Northwest Regional Forecast

of Power Loads and Resources

August 2008 – July 2018

PNUCC

April 2008

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PNUCC Website
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2008 Northwest Regional Forecast

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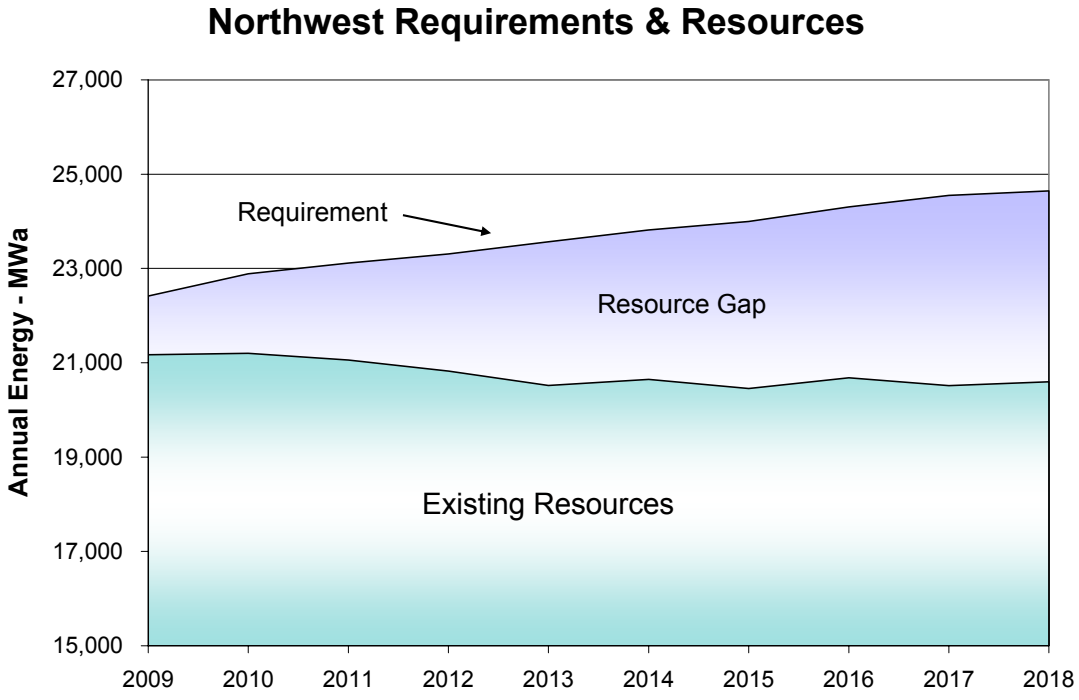
2008 Northwest Regional Forecast
Executive Summary

A high level of interest revolves around the Northwest electric power system as state and federal leaders implement and consider new initiatives to change utilities' requirements for acquiring resources to meet their customers' demands. Utilities contribute information each year to the *Northwest Regional Forecast* to shed light on the regional electric loads and resources picture. This PNUCC report presents an updated picture of the Northwest utilities' need to acquire power in the next decade with an assessment of the sum of individual utilities' projected electric loads and generating resources.

The results of this year's analysis shows that utilities are planning to acquire significant resources in the next five years to meet the projected need.

Northwest Needs to Acquire

The sum of utilities' loads and existing resources result in a regional deficit in 2009 of 1,200 MWa increasing to just over 3,000 MWa in five years. Forecasted loads are projected to grow at about 250 MWa annually while firm regional imports are expected to decrease by more than 800 MWa in the five year horizon contributing to the growing resource gap. Utilities' plans for meeting this resource gap are highlighted next.

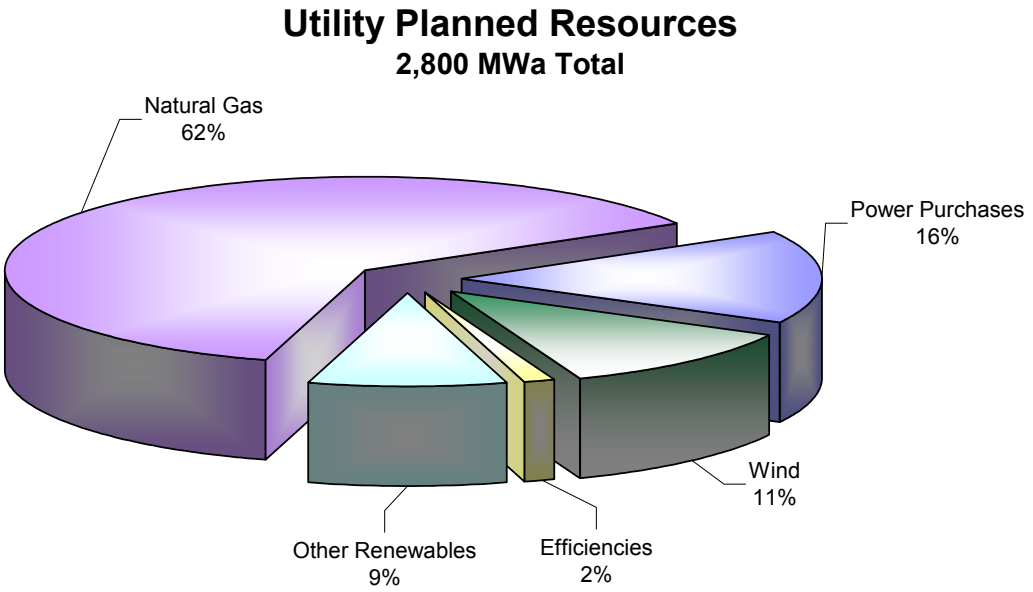


Note there is other potentially available generation not reflected in the requirements and resources pictured above. Besides power purchases from entities outside the region, there are about 4,100 MWa of additional non-firm hydropower generation available in average water conditions, another 4,000 MWa of uncommitted generation from independent power producers and almost 1,040 MWa of generation that may be available for emergencies from combustion turbines that are used by utilities for meeting peak loads.

