Northwest Regional Forecast

of Power Loads and Resources

2012 through 2021

PNUCC

March 2011

Special thanks to PNUCC System Planning Committee members and utility staff that provided us with this information.

Electronic copies of this report are available on the

PNUCC Website

www.PNUCC.org

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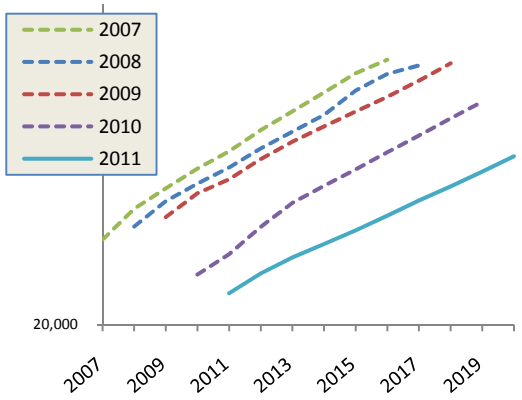
Executive Summary

A Historical Perspective

A look in the rearview mirror at the Northwest's demand for electricity reminds us that electric utilities continually update their forecasts to reflect current conditions. While utilities are acquiring resources to maintain a dependable power supply, they are also carefully monitoring electricity demand. This figure shows that in the last five years, utilities have lowered their expectations about growth. Not only have utilities adjusted their load forecasts to reflect the region's economic situation, they also have been diligent about promoting energy efficiency and other demand-side programs that dampen load.

Regional Firm Load
2007 - 2011 Forecasts



The *Northwest Regional Forecast* is a state of the union for the region's electric utilities. It matches up generating resources to electricity demand and indicates the region's need to acquire new power supply. It also points out where utilities are headed to meet their future needs. The *Forecast* is based on information provided by individual utilities and is, in essence, a sum of regional utilities' integrated resource plans. For 60 years, PNUCC has been compiling this *Forecast,* and this history provides a solid foundation to inform and guide utility resource planners and decision makers.

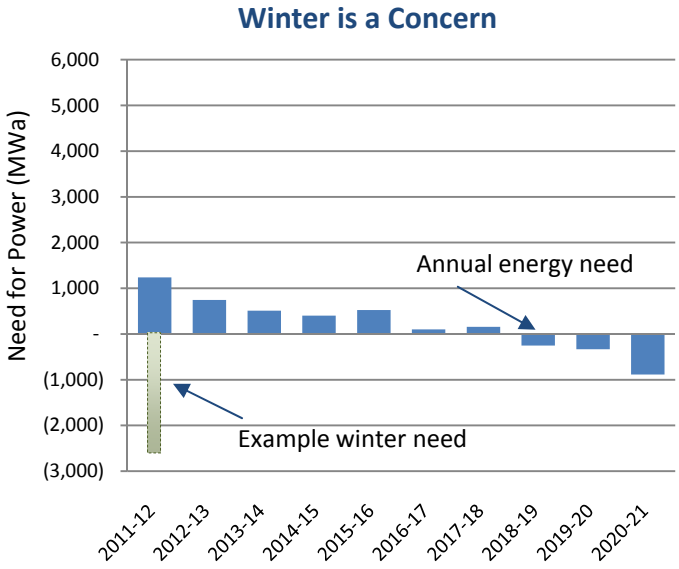
Northwest Power Needs are Changing

Our latest *Forecast* reflects changes in the region's resource mix that are affecting what utilities must have to keep their systems balanced and reliable. The addition of large amounts of wind generation, for example, is influencing planning and operations in new and unexpected ways.

For 2011, multiple metrics are reflected in the *Forecast* to offer a more nuanced picture of loads and resources. With the help of PNUCC's System Planning Committee energy experts, we are shining a spotlight on key topics in today's Northwest power industry, such as utilities' ability to meet firm peak loads and seasonal needs.

Annual Snapshot Only Part of the Picture

On an average annual basis, Northwest utilities have adequate energy to meet their needs for most of the 10-year *Forecast* horizon. It isn't until the end of the period that this metric signals a need to add resources. However, a big piece of the picture is missing with this traditional view.



The annual snapshot masks what's taking place month to month. In the first year of the *Forecast*, the annual picture indicates about a 1,200 MWa surplus, yet the monthly picture tells us there is a 2,000 to 3,000 MWa need for power in the winter as shown here.

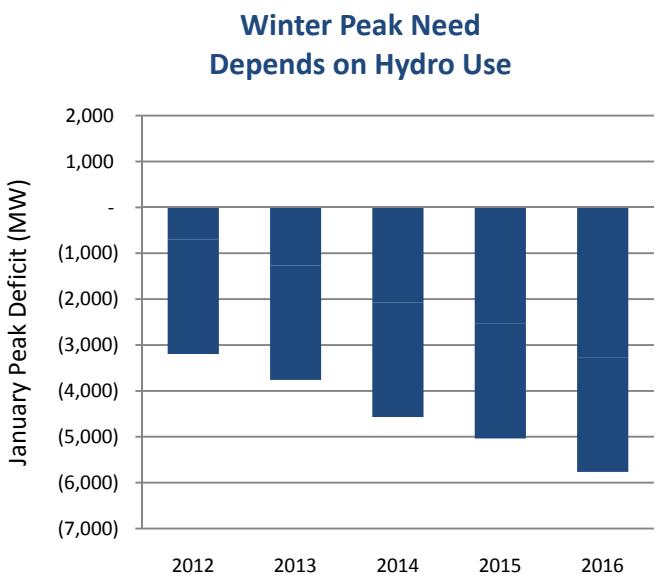
The shape of electric power needs over a 12-month period is driven largely by the shape of consumer demand and the use of hydropower to meet that demand.

Peak Needs Pose Challenges

The region's need for resources to meet peak electricity loads is growing. While our 2010 *Forecast* underscored the need for more generation in the Northwest, the story in 2011 is the growing need for resources to meet peak demand.

A look at utilities' own estimates of their peak needs out five years makes this point too. Five of the utilities providing information this year, indicate a peak need in the summer and/or winter. The sum of their peak need estimates add to over 3,000 MW for both summer and winter season.

In 2012 of the regional analysis, we are short of winter generating capacity to meet peak loads, and in each succeeding year, the deficit grows. As shown in the next graph the *Forecast* indicates the Northwest has an overall need for 3,200 MW of new resources to meet peak demand in the winter (almost as much as the output of three Bonneville dams).



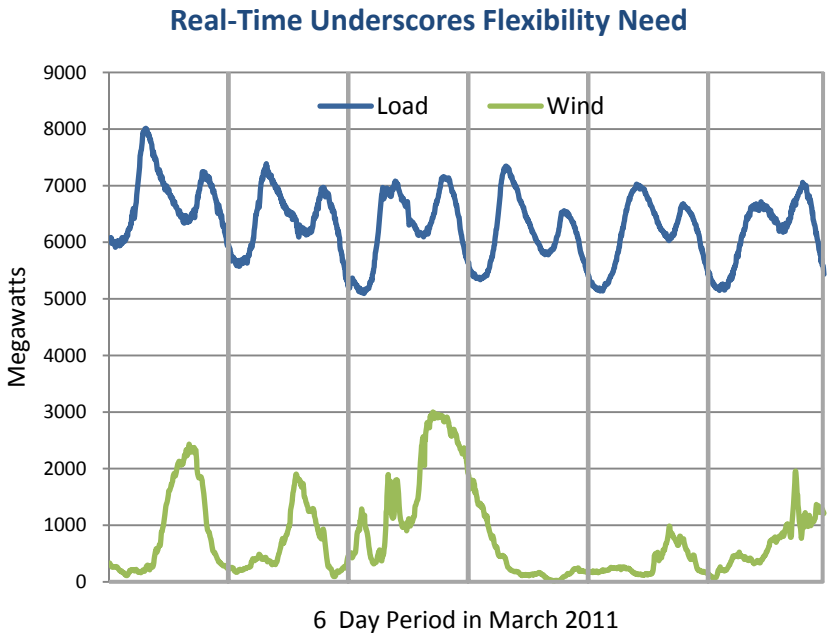
A key factor in the magnitude of this gap is the use of hydro generation. Operators control flows, letting more or less water through the dams, depending on whether they need a big burst of power for a short time or a constant level of generation stretched over a longer time.

The peak need in this analysis is based on using flows spread over a longer period of time, which defines the sustained peaking capability of the system.

The utilities' focus in the current *Forecast* is on winter peak capability. It is worth noting, however, that some utilities report their summer peak load is growing and eventually could overtake winter peak. Planners will be keeping tabs on summer peak as another metric to track.

Real-Time Flexibility Gets Attention

The story on regional power needs is not complete without a look at the growing requirement for real-time flexibility. Our power grid is designed to react and adjust every four seconds, 24 hours a day in order to keep the lights on. Utilities are finding that the need for capability to react to variations in load and generation in real time is increasing. There are a number of reasons, both operational and regulatory, for why this is happening.



Flexibility Focus

The focus on system flexibility has spawned an effort by the PNUCC System Planning Committee to evaluate the operating characteristics of different types of electricity generation. The committee has documented its findings in a report, Capabilities of Electric Power Resources, that helps define the operating capabilities of several types of electricity generation that planners may be considering to meet future needs.

Six days of actual load and wind generation on the Bonneville Power system (March 8-13, 2011), shown in the graph above, demonstrates how much and how often the power system varies in real-time. In this snapshot, Bonneville's system loads ramp up and down by about 2,000 MW each day.

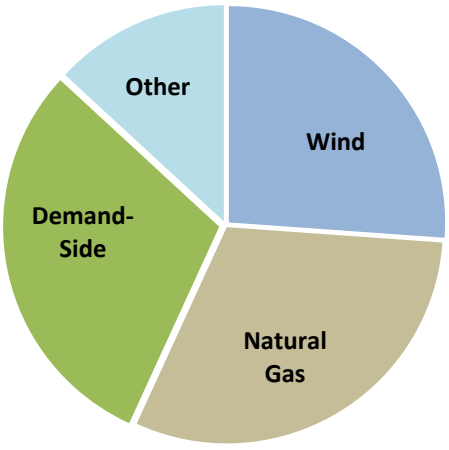
Large amounts of installed wind capacity mean large fluctuations in system generation, as well. In this example, generation from wind ramps up to almost full capability (3,000 MW) and back down to zero within 24 hours. It is the operator's job to keep power flowing steadily while the loads and wind generation are changing.

Today, system operators rely on flexible resources, such as hydro generation, to balance the changes across the hours and days to keep the system reliable. But we are reaching the limits of the region's hydro system to provide this physical backup capability. Planners are looking to new resources to help carry the burden of capacity demands. Dispatchable resources, like natural-gas turbines, will be needed to ensure reliability.

