DECEMBER 2004

2004 PACIFIC NORTHWEST LOADS AND RESOURCES STUDY

OPERATING YEARS 2006 THROUGH 2015

REVISED NOVEMBER 2005

BONNEVILLE POWER ADMINISTRATION

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

POWER BUSINESS LINE

September 8, 2005

In reply refer to: PGPL-5

Dear Interested Parties:

This summary document is Bonneville Power Administration's (BPA) latest projected Pacific Northwest Loads and Resources Study, commonly called the "White Book". The 2004 White Book is a snapshot of the Pacific Northwest (PNW) region and the Federal system loads and resources as of December 31, 2004. The analysis incorporates BPA's estimates of PNW total regional retail loads, contract obligations, contract purchases, and resource capabilities. These estimates were provided by BPA and PNW Federal agencies, public agencies, cooperatives, U.S. Bureau of Reclamation (USBR), and investor-owned utilities (IOUs) through 2004 Pacific Northwest Utilities Conference Committee (PNUCC) data submittals as well as direct submittals to BPA. These projections were compiled to estimate the load and resource capabilities for the 10-year study horizon, operating years (OY) 2006 through 2015, for both the PNW region and the Federal system.

The White Book is used as input into BPA's long-range resource planning process, to assist planning for adequate and reliable load service for the Federal system and the region. This White Book includes possible scenarios of resource levels for both the Federal system and the region. The 2004 Pacific Northwest Loads and Resources Study is an update to the previous 2003 White Book.

Federal Firm Sales and Load Obligations

Federal system sales and load obligations are comprised of BPA's power sales contract (PSC) obligations to PNW Federal agency, public agency, cooperative, USBR, IOU, and DSI customers and other BPA firm contractual obligations.

BPA Power Sales Contract Obligations: BPA signed either 5- or 10-year PSCs with its customers that began October 1, 2001. The following is a description of power deliveries to specific customer classes:

- BPA's Federal agency, public agency, cooperative, and USBR customers signed either 5- or 10-year PSCs. Some of the public agencies and cooperatives signed up for the 10-year Slice of the System Product (Slice). BPA's PSC and Slice obligations end September 30, 2011; however, this study assumes that BPA will meet these or similar obligations through OY 2015. The public utility net requirement load obligations are estimated to range from approximately 6,750 aMW in OY 2006 to 7,618 aMW in OY 2015. In actual operation, BPA's obligations to serve these customers may be higher or lower than those shown in this study;
- The IOU's signed the 10-year Residential Purchase and Sales Agreement (RPSA) settling BPA's obligations to the IOUs under the Northwest Power Act. As a result of negotiations in 2001, IOU power deliveries under the RPSA settlement reflect reduced

deliveries in exchange for financial considerations through September 30, 2006. This resulted in a net IOU RPSA settlement power delivery of 258 aMW during this time period. The amendments made to the RPSA settlement contracts by BPA and the IOUs on May 28, 2004, stipulate that BPA provides only financial benefits and that no power is delivered for the period October 1, 2006, through September 30, 2011; and

- BPA's DSI customers signed 5-year contracts beginning October 1, 2001, through September 30, 2006. Due to signed load reduction agreements, closures, and contract terminations, BPA's DSI load obligations are estimated to reach up to 271 aMW. After September 30, 2006, Federal service to the DSIs is not assumed because the DSIs do not have signed contracts in place for service. However, this assumption does not represent a decision by BPA as to whether or what form of DSI service will be offered post September 30, 2006.

Table 1, shows BPA's Federal agency, public agency, cooperative, USBR, IOU, and DSI load obligations under their 2001 PSCs.

Table 1

2004 White Book
BPA Power Sales Contract Load Obligations
Annual Energy in Average Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
USBR	149	149	149	149	149	149	149	149	149	149
Federal Agency	118	124	131	142	144	146	147	148	150	151
Public Agency 1/	6,481	6,882	7,032	7,052	7,121	7,155	7,203	7,222	7,293	7,318
DSI 2/	271	45	0	0	0	0	0	0	0	0
IOU										
Power Deliveries 3/	382	64	0	0	0	0	0	0	0	0
Power Purchase Programs 4/	-124	-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Net IOU Power Deliveries 5/	258	43	0	0	0	0	0	0	0	0

1/ This includes BPA's PSC net requirement load obligations that include full service, partial service, block, slice block, and slice resource contracts. BPA's obligations are reduced for load reduction agreements.

2/ BPA's DSI customers signed 5-year contracts beginning October 1, 2001, extending through September 30, 2006, and reflect load reduction agreements and contract terminations as of December 31, 2004. After September 30, 2006, Federal service to the DSIs is not assumed because the DSIs do not have signed contracts in place for service. This assumption does not represent a decision by BPA as to whether or what form of DSI service will be offered post September 30, 2006.

3/ BPA's IOU RPSA settlement power deliveries were reduced through September 30, 2006. For October 1, 2006 through September 30, 2011, BPA's IOU RPSA settlement contracts assume only financial benefits and no power is delivered. This assumption is consistent with the amendments made to the RPSA contracts by BPA and the IOUs on May 28, 2004.

4/ In addition to the IOU RPSA settlement, some of the IOUs reduced BPA's obligations utilizing power purchase programs through September 30, 2006. Under these programs, BPA purchased power back from some of the IOUs through September 30, 2006. These contracts are shown as BPA purchases in Intra-Regional Transfers and reduce BPA's actual IOU power deliveries.

5/ BPA's net IOU power deliveries, under the RPSA settlement and BPA power purchase programs, are 258 aMW through September 30, 2006.

Federal System Resources

BPA is the designated marketer of the hydro resources of the Federal system, which includes 31 dams owned and operated by the USBR and the U.S. Army Corps of Engineers. BPA also markets the generation from: hydro projects owned by the City of Idaho Falls and Lewis County Public Utility District; thermal generation from the Columbia Generating Station nuclear plant, operated by Energy Northwest, Inc.; and the output from several renewable power plants under power purchase contracts with BPA, primarily cogeneration and wind turbines. The hydroregulation study used for this analysis incorporates measures from the National Oceanographic and Atmospheric Administration Fisheries Biological Opinions, dated December 2000, and the U.S. Fish and Wildlife Service's 2000 Biological Opinion for the Snake River and Columbia River projects. Estimates of hydro resources include projected hydro improvements that will increase and preserve Federal hydro generation by:

- Replacing turbine runners to preserve and increase generation and to make the turbine operations more fish friendly;
- Providing increased reliability by decreasing forced and planned outages; and
- Implementing hydro system optimization and operational planning tools to increase generation efficiency as part of Federal operating decisions for the system.

The Council, BPA, other Federal agencies, and other PNW entities will continue to evaluate ways to enhance fish and wildlife. Future proposals could include additional amendments to the Council's Columbia River Basin Fish and Wildlife Program, revision of the PNCA, renegotiation of Canadian Entitlement allocation agreements, and/or implementation of additional programs in support of the Endangered Species Act. The impacts of future proposals are unknown. These proposals, however, will most likely impact non-power requirements on the hydro system and change operating flexibility, the monthly shape of streamflows, and the availability of operational Federal system capacity. Future studies will incorporate new known impacts.

Federal Operational Peaking Adjustment: The instantaneous capability of the Federal hydro projects overstates the amount of Federal hydro capacity actually available to meet firm load obligations, month after month, year after year. This is due to the fact that the Federal hydro system has more generating units than hydro fuel available to operate all units on a continuous basis. Therefore, an operational peaking adjustment reduction is made to the Federal hydro capacity to reflect meeting expected peak load obligations for each month.

Electricity industry deregulation, changes in electricity marketing methods, and changes in Biological Opinion fish requirements created conditions that led BPA to reevaluate its existing operational peaking adjustment methodology for this study. A change in methodology was made to better reflect the Federal hydro system monthly operation to meet normal peak load obligations. This method estimates the Federal hydro system monthly maximum operational capacity that is available to meet the 1-hour expected peak load for each of the 1929 through 1978 historical water conditions. The revised methodology of calculating firm capacity provides a better measure of the Federal system and PNW resource peaking capability actually available to meet expected peak load obligations for BPA planning purposes.

Federal System Annual Firm Energy Surplus/Deficit

Table 2, is a summary of the Federal system annual firm energy surplus/deficits presented in the 2004 White Book, page 57. The analysis used the "Federal System Assumptions" detailed on page 15 of the study document. The Federal system is expected to be energy surplus in OY 2006 through 2009 and 2012, ranging from 451 aMW in OY 2006 and down to 4 aMW in OY 2009. Energy deficits are expected in OY 2010 and 2011 and 2013 through 2015, ranging from -18 in OY 2010 to -158 in OY 2015. In addition, monthly Federal system energy deficits may occur due to water and load variability. The monthly variability of Federal system loads and resources are described in the 2004 White Book on page 27. BPA will most likely meet monthly and annual energy deficits using a combination of methods described below in the Federal System Resource Adequacy.

Table 2

2004 White Book
Federal System Firm Energy Surplus/Deficit
Under 1937-Critical Water Conditions
Annual Energy in Average Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Obligations	8,854	8,340	8,335	8,312	8,475	8,472	8,298	8,283	8,340	8,354
Resources	9,305	8,485	8,423	8,315	8,457	8,346	8,309	8,187	8,317	8,195
Surplus/Deficit	451	144	88	4	-18	-126	12	-96	-23	-158

Potential Variability of Federal System Resources and Surplus/Deficit

To show the potential variability of Federal system resources and surplus/deficits, this study compares four different levels of Federal system generation based on 50-historical water conditions (1929 through 1978). While the study uses 1937-water conditions to estimate the firm generation of the Federal system, this particular section of the study compares the annual Federal system generation and surplus/deficit using 1937-water conditions and the average of the bottom ten percent, middle 80 percent, and top ten percent of the historical 50-water year conditions. This is shown on page 22 of the 2004 White Book document.

Federal System Resource Adequacy

The Federal system energy and capacity load and resource projections are considered conservative and assume hydro generation under 1937-critical water conditions, Federal non-hydro resources operating at expected generation levels, and Federal contract obligations and purchases delivered at maximum contract levels. The analysis includes Federal power purchases or new resources that were acquired as of December 31, 2004. Federal system deficits will be met by any combination of the following:

- Better than critical water conditions, which increases water flow and water storage thereby increasing the output of the Federal hydro system;
- Power purchases or the acquisition of generation from operating Independent Power Producer (IPP) projects;

- BPA's DSI obligations may be lower than their contracted amounts through September 30, 2006, due to contract terminations, closures, and/or economic conditions;
- Market purchases to cover delay or termination of planned resource purchases under long-term contracts;
- PSC load obligation variability due to current and future economic conditions; and
- Purchase of off-system storage and exchange agreements that allow for monthly seasonal shaping of Federal hydropower with other PNW entities or other west coast regions.

PNW Region Total Retail Load Forecast

For this study, total retail load forecasts for each PNW entity were estimated separately and then grouped into the following customer categories: Federal agency, public agency, cooperative, USBR, IOU, and DSI. The total retail load forecasts for the Federal agencies, USBR, cooperatives, and most public agencies were developed by BPA's Eastern and Western Power Business Line Area Hubs using linear trend methods, based on individual customers' historical annual energy consumption and their 2001 Power Sales Contracts' Exhibit C submittals. Similarly, the forecasts for the IOUs and some generating public agencies were developed from data submitted in the 2004 PNUCC submittals or load forecasts sent directly to BPA. DSI total retail load estimates were based on their current PSCs with BPA through September 30, 2006, and forecasts from BPA's Bulk Hub throughout the remainder of the study period. All total retail load forecasts were finalized on December 31, 2004.

2004 White Book and the Council Regional Total Retail Load Comparison: Table 3 shows the comparison of the non-DSI regional total retail loads for the 2004 White Book and the Northwest Power and Conservation Council (Council) for OY 2006 through 2015. The Council's load forecast, for this comparison, was based on their Pre-Publication Draft Forecast of Electricity Demand for the Fifth Power Plan (January 2005). To provide consistency between the load forecasts for comparison purposes, the DSI load components were removed from both forecasts. The comparison of the non-DSI load forecasts shows that the 2004 White Book projections are slightly lower in all years of the study. The average difference over the 10-years of the study is -0.7 percent. The maximum difference is –1.1 percent (-255 aMW) in OY 2006, declining to -0.8 percent (-180 aMW) by OY 2015. This difference is considered minor and is mainly due to variations in modeling methods and the vintage of data used in the two forecasts.

Table 3

Non-DSI PNW Regional Firm Load Comparison
BPA's 2004 White Book Load Projections
and the Council's Pre-Publication Draft Fifth Power Plan
Annual Energy in Average Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
2004 White Book	20,013	20,324	20,619	20,921	21,207	21,487	21,788	22,128	22,415	22,726
Council Reg. Plan	20,238	20,497	20,759	21,033	21,331	21,632	21,941	22,245	22,565	22,906
Difference (aMW)	-225	-173	-141	-112	-124	-145	-153	-118	-150	-180
Difference (%)	-1.1%	-0.9%	-0.7%	-0.5%	-0.6%	-0.7%	-0.7%	-0.5%	-0.7%	-0.8%

PNW Region Annual Firm Energy Surplus/Deficit

Table 4 is a summary of the PNW region annual firm energy surplus/deficits presented in the 2004 White Book, page 87. This study used the "Regional Analysis Assumptions" detailed on page 33 of the study and 1937-critical water conditions. The PNW regional resource stack assumes that generation from all uncommitted IPP projects are available to meet regional loads unless otherwise specified. Using this resource stack, the region is expected to experience firm energy surpluses through OY 2014. The region is projected to be energy deficit in OY 2015 and will most likely meet this deficit using a combination of methods described in the 2004 White Book on page 47.

Table 4

2004 White Book
PNW Regional Firm Energy Surplus/Deficit
Under 1937-Critical Water Conditions
Annual Energy in Average Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total Firm Loads	21,707	21,826	22,140	22,370	22,749	22,990	23,237	23,539	23,813	24,088
Net Resources	23,953	23,887	24,287	23,947	24,119	23,911	24,034	23,903	24,101	24,007
Surplus/Deficit	2,246	2,060	2,146	1,576	1,370	921	797	364	289	-81

Potential Variability of Regional Annual Energy Surplus/Deficit Projections

To show the potential variability of the regional annual energy surplus/deficits, this analysis shows projections using two different sets of resource scenarios. First, both the regional resource projections and energy surplus/deficits are presented using different levels of water conditions over the study horizon, similar to that in the Federal Section. Second, this study assumes that all uncommitted IPP generation is available to the region, though only a portion of PNW IPP generating resources are specifically contracted for delivery to the PNW. This study presents regional surplus/deficit scenarios assuming different levels of IPP generation that is specifically dedicated to the PNW region presented on page 42 of the 2004 White Book document.

2004 White Book Key Messages

For the Federal System:

- The Federal system is expected to have minimal energy surpluses OY 2006 through 2009 and in OY 2012 under 1937-critical water conditions. Minimal energy deficits are estimated for OY 2010 and 2011 and OY 2013 through 2015.
- BPA energy surplus/deficits may differ due to:
    - Actual level of PSC obligations for October 1, 2006, through September 30, 2011. In actual operation, BPA's obligations to serve customers may be higher or lower than those used in this analysis;
    - Uncertainty of future BPA sales to DSI customers;
    - Changes in non-power requirements on Federal hydro projects; and
    - Actual level of Federal system hydro generation realized under current water conditions that can vary by up to 3,500 aMW annually.

For the PNW Region:

- The PNW region is expected to experience firm energy surpluses through OY 2014, under 1937-critical water conditions, assuming all uncommitted IPP generation is available to serve PNW loads. The region is forecasted to be energy deficit in OY 2015.
- Regional energy surplus/deficits may differ due to:
    - Actual level of total retail loads which may be higher or lower depending on economics;
    - Changes in non-power requirements on Federal and non-Federal hydro projects;
    - Availability of fuel (i.e. natural gas, coal, wind, etc.) for other regional resources;
    - Actual level of regional hydro generation realized under current water conditions which can vary by up to 7,300 aMW annually; and
    - Assumption of approximately 3,110 aMW of uncommitted PNW IPP generation as regional resources. While this assumption is reasonable from an electrical reliability standpoint, resulting regional surpluses may understate the potential for price volatility and overstate the availability of IPP generation for use within the PNW. The PNW region may have to compete with other western markets to secure uncommitted IPP generation to meet electricity demand. Under 1937-water conditions, regional energy surplus/deficits could potentially vary up to 3,110 aMW, depending on IPP generation contracted for or available to meet firm PNW loads.

Federal system and regional energy deficits are projected for planning purposes and should not be seen as precursors of impending blackouts or other system disturbances.

Additional copies of this document can be obtained from BPA's Public Information Center, 1-800-622-4520. The 2004 Pacific Northwest Loads and Resources Study Technical Appendix presents regional loads, grouped by major PNW utility categories and detailed contract and resource information. The Technical Appendix is available only in electronic form. Both the Technical Appendix and this summary document are available on BPA's external website at: http://www.bpa.gov/power/whitebook2004.

Please send questions or additional comments to Tim Misley (503) 230-3942.

Sincerely,

/s/ Steven R. Oliver

Steven R. Oliver
Vice President, Generation Supply

Enclosure

2004 PACIFIC NORTHWEST LOADS AND RESOURCES STUDY

THE WHITE BOOK

BONNEVILLE POWER ADMINISTRATION
December 2004

Cover Photo Montage:

(Top left clockwise)

Photographs provided by Thomas Osborn, Mechanical Engineer, BPA, Energy Efficiency Group, Walla Walla Washington, Office.

John Day Power House The John Day power house is located in the John Day Dam and was completed in 1971. At the time of its completion, at a total cost of $511 million, the John Day Dam Powerhouse was the second largest in the world.

John Day Dam Spanning the Columbia River, 28 miles east of the city of The Dalles, Oregon, is the John Day dam. It is owned and operated by the U.S. Corps of Engineers. Construction for this project began in 1958 and ended in 1971 with an installed capacity of 2,160 MW.

White Bluffs Solar Project The White Bluffs Solar Energy project is being jointly developed by Bonneville Environmental Foundation, Bonneville Power Administration, and Energy Northwest, on the site of the terminated WNP 1 nuclear power plant on the Hanford Nuclear Reservation, north of Richland, Washington. It will have an installed capacity of 40 kW, with expected peak generation of 29.6 kW.

Stateline Wind Generation The Stateline Wind Energy Center is located on Vansycle Ridge,a crest of land straddling the Washington–Oregon border, near Touchet, Washington, and Pendleton, Oregon. The Stateline Wind Energy Center will use 660 kW Vestas wind turbines, and will collectively produce a maximum output of 300 megawatts (MW) of electricity. On average the project is expected to receive enough wind to deliver 30 to 35 percent of its peak capacity year–round.

ACKNOWLEDGMENTS

Preparation of the annual Pacific Northwest loads and resources study is a complex, multidisciplinary effort. BPA wishes to acknowledge the team—BPA staff and others—whose diligence and dedication result in a reliable, high quality document.

Bonneville Power Administration

Generation Supply: Regional Coordination Group

Requirements Marketing: Western Power Business Area Group
Eastern Power Business Area Group

Bulk Marketing and Transmission Services: Account Services Group

Office of General Counsel

Pacific Northwest Utilities Conference Committee

Northwest Power & Conservation Council

Reports Powered by:

Loads and Resources Information System

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Section 1: Introduction

Description of the White Book

The Pacific Northwest Loads and Resources Study (White Book), which is published annually by the Bonneville Power Administration (BPA), establishes one of the planning bases for supplying electricity to customers. The White Book contains projections of regional and Federal system load and resource capabilities, along with relevant definitions and explanations. The White Book also contains information obtained from formalized resource planning reports and data submittals including those from individual utilities, the Northwest Power and Conservation Council (Council), and the Pacific Northwest Utilities Conference Committee (PNUCC).

The White Book is not an operational planning guide, nor is it used for determining BPA revenues, although the database that generates the data for the White Book analysis contributes to the development of BPA's inventory and ratemaking processes. Operation of the Federal Columbia River Power System (FCRPS) is based on a set of criteria different from that used for resource planning decisions. Operational planning is dependent upon real-time or near-term knowledge of system conditions that include expectations of river flows and runoff, market opportunities, availability of reservoir storage, energy exchanges, and other factors affecting the dynamics of operating a power system.

The load resource balance of BPA and/or the region is determined by comparing resource availability to an expected level of total retail electricity consumption. Resources include projected energy capability plus contract purchases. Loads include a forecast of retail obligations plus contract obligations. Surplus energy is available when resources are greater than loads. This energy could be marketed to increase revenues. Energy deficits occur when resources are less than loads. These deficits could be met by any combination of the following: better-than-critical water conditions, demand-side management and conservation programs, permanent loss of loads due to economic conditions or closures, additional contract purchases, and/or the addition of new generating resources.

This study incorporates information on Pacific Northwest (PNW) regional retail loads, contract obligations, and contract resources. It also includes resource capability estimates provided by BPA, PNW Federal agencies, public agencies, cooperatives, U.S. Bureau of Reclamation (USBR), and investor-owned utility (IOU) customers furnished through annual PNUCC data submittals for 2004 and direct submittals to BPA.

The loads and resources analysis in this study simulates the operation of the power system under the current Pacific Northwest Coordination Agreement (PNCA). The PNCA defines the planning and operation of seventeen U.S. Pacific Northwest utilities and other parties with generating facilities within the region's hydroelectric (hydro) system. The hydroregulation study used for the 2004 White Book incorporates measures from the National Oceanographic and Atmospheric Administration Fisheries (NOAA Fisheries) Biological Opinion dated December 2000, and the U.S. Fish and

Wildlife Service's 2000 Biological Opinion (2000 FCRPS BiOps) for the Snake River and Columbia River projects. These measures include:

- Increased flow augmentation for juvenile fish migrations in the Snake and Columbia rivers in the spring and summer;
- Mandatory spill requirements at the Lower Snake and Columbia dams to provide for non-turbine passage routes for juvenile fish migrants; and
- Additional flows for Kootenai River white sturgeon in the spring;

The hydroregulation criteria for this analysis includes the following:

- Detailed Operation Plan operation for Treaty reservoirs for Operating Year (OY)[1] 2004;
- PNCA planning criteria for OY 2004; and
- Juvenile fish bypass spill levels for 2000 FCRPS BiOps implementation.

The 2004 White Book is presented in two documents: 1) this summary document of Federal system and PNW region loads and resources, and 2) a technical appendix which presents regional loads, grouped by major PNW utility categories, and detailed contract and resource information. The technical appendix is available only in electronic form. Individual customer information for marketer contracts is not detailed due to confidentiality agreements. The 2004 White Book analysis updates the 2003 White Book.

This analysis projects the yearly average energy consumption and resource availability for the study period, OY 2006 through 2015. The study shows the Federal system's and the region's expected monthly peak demand, monthly energy demand, monthly peak generating capability, and monthly energy generation for OY 2006, 2010, and 2015. The Federal system and regional monthly capacity surplus/deficit projections are summarized for the 10 operating years of the study period.

This document analyzes the PNW's projected loads and available generating resources in two parts: 1) the loads and resources of the Federal system, for which BPA is the marketing agency; and 2) the larger PNW regional power system loads and resources that include the Federal system as well other PNW entities. The "Federal System Analysis" is presented in Section 4, beginning on page 15. The analysis for the "Pacific Northwest Regional Analysis" is presented in Section 5, page 33.

"The Administrator's Record of Decision (ROD)" for the 2004 White Book is contained in Section 9, page 113.

The glossary of terms and a list of acronyms are included in Section 10, page 119.

This document and the 2004 Pacific Northwest Loads and Resources Study Technical Appendix are available on BPA's external website at http://www.bpa.gov/power/whitebook2004.

Additional hard copies of this summary document are available from BPA's Public Information Center, toll-free, 1-800-622-4520.

[1] Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 2006 is August 1, 2005, through July 31, 2006.

Section 2: Background

Pacific Northwest Planning Area

The PNW regional planning area is defined by the 1980 Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act), and includes Oregon, Washington, Idaho, Montana west of the Continental Divide, and portions of Nevada, Utah, and Wyoming that lie within the U.S. Columbia River drainage basin. The PNW planning area also includes the service areas of rural electric cooperative customers contiguous to but not in the geographic area described above that were served by BPA on the effective date of the Northwest Power Act, December 5, 1980. *16 U.S.C. §839(14).*

White Book Study Assumptions

This traditional loads and resources analysis for the Federal system and PNW region has been produced using a specific set of assumptions concerning contracts and non-hydro and hydro resources. The Federal system assumptions are detailed in "Section 4, Federal System Analysis", page 15. Regional assumptions are presented in "Section 5, Regional Analysis Assumptions", page 33.

Total Retail Load Forecast

For this study, the total retail loads were forecasted separately for each PNW entity. BPA's Eastern and Western Power Business Line Areas' Hubs estimated the total retail load for the Federal agencies, cooperatives, USBR, and most public agencies using linear trend methods based on individual customers' historical annual energy consumption and their 2001 Power Sales Contracts' (PSC) Exhibit C submittals. The forecasts for the IOUs and some generating public agencies were developed from data submitted in their PNUCC submittals or total retail load forecasts sent directly to BPA. Direct Service Industries' (DSI) total retail load estimates are based on their current PSCs with BPA through September 30, 2006, and forecasts from BPA's Bulk Hub throughout the remaining study period. All total retail load forecasts are as of December 31, 2004.

Pacific Northwest Hydro and Thermal Resources

Hydro Operations Under the PNCA: The 1997 PNCA agreement incorporates the NOAA Fisheries and U.S Fish and Wildlife Service's BiOps. These BiOp requirements changed the shape of energy production by increasing flows in the spring and summer to aid in the downstream migration of juvenile salmon. A result of these requirements is that reservoirs are no longer fully drafted to meet firm loads in the fall and winter, but are operated to retain as much water as possible and still meet flood control requirements by mid-April. The additional water in storage going into the spring snowmelt period results in additional flow in the river during the spring and summer. As a result, the ability to shift and shape hydro energy production to meet firm loads is greatly reduced. The PNCA agreement will remain in place through September 15, 2024.

To illustrate the monthly variability of the hydro system under the current PNCA, this document presents the Federal system and regional firm surpluses and deficits for OY 2006 through 2015 for 50-historical water conditions (1929 through 1978). The

results are shown in Exhibits 8 through 17, pages 73 through 82, for the Federal system, and in Exhibits 25 through 34, pages 103 through 112, for the region.

Hydro Energy: This study estimates the monthly energy capability of the Columbia River Basin's regulated and independent hydro projects, based on their average monthly river discharge that reflects river constraints and storage limitations. The generation from these hydro projects is estimated for each OY, by water year, for 1929 through 1978 historical water conditions. Water-year conditions span periods similar to OYs, in that the 12-month water year for 1937-water conditions spans August 1936 through July 1937. This study uses one of the lowest water years, 1937-water conditions, to represent a period of adverse water conditions during which the hydro system would produce low amounts of hydro generation and estimates the Federal system's firm hydro energy capability under such conditions. This is called the "critical period".

Hydro Capacity: The study estimates the monthly instantaneous capacity of Columbia River Basin regulated and independent hydro projects based on their full-gate-flow maximum generation at its mid-month reservoir elevation using 1929 through 1978 historical water conditions. The hydro generation reflects river constraints and storage limitations, within any water condition, that may limit the release of water to achieve maximum capacity. BPA assumes 1937-water levels to estimate the regional hydro capacity because that year approximates a peaking capability that is consistent with the reliability criteria set forth in the PNCA.