Utilities are Taking Action

Utilities are continuing to take action to meet their growing need. This past year the region saw the completion of eight more power projects providing another 140 MWa of energy to meet the region's needs. In addition there are ten projects under construction that will provide another 370 MWa of energy to meet utilities' loads. This 510 MWa of new utility-owned generation has been included in the resource stack for this analysis.

Utilities have a number of other resource acquisitions in the works to meet the region's forecasted need. They have identified another 2,800 MWa of energy they are planning to acquire, the majority of which will be completed within the next five years. The greatest number of projects will be wind projects. However, the greatest amount of energy will come from gas-fired combustion turbines. Other renewable resources shown include small hydropower generation, solar, biomass and geothermal projects. The efficiencies noted here are thermal and hydro project improvements and upgrades.



There are 27 wind projects, ten small renewable projects and efficiency improvements and about 2,000 MWa of energy from natural gas-fired combustion turbines included in the resources that have either just been built, are under construction or are planned to be acquired. Utilities' investments in energy efficiency are not shown here. Because utilities acquire and account for conservation in various ways, potential savings from new programs have not been quantified on a regional basis.

Not included in the chart, but worth mentioning, is the Satsop Combustion Turbine, a non-utility project of 530 MW that is about to be completed in western Washington.

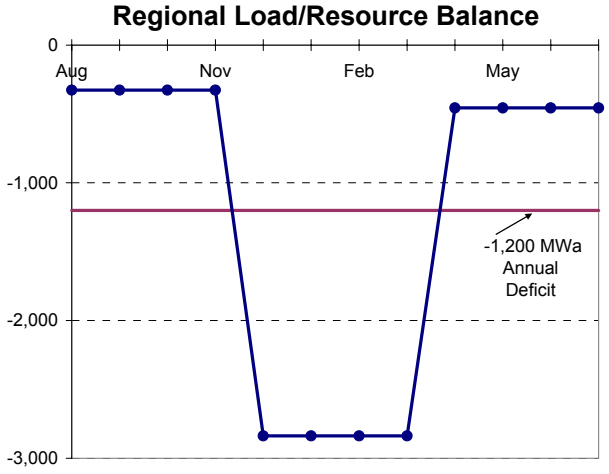
Different Perspectives

The Northwest Regional Forecast is an indicator of the need for regional utilities to acquire resources. It is the sum of utilities' firm loads and resources over the next 10 years and examines the resources utilities are planning to acquire to meet their projected need. As this report shows, the region does need to acquire resources and utilities are doing so.

For a different purpose, 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.

Resource Planning is Complex

On a regional basis, the annual load/resource comparison provides a glimpse of the Northwest's power situation. However, it is not a complete picture. Utilities consider many more factors than the annual loads/resource balance to make decisions about acquiring resources.



One example of the complexity of these decisions is the significant seasonal variation of the annual load/resource picture. The annual deficit is 1,200 MWa for 2009, while the seasonal picture for that same time period shows a small deficit of 330 to 460 MWa in the spring, summer and fall and a much greater deficit of almost 2,900 MWa in the winter. Utility decisions about resource needs, among other things, will consider both the annual deficit and the seasonal variability in the deficit.

Northwest Region
Requirements and Resources

Annual Energy (MWa)	2008-09	2009-10	2010-11	2011-12	2012-13
Requirements					
Load	21,566	21,946	22,213	22,459	22,757
Exports	847	940	901	847	810
Total	22,413	22,887	23,115	23,306	23,567
Resources					
Hydro	11,521	11,501	11,492	11,558	11,558
Small Thermal & Miscellaneous	24	24	24	24	24
Combustion Turbines	1,774	1,891	2,029	2,045	2,045
Renewables	983	1,060	1,067	1,058	1,050
Cogeneration	983	988	994	839	724
Imports	1,547	1,231	1,036	736	713
Large Thermal	4,381	4,543	4,456	4,605	4,443
Total	21,213	21,239	21,098	20,865	20,558
Surplus (Deficit)	**(1,200)**	**(1,648)**	**(2,017)**	**(2,441)**	**(3,009)**

Additional Information

Potentially Available Resources					
Independent Power Producer Projects	4,008	4,008	4,008	4,008	4,008
Hydro Generation (average water)	4,085	4,102	4,110	4,045	4,045
Peaking Resources Additional Energy	1,038	1,037	1,036	1,036	1,037
Non Utility Industry Loads	**530**	**530**	**530**	**530**	**530**

