

Northwest Regional Forecast

of Power Loads and Resources

August 2007 – July 2017

The logo for PNWCC (Pacific Northwest Energy Council) features the letters 'PNWCC' in a bold, blue, sans-serif font. A stylized lightning bolt is integrated into the letter 'W', extending upwards and to the right.

April 2007

Exhibit____(TWK-2)

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Northwest Regional Forecast

Each year the Northwest Regional Forecast reports the sum of individual utilities' projected electric loads and anticipated generating resources as an indicator of the Northwest utilities' need to acquire additional power in the next decade. This year the attention on the region's load/resource picture has significantly escalated as state and national leaders are implementing recently passed and/or discussing new initiatives that are changing utilities' requirements for acquiring new resources to meet their customers' demands. Much of this activity centers on carbon-neutral, renewable generating resources and new technology.

In addition, many Northwest utilities are preparing new contracts with Bonneville Power Administration that are expected to include significant changes in how utilities meet their future load. In these contracts each utility will have the opportunity to commit to acquiring resources to meet their growing demand rather than relying on BPA for that service. These are exciting times that are pointing to change. This report provides a straight forward look at the region's load/resource picture and plans for future resources from the utilities' perspective in this evolving environment.

Serious About New Resources – Especially Renewables

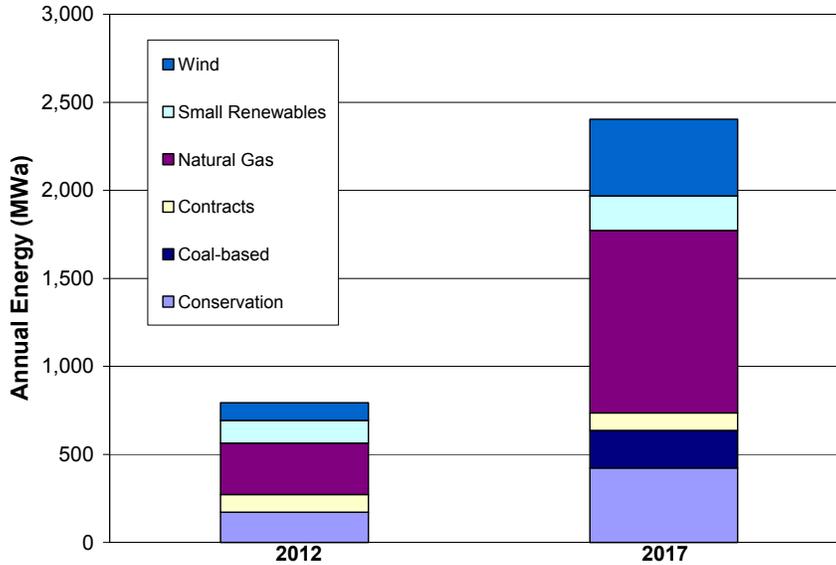
This report highlights utilities' activity in new resource development and how they are looking for opportunities to include renewable generation in their future plans. A dozen utility projects totaling almost 950 MW of new capacity were installed or acquired this last year. The majority of these projects are wind and other renewable generation. The other projects include one small coal plant and two natural gas fired combustion turbines.

Also reported are more than twenty projects currently being built and expected to be completed in the next two years. These projects total over 2,500 MW of capacity of which 1,300 MW is wind and other renewable generation. The remainder is natural gas-fired combustion turbines. Of all the generating capability added to the resource mix in 2006 and those resources under construction, one third of it is being developed by non-utility entities.

Many Northwest utilities develop integrated resource plans to evaluate their power needs for the next 10 to 20 years. In looking at those plans we get a glimpse at what utilities are expecting to build in the longer term. Below is a snapshot of resources utilities are planning to build or acquire, in annual average energy (MWh) for 5 and 10 years in the future. Wind generation, other small renewables, and conservation are a significant part of the picture. And as utilities' need for power increases, they will be relying on the traditional resources of combustion turbines and coal plants. This is only

a partial list of expected resources as some utilities are still completing their latest plans and have not identified the specific types of resources.