This year's analysis incorporates a revised methodology for calculating the monthly Federal operational peaking adjustment. An adjustment to the Federal system hydro capacity peaking adjustment is necessary because the Federal Columbia River Basin hydro projects have more generating units than hydro fuel available to operate all units on a continuous basis. Therefore, the instantaneous capability of the Federal hydro projects overstates the amount of Federal hydro capacity actually available to meet firm load obligations, month after month, year after year. The change was made to better reflect the actual ability of the Federal hydro system monthly operation to meet normal peak load obligations. This method estimates the Federal hydro system monthly maximum operational capacity that is available to meet the 1-hour expected peak load for each of the 1929 through 1978 historical water conditions. This revised methodology of calculating firm capacity provides a better measure of the Federal system and PNW resource peaking capability for BPA planning purposes. The operational peaking adjustment takes into account hydro maintenance, spinning reserves, and forced outage reserves, which are netted out for reporting purposes. (See "Section 3: Changes in the 2004 Pacific Northwest Loads and Resources Study, Federal Resource Stack", page 11.)

Hydro Projects' Multiple-Use Planning: Federal hydro projects in the PNW have many uses in addition to power generation. The projects provide flood control, supply irrigation for farming, assist in river navigation, provide for reservoir recreation, and contribute to municipal water supplies. In addition, operational constraints are in place to protect and enhance resident and anadromous fish and wildlife populations. Non-power reservoir operating requirements may reduce or increase hydropower production. BPA's resource planning takes into account all presently known non-power operating requirements in assessing regional hydro system capability.

The Council, BPA, other Federal agencies, and other PNW entities will continue to evaluate ways to enhance fish and wildlife. Future proposals could include additional

amendments to the Council's Columbia River Basin Fish and Wildlife Program, revision of the PNCA, renegotiation of Canadian Entitlement allocation agreements, and/or implementation of additional programs in support of the Endangered Species Act. The impacts of future proposals are unknown. These proposals, however, will most likely impact non-power requirements on the hydro system and change operating flexibility, the monthly shape of streamflows, and the availability of operational Federal system capacity. Future studies will incorporate any new known impacts.

Hydro Improvements: BPA has budgeted $1.2 billion over the next 8- to 10-years for maintaining and improving the reliability of the Federal hydro system. These improvements increase and preserve Federal hydro generation by:

- Replacing turbine runners to preserve and increase generation and to make the turbine operations more fish friendly;
- Providing increased reliability by decreasing forced and planned outages; and
- Implementing hydro system optimization and operational planning tools to increase generation efficiency as part of Federal operating decisions for the system.

Under critical water conditions, it is estimated that by OY 2006, the combination of these hydro improvements will annually preserve and create up to 89 average megawatts (aMW), of which 72 aMW are potential additional Federal hydro generation and the remaining 17 aMW are associated with preserving the existing level of hydro generation capability from degradation. In OY 2015, it is estimated that these improvements will annually preserve and create up to 305 aMW, of which 229 aMW are potential additional generation and the remaining 76 aMW, preserving hydro generation from degradation.

Under average water conditions, it is estimated that by OY 2006, the combination of these hydro improvements will annually preserve and create up to 252 aMW, of which 99 aMW are potential additional generation and the remaining 153 aMW, preserving hydro generation from degradation. In OY 2015, it is estimated that these improvements will annually preserve and create up to 1,013 aMW, of which 301 aMW are potential additional generation and the remaining 712 aMW, preserving hydro generation from degradation.

The total amount and timing of annual aMW actually realized over the next 8- to 10-years will be dependent on the timely completion of the scheduled installations, the success of the optimization changes, and hydrologic conditions. These estimated increases in generation are associated with the current level of fishery operations. If future fishery operations further decrease the flexibility of the hydro system operations and/or increase the amount of spill, the annual megawatt contribution of the hydro improvements realized will most likely be lower. Hydro improvement estimates will be updated in future studies.

Non-Hydro Resources: The expected output of regional non-hydro resources is based on the energy and capacity capability information submitted to BPA by the project owners. These projects include: nuclear, coal, gas-fired, oil-fired, and renewable resources such as wind, geothermal, solar, and biomass projects. Total plant output was reduced to account for scheduled maintenance, spinning reserves, and forced outage reserves. Merchant plants that have been built or that are in the process of construction have been added to the regional resource stack. Merchant plants are assumed dedicated to meet regional loads unless otherwise specified. The

discussion of the Federal resources is in Section 4, page 19. Regional resources are discussed in Section 5, page 36.

Analysis of Federal System Firm Loads and Resources

BPA is the Federal power-marketing agency in the PNW charged with marketing power and transmission to serve the firm electric load needs of its customers. BPA does not own generating resources. BPA's contractual customer load obligations, combined with the Federal and non-Federal resources from which BPA acquires the power it sells, are collectively called the "Federal system" in this study. BPA owns and operates the primary transmission grid, which includes more than 14,800 circuit miles of transmission lines above 115 kilovolts (high voltage) and 600 circuit miles below 115 kilovolts in the PNW.

The Federal system load obligations are comprised of BPA's sales to PNW Federal agencies, public agencies and cooperatives, USBR, IOUs, and DSIs as well as other firm contractual obligations to deliver power. BPA sells Federal power at wholesale and has no retail customers.

BPA is the designated marketer of the hydro resources of the Federal system, which includes 31 dams owned and operated by the USBR and the U.S. Army Corps of Engineers (USACE). BPA also markets the generation from: hydro projects owned by the City of Idaho Falls and Lewis County Public Utility District (PUD); thermal generation from the Columbia Generating Station nuclear plant operated by Energy Northwest, Inc. (ENW); and the output from several renewable power plants, primarily cogeneration and wind turbines, under power purchase contracts with BPA. The expected energy generation production from wind turbines is included in the analysis; however, since wind power production is intermittent and cannot be guaranteed to be available to meet peak hour loads, no capacity contribution from wind generation is assumed. The Federal system analysis is shown in Section 4, beginning on page 15.

BPA Power Sales Contract Obligations

BPA signed either 5- or 10-year PSCs with its PNW customers that began October 1, 2001. The following is a description of some of the contractual uncertainties associated with specific customer classes:

- Federal agency, public agency, cooperative, and USBR customers signed either 5- or 10-year PSCs. Some of the public agencies, and cooperatives signed up for the 10-year Slice of the System Product (see "Slice of the System Product", page 7). BPA's PSC and Slice PSC obligations end September 30, 2011; however, this study assumes that BPA will meet these or similar regional load contract obligations through OY 2015. In actual operation, BPA's contract obligations to serve these customers may be higher or lower than those shown in this analysis;
- The IOU's signed the 10-year Residential Purchase and Sales Agreement (RPSA) settling BPA's obligations under the Northwest Power Act to the IOUs. As a result of negotiations in 2001, the IOU RPSA firm power deliveries were reduced in exchange for financial considerations through September 30, 2006. This resulted in a net IOU RPSA settlement power delivery of 258 aMW during this time period. For the period October 1, 2006, through September 30, 2011, this study assumes that BPA's IOU RPSA settlement contracts provide only financial benefits and no

power is delivered. This assumption is consistent with the amendments made to the RPSA contracts by BPA and the IOUs on May 28, 2004; and

- BPA's DSI customers signed 5-year contracts beginning October 1, 2001, through September 30, 2006. BPA's DSI load obligations reflect load reduction agreements, contract terminations, and closures signed through December 31, 2004. BPA's DSI load obligations are estimated to be up to 271 aMW through September 30, 2006. The actual DSI loads may be lower than those obligations included in this study due to possible new agreements and/or changes in economic conditions. After September 30, 2006, no DSI Federal service is assumed because the DSIs do not have signed contracts for service. However, this assumption does not represent a decision by BPA as to whether or what form of DSI service will be offered post September 30, 2006.

Decisions and agreements may be reached through the Regional Dialogue process between BPA and its customers and other regional stakeholders on the nature of BPA's electrical service products post-2006. Any decisions made from the Regional Dialogue discussions will be incorporated in future studies.

Slice of the System Product

Slice of the System (Slice) is a public preference PSC product that provides firm and requirements power for load secondary energy to a customer based on their net requirements load for the 10-year period October 1, 2001, through September 30, 2011. It differs from traditional PSC products in that it is comprised of the following components: 1) Firm power deliveries based on the level and shape of the Federal system generation; and 2) Surplus power deliveries on a monthly or seasonal basis as it occurs. The Slice product was also combined with a sale of a fixed amount of power sold as a Block product

Slice Power Deliveries*:* Customers signed 10-year Slice contracts for power deliveries based on 22.63 percent of the Slice resource stack. The Slice resource stack is comprised of a set of specific Federal resources, net of a specific set of Federal obligations. This particular set of resources and obligations is used only for the Slice product and is not the Federal system resource stack. The specific set of Federal resources that comprise the Slice resource stack includes: the generation from the Federal hydro projects, Columbia Generating Station, Georgia Pacific Corporation's Wauna Mill, Federal Non-Utility Generation, and power deliveries from the Non-Federal Canadian Entitlement Return (CER) for Canada contracts. The specific set of Federal contract obligations, which are subtracted from the Slice resource stack for this purpose includes, but is not limited to, deliveries for the CER to Canada (shown as an Export) and Federal pumping loads. The amount of Slice product available for delivery is dependent on the Federal system operating decisions, hydro production that varies by water conditions, and generation from non-hydro Federal resources.

Slice Block Deliveries*:* All Slice customers signed 10-year contracts for Slice Block product purchases having a 100 percent load factor for each month. Under the Slice Block contract, customers had the option for either a 5- or 10-year purchase option. Most Slice customers chose the 10-year Slice Block purchase option. This option allowed customers to increase their Block for the period October 1, 2006, through September 30, 2011, to cover load growth during the first 5-years of their Slice contract. Remaining Slice customers chose to purchase the same amount of Block for

the latter 5-year period, October 1, 2006, through September 30, 2011, at BPA's current applicable rate.

Analysis of Regional Firm Loads and Resources

The PNW regional analysis contains the Federal system loads and resources, plus non-Federal regional loads, contractual obligations, and generating resources in the PNW region. The region has several groups that represent load sectors: Federal agencies, public agencies, cooperatives, USBR, IOUs, and DSIs. The regional hydro resources are owned and operated by various Federal entities, public agencies, cooperatives, and IOUs. The regional thermal generating resources, fueled by biomass, coal, natural gas, oil, or nuclear power, are owned and operated by various regional entities. The regional analysis is presented in Section 5, beginning on page 33.

Canadian Treaty Downstream Benefits

The Columbia River Treaty between the United States and Canada enhanced the use of storage in the Columbia River Basin with the construction of three large storage projects in Canada (Mica, Duncan, and Keenleyside). These Canadian Treaty projects provide downstream power benefits by increasing the firm power generating capability of U.S. hydro projects. Under the terms of the Treaty, the downstream power benefits are shared equally between the two countries. The Determination of Downstream Power Benefits analysis is performed annually and establishes the amount of benefits for each succeeding sixth year. The non-Federal mid-Columbia projects are Wells, Rocky Reach, Rock Island, Wanapum, and Priest Rapids. BPA and each of the non-Federal mid-Columbia participants are obligated to return their share of the downstream power benefits owed to Canada. This is called the Canadian Entitlement Return to Canada. The non-Federal Canadian Entitlement obligations are delivered to BPA, who, in turn, delivers both BPA's and the non-federal participants' obligations to Canada. The non-Federal entities' Canadian Entitlement obligation is included in each participating utility's loads and resources balance as a delivery to BPA. Table 1, below, shows BPA's delivery of the total Canadian Entitlement Return obligation to Canada, which is shown as an export.

Table 1

Federal System Exports of Canadian Entitlement to Canada
Energy and Capacity Obligations[1]

Energy in Average Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Federal System	535	488	483	465	567	527	517	505	495	483

January Capacity in Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Federal System	1,218	1,244	1,241	1,245	1,352	1,350	1,350	1,350	1,350	1,350

[1] Values are estimated for OY 2011 through 2015

Table 2, below, depicts the Non-Federal entities share of Canadian Entitlement Return obligations for the mid-Columbia hydro projects that are delivered to BPA.

Table 2

Non-Federal Canadian Entitlement Return Obligations Delivered to BPA

Energy and Capacity Obligations[1]

Energy in Average Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Public Agencies	59	58	57	58	65	68	67	67	66	65
Investor-Owned Utilities	70	66	64	64	63	62	61	60	60	59
Other Entities	10	10	10	10	10	10	11	10	10	10
Total Energy Obligation	**139**	**134**	**131**	**132**	**138**	**140**	**139**	**137**	**136**	**134**

January Capacity in Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Public Agencies	107	101	99	98	113	117	117	115	113	113
Investor-Owned Utilities	120	115	112	110	105	108	107	105	103	102
Other Entities	19	18	17	17	18	19	18	18	18	18
Total Capacity Obligation	**246**	**234**	**228**	**225**	**236**	**244**	**242**	**238**	**234**	**233**

Major Sources of Uncertainty

This study reflects several potential major changes in regional resources and power sales products that could affect regional and Federal loads and resources.

Loads and Resources Uncertainty: Future Federal system and regional firm surpluses/deficits are subject to a number of uncertainties over the 10-year study period. Some of these uncertainties include:

- Changes in loads or available resources resulting from deregulation of retail sales in the electric power industry;
- Federal system and regional water availability that affects hydro generation available to meet load obligations. See "Potential Variability of Federal System Resources", page 22, and "Potential Variability of Regional Resources", page 38;
- Volatility in short- and long-term electricity market prices;
- Deviation from forecasted loads due to changes in the economy;
- Failure of existing or contracted generating resources to operate at anticipated times and output levels;
- The availability of new and existing regional resources that can be purchased to serve firm loads in the PNW region;
- Implementation of decisions and agreements that may be reached through the Regional Dialogue process for BPA's electrical service products post-2006;

[1] Values are estimated for OY 2011 through 2015

- Additional changes to existing hydro system operation in response to programs developed to address the Endangered Species Act or other environmental considerations; and
- The success of BPA's future purchasing and marketing efforts that include: purchases, sales, demand-side management programs, conservation measures, and the purchase of the output of new or existing resources.

These uncertainties could affect both the size of projected surpluses or deficits and the times at which they occur.

Section 3: Changes in the 2004 Pacific Northwest Loads and Resources Study

This section describes the major data updates and changes in the assumptions for the 2004 White Book analysis compared to the 2003 White Book. Specific resource and contract changes are detailed in the 2004 Pacific Northwest Loads and Resources Study Technical Appendix. The 2004 Technical Appendix will be available on BPA's external website at http://www.bpa.gov/power/whitebook2004. The 2004 Technical Appendix presents auxiliary tables (A-tables) that contain aggregate information summarized by customer type.

Federal Firm Sales and Obligations

The 2004 White Book analysis reflects the following Federal system contract and obligation changes compared to the 2003 study:

- BPA's Federal agency, public agency, cooperative, and USBR PSC obligations were updated using linear trend methods based on historical power consumption under their PSCs. Previously, for October 1, 2006, through September 30, 2011, BPA's PSC obligations included approximately 800 aMW of service with 13 utilities that had not signed contracts for this time period. Since finalizing the data for this White Book, these utilities have all signed their 2006 PSCs. Though all of these contract obligations actually expire September 30, 2011, this study assumes that BPA will meet these net requirement obligations with similar agreements through OY 2015;
- BPA's Federal public agency and cooperative Slice customer obligations were updated for this study using methods described in "Slice of the System Product", page 7. Though these Slice obligations actually expire September 30, 2011, this study assumes that BPA will meet similar Slice obligations with agreements through OY 2015;
- For the period October 1, 2006, through September 30, 2011, this study assumed that BPA's IOU RPSA settlement contracts provide only financial benefits and no power is delivered. This assumption is consistent with the amendments made to the RPSA contracts by BPA and the IOUs on May 28, 2004;
- BPA's DSI load obligations were updated to reflect signed load reduction agreements, contract terminations, and closures through December 31, 2004; and
- Updated Federal system contract sales.

Federal Resource Stack

The 2004 White Book analysis reflects the following Federal system resource stack changes compared to the 2003 study:

- The methodology for calculating the Federal system operational peaking adjustment was revised. See "Federal Operational Peaking Adjustment", page 12.
- Updated Federal system contract purchases;
- Fourmile Hill Geothermal plant was postponed from October 1, 2006, to October 1, 2007. There is potential for contract termination of this resource

purchase due to project delays, thus making the completion date uncertain. Future studies will reflect new information on this project as it becomes available.

- The additions of the Boise River Diversion and White Bluffs Solar projects; and
- Clearwater hydro and Dworshak Small Hydro are now combined and called Dworshak/Clearwater Small Hydropower.

Federal Operational Peaking Adjustment

The instantaneous capability of the Federal hydro projects overstates the amount of Federal hydro capacity actually available to meet firm load obligations, month after month, year after year. This is due to the fact that the Federal hydro system has more generating units than hydro fuel available to operate all units on a continuous basis. Therefore, an operational peaking adjustment reduction is made to the Federal hydro capacity to reflect meeting expected peak load obligations for each month. Electricity industry deregulation, changes in electricity marketing methods, and changes in Biological Opinion fish requirements created conditions that led BPA to reevaluate its existing hydro peaking reduction methodology for this study. The change in methodology was made to better reflect the actual monthly Federal hydro operation to meet normal peak load obligations.

In prior studies, BPA reduced the Federal hydro instantaneous capacity using a sustained peaking adjustment that was formulated in the early 1990s using an hourly hydro simulator. This adjustment reduced the instantaneous Federal hydro capacity to simulate the Federal hydro meeting an additional 50-hours per week capacity sale. The 50-hour capacity sale assumed 10 Heavy Load Hour (HLH) weekday deliveries, for a total of 50-hours per week. Peaking replacement, associated with the capacity sale, was assumed delivered on Light Load Hours (LLHs). This capacity sale stressed Federal hydro operations by increasing HLH obligations. Conversely, peaking replacement energy, from the capacity sale, decreased the need for LLH Federal hydro generation by reducing LLH obligations. New capacity sales of this type are not typical of how BPA or other marketing entities sell power into today's electrical market.

Operational Peaking Adjustment Methodology: The new operational peaking adjustment was developed using a series of Hourly Operating and Scheduling Simulator (HOSS) studies. The HOSS model simulated the hourly Federal system operations needed to meet Federal obligations using a combination of Federal hydro, thermal, miscellaneous resources, and contract purchases for each of the 50 historical water conditions. The HOSS model maximized Federal system hydro generation by selling surplus energy in better than average water conditions. In low water conditions, HOSS maximized hydro generation and purchased energy to meet the monthly peak load demands.

The HOSS studies produced an hourly matrix of Federal system hydro generation by month, by water condition. Monthly relationships between the Federal system hydro energy and the Federal hydro maximum 1-hour generation were developed for each water condition. This method estimates the Federal hydro system monthly maximum operational capacity that is available to meet the 1-hour expected peak load for each of the 1929 through 1978 historical water conditions. This revised methodology of calculating firm capacity provides a better measure of the Federal system and PNW resource peaking capability for BPA planning purposes. The operational peaking adjustment takes into account hydro maintenance, spinning reserves, and forced outage reserves, which are netted out for reporting purposes. Due to the operational

peaking adjustment change, Federal and regional capacity surplus/deficit values are not comparable with prior studies.

PNW Total Retail Load

The 2004 White Book utilizes updated customer-by-customer regional retail load forecasts. The forecasts are based on a combination of their historical electrical load consumption, submittals provided for the 2001 PSCs, and/or their 2004 PNUCC data submittals. If available, the information and growth trends were verified with Federal Energy Regulatory Commission (FERC) filings. Below highlights the methods used to arrive at the load forecasts. The forecasts reflect applicable load reduction agreements and were aggregated together for each of the following customer classes.

- Federal agency, public agency, cooperative, and USBR retail load forecasts were developed by BPA using linear trend methods that incorporate historical retail load data and their 2001 PSCs' Exhibit C submittals. Some public agency customer loads were developed from their 2004 PNUCC data submittals;
- IOU retail load forecasts were developed by BPA using data provided in their PNUCC data submittals;
- DSI retail load estimates were updated by BPA and are based on their current PSCs with BPA; and
- Updated PNW regional contract sales.

PNW Regional Resource Stack Changes

In addition to the Federal system resource stack updates, the 2004 White Book analysis reflects the following regional resource changes compared to the 2003 study:

- Updated PNW regional contract purchases;
- The addition of Emmett Facility beginning OY 2006, Goldendale Energy Center beginning OY 2005, and Port Westward CCCT beginning OY 2007. Some of the smaller projects included are Bennett Mountain, Fossil Gulch Wind Project, Horseshoe Bend Wind Park, Curtiss Livestock, Commercial Energy Management, and Tiber Dam Liberty Montana; and
- The removal of Great Falls Wind, Boyd James Hydro, Joseph Hydro, Sygitowicz Creek Small Hydro, Port Townsend Paper Hydro TGS/Briggs Hydro, and Minnesota Methane.

Future studies will reflect new information as it becomes available.

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Section 4: Federal System Analysis

Federal System Assumptions

The Federal system loads and resources analysis is based on Federal resources, Federal contracts, and Federal power sales contract obligations as of December 31, 2004. Federal study assumptions are as follows:

- Forecasted Federal load obligations reflect normal weather conditions;
- Generating resources include operating requirements currently adopted by the hydro project owners and the firm planning assumptions for assured resource capability for the PNCA;
- BPA's Federal agency, public agency, cooperative, and USBR PSC obligations, that expire September 30, 2011, continue to be met by BPA with similar contract obligations through OY 2015;
- BPA's public agency and cooperative Slice obligations, that expire September 30, 2011, continue to be met by BPA with similar Slice contract obligations through OY 2015;
- For the period October 1, 2006, through September 30, 2011, BPA's IOU RPSA settlement contracts reflect only financial benefits and no power is delivered. This assumption is consistent with the amendments made to the RPSA contracts by BPA and the IOUs on May 28, 2004;
- BPA's DSI PSC obligations reflect signed load reduction agreements, contract terminations, and closures. DSI purchases total up to an annual maximum of 271 aMW per year through September 30, 2006;
- All existing Federal contractual arrangements not included under BPA's regional net requirements power sales contracts expire by the terms of their agreements and are not renewed;
- Federal power sales and capacity/energy exchange agreements with the cities of Burbank, Glendale, and Pasadena are shown as capacity/energy exchanges until they expire on April 15, 2008;
- Federal surplus capacity sale contract with PacifiCorp expires August 31, 2011;
- Firm hydro energy and capacity estimates are based on 1937-water conditions, unless otherwise specified;
- Federal hydro capacity is reduced, by an operational peaking adjustment, to estimate the monthly maximum operational capability that is available to meet the 1-hour expected peak load, for each of the 1929 through 1978 historical water conditions;
- Federal capacity surplus/deficit values do not reflect potential nighttime return problems that may be incurred with new capacity sales; and
- Transmission losses are treated as a resource reduction.

Annual Federal Firm Energy Load Obligations

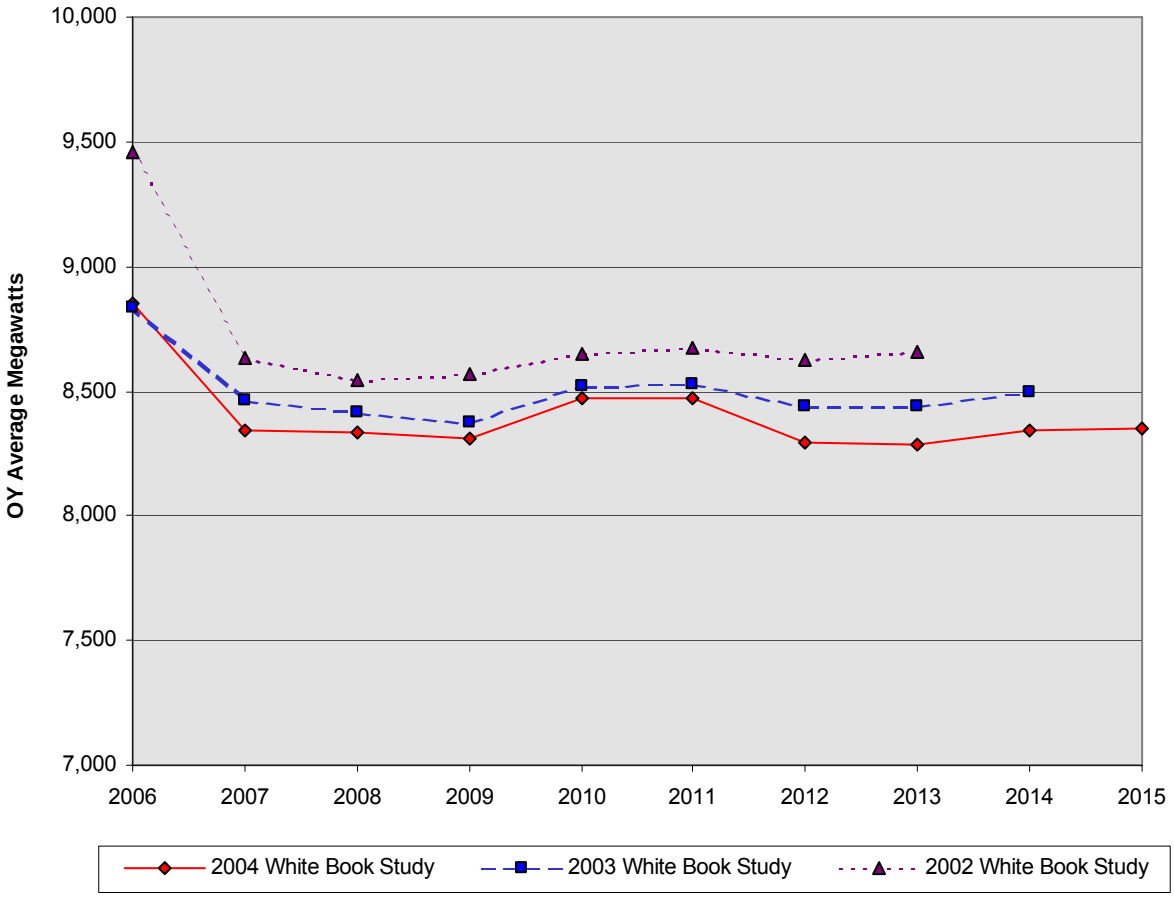
In this study, the annual Federal system firm energy load obligations incorporate the preceding Federal System Assumptions and include BPA's forecasted 2001 PSC obligations, including the "Slice of the System Product" discussed on page 7, for PNW Federal agencies, public agencies, cooperatives, USBR, IOUs, and DSIs. The

forecast assumes that PNW Federal agencies, public agencies, cooperatives, and the USBR purchase power from BPA under their PSCs to meet net regional firm energy loads not served by their own resources. The Federal obligations also include contracted Federal deliveries within the PNW region and export contracts delivered outside the PNW. The methods and assumptions used to complete this year's Federal power sales contract obligations are based on the forecasts of individual entity's total retail load discussed in "Total Retail Load Forecast", page 3.

Figure 1, below, illustrates the difference between the forecasted 2004 White Book annual Federal system energy load obligations for OY 2006 through 2015 from the previous 2003 and 2002 Studies. The expected lower Federal load obligations for OY 2006 through 2015 reflect changes in BPA's small public agency, cooperative, DSI, and export contracts. The annual Federal firm energy load obligations for OY 2006 through 2015 are presented in Exhibit 1, page 57.

