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October 25, 2012

MEMORANDUM

TO: Power Committee 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 for approval. On November 6th, I will brief the power committee on that assessment. The committee will also decide whether to recommend to the full Council to release the assessment.

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. Between 2015 and 2017, the region's loads are expected to grow by about 300 average megawatts (or about a 0.7 percent annual rate) net of conservation savings. During that same time period, about 100 megawatts of new thermal generating capacity and about 1,200 megawatts of new wind capacity are expected to be added. Unfortunately, increased wind capacity means additional within-hour balancing requirements, which further limit the hydro system's peaking capability. Other expected new generation includes about 250 megawatts of small hydro and hydro upgrades and a 380 megawatt utility acquisition of a northwest independent power producer resource.

California is expected to retire a substantial amount of its water-cooled thermal generation and it is unclear how that generation will be replaced. It could be replaced in part with solar and demand response, resources that have limited or no capability in winter when the Northwest's peak demand occurs. In addition, two of the San Onofre Nuclear Generating Station plants may or may not be operational in 2017. Given this uncertainty in the Southwest surplus market, the Forum chose to decrease its assumption for Southwest on-peak winter market availability from 3,200 to 1,700 megawatts.

In aggregate, all of the changes mentioned above (plus other data updates and model refinements) push the 2017 power supply into the region of inadequacy. Adequacy is measured by the probability that power resources will be insufficient 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. This implies that counting only on existing resources and 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. The Council ensures that its resource strategy will produce an adequacy power supply by incorporating the 5 percent LOLP limit into its planning model.

Adequacy Assessment for the 2017 Pacific Northwest Power Supply



Power Committee Meeting
November 6, 2012
Couer d'Alene, Idaho

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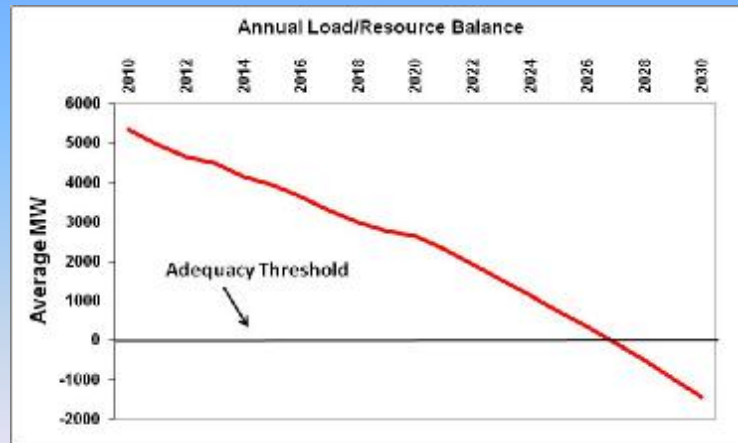
Outline

- § 2015 Adequacy Assessment
- § 2017 Adequacy Assessment
- § Making the Supply Adequate

- § Effects of Uncertainties
- § Use of Market Resources

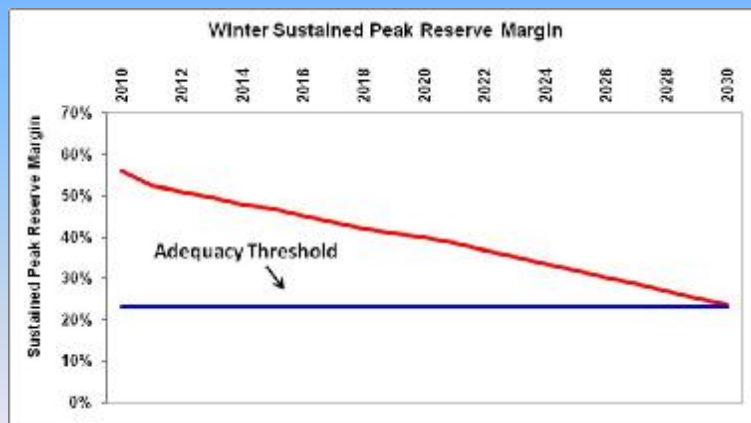
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2015 Adequacy Assessment Annual Energy



