

Northwest Regional Forecast

of Power Loads and Resources

2010 through 2019

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PNCC
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Executive Summary

Northwest utilities are working diligently to narrow the gap between existing resources and the load growth that is forecast to occur even in the face of an economic downturn. To meet the requirements of renewable portfolio standards and other mandates, the region's utilities are making a significant investment in wind generation and coupling efforts to expand the power supply with programs to encourage energy efficiency and conservation.

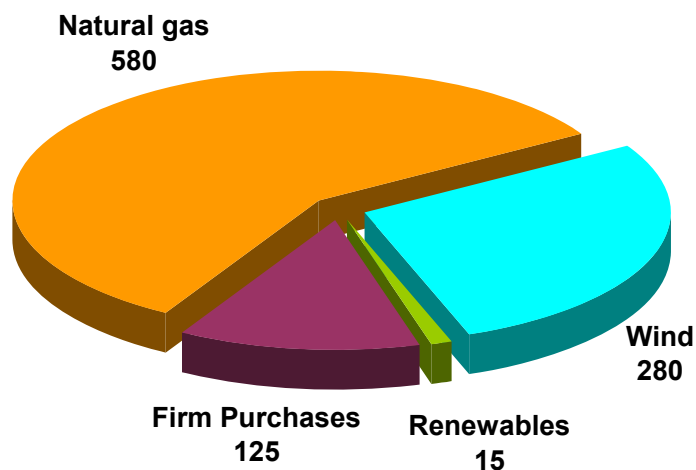
PNUCC's *Northwest Regional Forecast* provides an annual update on the region's electric loads and resource needs over the next decade. The forecast is based on information submitted by the utilities. In 2009, the gap between existing resources and future needs shrank, and utilities are emphasizing conservation and renewables, as well as natural gas, to meet growing loads.

Anatomy of the Acquisitions

Utilities have added 1,000 MWa to the region's energy supply in the last two years. This is the net of much utility activity. Utilities acquired 580 MWa of natural-gas fired generation, primarily by purchasing existing independent power plants. A dozen new wind projects, with an installed capacity of almost 900 MW, make up 280 MWa of new wind energy additions, and another 140 MWa will come from system firm purchase and five new renewable projects including geothermal and a solar demonstration project.

New Power Supply 2007 - 2009

Energy (MWa)
Total - 1,000



As a result of multiple actions by utilities, from acquiring generation to effecting conservation, the gap between existing supply and future needs shrank by 900 MWa since last year and by more almost 1,700 MWa since 2007. Investments in conservation are estimated to be reducing demand between 150 and 200 MWa annually.

Independent power producers are also developing resources in the region that may be available to serve Northwest load. Although such projects are not incorporated into this report, they represent a significant resource. Among the projects, a 530 MW combustion turbine was recently completed and brought on line in western Washington.

Building Blocks for Future Need

Integrated resource plans lay out the building blocks utilities will use to get ready for the future. This year's report indicates utilities have 5,400 MWa on the drawing board to meet the region's growing electricity demand. Resources shown here are already under construction or in some stage of planning. They include a broad range of actions including both conservation/energy efficiency programs and generating resources.

Future conservation/energy efficiency savings and new renewable resources account for almost two-thirds of what utilities have planned. Conservation makes up 1,700 MWa of the anticipated resources. Utilities plan to install another 3,500 MW of wind capacity, which they expect will provide 1,125 MWa of energy, and 18 smaller projects, including biomass, geothermal, and small hydro could add another 600 MWa. Natural gas-fired generation is likely to play a significant role in the future, with 1,400 MWa showing up in utilities' integrated resource plans.



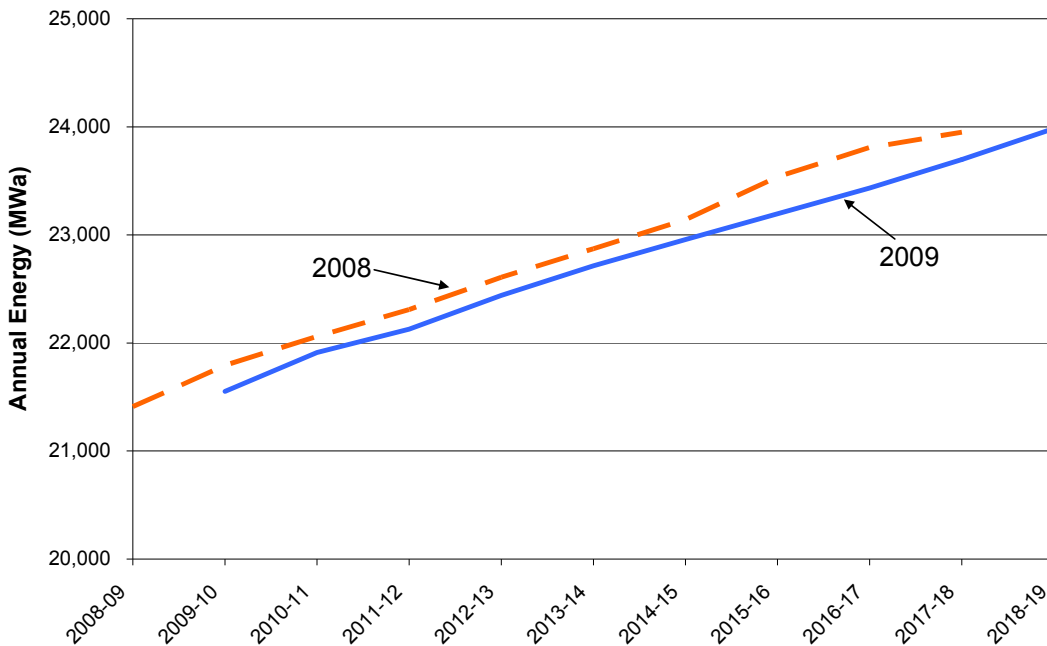
Loads Grow Despite Economy

The energy load in the Northwest is projected to grow about 270 MWa annually, from just under 21,600 MWa in 2009 to just under 24,000 MWa in 10 years. Even with the effect of existing conservation programs, a good share of the 5,000 MWa of planned resources will be needed to keep the region in load-resource balance.