Northwest Region
Requirements and Resources

Annual Energy (MWa)	2013-14	2014-15	2015-16	2016-17	2017-18
Requirements					
Load	23,021	23,292	23,687	23,959	24,102
Exports	796	705	618	591	542
Total	23,818	23,998	24,305	24,550	24,644
Resources					
Hydro	11,558	11,558	11,558	11,558	11,558
Small Thermal & Miscellaneous	24	25	25	25	25
Combustion Turbines	2,036	2,060	2,046	2,054	2,033
Renewables	1,050	1,040	1,040	1,040	1,041
Cogeneration	714	733	738	746	734
Imports	714	713	714	685	650
Large Thermal	4,589	4,369	4,600	4,448	4,597
Total	20,686	20,497	20,720	20,555	20,638
Surplus (Deficit)	**(3,132)**	**(3,500)**	**(3,585)**	**(3,995)**	**(4,006)**

Additional Information

Potentially Available Resources					
Independent Power Producer Projects	4,008	4,008	4,008	4,008	4,008
Hydro Generation (average water)	4,045	4,045	4,045	4,045	4,045
Peaking Resources Additional Energy	1,037	1,037	1,037	1,040	1,040
Non Utility Industry Loads	**530**	**530**	**530**	**530**	**530**

Northwest Region (Seasonal)
Requirements and Resources
2008 - 2009

Average Energy (MWa)	August - November	December - March	April - July	Average
Requirements				
Load	20,587	23,290	20,821	21,566
Exports	913	780	849	847
Total	21,500	24,070	21,671	22,413
Resources				
Hydro	11,312	10,914	12,324	11,521
Small Thermal & Misc.	25	24	24	24
Combustion Turbines	1,806	1,800	1,718	1,774
Renewables	965	973	1,008	983
Cogeneration	1,028	929	988	983
Imports	1,357	1,961	1,318	1,547
Large Thermal	4,680	4,631	3,834	4,381
Total	21,173	21,233	21,214	21,213
Surplus (Deficit)	(327)	(2,837)	(457)	(1,200)

Potentially Available Energy from Independent Power Producers

Project	Fuel/Tech	Nameplate (MW)	Percent Available	Potential Energy (MWa)
Big Hanaford	CCCT	248	100%	224
Big Horn	Wind	200	100%	
Centralia 1	Coal		92%	577
Centralia 2	Coal		92%	626
Chehalis Generating Facility	CCCT	520	100%	417
Emmett Biomass Project				10
Hermiston Power Project	CCCT	630	100%	568
Klamath Cogen Project	Cogen	506	100%	455
Klamath Peaking Units 1-4			100%	14
Klondike III	Wind	221	5%	39
Lancaster (Rathdrum)	CCCT	270	100%	244
Mint Farm Energy Center	CCCT	311	100%	264
Rearden	Wind	64	100%	16
Satsop	CCCT	650	100%	553
Total				**4,008**

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.

Newly Installed Generating Resources

Project	Date	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Energy (MWa)	Utility
Alkile Wind	Mar 2008	Wind	20	1	6	Idaho Power
Biglow Canyon - phase 1	Dec 2007	Wind	125	-	47	Portland General Elec.
Elk Horn Wind	Jan 2008	Wind	100	5	31	Idaho Power
Lowline Midway	Feb 2008	Hydro	3			Idaho Power
Marengo	Aug 2007	Wind	140	140	42	PacifiCorp
Nine Canyon Phase 3	Feb 2008	Wind	32		10	Energy Northwest
Treasure Valley	Jan 2008	Methane	3			Idaho Power
Wild Horse Solar Project	Dec 2007	Solar PV	1			Puget Sound Energy
		Total			**136**	

Resources Under Construction

Project	Schedule	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Energy (MWa)	Utility
Bennet Creek Wind	Apr 2008	Wind	20	1	6	Idaho Power
Danskin 1	Jun 2008	CT	170	180	3	Idaho Power
Goodnoe Hills	Jun 2008	Wind	94		28	PacifiCorp
Hot Springs Wind	Dec 2008	Wind	20	1	6	Idaho Power
Lancaster Power Project	2010	CCCT	270	281	260	Avista Corp.
Marengo II	Jul-08	Wind	70	70	21	PacifiCorp
Raft River 1	Jun 2008	Geotherma	16	13	13	Idaho Power
Raft River 2	2009	Geotherma	15	15	13	EWEB
Raft River 3	Jun 2009	Geotherma	13	13	13	Idaho Power & EWEB
Rearden	2008	Wind	64		16	Energy Northwest
Satsop Combustion Turbine	Mar 2008	CCCT	650			Grays Harbor Energy
		Total			**378**	

