Northwest Power and Conservation Council

December 12, 2006

A Pilot Capacity Adequacy Standard For the Pacific Northwest

Council Document 2006-23
Adopted Version

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
www.nwcouncil.org

Steve Crow
Executive Director

503-222-5161
800-452-5161
Fax: 503-820-2370

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The Pacific Northwest Resource Adequacy Forum[1] (Forum) has developed a regional pilot capacity adequacy standard (to be used in conjunction with the previously adopted energy adequacy standard) for guidance in long-term resource planning. The Forum recommends that the Northwest Power and Conservation Council (Council) adopt this pilot standard as an interim guide for regional entities to inform their planning efforts with the understanding that the Forum will test and refine the standard and propose a final standard within a year. The Forum also recommends that this interim regional standard be submitted to the Western Electricity Coordinating Council (WECC) in order to inform WECC's ongoing process to develop West-wide adequacy standards.

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 Northwest power supply is adequate in a physical sense, that is, in terms of "keeping the lights on." It can be thought of as the minimum threshold for resource acquisition.

The regional resource adequacy standard consists of a metric (something that can be measured) and a target (an acceptable value for that metric) for both the energy and the capacity capabilities of the system. One of these targets will be the limiting constraint for a region or sub-region in the West. For the Northwest, energy capability is most likely the limiting factor in winter but recent analysis shows that capacity might be the limiting factor in summer. However, the region is currently both energy and capacity surplus. Therefore, the Forum is comfortable recommending this pilot capacity metric and targets as an interim standard.

The Forum believes that the form of the capacity metric and the initial values of the capacity targets presented in this paper are appropriate. As the effort to test and refine the metric and targets progresses, the Forum will finalize the underlying assumptions and resource counting protocols. Within a year, the Forum will recommend the final regional capacity standard to the Council for adoption. Appendix A includes a draft work plan that is intended to identify remaining tasks required to finalize the capacity standard. However, even after the final standard is adopted, the intent is for this process to be dynamic. The Forum recommends that both the energy and capacity targets be re-evaluated on an annual basis to ensure that they continue to mark the threshold for an adequate Northwest power supply.

The Pacific Northwest Regional Capacity Standard

The capacity metric for the Pacific Northwest[2] is defined to be the planning reserve margin (PRM), which is the surplus *generating capability* over *expected peak load* during the *peak load hours* for each month[3] (also referred to as the surplus sustained-peaking capability), in units of percent, where:

- *Generating capability* is defined as the sustained peaking capability[4] from:
    - All non-hydro resources[5] (adjusting for fuel-supply limitations and/or environmental constraints and not counting resources on scheduled maintenance and assuming that no resource is on forced-outage)
    - Uncontracted in-region Independent Power Producer (IPP) resources: 100 percent in winter but in summer only that portion of IPP generation that may be accessible to northwest utilities during peak load conditions (1,000 megawatts will be used as a placeholder until better information is obtained)
    - Hydroelectric resources available to meet 1 in 2, or expected loads, based on critical water[6] conditions
    - Hydro flexibility (a conservative estimate of additional hydroelectric generation that can be provided over the peak load hours during a 1 in 20 year temperature event without invoking emergency actions): 2,000 megawatts in winter and 1,000 megawatts in summer
    - Out-of-Region spot market resources: 3,000 megawatts in winter and 0 megawatts in summer
    - The net of firm imports and exports into and out of the region
- The *peak load hours* are defined to be the same 10 consecutive hours per day over 5 consecutive days that yield the highest average load.
- *Expected peak load* is defined as the average load over the peak load hours, based normal daily-average temperature.
- Until better information is obtained, the capacity targets will be assessed using daily average regional temperatures and loads.

The pilot capacity target for the Pacific Northwest is 25 percent for winter and 19 percent for summer. The generating capability of the power supply in these months should be at least this much higher than the expected peak load over the peak load hours of the day. The capacity targets are comprised of:

- A component to cover operating reserve requirements: 6 percent[7] for both winter and summer, and
- A component to cover planning adjustment reserve[8] requirements: 4 percent for winter and 7 percent for summer, and
- A component to cover the load increase arising from a one-in-twenty year temperature deviation from the expected coldest/hottest day: 15 percent for winter and 6 percent for summer.

Endnotes

1. The Pacific Northwest Resource Adequacy Forum was created in response to action items ADQ-1 and ADQ-2 in the Council's 5th Power Plan (see www.nwcouncil.org).

2. The Pacific Northwest is defined to be the geographical area referenced in the 1980 Northwest Power Act, which includes the states of Oregon, Washington, Idaho and the western part of Montana.

3. The pilot capacity standard is in the form of a sustained peaking planning reserve margin (PRM), which can be calculated for every month. However, only the most critical month in winter and in summer are needed for resource planning purposes.

4. Peaking capability is the maximum sustained peaking capacity associated with the peak load period adjusted for fuel limitations or other operating constraints. For out-of-region resources, the peaking capability should be that portion of the resource that is contracted to serve regional loads. The Council's Natural Gas Advisory Committee will evaluate whether sufficient gas supply and transportation capacity is available to allow for counting the full peaking capability of the region's gas-fired power plants to meeting monthly or seasonal PRMs.

5. For the pilot standard, wind generation will be assessed at 15 percent of nameplate capacity.

6. For the region, under current operating constraints (including actions listed in NOAA Fisheries' biological opinion), the critical water year is defined by the hydrologic conditions from August 1936 through July 1937.