The current economic downturn has had an effect on the forecast, particularly in the early years. Due to conditions in the economy, utilities are updating their forecasts. The resulting changes may affect the overall regional load and need for new resources.

As it stands, compared to a year ago, the projections are down by almost one year's load growth. Loads start a little lower than what was forecasted in 2008 but the projections for load growth remain about the same.

Northwest Firm Loads



Northwest Region Requirements and Resources

Annual Energy (MWa)	<u>2009-10</u>	<u>2010-11</u>	<u>2011-12</u>	<u>2012-13</u>	<u>2013-14</u>
Requirements					
Load ^{1/}	21,551	21,912	22,126	22,440	22,713
Exports	930	869	816	787	775
Total	<u>22,481</u>	<u>22,781</u>	<u>22,942</u>	<u>23,227</u>	<u>23,487</u>
Resources					
Hydro	11,681	11,715	11,857	11,857	11,857
Small Thermal & Miscellaneous	23	23	23	23	23
Combustion Turbines	2,222	2,354	2,329	2,311	2,269
Renewables-Other	224	219	251	251	251
Wind	797	810	807	802	802
Cogeneration	1,061	1,067	856	601	566
Imports	1,282	1,108	986	910	831
Nuclear	1,030	800	1,030	878	1,030
Coal	<u>3,554</u>	<u>3,588</u>	<u>3,558</u>	<u>3,567</u>	<u>3,567</u>
Total	<u>21,873</u>	<u>21,685</u>	<u>21,698</u>	<u>21,200</u>	<u>21,196</u>
Surplus (Deficit)	(608)	(1,096)	(1,244)	(2,027)	(2,292)

Additional Information

Other Loads

Non Utility Industry Loads	530	530	530	530	530
Interruptible Load	155	153	152	151	151

Potentially Available Resources

Independent Power Producer Projects	3,096	3,096	3,096	3,096	3,096
Hydro Generation (average water)	2,888	2,853	2,713	2,713	2,713
Peaking Resources Additional Energy	1,685	1,679	1,676	1,678	1,678

^{1/} Net of Conservation Savings

Northwest Region Requirements and Resources

Annual Energy (MWa)	<u>2014-15</u>	<u>2015-16</u>	<u>2016-17</u>	<u>2017-18</u>	<u>2018-19</u>
Requirements					
Load ^{1/}	22,957	23,195	23,434	23,698	23,985
Exports	693	616	591	542	497
Total	<u>23,650</u>	<u>23,811</u>	<u>24,025</u>	<u>24,240</u>	<u>24,482</u>
					2,434
Resources					
Hydro	11,857	11,857	11,857	11,857	11,857
Small Thermal & Miscellaneous	23	23	23	23	23
Combustion Turbines	2,329	2,437	2,491	2,489	2,510
Renewables-Other	242	239	219	219	219
Wind	802	802	802	802	802
Cogeneration	594	648	689	694	668
Imports	836	813	707	656	628
Nuclear	878	1,030	878	1,030	878
Coal	<u>3,523</u>	<u>3,568</u>	<u>3,577</u>	<u>3,557</u>	<u>3,569</u>
Total	<u>21,083</u>	<u>21,416</u>	<u>21,241</u>	<u>21,327</u>	<u>21,154</u>
Surplus (Deficit)	(2,567)	(2,394)	(2,784)	(2,913)	(3,328)

Additional Information

Other Loads

Non Utility Industry Loads	530	530	530	530	530
Interruptible Load	151	151	151	151	151

Potentially Available Resources

Independent Power Producer Projects	3,096	3,096	3,096	3,096	3,096
Hydro Generation (average water)	2,713	2,713	2,713	2,713	2,713
Peaking Resources Additional Energy	1,680	1,680	1,682	1,682	1,682

^{1/} Net of Conservation Savings

Newly Installed Generating Resources

Project	Date	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Energy (MWa)	Utility
Alkile Wind	Mar 2008	Wind	20	1	6	Alkile Wind
Bennet Creek Wind	Apr 2008	Wind	20	1	6	Idaho Power
Biglow Canyon - phase 1	Dec 2007	Wind	125	0	47	Portland General Electric
Cassia Farms	Jan 2009	Wind	11	0	3	Idaho Power
Cassia Gulch	Jan 2009	Wind	21	1	7	Idaho Power
Chehalis	Mar 2008	Natural Gas	514	517	197	PacifiCorp
Credit Suisse PPA	Jan 2009	System Purchase	50		50	Puget Sound Energy
Danskin 1	Jun 2008	CT	170	180	3	Idaho Power
Elk Horn Wind	Jan 2008	Wind	100	5	31	Horizon Wind Energy
Goodnoe Hills	Jun 2008	Wind	94		28	PacifiCorp
Hot Springs Wind	Dec 2008	Wind	20	1	6	Idaho Power
Lowline Midway	Feb 2008	Hydro	3			Idaho Power Company
Marengo	Aug 2007	Wind	140	140	42	PacifiCorp
Marengo II	Jul 2008	Wind	70	70	21	PacifiCorp
Mint Farm	Jan 2009	Natural Gas	310	303	254	Puget Sound Energy
Nine Canyon Phase 3	Feb 2008	Wind	32		10	Several public utilities
Qualco	Jan 2009	Digester	1		0	Puget Sound Energy
Raft River 1	Jun 2008	Geothermal	16	13	10	Idaho Power
Sempra PPA	Jan 2009	System Purchase	75		75	Puget Sound Energy
Sumas	Jul 2008	Natural Gas	125	125	119	Puget Sound Energy
Treasure Valley	Jan 2008	Methane	3		2	Idaho Power Company
Wanapum Turbine Replacements (4)	2005 - 2008	Hydro	488	447		GCPUD
White Creek	Dec 2007	Wind	205		70	Cowlitz PUD Other Public Utilities
Wild Horse Solar Project	Dec 2007	Solar PV	1		1	RFP - demonstration project
Total			2,612		988	

