Northwest Power and Conservation Council

May 31, 2006

MEMORANDUM

TO: Power Committee

FROM: John Fazio, Senior System Analyst

SUBJECT: Resource Adequacy - Capacity Standard
(June 13, 2006 Power Committee)

Like the energy standard, the capacity standard will assess the balance between resources and loads but over a much shorter time period. For each month, the available sustained peaking capability will be assessed for a 2, 4 or 10 hour period. Expected loads for the same time increment will be subtracted and the surplus capability will be converted into a percent reserve margin.

The capacity target should be sufficiently large to provide for required contingency reserves, adverse weather and unexpected thermal outages. Based on an intuitive approach, the 10-hour capacity target should be in the 20 percent range (5 to 7 percent for contingency, 10 percent for adverse weather and 5 percent for unexpected outages).

Building a resource portfolio that satisfies the energy need for the region yields a capacity reserve margin of 30 percent or more -- more than seems to be required by the intuitive approach discussed above. This is an indicator that the region (at least in the winter) is still energy limited as opposed to capacity constrained.

A statistical approach can also be taken to assess the capacity target. For that approach, a "peaking" event is defined and a tolerance level (like 5 percent) is determined. By running a simulation model, the number of future years with peaking problems can be counted and a "capacity LOLP" can be computed (just like for the energy assessment). The capacity target can be estimated by computing the resulting reserve margin for a scenario that yield a 5 percent capacity LOLP.

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Resource Adequacy Capacity Standard

Power Committee

June 13, 2006

Boise, Idaho

Background Image: Bennett, Christian Science Monitor

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Objectives

(Recall that a standard includes a metric and a target.)

- The capacity metric should be transparent and easy to calculate.
- The metric should be linked to a more sophisticated analysis (e.g. LOLP).
- Meeting the capacity target should assure that the power supply will adequately protect against capacity problems.

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Proposed Capacity Metric

- A load/resource assessment (like the energy metric)
- But over the peak load period for each month (4 to 10 hours)
- In the form of a percent of resources that are surplus over the load or, in other words, a "surplus sustained peaking capacity"

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Proposed Capacity Standard

- Metric – Surplus sustained-peaking capacity (%)
  - over the highest load period (for each month)
  - period duration is ??? hours
  - normal weather
  - under critical hydro (’37 water)

- Target – ??? percent (i.e. reserve margin)

Proposed Capacity Target

Z% for the Sustained Peaking Capacity Reserve Margin

Y% for Adverse Weather and Load Forecast Uncertainty

X% for Outage Uncertainty

5-7% for Contingency Reserve

For example: California is using a 15 to 17% reserve margin but for a single hour peak

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Proposed Capacity Target

(For January)

- 5 to 7% for Contingency Reserve
- 5% for Resource Forced Outages
- 10% for Adverse Weather
  (What should we plan for?)

- Yields a 20 to 22% target

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Regional Capacity Assessment
(L/R Bal = –1,500 aMW, LOLP = 5%)

January 2006	1-Hour	2-Hour	4-Hour	10-Hour
Hydro (’37)	26,850	21,131	20,541	18,686
Non-hydro	9,760	9,760	9,760	9,760
Firm Imports	-1,218	-1,218	-1,218	-1,218
Spot Imports	3,000	3,000	3,000	3,000
Total Resource	38,392	32,673	32,083	30,228
Load (Avg)	25,633	25,506	24,847	22,691
Balance	12,759	7,167	7,236	7,537
Reserve	**50%**	**28%**	**29%**	**33%**

This is a scenario that is just adequate for energy needs.

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Observations

- Acquiring resources to meet the energy needs of the region (i.e. LOLP = 5%) yields a 10-hour capacity reserve of 33% for January.
- 33% is more than is needed based on our example,
- Which means that, for January, the region is energy constrained not capacity limited.