The Solution is New Resources and Technologies

The face of the Northwest's electricity supply is changing. Utilities have been investing in energy efficiency and adding wind and natural gas-fired generation since 2001 to keep up with growing demand and changing regulatory policies. The end result is that operators are stretching the region's existing power supply to respond to this new world. And it has heightened our awareness of the essential operating characteristics of new resources to maintain a reliable power supply.

Big Additions Planned to Meet Needs



Total Nameplate - 8,300 MW

This trend will continue as we meet future needs. Over the next 10 years, utilities are planning investments that add up to almost 8,300 MW of wind power, natural-gas generation, and demand-side savings, with a help from small renewable generation and power purchase contracts.

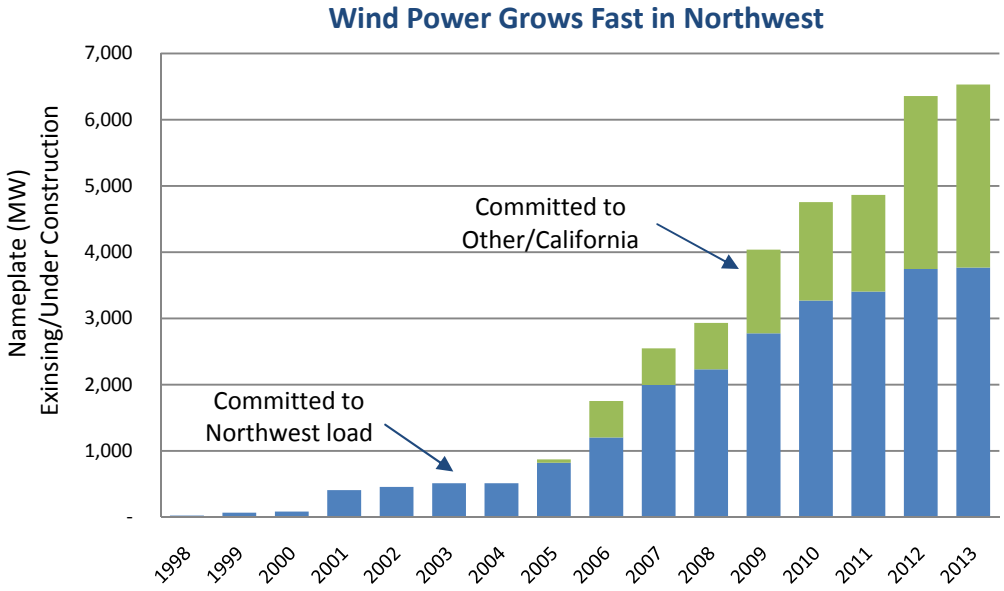
Natural Gas Fuels New Generation

Natural-gas generation makes a significant contribution to meet the region's future energy and flexibility needs. At almost thirty percent of the new resource pie, it is about equal to demand-side management as the energy resource of choice and plays an even greater role toward meeting peak demand.

Utilities plan significant additions to the region's natural-gas fired generation to bolster the benefits of wind generation. There are 2,400 MW of new natural-gas fired generating resources planned in the Northwest over the next 10 years. Because these projects are readily dispatchable and flexible, they will assist with the challenge of meeting the real-time fluctuations in system loads and wind generation.

Wind Contributes Significantly

A great deal of attention is focused on the Northwest's recent history of wind power development. As shown here the wind fleet is growing from zero in 1998 to over 6,000 MW by 2013 when projects being constructed today are completed. This significant addition is requiring utilities to create new tools and strategies to adapt to the changing system.



Compared with recent years, the pace of future wind development in utility plans is slowing. Yet, wind represents a sizeable chunk of new resources over the next 10 years, 27 percent (over 2,200 MW additional nameplate capability that equates to about 660 MWa of energy) by 2020. However, wind can't be relied on to meet peak loads, which is a significant issue for utilities.

Utilities Count on Demand-Side Management

State renewable portfolio standards have spurred the growth of energy efficiency and wind generation in utility resource plans. Demand-side management, which encompasses classic energy efficiency, transmission and distribution efficiency, market transformation efforts, cutting-edge demand-response technologies such as Smart Grid, fuel switching, fuel conversion, and energy storage, form this major piece of utilities' future resource plans.

At about one-third of planned new energy resources, demand-side management is showing up primarily as energy efficiency. It is expected to save the region over 1,700 MWa of energy in 10 years and lessen the need for new generating resources.

Other Renewables Enter the Mix

Utilities are looking to other renewable resources and new technologies to help meet state mandates and energy and capacity needs. These resources include geothermal, tidal power, biomass, landfill gas, solar, and cogeneration. Almost 200 MW is included in the 2011 list of planned resources.

Future Costs Will Rise

While the *Forecast* does not provide data on costs, the Northwest's current electricity supply points to higher and more volatile costs. The overall cost of electricity in the Northwest has traditionally been lower than in other parts of the country due to the abundance of hydropower. While that is not likely to change significantly in the short term, there are a couple of reasons that future electricity costs are on the rise.

As stated earlier, Northwest utilities are facing a shortage of generating capacity to meet peak loads. As flexibility in the hydro system is use up, more dispatchable and flexible resources will need to be added. In its most recent power plan, the Northwest Power and Conservation Council (a four-state compact charged with developing a 20-year power plan for the region) pointed out

that the use of hydropower as a base resource and the source of inexpensive flexibility keeps Northwest electricity prices low. “As the region outgrows the hydropower system’s capability to provide peaking and flexibility, other resources will be necessary and the cost of electricity will likely increase” (emphasis added), according to the plan. New resources and new technologies are simply more expensive. The capital and fuel for these resources will increase electricity costs.

PNUCC

Bringing the *Power* of good ideas *Together*.

PNUCC is a voluntary, non-profit organization that has played a pivotal role in the region’s electric power industry for more than 60 years. It serves as forum for its members for bringing the power of good ideas to bear on a range of issues that affect electricity providers and large industrial users in the Northwest.

Through PNUCC members work together to analyses and address regional issues that impact the electricity consumers of the region.

Overview

Each year the *Northwest Regional Forecast* provides utilities' ten-year projections of electric loads and resources indicating the region's need to acquire new power supply. It is a comprehensive look at the capability of existing and new electric generation resources, long-term firm contracts, expected savings from energy efficiency programs and other components of electric demand for the Northwest. This year's report presents estimates of annual average energy, seasonal energy and winter peak capability. These metrics provide a multi-dimensional look at the Northwest's need for power and underscores the growing complexity of the power system. This information can be found in Tables 1, 2 and 3 of the *Northwest Region Requirements and Resources* section of the report.

The utilities' existing generating resources are shown by resource type. Existing resources include those resources listed in tables 4, 5 and 7. *Table 4 Recently Installed Resources* highlights those projects that have most recently come on line and *Table 5 Under Construction Resources* lists those generating projects where construction has started and that utilities are counting on to meet need. *Table 7 Northwest Generating Resources* is a comprehensive list of generating resources that make up the electric power supply for the Pacific Northwest. These resources are utility-owned, utility contracted, and owned by independent power producers. While, uncommitted generation from power sources owned by independent power producers is highlighted in *Table 8 Potentially Available Energy*.

In addition to those resources and energy conservation programs that are currently in place, utilities continue to acquire resources and implement conservation programs to meet future demand. *Table 6 Planned Resources* captures resources utilities have identified to meet their own needs. The table shows the expected savings from utilities' conservation/energy efficiency programs and planned generating projects that are being counted on to meet the growing demand. This information is compilation of what utilities have reported in their individual integrated resources plans.

Comparison to Other Regional Plans

The Bonneville Power Administration and Northwest Power and Conservation Council regularly provide assessments of the Northwest's electric power industry needs. Readers must be cautious about making direct comparisons among these analyses. Bonneville Power makes a number of assessments for different purposes. They assess needs as part of their Resource Program and examine federal and regional loads and resources for activities such as rate cases, Columbia River Treaty review, and other internal efforts.

The Northwest Power and Conservation Council has adopted a Resource Adequacy Standard for the Northwest. This standard provides a minimum threshold that serves as an early warning of the region's ability to keep the lights on. The most recent version of this assessment indicates that "the region as a whole has more than sufficient resources to meet the minimum threshold for resource adequacy." This assessment should not be confused with the utilities' need to acquire resources.

Planning Area

The Northwest Regional Planning Area is that area defined by the Pacific Northwest Electric Power Planning and Conservation Act. It includes the states of Oregon; Washington; Idaho; Montana west of the Continental Divide; portions of Nevada, Utah, and Wyoming that lie within the Columbia River drainage basin; and any rural electric cooperative customer not in the geographic area described above, but served by BPA on the effective date of the Act.

Northwest Region Requirements and Resources

Table 1 Northwest Region Requirements and Resources – Annual Energy, shows the sum of the individual utilities' requirements and resources for each of the next 10 years. Expected firm load and exports make up the total firm regional requirements. The load component reflects expected savings from demand-side management and/or energy efficiency efforts.

Table 1: Annual Energy

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Requirements										
Load [1/]	20,439	20,723	20,956	21,153	21,355	21,573	21,804	22,019	22,245	22,483
Exports	856	820	814	707	668	643	608	558	539	533
Total	21,296	21,543	21,770	21,860	22,023	22,217	22,412	22,576	22,784	23,017
Resources										
Hydro	11,591	11,591	11,592	11,592	11,592	11,592	11,592	11,588	11,588	11,588
Small Thermal & Misc.	23	24	24	24	24	24	24	24	24	24
Combustion Turbines	3,014	3,246	3,226	3,286	3,392	3,439	3,469	3,457	3,457	3,448
Renewables-Other	208	200	201	190	190	192	233	242	242	242
Wind	1,027	1,091	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094
Cogeneration	885	619	584	607	659	675	680	654	654	650
Imports	1,017	954	876	882	860	755	706	679	683	683
Nuclear	1,030	878	1,030	878	1,030	878	1,030	878	1,030	878
Coal	3,743	3,685	3,654	3,708	3,708	3,668	3,741	3,711	3,681	3,527
Total	22,536	22,288	22,282	22,261	22,549	22,317	22,570	22,326	22,452	22,132
Surplus (Need)	1,241	745	512	401	525	100	157	(251)	(332)	(884)

1/ Loads net of conservation

Table 2 Northwest Region Requirements and Resources – 2011-12 Monthly Energy shows the monthly energy values for the 2011-2012 operating year.