Figure 1

Annual Federal Firm Energy Load Obligations
For OY 2006 through 2015 [1]



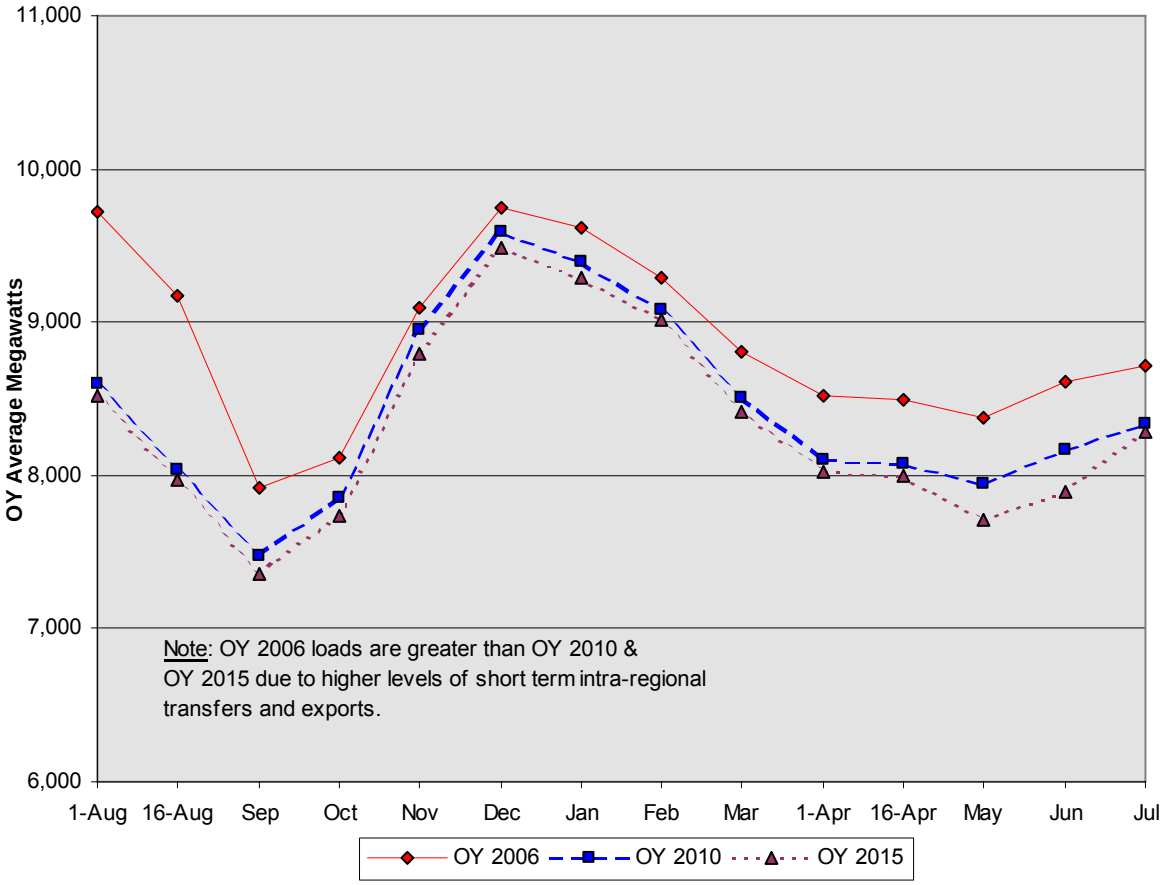
[1] 2002 White Book projections were published through OY 2013.
2003 White Book projections were published through OY 2014.

Monthly Federal Firm Energy Load Obligations

Figure 2, below, illustrates the Monthly Federal Firm energy load obligations for OY 2006, 2010, and 2015 that utilizes the same load components detailed in the sections on "Federal System Assumptions" and the "Annual Federal Firm Energy Load Obligations" presented on page 15.

Figure 2

Monthly Federal Firm Energy Load Obligations
For OY 2006, 2010, and 2015



The Monthly Federal Firm energy load obligations for OY 2006, 2010, and 2015, assuming 1937-water conditions, are shown in Exhibits 2 through 4, pages 61 through 63.

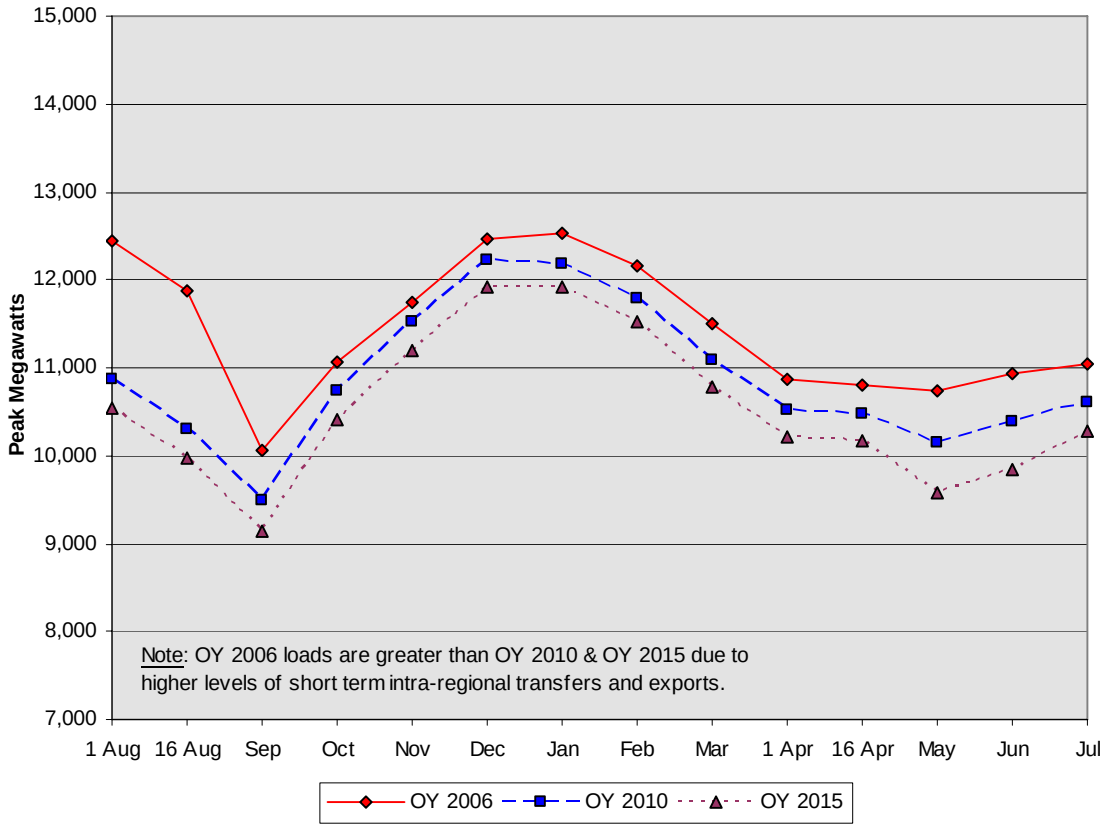
Monthly Federal Firm Peak Load Obligations

Figure 3, page 18, illustrates the Monthly Federal Firm peak load obligations for OY 2006, 2010, and 2015 that employ the same load components detailed in "Federal System Assumptions" and the "Annual Federal Firm Energy Load Obligations" detailed on page 15. The figure shows the expected 1-hour monthly maximum demand under BPA's 2004 White Book Study load obligations. The forecast assumes that PNW Federal agencies, public agencies, cooperatives, and

the USBR purchase capacity from BPA under their PSCs to meet regional peak loads not served by their own resources with the exception of the Slice product customers. Federal peak load obligations include BPA's exports and intra-regional contract sales. The peak load obligations assume normal weather conditions with a 50-percent probability that the actual peak load obligations could be exceeded. The peak load projections are reduced by a diversity component to address the fact that all electrical peak demands do not occur simultaneously throughout the region.

Figure 3

Monthly Federal Firm Peak Load Obligations
For OY 2006, 2010, and 2015



Federal peak load obligations decline in OY 2010 and OY 2015 due to lower levels of load and the expiration of export and intra-regional contract sales. The monthly Federal firm peak loads are presented in Exhibits 5 through 7, pages 67 through 69.

Federal Firm Resources

Table 3, below, summarizes the Federal system firm energy resources and contract purchases available to BPA to meet Federal load obligations for OY 2006. Federal system energy resources are comprised of approximately 73 percent hydropower, over 10 percent from one nuclear power plant, and over 16 percent from BPA's contracts and small thermal and renewable resources.

Table 3

Federal Firm Total Resources for OY 2006[1]
Based on 1937-Water Conditions
Capacity Based on January 2006

Project Type	Operational Peaking Capacity (January Peak MW)	Percent of Operational Peaking Capacity	Firm Energy (OY in aMW)	Percent of Firm Energy
Hydro	11,154[2]	82.7%	7,001	73.2%
Nuclear	1,150	8.5%	1,000	10.4%
Contracts/Small Thermal Resources	1,187	8.8%	1,574	16.4%
Total Federal Firm Resources	**13,491**	**100%**	**9,575**	**100%**

The Federal system hydro resources from which BPA markets power are detailed in Table 4, page 20. BPA also markets power purchased from non-Federally owned resources. In addition, BPA's capacity/energy exchange contracts provide marketable energy to BPA as payment for the capacity BPA delivers. Table 5, page 21, shows the non-Federally owned resources, return energy associated with BPA's existing capacity/energy exchanges, contractual resources, and other BPA hydro-related contracts.

Combined, these resources represent BPA's available firm resources. A detailed listing of Federal generating resources is in BPA's 2004 Pacific Northwest Loads and Resources Study Technical Appendix and is available on BPA's external website at http://www.bpa.gov/power/whitebook2004.

[1] Federal firm resource estimates before adjustments for reserves, maintenance, and transmission losses.

[2] The Federal hydroelectric capacity is reduced by an operational peaking adjustment to estimate the monthly maximum operational capability that is available to meet the 1-hour expected peak load, for 1937-water conditions. For January 2006, the reduction is 10,403 peak MW.

Table 4

Federal System Hydro Projects
Capacity and Energy Based on OY 2006

Project	Initial Year of Service	Number of Units	Nameplate Rating (MW)	OY 2006	
				Instantaneous Generating Capacity[1] (Peak MW)	Firm Energy[2] (aMW)
U.S. Bureau of Reclamation Hydro Projects					
Grand Coulee	1941	27	6,465	6,234	1,952
Grand Coulee Pump Gen.	1973	6	314	300	0
Hungry Horse	1952	4	428	361	77
Palisades	1957	4	176	122	66
Anderson Ranch	1950	2	27	36	16
Green Springs	1960	1	17	18	7
Minidoka	1909	4	28	26	16
Roza	1958	1	11	4	8
Black Canyon	1925	2	10	9	8
Chandler	1956	2	12	10	9
Total USBR Projects		**53**	**7,488**	**7,120**	**2,159**
U.S. Army Corps of Engineers Hydro Projects					
Chief Joseph	1955	27	2,458	2,535	1,066
John Day	1968	16	2,160	2,484	800
The Dalles w/fish turbines	1957	24	1,808	2,074	597
Bonneville w/fish turbines	1938	20	1,093	1,059	364
McNary	1953	14	980	1,127	521
Lower Granite	1975	6	810	930	218
Lower Monumental	1969	6	810	922	220
Little Goose	1970	6	810	928	215
Ice Harbor	1961	6	603	693	137
Libby	1975	5	525	566	168
Dworshak	1974	3	400	444	126
Lookout Point	1954	3	120	67	35
Detroit	1953	2	100	96	41
Green Peter	1967	2	80	79	28
Lost Creek	1975	2	49	18	30
Albeni Falls	1955	3	43	23	25
Hills Creek	1962	2	30	30	18
Cougar	1964	2	25	25	16
Foster	1968	2	20	22	12
Big Cliff	1954	1	18	21	11
Dexter	1955	1	15	17	9
Total Corp of Engineer Projects		**153**	**12,957**	**14,160**	**4,657**
Total USBR and USACE Projects		**206**	**20,445**	**21,280**	**6,816**

[1] This is the maximum hydro generation under optimum conditions for January 2006 assuming 1937-water conditions. Does not reflect reduction to the peaking capacity of the hydro system due to the drafting of reservoirs and other project constraints.

[2] Firm energy is a 12-month annual average for OY 2006 assuming 1937-water conditions.

Table 5

Non-Federally Owned BPA Resources and Contracts
Capacity and Energy Based on OY 2006

Project	Type	Operator	Date in Service	OY 2006	
				Capacity[1] (Peak MW)	Firm Energy (aMW)
Existing Non-Federally Owned BPA Resources					
Columbia Generating Station	Nuclear	ENW	1984	1,150	1,000
Idaho Falls Bulb Projects	Hydro	City of Idaho Falls	1982	18	19
Cowlitz Falls	Hydro	Lewis County PUD	1994	13[2]	26
Big Creek Hydro Unit	Hydro	Mission Valley	1981	1	0.167
Dworshak/Clearwater Small Hydro	Hydro	State of Idaho DWR	2000	3	3
Glines Canyon	Hydro	US Parks Service	1927	16	15
Elwah Hydro	Hydro	US Parks Service	1910	13	9
Boise River Diversion	Hydro	USBR	1912	0	1
Georgia Pacific Paper Wauna	Cogen.	Georgia Pacific	1996	32	29
Foote Creek 1	Wind	Foote Creek 1, LLC	1999	0	6
Foote Creek 2	Wind	Foote Creek 2, LLC	1999	0	1
Foote Creek 4	Wind	Foote Creek 4, LLC	2000	0	7
Stateline Wind Project	Wind	PPM, FLP	2001	0	28
Condon Wind Project	Wind	Condon Wind Project, LLC	2002	0	12
Klondike Phase 1	Wind	NW Wind Power	2001	0	7
Fourmile Hill Geothermal	Geo.	Calpine	2008[3]	0	0
Ashland Solar Project	Solar	Ashland, Oregon	2000	0	0.003
Total Non-Federally Owned BPA Resources				**1,246**	**1,163**
Firm Contracts[4]					
Canadian Entitlement for Canada (non-Federal)				246	139
Canadian Imports				1	1
Pacific Southwest Imports				0	50
Inland Southwest Imports				95	102
Eastern Imports				189	94
Intra-Regional Transfers In (Pacific Northwest Purchases)				838	1210
Total BPA Firm Contracted Resources				**1,369**	**1,596**
Total Non-Federally Owned BPA Resource Contracts				**2,615**	**2,759**

[1] This is the maximum generation under optimum conditions for January 2006 assuming 1937-water conditions.

[2] Operational capacity is 70 MW, but it is restricted in January.

[3] Fourmile Hill is assumed to be operational October 1, 2007. It will have a January peak of 50 MW and annual energy of 50 aMW. There is potential for termination of the contract with Calpine for this resource purchase due to project delays making the completion date uncertain. Future studies will reflect new information on this project as it becomes available.

[4] BPA's Canadian Entitlement Return for CSPE and Supplemental & Entitlement Capacity contracts were shown in prior studies. These contracts expired March 31, 2003.

Potential Variability of Federal System Resources

To illustrate the potential variability of Federal system resources, this study compares different scenarios using varying levels of Federal system generation based on water conditions. Table 6, below, compares the annual Federal system resources under four scenarios using 1937-water conditions, the base case of this study, and the averages of the bottom ten percent, middle 80 percent, and top ten percent of the historical 50-water year conditions (1929 through 1978).

Table 6

Potential Variability of Total Federal Net Resource Projections[1]
Utilizing Different Levels of Water Conditions
Energy in Average Megawatts

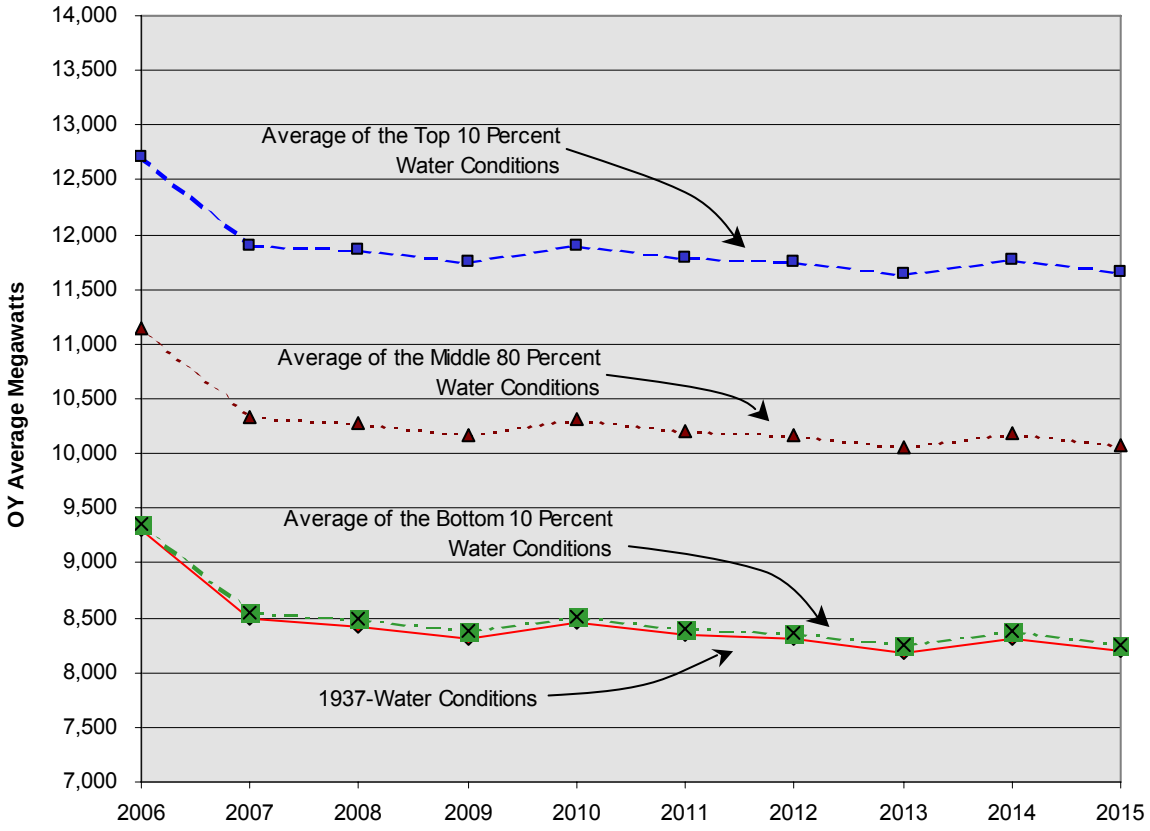
Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1937-Water Conditions	9,305	8,485	8,423	8,315	8,457	8,346	8,309	8,187	8,317	8,195
Average Bottom 10% Water Conditions	9,365	8,545	8,484	8,377	8,518	8,408	8,371	8,249	8,378	8,257
Average Middle 80% Water Conditions	11,144	10,331	10,278	10,174	10,319	10,212	10,178	10,059	10,190	10,070
Average Top 10% Water Conditions	12,711	11,903	11,855	11,753	11,900	11,795	11,761	11,644	11,776	11,656

[1] Total Federal net resource estimates include adjustments for reserves, maintenance, and transmission losses.

Figure 4, below, illustrates the annual Federal system resources under the four scenarios.

Figure 4

Potential Variability of Total Federal Net Resource Projections[1]
Utilizing Differing Water Conditions



Annual Federal Firm Energy Surplus/Deficit Projections

Using the "Federal System Assumptions" detailed on page 15, the projections for annual Federal firm energy surplus/deficits for OY 2006 through 2015 are presented in Table 7 on page 24. The Federal system is expected to be in energy surplus in OY 2006 through 2009 and 2012. Operating years 2010, 2011, and 2013 through 2015 expect minimal energy deficits and are due to projected growth in BPA's public customers' net requirements loads and the expiration of intra-regional contract purchases and imports. BPA will most likely meet these deficits using a combination of methods described in "Federal Resource Adequacy", page 31.

[1] Total Federal net resource estimates include adjustments for reserves, maintenance, and transmission losses.

Table 7

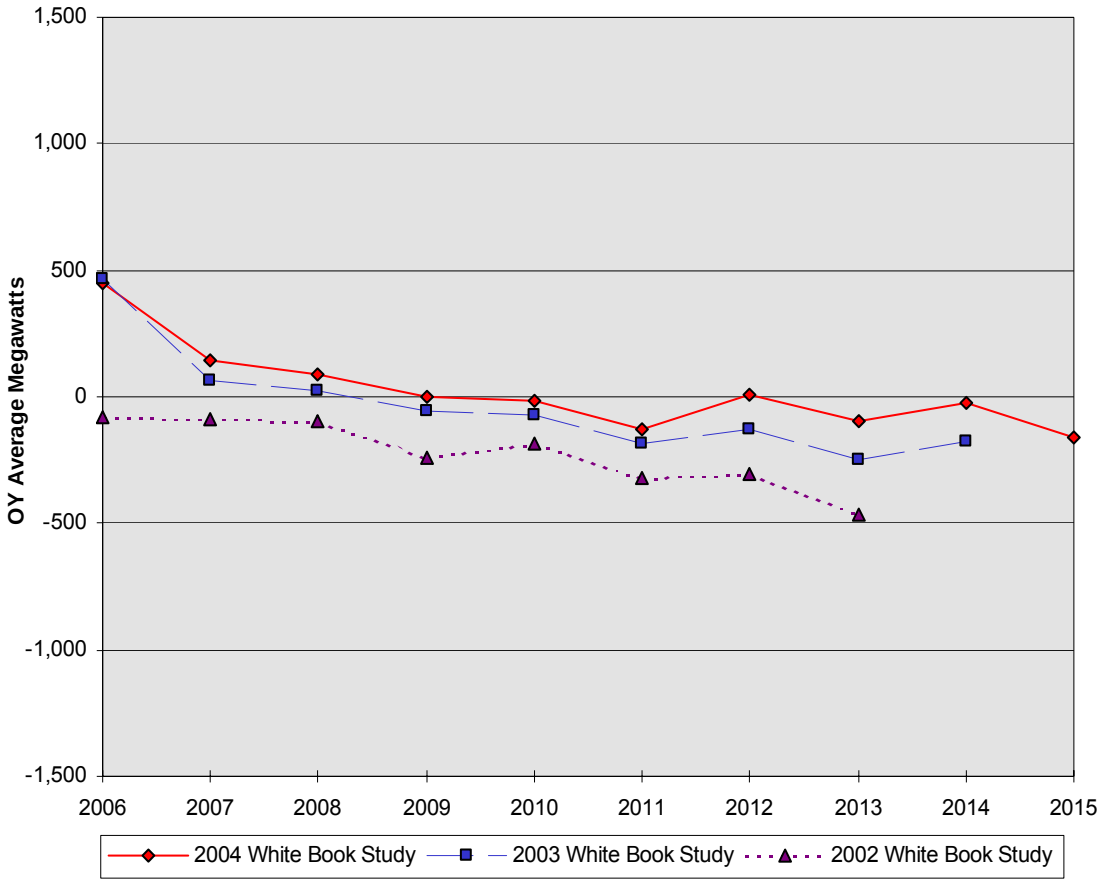
Annual Federal Firm Energy Surplus/Deficit Projections
Under 1937-Water Conditions
Energy in Average Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Federal Surplus/Deficit	451	144	88	4	-18	-126	12	-96	-23	-158

Figure 5, below, illustrates how the 2004 White Book Federal energy surplus/deficits compares to the previous 2003 and 2002 studies.

Figure 5

Annual Federal Firm Energy Surplus/Deficit Projections[1]
Assuming Existing Loads, Resources, Contracts,
and Normal Weather Conditions



[1] 2002 White Book projections were published through OY 2013.
2003 White Book projections were published through OY 2014.

The components of the annual Federal energy loads and resources balance under 1937-water conditions for OY 2006 through 2015 are presented in Exhibit 1, page 57.

Potential Variability of Annual Federal Energy Surplus/Deficit Projections

To illustrate the potential variability of annual Federal system energy surplus/deficits, this study compares different scenarios using varying levels of Federal system generation based on water conditions, under normal weather conditions. Table 8, below, compares the annual Federal system surplus/deficits under four scenarios using resources under 1937-water conditions, the base case of this study, and the averages of the bottom ten percent, middle 80 percent, and top ten percent of the historical 50-water year conditions (1929 through 1978).