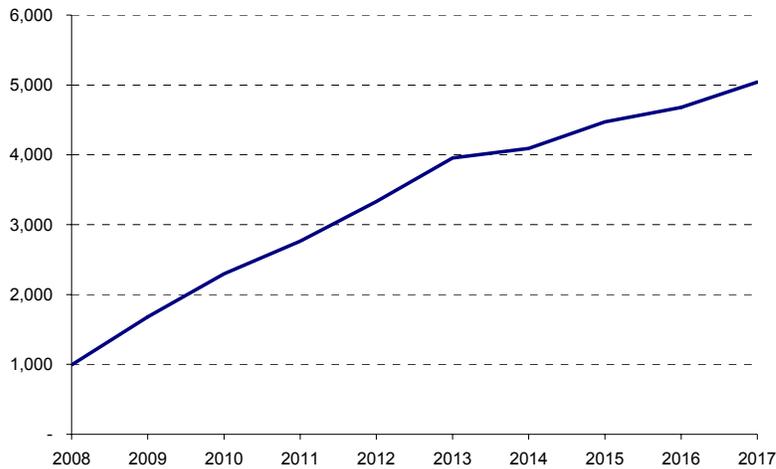
Future Resource Plans



Need for Power still Growing

With the amount of resource activity we see, it is no surprise that the sum of utilities' firm loads compared to expected resources indicates a need for power of approximately 1,000 MWa. This need continues to increase to over 5,000 MWa in ten years, as loads grow at about 300 MWa annually and firm imports and contracts diminish.

Northwest Need for Power
Annual Energy - MWa



This assumes critically low water conditions for fueling the hydro system. All resources are utility owned and operated or secured through firm contracts. Generating resources currently under construction are also included.

The load forecast includes both firm and interruptible loads assuming normal weather conditions and reflects utilities' expected savings from conservation efforts.

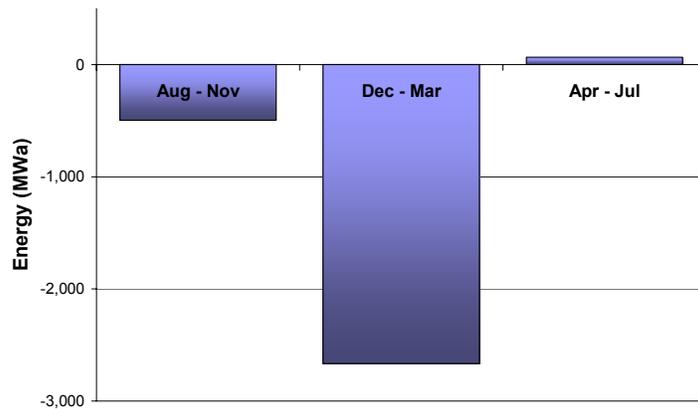
Other Perspectives – This report is one of several assessments used by electric utility industry planners as an indicator of a need for action to ensure generating resources are available to adequately meet customer’s future needs. The Bonneville Power Administration and the Northwest Power and Conservation Council are two other entities that develop a regional picture of loads and resources. The Bonneville *White Book* presents both energy and capacity perspectives. In BPA’s most recent report, December 2006, the energy analysis also suggests a need for action in the Northwest. The extent of actions needed vary depending on assumptions about the availability of uncommitted generation from independent power producers.

The Northwest Power and Conservation Council, working with the Regional Adequacy Forum, has developed a market analysis for evaluating regional adequacy. The Council analysis incorporates the regional energy market containing a mix of utility and non-utility participants. In other words, their assessment assumes that generation from facilities located in the Northwest and owned by independent entities (nearly 3,100 MWa) will be available to meet regional load during a period of power shortage. These resources can provide enough generation to the regional energy market to meet current loads.

More to the L/R Balance Story – The annual average energy load/resource picture does not tell the whole story. Historically the shape of the deficit across the year fluctuates greatly. This graph illustrates how the balance of supply and demand varies by season. The annual average firm deficit is about 1,000 MWa.

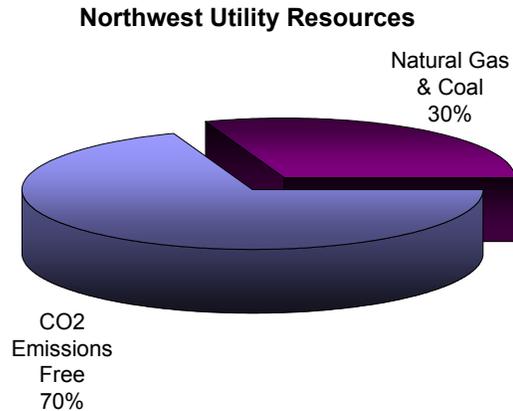
However, the winter deficit averages over 2,600 MWa during those four months and that is a stark contrast to April through July and August through November situation demonstrating some of the challenges utility planners face as they are deciding on new power sources.