Table 2: 2011-12 Monthly Energy

Average Megawatts	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July
Requirements												
Load [1/]	19,802	18,403	18,544	20,915	23,311	23,397	22,320	20,440	19,231	18,802	19,437	20,680
Exports	1,140	1,060	788	740	769	767	765	776	781	781	877	1,033
Total	20,942	19,463	19,332	21,655	24,080	24,164	23,084	21,216	20,012	19,582	20,314	21,714
Resources												
Hydro	12,602	9,878	9,915	11,425	13,230	10,000	8,806	10,429	10,442	13,705	14,553	13,878
Small Thermal & Misc.	25	25	25	25	25	25	25	25	25	12	12	25
Combustion Turbines	3,346	3,111	3,211	3,126	3,425	3,410	2,910	2,878	2,656	1,935	2,852	3,498
Renewables-Other	216	225	223	224	223	206	199	202	200	203	174	195
Wind	988	892	923	861	854	895	915	1,170	1,164	1,172	1,240	1,143
Cogeneration	1,127	1,127	1,142	1,115	1,127	787	750	693	775	608	615	757
Imports	888	790	824	1,207	1,450	1,409	1,341	1,052	871	700	780	887
Nuclear	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030
Coal	3,827	3,827	3,827	3,827	3,827	3,827	3,827	3,759	3,636	3,353	3,552	3,827
Total	24,049	20,903	21,121	22,840	25,189	21,588	19,803	21,239	20,798	22,718	24,808	25,240
Surplus (Need)	3,107	1,440	1,789	1,185	1,109	(2,576)	(3,281)	23	786	3,136	4,494	3,526

1/ Loads net of conservation

Table 3 Northwest Region Requirements and Resources – January Peak, shows the sum of the individual utilities' requirements and resources for a peak hour in January for each of the next 10 years. Hydropower generation is the sustained capability of a 50 hour peak analysis.

Table 3: January Peak

Megawatts	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Requirements										
Load [1/]	32,656	33,027	33,357	33,592	33,853	34,215	34,489	34,780	35,127	35,471
Exports	1,592	1,579	1,563	1,427	1,420	1,396	1,396	1,351	1,351	1,351
Planning Margin [2/]	3,919	4,293	6,670	5,039	5,417	5,817	6,208	6,608	7,025	7,094
Total	38,167	38,899	39,590	40,058	40,690	41,427	42,093	42,740	43,504	43,917
Resources										
Hydro (Sustained) [3/]	21,407	21,406	21,406	21,406	21,414	21,414	21,414	21,413	21,413	21,413
Small Thermal & Misc.	27	27	27	27	27	27	27	27	27	27
Combustion Turbines	4,903	5,203	5,203	5,203	5,203	4,886	4,886	4,886	4,886	4,886
Renewables-Other	246	246	246	235	235	235	285	285	284	284
Wind	168	202	202	202	202	202	202	202	202	202
Cogeneration	911	911	910	911	869	839	837	837	837	837
Imports	2,009	1,841	1,725	1,736	1,674	1,546	1,533	1,494	1,501	1,501
Nuclear	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150
Coal	4,151	4,151	4,151	4,151	4,151	4,151	4,151	4,151	4,151	3,724
Total	34,972	35,137	35,020	35,021	34,925	34,450	34,485	34,446	34,452	34,024
Surplus (Need)	(3,195)	(3,762)	(4,570)	(5,036)	(5,765)	(6,977)	(7,608)	(8,294)	(9,052)	(9,893)

1/ Loads net of conservation

2/ Planning margin accounts for forced outages, unanticipated load growth, load variation due to temperatures, and operating reserve

3/ Reflects 50-hour sustained peak capability

Northwest New and Existing Resources

The following tables present details about new and existing generating resources. ***Table 4 Recently Installed Resources*** highlights those projects that have most recently come on line and ***Table 5 Under Construction Resources*** lists those generating projects where construction has started and that utilities are counting on to meet need. All resources listed in these tables are included in the regional analysis of power needs.

Table 6 Planned Resources captures resources utilities have identified to meet their own needs. The table shows the expected savings from utilities' conservation/energy efficiency programs and planned generating projects that are being counted on to meet the growing demand. This information is compilation of what utilities have reported in their individual integrated resources plans.

Table 7 Northwest Generating Resources is a comprehensive list of generating resources that make up the electric power supply for the Pacific Northwest. These resources are utility-owned, utility contracted, and owned by independent power producers. In addition, uncommitted generation from power sources owned by independent power producers is highlighted in ***Table 8 Potentially Available Energy***.

Table 4
Recently Installed Generating Resources

Project	Date	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Energy (MWa)	Utility
Arrowrock Dam	Mar 2010	Hydro	18.0		9.2	Clatskanie PUD
Biglow Canyon - phase 3	Q4 2010	Wind	174.0	8.7	60.9	Portland General Electric
Burley Butte Wind Farm	Dec-10	Wind	21.3	1.1	6.4	Idaho Power
Camp Reed Wind Park	Dec-10	Wind	23	1.1	6.8	Idaho Power
Columbia Ridge	Dec. 2009	landfill gas	7.0	7.0	6.0	Seattle City Light
Farm Power Rexville	Jan-2010	Biogas	0.8	0.8	0.7	Puget Sound Energy
Farm Power Lynden	Oct-2010	Biogas	0.8	0.8	0.7	Puget Sound Energy
Golden Valley Wind Farm	Feb-11	Wind	12.0	0.6	3.6	Idaho Power
Milner Dam Wind Farm	Feb-11	Wind	19.9	1.0	6.0	Idaho Power
Oregon Trails Wind Farm	Jan-11	Wind	13.5	0.7	4.1	Idaho Power
Payne's Ferry Wind Park	Dec-10	Wind	21.0	1.1	6.3	Idaho Power
Pilgrim Stage Wind Farm	Jan-11	Wind	10.5	0.5	3.2	Idaho Power
Salmon Falls Wind Farm	Jan-11	Wind	22.0	1.1	6.6	Idaho Power
Thousand Springs Wind Farm	Jan-11	Wind	12.0	0.6	3.6	Idaho Power
Tuana Gulch Wind Farm	Jan-11	Wind	10.5	0.5	3.2	Idaho Power
Yahoo Creek Wind Park	Dec-10	Wind	21.0	1.1	6.3	Idaho Power
Total			386.7	26.5	133.4	

Table 5
Under Construction Resources

Project	Date	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Energy (MWa)	Utility
CHP - Biomass - PPA (*)	2010-2020	Biomass	2.0	2.0	0.1	PacifiCorp
Dorena Hydro	2012	Hydro	8.3	8.3	1.7	
Langley Gulch	Dec 2012	Natural Gas	300	330	195	Idaho Power
Lower Snake River I	Apr-2012	Wind	342		102.3	Puget Sound Energy
Noxon Rapids	2010-2012	Hydro Eff.	30.0	-	6.0	Avista
Seneca	2011	Biomass	19.0	18.0	16.0	EWEB
Thermal upgrades	2010-2019	Coal	48.0	48.0	39.3	PacifiCorp
Wanapum Turbine 5 & Generator Replacement	Feb 2011	Hydro	22.5	22.5		Grant PUD
Wanapum Turbine 7 & Generator Replacement	May 2010	Hydro	22.5	22.5		Grant PUD
Young's Creek	Nov 2011	Small Hydro	7.5	-	2.0	Snohomish PUD
Total			801.8	451.3	362.4	

Table 6
Planned Resources

Project	Schedule	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Energy (MWa)	Utility
Alpha Wind Project	2014	Wind	30	1	9	Idaho Power
Biomass	2016	Wood waste/cogen			14	Seattle City Light
Biomass	2020	Biomass			20	Puget Sound Energy
Box Canyon Upgrade	2013	Hydro	18			Pend Oreille PUD
Bravo Wind Project	2014	Wind	30	1	9	Idaho Power
CCCT	2015	Gas	441	441	406	Portland General Elec.
Charlie Wind Project	2014	Wind	28	1	8	Idaho Power
CHP	2015	Unknown	2	2	2	Portland General Elec.
CHP	2023	Steam Turbine			6	Seattle City Light
CHP - Biomass - PPA (*)	2011-2015	Biomass	1	1	0	PacifiCorp
Cold Springs	2012	Wind	20	1	6	Idaho Power
Combined Cycle CT	2012	CCCT	275	275	248	Puget Sound Energy
Combined Cycle CT	2017	CCCT	275	275	248	Puget Sound Energy
Combined Cycle CT	2020	CCCT	275	275	248	Puget Sound Energy
Cottonwood Wind Park	2012	Wind	20	1	6	Idaho Power
Cowlitz Landfill Gas	2010	Landfill Gas	1	1	1	Cowlitz PUD
Deep Creek Wind Park	2012	Wind	20	1	6	Idaho Power
Delta Wind Project	2014	Wind	29.9	1	9	Idaho Power
Demand-Side Management	2020	Energy Eff., etc.	2,542	2,542	1,713	Region
Desert Meadow Windfarm	2012	Wind	20	1	6	Idaho Power
DSG	2015	Diesel	52	52	n/a	Portland General Elec.
Echo Wind Project	2014	Wind	20	1	6	Idaho Power
Fall Creek Hydro		Hydro	10	8	2	Emerald
Geothermal	2019	Binary			18	Seattle City Light
Geothermal	2014	geothermal			10 to 90	Snohomish PUD
Gorge Tunnel II	2015	Hydro			5	Seattle City Light
Grouse Creek Wind Park	2013	Wind	21	1	6	Idaho Power
Grouse Creek Wind Park, II	2013	Wind	21	1	6	Idaho Power
Hammett Hill Windfarm	2012	Wind	20	1	6	Idaho Power
Hydro	2017	Conventional			24	Seattle City Light
Large Aero	2020	SCCT	100	100		Idaho Power
Lava Beds Wind	2011	Wind	18	1	5	Idaho Power
Lime Wind Energy	2011	Wind	3	0	1	Idaho Power
Magic Wind Park	2011	Wind	20	1	6	Idaho Power