Table 8

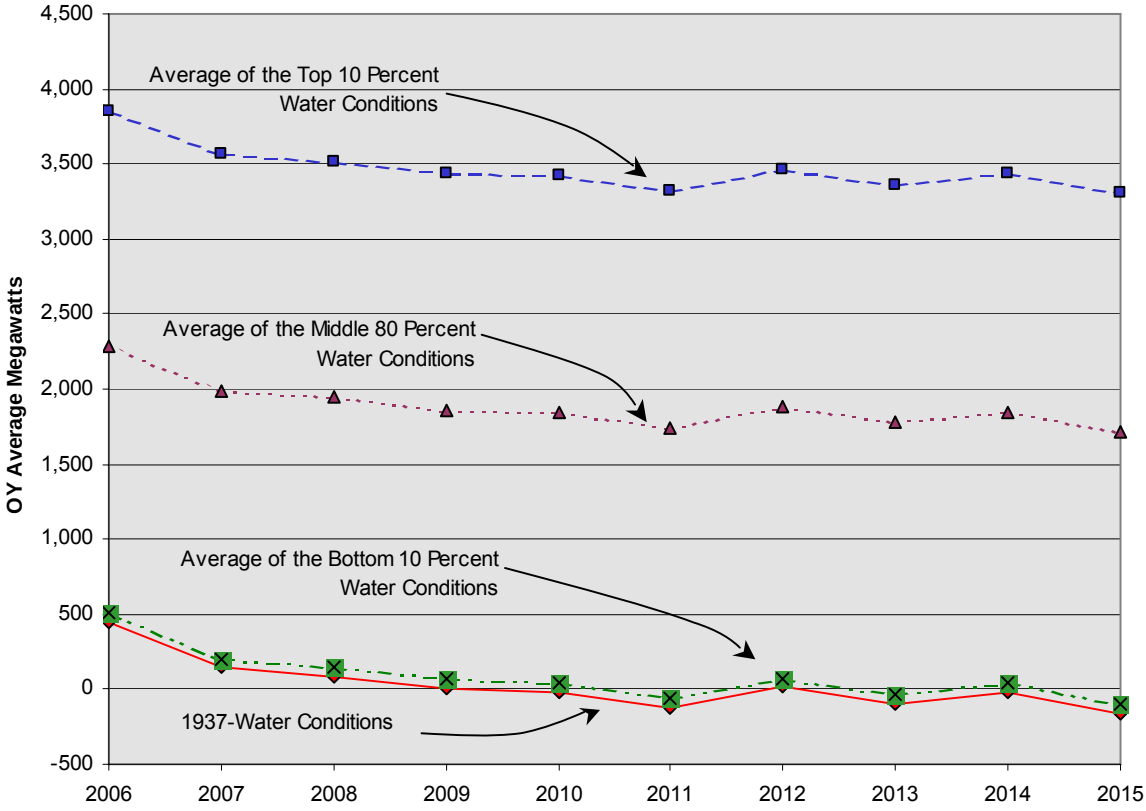
Potential Variability of Annual Federal Energy Surplus/Deficit
Utilizing Differing Water Conditions

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1937-Water Conditions	451	144	88	4	-18	-126	12	-96	-23	-158
Average Bottom 10% Water Conditions	511	205	149	65	43	-64	73	-34	39	-97
Average Middle 80% Water Conditions	2,290	1,991	1,943	1,863	1,844	1,740	1,880	1,775	1,851	1,716
Average Top 10% Water Conditions	3,857	3,563	3,520	3,442	3,425	3,323	3,463	3,360	3,437	3,303

Figure 6, below, graphically compares the annual Federal system surplus/deficits under four scenarios

Figure 6

Potential Variability of Annual Federal Energy Surplus/Deficit Projections
Utilizing Differing Water Conditions
For OY 2006 through 2015

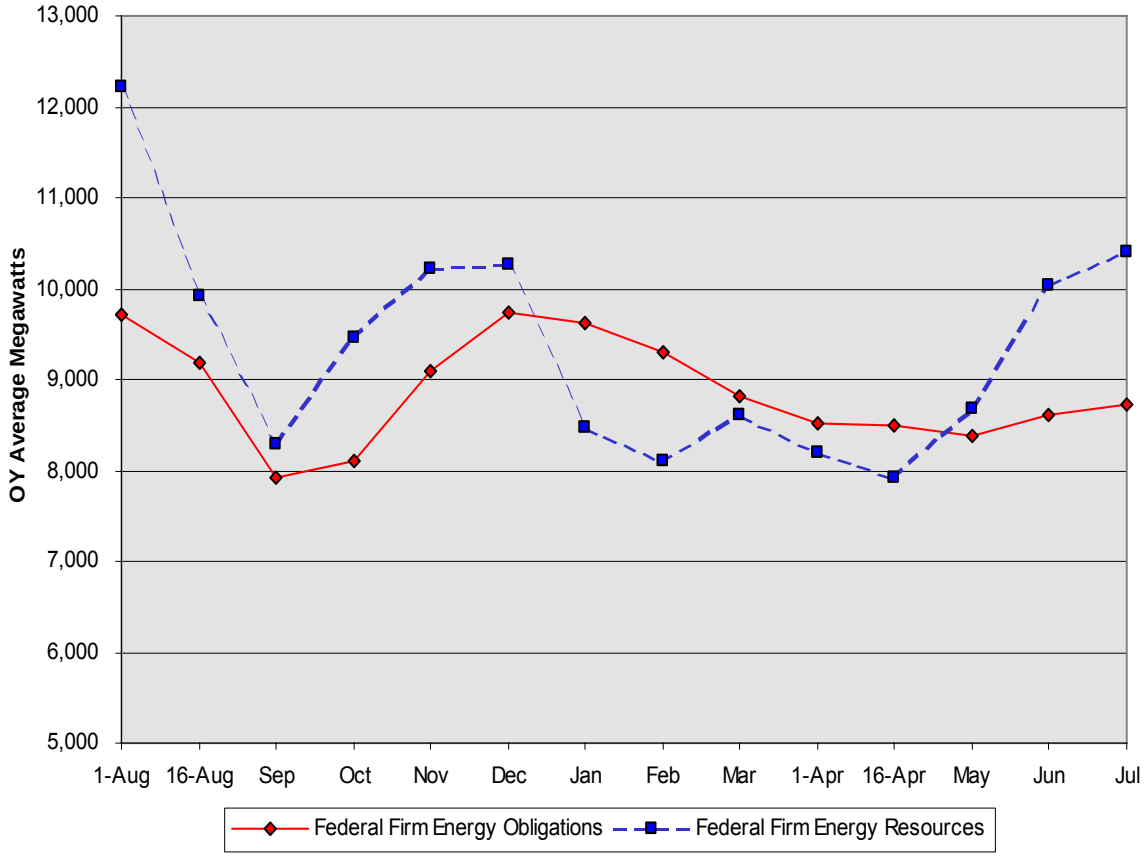


Monthly Federal Firm Energy Surplus/Deficit Projections

To depict the monthly variability of the loads and resources, under the "Federal System Assumptions" detailed on page 15, the monthly Federal system energy components under 1937-water conditions for OY 2006, 2010, and 2015 are shown in Exhibits 2 through 4, pages 61 through 63. Figure 7, below, illustrates the monthly Federal system firm energy loads and resources for OY 2006. This figure demonstrates the monthly timing of Federal system surpluses and deficits under current BiOp flow requirements.

Figure 7

OY 2006 Monthly Federal Firm Energy Loads and Resources Under 1937-Water Conditions



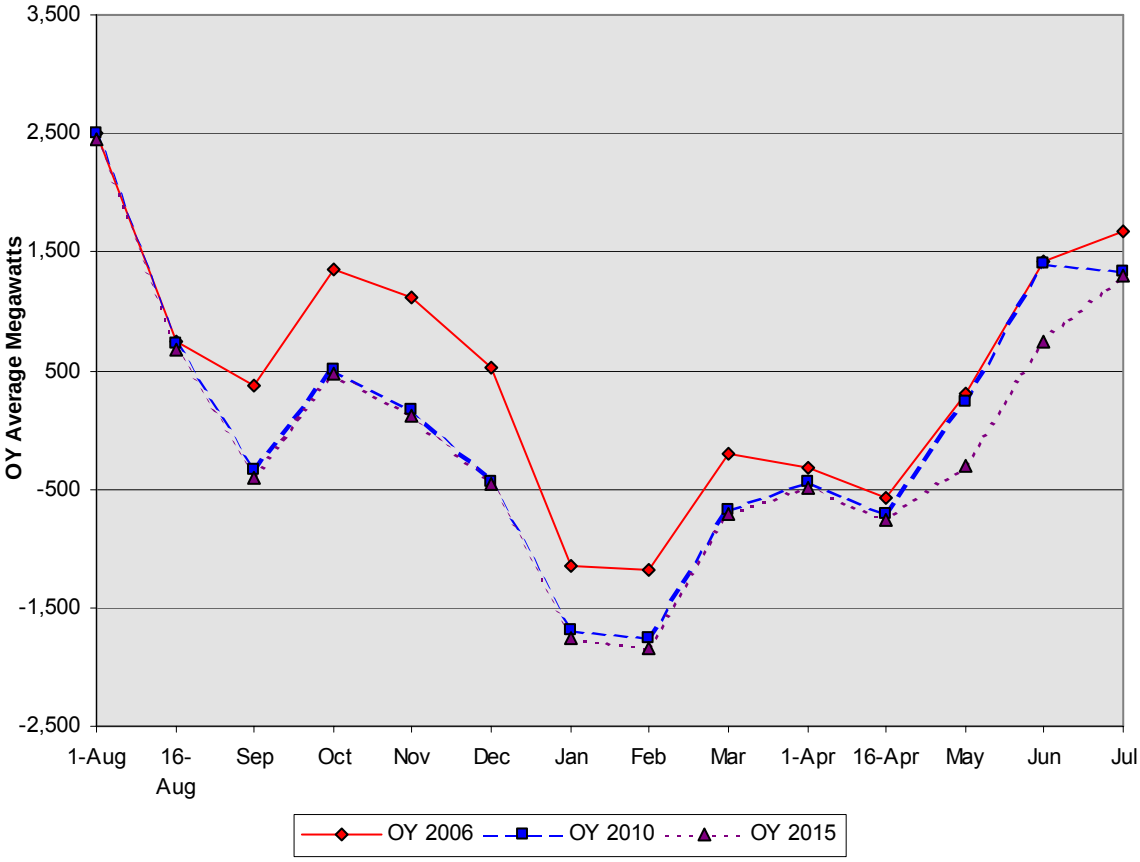
Under critical water conditions, Federal hydro resources are generally operated at lower power production levels during January through March to allow the reservoirs to store water for release in the spring to assist fish passage.

In addition to the monthly variability of the Federal surplus/deficit under critical water conditions, the Federal surplus/deficit can vary greatly depending on water conditions in the PNW. Exhibits 8 through 17, pages 73 through 82, illustrate the Federal firm energy surplus/deficit projections under the 50-water years of record.

Figure 8, below, shows the monthly Federal firm energy surplus/deficit projections for OY 2006, 2010, and 2015 incorporating the "Federal System Assumptions" detailed on page 15.

Figure 8

Monthly Federal Firm Energy Surplus/Deficit Projections
Under 1937-Water Conditions
For OY 2006, 2010, and 2015

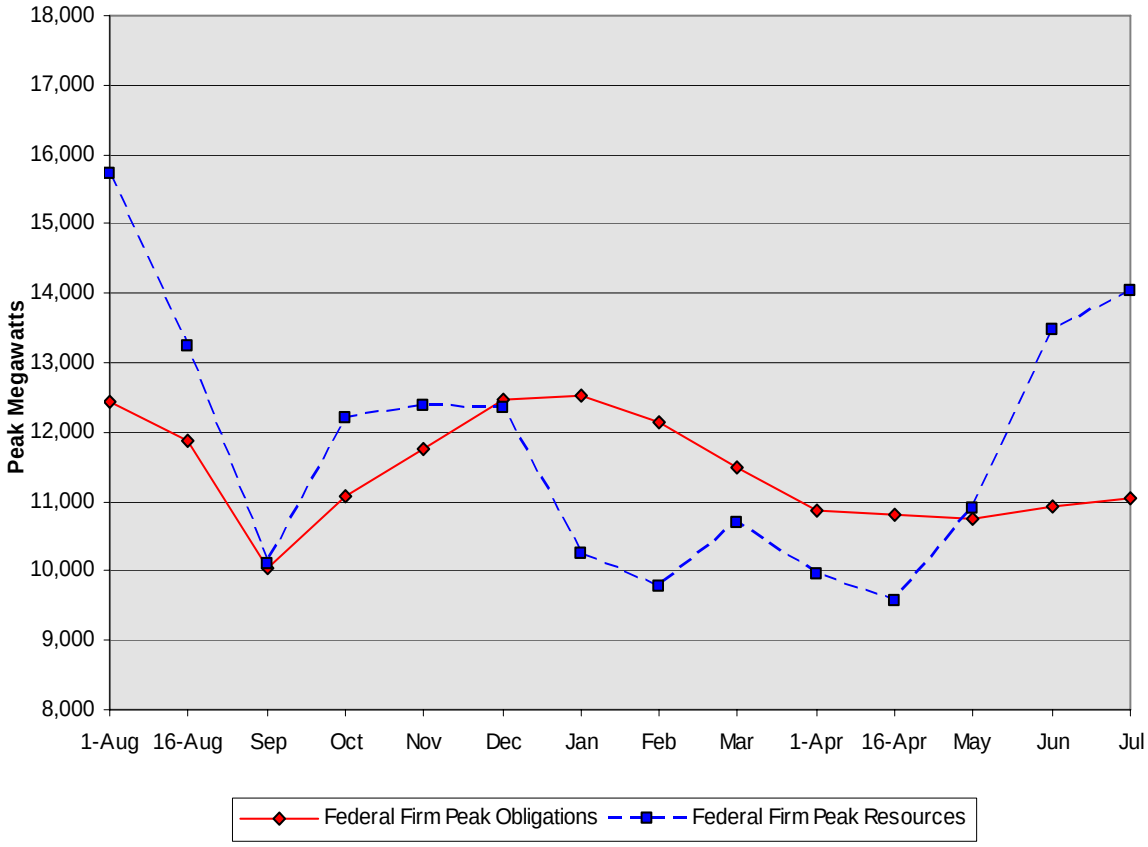


Monthly Federal Firm Capacity Surplus/Deficit Projections

Figure 9, on page 29, illustrates the monthly Federal system peak loads and resources for OY 2006 under the "Federal System Assumptions" detailed on page 15. The projections assume 1937-water conditions, normal weather conditions, and a 50-percent probability that the actual peak loads will be exceeded. In addition, the Federal hydro capacity is reduced by an operational peaking adjustment to estimate the monthly maximum operational capability that is available to meet the 1-hour expected peak load. This figure illustrates an example of how the timing and magnitude of the Federal system capacity surpluses and deficits that could potentially occur within any one operating year.

Figure 9

OY 2006 Monthly Federal Capacity Loads and Resources Under 1937-Water Conditions



BPA's surplus firm capacity values take into account the following Federal system hydrologic constraints:

- An operational peaking adjustment that reduced the maximum Federal hydro capacity estimate to meet the 1-hour expected peak load in any given month;
- Limitations on moving water between projects, including upstream storage;
- Pondage limitations due to hydraulic imbalance from reservoir to reservoir;
- Fish and Biological Opinion requirements from the (NOAA Fisheries) Biological Opinion dated December 2000, and the 2000 FCRPS BiOps for the Snake River and Columbia River projects; and
- Navigation and recreation constraints, including restrictions on the rate of rise or fall of tailwater and forebay elevations.

This analysis, however, does not take into account potential nighttime return problems from new capacity sales. Nighttime return problems can occur when replacement energy from capacity sales combined with minimum Federal hydro generation, thermal resources, and other Federal contract returns are greater than

BPA's nighttime load. The following factors may contribute to nighttime return problems:

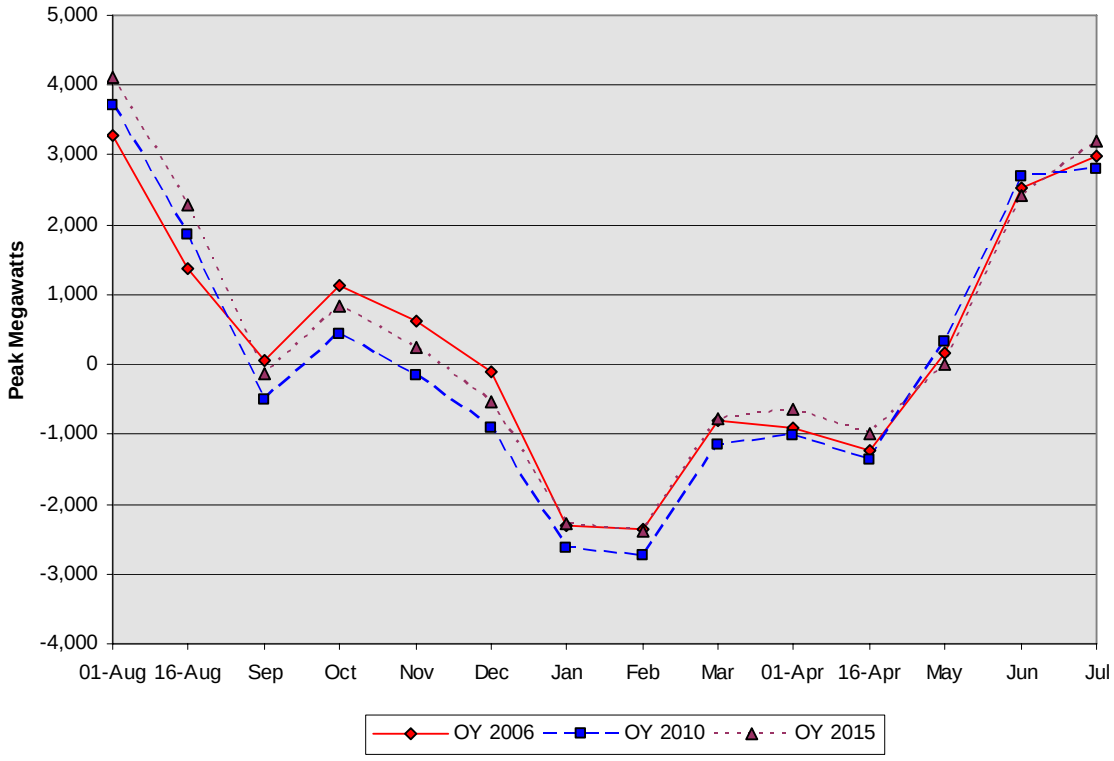
- Low nighttime Federal system load obligations;
- Minimum nighttime contract levels from contract purchases, peaking replacement, and exchange energy;
- The inability of Federal non-hydro resources—especially ENW's Columbia Generating Station—to cycle to fit differing day to night load requirements; and
- Additional nonpower hydro requirements that dictate minimum streamflows.

As changes develop in fish requirements and BPA's contracts, which restrict the Federal hydro system's ability to operate, updates to the Federal operational peaking adjustment would be incorporated into future studies.

Figure 10, below, illustrates the Federal firm capacity surplus/deficit projections for OY 2006, 2010, and 2015.

Figure 10

Monthly Federal Capacity Surplus/Deficit Projections
Under 1937-Water Conditions
For OY 2006, 2010, and 2015



Federal capacity surplus/deficit projections, assuming normal weather conditions and 1937-water conditions for OY 2006, 2010, and 2015, are shown in Exhibits 5 through 7, pages 67 through 69.

Federal Resource Adequacy

The Federal system energy and capacity load resource projections use the "Federal System Assumptions" presented on page 15 and are considered conservative. This analysis assumes Federal system hydro generation under 1937-critical water conditions, Federal non-hydro resources operating at expected generation levels, and Federal contract obligations, and purchases delivered at maximum contract levels. In addition, this analysis includes Federal power purchases or new resources that were acquired prior to December 31, 2004. Federal system deficits will be met by any combination of the following:

- Better than critical water conditions, which increases water flow and water storage thereby increasing the output of the Federal hydro system;
- Power purchases or the acquisition of generation from operating IPP projects;
- BPA's DSI obligations may be lower than their contracted amounts through September 30, 2006, due to contract terminations, closures, and/or economic conditions;
- Market purchases to cover delay or termination of planned resource purchases under long-term contracts;
- PSC net requirement load obligation variability due to current and future economic conditions; and
- Purchase of off-system storage and exchange agreements that allow for monthly seasonal shaping of Federal hydropower with other PNW entities or other west coast regions.

As the Federal system contracts for additional power purchases or generation from new or existing resources, those amounts will be incorporated into future studies.

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Section 5: Pacific Northwest Regional Analysis

Regional Analysis Assumptions

This regional loads and resources analysis is based on regional loads, resources, and contracts that were finalized as of December 31, 2004. Study assumptions for the regional Base Case analysis are as follows:

- Total retail load forecasts reflect normal weather conditions;
- Generating resources include all operating requirements currently adopted by the hydro project owners and the firm planning assumptions for assured resource capability for the PNCA;
- All existing regional import and export contracts expire by the terms of their agreements and are not renewed;
- Federal system power sales and capacity/energy exchange agreements with the cities of Burbank, Glendale, and Pasadena are shown as capacity/energy exchanges until they expire on April 15, 2008;
- IPP plants are included in the regional resource stack and are assumed available to meet regional load unless otherwise specified;
- There is no substantial operational change in non-Federal hydro licensing for regional hydro resources;
- Firm hydro energy and capacity estimates are based on 1937-water conditions, unless otherwise specified;
- Hydro capacity is reduced by an operational peaking adjustment to estimate the monthly maximum operational capability that is available to meet the 1-hour expected peak load, for each of the 1929 through 1978 historical water conditions;
- Capacity surplus/deficit values do not reflect potential nighttime return problems that may be incurred with new regional capacity sales; and
- Transmission losses are treated as a resource reduction.

Annual Regional Firm Energy Load Projections

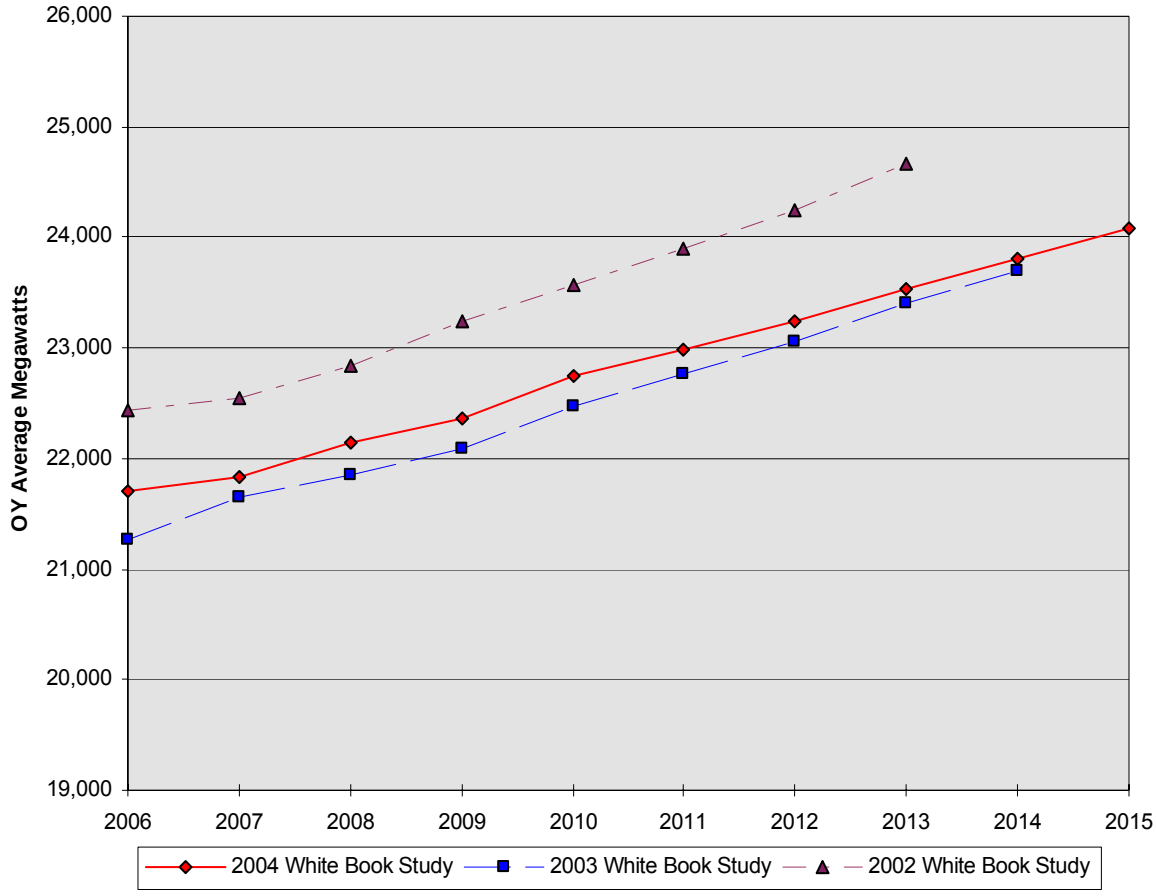
BPA's 2004 White Book annual regional firm energy load projections include two components:

- Total retail load consumption based on the individual entity's total retail load forecast discussed in "Total Retail Load Forecast", page 3; plus
- Reported long-term and multi-year export contracts made by PNW entities including BPA.

Figure 11, below, illustrates the change of the annual regional firm energy load projections from the previous 2003 and 2002 studies. The differences reflect updates in the regional total retail load forecasts and export contracts for the Federal agencies, public agencies, cooperatives, USBR, IOUs, and DSIs.

Figure 11

Annual Regional Firm Energy Load Projections[1]
Including Exports
For OY 2006 through 2015



[1] 2002 White Book projections were published through OY 2013.
2003 White Book projections were published through OY 2014.

Table 9, below, compares the relative size of regional firm loads by customer class for OY 2006.

Table 9

Annual Regional Firm Energy Load Customer Class
For OY 2006

Customer Class	Firm Energy (OY in aMW)	Firm Energy (Percent of Total)
Investor-Owned Entities	11,025	50.8%
Public Entities	8,531	39.3%
Exports	1,397	6.4%
Direct Service Industries	296	1.4%
Federal and Other Entities	457	2.1%
Total Regional Firm Load	**21,706**	**100.0%**

The annual regional firm energy loads are presented in Exhibit 18, page 87, and monthly firm energy loads for OY 2006, 2010, and 2015 are presented in Exhibits 19 through 21, pages 91 through 93.

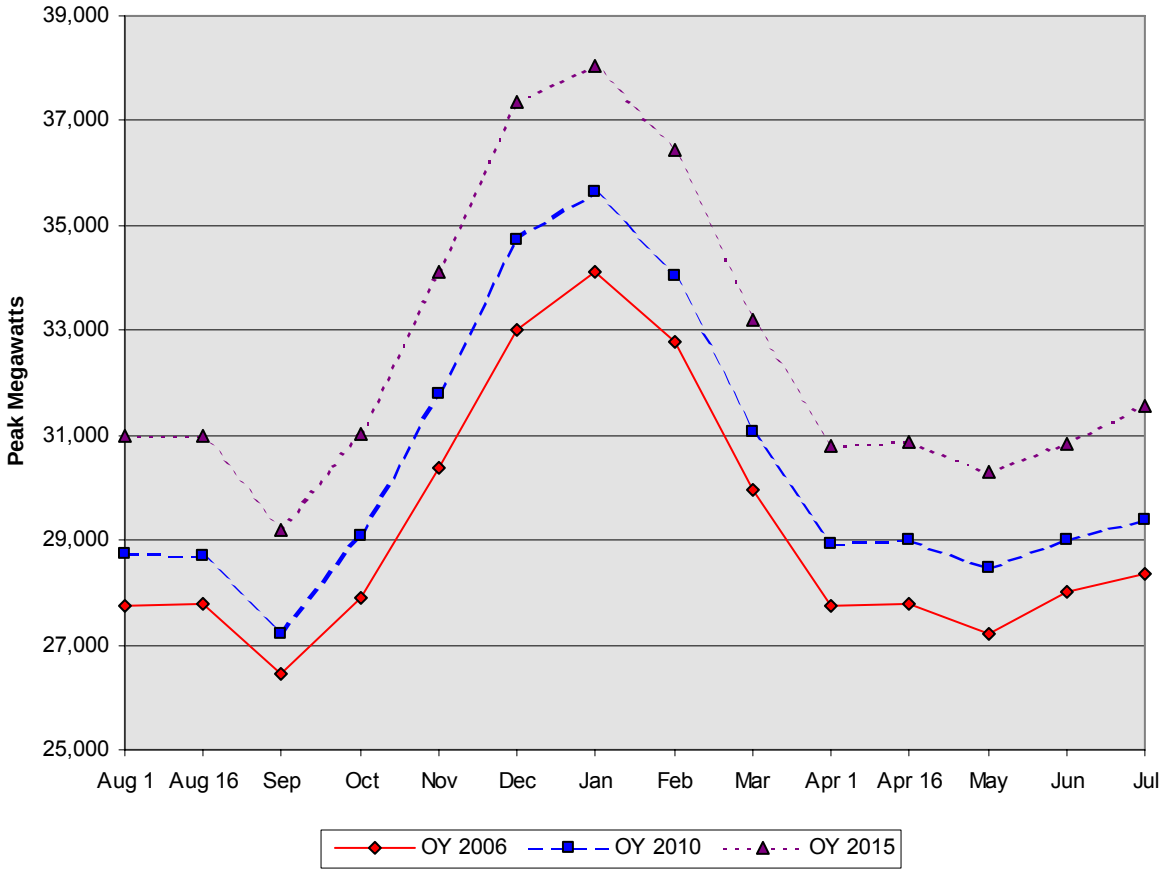
Monthly Regional Firm Peak Load Projections

BPA's 2004 White Book total retail load peaks are based on the individual entity forecasts of expected 1-hour monthly peak demand. The peak load estimates are based on normal weather conditions using a 50-percent probability that the forecasted peak load will be exceeded. In addition, the projected regional peak loads include export contracts made by PNW utilities, including those in the Federal system. The peak load projections are reduced by a diversity factor to account for the fact that all electrical peak demands do not occur simultaneously throughout the region.

Figure 12, below, illustrates the monthly regional firm peak loads for OY 2006, 2010, and 2015.

Figure 12

Monthly Regional Firm Peak Load Projections
For OY 2006, 2010, and 2015



The monthly regional firm peak loads are presented in Exhibits 22 through 24, pages 97 through 99.