Resources Under Construction

Project	Schedule	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Energy (MWa)	Location
Barclays PPA	Nov 2011	System Purchase	75		75	
Dorena Hydro	On-Line est. 3 QTR 2010	Hydro	9	9	2	Cottage Grove, OR
Lancaster Power Project	2010	CCCT	270	281	260	Rathdrum, ID
Wild Horse Expansion	Dec 2009	Wind	44		12	Kittitas Co., WA
Wanapum Turbine Replacement	2009	Hydro	122	112		Columbia River, WA
Wanapum Turbine Replacement	2010	Hydro	122	112		Columbia River, WA
Wanapum Turbine & Generator Replacement	2011	Hydro	122	112		Columbia River, WA
Wanapum Turbine & Generator Replacement	2011	Hydro	122	112		Columbia River, WA
Wanapum Turbine & Generator Replacement	2012	Hydro	122	112		Columbia River, WA
Wanapum Turbine & Generator Replacement	2013	Hydro	122	112		Columbia River, WA
Harvest Wind	Dec 2009	Wind	99	0	30	Klickitat County, WA
Wheat Field Wind Project	Spring 2009	Wind	97		16	Arlington, OR
Hay Canyon Wind Project	2009	Wind	101		17	Sherman Co., OR
Total					412	

Planned Resources

Project	Schedule	Fuel/Tech	Name plate (MW)	Capacity (MW)	Energy (MWh)	Location
Arrowrock Dam		Hydro	15		9	Boise River, ID
Biglow Canyon - phase 2&3	Dec 2010	Wind	300	45	105	Sherman Co., OR
Biomass	2018	Biomass			40	
Box Canyon Upgrade	Mar 2013	Hydro	18			
Burley Butte Wind Farm	Oct 2010	Wind	11		3	Burley, ID
CHP - Biomass - PPA (*)	2009-2018	Biomass	12	12	11	Oregon
CHP - Reciprocating Engine - PPA (*)	2012-2018	Natural Gas	4	4	4	Oregon
Conservation/Energy Efficiency	2009 - 2019	Conservation			1,700	
Contracts - 6-10 yrs. Bridging	by 2012	Contract	192	192	192	
Contracts - up to 5 yrs (load uncertainty)	by 2012	Contract	180	180	180	
Curtailment tariff	by 2012	Contract	35	35		
Direct load control	by 2012		25	25		
Distributed Standby Generation - PPA (*)	2009-2016	Natural Gas	22	22	21	Oregon
Distributed Standby Generation - PPA (*)	2017-2018	Natural Gas	12	12	12	Oregon
DSG@ 13.5 MW/yr	by 2012		80	80		
DSM - Direct Load Control - Irrigation	2016		13	13	0	Oregon
DSM - Direct Load Control - Irrigation	2016		6	6	0	Yakima
DSM - Direct Load Control - Residential	2016		6	6	0	Oregon
Exchange 1	Dec 2008	Contract			50	
Exchange 2	Dec 2009	Contract			55	
Fall Creek Hydro	In License ILP Process	Hydro	10	8	2	Fall Creek, OR
Flathead Co. Solid Waste	2009	Biomass	2			
Gas-Fired Resources	2015	Natural Gas	700-1000		850	WA
Geothermal	2014	geothermal			50	TBD
Geothermal 1	2013	Geothermal			45	
Geothermal 2	2020	Geothermal			80	
Golden Valley Wind Farm	Oct 2010	Wind	11	1	3	Burley, ID

Planned Resources

Project	Schedule	Fuel/Tech	Name plate (MW)	Capacity (MW)	Energy (MWa)	Location
Gorge Tunnel II	2015	Hydro			5	
Hydro Upgrades	Dec 2012 Dec 2013 Dec 2014	Hydro	75	25	0	Cougar, WA
JD Pool Pumped Storage		Pumped Storage	1129			Goldendale, WA
Landfill Gas	2009 - 2021	Biomass			21	
Langley Gulch	Jun 2012	Natural Gas	300	330	255	Payette Co., OR
Lava Beds Wind Farm	Oct 2010	Wind	18	1	6	Hagerman, ID
Lower Snake River Wind Energy Project		Wind	1250		417	Garfield & Columbia Counties
Mill Creek Generating Station		Natural Gas	200			Anaconda, MT
Milner Dam Wind Farm	Oct 2010	Wind	18	1	6	Twin Falls, ID
Notch Butte Wind Farm	Oct 2010	Wind	18	1	6	Twin Falls, ID
Noxon Rapids	Unit 1: 2009 Unit 2: 2010 Unit 3: 2011 Unit 4: 2012	Hydro Eff.	30		6	Noxon, MT
Oregon Trails Wind Farm	Oct 2010	Wind	11	0	3	Hagerman, ID
Partial Contract renewal (hydro)	by 2012	hydro	170	170	70	
Pilgrim Stage Wind Farm	Oct 2010	Wind	11	0	3	Hagerman, ID
Planned wind	4/11/2011	Wind	100	100	29	Yakima
Planned wind	4/11/2011	Wind	100	100	29	Walla Walla
Plant Efficiency Upgrades	by 2012		13	13	7	
Pumped Storage		Hydro	100			Douglas Co., WA
Radar Ridge	start 2010	Wind	54		18	Pacific County, WA
Raft River 2	2013	Geothermal	13	13	12	Cassia Co., ID
Rearden	2013	Wind	64		16	Rearden, WA
Renewables (OR RPS)	by 2015		133	133	218	
Salmon Falls Wind Farm	Oct 2010	Wind	21	1	7	Hagerman, ID
Simple cycle CT	by 2012	Natural Gas	100	100		