2007-08 Seasonal Load/Resource Balance



The Northwest Resource Mix is Clean

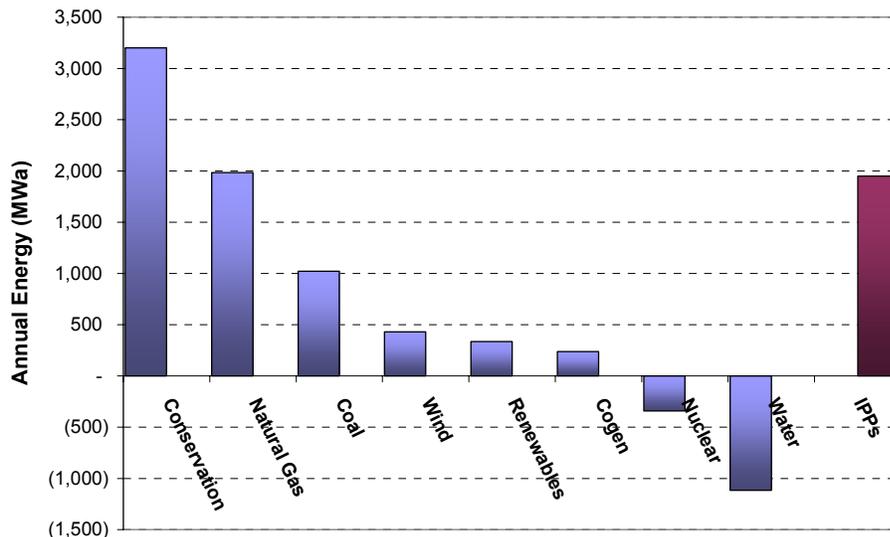
With all the attention on resources and what utilities should be acquiring, it is interesting to look at the types of firm resources Northwest utilities count on to meet their loads. The chart shows today's resource mix for the region's utilities is seventy percent CO₂ emissions free. Much of this is due to the significant reliance on hydropower in the region as well as our one nuclear plant. And the recent investments in wind and other renewable resources are contributing to this clean mix.



A look at what utilities have been investing in the past 25 years (below) shows that conservation efforts have provided the region with the greatest gain toward balancing Northwest loads and resources in the past two and a half decades. This conservation information is from the Council's recently released report on conservation accomplishments in the past 25 years and indicates that the region has saved 3,200 MWa during that time.

This also shows that gas-fired combustion turbines have been the generating resource of choice for utilities. And the energy shown for independent power producers is all gas-fired combustion turbines as well. Much of this generation came on line following the 2000-2001 power situation. This increase in independent power producers has created the notable difference between the sum of utilities' resources and total Northwest resources we see today.

Northwest Additional Resources 1980 to 2006



Northwest Region Requirements and Resources

| Annual Energy (MWa) | <u>2007-08</u> | <u>2008-09</u> | <u>2009-10</u> | <u>2010-11</u> | <u>2011-12</u> |
|--|----------------|----------------|----------------|----------------|----------------|
| Requirements | | | | | |
| Load | 21,371 | 21,831 | 22,141 | 22,444 | 22,711 |
| Exports | 828 | 773 | 866 | 827 | 773 |
| Total | <u>22,198</u> | <u>22,604</u> | <u>23,007</u> | <u>23,271</u> | <u>23,484</u> |
| Resources | | | | | |
| Hydro | 11,480 | 11,478 | 11,496 | 11,487 | 11,486 |
| Small Thermal & Miscellaneous | 24 | 24 | 24 | 24 | 24 |
| Combustion Turbines | 1,516 | 1,526 | 1,518 | 1,535 | 1,496 |
| Renewables | 802 | 868 | 872 | 871 | 862 |
| Cogeneration | 1,151 | 1,148 | 1,152 | 1,150 | 978 |
| Imports | 1,684 | 1,525 | 1,218 | 1,016 | 719 |
| Large Thermal | 4,523 | 4,329 | 4,404 | 4,397 | 4,562 |
| Total | <u>21,181</u> | <u>20,899</u> | <u>20,684</u> | <u>20,480</u> | <u>20,127</u> |
| Surplus (Deficit) | (1,018) | (1,705) | (2,323) | (2,791) | (3,357) |
| Potentially Available Resources | | | | | |
| Independent Power Producer Projects | 3,086 | 3,086 | 3,086 | 3,086 | 3,086 |
| Hydro Generation (70 year average) | 4,181 | 4,179 | 4,160 | 4,170 | 4,171 |