7. The 6 percent operating reserve requirement is an average for the region. The requirement calls for a 5 percent reserve for hydroelectric generation and a 7 percent reserve for thermal generation. The region's firm energy supply is almost equally divided between hydroelectric and thermal generation, thus the 6 percent average.

8. The planning adjustment reserve is derived from a loss-of-load-probability (LOLP) analysis. It is intended to protect against contingencies beyond those covered by the operating and adverse temperature reserves. The planning adjustment reserve tends to be higher during the summer when out-of-region supplies and hydro flexibility are less available. It is somewhat similar to the planning adjustment energy line item defined in the energy standard in that it is related to the northwest's dependence on non-firm resources, such as out-of-region supplies.

Appendix A

Resource Adequacy Forum Work Plan 2006-07
Revised by the Forum on 10/20/06

This work plan is primarily intended to identify remaining tasks required to finalize a capacity standard for the northwest. The schedule is tentative and will likely change over the course of the next year.

October 2006

- Steering Committee recommends a pilot capacity adequacy standard to the Council.
- Council votes to release the pilot capacity adequacy standard for comment.
- Council receives comments on the implementation approach.
- Technical Committee develops a set of assumptions regarding how resources are to be counted for energy and capacity adequacy assessments. Suggestions are made for revising the PNUCC reporting process.

November 2006

- PNUCC makes its annual request for resource and load data.
- Council votes to adopt the implementation approach.
- Council receives comments on the pilot capacity adequacy standard.
- Technical Committee begins development of a benchmark for the LOLP analysis.
    a. Technical Committee considers other tools as possible candidates for the LOLP analysis and/or to benchmark GENESYS LOLP analysis.
- Evaluate the appropriateness of the 5% LOLP based on tradeoffs between impacts of curtailments, cost of power and potential impacts to fish operations.
- Technical Committee begins reassessing the current LOLP definitions of what constitutes an adequate energy and capacity supply.

December 2006

- If the Technical Committee cannot reach a consensus on a final proposal for a reporting process, the Steering Committee will meet to resolve the issues.
- Council votes to adopt the pilot capacity adequacy standard.
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January 2007 through May 2007

- Technical Committee begins to explore economic targets for both the energy and capacity standards. This process will include examining the impacts to cost and to economic risk of changing adequacy targets.
- Technical Committee works to finalize capacity adequacy standard
    a. Council staff finalizes temperature/load relationships using the 50-hour duration rather than daily average temperatures for assessing the adverse temperature reserve requirement.
    b. BPA staff briefs the Technical Committee on suggested peak period durations for both winter and summer.

c. Technical Committee works with others to develop assumptions regarding wind resources.

d. Technical Committee reevaluates PRMs

- Technical Committee begins developing guidelines for interpreting regional energy and capacity adequacy standards for individual utilities.
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- Technical Committee reassesses the availability of surplus out-of-region resources to be used in the analyses.
    a. Fine-tune transmission assumptions
    b. Evaluate economic factors, which might dictate imports/exports depending on magnitude of shortages
- Technical Committee refines assumptions regarding the inclusion of uncontracted IPP generation in resource adequacy assessments.
- Technical Committee refines assumptions regarding the availability of hydro flexibility

- Technical Committee begins to explore the use of a "loss of fish operation probability" (LOFP) metric to assure that fish and wildlife operations are not unduly curtailed.
- Technical Committee checks that PNW Resource Adequacy Standards are consistent with NERC/WECC guidelines/standards.

June 2007

- Council assesses the region's resource adequacy (from a top-down perspective).
- PNUCC publishes its Northwest Regional Forecast, assessing adequacy from a bottom-up perspective.
- Results of the top-down and bottom-up assessments are compared.
- If necessary, Council evokes actions called for in the implementation approach.

July 2007 through August 2007

- Steering Committee considers guidance for interpreting regional energy and capacity standards for individual utility resource planning.
- Steering Committee decides on economic adequacy targets for energy and capacity.
- Steering Committee decides on assumptions regarding the peak duration period.
- Steering Committee decides on assumptions for out-of-region spot market availability, uncontracted IPP generation, wind generation and hydro flexibility for the top-down regional resource adequacy assessments.
- Steering Committee considers the use of a fish-operation reliability index to asssure that PNW resource adequacy standards do not impose unreasonable risk to required fish operations.

September 2007

- Technical Committee prepares the final capacity adequacy standard and forwards it to the Steering Committee.
- Suggested changes to resource and load reporting are incorporated into PNUCC's process.
- Technical Committee reviews the energy adequacy standard to incorporate any revised assumptions adopted for out-of-region spot market availability, uncontracted IPP

generation, wind generation and hydro flexibility as well as revisions to the LOLP analyses.

October 2007

- Steering Committee decides on a final capacity adequacy standard to forward to the Council.
- Council votes to release the final capacity adequacy standard for public comment.
- Technical Committee recommends revisions to the energy adequacy standard, if any, to Steering Committee for consideration.

November 2007

- Council takes comments on the final capacity adequacy standard.
- Steering Committee forwards any revisions to the energy adequacy standard it approves to the Council for adoption.

December 2007

- Council votes to adopt final capacity adequacy standard.
- Council requests public comment on revised energy adequacy standard, if needed.
- Technical committee completes background documentation in support of the Northwest regional resource adequacy standard.