Regional Firm Resources

Hydro resources represent a smaller share of the total regional resource stack than that of the Federal system. This is because regional entities own the majority of thermal resources, which are primarily comprised of coal, gas, and oil-fired projects and ENW's Columbia Generating Station nuclear plant. New generating projects are included when they have been placed into operation or are currently in the construction process. The projects are detailed in "Changes in the 2004 Pacific Northwest Loads and Resources Study", page 13.

Table 10, below, summarizes the PNW regional resource capacity and energy by generation type for OY 2006.

Table 10

Total Regional Firm Resources for OY 2006[1]
Based on 1937-Water Conditions

Project Type	Operational Peaking Capacity (January Peak MW)	Percent of Operational Peaking Capacity	Firm Energy (OY in aMW)	Percent of Firm Energy
Hydro	21,687[2]	57.8%	11,705	47.4%
Coal	5,901	15.7%	5,153	20.9%
Combustion Turbines	3,531	9.4%	2,188	8.9%
Cogeneration	2,234	5.9%	1,975	8.0%
Imports	1,852	4.9%	1,283	5.2%
Nuclear	1,150	3.1%	1,000	4.1%
Non-Utility Generation	1,082	2.9%	1,258	5.1%
Miscellaneous	122	0.3%	98	0.4%
Total Firm Resources	**37,559**	**100.0%**	**24,660**	**100.0%**

[1] Regional firm resource estimates before adjustments for reserves, maintenance, and transmission losses.

[2] The hydroelectric capacity is reduced by an operational peaking adjustment, to estimate the monthly maximum operational capability that is available to meet the 1-hour expected peak load, for 1937-water conditions. For January 2006, the reduction is 10,403 peak MW.

Potential Variability of Regional Resources

To illustrate the potential variability of regional resources, this study compares different scenarios using varying levels of regional hydro generation based on water conditions. Table 11, below, compares the annual regional resources under four scenarios using 1937-water conditions, the base case of this study and the averages of the bottom ten percent, middle 80 percent, and top ten percent of the historical 50-water year conditions (1929 through 1978). For OY 2006, regional resource estimates can vary up to 7,000 aMW, ranging from approximately 24,000 to 31,000 aMW, due to hydro variability.

Table 11

Potential Variability of Total Regional Net Resource Projections[1]
Utilizing Different Levels of Water Conditions
Energy in Average Megawatts

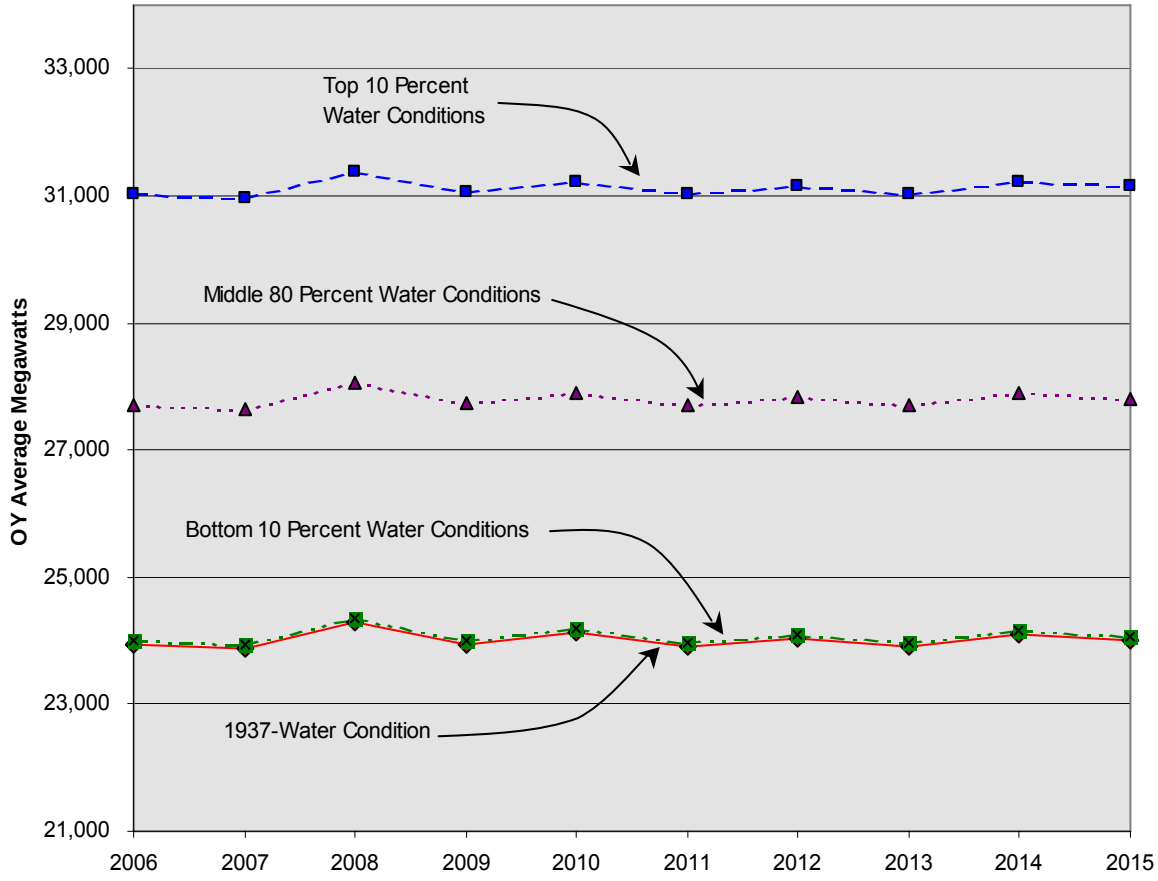
Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1937-Water Condition	23,953	23,887	24,287	23,947	24,119	23,911	24,034	23,903	24,101	24,007
Average Bottom 10% Water Conditions	24,009	23,944	24,345	24,005	24,178	23,971	24,094	23,963	24,162	24,067
Average Middle 80% Water Conditions	27,707	27,651	28,062	27,727	27,904	27,700	27,826	27,699	27,900	27,807
Average Top 10% Water Conditions	31,017	30,968	31,385	31,053	31,233	31,031	31,159	31,033	31,236	31,143

[1] Total regional net resource estimates include adjustments for reserves, maintenance, and transmission losses.

Figure 13, below, graphically compares the annual regional resources under the four scenarios.

Figure 13

Potential Variability of Total Regional Net Resource Projections[1]
Utilizing Different Levels of Water Conditions



[1] Total regional net resource estimates include adjustments for reserves, maintenance, and transmission losses.

Annual Regional Firm Energy Surplus/Deficit Projections

The annual regional firm energy surplus/deficit projections for OY 2006 through 2015, assuming 1937-water conditions, are presented below in Table 12. These projections incorporate the "Regional Analysis Assumptions" presented on page 33. Under the current PNW regional resource stack, the region is expected to be in firm energy surplus through OY 2014, ranging from 2,246 aMW in OY 2006, declining to 289 aMW in OY 2014. The region is expected to be deficit in OY 2015 by -81 aMW and will most likely meet the deficit using a variety of methods as described in "Regional Resource Adequacy", page 47. The changes in the regional energy surplus/deficit levels are mainly due to differing regional load forecasts and the timing of new generating resources.

Table 12

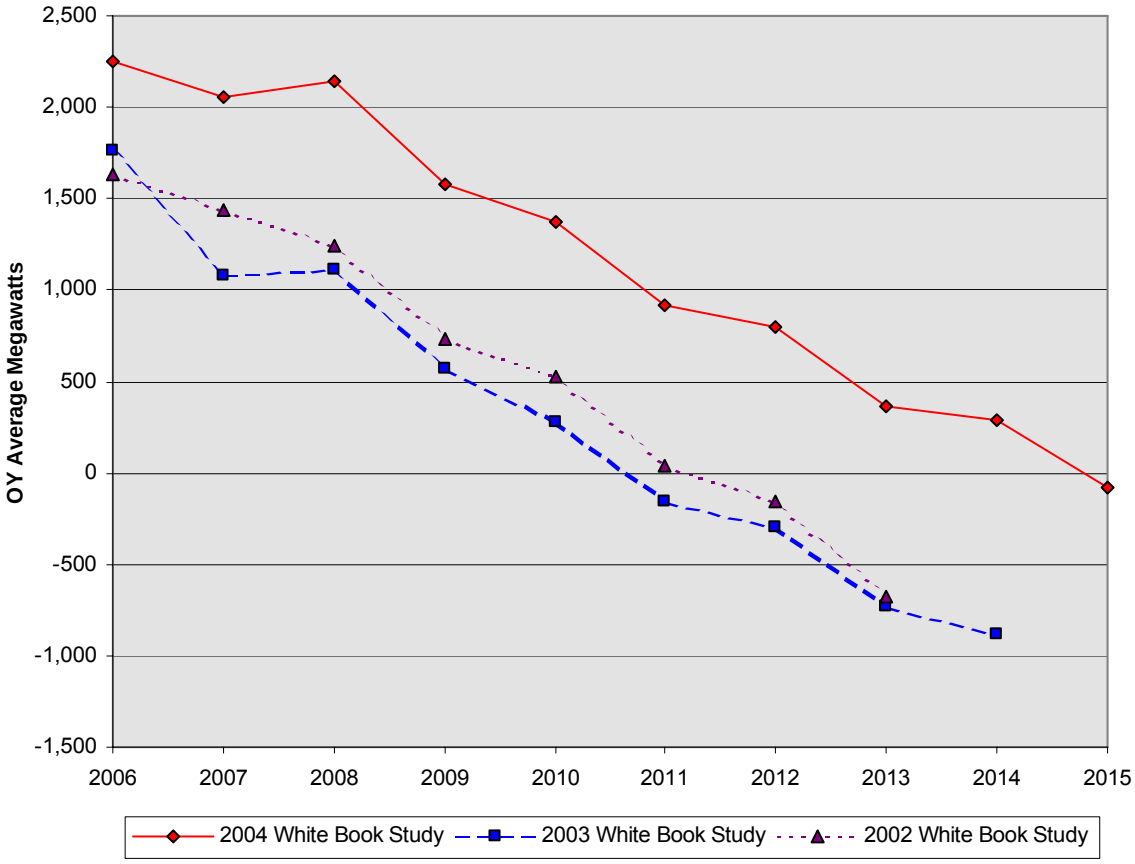
Regional Firm Energy Surplus/Deficit Projections
Under 1937-Water Conditions
Energy in Average Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regional Surplus/Deficit	2,246	2,060	2,146	1,576	1,370	921	797	364	289	-81

Figure 14, below, graphically illustrates how the 2004 White Book regional energy surplus/deficits compares to the previous 2003 and 2002 studies.

Figure 14

Annual Regional Firm Energy Surplus/Deficit Projections[1]
For OY 2006 through 2015



The regional energy surplus/deficits for OY 2006 through 2015 are presented in Exhibit 18, page 87. Monthly firm energy loads and resources balances for OY 2006, 2010, and 2015 are presented in Exhibits 19 through 21, pages 91 through 93. In addition to the monthly variability of the regional surplus/deficit, the region's surplus/deficit can vary greatly depending on water conditions in the PNW. Exhibits 25 through 34, pages 103 through 112, illustrate the regional firm energy surplus/deficit projections under the 50-water years of record.

[1] 2002 White Book projections were published through OY 2013.
2003 White Book projections were published through OY 2014.

Potential Variability of Annual Regional Energy Surplus/Deficit Projections

Potential Variability Due to Water Conditions: To show the potential variability of regional surplus/deficits, this study compares the surplus/deficits under different levels of regional generation based on different levels of water conditions (1929 through 1978). These projections incorporate the "Regional Analysis Assumptions" presented on page 33. Table 13, below, presents a range of estimated regional surplus/deficits assuming differing levels of regional hydro generation by using the averages of the bottom ten percent, middle 80 percent, and top ten percent of the historical 50-water year conditions.

Table 13

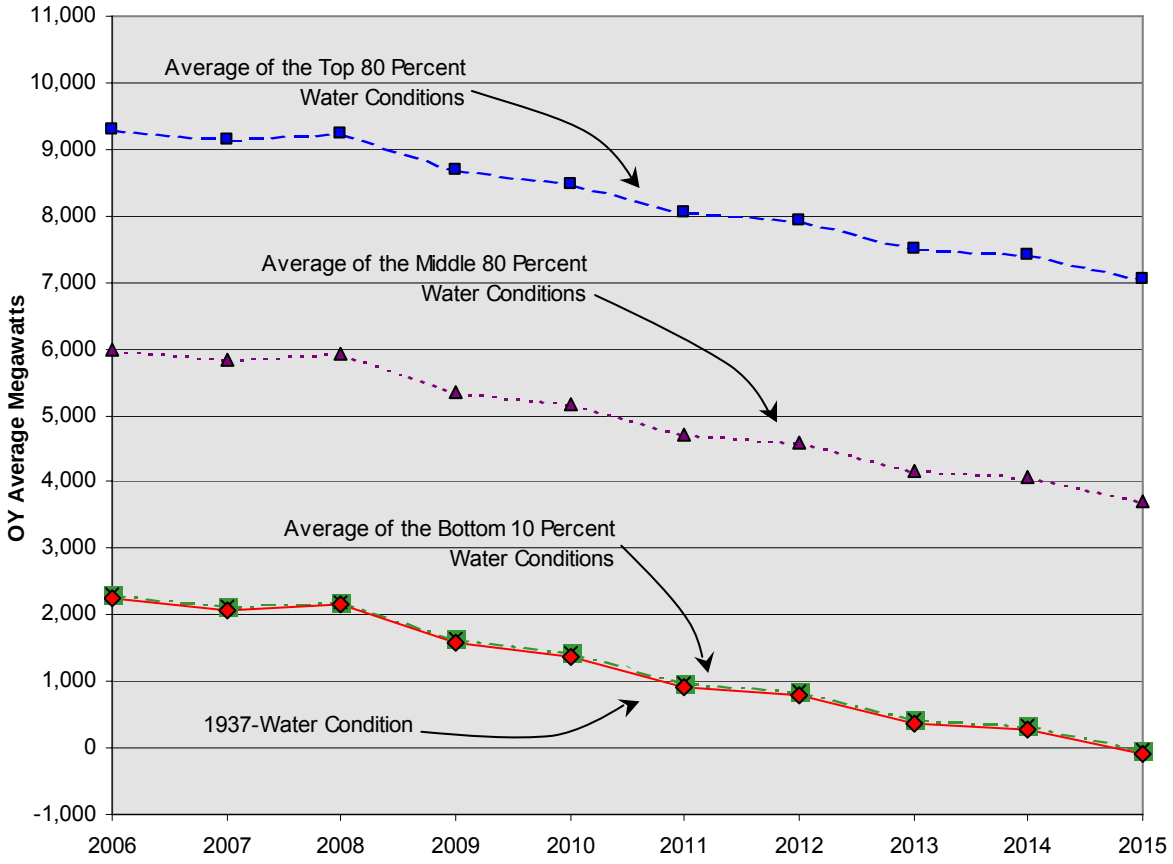
Potential Variability of Annual Regional Firm Energy Surplus/Deficit
Based on Different Levels of Water Conditions
Energy in Average Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1937-Water Conditions	2,246	2,060	2,146	1,576	1,370	921	797	364	289	-81
Average Bottom 10% Water Conditions	2,302	2,118	2,205	1,635	1,429	981	857	424	349	-21
Average Middle 80% Water Conditions	6,000	5,824	5,921	5,356	5,155	4,711	4,589	4,160	4,087	3,719
Average Top 10% Water Conditions	9,310	9,141	9,245	8,682	8,484	8,042	7,921	7,494	7,423	7,055

Figure 15, below, illustrates a range of estimated regional surplus/deficits assuming differing levels of regional hydro generation.

Figure 15

Variability of Annual Regional Firm Energy Surplus/Deficit
Based on Different Levels of Water Conditions
For OY 2006 through 2015



Potential Variability Due to IPP Generation Amounts Delivered to the Region: This study assumes approximately 3,110 aMW of not-contract-for IPP generation as PNW regional resources, though these resources potentially may not be available when needed to serve PNW regional loads. The 2003 White Book showed about 3,400 aMW of IPP generation. The change is due to updates in the timing of IPP project completions and/or PNW regional acquisition of IPP generation. While this assumption is reasonable from an electrical reliability standpoint, resulting regional surpluses may understate the potential for price volatility or overstate the availability of IPP generation for use within the PNW. The PNW region may have to compete with other western markets to secure IPP generation to meet

electricity demand. Table 14, below, shows the potential variability of regional surplus/deficits due to the differing levels of IPP generation assumed delivered to the region—25 percent, 50 percent, and 75 percent.

Table 14

Potential Variability of Annual Regional Firm Energy Surplus/Deficit Based on Different Levels of IPP Generation Delivered to the Region

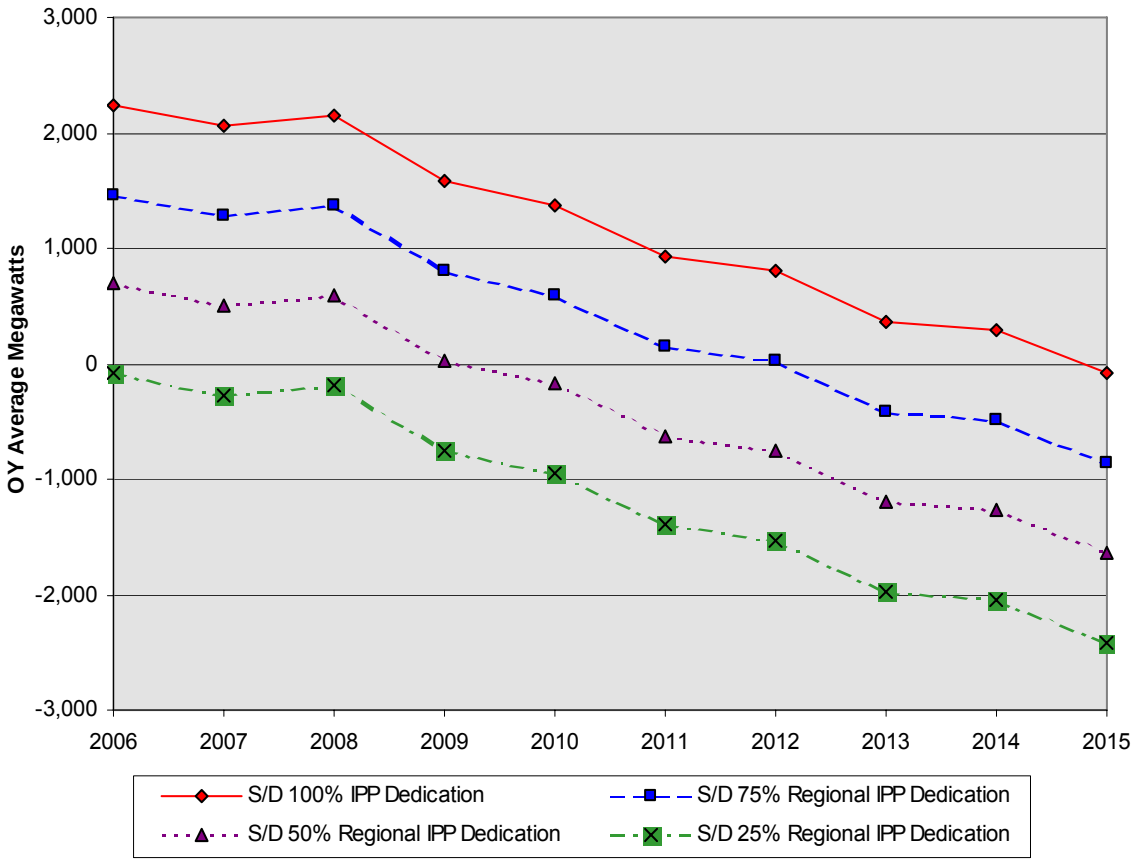
Energy in Average Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Surplus/Deficit 100% IPP Delivered	2,246	2,060	2,146	1,576	1,370	921	797	364	289	-81
Surplus/Deficit 75% IPP Delivered	1,468	1,283	1,369	799	598	150	20	-413	-489	-859
Surplus/Deficit 50% IPP Delivered	691	505	591	21	-173	-622	-758	-1,191	-1,266	-1,637
Surplus/Deficit 25% IPP Delivered	-87	-272	-186	-757	-945	-1,394	-1,536	-1,969	-2,044	-2,414

Figure 16, below, graphically illustrates the potential variability of regional surplus/deficits due to the differing levels of IPP generation assumed delivered to the region—25 percent, 50 percent, and 75 percent.

Figure 16

Potential Variability of Annual Regional Firm Energy Surplus/Deficit Based on Different Levels of IPP Generation Delivered to the Region

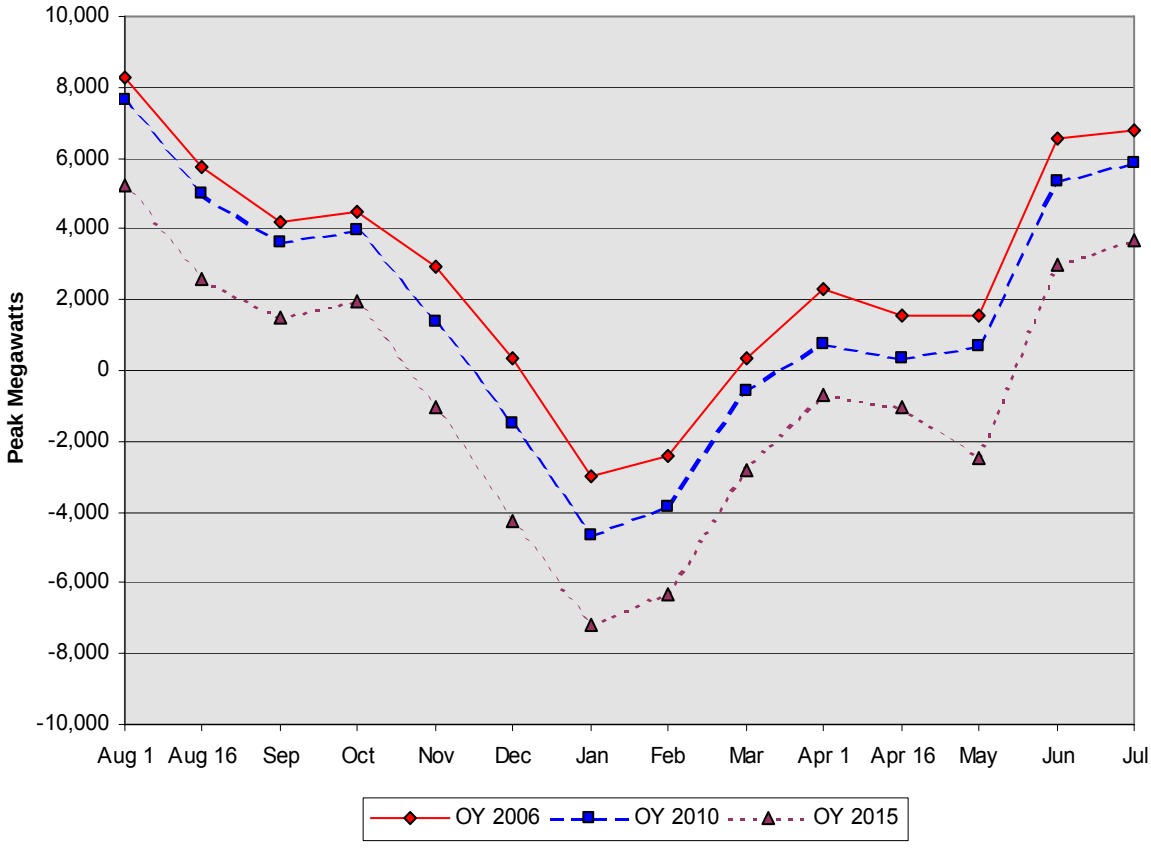


Monthly Regional Firm Capacity Surplus/Deficit Projections

Figure 17, below, graphically illustrates the monthly regional capacity surplus/deficit projections for OY 2006, 2010, and 2015 and incorporates the "Regional Analysis Assumptions" on page 33. The projections assume 1937-water conditions, normal weather conditions, and a 50-percent probability that the actual peak loads will be exceeded. In addition, the hydro instantaneous capacity is reduced, by an operational peaking adjustment, to estimate the monthly maximum operational capability that is available to meet the 1-hour expected peak load. See "Federal Operational Peaking Adjustment", page 12. Regional surplus firm capacity values take into account hydrologic constraints detailed in the "Monthly Federal Firm Capacity Surplus/Deficit Projections", page 28.

Figure 17

Monthly Regional Firm Capacity Surplus/Deficit Projections
For OY 2006, 2010, and 2015



Regional capacity surplus/deficit projections, assuming normal weather conditions and 1937-water conditions for OY 2006, 2010, and 2015, are shown in Exhibits 22 through 24, pages 97 through 99.

Regional Resource Adequacy

The regional energy and capacity load resource projections use the "Regional Analysis Assumptions" presented on page 33 and are considered conservative with the exception of the treatment of IPP resources. This analysis assumes regional hydro generation under 1937-critical water conditions, non-hydro resources operating at expected generation levels, and contract obligations and purchases delivered at maximum contract levels. IPP plants are assumed to be available to meet regional loads unless otherwise contracted. However, the resulting regional surpluses may understate the potential for price volatility because the PNW region may have to compete with other western markets to secure these sources of supply. Regional deficits will be met by any combination of the following:

- Better than critical water conditions, which increases water flow and water storage thereby increasing the output of the regional hydro system;
- Power purchases or the acquisition of generation from operating IPP projects;
- Total retail load variability due to current and future economic conditions;
- DSI long-term load levels are forecasted to reach 608 aMW throughout the study. Actual DSI load levels could be different, based on electricity prices, aluminum commodity prices, and closures; and
- Purchase of off-system storage and exchange agreements that allow for monthly seasonal shaping of regional hydropower with other regions.

As the region executes contracts for additional power purchases or generation from new or existing resources, those amounts will be included in future analyses.

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Section 6: Northwest Power and Conservation Council Comparison

Non-DSI Regional Load Comparison: 2004 White Book to Council

The following compares the non-DSI regional firm total retail loads between BPA's 2004 White Book and the Northwest Power and Conservation Council's Pre-Publication Draft Forecast of Electricity Demand for the Fifth Power Plan (January 2005). To provide consistency for this comparison, the regional DSI load component was removed from both forecasts. It should be noted that the regional total retail loads do not include regional exports, which are a separate component of load obligations to the PNW region.

2004 White Book Non-DSI Total Retail Load Forecast: The 2004 White Book total retail load projections were initially estimated separately, by each individual entity and then grouped into the following categories: Federal agencies, public agencies, cooperatives, USBR, and IOUs. The total retail load forecasts were finalized on December 31, 2004.

The total retail load forecasts for the Federal agencies, public agencies, cooperatives, and USBR were developed using any combination of the following:

- Linear trending based on historical power consumption;
- Data obtained from the individual entity's 2001 power sales contracts' Exhibit C submittals; and
- Retail load forecasts sent directly to BPA through their PNUCC submittals.

The load forecasts for the IOUs were developed from both data submitted in their PNUCC submittals and load forecasts sent directly to BPA. Generally, the load estimates are higher when compared to last year's analysis due to improved economic conditions in the region, which are reflected in the forecast.