Northwest Region Requirements and Resources

| Annual Energy (MWa) | <u>2012-13</u> | <u>2013-14</u> | <u>2014-15</u> | <u>2015-16</u> | <u>2016-17</u> |
|--|----------------|----------------|----------------|----------------|----------------|
| Requirements | | | | | |
| Load | 23,049 | 23,348 | 23,655 | 23,972 | 24,197 |
| Exports | 735 | 722 | 674 | 618 | 555 |
| Total | <u>23,784</u> | <u>24,070</u> | <u>24,329</u> | <u>24,590</u> | <u>24,752</u> |
| Resources | | | | | |
| Hydro | 11,484 | 11,483 | 11,481 | 11,481 | 11,481 |
| Small Thermal & Miscellaneous | 24 | 24 | 25 | 25 | 25 |
| Combustion Turbines | 1,516 | 1,509 | 1,518 | 1,503 | 1,516 |
| Renewables | 855 | 856 | 846 | 845 | 845 |
| Cogeneration | 831 | 743 | 745 | 745 | 745 |
| Imports | 719 | 722 | 722 | 726 | 581 |
| Large Thermal | 4,374 | 4,617 | 4,494 | 4,560 | 4,494 |
| Total | <u>19,803</u> | <u>19,953</u> | <u>19,831</u> | <u>19,884</u> | <u>19,686</u> |
| Surplus (Deficit) | (3,981) | (4,117) | (4,498) | (4,706) | (5,066) |
| Potentially Available Resources | | | | | |
| Independent Power Producer Projects | 3,086 | 3,086 | 3,086 | 3,086 | 3,086 |
| Hydro Generation (70 year average) | 4,172 | 4,174 | 4,175 | 4,176 | 4,176 |

Northwest Region (Seasonal) Requirements and Resources

| Average Energy (MWa) | <u>August - November</u> | <u>December - March</u> | <u>April - July</u> | <u>Average</u> |
|--------------------------|--------------------------|-------------------------|---------------------|----------------|
| Requirements | | | | |
| Load | 20,439 | 23,107 | 20,564 | 21,371 |
| Exports | 900 | 765 | 819 | 828 |
| Total | <u>21,339</u> | <u>23,871</u> | <u>21,383</u> | <u>22,198</u> |
| Resources | | | | |
| Hydro | 11,184 | 10,957 | 12,298 | 11,480 |
| Small Thermal & Misc. | 25 | 24 | 24 | 24 |
| Combustion Turbines | 1,563 | 1,518 | 1,464 | 1,516 |
| Renewables | 692 | 840 | 872 | 802 |
| Cogeneration | 1,162 | 1,169 | 1,121 | 1,151 |
| Imports | 1,535 | 2,090 | 1,425 | 1,684 |
| Large Thermal | 4,667 | 4,662 | 4,240 | 4,523 |
| Total | <u>20,826</u> | <u>21,260</u> | <u>21,444</u> | <u>21,180</u> |
| Surplus (Deficit) | (513) | (2,611) | 62 | (1,018) |

Potentially Available Resources

| Project | Fuel/Tech | Nameplate (MW) | Percent Available | Annual Energy (MWa) | Developer |
|------------------------------|-----------|-------------------|----------------------|---------------------------|------------------------------------|
| Big Hanaford | CCCT | 248 | 100% | 223 | Transalta |
| Big Horn | Wind | 200 | 100% | | PPM Energy |
| Centralia 1 & 2 | Coal | 1,404 | 92% | 1,097 | Transalta |
| Chehalis Generating Facility | CCCT | 520 | 100% | 468 | Chehalis Power Limited |
| Hermiston Power Project | CCCT | 630 | 100% | 567 | Calpine |
| Klamath Cogen Project | Cogen | 484 | 100% | 436 | Pacific Klamath Energy, PPM Energy |
| Klondike III | Wind | 221 | 100% | | PPM Energy |
| Rathdrum Power Project | CCCT | 270 | 100% | 243 | Avista Energy |
| Rearden | Wind | 64 | 100% | 16 | Energy Northwest |
| White Creek | Wind | 205 | 52% | 37 | FPL Energy |
| Total | | | | 3,086 | |

