

Appendix C

Background on the Northwest Resource Adequacy Standard

Summary

The Resource Adequacy Standard serves as a gauge to assess whether the Northwest electricity supply is sufficient to meet the region's needs now and in the future. Developed over the last two and a half years by the Pacific Northwest Resource Adequacy Forum, it provides a *minimum threshold* that serves as an early warning should resource development fall dangerously short. It also suggests a *higher threshold* that encourages greater resource development to offset electricity price volatility.

The standard was developed for a number of reasons. First, the operation of the power supply is becoming increasingly complex with the addition of wind resources and greater operating constraints on the hydroelectric system. Second, utility planners want to avoid a repeat of the electricity crisis of 2000-01, which brought the region to the brink of a blackout and caused electricity prices to soar. Finally, the North American Electric Reliability Corporation (NERC) plans to initiate the development of a resource adequacy assessment standard in 2009, which will require the Western Electricity Coordinating Council (WECC) to develop an adequacy assessment framework. The WECC, in turn, has asked for help in assessing the adequacy of the Northwest's power supply.

The standard does not mandate compliance or imply any enforcement mechanisms. It does not directly apply to individual utilities – because every utility's circumstances differ. The forum has provided some guidance for applying the standard to utility resource planning, but ultimately, each utility must assess its own needs and risk factors, such as its reliance on market supplies.

Currently, the region as a whole has more than sufficient resources to meet the *minimum threshold* for resource adequacy. The minimum threshold, however, should not be mistaken as a resource planning target. The prudent amount of resource acquisition should be derived from an integrated resource planning process. For the region, the Council's power plan serves as a blueprint for the types and amounts of resources the Northwest should acquire. Individual utilities determine their own planning targets, which are screened by public utility commissions or by their boards of directors.

The Pacific Northwest Utilities Conference Committee (PNUCC) and the Bonneville Power Administration (BPA) amass utility planning information and produce regional assessments of loads and resources. These tabulations have a different purpose than the resource adequacy standard – they address utilities' need to acquire prudent amounts of new resources not the bare minimum necessary to keep the lights on. It would be a misapplication of the adequacy standard to infer that utilities should slow down their resource acquisition activity because the adequacy standard is already being met.

Background

Electricity does more than keep the lights on in the Pacific Northwest. It literally powers our economy. The absence or presence of an adequate electricity supply can either curtail or facilitate economic growth. That's why the region's electricity experts have been working on a resource adequacy standard – to help ensure we continue to have an adequate electricity supply well into the future.

In the worst extreme, an inadequate electricity supply can affect public health and safety, as in a blackout. Fortunately, such events are rare and when they do happen are most often caused by a disruption in the delivery of electricity (transmission lines), not the supply. However, there have been times – during extreme cold spells or heat waves – when the supply has been tenuous. The fact that most of the region's electricity comes from hydropower presents unique challenges to the energy supply, too, since periods of drought that limit hydropower production are unpredictable.

While most disruptions in supply have been short term, the Western United States did experience an extended energy crisis in 2000-01. At its root, the crisis was precipitated by an imbalance of electricity supply and demand centered in California and the Pacific Northwest, where for years, development of new energy resources had lagged behind energy demand. The ripple effects were felt throughout the West as the crisis drove electricity prices and consumer rates to historic highs.

Electricity planners in the Pacific Northwest are taking the lessons learned from that crisis to heart. They have been working to ensure that such a crisis does not happen again in this region.

The Adequacy Forum

In the summer of 2005, BPA and the Council jointly initiated the Pacific Northwest Resource Adequacy Forum. The forum includes representatives from the region's electric utilities and utility organizations, public utility commissions and public interest groups, as well as from BPA and the Council. It is made up of a steering committee and a technical committee.

The forum's overarching goal is to *“establish a resource adequacy framework for the Pacific Northwest to provide a clear, consistent, and unambiguous means of answering the question of whether the region has adequate deliverable resources to meet its loads reliably and to develop an effective implementation framework.”*

To that end, the forum has been working to forge a consensus-based standard for the region to address both energy (annual needs) and capacity (hourly needs). This standard has been designed to assess whether the region has sufficient resources to meet growing demand for electricity well into the future. This is important, because it takes time – usually years – to acquire or construct the infrastructure necessary to provide an adequate electricity supply.

As part of this effort, the Council accepted the recommendations of the forum and has adopted the proposed resource adequacy standard for the Northwest. The Council also adopted a voluntary implementation plan that was developed and recommended by the forum.

Two Perspectives: Utility and Regional

When the region's utilities add up their loads and resources through the PNUCC Northwest Regional Forecast, they currently show a substantial need to acquire resources, and they identify the type and quantity of resources they plan to acquire. In contrast, the regional resource adequacy assessment currently indicates that the region is above the minimum threshold for resource adequacy. While these perspectives appear inconsistent with one another, each is valid. The regional adequacy standard defines a floor or minimum amount of resource development, whereas the utility assessment and the Council's power plan suggest targets for more optimal amounts of new resource capability.