Table 6
Planned Resources

Project	Schedule	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Energy (MWa)	Utility
Mainline Windfarm	2012	Wind	20	1	6	Idaho Power
Murphy Flat Energy	2012	Wind	20	1	6	Idaho Power
Murphy Flat Mesa	2012	Wind	20	1	6	Idaho Power
Murphy Flat Wind	2012	Wind	20	1	6	Idaho Power
Nine Mile	2013	Hydro Efficiency				
Notch Butte Wind	2011	Wind	18	1	5	Idaho Power
Priest Rapids Turbine 4 & Gen Replacement	2014	Hydro	21	21		Grant PUD
Priest Rapids Turbine 1 & Gen Replacement	2017	Hydro	21	21		Grant PUD
Priest Rapids Turbine 2 & Gen Replacement	2017	Hydro	21	21		Grant PUD
Priest Rapids Turbine 3 & Gen Replacement	2017	Hydro	21	21		Grant PUD
Priest Rapids Turbine 5 & Generator Replace	2018	Hydro	21	21	1	Grant PUD
Priest Rapids Turbine 6 & Gen Replacement	2019	Hydro	21	21	1	Grant PUD
Priest Rapids Turbine 7 & Gen Replacement	2020	Hydro	21	21		Grant PUD
Priest Rapids Turbine 8 & Gen Replacement	2020	Hydro	21	21		Grant PUD
Pumped Storage		Hydro	100			Douglas PUD
Raft River 2	2013	Geothermal	15	13	12	EWEB
Rainbow Ranch Wind	2012	Wind	20	1	6	Idaho Power
Rainbow West Wind	2012	Wind	20	1	6	Idaho Power
Rockland Wind Project	2011	Wind	80	4	24	Idaho Power
Rogerson Flats Wind Park	2012	Wind	20	1	6	Idaho Power
RPS Renewables	2015	Wind, Solar	370	18	122	Portland General Elec.
Ryegrass Windfarm	2012	Wind	20	1	6	Idaho Power
Salmon Creek Wind Park	2012	Wind	20	1	6	Idaho Power
Sawtooth Wind Project	2012	Wind	21	1.1	6	Idaho Power
SCCT or Similar	2013	Gas	200	200		Portland General Elec.
Seasonal Capacity	2015	Gas	354	354		Portland General Elec.
Seneca	Pending	Biomass	19	18	16	EWEB
Shoshone Falls Upgrade	2015	Hydro	49	2	9	Idaho Power
Single Cycle CT	2012	SCCT	160	160		Puget Sound Energy
Single Cycle CT	2017	SCCT	160	160		Puget Sound Energy

Table 6
Planned Resources

Project	Schedule	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Energy (MWa)	Utility
Single Cycle CT	2020	SCCT	160	160		Puget Sound Energy
Solar PVU (*)	2011-2015	Solar	2	2	1	PacifiCorp
S. Montana Electric G&T	2011	Coal	268	268		NorthWestern Energy
Thermal upgrades	2010 - 2017	Coal	48	48	39	NorthWestern Energy
Tidal	2018	Tidal	1 to 5	1 to 5	1 to 5	Snohomish PUD
Two Ponds Windfarm	2012	Wind	20	1	6	Idaho Power
Wanapum Turbine 2 & Generator Replacement	2011	Hydro	23	23	2	Grant PUD
Wanapum Turbine 1 & Generator Replacement	2012	Hydro	23	23		Grant PUD
Wanapum Generator 8 Replacement	2013	Hydro	23	23	2	Grant PUD
Wanapum Generator 4 Replacement	2014	Hydro	14	14	3	Grant PUD
Wanapum Generator 6 Replacement	2015	Hydro	14	14	1	Grant PUD
Wanapum Turbine 3 & Generator Replacement	2015	Hydro	23	23		Grant PUD
Wanapum Generator 9 Replacement and Transformer E upgrade	2016	Hydro	23	23	2	Grant PUD
Wanapum Generator 10 Replacement	2017	Hydro	14	14	1	Grant PUD
Western Desert Energy	2012	Wind	5	0	2	Idaho Power
Wind	2020	Wind			56	Seattle City Light
Wind Generation		Wind	200			Douglas PUD
Wind Generation	2011	Wind	100	5	30	Puget Sound Energy
Wind Generation	2012	Wind	200	10	60	Puget Sound Energy
Wind Generation	2014	Wind	100	5	30	Puget Sound Energy
Wind Generation	2016	Wind	200	10	60	Puget Sound Energy
Wind Generation	2018	Wind	200	10	60	Puget Sound Energy
Wind Generation	2020	Wind	200	10	60	Puget Sound Energy
Winter Only RFP	2010	Contract	210	210	n/a	Portland General Elec.
Total			8,269	5,985	3,715	

Table 7
Northwest Generating Resources

Project	Owner	NW Utility	Nameplate (MW)
HYDRO			**33,701 MW**
Albany	City of Albany		1
Albeni Falls	US Army Corps of Engineers	Federal System (BPA)	43
Alder	Tacoma Power		50
American Falls	Idaho Power Company		92
Anderson Ranch	USBR	Federal System - BPA	40
Arrowrock Dam	Clatskanie PUD/Idaho & Oregon irrigation	Clatskanie	18
Barber Dam	Non - Utility	Idaho Power Company	4
Bend	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	1
Big Cliff	USCE	Federal System - BPA	18
Big Creek	Flathead Irrigation Project (FIP)		0
Big Fork	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	4
Billings Generation, Inc.	Non - Utility	NorthWestern Energy, partially dedicated to region	64
Birch Creek	Non - Utility	PacifiCorp (PPL/UPLC)	3
Black Canyon	USBR	Federal System - BPA	10
Black Creek Hydro	Puget Sound Energy		4
Black Eagle	PP&L - Montana	Missouri River	17
Blind Canyon	Non - Utility	Idaho Power Company	2
Bliss	Idaho Power Company		75
Boise Diversion	USBR	Federal System - BPA	2
Bonneville	US Corps of Engineers	Federal System (BPA)	1,102
Bonneville Pacific	Non - Utility	PacifiCorp (PPL/UPLC)	6
Boulder Creek		Federal System - BPA	0
Boundary	Seattle City Light	Seattle City Light	1,040
Box Canyon	Pend Oreille County PUD	Pend Oreille County PUD	60
Broadwater Dam	Non - Utility	NorthWestern Energy	10
Brownlee	Idaho Power	Idaho Power	585
Burnside Hydro	Non - Utility	Other Publics	0
Bypass	Non - Utility	Idaho Power Company	10
C.J. Strike	Idaho Power Company		83
Cabinet Gorge	Avista Corp.	Avista Corp.	265
Calispel Creek	Pend Oreille County PUD #2	Minor-Hydro-Others	1
Carmen	Eugene Water & Electric Board		80
Cascade	Idaho Power Company		12
CDM Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	-
Cedar Draw Creek	Non - Utility	Idaho Power Company	2
Cedar Falls	Seattle City Light		20
Chandler	USBR	Federal System - BPA	12
Chelan	Chelan County PUD	Chelan County PUD	59
Chief Joseph	Corps of Engineers	Federal System(BPA)	2,457
City of Idaho Falls	City of Idaho Falls		8
Clear Lake	Idaho Power Company	Spring Plants	3
Clearwater	Non - Utility	Federal (BPA)	1
Clearwater No. 1	PacifiCorp (PPL/UPLC)	Umpqua River	15
Clearwater No. 2	PacifiCorp (PPL/UPLC)	Umpqua River	26
Cline Falls	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	1

Table 7
Northwest Generating Resources

Project	Owner	NW Utility	Nameplate (MW)
Cochrane	PP&L - Montana	Missouri River, partially dedicated to region	48
COID	Non - Utility	PacifiCorp (PPL/UPLC)	7
Condit	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	10
Copco No. 2	PacifiCorp (PPL/UPLC)	Klamath River	27
Copco No.1	PacifiCorp (PPL/UPLC)	Klamath River	20
Cougar	USCE	Federal System - BPA	25
Cove Hydro	Non - Utility	Other Publics	0
Cowlitz Falls	Lewis County PUD		70
Crystal Springs	Non - Utility	Idaho Power Company	2
Cushman 1	Tacoma Power		43
Cushman 2	Tacoma Power		81
Deep Creek	Non - Utility	Avista Corp.	1
Derr Creek	Non - Utility	Avista Corp.	0
Detroit	USCE	Federal System - BPA	100
Dexter	USCE	Federal System - BPA	15
Diablo Canyon	Seattle City Light		153
Dietrich Drop	Non - Utility	Idaho Power Company	5
Dworshak	US Corps of Engineers	Federal System (BPA)	400
Dworshak/Clearwater Hatchery	Idaho		3
Eagle Point	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	3
East Side	PacifiCorp (PPL/UPLC)	Klamath River	3
Electron	Puget Sound Energy	Snoqualmie & Minor	26
Elk Creek	Non - Utility	Idaho Power Company	2
Eltopia Branch Canal	Non - Utility	Seattle City Light/Tacoma Power	2
Elwha	USBR	Federal System - BPA	11
Falls Creek	Non - Utility	PacifiCorp (PPL/UPLC)	-
Falls River	Non - Utility	Idaho Power Company	9
Faraday	Portland General Electric Company		37
Farmers Irrigation	Non - Utility	PacifiCorp (PPL/UPLC)	3
Felt	PacifiCorp (PPL/UPLC)		1
Fish Creek	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	11
Foster	USCE	Federal System - BPA	20
Frontier Technologies	Non - Utility	PacifiCorp (PPL/UPLC)	4
Galesville Dam	Non - Utility	PacifiCorp (PPL/UPLC)	2
GEM State Hydro	City of Idaho Falls		15
Geobon 2	Non - Utility	Idaho Power Company	1
Glines Canyon	USBR	Federal System - BPA	13
Glines Hydro		Federal System - BPA	16
Gorge	Seattle City Light		207
Grand Coulee	US Bureau of Reclamation	Federal System (BPA)	6,494
Green Peter	USCE	Federal System - BPA	80
Green Springs	USBR	Federal System - USBR	16
Hauser Lake	PP&L - Montana	Missouri River, partially dedicated to region	17
Hazelton A	Non - Utility	Idaho Power Company	8
Hazelton B	Non - Utility	Idaho Power Company	7
Hells Canyon	Idaho Power	Idaho Power	392
Henry M. Jackson (Sultan)	Snohomish County PUD #1		112
Hills Creek	USCE	Federal System - BPA	30

