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February 22, 2006

MEMORANDUM

TO: Council Members

FROM: Wally Gibson, Manager, System Analysis and Generation
John Fazio, Senior System Analyst

SUBJECT: Resource Adequacy Standard for the Northwest

In its Fifth Power Plan, the Council recognized the importance of developing a resource adequacy framework and standard. Action items ADQ-1 and ADQ-2 in the plan call for the establishment of resource information gathering protocols 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.

The Forum, including both a steering committee and a technical committee, has been active since June 2005. At the Council meeting, the staff will present the first recommendation from the steering committee, in the form of an issue paper recommending the Council adopt a regional energy metric and target value. The issue paper also includes a recommended general form for a capacity metric and target, to be fleshed out over the next three to four months.

Release of the issue paper for wider regional discussion will be the first major step toward regional entities formally addressing the resource adequacy issue. We expect that Bonneville will incorporate the results of the Forum's work into its Regional Dialogue decisions, that regional utility commissions will make it a reference point for their evaluation of integrated resource plans and that utilities will actively participate in implementing the regional standards.

It will also be a first step in providing recommended Northwest input to WECC for its work in developing metrics and targets that will help it to improve its assessments of resource adequacy on a westwide basis.

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DRAFT - February 1, 2006

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February 22, 2006

DECISION MEMORANDUM

TO: Council Members

FROM: Wally Gibson, Manager, System Analysis and Generation
John Fazio, Senior System Analyst

SUBJECT: Resource Adequacy Standard for the Northwest

PROPOSED ACTION: Approve the release of an issue paper (for public comment) describing a proposed resource adequacy standard for the northwest.

SIGNIFICANCE:

- Recent adoption of the energy bill gives the Federal Energy Regulatory Commission (FERC) authority to assess the adequacy of the nation's power supplies. We expect that the Western Electricity Coordinating Council (WECC) will be designated to assess the adequacy of the western power supply. We intend this proposed standard for the Pacific Northwest to be integrated into WECC's efforts.
- The Bonneville Power Administration (BPA) has been a joint sponsor of the Resource Adequacy Forum and intends to incorporate the standard in its Regional Dialogue and the ensuing contracts.
- The establishment of a regional resource adequacy standard will provide a consistent context to utilities, regulatory commissions and public utility boards in their assessment of individual utility resource plans.

BUDGETARY/ECONOMIC IMPACTS:

- There are minimal effects on the Council's budget. At this time, there is no indication that additional funds would be needed for contracting work or for advisory committee member travel expenses.
- The regional economic benefits of establishing a resource adequacy standard could be significant. Historically, the region has experienced periods of surplus and deficit energy supplies. Neither situation is desirable from an economic point of view. The establishment of an adequacy standard will help minimize the number of times the region finds itself in a costly situation of too little or too much energy supply.

BACKGROUND:

Recent events such as the Western energy crisis of 2001, which led to both curtailments in California and to West-wide price spikes, have forced utilities and regulators to rethink their approach to planning and operating the power system. In that year, the Northwest experienced its second-lowest water year (based on historical records since 1929). Also, few new resources were developed during the late 1990s, leading to areas of resource deficiency throughout the West. Combined with a flawed electricity market design in California and apparent market manipulation, these factors led to the undesirable events of 2001. The Northwest is still recovering from the economic recession following that crisis.

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 between the public utilities and BPA.

One way to alleviate the problem is to develop a regional resource adequacy standard and implementing framework. Such a standard would help utilities and their regulators gauge whether they have enough resources to meet their loads under a regionally accepted measure of generation sufficiency. A framework for implementing the standard would lay the foundation for those entities to plan for and acquire sufficient resources to meet load.

In its Fifth Power Plan, the Council recognized the importance of developing a resource adequacy standard and implementing framework. Action items ADQ-1 and ADQ-2 in the plan call for the establishment of resource information-gathering protocols 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.

ANALYSIS:

The Resource Adequacy Forum has been working on this task for the better part of a year. 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.

The proposed standard consists of a metric (something that can be measured) and a target (an acceptable value for that metric) for both energy and capacity capabilities of the system. The standard is designed to be transparent and simple to understand. For the energy standard, an annual load/resource balance is proposed. The target for the load/resource balance is based on a more detailed and sophisticated analysis of the power system, which includes hourly as well as seasonal analysis. The standard is also expected to be flexible, in that the target will be adjusted as conditions in the energy markets change and as the region's ability to measure and analyze its capability improves.

For the capacity standard, a sustained-peaking capability is proposed. Work on establishing a target for this metric is ongoing but should not hinder the process of regional review for this recommendation. The binding constraint on the region has been and still is annual energy, which gives us more time to develop a capacity target.