Planned Resources

Project	Schedule	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Energy (MWa)	Utility
Biglow Canyon - phase 2&3	Dec 2010	Wind	300	45	105	Portland General Elec.
Box Canyon Upgrade	Mar 2013	Hydro	18			Pend Oreille PUD
Burley Butte Wind Farm	Dec 2008	Wind	11		3	Idaho Power
Combustion Turbine - IRP	2011	CCCT			560	PacifiCorp
Conservation (add'l cost effective)	2008 - 2012		65	65	45	Portland General Elec.
Conservation (ETO)	2007 - 2012		111	111	85	Portland General Elec.
Contracts - 6-10 yrs. Bridging	by 2012		192	192	192	Portland General Elec.
Contracts - up to 5 yrs (load uncertainty)	by 2012		180	180	180	Portland General Elec.
Curtailment tariff	by 2012		35	35		Portland General Elec.
Direct load control	by 2012		25	25		Portland General Elec.
DSG@ 13.5 MW/yr	by 2012		80	80		Portland General Elec.
Emmett Facility	Dec 2008	Biomass	18		9	Idaho Power
Geothermal (Contract-25 year)	Dec 2008	Geotherma l	14		7	Puget Sound Energy
Glenrock Wind Energy Project	Dec 2008	Wind	99		33	PacifiCorp
Golden Valley Wind Farm	Dec 2008	Wind	11		3	Idaho Power
Hydro Upgrades	Dec 2013 Dec 2014 Dec 2015	Hydro	75	25	-	PacifiCorp
Lava Beds Wind Farm	Dec 2008	Wind	18		6	Idaho Power
Milner Dam Wind Farm	Dec 2008	Wind	18		6	Idaho Power
New Gas	Q3 2008	Natural Gas	125		106	Puget Sound Energy
Notch Butte Wind Farm	Dec 2008	Wind	18		6	Idaho Power
Noxon Rapids	Unit 1: 2008 Unit 2: 2009 Unit 3: 2007 Unit	Hydro Eff.	33		19	Avista

Planned Resources

Project	Schedule	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Energy (MWa)	Utility
Oregon Trails Wind Farm	Dec 2008	Wind	11		3	Idaho Power
Partial Contract renewal (hydro)	by 2012	hydro	170	170	70	Portland General Elec.
Pilgrim Stage Wind Farm	Dec 2008	Wind	11		3	Idaho Power
Plant Efficieny Upgrades	by 2012		13	13	7	Portland General Elec.
Rainbow Rehab		Hydro		24	9	PPL Montana
Renewables (OR RPS)	by 2015		133	133	218	Portland General Elec.
Rolling HIlls Wind Project	end 2008	Wind	99		33	PacifiCorp
Salmon Falls Wind Farm	Dec 2008	Wind	21		7	Idaho Power
Seven Mile Hill	Dec 2008	Wind	99		33	PacifiCorp
Simple cycle CT	by 2012		100	100		Portland General Elec.
Thermal upgrades	Jun 2010 May 2013 May 2011 Jun 2012	Coal	70	17	15	PacifiCorp
Thousand Springs Wind Farm	Dec 2008	Wind	11		3	Idaho Power
Tuana Gulch Wind Farm	Dec 2008	Wind	11		4	Idaho Power
Wanapum Generator 1-4	2008 - 11	Hydro	447	111.85 Ea.		Grant PUD
Wind	Dec 2009	Wind	100		33	Puget Sound Energy
Winter-only RFP	by 2012		210	210		Portland General Elec.
Withrow Wind Energy Project		Wind	80	80	25	Douglas Co. PUD
Combustion Turbine - IRP	2015	CCCT			1,030	Puget Sound Energy
		Total			**2,859**	

Northwest Generating Resources

Project	Owner	Nameplate (MW)
HYDRO		
Albeni Falls	Corps of Engineers (BPA)	43
Alder	Tacoma Power	50
American Falls	Idaho Power	92
Anderson Ranch	Bureau of Reclamation (BPA)	40
Barber Dam	Idaho Power - non utility	4
Bend	PacifiCorp	1
Big Cliff	Corps of Engineers (BPA)	18
Big Creek	Flathead Irrigation Project	0
Big Fork	PacifiCorp	4
Billings Generation, Inc.	NorthWestern Energy	64
Birch Creek	PacifiCorp - non utility	3
Black Canyon	Bureau of Reclamation (BPA)	10
Black Creek Hydro	Puget Sound Energy	4
Black Eagle	PP&L Montana	17
Blind Canyon	Idaho Power - non utility	2
Bliss	Idaho Power	75
Boise Diversion	Bureau of Reclamation (BPA)	2
Bonneville Dam	Corps of Engineers (BPA)	1,101
Bonneville Pacific	PacifiCorp - non utility	6
Boulder Creek	Federal (BPA) - non utlity	0
Boundary	Seattle City Light	1,040
Box Canyon	Pend Oreille County PUD #1	60
Broadwater Dam	Northwestern Energy - non utility	10
Brownlee	Idaho Power	585
Bull Run	Portland General Electric	21
Burnside Hydro	Other Publics - non utilty	0
Bypass	Idaho Power - non utility	10
C.J. Strike	Idaho Power	83
Cabinet Gorge	Avista Corp.	245
Calispel Creek	Pend Oreille County PUD #2	1
Carmen	Eugene Water & Electric Board	80
Cascade	Idaho Power	12
CDM Hydro	PacifiCorp - non utility	-
Cedar Draw Creek	Idaho Power - non utility	2
Cedar Falls, Newhalem	Seattle City Light	20
Chandler	Bureau of Reclamation (BPA)	12
Chelan	Chelan County PUD #1	48
Chief Joseph	Corps of Engineers (BPA)	2,457
Clear Lake	Idaho Power	3
Clearwater	Federal (BPA) - non utlity	1
Clearwater No. 1	PacifiCorp	15
Clearwater No. 2	PacifiCorp	26
Cline Falls	PacifiCorp	1
Cochrane	PP&L Montana	48
COID	PacifiCorp - non utility	7