Council Non-DSI Total Retail Load Forecast: The Council's Pre-Publication Draft Forecast of Electricity Demand for the Fifth Power Plan (January 2005) assumes that non-DSI electricity demand will return to an almost non-recession level, but that demand is still lower than the Fourth Power Plan forecast. The expected lower level of demand is partially due to permanent effects of higher electricity prices which are assumed to dampen the effects of the economic recovery, as well as, due to lasting efficiency improvements achieved during the electricity crisis the region experienced during late 2000 and 2001.

Comparison of the Non-DSI Total Retail Load Forecast: The differences between the Council and 2004 White Book non-DSI load forecasts average -0.7 percent over the 10 years of the study. The maximum difference expected is -1.1 percent (-255 aMW) in OY 2006, declining to a difference of -0.8 percent (-180 aMW) by 2015. The difference is considered minor and is mainly due to variations in modeling methods and the vintage of data used in the two forecasts.

Table 15, below, compares the non-DSI regional firm total retail loads between BPA's 2004 White Book and the Northwest Power and Conservation Council's Pre-Publication Draft Forecast of Electricity Demand for the Fifth Power Plan (January 2005).

Table 15

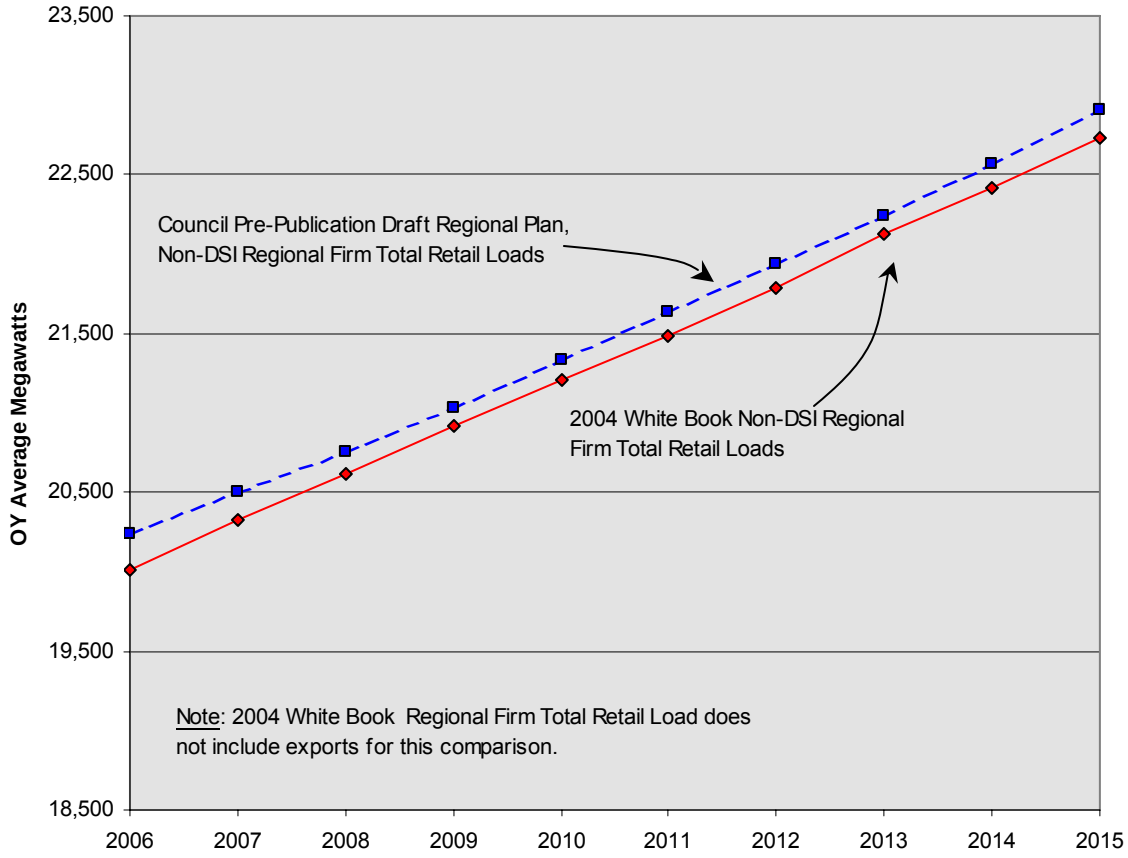
Non-DSI PNW Regional Firm Total Retail Load Comparison
BPA's 2004 White Book Load Projections
and the Council's Pre-Publication Draft Fifth Power Plan (January 2005)
Annual Energy in Average Megawatts

Operating Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
2004 White Book										
Regional Firm Loads	20,309	20,797	21,210	21,529	21,815	22,095	22,396	22,736	23,023	23,334
Regional DSI Loads	296	473	591	608	608	608	608	608	608	608
Non-DSI Regional Firm Loads	20,013	20,324	20,619	20,921	21,207	21,487	21,788	22,128	22,415	22,726
Council Pre-Publication Draft Fifth Plan (January 2005)										
Non-DSI Regional Firm Loads	20,238	20,497	20,759	21,033	21,331	21,632	21,941	22,245	22,565	22,906
Comparison: 2004 White Book – Council										
Difference	**-225**	**-173**	**-141**	**-112**	**-124**	**-145**	**-153**	**-118**	**-150**	**-180**
Percent Difference	**-1.1%**	**-0.9%**	**-0.7%**	**-0.5%**	**-0.6%**	**-0.7%**	**-0.7%**	**-0.5%**	**-0.7%**	**-0.8%**

Figure 18, below, graphically illustrates the expected non-DSI regional firm total retail loads from BPA's 2004 White Book and the Northwest Power and Conservation Council's Pre-Publication Draft Forecast of Electricity Demand for the Fifth Power Plan (January 2005).

Figure 18

Comparison of Non-DSI Regional Firm Total Retail Loads
BPA 2004 White Book Load Projections
and the Council's Pre-Publication Draft Fifth Power Plan (January 2005)



Comparison of Resource Stack Assumptions: 2004 White Book to Council

A comparison of the resource assumptions between the 2004 White Book and the Council's Pre-Publication Draft Power Price Forecast for the Fifth Power Plan is listed below.

2004 White Book Resource Stack Assumptions: The 2004 White Book resource stack assumptions were estimated on a unit basis. Revisions to current thermal plant operations are based on submittals by utilities either to the PNUCC or data submitted directly to BPA for the purpose of this study. Resources listed in this study represent plants that have been placed into operation or are currently in the

construction process. The capacity and energy values have been estimated through information provided by PNUCC or through conversations with the plant managers.

Council Resource Stack Assumptions: The Council's near-term regional resource stack assumptions for its wholesale power price forecast are based on projects under construction, similar to the process utilized by BPA. The treatment of new resources by the Council and BPA differ in the following manner: 1) BPA adds plants to the resources based on the operator's/developer's best estimate of completion; and 2) the Council estimates operation dates for new resources based on economic competitiveness as estimated by the AURORA™ Electric Market Model. Therefore, the Council may delay an announced operational date of a future plant based on the perceived need for the plant as determined by their model.

Comparison of the Resource Stack: The following compares the different assumptions used for BPA's 2004 White Book and the Council's estimation in constructing their new resource stack.

- BPA includes only Pennsylvania Power & Light Company's (PPL Montana) resources that are dedicated to serve Northwestern Energy's (formally Montana Power Company) eastern Montana loads. The Council includes most of PPL Montana's generation in their regional resource stack, regardless of whether they are dedicated to serve PNW regional loads. BPA will review the status of these resources in future studies.
- The Council includes the nameplate rating of the following self-generating units: BP Cherry Point, Georgia Pacific Bellingham, Sierra Pine Medite, and Wah Chang. In addition, the Council includes the reactivated Frontier Energy project. BPA does not include these plants and will review these plants for possible inclusion in future studies.
- In addition, BPA and the Council treat the wind projects differently. At this time, BPA only recognizes the average energy generation projection for wind projects and does not recognize a peaking capacity credit for wind projects to be able to predictably meet peaking loads. The Council models wind projects as predictable, shaped energy resources and credits wind with a capacity equivalent to the installed wind capacity times a capacity factor.

These resource stack differences are generally based on the timing and treatment of new regional resources. They are considered minor in long-range load resource planning.

Section 7: Federal System Exhibits

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Exhibit 1

Federal System Annual Energy Analysis Under 1937-Water Conditions for 10 Operating Years

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Exhibit 1: OY 2006 through 2015 Annual Energy

Loads and Resources - Federal System
PNW Loads and Resource Study
2006 - 2015 Operating Years
1937 Water Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	2006 Avg.	2007 Avg.	2008 Avg.	2009 Avg.	2010 Avg.	2011 Avg.	2012 Avg.	2013 Avg.	2014 Avg.	2015 Avg.
Non-Utility Obligations										
Federal Agencies 2002 PSC Sale	118	124	131	142	144	146	147	148	150	151
USBR 2002 PSC Sale	149	149	149	149	149	149	149	149	149	149
DSI 2002 PSC Sale	271	45	0	0	0	0	0	0	0	0
Total Firm Non-Utility Obligations	538	319	280	291	294	295	296	297	299	300
Transfers Out										
NGP 2002 PSC Sale	2749	2901	2961	2989	3025	3066	3088	3115	3144	3177
GPU 2002 PSC Sale	2098	2350	2402	2414	2430	2444	2438	2452	2462	2478
NGP Slice Sale	613	612	626	619	625	617	629	621	633	624
GPU Slice Sale	1021	1019	1043	1030	1041	1028	1048	1034	1054	1039
IOU 2002 PSC Sale	382	64	0	0	0	0	0	0	0	0
Exports	969	696	653	598	691	652	600	580	570	557
Intra-Regional Transfers (Out)	485	380	370	370	370	370	199	184	178	178
Federal Diversity	0	0	0	0	0	0	0	0	0	0
Total Transfers Out	8316	8021	8055	8021	8181	8177	8001	7986	8041	8053
Total Firm Obligations	8854	8340	8335	8312	8475	8472	8298	8283	8340	8354
Hydro Resources										
Regulated Hydro	6464	6492	6527	6545	6562	6577	6589	6603	6614	6620
Independent Hydro	398	399	399	399	399	399	399	399	399	399
Operational Peaking Adjustment	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (Canada)	139	134	131	132	138	140	139	137	136	134
Total Hydro Resources	7001	7025	7057	7076	7099	7117	7126	7139	7149	7154
Other Resources										
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0
Renewables	29	29	29	29	29	29	29	29	29	29
Cogeneration	0	0	0	0	0	0	0	0	0	0
Imports	247	226	199	184	183	175	175	175	175	175
Intra-Regional Transfers (In)	1210	510	276	276	276	276	105	90	90	84
Large Thermal	1000	877	1000	877	1000	877	1000	877	1000	877
Non-Utility Generation	88	65	106	115	115	115	115	115	115	115
Augmentation Purchases	0	0	0	0	0	0	0	0	0	0
Augmentation Resources	0	0	0	0	0	0	0	0	0	0
Total Other Resources	2574	1706	1610	1481	1603	1472	1424	1286	1409	1279
Total Resources	9575	8731	8667	8557	8702	8589	8550	8425	8558	8433
Reserves & Maintenance										
Hydro Reserves	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0
Federal Hydro Maintenance	0	0	0	0	0	0	0	0	0	0
Spinning Reserves	0	0	0	0	0	0	0	0	0	0
Federal Transmission Losses	-270	-246	-244	-241	-245	-242	-241	-238	-241	-238
Total Reserves, Maintenance & Losses	-270	-246	-244	-241	-245	-242	-241	-238	-241	-238
Total Net Resources	9305	8485	8423	8315	8457	8346	8309	8187	8317	8195
Total Firm Surplus/Deficit	451	144	88	3.6	-18	-126	12	-96	-23	-158

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Exhibits 2 - 4

Federal System Monthly Energy Analysis Under the 2004 White Book Load Forecast for 1937-Water Conditions

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Exhibit 2: OY 2006 Monthly Energy

Loads and Resources - Federal System
PNW Loads and Resource Study
2005 - 2006 Operating Year
1937 Water Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
Non-Utility Obligations															
Federal Agencies 2002 PSC Sale	117	117	106	108	125	135	138	132	122	108	108	106	108	117	118
USBR 2002 PSC Sale	314	280	171	129	0.1	0.1	0.1	0.9	20	248	311	263	299	331	149
DSI 2002 PSC Sale	265	265	265	272	272	272	272	272	272	272	272	272	272	272	271
Total Firm Non-Utility Obligations	695	661	542	508	397	407	410	405	414	628	691	641	679	720	538
Transfers Out															
NGP 2002 PSC Sale	2645	2645	2417	2478	2778	3113	3174	3077	2745	2584	2577	2570	2642	2764	2749
GPU 2002 PSC Sale	1710	1710	1816	1850	2182	2442	2576	2493	2370	2180	2174	2029	1816	1712	2098
NGP Slice Sale	838	645	500	602	665	669	547	521	567	534	509	601	704	718	613
GPU Slice Sale	1395	1074	833	1003	1107	1114	911	867	945	890	847	1001	1172	1195	1021
IOU 2002 PSC Sale	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382
Exports	1048	1049	1037	943	940	954	950	948	938	951	949	984	987	943	969
Intra-Regional Transfers (Out)	1003	1008	393	346	648	661	659	603	450	367	368	172	231	281	485
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Transfers Out	9021	8514	7379	7604	8701	9336	9200	8890	8396	7886	7806	7738	7934	7994	8316
Total Firm Obligations	9717	9175	7921	8113	9098	9743	9610	9295	8810	8514	8497	8379	8613	8715	8854
Hydro Resources															
Regulated Hydro	9278	6907	5151	6342	7050	7171	5752	5427	5931	5577	5248	6096	7328	7811	6464
Independent Hydro	440	438	373	386	305	237	176	196	275	434	518	714	749	454	398
Operational Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (Canada)	141	141	141	141	141	141	141	141	141	136	136	136	136	136	139
Total Hydro Resources	9859	7487	5665	6869	7497	7550	6069	5765	6347	6146	5901	6945	8213	8401	7001
Other Resources															
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27	29
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	184	184	217	249	318	376	351	305	275	272	239	102	124	203	247
Intra-Regional Transfers (In)	1422	1425	1567	1520	1568	1503	1161	1151	1128	873	871	756	874	996	1210
Large Thermal	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Non-Utility Generation	80	78	55	72	96	100	102	94	87	110	109	103	91	72	88
Augmentation Purchases	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Augmentation Resources	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	2713	2714	2867	2868	3012	3009	2645	2581	2520	2284	2250	1988	2116	2298	2574
Total Resources	12572	10201	8532	9738	10508	10559	8714	8346	8867	8431	8151	8933	10328	10699	9575
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Hydro Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Transmission Losses	-355	-288	-241	-275	-296	-298	-246	-235	-250	-238	-230	-252	-291	-302	-270
Total Reserves, Maintenance & Losses	-355	-288	-241	-275	-296	-298	-246	-235	-250	-238	-230	-252	-291	-302	-270
Total Net Resources	12217	9913	8291	9463	10212	10261	8469	8110	8617	8193	7921	8681	10037	10397	9305
Total Firm Surplus/Deficit	2501	738	370	1350	1114	518	-1141	-1185	-193	-321	-576	302	1424	1683	451

Exhibit 3: OY 2010 Monthly Energy

Loads and Resources - Federal System
PNW Loads and Resource Study
2009 - 2010 Operating Year
1937 Water Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
Non-Utility Obligations															
Federal Agencies 2002 PSC Sale	141	141	127	132	153	166	169	163	149	132	132	128	131	141	144
USBR 2002 PSC Sale	314	280	171	129	0.1	0.1	0.1	0.9	20	248	311	263	299	331	149
DSI 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Non-Utility Obligations	454	420	299	261	153	166	169	164	169	380	442	391	430	473	294
Transfers Out															
NGP 2002 PSC Sale	2965	2965	2672	2711	3056	3361	3464	3355	3005	2834	2827	2841	2958	3083	3025
GPU 2002 PSC Sale	1995	1995	2202	2277	2668	2961	2990	2928	2729	2383	2376	2195	1932	1903	2430
NGP Slice Sale	852	657	510	613	678	682	558	531	578	546	519	611	716	733	625
GPU Slice Sale	1418	1093	850	1022	1129	1136	929	884	962	910	865	1017	1193	1220	1041
IOU 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports	712	712	709	675	670	679	676	675	669	689	689	717	711	704	691
Intra-Regional Transfers (Out)	197	197	236	291	592	605	602	547	394	361	362	167	227	226	370
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Transfers Out	8138	7619	7179	7589	8792	9424	9221	8920	8336	7723	7639	7548	7737	7869	8181
Total Firm Obligations	8593	8039	7478	7850	8945	9590	9390	9083	8505	8103	8081	7940	8168	8342	8475
Hydro Resources															
Regulated Hydro	9408	7011	5231	6441	7171	7293	5845	5513	6017	5668	5323	6162	7426	7941	6562
Independent Hydro	441	439	373	387	306	237	176	197	275	434	518	715	750	455	399
Operational Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (Canada)	137	137	137	137	137	137	137	137	137	141	141	141	141	141	138
Total Hydro Resources	9985	7587	5741	6964	7613	7667	6158	5847	6429	6243	5982	7018	8317	8537	7099
Other Resources															
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27	29
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	109	111	145	182	251	304	279	233	203	203	173	83	94	125	183
Intra-Regional Transfers (In)	184	184	329	318	364	300	324	312	290	285	285	167	286	159	276
Large Thermal	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Non-Utility Generation	106	106	99	112	122	122	125	121	114	117	117	114	117	106	115
Augmentation Purchases	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Augmentation Resources	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	1426	1428	1600	1639	1767	1758	1760	1697	1638	1636	1606	1390	1524	1417	1603
Total Resources	11411	9015	7341	8603	9380	9424	7917	7543	8066	7879	7588	8408	9842	9954	8702
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Hydro Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Transmission Losses	-322	-254	-207	-243	-265	-266	-223	-213	-227	-222	-214	-237	-278	-281	-245
Total Reserves, Maintenance & Losses	-322	-254	-207	-243	-265	-266	-223	-213	-227	-222	-214	-237	-278	-281	-245
Total Net Resources	11089	8760	7134	8360	9115	9158	7694	7331	7839	7657	7374	8171	9564	9673	8457
Total Firm Surplus/Deficit	2496	721	-344	510	170	-432	-1696	-1753	-666	-446	-708	231	1396	1331	-18

Exhibit 4: OY 2015 Monthly Energy

Loads and Resources - Federal System
PNW Loads and Resource Study
2014 - 2015 Operating Year
1937 Water Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
Non-Utility Obligations															
Federal Agencies 2002 PSC Sale	148	148	134	138	160	172	177	170	155	138	137	134	137	149	151
USBR 2002 PSC Sale	314	280	171	129	0.1	0.1	0.1	0.9	20	248	311	263	299	331	149
DSI 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Non-Utility Obligations	462	428	305	267	160	173	177	171	176	386	448	397	436	481	300
Transfers Out															
NGP 2002 PSC Sale	3130	3130	2809	2836	3198	3521	3636	3528	3153	2970	2963	2983	3115	3252	3177
GPU 2002 PSC Sale	2043	2043	2247	2318	2710	2999	3039	2996	2773	2433	2427	2242	1984	1958	2478
NGP Slice Sale	863	667	519	623	688	692	567	540	587	555	527	565	656	743	624
GPU Slice Sale	1437	1110	864	1037	1145	1153	945	899	977	924	877	941	1092	1238	1039
IOU 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports	578	576	577	543	534	535	534	534	534	563	563	587	589	574	557
Intra-Regional Transfers (Out)	13	13	42	108	363	418	391	347	217	188	190	0.1	18	34	178
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Transfers Out	8064	7539	7057	7466	8639	9318	9112	8844	8240	7634	7546	7318	7455	7799	8053
Total Firm Obligations	8526	7967	7362	7733	8799	9491	9289	9015	8416	8020	7994	7715	7891	8280	8354
Hydro Resources															
Regulated Hydro	9488	7078	5279	6498	7235	7359	5899	5563	6073	5728	5366	6203	7481	8021	6620
Independent Hydro	441	439	373	387	306	237	176	197	275	435	519	716	750	455	399
Operational Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (Canada)	135	135	135	135	135	135	135	135	135	133	133	133	133	133	134
Total Hydro Resources	10064	7652	5787	7019	7676	7731	6210	5895	6483	6296	6018	7052	8365	8610	7154
Other Resources															
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27	29
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	103	104	137	169	240	293	267	223	194	193	168	76	94	121	175
Intra-Regional Transfers (In)	0	0	112	112	112	112	112	112	112	112	112	0	112	0	84
Large Thermal	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	355	167	1000	877
Non-Utility Generation	106	106	99	112	122	122	125	121	114	117	117	114	117	106	115
Augmentation Purchases	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Augmentation Resources	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	1236	1236	1375	1421	1503	1559	1536	1487	1452	1453	1428	572	517	1254	1279
Total Resources	11300	8888	7162	8440	9179	9290	7746	7382	7934	7749	7446	7624	8882	9864	8433
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Hydro Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Transmission Losses	-319	-251	-202	-238	-259	-262	-218	-208	-224	-219	-210	-215	-250	-278	-238
Total Reserves, Maintenance & Losses	-319	-251	-202	-238	-259	-262	-218	-208	-224	-219	-210	-215	-250	-278	-238
Total Net Resources	10981	8637	6960	8202	8920	9028	7528	7174	7711	7530	7236	7409	8631	9586	8195
Total Firm Surplus/Deficit	2455	671	-402	470	122	-462	-1761	-1841	-705	-489	-759	-306	741	1306	-158

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Exhibits 5 – 7

Federal System Monthly Capacity Analysis Under the 2004 White Book Load Forecast for 1937-Water Conditions

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Exhibit 5: OY 2006 Monthly Capacity

Loads and Resources - Federal System
PNW Loads and Resource Study
2005 - 2006 Operating Year
1937 Water Year
[27] 2004 White Book

10/31/2005

Capacity in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul
Non-Utility Obligations														
Federal Agencies 2002 PSC Sale	229	229	179	205	212	203	224	212	202	189	189	185	198	193
USBR 2002 PSC Sale	281	247	157	139	0.2	0.2	0.2	0.2	37	266	329	260	272	290
DSI 2002 PSC Sale	265	265	265	272	272	272	272	272	272	272	272	272	272	272
Total Firm Non-Utility Obligations	774	740	600	616	485	475	496	485	511	727	790	717	742	755
Transfers Out														
NGP 2002 PSC Sale	3504	3504	3327	3838	4035	4255	4560	4375	3991	3772	3772	3591	3532	3644
GPU 2002 PSC Sale	1926	1926	2051	2304	2625	2904	3100	3027	2825	2390	2380	2412	2010	1965
NGP Slice Sale	1096	889	627	805	826	823	675	640	717	656	617	747	963	985
GPU Slice Sale	1826	1481	1045	1340	1376	1370	1124	1066	1194	1092	1028	1244	1603	1640
IOU 2002 PSC Sale	382	382	382	382	382	382	382	382	382	382	382	382	382	382
Exports	1970	1970	1964	1821	1746	1762	1759	1758	1748	1753	1753	1843	1844	1773
Intra-Regional Transfers (Out)	1743	1743	797	739	964	1018	992	948	830	753	753	581	633	697
Federal Diversity	-772	-768	-743	-778	-687	-515	-552	-533	-705	-662	-667	-774	-782	-792
Total Transfers Out	11674	11126	9450	10451	11267	11998	12040	11664	10981	10136	10018	10026	10186	10296
Total Firm Obligations	12449	11867	10050	11067	11752	12473	12536	12148	11492	10863	10808	10743	10928	11050
Hydro Resources														
Regulated Hydro	20409	20228	20436	20534	20759	20518	20667	20749	20411	19639	19335	19766	20362	20520
Independent Hydro	748	760	742	747	711	673	644	760	820	845	848	887	889	765
Operational Peaking Adjustment	-2840	-5808	-9346	-7261	-7363	-7986	-10403	-10554	-9256	-8920	-9304	-8246	-6226	-4814
Non-Fed CER (Canada)	245	245	245	245	246	247	246	246	245	234	234	234	234	234
Total Hydro Resources	18562	15425	12078	14265	14353	13452	11154	11201	12219	11798	11113	12641	15259	16705
Other Resources														
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	139	139	168	204	257	311	285	241	213	216	216	76	94	160
Intra-Regional Transfers (In)	1238	1238	1261	1226	1226	1203	838	838	838	588	588	588	588	838
Large Thermal	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
Non-Utility Generation	34	34	17	32	41	32	32	32	32	32	32	49	32	29
Augmentation Purchases	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Augmentation Resources	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	2588	2588	2624	2640	2703	2727	2337	2292	2264	2016	2016	1890	1892	2204
Total Resources	21150	18013	14702	16905	17056	16180	13491	13493	14483	13814	13129	14531	17150	18909
Reserves & Maintenance														
Hydro Reserves	-1058	-1049	-1059	-1064	-1073	-1060	-1066	-1075	-1062	-1024	-1009	-1033	-1063	-1064
Small Thermal & Misc. Reserves	-3	-3	-2.2	-3	-3.5	-3.2	-3.2	-3.2	-3.2	-3.1	-3.1	-3.8	-3.0	-2.8
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172
Federal Hydro Maintenance	-3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
Spinning Reserves	-386	-320	-235	-291	-294	-293	-247	-236	-261	-248	-237	-276	-344	-351
Federal Transmission Losses	-545	-459	-351	-423	-429	-428	-355	-339	-371	-345	-332	-378	-467	-487
Total Reserves, Maintenance & Losses	-5427	-4765	-4589	-4705	-4678	-3823	-3250	-3709	-3784	-3854	-3559	-3620	-3684	-4862
Total Net Resources	15723	13248	10112	12200	12378	12357	10240	9784	10700	9960	9570	10911	13466	14047
Total Firm Surplus/Deficit	3274	1381	62	1133	626	-116	-2296	-2365	-793	-903	-1238	168	2538	2997

Exhibit 6: OY 2010 Monthly Capacity

Loads and Resources - Federal System
PNW Loads and Resource Study
2009 - 2010 Operating Year
1937 Water Year
[27] 2004 White Book