There are four main reasons for the difference:

- First, the regional adequacy standard includes a large amount of generation that is physically available to the region but is not owned or contracted for any utility. Most utilities only count resources they have firm rights to, through ownership or contract.
- Second, most utilities use critical water (driest year on record) to measure hydroelectric generating capacity. The regional adequacy standard uses a somewhat less stringent measure to define the minimum threshold for adequacy.
- Third, many utilities do not count the full availability of particular resources because of high operating costs, lack of firm fuel contracts or other reasons. The regional standard is based on the assumption that during emergencies, many of these resources would be available.
- Fourth, many utilities are concerned about the risk of high costs during periods when the power supply is tight and, therefore take a more conservative approach in defining their need to acquire new resources.

The current adequacy assessment indicates that there are sufficient resources (both firm and non-firm) physically available to regional utilities to make the likelihood of a blackout very low – within the limits of what the region will tolerate. However, the minimum threshold does not address the optimal amount of resources, nor the types of resources that the region should acquire. Being at the minimum level may keep the likelihood of blackouts low, but it does not guarantee that prices will remain stable. The desired or prudent amount of resource development for the region is determined by the Council's Power Plan, not by this standard. This higher threshold for resource development for the region has been referred to as the *economic threshold*. The optimal amount of resource development for individual utilities must be derived from their own integrated resource planning processes.

The Regional Standard

As the standard was developed, the forum considered a number of recent changes in the regional power picture. These changes include the growing role of independent power producers, enhanced wholesale power trading, reduced flexibility in the hydroelectric system, the increased importance of natural gas-fired generation, the growth in wind generation, and higher summer air-conditioning loads.

The new standard is based on a sophisticated hourly assessment of loads and resources and how they might be affected by temperature (load deviations), precipitation (water supply), forced outages to generating resources, and other factors. At the heart of the forum's effort is a computer program that estimates the future likelihood of a significant power curtailment under many possible future load and resource conditions.

Historically, the region's tolerance for a significant power supply shortage has been assumed to be 5 percent – that is, the region would tolerate a significant power shortage no more than once in 20 years. This assessment, usually referred to as a loss-of-load probability (LOLP) analysis, is converted into an equivalent, but simpler and more familiar load/resource balance measurement that regional planners use in their calculations. The boxed text summarizes the current standard. To view the actual standard, go to: <http://www.nwcouncil.org/energy/resource/Default.asp>.

Implementing the Standard

The forum also wanted to ensure it did not overstep the jurisdiction of states or the prerogatives of individual utilities in planning and acquiring resources to meet load. Because each utility's circumstances differ, it is difficult to translate a regional standard into a utility-specific standard. The forum has provided some guidance for utilities but, ultimately, they and their regulators are the decision makers for resource acquisition. The implementation plan depends on regional sharing of information, transparency of assessment methodologies, and regional coordination. The forum believes that a voluntary

Energy Standard

Energy in this context refers to the annual electricity needs of the region. The measure for this standard is the annual average load/resource balance in units of average megawatts. The threshold for this measure is set so that the resulting loss-of-load probability assessment yields a 5 percent value. In determining resource generating capability, the forum includes hydroelectric generation available under critical water, available annual output of regionally committed thermal generators and renewable resources, and a portion of the uncommitted independent power producer generation. The forum also includes a small amount of non-firm resources such as out-of-region market supplies and non-firm hydroelectric generation. The amount of non-firm resources the region should rely on is determined by the 5 percent loss-of-load probability analysis. In determining load, the standard uses the region's average annual firm load based on normal temperatures and adjusted for firm out-of-region energy contract sales and purchases and savings from conservation programs.

Capacity Standard

Capacity in this context refers to the peak electricity needs of the region. The measure for this standard is the planning reserve margin, or the surplus sustained-peak capacity, in units of percent. It represents the surplus generating capability above the sustained-peak demand. In determining resource peak capability, the forum includes the same firm and non-firm resources used to assess the energy standard for the region. The planning reserve margin is assessed over the six highest load hours of the day for three consecutive days (sustained-peak period). This is intended to simulate a cold snap or heat wave – periods of the year when the Northwest requires the most capacity. The planning reserve margin is computed relative to normal weather sustained-peak loads. The threshold for this measure is determined by the 5 percent loss-of-load probability analysis and should be sufficient to cover load deviations due to extreme temperatures and the loss of some generating capability.

approach will work because utilities and their governing bodies have a strong incentive to develop adequate resources to meet retail loads.

BPA will also play a significant role. As it signs new wholesale power contracts with its utility customers, BPA will require that customers provide forecast loads and resource data annually, on a confidential basis, to the PNUCC, or its successor organization. This information will be used to facilitate regional resource adequacy assessments. BPA expects its customer contracts to include terms that define which parties will have responsibility to serve load growth.

For the reasons addressed above, it is to be expected that utilities will be acquiring resources even when the resource adequacy standard is already being met. The adequacy standard is intended to be the bare minimum, not the target, for regional resource development.

The Future

The Northwest is not alone in focusing on ensuring an adequate power supply. NERC plans to initiate the development of a resource adequacy assessment standard in 2009, which will require the WECC to develop an adequacy assessment framework. WECC has spent the past several years developing a framework for the West's power supply, which is currently in place. WECC's framework is explicitly not intended to override any state or regional assessments, including regional adequacy measures or their thresholds. In fact, WECC has solicited help from regional entities to aid in its assessment of west-wide resource adequacy.