Table 7
Northwest Generating Resources

Project	Owner	NW Utility	Nameplate (MW)
Holter	PP&L - Montana	Missouri River, partially dedicated to region	38
Hood Street Reservoir	Tacoma Power		1
Horseshoe Bend	Non - Utility	Idaho Power Company	10
Hungry Horse	US Bureau of Reclamation	Federal System (BPA)	428
Hutchinson Creek	Non - Utility	Puget Sound Energy	1
Ice Harbor	US Corps of Engineers	Federal System(BPA)	603
Iron Gate	PacifiCorp (PPL/UPLC)	Klamath River	18
Island Park (2)		Federal System - BPA	5
Jim Ford Creek	Non - Utility	Avista Corp.	2
John C. Boyle	PacifiCorp (PPL/UPLC)	Klamath River	80
John Day	US Corps of Engineers	Federal System(BPA)	2,160
John Day Creek	Non - Utility	Avista Corp.	1
Joseph Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	8
Kasel-Witherspoon	Non - Utility	Idaho Power Company	1
Kerr	PP&L - Montana	Flathead River, partially dedicated to region	171
Klamath	Non - Utility	PacifiCorp (PPL/UPLC)	92
Koma Kulshan	Non - Utility	Puget Sound Energy	14
Koyle	Non - Utility	Idaho Power Company	1
La Grande	Tacoma Power		64
Lake Oswego Corporation	Non - Utility	Portland General Electric Company	1
Lateral #10	Non - Utility	Idaho Power Company	2
Leaburg	Eugene Water & Electric Board		14
Lemolo No. 1	PacifiCorp (PPL/UPLC)	Umpqua River	29
Lemolo No. 2	PacifiCorp (PPL/UPLC)	Umpqua River	33
Libby	US Corps of Engineers	Federal System(BPA)	525
Lilliwaup Falls	Other Publics		1
Little Falls	Avista Corp.		32
Little Goose	US Corps of Engineers	Federal System(BPA)	810
Little Wood	Non - Utility	Idaho Power Company	2
Littlewood-Arkoosh	Non - Utility	Idaho Power Company	1
Long Lake	Avista Corp.		70
Lookout Point	USCE	Federal System - BPA	120
Lost Creek	USCE	Federal System - BPA	49
Lower	City of Idaho Falls		11
Lower Baker	Puget Sound Energy		85
Lower Granite	US Corps of Engineers	Federal System(BPA)	810
Lower Malad	Idaho Power Company	Spring Plants	14
Lower Monumental	US Corps of Engineers	Federal System(BPA)	810
Lower Salmon	Idaho Power Company		60
Lowline #2	Non - Utility	Idaho Power Company	3
Lowline Canal	Non - Utility	Idaho Power Company	8
Lucky Peak	IID	Seattle City Light	113
Madison	PP&L - Montana	Madison River, partially dedicated to region	7
Magic Reservoir	Non - Utility	Idaho Power Company	9
Main Canal Headworks	Non - Utility	Seattle City Light/Tacoma Power	26
Marcos Ranches	Non - Utility	Idaho Power Company	1

Table 7
Northwest Generating Resources

Project	Owner	NW Utility	Nameplate (MW)
Mayfield	Tacoma Power		162
McNary	US Corps of Engineers	Federal System(BPA)	980
McNary Fishway	Public Utility		8
Merwin	PacifiCorp	PacifiCorp	136
Meyers Falls	Avista Corp.	Avista Corp.	1
Middlefork Irrigation	Non - Utility	PacifiCorp (PPL/UPLC)	3
Mile 28	Non - Utility	Idaho Power Company	2
Mill Creek		Federal System - BPA	1
Milner	Idaho Power Company		59
Minidoka	USBR	Federal System - BPA	28
Mink Creek	Non - Utility	PacifiCorp (PPL/UPLC)	3
Mitchell Butte	Non - Utility	Idaho Power Company	2
Monroe Street	Avista Corp.		15
Morony	PP&L - Montana	Missouri River, partially dedicated to region	45
Morse Creek	City of Port Angeles		1
Mossyrock	Tacoma Power		300
Moyie Springs	City of Bonners Ferry	Minor Hydro-Others	4
Mystic Lake	PP&L - Montana	W. Rosebud River, partially dedicated to region	10
Naches	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	6
Naches Drop	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	1
Newhalem	Seattle City Light		2
Nine Mile	Avista Corp.		26
Nooksack	Puget Sound Energy	Snoqualmie & Minor	2
North Fork	Portland General Electric Company		41
North Fork Sprague	Non - Utility	PacifiCorp (PPL/UPLC)	1
North Umpqua	PacifiCorp (PPL/UPLC)	PacifiCorp (PPL/UPLC)	175
Noxon Rapids	Avista Corp.	Avista Corp.	466
Oak Grove	Portland General Electric Company		51
Opal Springs	Non - Utility	PacifiCorp (PPL/UPLC)	5
Owyhee Dam	Non - Utility	Idaho Power Company	5
Oxbow	Idaho Power	Idaho Power	190
P.E.C. Headworks	Non - Utility	Grant County PUD #2	7
Packwood	Energy Northwest		28
Palisades	USBR	Federal System - BPA	177
Pelton	Portland General Electric	Portland General Electric	110
Pelton Reregulating	Warm Springs Tribe	Portland General Electric	19
Phillips Ranch	Non - Utility	Avista Corp.	0
Pigeon Cove	Non - Utility	Idaho Power Company	2
Portland Hydro Project	Non - Utility	Portland General Electric Company	36
Post Falls	Avista Corp.		15
Potholes East Canal 66	Non - Utility	Seattle City Light/Tacoma Power	2
Powerdale	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	6
Priest Rapids	Grant County PUD		956
Prospect No. 1	PacifiCorp (PPL/UPLC)	Rogue River	4
Prospect No. 2	PacifiCorp (PPL/UPLC)	Rogue River	32
Prospect No. 3	PacifiCorp (PPL/UPLC)	Rogue River	7
Prospect No. 4	PacifiCorp (PPL/UPLC)	Rogue River	1

Table 7
Northwest Generating Resources

Project	Owner	NW Utility	Nameplate (MW)
Quincy Chute	Non - Utility	Grant County PUD #3	9
R. D. Smith	Non - Utility	Seattle City Light/Tacoma Power	6
Rainbow	PP&L - Montana	Missouri River, partially dedicated to region	36
Reeder Gulch	Other Publics		1
River Mill	Portland General Electric Company		19
Rock Creek #1	Non - Utility	Idaho Power Company	2
Rock Creek #2	Non - Utility	Idaho Power Company	2
Rock Island	Chelan County PUD	Chelan County PUD	628
Rocky Reach	Chelan County PUD		1,300
Rogue	PacifiCorp (PPL/UPLC)	PacifiCorp (PPL/UPLC)	25
Ross	Seattle City Light		360
Round Butte	Portland General Electric	Portland General Electric	247
Roza-Pump	USBR	Federal System - BPA	13
Ryan	PP&L - Montana	Missouri River, partially dedicated to region	48
Sheep Creek	Non - Utility	Avista Corp.	2
Shoshone Falls	Idaho Power Company		13
Slide Creek	PacifiCorp (PPL/UPLC)	Umpqua River	18
Smith Creek	Eugene Water & Electric Board		38
Snoqualmie Fall	Puget Sound Energy	Snoqualmie & Minor	42
Soda Creek	Other Publics		1
Soda Springs	PacifiCorp (PPL/UPLC)	Umpqua River	11
South Fork Tolt	Seattle City Light		17
Spokane Upriver	Non - Utility	Avista Corp.	16
Stauffer Dry Creek	Non - Utility	PacifiCorp (PPL/UPLC)	4
Stayton	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	1
Stone Creek	Eugene Water & Electric Board		12
Strawberry Creek	Lower Valley Power & Light Inc.	S. Idaho-Public Agy.	2
Sullivan Lake	Pend Oreille County PUD #3	Storage Only	-
Summer Falls	Non - Utility	Seattle City Light/Tacoma Power	92
Swan Falls	Idaho Power Company		25
Swift 1	PacifiCorp	Cowlitz Co PUD	204
Swift 2	Cowlitz County PUD	Cowlitz County PUD	70
T.W. Sullivan	Portland General Electric Company		15
The Dalles	US Corps of Engineers	Federal System(BPA)	1,807
The Dalles Fishway	Northern Wasco		0
Thompson Falls	PP&L - Montana	Clark Fork River, partially dedicated to region	80
Thompson Falls Add.	PP&L - Montana	Clark Fork River, partially dedicated to region	-
Thousand Springs	Idaho Power Company	Spring Plants	9
Toketee	PacifiCorp (PPL/UPLC)	Umpqua River	43
Trail Bridge	Eugene Water & Electric Board		10
Tunnel #1	Non - Utility	Idaho Power Company	7
Twin Falls	Idaho Power Company		52
Twin Falls	Non - Utility	Puget Sound Energy	20
Upper	City of Idaho Falls		8
Upper Baker	Puget Sound Energy		106
Upper Falls	Avista Corp.		10

Table 7
Northwest Generating Resources

Project	Owner	NW Utility	Nameplate (MW)
Upper Malad	Idaho Power Company	Spring Plants	8
Upper Salmon 1 & 2	Idaho Power Company		18
Upper Salmon 3 & 4	Idaho Power Company		17
Walla Walla	Non - Utility	PacifiCorp (PPL/UPLC)	2
Wallowa Falls	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	1
Walterville	Eugene Water & Electric Board		8
Wanapum	Grant County PUD		934
Weeks Falls	Non - Utility	Puget Sound Energy	5
Wells	Douglas County PUD	Avista Corp.	774
West Side	PacifiCorp (PPL/UPLC)	Klamath River	1
Wilson Lake	Non - Utility	Idaho Power Company	8
Wynoochee Dam	Tacoma Power		13
Yakima-Trenton	Non - Utility	PacifiCorp (PPL/UPLC)	3
Yale	PacifiCorp	PacifiCorp	134
Yelm	City of Centralia		10
Young's Creek	Snohomish PUD	Snohomish PUD	8
COAL			**6,981 MW**
Boardman	Portland General Electric	Portland General Electric	642
Centralia #1	TransAlta		670
Centralia #2	TransAlta		670
Colstrip #1	PP&L Montana, LLC	PP&L Montana, LLC	330
Colstrip #2	PP&L Montana, LLC	PP&L Montana, LLC	330
Colstrip #3	PP&L Montana, LLC	PP&L Montana, LLC	740
Colstrip #4	NorthWestern Energy	NorthWestern Energy	805
Corette	PP&L Montana, LLC	PPL Montana, LLC	163
Jim Bridger #1	PacifiCorp	PacifiCorp	530
Jim Bridger #2	PacifiCorp	PacifiCorp	530
Jim Bridger #3	PacifiCorp	PacifiCorp	520
Jim Bridger #4	PacifiCorp	PacifiCorp	530
Valmy #1	Idaho Power	Idaho Power	254
Valmy #2	Idaho Power	Idaho Power	267
NUCLEAR			**1,230 MW**
Columbia Generating Station	Energy Northwest	Federal System (BPA)	1,230

