “capacity”
- § January, February and August most critical
- § 80-year water record has big impact

- § **Interpretation:** Relying only on existing resources and expected efficiency savings yields a power supply in 2017 whose likelihood of curtailment exceeds our agreed upon threshold

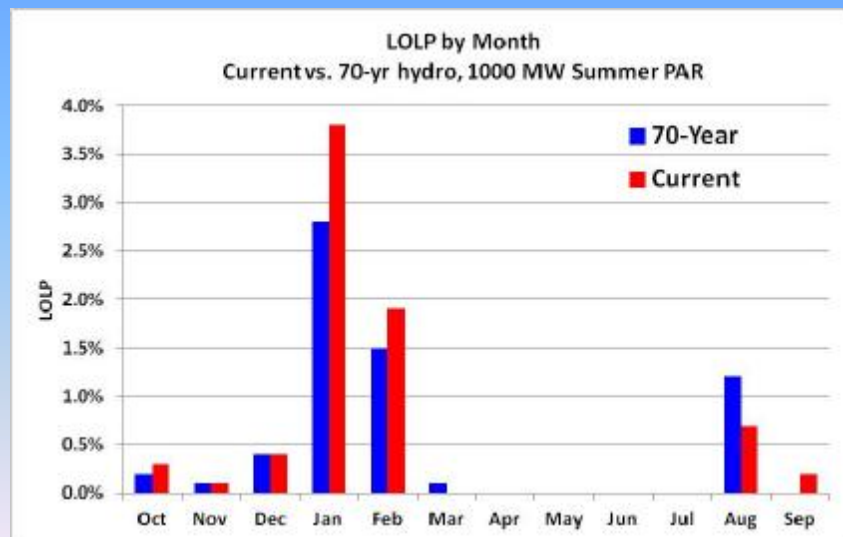
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2017 Monthly LOLP



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Effects of 70-yr vs. 80-yr hydro



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Major Uncertainties

§ Explicitly modeled

- Water supply
- Temperature load variation
- Wind
- Forced outages

§ Not modeled explicitly

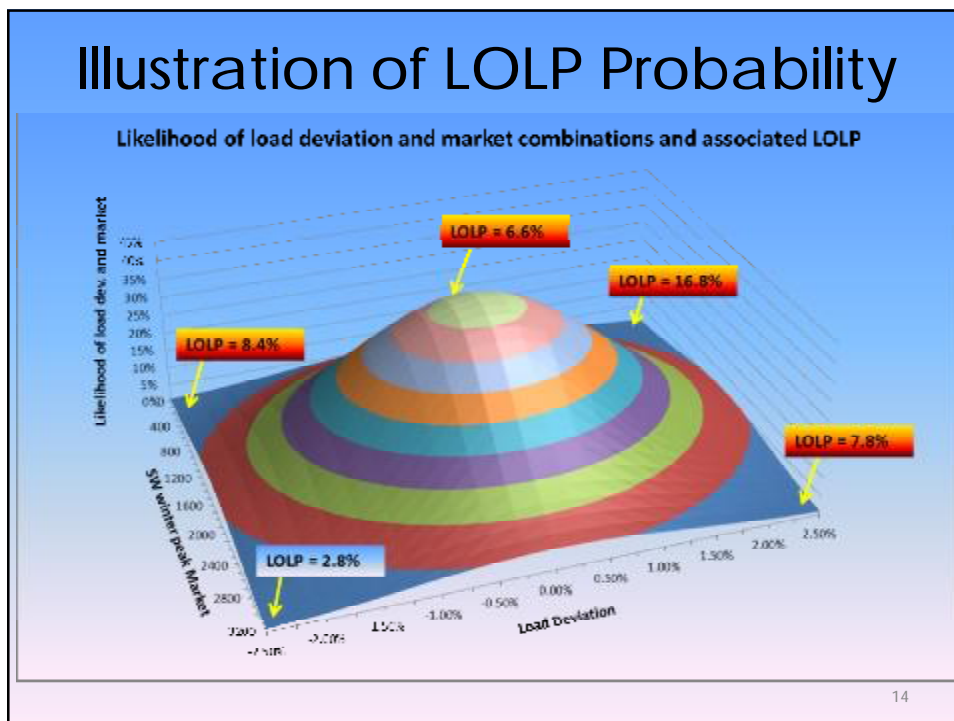
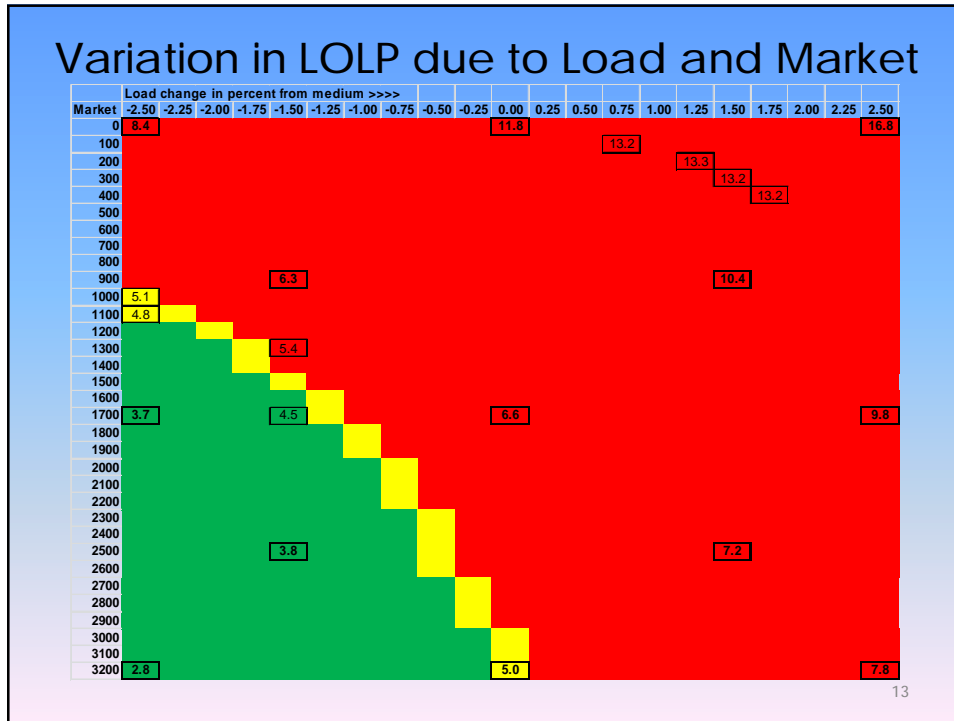
- Economic load growth
- Uncertainty in SW market

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Effects of Uncertainties

Load	SW Winter Market	LOLP
Low	High	2.8%
Low	None	8.4%
High	High	7.8%
High	None	16.8%
Expected	Expected	6.6%

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Actions to Alleviate Expected Inadequacy (6.6% to 5%)

- § 350 MW of new generating resource capacity drops the expected LOLP to 5%
- § Equivalently, 300 average megawatts of additional energy efficiency does the same
- § Demand response measures could also help

- § This is consistent with utility plans and the Council's resource strategy

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What about Worse Cases?

- § 2,850 MW of new resource moved an LOLP of 13.3% down to 5.0%

- § Sum of utility planned* resources exceeds 3,000 MW

*In this context "planned" means request for proposals or RFPs.

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Council Decision

- § To release the final 2017 resource adequacy assessment

- § Staff will prepare a summary report for release to the public as soon as the Forum's technical report is complete