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 surplus/deficit 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) | Location | Utility |
|---|----------|--------------|-------------------|-------------------|---------------------|
| Basin Creek ¹ | May 2006 | Natural Gas | 50 | | NorthWestern Energy |
| Goldendale | Feb 2007 | CCCT | 277 | Goldendale, WA | Puget Sound Energy |
| Hidden Hollow Landfill | Apr 2006 | Landfill Gas | 3 | Boise, ID | Idaho Power |
| Horseshoe Bend - Great Falls ¹ | Feb 2006 | Wind | 9 | | NorthWestern Energy |
| Horseshoe Bend Wind Park | Feb 2006 | Wind | 9 | Great Falls, MT | Idaho Power |
| Judith Gap ¹ | Feb 2006 | Wind | 135 | | NorthWestern Energy |
| Leaning Juniper 1 Wind Project | Dec 2006 | Wind | 101 | Arlington, OR | PacifiCorp |
| Mora Drop | Sep 2006 | Hydro | 2 | Boise, ID | Idaho Power |
| Rocky Mountain Hardin ¹ | Apr 2006 | Coal | 116 | | NorthWestern Energy |
| Sahko | Jun 2006 | Hydro | 1 | Twin Falls, ID | Idaho Power |
| Tieton Hydro | Aug 2006 | Hydro | 15 | Klickitat Co., WA | EWEB |
| Wildhorse Wind Project | Dec 2006 | Wind | 229 | Kittitas Co., WA | Puget Sound Energy |
| Total | | | 946 | | |

¹ Company-wide resource may not serve NRF region load

Resources Under Construction

| Project | Schedule | Fuel/Tech | Nameplate (MW) | Location | Utility |
|------------------------------------|----------|---------------|-------------------|-------------------|-----------------------|
| Big Horn | | Wind | 200 | Bickleton, WA | |
| Biglow Canyon | Dec 2007 | Wind | 125 | Sherman Co., OR | Portland General |
| Danskin 1 | Jun 2008 | CT | 170 | | Idaho Power |
| Elk Horn Wind | Jan 2008 | Wind | 100 | North Powder, OR | Idaho Power |
| Freres Lumber | Dec 2007 | Biomass-Wood | 10 | Lyons, OR | PacifiCorp |
| Kerr Rehab | Mar 2007 | Hydro | | Kerr Lake | PPL Montana |
| Klondike III | 2007 | Wind | 221 | Sherman Co., OR | |
| Lowline Midway | Feb 2008 | Hydro | 3 | Twin Falls, ID | Idaho Power |
| Marengo | Aug 2007 | Wind | 140 | Dayton, WA | PacifiCorp |
| Mountain Wind 1 QF ¹ | Dec 2007 | Wind | 60 | Wyoming | PacifiCorp |
| Mountain Wind 2 QF ¹ | Dec 2007 | Wind | 60 | Wyoming | PacifiCorp |
| Neal Hot Springs | Nov 2007 | Geothermal | | Vale, OR | Idaho Power |
| Nine Canyon Phase 3 | Feb 2008 | Wind | 32 | Finley, WA | |
| Pioneer Ridge QF ¹ | Dec 2007 | Wind | 70 | Utah | PacifiCorp |
| Port Westward | Mar 2007 | CT, CW, CA | 415 | Clatskanie, OR | Portland General |
| Raft River 1 | Oct 2007 | Geothermal | | Malta, ID | Idaho Power |
| Raft River 3 | Jun 2009 | Geothermal | | Malta, ID | Idaho Power & EWEB |
| Rearden | 2008 | Wind | 64 | Rearden, WA | |
| Satsop Combustion Turbine | Mar 2008 | CCCT | 650 | Satsop, WA | |
| Sumas Recovered Heat Generation | | Heat Recovery | 5 | Sumas, WA | Puget Sound Energy |
| Treasure Valley | Jan 2008 | Methane | 3 | Caldwell, ID | Idaho Power |
| White Creek | Dec 2007 | Wind | 205 | Klickitat Co., WA | Cowlitz PUD |
| Total | | | 2,532 | | |