Table 7
Northwest Generating Resources

Project	Owner	NW Utility	Nameplate (MW)
COMBUSTION TURBINES			**6,144 MW**
Alden Bailey	Clatskanie PUD	Clatskanie PUD	11
Beaver	Portland General Electric	Portland General Electric	586
Beaver 8	Portland General Electric	Portland General Electric	25
Bennett Mountain	Idaho Power Company	Idaho Power Company	162
Big Hanaford	TransAlta		248
Chehalis Generating Facility	PacifiCorp	PacifiCorp	517
Coyote Springs II	Avista Corp	Avista Corp	287
Danskin	Idaho Power Company	Idaho Power Company	90
Danskin 1	Idaho Power Company	Idaho Power Company	170
Encogen	Puget Sound Energy	Puget Sound Energy	159
Finley CT			29
Frederickson Generation Station	EPCOR Power L.P./PSE	Benton PUD	258
Fredonia 1 & 2	Puget Sound Energy	Puget Sound Energy	208
Fredonia 3 & 4	Puget Sound Energy	Puget Sound Energy	108
Fredrickson 1 & 2	Puget Sound Energy	Puget Sound Energy	149
Goldendale	Puget Sound Energy	Puget Sound Energy	261
Hermiston Power Project	Hermiston Power Partners (Calpine)		689
Kettle Falls CT	Avista Corp	Avista Corp	7
Klamath Peaking Units 1-4	Iberdrola Renewables		100
Lancaster Power Project	Avista Corp	Avista Corp	270
Langley Gulch	Idaho Power Company	Idaho Power Company	300
Mint Farm Energy Center	Wayzata Investment Partners	Puget Sound Energy	305
Northeast 1 & 2	Avista Corp	Avista Corp	62
Pasco Generation Station	Franklin PUD/Grays Harbor PUD	Franklin County PUD	44
Port Westward	Portland General Electric	Portland General Electric	415
Rathdrum 1 & 2	Avista Corp	Avista Corp	167
River Road Generating Project	Clark Public Utilities	Clark Public Utilities	248
Sumas Energy	Puget Sound Energy	Puget Sound Energy	121
Whitehorn #2 & 3	Puget Sound Energy	Puget Sound Energy	149
COGENERATION			**2,025 MW**
Afton Energy (Wood)	Non-Utility	Idaho Power Company	8
Billings Cogeneration (Coke)	Billings Generation, Inc.	NorthWestern Energy	64
Boise Cascade (Wood)	PacifiCorp	PacifiCorp	9
Coyote Springs I (Natural gas)	Portland General Electric	Portland General Electric	266
DAW	PacifiCorp	PacifiCorp	-
Glenns Ferry (Natural Gas)	Idaho Power	Idaho Power	10
Grays Harbor Paper (Wood)	Grays Harbor PUD	Grays Harbor PUD	16
Hermiston (Natural gas)	PacifiCorp	PacifiCorp	469
James River - Camas	PacifiCorp	PacifiCorp	52
Kimberly Clark Cogeneration	Snohomish County PUD	Snohomish County PUD	52
Klamath Cogen Plant (Natural gas)	Iberdrola Renewables		502
March Point 1 (Natural gas)	March Point Cogen	Puget Sound Energy	80
March Point 2 (Natural gas)	March Point Cogen	Puget Sound Energy	60

Table 7
Northwest Generating Resources

Project	Owner	NW Utility	Nameplate (MW)
PERC (Methane)	Pyallup Energy Recovery Company		3
Rough & Ready Lumber (Wood)	Rough & Ready	PacifiCorp	1
Rupert (Natural gas)	Idaho Power	Idaho Power	10
Scott Cogeneration	Non-Utility	Snohomish County PUD	43
Simplot	Idaho Power	Idaho Power	12
Tasco 1	Idaho Power	Idaho Power	2
Tasco 2	Idaho Power	Idaho Power	3
Tenaska (Natural gas)	Tenaska	Puget Sound Energy	245
Thompson River (Coal)	NorthWestern Energy	NorthWestern Energy	12
Warm Springs Forest Products (Wood)	PacifiCorp	PacifiCorp	8
Wauna (James River) (Biomass)	Western Generation Agency	Eugene Water & Electric Board	36
Weyco Energy Center (Wood)	Eugene Water & Electric Board	Eugene Water & Electric Board	64
Renewables-Other			**401 MW**
Ashland Solar Project		Federal (BPA)	-
Bellevue Solar	Bellevue Solar, LLC	Portland General Electric	1
Bettencourt B6 (Biomass)	Cargill	Idaho Power Company	2
Bettencourt Dry Creek (Biomass)	Cargill	Idaho Power Company	2
Big Sky West Dairy (Biomass)	Dean Foods Co. & AgPower Partners LLC	Idaho Power Company	2
Biomass One (Wood)	PacifiCorp	PacifiCorp	25
Coffin Butte Resource Project (Landfill Gas)	Power Resources Cooperative	PNGC Power	6
Cogen Company (Wood)		Other Publics (BPA)	8
Co-Gen II - DR Johnson Lumber	PacifiCorp	PacifiCorp	8
Columbia Ridge Landfill Gas	Waste Management	Seattle City Light	6
Convanta Marion (Municipal solid waste)	Portland General Electric	Portland General Electric	16
Dry Creek Landfill	Dry Creek Landfill Inc.	PacifiCorp	3
Flathead County Landfill	Flathead Electric Cooperative, Inc.	Flathead Electric Cooperative	2
Four Mile Hill Geothermal	Calpine	Federal (BPA)	50
Hidden Hollow Landfill	G2 Energy	Idaho Power Company	3
H. W. Hill Landfill Gas Power Plant	Allied Waste Companies		11
Kettle Falls (Wood)	Avista Corp.	Avista Corp	51
Lynden (Biogass)	Farm Power	Puget Sound Energy	1
Mead (Methane Energy Agricultural Development)		Other Publics (BPA)	2
Olympic View 1&2 (Landfill gas)	Mason County PUD 3	Utility 1	5
Pine Products (Biomass)	PacifiCorp	PacifiCorp	6
Pocatello Wastewater	Idaho Power Company	Idaho Power Company	0
Potlatch (Wood waste)	Avista Corp.	Avista Corp	114
Qualco (Methane)	Owner Utility	Puget Sound Energy	0
Raft River 1 (Geothermal)	US Geothermal	Idaho Power Company	16
Rexville (Biogas)	Farm Power	Puget Sound Energy	1
Seneca (Wood waste)	Seneca Sustainable Energy, LLc	EWEB	19
Short Mountain (Landfill Gas)		Emerald PUD	3
Spokane MSW	City of Spokane	Puget Sound Energy	23

Table 7
Northwest Generating Resources

Project	Owner	NW Utility	Nameplate (MW)
Stimson Lumber (Wood waste)	Avista Corp.	Avista Corp.	7
Tamarack (Wood)	Idaho Power Company	Idaho Power Company	5
Treasure Valley (Methane)	Idaho Power Company	Idaho Power Company	3
VanderHaak Dairy (Biogas)	VanderHaak Dairy, LLC.	Puget Sound Energy	0
White Bluffs Solar Station	Energy Northwest	Energy Northwest	-
Wild Horse Solar Project	Puget Sound Energy		1
Yamhill Solar	Yamhill solar, LLC	Portland General Electric	1
WIND			**4,079 MW**
Bennet Creek	Bennet Creek	Idaho Power Company	21
Big Horn	Iberdrola Renewables		199
Big Top	Big Top LLC (QF)	PacifiCorp	2
Biglow Canyon - 1	Portland General Electric	Portland General Electric	125
Biglow Canyon - 2	Portland General Electric	Portland General Electric	150
Biglow Canyon - 3	Portland General Electric	Portland General Electric	174
Burley Butte Wind	Burley Butte Wind Park	Idaho Power Company	20
Buttes Creek Power	Buttes Creek Power LLC	PacifiCorp	5
Camp Reed Wind	Camp Reed Wind Park	Idaho Power Company	-
Cassia Wind Farm	Cassia Wind Farm	Idaho Power Company	11
Cassia Gulch	John Deere	Idaho Power Company	21
Combine Hills I	Eurus Energy of America	PacifiCorp	41
Combine Hills II	Eurus Energy of America	Clark	63
Condon Wind	Goldman Sachs (75%), SeaWest NW 25%	Federal - BPA	25
Elkhorn Wind	Telocaset Wind Power Partners	Idaho Power Company	101
Foote Creek Rim 1	PacifiCorp & EWEB		41
Foote Creek Rim 2	PPM Energy	Federal	2
Foote Creek Rim 4	PPM Energy	Federal	17
Fossil Gulch Wind	Idaho Power Company	Idaho Power Company	11
Four Corners Windfarm	Four Corners Windfarm LLC	PacifiCorp	10
Four Mile Canyon Windfarm	Four Mile Canyon Windfarm LLC	PacifiCorp	10
Golden Valley Wind	Golden Valley Wind Park	Idaho Power Company	12
Goodnoe Hills	PacifiCorp	PacifiCorp	94
Harvest Wind	Owner Utility		99
Hay Canyon Wind	Hay Canyon Wind Project LLC (Iberdrola)	Snohomish County PUD	101
Hopkins Ridge	Puget Sound Energy	Puget Sound Energy	157
Horseshoe Bend	Horseshoe Bend Wind Park LLC	Idaho Power Company	9
Hot Springs Wind	Hot Springs Wind	Idaho Power Company	21
Judith Gap	Invenergy Wind, LLC	NorthWestern	135
Klondike I	PPM Energy	Federal (BPA)	24
Klondike II	PPM Energy	Portland General Electric	75
Klondike III	PPM Energy		221
Lava Beds Wind	Lava Beds Wind Park	Idaho Power Company	18
Leaning Juniper 1	PPM Energy	PacifiCorp	101
Lewandowski Farms	Idaho Power	Idaho Power	0
Lower Snake River 1	Puget Sound Energy	Puget Sound Energy	342
Magic Wind Park	Magic Wind	Idaho Power Company	20
Marengo	Renewable Energy America	PacifiCorp	140
Marengo II	PacifiCorp	PacifiCorp	70

Table 7
Northwest Generating Resources

Project	Owner	NW Utility	Nameplate (MW)
Milner Dam Wind	Milner Dam Wind Park	Idaho Power Company	20
Nine Canyon	Energy Northwest		96
Notch Butte Wind	Notch Butte Wind Park	Idaho Power Company	18
Oregon Trail Windfarm	Oregon Trail Windfarm LLC	PacifiCorp	10
Oregon Trail Wind Park	Oregon Trail Wind Park	Idaho Power Company	18
Pa Tu Wind Farm	Pa Tu Wind Farm, LLC	Portland General Electric	9
Pacific Canyon Windfarm	Pacific Canyon Windfarm LLC	PacifiCorp	8
Paynes Ferry Wind	Payne's Ferry Wind Park	Idaho Power Company	21
Pilgrim Stage Station Wind	Pilgrim Stage Station Wind Park	Idaho Power Company	11
Rockland Wind	Ridgeline	Idaho Power Company	80
Salmon Falls Wind	Salmon Falls Wind Park	Idaho Power Company	21
Sand Ranch Windfarm	Sand Ranch Windfarm LLC	PacifiCorp	10
Sawtooth Wind	Idaho Winds	Idaho Power Company	21
Stateline Wind	PPM Energy	Federal (BPA)	300
Thousand Springs Wind	Thousand Springs Wind Park	Idaho Power Company	12
Tuana Gulch Wind	Tuana Gulch Wind Park	Idaho Power Company	11
Tuana Springs Expansion Wind	Cassia Gulch Wind Park	Idaho Power Company	36
Vansycle Ridge	ESI Vansycle Partners	Portland General Electric	25
Wagon Trail Windfarm	Wagon Trail Windfarm LLC	PacifiCorp	3
Ward Butte Windfarm	Ward Butte Windfarm LLC	PacifiCorp	7
Wheat Field Wind Project	Wheat Field Wind LLC (Horizon Energy/EDP)	Snohomish PUD	97
White Creek	White Creek Wind I (investment firm)		205
Wild Horse	Puget Sound Energy	Puget Sound Energy	273
Wolverine Creek	Invenergy	PacifiCorp	65
Yahoo Creek Wind	Yahoo Creek Wind Park	Idaho Power Company	21
SMALL THERMAL AND MISCELLANEOUS			**27 MW**
Boulder Park	Avista Corp		25
Crystal Mountain	Puget Sound Energy		3

Table 8
Potentially Available Energy

Project	In-Service	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Percent Available	Potential Energy (MWa)
Big Hanaford	2002	CCCT	248	248	100%	224
Centralia 1	1971	Coal		670	100%	596
Centralia 2	1971	Coal		670	100%	596
Hermiston Power Project	2002	CCCT	630	630	100%	568
Klamath Cogen Project	2001	Cogen	506	506	100%	455
Klamath Peaking Units 1-4				100	100%	14
Satsop	2008	CCCT	650	650	100%	553
Star Point	2010	Wind	99	-	51%	15
Total				3,474		3,021

Note: These are projects located in the Northwest and owned by Independent Power Producers.