Planned Resources

Project	Schedule	Fuel/Tech	Name plate (MW)	Capacity (MW)	Energy (MWa)	Location
Thermal upgrades		Coal	42	42	37	Rock Springs, WY
Thousand Springs Wind Farm	Oct 2010	Wind	11	1	3	Hagerman, ID
Tuana Gulch Wind Farm	Oct 2010	Wind	11	1	4	Hagerman, ID
Utility - Biomass PPA	2016	Biomass	25	25	23	Oregon
Whitehorn Generating Station	Feb 2009	Natural Gas	74			Whatcom County, WA
Wind	2015	Wind	900		297	WA
Wind	2024	Wind	255		85	
Wind Generation		Wind	200			Douglas Co., WA
Winter-only RFP	by 2012		210	210		
Withrow Wind Energy Project		Wind	80	80	25	Vicinity of Withrow, WA
Young's Creek	2012	sm hydro	8		3	Sultan, WA
Total					5,024	

Northwest Generating Resources

Name	Fuel	Owner	NW Utility	Nameplate Rating MW
HYDRO				
Albany	Hydro	City of Albany		1
Albeni Falls	Hydro	US Army Corps of Engineers	Federal System (BPA)	43
Alder	Hydro	Tacoma Power		50
American Falls	Hydro	Idaho Power Company		92
Anderson Ranch	Hydro	USBR	Federal System - BPA	40
Barber Dam	Hydro	Non - Utility	Idaho Power Company	4
Bend	Hydro	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	1
Big Cliff	Hydro	USCE	Federal System - BPA	18
Big Creek	Hydro	Flathead Irrigation Project (FIP)		0
Big Fork	Hydro	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	4
Billings Generation, Inc.	Hydro	Non - Utility	NorthWestern Energy, partially dedicated to region	64
Birch Creek	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	3
Black Canyon	Hydro	USBR	Federal System - BPA	10
Black Creek Hydro	Hydro	Puget Sound Energy		4
Black Eagle	Hydro	PP&L - Montana	Missouri River	17
Blind Canyon	Hydro	Non - Utility	Idaho Power Company	2
Bliss	Hydro	Idaho Power Company		75
Boise Diversion	Hydro	USBR	Federal System - BPA	2
Bonneville	Hydro	US Corps of Engineers	Federal System (BPA)	1,102
Bonneville Pacific	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	6
Boulder Creek	Hydro		Federal System - BPA	0
Boundary	Hydro	Seattle City Light	Seattle City Light	1,040
Box Canyon	Hydro	Pend Oreille County PUD	Pend Oreille County PUD	60
Broadwater Dam	Hydro	Non - Utility	NorthWestern Energy	10
Brownlee	Hydro	Idaho Power	Idaho Power	585
Bull Run	Hydro	Portland General Electric Company		21
Burnside Hydro	Hydro	Non - Utility	Other Publics	0
Bypass	Hydro	Non - Utility	Idaho Power Company	10
C.J. Strike	Hydro	Idaho Power Company		83
Cabinet Gorge	Hydro	Avista Corp.	Avista Corp.	265
Calispel Creek	Hydro	Pend Oreille County PUD #2	Minor-Hydro-Others	1
Carmen	Hydro	Eugene Water & Electric Board		80
Cascade	Hydro	Idaho Power Company		12
CDM Hydro	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	-
Cedar Draw Creek	Hydro	Non - Utility	Idaho Power Company	2
Cedar Falls	Hydro	Seattle City Light		20
Chandler	Hydro	USBR	Federal System - BPA	12
Chelan	Hydro	Chelan County PUD	Chelan County PUD	48
Chief Joseph	Hydro	Corps of Engineers	Federal System(BPA)	2,457
City of Idaho Falls	Hydro	City of Idaho Falls		8
Clear Lake	Hydro	Idaho Power Company	Spring Plants	3
Clearwater	Hydro	Non - Utility	Federal (BPA)	1
Clearwater No. 1	Hydro	PacifiCorp (PPL/UPLC)	Umpqua River	15
Clearwater No. 2	Hydro	PacifiCorp (PPL/UPLC)	Umpqua River	26
Cline Falls	Hydro	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	1
Cochrane	Hydro	PP&L - Montana	Missouri River, partially dedicated to region	48
COID	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	7
Condit	Hydro	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	10
Copco No. 2	Hydro	PacifiCorp (PPL/UPLC)	Klamath River	27
Copco No.1	Hydro	PacifiCorp (PPL/UPLC)	Klamath River	20