ALTERNATIVES:

- One alternative is to not develop a Northwest resource adequacy standard. This means that the region would continue to develop resources without the benefit of an overarching strategy. The likely outcome of this alternative is a greater possibility of periods of over- or under-building for the needs of Northwest consumers. Quantifying the potential regional cost of this alternative is difficult but based on past experiences could be significant.
- A second alternative is to allow the WECC to establish a West-wide adequacy standard, which would also apply to the Northwest. The drawback to this alternative is that WECC has little or no expertise in planning for systems that are energy-limited (as opposed to capacity-limited regions such as California). The WECC standard would not likely address Northwest needs in an appropriate way.

ATTACHMENTS:

The recommended regional resource adequacy standard is presented in the attached paper. This recommendation was developed by the Pacific Northwest Resource Adequacy Forum and was unanimously agreed to by its steering committee.

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February 22, 2006

Dear Interested Party,

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

Adopting a regional standard would be a first step in providing input to WECC for its work in developing metrics and targets on a West-wide basis. It is also expected that Bonneville will incorporate results of the Forum's work into its Regional Dialogue decisions, that regional utility commissions will make it a reference point for their evaluation of integrated resource plans and that utilities will actively participate in implementing the regional standards.

The Forum has completed the initial phase of its work, which was to develop an energy metric and target and to develop a form for the capacity standard. Its recommendation will be presented to the Council at the February 22 meeting in Portland. Council staff has prepared the attached issue paper, which includes the Forum's recommendation. The Council invites comments on this issue. Additional copies of the issue paper (document number 2006-01) are available by calling the Council's central office in Portland, Oregon (1-800-452-5161) or through the Council's website at <http://www.nwcouncil.org>.

Oral comments on this issue can be made at the Council's March 14, 2006, and April 11, 2006, meetings. Written comments will be accepted through April 14, 2006. Written comments should be directed to Mark Walker, Director of Public Affairs, 851 S.W. 6th Ave, Suite 1100, Portland, Oregon 97204. Comments via email should be addressed to mwalker@nwcouncil.org. At its May 9, 2006, meeting, the Council will consider whether to adopt the Forum's recommendation.

Thank you for your interest in the Council's review of this recommendation.

Sincerely,

Stephen L. Crow
Executive Director

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February 22, 2006

A Resource Adequacy Standard For the Pacific Northwest

Issue Paper

Council Document 2006-01

A Resource Adequacy Standard for the Pacific Northwest

Developed by the
Pacific Northwest Resource Adequacy Forum
January 24, 2006

The Pacific Northwest Resource Adequacy Forum¹ (Forum) recommends the following standard be used for guidance in long-term regional resource planning efforts. Further, the Forum recommends that this standard be submitted to the Western Electricity Coordinating Council (WECC) for inclusion in its development of 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 defined 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 also be thought of as a threshold that indicates a need for resource-acquisition actions.

The standard consists of a metric (something that can be measured) and a target (an acceptable value for that metric) for both energy and capacity capabilities of the system. Generally, only one of these targets will provide the limiting constraint for a region or sub-region in the West. For the Northwest, the energy target is most likely the limiting factor.

There remain a number of important and still unresolved issues regarding this recommendation.² However, the Forum believes that the form of the energy and capacity metrics and targets presented in this paper is appropriate. As issues are resolved and as new information is made available, underlying assumptions for both the energy and capacity standards will be updated. In fact, the intent is for this process to be dynamic, and the Forum recommends that an assessment of the region’s resource adequacy be made at least once per year. Details regarding the counting of resources and loads will be developed by the committee and presented in a future paper.

Energy

The **energy metric** for the Northwest³ is defined to be the annual average load/resource balance in units of energy (average megawatts)⁴, where:

- The load/resource balance is defined as the available average annual energy minus the average annual firm load.
- The resource available is the average annual energy and is defined as the sum of:

¹ The Pacific Northwest Resource Adequacy Forum arose from action items ADQ-1 and ADQ-2 in the Council’s Fifth Power Plan (see www.nwccouncil.org).

² In particular, regarding the capacity metric and target.

³ The 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.

⁴ One average megawatt is equivalent to 8,760 megawatt-hours of energy.

- the energy capability⁵ from all⁶ non-hydro resources⁷ (accounting for maintenance and forced-outage rates and limited by fuel-supply constraints⁸ and/or environmental constraints) plus
- the hydroelectric-system energy based on critical water⁹ conditions plus
- 1,500 average megawatts of “planning-adjustment” energy,¹⁰ which is derived from the currently used¹¹ 5 percent loss-of-load probability (LOLP) standard.
- The average annual firm load¹² is based on average temperature conditions and is adjusted for firm out-of-region energy contract sales and purchases.

The **energy target** for the Northwest is zero¹³, that is, on an annual basis; resources (as defined above) should at least match the expected annual load.

⁵ For in-region resources, the energy capability should be the maximum dispatchable energy adjusted for maintenance and forced outage rates. For out-of-region resources, the contracted amount of energy should be counted.