Northwest Generating Resources

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

Northwest Generating Resources

Project	Owner	Nameplate (MW)
Holter	PP&L Montana	38
Hood Street Reservoir	Tacoma Power	1
Horseshoe Bend	Idaho Power - non utility	10
Hungry Horse	Bureau of Reclamation (BPA)	428
Hutchinson Creek	Puget Sound Energy - non utility	1
Ice Harbor	Corps of Engineers (BPA)	603
Idaho Falls	City of Idaho Falls	27
Iron Gate	PacifiCorp	18
Island Park (2)	Federal System - BPA	5
Jim Ford Creek	Avista Corp. - non utility	2
John C. Boyle	PacifiCorp	80
John Day	Corps of Engineers (BPA)	2,160
John Day Creek	Avista Corp. - non utility	1
Joseph Hydro	PacifiCorp - non utility	8
Kasel-Witherspoon	Idaho Power - non utility	1
Klamath	PacifiCorp - non utility	92
Kerr	PP&L Montana	171
Koma Kulshan	Puget Sound Energy - non utility	14
Koyle	Idaho Power - non utility	1
LaGrande	Tacoma Power	64
Lake Oswego Corporation	Portland General Electric - non utility	1
Lateral #10	Idaho Power - non utility	2
Leaburg	Eugene Water & Electric Board	14
Lemolo No. 1	PacifiCorp	29
Lemolo No. 2	PacifiCorp	33
Libby	Corps of Engineers (BPA)	525
Lilliwaup Falls	Other Publics	1
Little Falls	Avista Corp.	32
Little Goose	Corps of Engineers (BPA)	810
Little Wood	Idaho Power - non utility	2
Littlewood-Arkoosh	Idaho Power - non utility	1
Long Lake	Avista Corp.	70
Lookout Point	Corps of Engineers (BPA)	120
Lost Creek	Corps of Engineers (BPA)	49
Lower Baker	Puget Sound Energy	64
Lower Granite	Corps of Engineers (BPA)	810
Lower Malad	Idaho Power	14
Lower Monumental	Corps of Engineers (BPA)	810
Lower Salmon	Idaho Power	60
Lowline #2	Idaho Power	3
Lowline Canal	Idaho Power - non utility	8
Lowline Midway	Idaho Power	3
Lucky Peak	Seattle City Light - non utility	113
Madison	PP&L Montana	7
Magic Reservoir	Idaho Power - non utility	9
Main Canal Headworks	City of Seattle - non utility	26

Northwest Generating Resources

Project	Owner	Nameplate (MW)
Marcos Ranches	Idaho Power - non utility	1
Mayfield	Tacoma Power	162
McNary	Corps of Engineers (BPA)	980
McNary Fishway	Public Utility	8
Merwin	PacifiCorp	136
Meyers Falls	Avista Corp.	1
Middlefork Irrigation	PacifiCorp - non utility	3
Mile 28	Idaho Power - non utility	2
Mill Creek	Federal System - BPA	1
Milner	Idaho Power Company	59
Minidoka	Bureau of Reclamation (BPA)	28
Mink Creek	PacifiCorp - non utility	3
Mitchell Butte	Idaho Power - non utility	2
Mora Drop	Idaho Power - non utility	2
Monroe Street	Avista Corp.	15
Morony	PP&L Montana	45
Morse Creek	City of Port Angeles	1
Mossyrock	Tacoma Power	300
Moyie Springs	City of Bonners Ferry	4
Mystic Lake	PP&L Montana	10
Naches	PacifiCorp	6
Naches Drop	PacifiCorp	1
Newhalem	Seattle City Light	2
Nine Mile	Avista Corp.	26
Nooksack	Puget Sound Energy	2
North Fork	Portland General Electric Company	41
North Fork Sprague	PacifiCorp - non utility	1
North Umpqua	PacifiCorp	175
Noxon Rapids	Avista Corp.	466
Oak Grove	Portland General Electric Company	51
Opal Springs	PacifiCorp - non utility	5
Owyhee Dam	Idaho Power - non utility	5
Oxbow	Idaho Power	190
P.E.C. Headworks	Grant County PUD #2 - non utility	7
Packwood	Energy Northwest	28
Palisades	Bureau of Reclamation (BPA)	177
Pelton	Portland General Electric	110
Pelton Reregulating	Portland General Electric	18
Phillips Ranch	Avista Corp. - non utility	0
Pigeon Cove	Idaho Power - non utility	2
Portland Hydro Project	Portland General Electric - non utility	36
Post Falls	Avista Corp.	15
Potholes East Canal 66	City of Seattle - non utility	2
Powerdale	PacifiCorp	6
Priest Rapids	Grant County PUD #2	956
Prospect No. 1	PacifiCorp	4