Northwest Generating Resources

Name	Fuel	Owner	NW Utility	Nameplate Rating MW
Cougar	Hydro	USCE	Federal System - BPA	25
Cove Hydro	Hydro	Non - Utility	Other Publics	0
Cowlitz Falls	Hydro	Lewis County PUD		70
Crystal Springs	Hydro	Non - Utility	Idaho Power Company	2
Cushman 1	Hydro	Tacoma Power		43
Cushman 2	Hydro	Tacoma Power		81
Deep Creek	Hydro	Non - Utility	Avista Corp.	1
Derr Creek	Hydro	Non - Utility	Avista Corp.	0
Detroit	Hydro	USCE	Federal System - BPA	100
Dexter	Hydro	USCE	Federal System - BPA	15
Diablo Canyon	Hydro	Seattle City Light		153
Dietrich Drop	Hydro	Non - Utility	Idaho Power Company	5
Dworshak	Hydro	US Corps of Engineers	Federal System (BPA)	400
Dworshak/Clearwater Hatchery	Hydro	Idaho		3
Eagle Point	Hydro	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	3
East Side	Hydro	PacifiCorp (PPL/UPLC)	Klamath River	3
Electron	Hydro	Puget Sound Energy	Snoqualmie & Minor	26
Elk Creek	Hydro	Non - Utility	Idaho Power Company	2
Elopiya Branch Canal	Hydro	Non - Utility	Seattle City Light/Tacoma Power	2
Elwha	Hydro	USBR	Federal System - BPA	11
Falls Creek	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	-
Falls River	Hydro	Non - Utility	Idaho Power Company	9
Faraday	Hydro	Portland General Electric Company		37
Farmers Irrigation	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	3
Felt	Hydro	PacifiCorp (PPL/UPLC)		1
Fish Creek	Hydro	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	11
Foster	Hydro	USCE	Federal System - BPA	20
Frontier Technologies	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	4
Galesville Dam	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	2
GEM State Hydro	Hydro	City of Idaho Falls		15
Geobon 2	Hydro	Non - Utility	Idaho Power Company	1
Glines Canyon	Hydro	USBR	Federal System - BPA	13
Glines Hydro	Hydro		Federal System - BPA	16
Gorge	Hydro	Seattle City Light		207
Grand Coulee	Hydro	US Bureau of Reclamation	Federal System (BPA)	6,494
Green Peter	Hydro	USCE	Federal System - BPA	80
Green Springs	Hydro	USBR	Federal System - USBR	16
Hauser Lake	Hydro	PP&L - Montana	Missouri River, partially dedicated to region	17
Hazelton A	Hydro	Non - Utility	Idaho Power Company	8
Hazelton B	Hydro	Non - Utility	Idaho Power Company	7
Hells Canyon	Hydro	Idaho Power	Idaho Power	392
Henry M. Jackson (Sultan)	Hydro	Snohomish County PUD #1		112
Hills Creek	Hydro	USCE	Federal System - BPA	30
Holter	Hydro	PP&L - Montana	Missouri River, partially dedicated to region	38
Hood Street Reservoir	Hydro	Tacoma Power		1
Horseshoe Bend	Hydro	Non - Utility	Idaho Power Company	10
Hungry Horse	Hydro	US Bureau of Reclamation	Federal System (BPA)	428
Hutchinson Creek	Hydro	Non - Utility	Puget Sound Energy	1
Ice Harbor	Hydro	US Corps of Engineers	Federal System(BPA)	603
Iron Gate	Hydro	PacifiCorp (PPL/UPLC)	Klamath River	18

Northwest Generating Resources

Name	Fuel	Owner	NW Utility	Nameplate Rating MW
Island Park (2)	Hydro		Federal System - BPA	5
Jim Ford Creek	Hydro	Non - Utility	Avista Corp.	2
John C. Boyle	Hydro	PacifiCorp (PPL/UPLC)	Klamath River	80
John Day	Hydro	US Corps of Engineers	Federal System(BPA)	2,160
John Day Creek	Hydro	Non - Utility	Avista Corp.	1
Joseph Hydro	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	8
Kasel-Witherspoon	Hydro	Non - Utility	Idaho Power Company	1
Kerr	Hydro	PP&L - Montana	Flathead River, partially dedicated to region	171
Klamath	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	92
Koma Kulshan	Hydro	Non - Utility	Puget Sound Energy	14
Koyle	Hydro	Non - Utility	Idaho Power Company	1
La Grande	Hydro	Tacoma Power		64
Lake Oswego Corporation	Hydro	Non - Utility	Portland General Electric Co.	1
Lateral #10	Hydro	Non - Utility	Idaho Power Company	2
Leaburg	Hydro	Eugene Water & Electric Board		14
Lemolo No. 1	Hydro	PacifiCorp (PPL/UPLC)	Umpqua River	29
Lemolo No. 2	Hydro	PacifiCorp (PPL/UPLC)	Umpqua River	33
Libby	Hydro	US Corps of Engineers	Federal System(BPA)	525
Lilliwaup Falls	Hydro	Other Publics		1
Little Falls	Hydro	Avista Corp.		32
Little Goose	Hydro	US Corps of Engineers	Federal System(BPA)	810
Little Wood	Hydro	Non - Utility	Idaho Power Company	2
Littlewood-Arkoosh	Hydro	Non - Utility	Idaho Power Company	1
Long Lake	Hydro	Avista Corp.		70
Lookout Point	Hydro	USCE	Federal System - BPA	120
Lost Creek	Hydro	USCE	Federal System - BPA	49
Lower	Hydro	City of Idaho Falls		11
Lower Baker	Hydro	Puget Sound Energy		85
Lower Granite	Hydro	US Corps of Engineers	Federal System(BPA)	810
Lower Malad	Hydro	Idaho Power Company	Spring Plants	14
Lower Monumental	Hydro	US Corps of Engineers	Federal System(BPA)	810
Lower Salmon	Hydro	Idaho Power Company		60
Lowline #2	Hydro	Non - Utility	Idaho Power Company	3
Lowline Canal	Hydro	Non - Utility	Idaho Power Company	8
Lucky Peak	Hydro	IID	Seattle City Light	113
Madison	Hydro	PP&L - Montana	Madison River, partially dedicated to region	7
Magic Reservoir	Hydro	Non - Utility	Idaho Power Company	9
Main Canal Headworks	Hydro	Non - Utility	Seattle City Light/Tacoma Power	26
Marcos Ranches	Hydro	Non - Utility	Idaho Power Company	1
Mayfield	Hydro	Tacoma Power		162
McNary	Hydro	US Corps of Engineers	Federal System(BPA)	980
McNary Fishway	Hydro	Public Utility		8
Merwin	Hydro	PacifiCorp	PacifiCorp	136
Meyers Falls	Hydro	Avista Corp.	Avista Corp.	1
Middlefork Irrigation	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	3
Mile 28	Hydro	Non - Utility	Idaho Power Company	2
Mill Creek	Hydro		Federal System - BPA	1
Milner	Hydro	Idaho Power Company		59
Minidoka	Hydro	USBR	Federal System - BPA	28
Mink Creek	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	3
Mitchell Butte	Hydro	Non - Utility	Idaho Power Company	2