¹ Company-wide resource may not serve NRF region load

Planned Resources

| Project | Schedule | Fuel/Tech | Nameplate (MW) | Location | Utility |
|----------------------------------|--|--------------|-------------------|---------------------------|-----------------------|
| Alkali Wind Generation Facility | | Wind | 18 | Glenns Ferry | Idaho Power |
| Arlington Wind Farm | 2008 | Wind | 104 | N-Central OR | |
| Arrowrock Dam | | Hydro | 15 | Boise River, ID | |
| Bennett Creek | | Wind | | Mountain Home, ID | Idaho Power |
| BP Cherry Point Refinery | | Cogen CCCT | 720 | Birch Bay, WA | |
| Cabinet Gorge Units 2 & 4 | Unit 4: 2006 | Hydro Eff. | 3 | Clark Fork River, ID | Avista |
| Coffin Butte | Oct 2007 | Landfill Gas | 3 | | PNGC Power |
| Collins Pine | Dec 2008 | Biomass | 13 | Lakeview, OR | |
| Colstrip 3 & 4 Therm. Upgrad | Unit 3: 2007 Unit 4: 2006 | Thermal | 8 | Colstrip, MT | |
| Demand-Side Res. Programs | 2007 | Conservation | | | Idaho Power |
| Evander Andrews | 2008 | "Peaker" | 170 | Mountain Home, ID | Idaho Power |
| Fourmile Hill | | Geothermal | 55 | Siskiyou Co., CA | |
| Hot Springs | | Wind | | Mountain Home, ID | Idaho Power |
| Kittitas Valley Wind Pwr Project | | Wind | 182 | Kittitas Co., WA | |
| Klamath Generating Facility | | CCCT | 480 | Klamath Falls, OR | |
| Leaning Juniper II | | Wind | 279 | Arlington, OR | |
| Mar-Lu Wind Farm | 2007 | Wind | 5 | N-Central, OR | |
| Noxon Rapids | Unit 1: 2008 Unit 2: 2009 Unit 3: 2007 Unit 4: 2010 | Hydro Eff. | 33 | Noxon, MT | Avista |
| Raft River - Unit 2 | Dec 2008 | Geothermal | 13 | Cassia Co., ID | EWEB |
| Roosevelt | | Wind | 150 | Klickitat Co., WA | |
| Shepards Flat Wind | | Wind | 909 | Gilliam/Morrow Co., OR | |
| Summit Ridge | | Wind | 50 | Wasco Co., WA | |
| Wanapum Generator 1-4 | 2008-11 | Hydro | | Columbia River, WA | Grant PUD |
| Wild Horse Solar Project | Dec 2007 | Solar PV | 1 | Kittitas Co., WA | Puget Sound Energy |
| Total | | | 3,210 | | |

Prospective Resources

| Project | Schedule | Fuel/Tech | Nameplate (MW) | Location | Utility |
|--|-----------|-------------|-------------------|--------------------|---------------------|
| Black Canyon | | Hydro | 10 | | BPA |
| Bull Mountain | 2011-2012 | IGCC | 300 | Roundup, MT | |
| Bull Mountain 1&2 | Mar 2009 | Coal | 700 | | NorthWestern Energy |
| Burley Butte Wind Farm | Dec 2007 | Wind | 11 | Burley, ID | Idaho Power |
| COB Energy Facility | | CCCT | 1,150 | Klamath Co., OR | |
| Combine Hills II | | Wind | 63 | Umatilla Co., OR | |
| Desert Claim | | Wind | 180 | near Ellensburg WA | |
| Emmett Facility | Nov 2007 | Biomass | 18 | Emmett, ID | Idaho Power |
| Golden Valley Wind Farm | Apr 2007 | Wind | 11 | Burley, ID | Idaho Power |
| Hector Ridge | | Wind | 60 | Klickitat County | |
| Idaho Energy Complex | | Nuclear | 1,600 | near Bruneau, ID | |
| Klickitat Wind | | Wind | 15 | Klickitat Co., WA | |
| Lava Beds Wind Farm | Mar 2009 | Wind | 18 | Hagerman, ID | Idaho Power |
| Lower Columbia Clean Energy Center | Jun 2011 | IGCC/NatGas | 520 | Columbia Co., OR | |
| Makah Bay Offshore Wave Energy Pilot Project | | Wave | 1 | Neah Bay, WA | Clallam PUD |
| Milner Dam Wind Farm | Mar 2009 | Wind | 18 | Twin Falls, ID | Idaho Power |
| Nelson Creek 1&2 | Apr 2013 | Coal | 500 | | NorthWestern Energy |
| Notch Butte Wind Farm | Mar 2009 | Wind | 18 | Twin Falls, ID | Idaho Power |
| Oregon Trails Wind Farm | Dec 2007 | Wind | 11 | Hagerman, ID | Idaho Power |
| Pacific Mountain Energy Center | | IGCC | 600 | Cowlitz Co., WA | |
| Pilgrim Stage Wind Farm | Dec 2007 | Wind | 11 | Hagerman, ID | Idaho Power |
| Reedsport OPT Wave Park | | Wave | 2 | Douglas Co., OR | PNGC Power |
| Salmon Falls Wind Farm | Mar 2008 | Wind | 21 | Hagerman, ID | Idaho Power |
| Seven Mile Hill Wind | | Wind | 60 | Wasco Co., OR | |
| Total | | | 5,896 | | |