Northwest Generating Resources

Project	Owner	Nameplate (MW)
Prospect No. 2	PacifiCorp	32
Prospect No. 3	PacifiCorp	7
Prospect No. 4	PacifiCorp	1
Quincy Chute	Grant County PUD #2 - non utility	9
R. D. Smith	City of Seattle - non utility	6
Rainbow	PP&L Montana	36
Reeder Gulch	Other Publics	1
River Mill	Portland General Electric	19
Rock Creek #1	Idaho Power - non utility	2
Rock Creek #2	Idaho Power - non utility	2
Rock Island (PH1&2)	Chelan County PUD #1	624
Rocky Reach	Chelan County PUD #1	1,280
Rogue	PacifiCorp	25
Ross	Seattle City Light	360
Round Butte	Portland General Electric	247
Roza-Pump	Bureau of Reclamation (BPA)	13
Ryan	PP&L Montana	48
Sahko	Idaho Power - non utility	1
Sheep Creek	Avista Corp. - non utility	2
Shoshone Falls	Idaho Power	13
Slide Creek	PacifiCorp	18
Smith Creek	Eugene Water & Electric Board	38
Snoqualmie Fall	Puget Sound Energy	42
Soda Creek	Other Publics	1
Soda Springs	PacifiCorp	11
South Fork Tolt	Seattle City Light	17
Spokane Upriver	Avista Corp. - non utility	16
Stauffer Dry Creek	PacifiCorp - non utility	4
Stayton	PacifiCorp	1
Stone Creek	Eugene Water & Electric Board	12
Strawberry Creek	Lower Valley Power & Light Inc.	2
Sullivan Lake	Pend Oreille County PUD #3	-
Summer Falls	City of Seattle - non utility	92
Swan Falls	Idaho Power	25
Swift #1	PacifiCorp	204
Swift #2	Cowlitz County PUD	70
T.W. Sullivan	Portland General Electric	15
The Dalles	Corps of Engineers (BPA)	1,807
The Dalles Fishway	Northern Wasco	0
Thompson Falls	PP&L Montana	80
Thompson Falls Add.	PP&L Montana	-
Thousand Springs	Idaho Power	9
Tieton Hydro	EWEB - non utility	15
Toketee	PacifiCorp	43
Trail Bridge	Eugene Water & Electric Board	10
Tunnel #1	Idaho Power - non utility	7

Northwest Generating Resources

Project	Owner	Nameplate (MW)
Twin Falls	Idaho Power	52
Twin Falls	Puget Sound Energy - non utility	20
Upper Baker	Puget Sound Energy	105
Upper Falls	Avista Corp.	10
Upper Malad	Idaho Power	8
Upper Salmon 1 & 2	Idaho Power	18
Upper Salmon 3 & 4	Idaho Power	17
Walla Walla	PacifiCorp - non utility	2
Wallowa Falls	PacifiCorp	1
Walterville	Eugene Water & Electric Board	8
Wanapum	Grant County PUD #2	1,038
Weeks Falls	Puget Sound Energy - non utility	5
Wells	Douglas County PUD #1	774
West Side	PacifiCorp	1
White River	Puget Sound Energy	70
Wilson Lake	Idaho Power - non utility	8
Wynoochee Dam	Tacoma Power	13
Yakima-Trenton	PacifiCorp - non utility	3
Yale	PacifiCorp	134
Yelm	City of Centralia	10
COAL		
Boardman	Portland General Electric	601
Centralia 1 & 2	Transalta	1,343
Colstrip 1	PP&L Montana	333
Colstrip 2	PP&L Montana	333
Colstrip 3	PP&L Montana	805
Colstrip 4	NorthWestern Energy	805
J. E. Corette	PP&L Montana	163
Jim Bridger 1-4	PacifiCorp	2,080
Rocky Mountain Hardin	NorthWestern Energy	116
Valmy 1	Idaho Power	254
Valmy 2	Idaho Power	267
NUCLEAR		
Columbia Generating Station	Energy Northwest (BPA)	1,157
COMBUSTION TURBINES		
Alden Bailey	Clatskanie PUD	11
Basin Creek	NorthWestern Energy	50
Beaver (Combined-cycle)	Portland General Electric	586
Beaver 8	Portland General Electric	25
Bennett Mountain	Idaho Power	162
Big Hanaford	Transalta	248
Chehalis Generating Facility	Transalta	520
Coyote Springs II	Avista Corp.	288

Northwest Generating Resources

Project	Owner	Nameplate (MW)
Danskin	Idaho Power	90
Danskin 1	Idaho Power	170
Encogen	Puget Sound Energy	160
Frederickson Gen. Station	Puget Sound Energy/EPCOR Power	250
Fredonia 1 & 2	Puget Sound Energy	124
Fredonia 3 & 4	Puget Sound Energy	106
Fredrickson 1 & 2	Puget Sound Energy	85
Goldendale Energy Center	Puget Sound Energy	277
Kettle Falls	Avista Corp.	7
Lancaster Power Project	Avista Corp.	270
Hermiston Power Project	Calpine	630
Northeast 1& 2	Avista Corp.	61
Port Westward	Portland General Electric	415
Rathdrum 1 & 2	Avista Corp.	166
Rathdrum Power Project	Avista Corp.	248
River Road Generating Project	Clark County PUD	235
Satsop Combustion Turbine	Grays Harbor Energy	650
Whitehorn 2 & 3	Puget Sound Energy	170
COGENERATION		
Billings Cogeneration	NorthWestern Energy - non utility	64
Boise Cascade	Idaho Power - non utility	-
Coyote Springs	Portland General Electric	266
DAW	PacifiCorp - non utility	-
Freres Lumber	PacifiCorp - non utility	10
Grays Harbor Paper	Grays Harbor PUD	6
Hermiston Cogeneration	PacifiCorp	469
James River - Camas	PacifiCorp	520
Kimberly Clark Cogeneration	Snohomish PUD	52
Klamath Cogeneration Project	Pacific Klamath Energy	484
Magic Valley	Idaho Power - non utility	10
Magic West	Idaho Power - non utility	10
March Point Cogen #1	Puget Sound Energy - non utility	80
March Point Cogen #2	Puget Sound Energy - non utility	60
PERC	Puget Sound Energy - non utility	3
Potlatch Corporation	Avista - non utility	132
Simplot	Idaho Power - non utility	12
Sumas Energy	Puget Sound Energy - non utility	123
Tamarack (Wood)	Idaho Power - non utility	5
Tasco 1	Idaho Power - non utility	2
Tasco 2	Idaho Power - non utility	3
Tenaska	Puget Sound Energy - non utility	245
Thompson River	Northwestern Energy	12
Warm Springs (Wood)	PacifiCorp - non utility	8
Wauna (James River)	Eugene Water & Electric Board	15
Weyco Energy Center	Eugene Water & Electric Board	51