Northwest Generating Resources

Name	Fuel	Owner	NW Utility	Nameplate Rating MW
Monroe Street	Hydro	Avista Corp.		15
Morony	Hydro	PP&L - Montana	Missouri River, partially dedicated to region	45
Morse Creek	Hydro	City of Port Angeles		1
Mossyrock	Hydro	Tacoma Power		300
Moyie Springs	Hydro	City of Bonners Ferry	Minor Hydro-Others	4
Mystic Lake	Hydro	PP&L - Montana	W. Rosebud River, partially dedicated to region	10
Naches	Hydro	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	6
Naches Drop	Hydro	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	1
Newhalem	Hydro	Seattle City Light		2
Nine Mile	Hydro	Avista Corp.		26
Nooksack	Hydro	Puget Sound Energy	Snoqualmie & Minor	2
North Fork	Hydro	Portland General Electric Company		41
North Fork Sprague	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	1
North Umpqua	Hydro	PacifiCorp (PPL/UPLC)	PacifiCorp (PPL/UPLC)	175
Noxon Rapids	Hydro	Avista Corp.	Avista Corp.	466
Oak Grove	Hydro	Portland General Electric Company		51
Opal Springs	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	5
Owyhee Dam	Hydro	Non - Utility	Idaho Power Company	5
Oxbow	Hydro	Idaho Power	Idaho Power	190
P.E.C. Headworks	Hydro	Non - Utility	Grant County PUD #2	7
Packwood	Hydro	Energy Northwest		28
Palisades	Hydro	USBR	Federal System - BPA	177
Pelton	Hydro	Portland General Electric	Portland General Electric	110
Pelton Reregulating	Hydro	Warm Springs Tribe	Portland General Electric	19
Phillips Ranch	Hydro	Non - Utility	Avista Corp.	0
Pigeon Cove	Hydro	Non - Utility	Idaho Power Company	2
Portland Hydro Project	Hydro	Non - Utility	Portland General Electric Co.	36
Post Falls	Hydro	Avista Corp.		15
Potholes East Canal 66	Hydro	Non - Utility	Seattle City Light/Tacoma Power	2
Powerdale	Hydro	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	6
Priest Rapids	Hydro	Grant County PUD		956
Prospect No. 1	Hydro	PacifiCorp (PPL/UPLC)	Rogue River	4
Prospect No. 2	Hydro	PacifiCorp (PPL/UPLC)	Rogue River	32
Prospect No. 3	Hydro	PacifiCorp (PPL/UPLC)	Rogue River	7
Prospect No. 4	Hydro	PacifiCorp (PPL/UPLC)	Rogue River	1
Quincy Chute	Hydro	Non - Utility	Grant County PUD #3	9
R. D. Smith	Hydro	Non - Utility	Seattle City Light/Tacoma Power	6
Rainbow	Hydro	PP&L - Montana	Missouri River, partially dedicated to region	36
Reeder Gulch	Hydro	Other Publics		1
River Mill	Hydro	Portland General Electric Company		19
Rock Creek #1	Hydro	Non - Utility	Idaho Power Company	2
Rock Creek #2	Hydro	Non - Utility	Idaho Power Company	2
Rock Island	Hydro	Chelan County PUD	Power House 1	623
Rocky Reach	Hydro	Chelan County PUD		1,300
Rogue	Hydro	PacifiCorp (PPL/UPLC)	PacifiCorp (PPL/UPLC)	25
Ross	Hydro	Seattle City Light		360
Round Butte	Hydro	Portland General Electric	Portland General Electric	247
Roza-Pump	Hydro	USBR	Federal System - BPA	13

Northwest Generating Resources

Name	Fuel	Owner	NW Utility	Nameplate Rating MW
Ryan	Hydro	PP&L - Montana	Missouri River, partially dedicated to region	48
Sheep Creek	Hydro	Non - Utility	Avista Corp.	2
Shoshone Falls	Hydro	Idaho Power Company		13
Slide Creek	Hydro	PacifiCorp (PPL/UPLC)	Umpqua River	18
Smith Creek	Hydro	Eugene Water & Electric Board		38
Snoqualmie Fall	Hydro	Puget Sound Energy	Snoqualmie & Minor	42
Soda Creek	Hydro	Other Publics		1
Soda Springs	Hydro	PacifiCorp (PPL/UPLC)	Umpqua River	11
South Fork Tolt	Hydro	Seattle City Light		17
Spokane Upriver	Hydro	Non - Utility	Avista Corp.	16
Stauffer Dry Creek	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	4
Stayton	Hydro	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	1
Stone Creek	Hydro	Eugene Water & Electric Board		12
Strawberry Creek	Hydro	Lower Valley Power & Light Inc.	S. Idaho-Public Agy.	2
Sullivan Lake	Hydro	Pend Oreille County PUD #3	Storage Only	-
Summer Falls	Hydro	Non - Utility	Seattle City Light/Tacoma Power	92
Swan Falls	Hydro	Idaho Power Company		25
Swift 1	Hydro	PacifiCorp	Cowlitz Co PUD	204
Swift 2	Hydro	Cowlitz County PUD	Cowlitz County PUD	70
T.W. Sullivan	Hydro	Portland General Electric Company		15
The Dalles	Hydro	US Corps of Engineers	Federal System(BPA)	1,807
The Dalles Fishway	Hydro	Northern Wasco		0
Thompson Falls	Hydro	PP&L - Montana	Clark Fork River, partially dedicated to region	80
Thompson Falls Add.	Hydro	PP&L - Montana	Clark Fork River, partially dedicated to region	-
Thousand Springs	Hydro	Idaho Power Company	Spring Plants	9
Toketee	Hydro	PacifiCorp (PPL/UPLC)	Umpqua River	43
Trail Bridge	Hydro	Eugene Water & Electric Board		10
Tunnel #1	Hydro	Non - Utility	Idaho Power Company	7
Twin Falls	Hydro	Idaho Power Company		52
Twin Falls	Hydro	Non - Utility	Puget Sound Energy	20
Upper	Hydro	City of Idaho Falls		8
Upper Baker	Hydro	Puget Sound Energy		106
Upper Falls	Hydro	Avista Corp.		10
Upper Malad	Hydro	Idaho Power Company	Spring Plants	8
Upper Salmon 1 & 2	Hydro	Idaho Power Company		18
Upper Salmon 3 & 4	Hydro	Idaho Power Company		17
Walla Walla	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	2
Wallowa Falls	Hydro	PacifiCorp (PPL/UPLC)	Condit, Big F & Minor	1
Walterville	Hydro	Eugene Water & Electric Board		8
Wanapum	Hydro	Grant County PUD		1,038
Weeks Falls	Hydro	Non - Utility	Puget Sound Energy	5
Wells	Hydro	Douglas County PUD	Avista Corp.	774
West Side	Hydro	PacifiCorp (PPL/UPLC)	Klamath River	1
Wilson Lake	Hydro	Non - Utility	Idaho Power Company	8
Wynoochee Dam	Hydro	Tacoma Power		13
Yakima-Trenton	Hydro	Non - Utility	PacifiCorp (PPL/UPLC)	3
Yale	Hydro	PacifiCorp	PacifiCorp	134
Yelm	Hydro	City of Centralia		10