This generation is not known to be committed by firm contract to load serving utilities within the region and thus, is not considered in estimating the regional load/resource balance.

The percent available is that share of the project that is potentially available for purchase.

Report Procedures

This report provides an estimate of regional 'need to acquire' using annual energy (August through July), seasonal/monthly energy and winter (January) peak-hour metrics. These three metrics provide a multi-dimensional look at the Northwest's need for power and underscores the growing complexity of the power system.

This regional report reflects the summation of individual utilities forecasts. The utilities, in most cases, prepared their own projections. Bonneville Power Administration provides much of the information for its smaller customers. Load and resource information is included for the utilities listed In Table 9 at the end of this section. Procedures employed in preparing the regional load-resource comparisons of winter peak and energy are described here. And a list of definitions is included at the end of this section.

Load Estimate

Regional loads are the sum of loads estimated by the Northwest utilities and BPA for its federal agency customers, certain non-generating public utilities, and direct service industrial customers (DSI). Estimates are made for system peak and system energy loads. Load projections reflect network transmission and distribution losses, reductions in demand due to rising electricity prices, and the effects of appliance efficiency standards and energy building codes. Savings from demand-side management resources including energy efficiency and demand response are also reflected in the regional load forecasts.

Energy Loads

A ten-year forecast of monthly firm energy loads are provided. This forecast reflects normal weather conditions.

Peak Loads

Northwest regional peak loads are provided for each month of the ten year forecast period. The tabulated loads for winter peak are the highest estimated 60-minute clock-hour average demand for that month, assuming normal weather conditions. The regional firm peak load is the sum of the individual utility peak loads, and does not account for the fact that each utility may experience its peak load at a different hour than other Northwest utilities. Hence the regional peak load is considered non-coincident. The federal system (BPA) firm peak load is adjusted to reflect a federal coincident peak among its many utility customers.

Federal System Transmission Losses

Federal System (BPA) transmission losses for both firm loads and contractual obligations are embedded in federal load. These losses represent the difference between energy generated by the federal system (or delivered to a system interchange point) and the amount of energy sold to customers. System transmission losses are calculated by BPA for firm loads utilizing the federal transmission system.

Planning Margin

In the derivation of regional requirements, a planning margin has been added to the load. This regional planning margin is equal to 12 percent of the total peak load for the first year of the planning horizon, increasing 1 percent per year to 20 percent and remaining at 20 percent thereafter. They are intended to cover, for planning purposes, all elements of uncertainty not specifically accounted for in determining loads and resources. These include forced-outage reserves, unanticipated load growth, temperature variations, hydro maintenance and project construction delays. An increasing reserve requirement reflects greater uncertainty about load levels and of achieving construction schedules in the future.

Demand-Side Management

The demand-side management estimates include expected future energy savings from existing and new programs in the areas of energy efficiency, distribution efficiency, market transformation, demand response, fuel conversion, fuel switching, energy storage and other efforts that reduce the demand for electricity.

These estimates reflect first year savings and in subsequent years the cumulative savings for the life of the measure. They reflect savings from programs that utilities fund directly, or through a third-party, such as Northwest Energy Efficiency Alliance and Energy Trust of Oregon.

Generating Resources

This report considers existing resources, resources under construction and future resources. Only the existing resources and resources under construction are reflected in the regional tabulations. Only generating resources (or shares) that are committed to meeting Northwest loads are included in the regional analysis.

Hydro

Hydro resource capabilities are estimated from a regional analysis using a computer model that simulates reservoir operation of past hydrologic conditions. The historical stream flow record used covers the 70-year period from August 1928 through July 1998.

Energy

The firm energy capability of hydro plants is the amount of energy produced during the operating year with the lowest 12-month average generation. The lowest generation occurred in 1936-37 given today's river operating criteria. The firm energy capability is the average of 12 months, August 1936 to July 1937. Generation for projects that are influenced by downstream reservoirs reflects the reduction due to encroachment.

Peak Capability

For this report the peak capability of the hydro system is estimated as the maximum generation available to meet peak demand during heavy load hours for a sustained period of time. This heavy load period is defined as 50 hours per week, 10 hours a day, Monday through Friday.

The sustained peaking capability of the hydro system maximizes available energy and capacity associated with the monthly distribution of streamflow. The sustained peaking capability is the hydro system's ability to continuously produce power for a specific time period by utilizing the limited water supply while meeting power and non-power requirements, scheduled maintenance, and operating reserves (including wind reserves).

A computer model is used to estimate the operational hydro peaking capability of individual projects, based on their monthly average energy. This model shapes the monthly hydro energy to maximize generation in the heavy load hours and is not an indication of the hydro system's ability to react to system distress.

Columbia River Treaty

In 1964 the United States signed a treaty with Canada that outlined the operation of U.S. and Canadian storage projects to increase the total combined generation. Hydropower generation in this analysis reflects the firm power generated by coordinating operation of three Canadian reservoirs, Duncan, Arrow and Mica with the Libby reservoir and other power facilities in the region. Canada's share of the coordinated operation benefits is called Canadian Entitlement. BPA and each of the non-Federal mid-Columbia projects owners are obligated to return their share of the downstream power benefits owed to Canada. The delivery of the Entitlement is reflected in this analysis.

Downstream Fish Migration

Another requirement incorporated in the computer simulations is modified river operations to provide for the downstream migration of anadromous fish. These modifications include adhering to specific flow limits at some projects, spilling water at several projects, and augmenting flows in the spring and summer on the Columbia, Snake and Kootenai rivers. Specific requirements that are a part of operation for fish include: observing flow limits as measured at Columbia Falls (downstream of Hungry Horse Dam); and operating the Brownlee project as prescribed by its owner, Idaho Power.

During the spring and summer, an amount of water is deliberately spilled at all mid-Columbia projects based on negotiations and/or Federal Energy Regulatory Commission (FERC) orders. The amount of spill used for fish varies by project and generally occurs the second half of April through August.

Similarly, fish passage spill programs during the spring and summer have been reflected for the Lower Snake River and Lower Columbia River dams operated by the Corps of Engineers. Scheduled spill for fish is in accordance with the Corps of Engineers data submitted for project operations. Augmented flows are simulated according to the National Marine Fisheries Service (NMFS) Biological Opinion for river operations. Augmented flows for salmon occur during the spring and summer months on both the Snake and Columbia rivers. The amount of water provided for flow augmentation varies depending on the water supply forecast for each year. Since low water conditions warrant the maximum amount of augmentation that is what is assumed for determining the firm power generation.

Flow augmentation for sturgeon on the Kootenai River and for steelhead on the mid-Columbia occurs according to the US Fish and Wildlife and NMFS Biological Opinions and is the same every year regardless of the water supply.

Hydro Maintenance

Estimates of energy losses due to scheduled hydro maintenance are reflected in the annual average hydro capability. This maintenance is based on the mean (average) of the maintenance schedules submitted to the Northwest Power Pool. These schedules are published annually in the Pacific Northwest Coordination Agreement Data and Pool Operating Program.

Thermal and Renewable Resources

Thermal resources are reported in a variety of categories. Coal, nuclear, cogeneration and combustion turbine projects are each totaled and reported as individual categories. The Small Thermal and Miscellaneous category for the most part is a list of diesel generators that would be used in emergency situations.

The category of Other Renewables includes energy from biomass, geothermal, solar, municipal solid waste projects and other small projects. Wind projects are reported in their own category.

All existing generating plants, regardless of size, are included in amounts submitted by each utility that owns or is purchasing the generation. The energy capabilities of plants are computed on annual planning equivalent availability factors submitted by the sponsors of the projects. The factors include allowance for scheduled maintenance (including refueling), forced outages and other expected operating constraints. Some small fossil-fuel plants and combustion turbines are included as peaking resources and their reported energy capabilities are only the amounts necessary for peaking operations. Additional energy potentially may be available from these peaking resources for emergencies but is not included in the regional load/resource balance.

The report also shows in Table 8, the energy potentially available from projects owned by independent power producers that are not committed to meet regional loads. This additional generation is not included in the regional load/resource balance.

New and Future Resources

The latest activity with new and future resource developments, including expected energy efficiencies are tabulated in this report. These resources are reported as *Recently Installed, Under Construction* and *Planned Resources* to reflect the different stages of development.

Recently Installed

These resources have been acquired in the past year and are serving utility loads as of December 31, 2010. They are reflected as part of the regional load-resource analysis.

Under Construction

Resources *Under Construction* include those projects not complete as of December 31, 2010, but currently are being built. In this report, resources being built by utilities or resources where their output is firmly committed to utilities are included in the regional load-resource analysis. Uncommitted resources being developed by non-utility entities are reported but not included in the regional analysis.

Planned Resources

Planned Resources include future savings from demand-side management programs, specific resources and/or blocks of resources identified in utilities' most current integrated resource plans. Projects specifically named in *Planned Resources* are not yet under construction as of December 31, 2010, but a firm commitment to construct or acquire the power has been made and they are at some stage in the site certification process. For example, a utility or developer has obtained all licenses for construction or acquisition or is in the process of receiving their site certificate from the state. These resources are <u>not</u> part of the regional load-resource analysis.

Contracts

Imports and exports include firm arrangements for interchanges with systems outside the region. These arrangements comprise firm contracts with utilities to the East, the Pacific Southwest and Canada. Contracts to and from these areas are amounts delivered at the area border and include any transmission losses associated with deliveries.

"Intra-company transfers" apply to utilities whose service territories extend beyond the regional boundary. These transfers pertain to utilities with loads inside the region that will be served by resources that are outside the region. Transfers of other utilities do not consider any transmission bottlenecks that may occur in the future.