Resources Under Consideration

| Project | Schedule | Fuel/Tech | Nameplate (MW) | Location | Utility |
|---------------------------------|----------|------------------|-------------------|--------------------|--------------------|
| CHP 1 | 2010 | Natural Gas | 50 | | Idaho Power |
| CHP 2 | 2020 | Natural Gas | 100 | | Idaho Power |
| Cle Elum Dam | | Hydro | 30 | Cle Elum River | |
| Douglas Wind Generation | | Wind | 300 | Douglas Co., WA | Douglas PUD |
| Geothermal (Binary) 1 | 2009 | Geothermal | 50 | | Idaho Power |
| Geothermal (Binary) 2 | 2021 | Geothermal | 50 | | Idaho Power |
| Geothermal (Binary) 3 | 2022 | Geothermal | 50 | | Idaho Power |
| Geothermal (Contract-25 year) | Dec 2008 | Geothermal | 14 | South Idaho | Puget Sound Energy |
| INL Nuclear | 2023 | Nuclear Purchase | 250 | | Idaho Power |
| Longview Power Station | | CCCT | 249 | Longview, WA | |
| New Gas (Contract - 15 year) | Jan 2011 | CCCT | 280 | Western WA | Puget Sound Energy |
| Pacific Mt. Energy Center | Oct 2011 | IGCC | 600 | Kalama, WA | |
| Pumped Storage | | Hydro | 100 | Douglas Co., WA | Douglas PUD |
| Rainbow Rehab | | Hydro | | Cascade | PPL Montana |
| Regional IGCC Coal | 2017 | Coal/IGCC | 250 | | Idaho Power |
| Seasonal Exchange (5-yr winter) | Jan 2007 | | 100 | System Delivery | Puget Sound Energy |
| Silver Bow Generation Project | | CCCT | 500 | Silver Bow Co., MT | |
| Thermal (RECIPS) | Mar 2007 | Natural Gas | 9 | Western WA | Puget Sound Energy |
| Wanapa | 2009 | CCCT | 650 | Hermiston, OR | EWEB |
| Wind | 2012 | Wind | 150 | | Idaho Power |
| Wind (Contract 15-year) | Dec 2007 | Wind | 50 | WA/OR | Puget Sound Energy |
| Wyoming Pulv. Coal | 2013 | Coal/Pulv | 250 | | Idaho Power |
| Total | | | 4,082 | | |

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 utility | 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 utility | 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 utility | 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 utility | 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 |
| 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 |
| Marcos Ranches | Idaho Power - non utility | 1 |

Northwest Generating Resources

| Project | Owner | Nameplate (MW) |
|------------------------|---|-------------------|
| 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 |
| 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 |
| Prospect No. 2 | PacifiCorp | 32 |
| Prospect No. 3 | PacifiCorp | 7 |

Northwest Generating Resources

| Project | Owner | Nameplate (MW) |
|---------------------|-----------------------------------|-------------------|
| 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 |
| 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 |
| Toketee | PacifiCorp | 43 |
| Trail Bridge | Eugene Water & Electric Board | 10 |
| Tunnel #1 | Idaho Power - non utility | 7 |
| Twin Falls | Idaho Power | 52 |
| Twin Falls | Puget Sound Energy - non utility | 20 |
| Upper Baker | Puget Sound Energy | 105 |
| Upper Falls | Avista Corp. | 10 |

Northwest Generating Resources

| Project | Owner | Nameplate (MW) |
|--------------------------------|----------------------------------|-------------------|
| 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 |
| 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 |
| 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 |
| Danskin | Idaho Power | 90 |
| 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 |

Northwest Generating Resources

| Project | Owner | Nameplate (MW) |
|-------------------------------|-----------------------------------|-------------------|
| Goldendale Energy Center | Puget Sound Energy | 237 |
| Kettle Falls | Avista Corp. | 7 |
| 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 |
| 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 |
| Weyerhaeuser Pulp Mill | Grays Harbor PUD | 15 |
| RENEWABLE | | |
| Ashland Solar Project | | - |
| 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 |