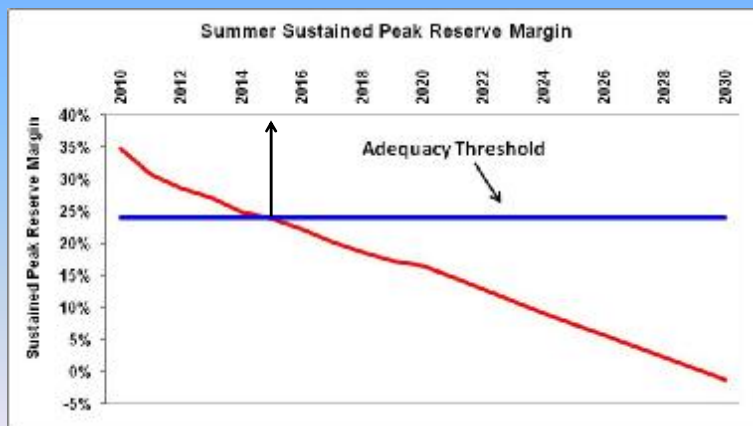
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2015 Adequacy Assessment Winter Capacity



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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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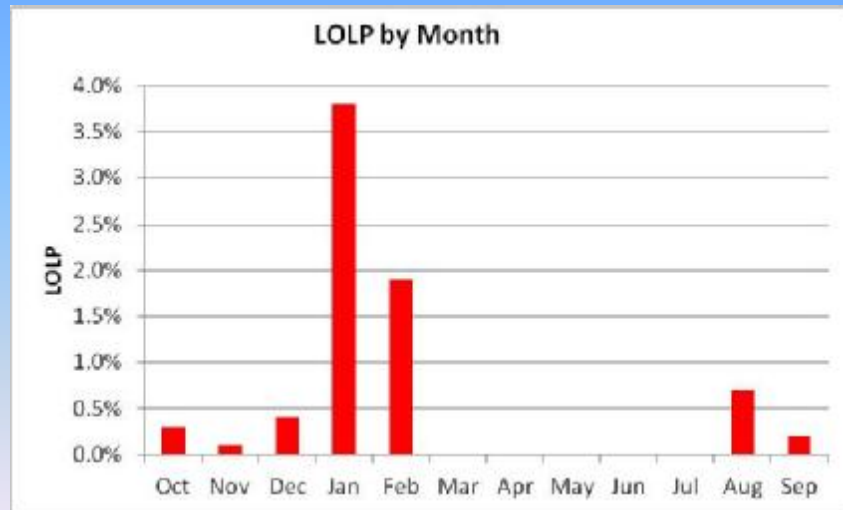
2017 Assessment

- § 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

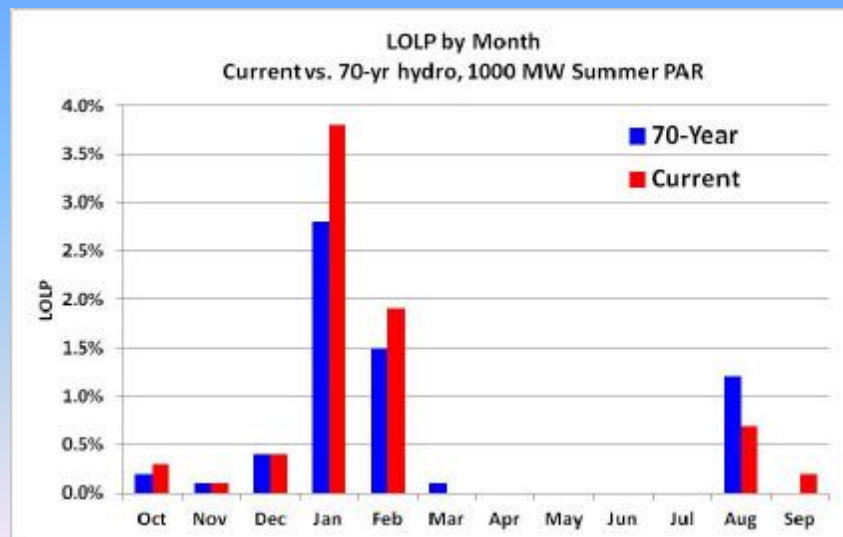
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2017 Monthly LOLP



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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