Table 9: Utilities included in the Northwest Regional Forecast

Albion, City of
Alder Mutual
Ashland, City of
Asotin County PUD #1
Avista Corp.
Bandon, City of
Benton County PUD
Benton REA
Big Bend Electric Co-op
Blachly-Lane Electric
Blaine, City of
Bonners Ferry, City of
Bonneville Power Administration
Burley, City of
Canby, City of
Cascade Locks, City of
Central Electric
Central Lincoln PUD
Centralia, City of
Chelan County PUD
Cheney, City of
Chewelah, City of
City of Port Angeles
Clallam County PUD #1
Clark Public Utilities
Clatskanie PUD
Clearwater Power Co.
Columbia Basin Elec. Co-op
Columbia Power Co-op
Columbia REA
Columbia River PUD
Consolidated Irrigation Dist. #19
Consumers Power Inc.
Coos-Curry Electric
Coulee Dam, City of
Cowlitz County PUD
Declo, City of
Douglas County PUD
Douglas Electric
Drain, City of
East End Mutual Electric
Eatonville, City of
Ellensburg, City of
Elmhurst Mutual P & L
Emerald County PUD
Energy Northwest
Eugene Water & Electric Bd
Fall River Rural Electric.
Farmers Electric Co-op
Ferry County PUD #1
Fircrest, Town of
Flathead Electric Co-op
Forest Grove, City of
Franklin County PUD
Glacier Electric
Grant County PUD
Grays Harbor PUD
Harney Electric
Hermiston, City of
Heyburn, City of
Hood River Electric
Idaho County L & P
Idaho Falls Power
Idaho Power Company
Inland Power & Light
Kittitas County PUD #1
Klickitat County PUD #1
Kootenai Electric Co-op
Lakeview L & P (WA)
Lane Electric
Lewis County PUD #1
Lincoln Electric Co-op (MT)
Lost River Electric
Lower Valley Energy
Mason County PUD #1
Mason County PUD #3
McCleary, City of
McMinnville, City of
Midstate Electric Co-op
Milton, Town of
Milton-Freewater, City of
Minidoka, City of
Missoula Electric Co-op
Modern Electric Co-op
Monmouth, City of
Nespelem Valley Elec.Co-op
Northern Lights Inc.
Northern Wasco Co. PUD
NorthWestern Energy
Ohop Mutual Light Company
Okanogan Co. Electric
Okanogan County PUD #1
Orcas Power & Light
Oregon Trail Co-op
Pacific County PUD #2
Pacific Power
Parkland Light & Water
Pend Oreille County PUD
Peninsula Light Company
Plummer, City of
PNGC Power
Port of Seattle – SEATAC
Portland General Electric
Puget Sound Energy
Raft River Rural Electric
Ravalli Co. Electric Co-op
Richland, City of
Riverside Electric Co-op
Rocky Mountain Power
Rupert, City of
Salem Electric Co-op
Salmon River Electric
Seattle City Light
Skamania County PUD #1
Snohomish County PUD
Soda Springs, City of
Southside Electric Lines
Springfield Utility Board
Steilacoom, Town of
Sumas, Town of
Surprise Valley Elec. Co-op
Tacoma Power
Tanner Electric Co-op
Tillamook PUD #1
Troy, City of
Umatilla Electric Co-op
Umpqua Indian Utility Co-op
United Electric Co-op
U.S. Corps of Engineers
U.S. Bureau of Reclamation
Vera Irrigation District
Vigilante Electric Co-op
Wahkiakum County PUD #1
Wasco Electric Co-op
Weiser, City of
Wells Rural Electric Co-op
West Oregon Electric Co-op
Whatcom County PUD #1
Yakama Power

Definitions

Annual Energy

Energy value in megawatts that represents the average of monthly values in a given year.

Average Megawatts

(MWa) Unit of energy for either load or generation that is the ratio of energy (in megawatt-hours) expected to be consumed or generated during a period of time to the number of hours in the period.

Biomass

Any organic matter which is available on a renewable basis, including forest residues, agricultural crops and waste, wood and wood wastes, animal wastes, livestock operation residue, aquatic plants, and municipal wastes.

Canadian Entitlement

Canada is entitled to one-half the downstream power benefits resulting from Canadian storage as defined by the Columbia River Treaty. Canadian entitlement returns above contractually stipulated amounts are estimated by Bonneville Power Administration and in no way constitute endorsement or agreement by other utilities.

Coal Resources

This category of resources includes the region's coal-fired plants.

Cogeneration

Cogeneration is the technology of producing electric energy and other forms of useful energy (thermal or mechanical) for industrial and commercial heating or cooling purposes through sequential use of an energy source.

Combustion Turbines

These are plants with combined-cycle or simple-cycle gas-fired combustion turbine technology for producing electricity.

Conservation

Any reduction in electrical power consumption as a result of increases in the efficiency of energy use, production, or distribution. (Synonymous with energy efficiency in the *Forecast*)

Critical Period

That portion of the historical streamflow record during which recorded streamflows, combined with all available reservoir storage, produced the least amount of hydroelectric energy. For this report, the critical period is the 8-month period starting September 1936 and ending April 1937.

Demand Response

Control of load through customer/utility agreements that result in a temporary change in consumers' use of electricity in times of system stress.

Demand-side Management

Peak and energy savings from conservation/energy efficiency measures and demand response that serve to reduce demand.

Direct Service Industries (DSI)

A group of industrial firms which purchase electric power directly from Bonneville Power Administration (BPA).

Dispatchable Resource

A term referring to controllable generating resources that are able to be dispatched for a specific time and need.

Distribution Efficiency

Infrastructure upgrades to utilities' transmission and distribution systems that save energy by minimizing losses.

Encroachment

A term used to describe a situation where the operation of a hydroelectric project causes an increase in the level of the tailwater of the project that is directly upstream.

Energy Efficiency

Any reduction in electrical power consumption as a result of increases in the efficiency of energy use, production, or distribution. (Synonymous with Conservation in the *Forecast*)

Energy Storage

Technologies for storing energy in a form that is convenient for use at a later time when a specific energy demand is greater.

Exports

Firm interchange arrangements where power flows from regional utilities to utilities outside the region.

Federal System (BPA)

The federal system is a combination of BPA's customer loads and contractual obligations, and resources from which BPA acquires the power it sells. The resources include plants operated by the U.S. Army Corps of Engineers (COE), U.S. Bureau of Reclamation (USBR), and hydroelectric projects owned by the city of Idaho Falls and Energy Northwest. BPA markets the thermal generation from Columbia Generating Station, operated by Energy Northwest.

Federal Columbia River Power System (FCRPS)

Thirty federal hydroelectric projects constructed and operated by the Corps of Engineers and the Bureau of Reclamation, and the Bonneville Power Administration transmission facilities.

Firm Energy

Electric energy intended to have assured availability to customers over a defined period.

Firm Energy Load Carrying Capability (FELCC)

The amount of load the hydro system can serve on a firm basis, given a recurrence of critical period streamflows.

Firm Load

The sum of the estimated firm loads of private utility and public agency systems, federal agencies and BPA industrial customers.

Firm Losses

Losses incurred on the transmission system of the Northwest region.

Fuel Conversion

Consumers' efforts to make a permanent change from electricity to natural-gas or other fuel source to meet a specific energy need, such as heating.

Fuel Switching

Consumers' efforts to make a temporary change from electricity to another fuel source to meet a specific energy need.

Historical Streamflow Record

A database of unregulated streamflows for 70 years (July 1928 to June 1998). Data is modified to take into account adjustments due to irrigation depletions, evaporations, etc. for the particular operating year being studied.

Hydro Maintenance

The amount of energy lost due to the estimated maintenance required during the critical period. Peak hydro maintenance is included in the peak reserve calculations.

Hydro Regulation

A study that utilizes a computer model to simulate the operation of the Pacific Northwest hydroelectric power system using the historical streamflows, monthly loads, thermal and other non-hydro resources, and other hydroelectric plant data for each project.

Imports

Firm interchange arrangements where power flows to regional utilities from utilities outside the region.

Independent Power Producers

Non-utility entities who own generation that may be partially contracted to meet regional load.

Intra-Company Transfer

An interchange category that applies to utilities whose service territories extend beyond the regional boundary.

Investor-Owned Utility (IOU)

A privately owned utility organized under State law as a corporation to provide electric power service and earn a profit for its stockholders.

Market Transformation

A strategic process of intervening in a market to accelerate the adoption of all cost-effective energy efficiency.

Nameplate Capacity

A measure of the approximate generating capability of a project or unit as designated by the manufacturer.

Non-Utility Generation

Facilities that generate power whose percent of ownership by a sponsoring utility is 50 percent or less. These include PURPA-qualified facilities (QFs) or non-qualified facilities of independent power producers (IPPs).

Nuclear Resources

The nuclear plant, the Columbia Generating Station is included in this category.

Operating Year

Twelve-month period beginning on August 1 of any year and ending on July 31 of the following year. For example, operating year 2012 is August 1, 2011 through July 31, 2012.

Other Publics (BPA)

Refers to the smaller, non-generating Public Utility Customers whose load requirements are estimated and served by Bonneville Power Administration.

Peak Load

The maximum demand for power during a specified period of time.

Planned Resources

Planned resources include those projects, measures, and transactions that utilities have made some commitment to acquire and are in some stage of state site certification process; however, either not all licenses have been obtained, no commercial operation data has been specified, or the specifics of the transaction have not been finalized.

Planning Margin

A component of regional requirements that is added to the load forecast to account for uncertainties.

Private Utilities

Same as investor-owned utilities.

Publicly-Owned Utilities

One of several types of not-for-profit utilities created by a group of voters and can be a municipal utility, a public utility district, or an electric cooperative.

Renewables - Other Resources

A category of resources that includes projects that produce power from such fuel sources as solar, geothermal, and biomass (includes wood, municipal solid-waste facilities).

Requirements

For each year, a utility's projected loads, exports, and contracts out.

Reservoir Plant

A hydroelectric plant on a reservoir with storage capacity, installed machine capacity, head characteristics, and flow levels, which will permit seasonal drafts.

Resources Under Construction

These projects are under construction at the time of publication and are included in the resources for calculating the regional load/resource balance.

Small Thermal Resources

This category of resources includes small thermal generating resources such as diesel generators used to meet peak and/or emergency loads.

Sustained Hydro Capability

The capability of the hydro system to sustained a maximum level of generation for a defined period of time. In this report the sustained capability is estimated for a 50 hour peak (five 10-hour weekdays).

Thermal Resources

Resources that burn coal, natural gas, oil, diesel or use nuclear fission to create heat which is converted into electricity.

Wind Resources

This category of resources includes the region’s wind powered projects.