Northwest Generating Resources

Name	Fuel	Owner	NW Utility	Nameplate Rating MW
COAL				
Boardman	Coal	Portland General Electric	Portland General Electric	642
Centralia #1	Coal	TransAlta		670
Centralia #2	Coal	TransAlta		670
Colstrip #1	Coal	PP&L Montana, LLC	PP&L Montana, LLC	330
Colstrip #2	Coal	PP&L Montana, LLC	PP&L Montana, LLC	330
Colstrip #3	Coal	PP&L Montana, LLC	PP&L Montana, LLC	740
Colstrip #4	Coal	NorthWestern Energy	NorthWestern Energy	805
Corette	Coal	PP&L Montana, LLC	PPL Montana, LLC	163
Jim Bridger #1	Coal	PacifiCorp	PacifiCorp	530
Jim Bridger #2	Coal	PacifiCorp	PacifiCorp	530
Jim Bridger #3	Coal	PacifiCorp	PacifiCorp	520
Jim Bridger #4	Coal	PacifiCorp	PacifiCorp	530
Valmy #1	Coal	Idaho Power Company	Idaho Power Company	254
Valmy #2	Coal	Idaho Power Company	Idaho Power Company	267
NUCLEAR				
Columbia Generating Station	Uranium	Energy Northwest	Federal System (BPA)	1,230
COMBUSTION TURBINES				
Alden Bailey	Natural Gas	Clatskanie PUD	Clatskanie PUD	11
Beaver	Natural Gas	Portland General Electric	Portland General Electric	586
Beaver 8	Natural Gas	Portland General Electric	Portland General Electric	25
Bennett Mountain	Natural Gas	Idaho Power Company	Idaho Power Company	162
Big Hanaford	Natural Gas	TransAlta		248
Chehalis Generating Facility	Natural Gas	PacifiCorp	PacifiCorp	517
Coyote Springs II	Natural Gas	Avista Corp	Avista Corp	287
Danskin	Natural Gas	Idaho Power Company	Idaho Power Company	90
Danskin 1	Natural Gas	Idaho Power Company	Idaho Power Company	170
Encogen	Natural Gas	Puget Sound Energy	Puget Sound Energy	194
Finley CT	Natural Gas			29
Frederickson Generation	Natural Gas	EPCOR Power L.P./PSE	Benton PUD	269
Fredonia 1 & 2	Natural Gas	Puget Sound Energy	Puget Sound Energy	287
Fredonia 3 & 4	Natural Gas	Puget Sound Energy	Puget Sound Energy	121
Fredrickson 1 & 2	Natural Gas	Puget Sound Energy	Puget Sound Energy	188
Goldendale	Natural Gas	Puget Sound Energy	Puget Sound Energy	335
Hermiston Power Project	Natural Gas	Hermiston Power Partners		689
Kettle Falls CT	Natural Gas	Avista Corp	Avista Corp	7
Klamath Peaking Units 1-4	Natural Gas	Iberdrola Renewables		100
Lancaster Power Project	Natural Gas	Avista Corp	Avista Corp	270
Mint Farm Energy Center	Natural Gas	Wayzata Investment Partners	Puget Sound Energy	310
Northeast 1 & 2	Natural Gas	Avista Corp	Avista Corp	62
Pasco Generation Station	Natural Gas	Franklin PUD/Grays Harbor PUD	Franklin County PUD	44
Port Westward	Natural gas	Portland General Electric	Portland General Electric	415
Rathdrum 1 & 2	Natural Gas	Avista Corp	Avista Corp	167
River Road Generating	Natural Gas	Clark Public Utilities	Clark Public Utilities	248
Sumas Energy	Natural Gas	Puget Sound Energy	Puget Sound Energy	161
Whitehorn #2 & 3	Natural Gas	Puget Sound Energy	Puget Sound Energy	188

Northwest Generating Resources

Name	Fuel	Owner	NW Utility	Nameplate Rating MW
COGENERATION				
Afton Energy (Wood)	Cogen	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 (Magic West)		Idaho Power Company	Idaho Power Company	10
Grays Harbor Paper	Wood Waste	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
PERC		Puget Sound Energy	Puget Sound Energy	3
Rough & Ready Lumber	Wood	Rough & Ready	PacifiCorp	1
Rupert (Magic Valley)		Idaho Power Company	Idaho Power Company	10
Scott Cogeneration	Cogen	Non-Utility	Snohomish County PUD	43
Simplot		Idaho Power Company	Idaho Power Company	12
Tasco 1		Idaho Power Company	Idaho Power Company	2
Tasco 2		Idaho Power Company	Idaho Power Company	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)	99% Biomass, 1% Natural Gas	Eugene Water & Electric Board	Eugene Water & Electric Board	36
Weyco Energy Center	Wood	Eugene Water & Electric Board	Eugene Water & Electric Board	51
OTHER RENEWABLES				
Ashland Solar Project	Solar		Federal (BPA)	-
Biomass One	Wood	PacifiCorp	PacifiCorp	25
Blue Mountain	Wood			4
Coffin Butte Resource	Landfill Gas	Power Resources Cooperative	PNGC Power	6
Cogen Company			Other Publics (BPA)	8
Co-Gen II - DR Johnson	Wood	PacifiCorp	PacifiCorp	8
Convanta Marion		Portland General Electric	Portland General Electric	16
Dry Creek Landfill	Gas	Dry Creek Landfill Inc.	PacifiCorp	3
Four Mile Hill Geothermal		Calpine	Federal (BPA)	50
Georgia-Pacific Paper		Federal (BPA)	Federal (BPA)	32
Hidden Hollow Landfill	Landfill Gas	G2 Energy	Idaho Power Company	3
H. W. Hill Landfill Gas	Landfill gas	Allied Waste Companies	Benton PUD	11
Kettle Falls	Wood	Avista Corp.	Avista Corp	51
Mead (Methane Energy)	Methane		Other Publics (BPA)	2
Olympic View 1&2	gas	Mason County PUD 3		5
Pine Products		PacifiCorp	PacifiCorp	6
Pocatello Wastewater		Idaho Power Company	Idaho Power Company	0
Potlatch		Avista Corp.	Avista Corp	114
Qualco		Owner Utility	Puget Sound Energy	1
Raft River 1		US Geothermal	Idaho Power Company	16