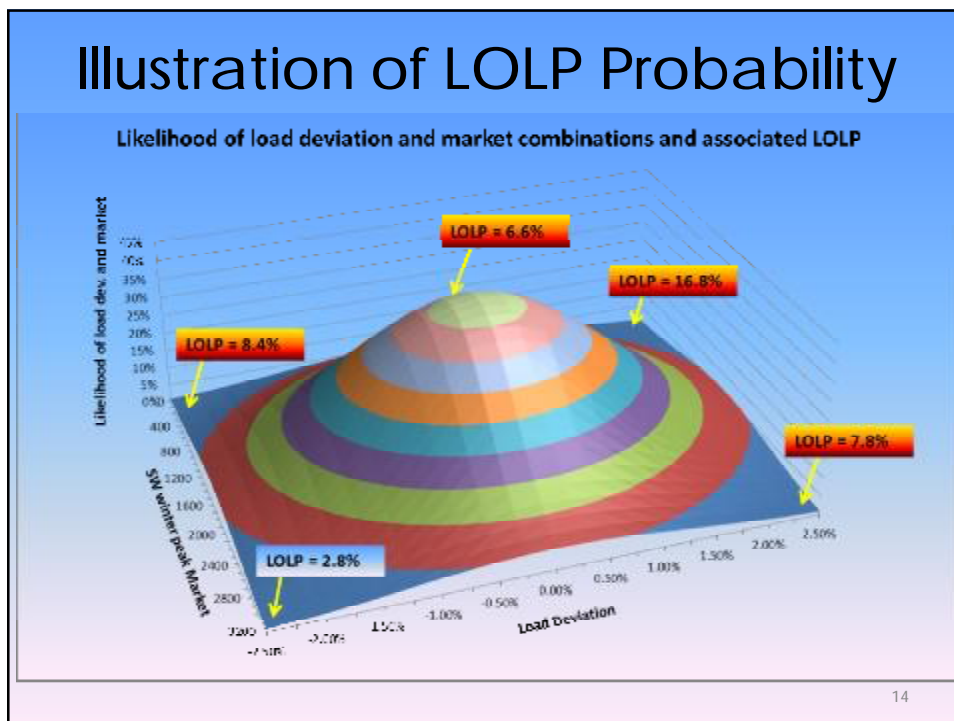
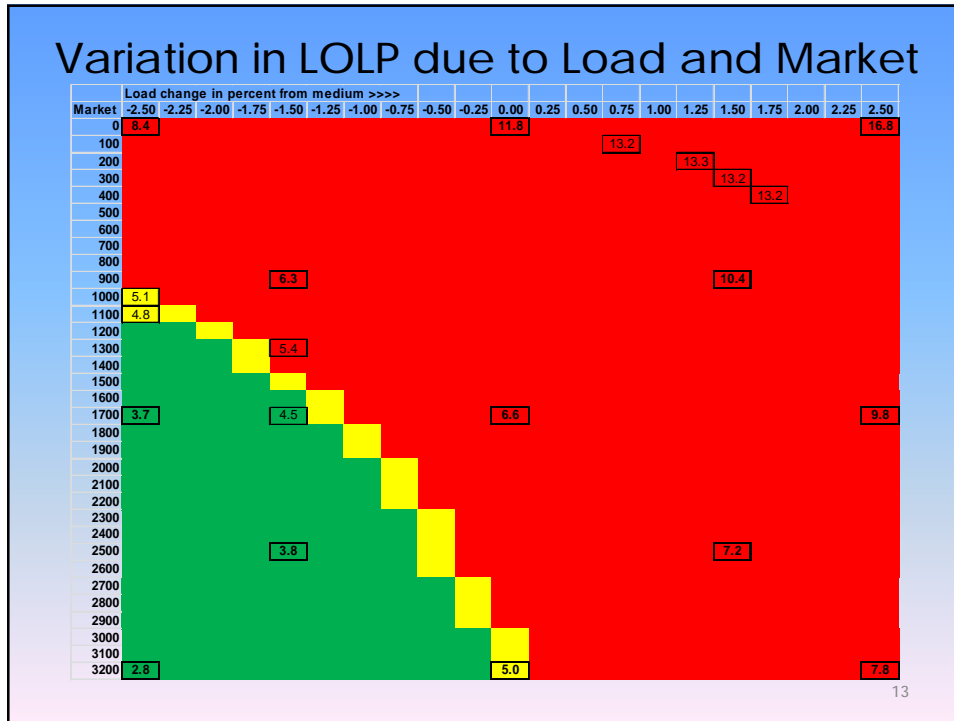
- Economic load growth
- Uncertainty in SW market

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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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