⁶ The net annual average energy capability (energy capability minus firm out-of-region contracts) of independent power producer (IPP) resources is included in the assessment as a separate line item. IPP resource status will be reviewed annually with Council’s Natural Gas Advisory Committee, focusing particularly on gas supply and transportation capacity issues.

⁷ This refers to resources that are committed to serve regional load, whether or not they are physically located in the region.

⁸ For wind resources, the historical annual average energy production should be used. If insufficient historical data is available, then a percentage (yet to be determined) of the nameplate rating will be used to calculate annual energy production. A similar method will be used for other renewable resources.

⁹ 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. The annual average generation from all hydroelectric facilities in the U.S. (including independent projects and Idaho Power Company’s projects) based on these water conditions is to be used in the load/resource balance calculation. Of course, this assumes that Idaho Power Company’s load will be included in the tabulation of the average annual load. This is not intended to prejudice any decisions about net requirements in the Regional Dialogue discussions.

¹⁰ The value used for “planning adjustment” energy is derived from the Genesys model and should be reassessed at least once a year or whenever new resource information is available. This factor represents an adjustment to be made to the load/resource balance so that when the balance is zero, the associated loss-of-load-probability (LOLP) will be 5 percent. The amount of planning adjustment energy depends on assessments of the availability of out-of-region resources, the amount of hydro flexibility energy available to system operators and on other factors. In the simulation, hydro flexibility energy is used when all other available resources have already been dispatched, including imports from other regions, and loads still are not met. Hydro flexibility energy is defined as that generation derived from drafting reservoirs below their biological opinion refill elevations (winter period) and if necessary below their critical rule curves. Hydro flexibility energy is used to cover needs over a period of hours or days. This type of operation is normal and does not require an “emergency” declaration under the biological opinion from BPA or the region. Hydro flexibility water is replaced as soon as possible and in the majority of cases does not affect refill targets. Hydro flexibility drafts are not intended to be used in lieu of providing an adequate resource supply. The value for out-of-region energy currently assumes an hourly market of 3,000 MW available to the Northwest in the winter season (December through March) only. This was judged to be reasonable for current use, based on recent Bonneville assessments of the status of generation in California. The regional “planning-adjustment” energy should not prejudice any individual utility resource-planning decisions.

¹¹ The Resource Adequacy Forum is also reviewing the 5 percent LOLP standard. Any change to this standard would translate into a different “planning-adjustment” energy value.

¹² Load is based on a medium forecast and includes all existing and planned conservation measures.

¹³ This will yield a 5 percent LOLP in the Council’s regional analysis.

Capacity

The **capacity metric** for the Northwest is defined to be the excess sustained-peaking capability¹⁴ of the power supply over the peak-load hours, in units of percent, where:

- The sustained-peak duration is X hours per weekday (or Y hours total per week),
- the sustained-peak capability is shaped to match load, and
- peak load is defined to be the average load (based on normal temperatures) during the highest load week of the highest load month and includes reserve requirements and export commitments.

The **capacity target** for the Northwest is Z percent, that is, as a minimum; the sustained-peaking capability of the power supply should be at least Z percent higher than the sustained-peak period load. The Forum continues to make progress in defining the peak-duration period and the appropriate target for the capacity metric.

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¹⁴ The method of assessing the sustained-peaking capability is yet to be determined but could be in the form of an Excel worksheet or an hourly hydro-simulation computer model.

Resource Adequacy for the Pacific Northwest

**Council Meeting
Portland, Oregon
February 22, 2006**

Presentation Outline

1. Guidelines for a Standard
2. Proposed NW Standard
3. Process and Timeline

1. Guidelines for a Standard

- Components:

Metric – something that can be measured

Target – acceptable value for the metric

- Standards for:

Capacity – **peak** demand

Energy – **average** demand

2. Proposed NW Standard - **Energy**

- **Metric** – Annual average load/resource balance
 - Load = annual average load (normal weather)
+ net inter-regional contracts
- conservation savings
 - Resource = thermal generation (including IPP)
+ renewable generation
+ firm hydro (critical water)
+ 1,500 aMW planning adjustment
- **Target** – Zero

Proposed NW Standard - **Capacity**

- **Metric** – Surplus sustained-peaking capability
 - Over the highest load period of the year
(normal weather, including reserves and exports)
 - Period duration is **TBA** hours
 - Max generation shaped to load
- **Target** – **TBA** percent (i.e. reserve margin)

3. Council Process

- Feb 22 – Council decision to release issue paper
- Apr 14 – Last day for public comment
- May 9 – Council decision on energy standard
- Aug – Council release of capacity issue paper
- Oct – Last day for public comment
- Nov – Council decision on capacity standard

Overall Process

- Sep – Regional reporting process in place
- Fall – Annual assessment of resource adequacy
- Nov – Council adoption of standard
- Nov – Non-binding guidelines for utilities
- Ongoing – Develop incentives for compliance