Northwest Generating Resources

| Project | Owner | Nameplate (MW) |
|--|---|-------------------|
| 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 |
| 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 (wood) | Idaho Power - non utility | 9 |
| Georgia Pacific Paper (Wauna) | Federal (BPA) | 32 |
| 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 (wind) | PacifiCorp - non utility | 101 |
| Mead | Non-Utility | 2 |
| Mountain Wind QF 1&2 | PacifiCorp - non utility | 120 |
| Nine Canyon Wind | Energy Northwest | 64 |
| Pine Products | PacifiCorp - non utility | 6 |
| Rock River (wind) | Shell Wind Energy | 50 |
| Short Mountain | Other Publics (BPA) | 3 |
| Spokane MSW | Puget Sound Energy - non utility | 23 |
| Stateline Wind Project | PPM Energy | 300 |
| Tamarack (wood) | Idaho Power | 5 |
| Vaagen Bros. (wood) | Idaho Power - non utility | 5 |
| Van Sycle (wind) | Portland General Electric | 25 |
| West Boise Waste | Idaho Power | 0 |
| 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 |
| Treasure Valley (methane) | Idaho Power | |

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 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.

Federal System (BPA) Loads

Federal System (BPA) firm loads are the sum of the direct service industrial customers (DSI) loads, 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.

Transmission Losses

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

RESOURCE ESTIMATES

This report considers existing resources and four categories of future resources: Under Construction; Planned; Prospective, and Under Consideration. Only the existing resources and resources Under Construction are reflected in the regional tabulations. Generating resources (or shares) that are committed to meeting NW 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 is reported after encroachment.

Hydro energy capability was also estimated for each of the 70 historical water years. In these studies, reservoirs began the first year of the 70-year period at their end of July elevation except for Dworshak, Hungry Horse, Libby, and Grand Coulee. 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.

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 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 Biological Opinion 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.

Non-Hydro Resources

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.

Non-Utility Generation

Non-utility (or independent power producer) 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.

Future Resources

Future generating resources are included in this report. They are categorized into one of four categories to reflect the various stages of planning and development.

Under Construction

Resources *Under Construction* include those projects not complete as of December 31, 2006, but currently are being built. In this report, these resources are included in the regional load-resource analysis.

Planned

Planned Resources include those projects not under construction as of December 31, 2006, 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.

Prospective

Prospective Resources include those projects that developers or utilities have made some commitment to construct or acquire and in the initial stages of filing for site certificates and licenses for construction. However, not all licenses have been obtained, a commercial operation data has not been necessarily specified, or the specifics of the transaction have not been finalized.

Under Consideration

Resources Under Consideration include those projects that developers and utilities are considering for construction or acquisition. Planning for these resources has not progressed far enough to allow a potential sponsor to commit itself in terms of funding, size or sharing or ownership.

INTERCHANGES WITH SYSTEMS OUTSIDE THE REGION

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

(MWh) 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 (CAN)

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.

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.

Dedicated Resources

The actual resources used by a utility in the operating year prior to the signing of the Northwest Electric Power Planning and Conservation Act, and other resources that the utility dedicates to serve load. These resources are declared for a rolling 7-year period in utilities' power sale contracts with BPA.

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 (ENC)

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 Capacity

Maximum on-peak electrical energy intended to have assured availability to customers over a defined period.

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.

Firm Requirements

Firm loads plus reserves.

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.

Industrial Customers

Same as Direct Service Industries (DSI).

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.

January Peak

A capacity value in megawatts for the month of January (January 1937 for this report). Used to represent highest estimated 60-minute clock hour average demand for that month under normal weather conditions.

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).

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 2006 is August 1, 2005 through July 31, 2006.

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.

Prospective Resources

Projects, measures, and transactions utilities are considering for construction or acquisition and are initiating the state siting process. Planning for these resources may not have progressed far enough to allow a potential sponsor to commit itself in terms of funding, size, or sharing of ownership.

Renewable Resource

A category of resources, besides hydropower, 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 Consideration

Resources under consideration include those projects, measures and transactions the utilities have determined as developable or are considering for construction or acquisition. Planning for these resources has not progressed far enough to allow a potential sponsor to commit itself in terms of funding, size, or sharing of ownership.

Resources Under Construction

Embedded in the forecast of future resources, these projects are incomplete but under construction at the time of publication.

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.

Secondary Energy Loads

Loads that are served with nonfirm energy when available.

Surplus Firm Energy

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

Sustained Peaking Adjustment

An adjustment to the peaking capability of the federal hydro system that reflects the ability to meet a 10-hour peak load.

System Diversity

The difference between the sum of the individual utility non-coincidental peak loads and the sum of the individual utility peak loads coincidental with the federal system (BPA) peak.

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.