10/31/2005

Capacity in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul
Non-Utility Obligations														
Federal Agencies 2002 PSC Sale	305	305	220	260	272	253	288	271	255	235	235	224	252	244
USBR 2002 PSC Sale	281	247	157	139	0.2	0.2	0.2	0.2	37	266	329	260	272	290
DSI 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Non-Utility Obligations	586	552	376	399	272	253	289	271	292	502	565	484	525	534
Transfers Out														
NGP 2002 PSC Sale	3791	3791	3588	4110	4321	4515	4846	4642	4252	3982	3982	3813	3793	3921
GPU 2002 PSC Sale	2250	2250	2476	2681	3055	3344	3383	3335	3122	2738	2738	2503	2139	2142
NGP Slice Sale	1097	894	628	811	834	827	680	642	716	660	622	749	970	993
GPU Slice Sale	1826	1489	1045	1351	1389	1378	1133	1070	1192	1099	1035	1248	1616	1654
IOU 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports	1599	1599	1595	1555	1504	1513	1510	1511	1505	1520	1520	1587	1564	1571
Intra-Regional Transfers (Out)	588	588	617	683	907	961	935	891	774	747	747	575	628	642
Federal Diversity	-861	-857	-837	-863	-765	-568	-596	-577	-767	-722	-728	-816	-839	-858
Total Transfers Out	10289	9753	9111	10328	11245	11970	11891	11513	10794	10022	9915	9660	9870	10066
Total Firm Obligations	10875	10305	9487	10727	11517	12224	12179	11784	11086	10524	10479	10144	10394	10600
Hydro Resources														
Regulated Hydro	20409	20228	20436	20534	20759	20518	20667	20749	20411	19639	19335	19766	20362	20520
Independent Hydro	748	760	742	747	711	673	644	760	820	845	848	887	889	765
Operational Peaking Adjustment	-2738	-5651	-9244	-7083	-7165	-7826	-10240	-10423	-9169	-8790	-9171	-8136	-6055	-4632
Non-Fed CER (Canada)	236	236	236	236	236	236	236	236	236	244	244	244	244	244
Total Hydro Resources	18656	15573	12170	14433	14541	13601	11307	11322	12298	11938	11256	12762	15440	16897
Other Resources														
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	89	89	118	154	207	261	235	191	163	166	166	76	94	110
Intra-Regional Transfers (In)	0	0	23	23	23	0	0	0	0	0	0	0	0	0
Large Thermal	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
Non-Utility Generation	53	53	53	53	53	53	53	53	53	53	53	53	53	53
Augmentation Purchases	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Augmentation Resources	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	1319	1319	1371	1408	1462	1495	1470	1425	1397	1399	1399	1306	1324	1340
Total Resources	19974	16892	13542	15841	16002	15096	12777	12747	13695	13337	12655	14068	16764	18237
Reserves & Maintenance														
Hydro Reserves	-1058	-1049	-1059	-1064	-1073	-1060	-1066	-1075	-1062	-1024	-1009	-1033	-1063	-1064
Small Thermal & Misc. Reserves	-4.0	-4.0	-4.0	-4	-4.1	-4.2	-4.2	-4.2	-4.2	-4.1	-4.1	-4.0	-4.0	-4.0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172
Federal Hydro Maintenance	-3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
Spinning Reserves	-389	-324	-239	-296	-299	-297	-251	-239	-263	-251	-241	-279	-349	-356
Federal Transmission Losses	-505	-421	-311	-387	-394	-392	-331	-314	-344	-329	-316	-363	-454	-464
Total Reserves, Maintenance & Losses	-5392	-4732	-4555	-4675	-4648	-3792	-3232	-3689	-3761	-3843	-3547	-3607	-3676	-4846
Total Net Resources	14583	12160	8986	11166	11354	11304	9545	9058	9934	9494	9107	10460	13088	13391
Total Firm Surplus/Deficit	3708	1855	-500	439	-163	-920	-2634	-2726	-1152	-1030	-1372	316	2693	2791

Exhibit 7: OY 2015 Monthly Capacity

Loads and Resources - Federal System
PNW Loads and Resource Study
2014 - 2015 Operating Year
1937 Water Year
[27] 2004 White Book

10/31/2005

Capacity in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul
Non-Utility Obligations														
Federal Agencies 2002 PSC Sale	314	314	228	268	280	262	299	281	265	244	244	233	261	254
USBR 2002 PSC Sale	281	247	157	139	0.2	0.2	0.2	0.2	37	266	329	260	272	290
DSI 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Non-Utility Obligations	595	561	385	407	280	262	299	282	302	511	574	493	533	544
Transfers Out														
NGP 2002 PSC Sale	3986	3986	3780	4304	4519	4719	5083	4852	4450	4173	4173	3988	3973	4121
GPU 2002 PSC Sale	2403	2403	2631	2855	3215	3501	3561	3538	3290	2901	2901	2665	2301	2329
NGP Slice Sale	1102	902	632	819	843	834	688	648	721	666	627	677	899	1001
GPU Slice Sale	1835	1502	1053	1364	1404	1390	1145	1080	1200	1109	1044	1127	1498	1667
IOU 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports	1510	1510	1509	1464	1417	1418	1416	1417	1417	1446	1446	1493	1493	1494
Intra-Regional Transfers (Out)	13	13	42	108	325	379	353	309	199	172	172	0.1	18	34
Federal Diversity	-908	-903	-884	-908	-801	-594	-626	-607	-804	-759	-765	-858	-885	-909
Total Transfers Out	9940	9412	8764	10006	10922	11647	11620	11237	10472	9708	9598	9092	9298	9736
Total Firm Obligations	10535	9973	9149	10413	11203	11909	11919	11519	10774	10218	10171	9585	9831	10280
Hydro Resources														
Regulated Hydro	20409	20228	20436	20534	20759	20518	20667	20749	20411	19639	19335	19766	20362	20520
Independent Hydro	748	760	742	747	711	673	644	760	820	845	848	887	889	765
Operational Peaking Adjustment	-2676	-5551	-9182	-6982	-7049	-7736	-10145	-10346	-9110	-8703	-9094	-8067	-5961	-4522
Non-Fed CER (Canada)	233	233	233	233	233	233	233	233	233	231	231	231	231	231
Total Hydro Resources	18714	15670	12229	14531	14653	13688	11399	11395	12354	12012	11320	12818	15521	16994
Other Resources														
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	89	89	118	154	207	261	235	191	163	166	166	76	94	110
Intra-Regional Transfers (In)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	0	0	1150
Non-Utility Generation	53	53	53	53	53	53	53	53	53	53	53	53	53	53
Augmentation Purchases	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Augmentation Resources	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	1319	1319	1348	1385	1439	1495	1470	1425	1397	1399	1399	156	174	1340
Total Resources	20033	16988	13577	15916	16092	15183	12869	12820	13751	13411	12719	12974	15695	18334
Reserves & Maintenance														
Hydro Reserves	-1058	-1049	-1059	-1064	-1073	-1060	-1066	-1075	-1062	-1024	-1009	-1033	-1063	-1064
Small Thermal & Misc. Reserves	-4.0	-4.0	-4.0	-4	-4.1	-4.2	-4.2	-4.2	-4.2	-4.1	-4.1	-4.0	-4.0	-4.0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	0	0	-172
Federal Hydro Maintenance	-3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
Spinning Reserves	-390	-327	-240	-298	-302	-299	-254	-241	-265	-254	-243	-247	-317	-359
Federal Transmission Losses	-507	-425	-313	-389	-396	-395	-334	-316	-346	-331	-318	-333	-425	-467
Total Reserves, Maintenance & Losses	-5395	-4738	-4558	-4680	-4654	-3797	-3237	-3693	-3764	-3847	-3551	-3373	-3443	-4852
Total Net Resources	14638	12251	9019	11237	11438	11386	9632	9127	9987	9564	9167	9601	12252	13482
Total Firm Surplus/Deficit	4103	2278	-130	824	235	-523	-2287	-2392	-788	-654	-1004	16	2420	3202

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Exhibits 8 – 17

Federal System Energy Surpluses and Deficits under the 2004 White Book Load Forecast for 50-Historical Water Conditions

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Exhibit 8: OY 2006 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resource Study
2005 - 2006 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Federal Surplus/Deficit	2942	929	447	1176	1038	554	668	-1391	-189	-540	-852	-122	2034	2106	630
1930 Federal Surplus/Deficit	1597	706	334	1359	1190	530	-1399	-429	-141	-171	-431	-175	1929	2324	531
1931 Federal Surplus/Deficit	2057	964	459	1306	1157	573	-1352	-1370	-362	355	-1065	331	1433	1422	396
1932 Federal Surplus/Deficit	1923	497	482	1213	1045	495	-1320	-1522	1038	3238	4974	5257	4744	3241	1666
1933 Federal Surplus/Deficit	3223	2314	675	1362	798	1419	3136	2313	-187	691	1563	3611	7019	5589	2469
1934 Federal Surplus/Deficit	2755	3055	1261	2468	2530	5717	6272	4615	3068	5914	5230	4690	1276	2869	3604
1935 Federal Surplus/Deficit	1333	-0.7	284	1113	762	969	2596	2966	-696	500	2258	2899	3620	3220	1648
1936 Federal Surplus/Deficit	2750	978	462	1303	1065	538	-661	-1355	38	-283	1969	6400	3253	2194	1329
1937 Federal Surplus/Deficit	2501	738	370	1350	1114	518	-1141	-1185	-193	-321	-576	302	1424	1683	451
1938 Federal Surplus/Deficit	2105	351	359	1513	983	612	3404	300	2067	2603	2746	5446	4001	2806	2116
1939 Federal Surplus/Deficit	1861	574	764	1423	1066	515	1043	-1078	378	545	1336	4130	1939	2306	1221
1940 Federal Surplus/Deficit	2678	857	376	1537	1006	726	415	-279	2287	1470	2062	2807	2681	1687	1398
1941 Federal Surplus/Deficit	1765	429	326	1326	889	1120	975	-1329	-95	-693	-701	902	2255	1051	652
1942 Federal Surplus/Deficit	1542	574	704	1272	773	2704	3530	-709	-681	27	788	2540	5192	3762	1713
1943 Federal Surplus/Deficit	3193	2264	665	1324	900	947	2778	2019	2724	5577	4889	5382	4994	3881	2798
1944 Federal Surplus/Deficit	2990	2179	666	1432	1101	495	1041	-1315	-607	-485	-1023	-151	1184	891	547
1945 Federal Surplus/Deficit	1632	68	442	1143	1066	497	-1276	-900	-321	-416	-739	2798	4250	2236	851
1946 Federal Surplus/Deficit	1809	1337	254	1448	1075	566	1482	1419	2808	3061	3984	5731	4381	3703	2330
1947 Federal Surplus/Deficit	3286	1962	887	1311	1048	3535	3762	2927	3076	1451	2865	4886	4063	3336	2801
1948 Federal Surplus/Deficit	3301	1386	720	3476	2032	2419	3645	500	1670	1687	3803	6871	7725	4122	3189
1949 Federal Surplus/Deficit	2887	3355	1601	1600	967	1184	1597	345	3889	1746	4701	5773	3901	1581	2399
1950 Federal Surplus/Deficit	1599	108	61	1340	887	284	1854	3344	4637	4129	3898	4643	6820	4248	2749
1951 Federal Surplus/Deficit	2510	2808	1047	2325	2533	4492	5140	5101	3314	3986	4428	5776	3271	4163	3669
1952 Federal Surplus/Deficit	2986	2913	1341	2940	1219	2837	3423	1848	2085	4213	4613	6775	4202	2574	3051
1953 Federal Surplus/Deficit	3004	1241	599	1301	1155	525	848	2956	289	-414	1224	4329	6594	4328	2121
1954 Federal Surplus/Deficit	3128	2019	920	1579	1138	1881	2460	3197	1666	3412	2693	5112	6072	5039	2891
1955 Federal Surplus/Deficit	4109	3114	3505	2165	1650	2009	478	-996	-546	521	54	2287	7385	6098	2328
1956 Federal Surplus/Deficit	2900	3285	813	2039	1933	4169	5679	2361	4030	4173	6084	6822	7378	4495	3995
1957 Federal Surplus/Deficit	3258	2523	864	1702	937	2049	2163	-356	1297	4759	2985	6366	7090	2771	2637
1958 Federal Surplus/Deficit	2159	802	510	1440	1065	660	1683	1904	1879	760	3596	5734	5554	2341	2202
1959 Federal Surplus/Deficit	2189	1076	607	1330	1553	2803	5156	3529	1905	2911	2126	4009	6032	4860	2994
1960 Federal Surplus/Deficit	2998	2344	3289	4108	3016	3672	3405	544	1722	6011	3936	3559	4393	3364	3226
1961 Federal Surplus/Deficit	3292	950	673	1482	1273	1151	2213	2581	2565	2953	2963	4266	6951	2914	2596
1962 Federal Surplus/Deficit	2363	1440	319	1400	1049	406	2095	-407	-148	4355	4627	3714	3534	3586	1828
1963 Federal Surplus/Deficit	2813	1861	554	1898	1694	2776	2411	1142	987	607	886	4540	4157	3306	2212
1964 Federal Surplus/Deficit	3521	2075	993	1223	1106	776	1962	352	-194	1696	1767	3315	7057	5616	2228
1965 Federal Surplus/Deficit	3033	2755	1592	2288	1229	4399	6197	4714	3575	2697	4529	5551	4954	2872	3657
1966 Federal Surplus/Deficit	3098	2532	949	1833	1278	1975	3068	81	106	3383	1604	3632	2992	3675	2075
1967 Federal Surplus/Deficit	3330	1695	416	1297	1045	1117	3478	4119	1045	2320	1112	2391	6608	4940	2557
1968 Federal Surplus/Deficit	3093	2425	1051	1646	1168	1812	2972	2204	1851	-710	987	2532	4763	4602	2292
1969 Federal Surplus/Deficit	3254	2566	1987	2410	2071	2657	5014	3660	2337	5166	4664	6618	4629	3544	3563
1970 Federal Surplus/Deficit	3199	1292	596	1418	1170	940	2599	2140	315	-246	1785	3571	5135	1697	1883
1971 Federal Surplus/Deficit	2013	955	329	1421	1270	813	4239	5686	3084	3429	4144	6975	6835	4824	3395
1972 Federal Surplus/Deficit	3212	3439	1217	1503	1184	1956	4043	5297	5649	5659	2617	6678	7274	5239	3958
1973 Federal Surplus/Deficit	3759	3133	1670	1668	1051	2189	3427	-1039	-258	-851	-793	761	2203	2035	1361
1974 Federal Surplus/Deficit	1903	251	228	1052	754	2998	6685	5641	4395	4965	5578	6099	7401	6478	4007
1975 Federal Surplus/Deficit	3278	3409	1614	1187	1073	1046	2849	1704	3103	1771	2038	4451	5583	5512	2781
1976 Federal Surplus/Deficit	2109	1399	991	2075	2345	5258	5042	3540	2501	4906	3699	6185	3668	5056	3560
1977 Federal Surplus/Deficit	4668	4336	4129	1819	1079	675	1066	-1408	-934	-982	-1312	605	833	869	1007
1978 Federal Surplus/Deficit	1940	64	200	877	864	862	2184	614	2960	1772	2525	3969	3334	3694	1892
Top Ten Percent	2711	2508	979	1841	1527	3603	5549	4623	4192	4296	4647	6185	6056	4650	3857
Middle Eighty Percent	2730	1657	961	1660	1254	1628	2437	1279	1383	2075	2439	4261	4693	3477	2290
Bottom Ten Percent	2417	1103	455	1325	1120	534	-437	-1138	-298	-233	-789	37	1601	1685	511

Exhibit 9: OY 2007 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resource Study
2006 - 2007 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Federal Surplus/Deficit	3338	1316	201	829	587	113	243	-1843	-556	-567	-884	-570	1471	1817	324
1930 Federal Surplus/Deficit	1982	1093	88	1008	741	89	-1832	-876	-506	-196	-464	-624	1366	2039	225
1931 Federal Surplus/Deficit	2445	1353	213	954	708	133	-1784	-1820	-728	331	-1101	-116	872	1138	90
1932 Federal Surplus/Deficit	2313	887	236	863	595	50	-1753	-1973	676	3224	4962	4825	4192	2959	1363
1933 Federal Surplus/Deficit	3613	2703	430	1015	348	977	2721	1881	-549	674	1537	3172	6474	5318	2171
1934 Federal Surplus/Deficit	3146	3450	1021	2126	2081	5293	5870	4191	2718	5910	5221	4262	708	2584	3310
1935 Federal Surplus/Deficit	1722	390	41	762	311	526	2179	2536	-1056	480	2236	2457	3060	2940	1347
1936 Federal Surplus/Deficit	3144	1368	217	954	617	97	-1088	-1806	-327	-310	1947	5969	2695	1910	1026
1937 Federal Surplus/Deficit	2888	1125	124	1001	665	77	-1573	-1634	-559	-347	-609	-150	856	1396	144
1938 Federal Surplus/Deficit	2493	742	113	1163	535	171	2988	-139	1709	2586	2724	5016	3442	2525	1816
1939 Federal Surplus/Deficit	2247	955	520	1076	616	73	624	-1525	16	524	1311	3693	1374	2020	917
1940 Federal Surplus/Deficit	3069	1246	130	1190	558	285	-12	-726	1932	1449	2048	2365	2117	1401	1096
1941 Federal Surplus/Deficit	2152	819	80	978	440	681	545	-1778	-461	-713	-724	458	1691	762	347
1942 Federal Surplus/Deficit	1926	960	457	922	324	2263	3122	-1155	-1047	4.4	762	2098	4638	3484	1411
1943 Federal Surplus/Deficit	3586	2651	420	976	449	504	2363	1579	2369	5569	4876	4953	4439	3602	2500
1944 Federal Surplus/Deficit	3376	2567	420	1084	649	52	615	-1767	-975	-513	-1053	-597	617	600	241
1945 Federal Surplus/Deficit	2016	454	196	792	615	55	-1709	-1350	-689	-444	-775	2360	3693	1954	545
1946 Federal Surplus/Deficit	2191	1721	7.9	1098	625	125	1057	979	2455	3045	3967	5303	3827	3422	2030
1947 Federal Surplus/Deficit	3677	2350	644	963	598	3093	3355	2494	2723	1433	2844	4453	3510	3055	2504
1948 Federal Surplus/Deficit	3689	1769	475	3138	1582	1984	3234	57	1315	1667	3784	6446	7183	3851	2893
1949 Federal Surplus/Deficit	3275	3747	1359	1255	517	740	1178	-102	3540	1729	4686	5341	3342	1294	2099
1950 Federal Surplus/Deficit	1982	491	-186	990	437	-156	1437	2908	4290	4117	3882	4210	6274	3972	2451
1951 Federal Surplus/Deficit	2894	3198	803	1982	2082	4062	4736	4678	2962	3974	4414	5348	2711	3887	3374
1952 Federal Surplus/Deficit	3374	3303	1099	2599	771	2399	3010	1414	1726	4201	4598	6350	3646	2293	2754
1953 Federal Surplus/Deficit	3392	1623	353	952	705	84	418	2526	-69	-436	1197	3891	6045	4051	1820
1954 Federal Surplus/Deficit	3517	2406	676	1234	689	1439	2044	2767	1309	3396	2671	4682	5524	4765	2594
1955 Federal Surplus/Deficit	4504	3506	3273	1822	1201	1570	52	-1445	-913	501	35	1842	6841	5829	2029
1956 Federal Surplus/Deficit	3290	3678	568	1695	1482	3736	5276	1930	3678	4164	6076	6397	6834	4219	3702
1957 Federal Surplus/Deficit	3647	2911	619	1357	486	1608	1745	-803	941	4746	2967	5942	6545	2486	2339
1958 Federal Surplus/Deficit	2543	1184	264	1092	615	216	1264	1464	1526	738	3576	5302	5006	2054	1902
1959 Federal Surplus/Deficit	2573	1462	361	983	1103	2364	4750	3103	1546	2897	2104	3575	5485	4582	2697
1960 Federal Surplus/Deficit	3389	2733	3056	3771	2567	3238	2998	105	1365	6009	3921	3121	3837	3083	2931
1961 Federal Surplus/Deficit	3683	1334	429	1136	824	707	1795	2148	2212	2938	2938	3835	6406	2631	2298
1962 Federal Surplus/Deficit	2752	1829	73	1053	598	-38	1676	-849	-515	4340	4617	3277	2975	3306	1527
1963 Federal Surplus/Deficit	3203	2248	309	1554	1245	2339	1998	706	622	589	864	4103	3604	3026	1913
1964 Federal Surplus/Deficit	3912	2461	750	875	655	332	1543	-88	-560	1674	1740	2876	6512	5347	1928
1965 Federal Surplus/Deficit	3421	3144	1351	1946	781	3960	5795	4290	3223	2679	4515	5122	4400	2589	3361
1966 Federal Surplus/Deficit	3485	2916	706	1488	830	1533	2654	-356	-259	3374	1583	3195	2433	3395	1775
1967 Federal Surplus/Deficit	3724	2082	170	949	595	675	3064	3693	688	2305	1084	1951	6063	4663	2259
1968 Federal Surplus/Deficit	3485	2816	808	1301	719	1369	2557	1772	1496	-735	964	2087	4213	4322	1992
1969 Federal Surplus/Deficit	3646	2956	1749	2068	1622	2219	4608	3234	1981	5157	4652	6193	4078	3263	3268
1970 Federal Surplus/Deficit	3587	1679	350	1072	720	497	2177	1707	-45	-269	1764	3131	4579	1412	1582
1971 Federal Surplus/Deficit	2397	1335	81	1072	819	371	3828	5264	2731	3413	4129	6551	6288	4549	3099
1972 Federal Surplus/Deficit	3602	3831	974	1156	734	1514	3630	4873	5306	5655	2599	6252	6729	4969	3665
1973 Federal Surplus/Deficit	4152	3525	1428	1322	600	1748	3012	-1488	-623	-874	-819	313	1641	1748	1058
1974 Federal Surplus/Deficit	2290	639	-19	700	303	2556	6285	5219	4048	4956	5568	5671	6857	6210	3713
1975 Federal Surplus/Deficit	3666	3801	1373	839	622	603	2433	1270	2748	1753	2014	4015	5030	5241	2483
1976 Federal Surplus/Deficit	2494	1781	748	1731	1894	4829	4637	3112	2149	4898	3682	5758	3109	4782	3265
1977 Federal Surplus/Deficit	5063	4729	3899	1474	628	233	641	-1859	-1303	-1010	-1342	159	266	578	703
1978 Federal Surplus/Deficit	2328	454	-46	525	413	417	1762	170	2608	1758	2503	3534	2772	3415	1591
Top Ten Percent	3100	2898	735	1496	1076	3165	5144	4198	3843	4286	4635	5758	5506	4375	3563
Middle Eighty Percent	3119	2044	717	1313	804	1188	2019	841	1024	2058	2418	3827	4139	3197	1991
Bottom Ten Percent	2806	1491	209	975	670	93	-866	-1588	-665	-258	-822	-411	1037	1398	205

Exhibit 10: OY 2008 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resource Study
2007 - 2008 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Federal Surplus/Deficit	3013	976	-195	442	193	-285	257	-1819	-545	-554	-873	-74	2114	1841	268
1930 Federal Surplus/Deficit	1645	754	-307	618	354	-305	-1826	-848	-493	-182	-459	-129	2019	2069	169
1931 Federal Surplus/Deficit	2113	1016	-184	562	320	-258	-1777	-1795	-715	347	-1092	385	1533	1168	36
1932 Federal Surplus/Deficit	1980	547	-159	473	205	-350	-1749	-1947	686	3254	5007	5346	4857	2995	1313
1933 Federal Surplus/Deficit	3288	2372	36	629	-43	581	2754	1935	-530	707	1558	3690	7142	5372	2127
1934 Federal Surplus/Deficit	2823	3131	634	1749	1689	4914	5915	4255	2752	5953	5261	4797	1359	2614	3272
1935 Federal Surplus/Deficit	1388	50	-349	372	-82	127	2210	2593	-1032	499	2258	2963	3712	2979	1299
1936 Federal Surplus/Deficit	2821	1032	-176	568	229	-295	-1074	-1780	-315	-292	1958	6491	3360	1941	976
1937 Federal Surplus/Deficit	2556	786	-273	613	278	-316	-1564	-1606	-544	-330	-600	339	1499	1422	88
1938 Federal Surplus/Deficit	2161	406	-282	775	148	-226	3017	-98	1729	2614	2746	5543	4093	2561	1769
1939 Federal Surplus/Deficit	1914	614	127	689	224	-326	650	-1494	28	542	1323	4204	2026	2049	864
1940 Federal Surplus/Deficit	2742	907	-266	805	171	-111	1	-700	1955	1463	2079	2867	2769	1428	1043
1941 Federal Surplus/Deficit	1817	480	-316	591	51	287	553	-1753	-449	-690	-699	963	2338	784	292
1942 Federal Surplus/Deficit	1589	621	59	531	-69	1862	3165	-1127	-1037	17	774	2601	5297	3527	1359
1943 Federal Surplus/Deficit	3265	2320	24	590	56	102	2387	1607	2387	5601	4901	5480	5092	3635	2450
1944 Federal Surplus/Deficit	3050	2240	20	697	255	-349	629	-1745	-966	-502	-1038	-95	1261	619	184
1945 Federal Surplus/Deficit	1679	112	-200	401	223	-342	-1707	-1329	-679	-431	-770	2860	4345	1989	488
1946 Federal Surplus/Deficit	1853	1384	-390	707	234	-274	1068	1012	2479	3074	3994	5834	4495	3460	1982
1947 Federal Surplus/Deficit	3356	2018	249	574	205	2685	3397	2532	2751	1464	2872	4971	4179	3093	2457
1948 Federal Surplus/Deficit	3362	1430	79	2765	1188	1592	3263	85	1341	1694	3812	6973	7856	3904	2850
1949 Federal Surplus/Deficit	2952	3429	966	870	125	340	1202	-77	3565	1752	4719	5856	4000	1320	2049
1950 Federal Surplus/Deficit	1645	147	-584	600	45	-553	1463	2947	4323	4143	3914	4734	6943	4015	2405
1951 Federal Surplus/Deficit	2566	2875	407	1599	1684	3671	4778	4734	2987	4002	4449	5878	3364	3931	3332
1952 Federal Surplus/Deficit	3051	2980	707	2222	380	2001	3040	1453	1742	4224	4621	6876	4301	2329	2708
1953 Federal Surplus/Deficit	3068	1282	-45	564	315	-311	420	2571	-48	-409	1215	4409	6705	4092	1771
1954 Federal Surplus/Deficit	3194	2076	282	850	299	1041	2071	2816	1333	3426	2689	5211	6202	4815	2551
1955 Federal Surplus/Deficit	4189	3186	2897	1442	810	1179	67	-1420	-899	521	61	2347	7518	5886	1984
1956 Federal Surplus/Deficit	2966	3357	174	1314	1086	3342	5318	1974	3699	4201	6113	6924	7508	4266	3660
1957 Federal Surplus/Deficit	3325	2585	224	972	93	1208	1770	-779	958	4772	2996	6469	7218	2516	2291
1958 Federal Surplus/Deficit	2210	842	-133	705	224	-186	1287	1496	1556	759	3598	5817	5680	2080	1853
1959 Federal Surplus/Deficit	2238	1123	-35	598	708	1966	4789	3161	1565	2932	2134	4102	6157	4625	2654
1960 Federal Surplus/Deficit	3066	2407	2677	3397	2175	2851	3042	143	1383	6058	3962	3641	4497	3120	2889
1961 Federal Surplus/Deficit	3362	992	37	752	434	309	1824	2194	2241	2973	2965	4368	7087	2664	2255
1962 Federal Surplus/Deficit	2423	1494	-324	668	205	-437	1702	-815	-504	4364	4660	3796	3631	3346	1478
1963 Federal Surplus/Deficit	2881	1913	-88	1169	852	1943	2030	742	634	611	890	4608	4258	3064	1863
1964 Federal Surplus/Deficit	3590	2127	357	488	262	-67	1570	-49	-547	1686	1761	3387	7179	5402	1880
1965 Federal Surplus/Deficit	3099	2819	960	1567	393	3552	5834	4339	3246	2704	4543	5643	5050	2619	3316
1966 Federal Surplus/Deficit	3163	2588	311	1103	440	1131	2682	-313	-247	3411	1609	3710	3091	3436	1728
1967 Federal Surplus/Deficit	3404	1743	-226	563	203	277	3096	3750	713	2344	1109	2462	6734	4709	2215
1968 Federal Surplus/Deficit	3163	2491	416	916	329	968	2584	1816	1521	-720	989	2588	4880	4361	1945
1969 Federal Surplus/Deficit	3326	2630	1362	1687	1228	1826	4644	3289	1997	5193	4688	6722	4752	3301	3227
1970 Federal Surplus/Deficit	3260	1342	-45	687	329	96	2189	1746	-26	-244	1800	3639	5228	1439	1530
1971 Federal Surplus/Deficit	2065	994	-320	682	424	-32	3852	5317	2749	3437	4161	7076	6952	4591	3052
1972 Federal Surplus/Deficit	3282	3511	580	769	341	1111	3654	4926	5340	5701	2634	6778	7397	5024	3624
1973 Federal Surplus/Deficit	3835	3206	1035	937	207	1347	3038	-1462	-612	-853	-796	810	2295	1775	1006
1974 Federal Surplus/Deficit	1958	297	-416	307	-94	2150	6326	5277	4077	4990	5605	6193	7526	6265	3670
1975 Federal Surplus/Deficit	3345	3482	982	451	228	201	2458	1313	2767	1783	2036	4532	5683	5287	2436
1976 Federal Surplus/Deficit	2166	1449	353	1346	1498	4438	4676	3164	2171	4931	3713	6281	3758	4830	3220
1977 Federal Surplus/Deficit	4753	4414	3527	1091	235	-166	657	-1835	-1291	-996	-1323	667	917	600	652
1978 Federal Surplus/Deficit	1993	114	-442	133	19	6.1	1776	195	2634	1794	2534	4054	3419	3452	1539
Top Ten Percent	2774	2572	341	1111	682	2765	5182	4250	3870	4320	4669	6283	6169	4421	3520
Middle Eighty Percent	2793	1712	324	928	412	790	2045	879	1044	2084	2445	4344	4800	3235	1943
Bottom Ten Percent	2476	1154	-188	586	280	-303	-856	-1562	-653	-244	-812	85	1685	1424	149

