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## **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  
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The Pacific Northwest Resource Adequacy Forum<sup>1</sup> (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.<sup>2</sup> 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 Northwest<sup>3</sup> is defined to be the annual average load/resource balance in units of energy (average megawatts)<sup>4</sup>, 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:

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<sup>1</sup> 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](http://www.nwccouncil.org)).

<sup>2</sup> In particular, regarding the capacity metric and target.

<sup>3</sup> 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.

<sup>4</sup> One average megawatt is equivalent to 8,760 megawatt-hours of energy.

- the energy capability<sup>5</sup> from all<sup>6</sup> non-hydro resources<sup>7</sup> (accounting for maintenance and forced-outage rates and limited by fuel-supply constraints<sup>8</sup> and/or environmental constraints) plus
- the hydroelectric-system energy based on critical water<sup>9</sup> conditions plus
- 1,500 average megawatts of “planning-adjustment” energy,<sup>10</sup> which is derived from the currently used<sup>11</sup> 5 percent loss-of-load probability (LOLP) standard.
- The average annual firm load<sup>12</sup> 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 zero<sup>13</sup>, that is, on an annual basis; resources (as defined above) should at least match the expected annual load.

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<sup>5</sup> 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.

<sup>6</sup> 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.

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

<sup>8</sup> 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.

<sup>9</sup> 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.

<sup>10</sup> 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.

<sup>11</sup> 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.

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

<sup>13</sup> 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 capability<sup>14</sup> 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-peaking capability is based on critical hydro conditions,**
- the sustained-peaking capability is shaped to match load, and
- peak load is defined to be the average load (based on normal temperatures) **across the sustained-peaking duration for** ~~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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<sup>14</sup> 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.