Northwest Generating Resources

Name	Fuel	Owner	NW Utility	Nameplate Rating MW
Short Mountain	Biomass (Landfill Gas)		Other Publics (BPA)	3
Spokane MSW	MSW	City of Spokane	Puget Sound Energy	23
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
Vaagen Bros.	Wood	Idaho Power Company	Idaho Power Company	5
VanderHaak Dairy	Biogas		Puget Sound Energy	0
White Bluffs Solar Station	Solar	Energy Northwest	Federal (BPA)	-
Wild Horse Solar Project	Solar PV	Puget Sound Energy		1

Wind

Bennet Creek	Wind	Bennet Creek	Idaho Power Company	21
Big Horn	Wind	Iberdrola Renewables		199
Biglow Canyon - 1	Wind	Portland General Electric	Portland General Electric	125
Cassia Farms	Wind	John Deere	Idaho Power Company	11
Cassia Gulch	Wind	John Deere	Idaho Power Company	21
Combine Hills I	Wind	Eurus Energy of America	PacifiCorp	41
Condon Wind	Wind	Goldman Sachs (75%), SeaWest NW 25%	Federal - BPA	25
Elk Horn Wind	Wind	Horizon Wind	Idaho Power Company	100
Foote Creek Rim 1, 2, 4	Wind	PacifiCorp & EWEB		60
Fossil Gulch Wind	Wind	Idaho Power Company		11
Goodnoe Hills	Wind	PacifiCorp	PacifiCorp	94
Harvest Wind	Wind	Owner Utility	Cowlitz	99
Hopkins Ridge	Wind	Puget Sound Energy	Puget Sound Energy	157
Horseshoe Bend	Wind	Horseshoe Bend Wind Park LLC	Idaho Power Company	9
Hot Springs Wind	Wind	Hot Springs Wind	Idaho Power Company	21
Judith Gap	Wind	Invenergy Wind, LLC	NorthWestern	135
Klondike I	Wind	PPM Energy	Federal (BPA)	24
Klondike II	Wind	PPM Energy	Portland General Electric	75
Klondike III	Wind	PPM Energy	Eugene Water & Electric Board	221
Leaning Juniper 1	Wind	PPM Energy	PacifiCorp	101
Lewandowski Farms	Wind	Idaho Power	Idaho Power	0
Marengo	Wind	Renewable Energy America	PacifiCorp	140
Marengo II	Wind	PacifiCorp	PacifiCorp	70
Mountain Wind 1 QF	Wind	Trilateral Energy	PacifiCorp	60
Mountain Wind 2 QF	Wind	Trilateral Energy	PacifiCorp	80
Nine Canyon	Wind	Energy Northwest	Benton County PUD	96
Rock River I	Wind	Rock River I LLC.	PacifiCorp	50
Stateline Wind	Wind	PPM Energy	Federal (BPA)	300
Vansycle Ridge	Wind	ESI Vansycle Partners	Portland General Electric	25
Wheat Field Wind Project	Wind	Horizon Wind Energy	Snohomish PUD	97
White Creek	Wind	White Creek Wind I (investment)	Cowlitz PUD	205
Wild Horse	Wind	Puget Sound Energy	Puget Sound Energy	273
Wolverine Creek	Wind	Invenergy	PacifiCorp	65

SMALL THERMAL & MISCELLANEOUS

Boulder Park		Avista Corp		25
Crystal Mountain		Puget Sound Energy		3
Springfield Generation Farm		Springfield Utility Board		10

Potentially Available Energy from Independent Power Producers

Project	In-Service	Fuel/Tech	Nameplate (MW)	Capacity (MW)	Percent Available	Potential Energy (MWa)
Big Hanaford	2002	CCCT	248	248	100%	224
Big Horn	2006	Wind	200		100%	64
Centralia 1	1971	Coal		670	100%	596
Centralia 2	1971	Coal		670	100%	596
Emmett Biomass Project				18	100%	10
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
Rearden	2008	Wind	64	-	100%	16
Satsop	2008	CCCT	650	650	100%	553
Total				3,492		3,096

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.

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. 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 and resource information is included for the utilities listed in Table 1 at the end of this section.

LOAD ESTIMATES

The Northwest regional loads are the sum of firm 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. Note, that additional savings from planned conservation programs are reported in future resources.

Interruptible loads and 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 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.

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 are reported in a variety of categories. Coal, nuclear, cogeneration and combustion turbines 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 miscellaneous projects. Wind projects are reported in their own category.

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, 2008, 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, 2008, 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. Future conservation, 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 the region. Transfers of other utilities do not consider any transmission bottlenecks that may occur in the future.

Table 1 - Utilities included in the Northwest Regional Forecast

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

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.

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.

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.

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.

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 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 - 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.

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.

Wind Resources

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