Northwest Generating Resources

Project	Owner	Nameplate (MW)
Weyerhaeuser Pulp Mill	Grays Harbor PUD	15
RENEWABLE		
Alkile Wind	Idaho Power - non utility	20
Ashland Solar Project		-
Bennet Creek Wind	Idaho Power - non utility	1
Biglow Canyon 1	Portland General Electric	125
Biomass One	PacifiCorp - non utility	25
Blue Mountain	Other Publics (BPA) - non utility	4
Champion - Stimson	PacifiCorp - non utility	17
Chinook Wind	PacifiCorp - non utility	1
Coffin Butte (landfill gas)	PNGC Power	2
Cogen Company	Non-Utility	8
Co-Gen II	PacifiCorp - non utility	8
Condon Wind	Federal (BPA - nun utility	50
Covanta Energy (MSW)	Portland General Electric - non utility	14
Elk Horn Wind	Idaho Power	100
Foote Creek Rim 1,2,4 (wind)	PacifiCorp/EWEB	60
Fossil Gulch Wind	Idaho Power	11
Fourmille Hill Geothermal	Federal (BPA)	50
Glass Mountain (geothermal)	Non-Utility	30
Haley West (wood waste)	Avista Corp.	7
Hidden Hollow Landfill	Idaho Power - non utility	3
Hopkins Ridge (wind)	Puget Sound Energy	150
Horseshoe Bend (wind)	Idaho Power - non utility	9
Hot Springs Wind	Idaho Power	20
Georgia Pacific Paper (Wauna)	Federal (BPA)	32
Goodnoe Hills Wind	PacifiCorp	94
Judith Gap Wind	NorthWestern Energy	135
Kettle Falls (wood)	Avista Corp.	51
Klondike 1 (wind)	Federal (BPA) - non utility	24
Klondike 2 (wind)	Portland General Electric - non utility	75
Leaning Juniper 1 (wind)	PacifiCorp - non utility	101
Marengo Wind	PacifiCorp	140
Marengo II Wind	PacifiCorp	70
Mead	Non-Utility	2
Mountain Wind QF 1&2	PacifiCorp - non utility	120
Nine Canyon Wind	Energy Northwest	96
Pine Products	PacifiCorp - non utility	6
Raft River 1	Idaho Power	16
Raft River 2	EWEB	15
Raft River 3	Idaho Power & EWEB	13
Rearden Wind	Energy Northwest	64
Rock River (wind)	Shell Wind Energy	50
Short Mountain	Other Publics (BPA)	3
Spokane MSW	Puget Sound Energy - non utility	23

Northwest Generating Resources

Project	Owner	Nameplate (MW)
Stateline Wind Project	PPM Energy	300
Tamarack (wood)	Idaho Power	5
Treasure Valley (methane)	Idaho Power	3
Vaagen Bros. (wood)	Idaho Power - non utility	5
Van Sycle (wind)	Portland General Electric	25
West Boise Waste	Idaho Power	0
Wild Horse Solar	Puget Sound Energy	1
Wild Horse Wind	Puget Sound Energy	229
Wolverine Creek (wind)	PacifiCorp	65
SMALL THERMAL AND MISCELLANEOUS		
Boulder Park	Avista Corp.	25
Crystal Mountain	Puget Sound Energy	3
Hoquiam Diesel	Gray's Harbor PUD	10
Randolph Road Diesel	Non-Utility	32
Springfield Generation Farm	Springfield Utility Board	10

Assumptions and Procedures

This report is produced annually by PNUCC. The utilities, in most cases, prepared their own projections. Bonneville Power Administration provides much of the information for its smaller customers and the Direct Service Industries. Procedures employed in preparing the regional load-resource comparison are described here. A list of definitions is included at the end of this section.

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.

LOAD ESTIMATES

The Northwest regional loads are the sum of loads estimated by the Northwest utilities and BPA. Estimates are reported for expected system monthly energy loads and reflect normal weather conditions. Annual average energy is for August through July of each year. Load projections reflect reductions in demand due to rising electricity prices and savings from appliance efficiency standards and energy codes. Savings from programmatic conservation are treated as demand-side resources and have been subtracted from the utility load forecasts to reflect the influence of assured programmatic conservation. Firm and interruptible loads are included in the regional total.

Non utility industrial load forecasts provided by those industries are presented in the report, and they are not included in the total regional load.

Federal System (BPA) Loads

Federal System (BPA) firm loads are the sum of firm transmission losses and federal agency loads (e.g., military bases). Federal System loads exclude Grand Coulee and Roza pumping loads and US Bureau of Reclamation local use at Grand Coulee. These loads are accounted for by reducing Grand Coulee and Roza resources by equivalent amounts.

The Federal System load does not include obligations to public or private utilities under the Pacific Northwest Regional Power Act. Consequently, the Federal System (BPA) loads shown do not represent the BPA Administrator's entire obligation.

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.

RESOURCE ESTIMATES

This report considers existing resources, resources Under Construction and Planned 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.

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.

Hydro energy capability was also estimated for each of the 70 historical water years. Reservoirs were operated in accordance with normal requirements for refilling. Other operational data were in accordance with the Pacific Northwest Coordination Agreement. The 70-year model was run in continuous mode. The non-firm generation available in average water condition is also reported. This additional generation is not included in the regional load/resource balance.

Canadian Treaty

Energy resources include downstream generation in the United States resulting from storage regulation of three Canadian Treaty reservoirs Duncan, Arrow and Mica in coordination with Libby reservoir and other power facilities in the region as required by the Pacific Northwest Coordination Agreement and the Columbia River Treaty. Canadian Entitlement to these downstream power benefits reverted to Canada as of April 1, 2003. This year's report assumes that Canadian rights to divert water from the Kootenai River to the Columbia River upstream of Libby Dam have not been exercised within the planning horizon.

An agreement between B.C. Hydro and BPA in 1990 provides for increased United States-Canadian coordination of the Columbia River system. This agreement cooperatively managed 4.5 MAF of non-treaty storage through June 30, 2003. At this time, this non-treaty storage is used to increase operational flexibility of the hydro system and is not included as a firm resource in the hydro-regulation studies.

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 Company.

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. Augmentation for salmon occurs 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. For the 70-year analysis, the volumes of water provided vary by water condition.

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 and reported in a variety of categories. Cogeneration projects and combustion turbines projects are each totaled and reported as individual categories. The Large Thermal category is the total energy from coal-fired generators and the Columbia Generating Station nuclear plant output. 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 Renewables includes energy from wind projects, biomass, geothermal, solar, municipal solid waste projects and other small miscellaneous projects.

All existing generating plants, regardless of size, are included in amounts submitted by each plant operator. 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 available from these peaking resources for emergencies is also reflected in the report. This energy is not included in the regional load/resource balance.

Non-Utility Generation

Non-utility generation is reflected in the tables along with utility-owned generation for each resource type (e.g. hydro, cogeneration, renewable). Only generation that has been committed to serve regional load is reflected in the regional analysis.

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

New and Planned Resources

Newly acquired resources and planned generating resources are tabulated in this report. These resources are reported as Under Construction and Planned Resources to reflect the different stages of development.

Under Construction

Resources *Under Construction* include those projects not complete as of December 31, 2007, 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

Planned Resources include those projects not under construction as of December 31, 2007, but for which developers or utilities have made a firm commitment to construct or acquire and are at some stage in the site certification process. For example, they have obtained all licenses for construction or acquisition or are in the process of receiving their site certificate from the state. Specific resources and/or blocks of resources identified in utilities most current integrated resource plans are also included as planned resources.

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. Intra-company transfers for PacifiCorp have accounted for possible transmission bottlenecks. Transfers of other utilities do not consider any transmission bottlenecks that may occur in the future.

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.

Capacity Factor
The ratio of the average load on a machine or equipment, for the period of time considered, to the capacity rating of the machine or equipment.

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.

Columbia Storage Power Exchange (CSPE)
A non-profit corporation set up by a group of Northwest utilities to administer the purchase of Canada's rights to downstream power benefits defined by the Columbia River Treaty.

Conservation
Any reduction in electrical power consumption as a result of increases in the efficiency of energy use, production, or distribution.

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-side Resources
Peak and energy savings from conservation measures, efficiencies, and load control programs that can be considered a resource in the sense that they serve increased demand without obtaining new supplies.

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

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.

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.

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.

Hydroregulation
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.

Interruptible Load
Loads that can be interrupted in the event of a power deficiency on the part of the supplying system.

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

Large Thermal Resources
This category of resources includes the region's coal-fired plants and the nuclear plant, the Columbia Generating Station.

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).

Non-Utility Industry Loads
These are loads being served by the market rather than with firm contracts with a regional utility. These loads are not included in the regional load/resource balance.

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 2009 is August 1, 2008 through July 31, 2009.

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

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.

Private Utilities
Same as investor-owned utilities.

Renewables Resources
A category of resources that includes projects that produce power from such fuel sources as wind, 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.

Restoration
Restoration is the obligation under terms of the Pacific Northwest Coordination Agreement of utilities, which gained generation from the addition of Canadian storage to restore those utilities, which lost generation.

Run of River Plant
A hydroelectric plant with limited storage capacity limiting the operation to daily or weekly shaping.

Surplus Firm Energy
The amount of FELCC in excess of the firm energy loads served by the power system.

Total Load
The total load is the summation of utilities' firm and interruptible loads and Bonneville Power Administration's loads which consist of Federal agencies, public agencies, and industrial customers. Transmission and distribution losses are also included in the total loads.