Federal Surplus/Deficit by Water Year
PNW Loads and Resource Study
2008 - 2009 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Federal Surplus/Deficit	3032	994	-180	448	194	-288	253	-1796	-551	-555	-862	-545	1503	1862	184
1930 Federal Surplus/Deficit	1660	772	-293	621	357	-307	-1835	-823	-498	-182	-449	-600	1408	2090	85
1931 Federal Surplus/Deficit	2131	1035	-169	566	322	-260	-1786	-1772	-721	349	-1083	-85	923	1190	-48
1932 Federal Surplus/Deficit	1998	565	-144	477	207	-354	-1758	-1925	683	3259	5029	4884	4252	3018	1230
1933 Federal Surplus/Deficit	3306	2393	52	635	-40	579	2757	1969	-533	712	1575	3227	6538	5397	2048
1934 Federal Surplus/Deficit	2842	3155	653	1758	1691	4920	5920	4291	2755	5961	5284	4337	746	2636	3194
1935 Federal Surplus/Deficit	1405	68	-332	376	-80	124	2212	2628	-1034	502	2276	2497	3103	3002	1218
1936 Federal Surplus/Deficit	2840	1052	-160	573	231	-297	-1080	-1757	-320	-291	1976	6029	2754	1963	894
1937 Federal Surplus/Deficit	2574	804	-258	617	281	-318	-1572	-1583	-549	-330	-588	-134	885	1443	3.6
1938 Federal Surplus/Deficit	2178	426	-267	780	151	-228	3018	-69	1729	2618	2765	5082	3486	2584	1688
1939 Federal Surplus/Deficit	1931	632	143	695	225	-329	650	-1469	24	545	1339	3740	1413	2070	782
1940 Federal Surplus/Deficit	2761	925	-251	811	174	-114	-4.2	-675	1956	1465	2100	2401	2157	1449	961
1941 Federal Surplus/Deficit	1834	499	-301	597	54	285	547	-1729	-454	-686	-681	495	1727	804	209
1942 Federal Surplus/Deficit	1605	640	74	536	-67	1859	3169	-1102	-1043	19	790	2135	4691	3551	1278
1943 Federal Surplus/Deficit	3284	2341	40	595	57	98	2389	1636	2388	5607	4922	5020	4486	3657	2370
1944 Federal Surplus/Deficit	3069	2261	35	702	256	-352	625	-1723	-972	-503	-1025	-564	649	638	100
1945 Federal Surplus/Deficit	1695	130	-185	405	225	-346	-1716	-1306	-685	-432	-760	2396	3737	2011	404
1946 Federal Surplus/Deficit	1869	1404	-375	711	235	-276	1064	1041	2481	3079	4015	5373	3890	3483	1901
1947 Federal Surplus/Deficit	3375	2039	265	580	206	2681	3401	2564	2753	1468	2892	4509	3574	3116	2378
1948 Federal Surplus/Deficit	3380	1449	95	2775	1190	1593	3266	111	1342	1697	3833	6513	7252	3930	2771
1949 Federal Surplus/Deficit	2971	3452	983	877	126	336	1202	-52	3567	1756	4741	5394	3393	1340	1969
1950 Federal Surplus/Deficit	1661	164	-570	604	47	-555	1464	2978	4326	4148	3935	4273	6339	4039	2325
1951 Federal Surplus/Deficit	2584	2898	423	1608	1686	3674	4783	4770	2989	4007	4471	5417	2756	3956	3253
1952 Federal Surplus/Deficit	3070	3002	724	2231	383	2000	3043	1486	1741	4228	4642	6416	3695	2352	2628
1953 Federal Surplus/Deficit	3086	1301	-30	569	316	-314	413	2605	-48	-406	1232	3947	6100	4116	1690
1954 Federal Surplus/Deficit	3213	2098	298	856	301	1038	2073	2850	1334	3431	2707	4750	5598	4840	2472
1955 Federal Surplus/Deficit	4209	3209	2919	1451	813	1178	62	-1396	-905	524	81	1880	6914	5911	1903
1956 Federal Surplus/Deficit	2985	3380	190	1322	1087	3344	5322	2008	3700	4208	6135	6463	6903	4290	3582
1957 Federal Surplus/Deficit	3344	2607	240	979	94	1205	1771	-754	958	4776	3016	6009	6614	2537	2210
1958 Federal Surplus/Deficit	2227	860	-118	710	226	-190	1287	1525	1558	763	3617	5354	5076	2101	1772
1959 Federal Surplus/Deficit	2255	1142	-20	604	710	1965	4793	3197	1564	2938	2154	3641	5553	4648	2575
1960 Federal Surplus/Deficit	3085	2429	2698	3407	2177	2853	3046	172	1382	6066	3984	3178	3891	3143	2811
1961 Federal Surplus/Deficit	3381	1010	53	758	436	305	1825	2227	2243	2979	2982	3907	6483	2686	2175
1962 Federal Surplus/Deficit	2440	1513	-310	674	206	-441	1702	-787	-510	4368	4682	3334	3024	3369	1397
1963 Federal Surplus/Deficit	2900	1934	-73	1176	854	1943	2033	774	628	615	908	4143	3652	3087	1783
1964 Federal Surplus/Deficit	3609	2148	373	494	263	-71	1570	-21	-553	1688	1778	2924	6575	5427	1799
1965 Federal Surplus/Deficit	3118	2841	977	1576	396	3550	5839	4375	3247	2708	4564	5183	4443	2641	3237
1966 Federal Surplus/Deficit	3182	2609	328	1110	443	1128	2685	-283	-252	3417	1628	3248	2483	3460	1647
1967 Federal Surplus/Deficit	3424	1762	-211	568	205	274	3099	3785	713	2350	1126	1998	6130	4734	2136
1968 Federal Surplus/Deficit	3183	2513	432	923	331	965	2586	1849	1523	-719	1007	2120	4275	4385	1865
1969 Federal Surplus/Deficit	3346	2652	1381	1696	1230	1825	4648	3324	1997	5200	4710	6261	4147	3324	3149
1970 Federal Surplus/Deficit	3278	1361	-30	694	330	92	2187	1779	-28	-241	1820	3175	4620	1461	1449
1971 Federal Surplus/Deficit	2082	1011	-306	687	424	-36	3854	5353	2750	3441	4183	6616	6348	4615	2972
1972 Federal Surplus/Deficit	3301	3534	597	775	342	1108	3656	4961	5344	5709	2655	6317	6793	5049	3545
1973 Federal Surplus/Deficit	3856	3230	1052	943	208	1345	3040	-1439	-617	-852	-781	340	1685	1796	923
1974 Federal Surplus/Deficit	1975	314	-402	310	-93	2147	6330	5313	4080	4997	5627	5732	6922	6290	3591
1975 Federal Surplus/Deficit	3365	3506	999	456	229	197	2460	1345	2767	1787	2055	4070	5077	5312	2356
1976 Federal Surplus/Deficit	2184	1469	370	1354	1499	4442	4680	3199	2173	4938	3733	5821	3150	4855	3142
1977 Federal Surplus/Deficit	4774	4438	3550	1098	235	-169	654	-1812	-1298	-997	-1310	197	304	618	569
1978 Federal Surplus/Deficit	2010	132	-427	137	20	1.0	1774	222	2636	1800	2555	3592	2811	3475	1457
Top Ten Percent	2793	2593	357	1118	683	2765	5186	4285	3872	4326	4691	5823	5564	4445	3442
Middle Eighty Percent	2811	1732	340	934	414	788	2045	908	1042	2088	2464	3881	4194	3257	1863
Bottom Ten Percent	2493	1173	-173	591	282	-305	-863	-1539	-658	-244	-802	-386	1074	1445	65

Exhibit 12: OY 2010 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resource Study
2009 - 2010 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Federal Surplus/Deficit	2956	910	-266	342	81	-403	132	-1968	-669	-673	-983	-178	2016	1749	162
1930 Federal Surplus/Deficit	1581	688	-379	514	246	-421	-1960	-992	-615	-299	-570	-234	1922	1979	63
1931 Federal Surplus/Deficit	2053	953	-256	457	211	-374	-1910	-1943	-839	234	-1205	284	1437	1079	-70
1932 Federal Surplus/Deficit	1920	481	-230	370	95	-471	-1883	-2096	568	3146	4921	5261	4771	2908	1211
1933 Federal Surplus/Deficit	3229	2312	-34	529	-151	464	2643	1809	-648	600	1461	3602	7058	5290	2030
1934 Federal Surplus/Deficit	2765	3076	571	1656	1581	4814	5808	4133	2645	5852	5176	4715	1256	2525	3178
1935 Federal Surplus/Deficit	1327	-15	-417	269	-192	7.7	2097	2470	-1148	388	2164	2870	3619	2893	1200
1936 Federal Surplus/Deficit	2764	970	-245	467	120	-411	-1201	-1928	-437	-407	1863	6406	3272	1852	874
1937 Federal Surplus/Deficit	2496	721	-344	510	170	-432	-1696	-1753	-666	-446	-708	231	1396	1331	-18
1938 Federal Surplus/Deficit	2100	343	-353	673	41	-342	2903	-233	1617	2505	2654	5460	4003	2474	1670
1939 Federal Surplus/Deficit	1853	548	58	589	113	-444	534	-1638	-91	431	1224	4115	1925	1959	762
1940 Federal Surplus/Deficit	2684	842	-337	705	64	-228	-126	-844	1845	1351	1990	2774	2670	1337	941
1941 Federal Surplus/Deficit	1756	416	-387	491	-56	172	423	-1899	-572	-800	-795	866	2241	691	188
1942 Federal Surplus/Deficit	1526	557	-12	429	-178	1744	3057	-1270	-1161	-96	675	2508	5209	3442	1258
1943 Federal Surplus/Deficit	3208	2260	-46	489	-55	-17	2275	1472	2277	5496	4811	5398	5004	3547	2353
1944 Federal Surplus/Deficit	2992	2181	-52	597	143	-467	505	-1894	-1091	-621	-1144	-195	1160	524	78
1945 Federal Surplus/Deficit	1616	45	-272	297	113	-461	-1841	-1477	-804	-550	-882	2769	4255	1901	383
1946 Federal Surplus/Deficit	1789	1322	-461	603	124	-390	944	876	2370	2966	3904	5751	4409	3373	1883
1947 Federal Surplus/Deficit	3299	1958	181	474	94	2566	3289	2403	2642	1356	2781	4886	4093	3007	2361
1948 Federal Surplus/Deficit	3303	1366	9.8	2673	1078	1481	3153	-56	1232	1584	3722	6890	7771	3823	2754
1949 Federal Surplus/Deficit	2894	3373	899	772	14	220	1085	-221	3457	1642	4631	5770	3910	1229	1950
1950 Federal Surplus/Deficit	1582	80	-656	497	-65	-669	1348	2815	4218	4035	3825	4651	6860	3930	2307
1951 Federal Surplus/Deficit	2507	2818	338	1504	1574	3565	4670	4613	2879	3895	4362	5795	3273	3847	3237
1952 Federal Surplus/Deficit	2993	2922	641	2129	272	1887	2929	1324	1627	4116	4531	6794	4212	2242	2612
1953 Federal Surplus/Deficit	3010	1218	-116	462	205	-428	290	2446	-161	-519	1118	4322	6619	4007	1672
1954 Federal Surplus/Deficit	3137	2017	214	752	190	923	1958	2691	1222	3318	2595	5128	6118	4733	2455
1955 Federal Surplus/Deficit	4134	3131	2840	1347	702	1065	-59	-1567	-1023	410	-30	2251	7434	5804	1885
1956 Federal Surplus/Deficit	2909	3301	105	1218	975	3234	5210	1848	3590	4098	6027	6841	7424	4182	3566
1957 Federal Surplus/Deficit	3267	2527	156	875	-17	1091	1654	-923	846	4663	2905	6386	7135	2426	2193
1958 Federal Surplus/Deficit	2148	776	-204	604	114	-306	1171	1361	1448	649	3505	5731	5597	1989	1754
1959 Federal Surplus/Deficit	2177	1060	-106	499	599	1852	4681	3039	1451	2826	2043	4018	6074	4540	2558
1960 Federal Surplus/Deficit	3009	2349	2619	3306	2066	2743	2934	7.1	1269	5957	3874	3554	4409	3034	2795
1961 Federal Surplus/Deficit	3305	927	-31	653	325	189	1709	2067	2133	2867	2869	4285	7003	2575	2158
1962 Federal Surplus/Deficit	2363	1431	-396	568	93	-558	1586	-952	-628	4255	4574	3710	3541	3260	1378
1963 Federal Surplus/Deficit	2824	1853	-159	1072	743	1830	1919	612	511	501	794	4518	4170	2978	1765
1964 Federal Surplus/Deficit	3533	2067	289	388	150	-187	1453	-186	-670	1573	1665	3299	7095	5320	1781
1965 Federal Surplus/Deficit	3042	2761	894	1474	285	3436	5727	4216	3137	2595	4454	5560	4961	2531	3221
1966 Federal Surplus/Deficit	3106	2529	243	1006	333	1012	2570	-446	-369	3306	1516	3624	2999	3351	1629
1967 Federal Surplus/Deficit	3348	1678	-297	462	93	159	2986	3627	601	2239	1012	2373	6650	4626	2118
1968 Federal Surplus/Deficit	3107	2434	348	818	220	850	2472	1690	1412	-836	893	2491	4795	4276	1848
1969 Federal Surplus/Deficit	3270	2573	1300	1594	1119	1712	4536	3166	1886	5090	4601	6639	4667	3214	3133
1970 Federal Surplus/Deficit	3201	1278	-116	589	218	-24	2068	1618	-142	-355	1709	3549	5137	1350	1430
1971 Federal Surplus/Deficit	2004	927	-392	580	311	-151	3740	5195	2639	3328	4073	6993	6868	4507	2955
1972 Federal Surplus/Deficit	3226	3455	512	670	230	993	3542	4803	5235	5600	2544	6695	7313	4942	3529
1973 Federal Surplus/Deficit	3780	3151	968	839	96	1230	2925	-1608	-735	-967	-896	708	2199	1684	903
1974 Federal Surplus/Deficit	1897	230	-488	202	-205	2031	6218	5156	3971	4886	5519	6110	7441	6183	3574
1975 Federal Surplus/Deficit	3289	3427	915	350	116	81	2345	1184	2655	1674	1942	4447	5595	5205	2338
1976 Federal Surplus/Deficit	2107	1388	286	1250	1387	4334	4568	3040	2062	4827	3623	6199	3666	4747	3126
1977 Federal Surplus/Deficit	4699	4360	3471	994	122	-284	534	-1983	-1417	-1115	-1427	566	815	503	548
1978 Federal Surplus/Deficit	1932	49	-513	29	-93	-116	1655	55	2526	1689	2444	3969	3327	3365	1438
Top Ten Percent	2716	2513	272	1013	572	2652	5073	4127	3762	4215	4581	6200	6083	4337	3425
Middle Eighty Percent	2734	1650	256	829	303	673	1928	744	929	1975	2351	4256	4711	3148	1844
Bottom Ten Percent	2415	1090	-259	484	170	-420	-986	-1710	-776	-361	-922	-18	1586	1333	43

Exhibit 13: OY 2011 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resource Study
2010 - 2011 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Federal Surplus/Deficit	2971	719	-259	335	66	-422	118	-1985	-678	-681	-988	-666	1390	1749	55
1930 Federal Surplus/Deficit	1594	497	-372	505	231	-440	-1979	-1007	-624	-306	-576	-723	1295	1980	-44
1931 Federal Surplus/Deficit	2068	763	-249	448	196	-393	-1928	-1960	-848	228	-1212	-204	812	1080	-177
1932 Federal Surplus/Deficit	1934	290	-223	361	81	-492	-1902	-2113	561	3142	4925	4781	4150	2909	1105
1933 Federal Surplus/Deficit	3244	2124	-25	522	-166	445	2635	1802	-655	596	1461	3121	6438	5293	1927
1934 Federal Surplus/Deficit	2780	2889	581	1652	1566	4803	5800	4128	2643	5851	5180	4235	628	2526	3076
1935 Federal Surplus/Deficit	1341	-206	-408	260	-206	-13	2088	2464	-1154	383	2165	2385	2996	2895	1096
1936 Federal Surplus/Deficit	2780	781	-237	459	106	-429	-1217	-1944	-445	-413	1864	5926	2650	1853	769
1937 Federal Surplus/Deficit	2511	530	-337	502	156	-451	-1714	-1769	-675	-453	-713	-259	768	1332	-126
1938 Federal Surplus/Deficit	2115	154	-345	665	27	-361	2893	-243	1613	2501	2656	4980	3380	2475	1566
1939 Federal Surplus/Deficit	1868	357	67	582	98	-464	523	-1653	-99	426	1223	3633	1298	1959	657
1940 Federal Surplus/Deficit	2699	652	-329	698	50	-248	-141	-859	1841	1345	1994	2290	2044	1337	836
1941 Federal Surplus/Deficit	1770	225	-380	484	-70	153	407	-1916	-581	-805	-795	380	1615	691	82
1942 Federal Surplus/Deficit	1540	367	-4.7	421	-192	1725	3049	-1284	-1170	-101	675	2024	4588	3444	1153
1943 Federal Surplus/Deficit	3224	2072	-38	482	-71	-37	2265	1461	2273	5493	4814	4918	4382	3549	2249
1944 Federal Surplus/Deficit	3007	1993	-44	590	128	-487	490	-1911	-1102	-629	-1147	-682	533	522	-29
1945 Federal Surplus/Deficit	1630	-146	-264	289	97	-481	-1860	-1493	-814	-558	-888	2286	3632	1902	276
1946 Federal Surplus/Deficit	1802	1133	-454	595	109	-409	930	865	2367	2962	3908	5272	3788	3375	1778
1947 Federal Surplus/Deficit	3315	1769	189	468	79	2546	3281	2395	2639	1352	2784	4405	3472	3008	2258
1948 Federal Surplus/Deficit	3318	1177	18	2670	1064	1464	3144	-69	1228	1580	3725	6411	7150	3826	2651
1949 Federal Surplus/Deficit	2910	3186	909	766	-0.8	200	1073	-236	3454	1638	4635	5289	3288	1229	1846
1950 Federal Surplus/Deficit	1595	-112	-649	489	-80	-688	1338	2806	4215	4032	3828	4171	6239	3933	2204
1951 Federal Surplus/Deficit	2521	2631	346	1500	1559	3551	4663	4607	2876	3891	4366	5315	2651	3850	3135
1952 Federal Surplus/Deficit	3008	2735	650	2125	258	1869	2920	1316	1622	4112	4534	6314	3590	2244	2509
1953 Federal Surplus/Deficit	3025	1028	-109	454	190	-447	273	2439	-166	-524	1118	3841	5998	4010	1567
1954 Federal Surplus/Deficit	3152	1829	222	746	176	904	1949	2685	1218	3315	2597	4648	5498	4736	2352
1955 Federal Surplus/Deficit	4151	2944	2853	1343	689	1048	-74	-1583	-1033	405	-27	1767	6814	5807	1780
1956 Federal Surplus/Deficit	2924	3114	113	1213	959	3219	5202	1841	3586	4096	6032	6361	6803	4185	3464
1957 Federal Surplus/Deficit	3283	2339	164	869	-33	1073	1644	-938	842	4659	2908	5907	6514	2427	2089
1958 Federal Surplus/Deficit	2162	584	-196	597	99	-327	1160	1350	1445	644	3507	5250	4976	1990	1649
1959 Federal Surplus/Deficit	2191	870	-98	493	584	1834	4673	3033	1445	2823	2046	3538	5453	4542	2455
1960 Federal Surplus/Deficit	3025	2161	2632	3302	2052	2728	2927	-4.1	1263	5955	3878	3073	3788	3035	2692
1961 Federal Surplus/Deficit	3321	736	-23	647	311	168	1699	2060	2129	2863	2870	3805	6383	2576	2054
1962 Federal Surplus/Deficit	2377	1242	-389	562	78	-578	1575	-965	-637	4250	4579	3229	2918	3262	1273
1963 Federal Surplus/Deficit	2839	1664	-151	1067	729	1813	1911	604	502	497	795	4035	3549	2980	1661
1964 Federal Surplus/Deficit	3548	1878	298	381	135	-208	1442	-197	-679	1568	1665	2817	6475	5323	1676
1965 Federal Surplus/Deficit	3058	2574	904	1469	271	3418	5719	4210	3133	2591	4458	5081	4339	2532	3118
1966 Federal Surplus/Deficit	3122	2341	252	1000	319	993	2561	-457	-378	3303	1517	3142	2376	3353	1525
1967 Federal Surplus/Deficit	3364	1488	-290	455	77	139	2978	3622	596	2236	1012	1892	6030	4629	2015
1968 Federal Surplus/Deficit	3123	2246	356	812	206	831	2463	1682	1409	-843	894	2006	4175	4277	1744
1969 Federal Surplus/Deficit	3286	2385	1312	1589	1104	1695	4528	3161	1881	5087	4605	6159	4046	3215	3031
1970 Federal Surplus/Deficit	3216	1088	-108	583	203	-45	2055	1610	-149	-361	1712	3067	4515	1350	1326
1971 Federal Surplus/Deficit	2018	736	-386	572	296	-170	3731	5190	2635	3324	4077	6513	6247	4509	2851
1972 Federal Surplus/Deficit	3242	3268	521	663	215	973	3533	4797	5234	5598	2548	6215	6693	4945	3426
1973 Federal Surplus/Deficit	3797	2964	977	832	81	1211	2916	-1624	-744	-974	-898	221	1573	1684	798
1974 Federal Surplus/Deficit	1912	38	-482	193	-220	2012	6210	5150	3968	4884	5524	5631	6821	6186	3471
1975 Federal Surplus/Deficit	3304	3240	925	342	100	61	2335	1175	2651	1670	1944	3966	4973	5208	2235
1976 Federal Surplus/Deficit	2122	1200	295	1245	1372	4322	4561	3034	2058	4824	3626	5719	3044	4750	3024
1977 Federal Surplus/Deficit	4716	4174	3484	988	107	-304	519	-2000	-1428	-1124	-1431	79	186	501	442
1978 Federal Surplus/Deficit	1946	-142	-506	20	-108	-137	1642	41	2523	1686	2447	3489	2704	3367	1334
Top Ten Percent	2731	2325	280	1008	557	2634	5066	4121	3759	4212	4585	5720	5461	4340	3323
Middle Eighty Percent	2749	1461	264	822	288	655	1917	734	923	1971	2353	3775	4089	3150	1740
Bottom Ten Percent	2430	900	-252	476	155	-439	-1003	-1726	-786	-368	-927	-507	960	1333	-64

Exhibit 14: OY 2012 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resource Study
2011 - 2012 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Federal Surplus/Deficit	2943	888	-284	385	122	-356	181	-1884	-623	-639	-951	-148	2033	1765	193
1930 Federal Surplus/Deficit	1564	666	-398	554	289	-374	-1918	-904	-568	-262	-539	-206	1937	1996	93
1931 Federal Surplus/Deficit	2039	932	-275	497	253	-326	-1867	-1859	-793	273	-1176	314	1453	1096	-39
1932 Federal Surplus/Deficit	1906	459	-249	410	137	-428	-1841	-2012	619	3188	4969	5304	4795	2925	1243
1933 Federal Surplus/Deficit	3216	2295	-50	572	-108	511	2703	1910	-598	642	1502	3644	7083	5309	2067
1934 Federal Surplus/Deficit	2752	3061	558	1704	1624	4875	5868	4236	2703	5896	5223	4758	1268	2542	3217
1935 Federal Surplus/Deficit	1313	-36	-432	309	-149	53	2155	2572	-1096	429	2207	2906	3640	2911	1235
1936 Federal Surplus/Deficit	2751	952	-262	509	163	-363	-1153	-1844	-389	-369	1907	6448	3295	1869	908
1937 Federal Surplus/Deficit	2482	700	-363	552	213	-384	-1652	-1668	-620	-410	-675	257	1409	1348	12
1938 Federal Surplus/Deficit	2086	325	-370	714	84	-294	2960	-138	1672	2547	2699	5503	4025	2491	1706
1939 Federal Surplus/Deficit	1839	527	42	633	154	-398	589	-1551	-43	471	1264	4155	1938	1975	795
1940 Federal Surplus/Deficit	2670	822	-355	748	108	-182	-78	-757	1901	1391	2037	2811	2685	1353	974
1941 Federal Surplus/Deficit	1742	395	-405	535	-12	221	469	-1814	-525	-759	-755	899	2258	706	220
1942 Federal Surplus/Deficit	1511	536	-30	471	-134	1792	3117	-1181	-1115	-56	717	2545	5233	3460	1293
1943 Federal Surplus/Deficit	3196	2243	-63	532	-14	29	2333	1567	2333	5539	4857	5441	5027	3565	2389
1944 Federal Surplus/Deficit	2978	2164	-70	640	184	-421	554	-1811	-1048	-587	-1110	-164	1174	537	108
1945 Federal Surplus/Deficit	1601	23	-290	338	154	-415	-1800	-1392	-759	-515	-852	2809	4277	1919	414
1946 Federal Surplus/Deficit	1773	1304	-479	644	166	-342	994	970	2427	3008	3951	5794	4433	3391	1918
1947 Federal Surplus/Deficit	3286	1941	165	518	136	2614	3349	2503	2699	1397	2827	4928	4117	3024	2398
1948 Federal Surplus/Deficit	3290	1347	-7.1	2722	1122	1533	3212	35	1288	1625	3768	6933	7794	3842	2791
1949 Federal Surplus/Deficit	2881	3357	885	817	56	265	1139	-133	3514	1683	4678	5812	3933	1245	1986
1950 Federal Surplus/Deficit	1567	57	-675	539	-23	-621	1405	2912	4275	4077	3871	4693	6884	3949	2344
1951 Federal Surplus/Deficit	2493	2802	322	1551	1617	3622	4731	4716	2936	3936	4409	5838	3296	3866	3276
1952 Federal Surplus/Deficit	2980	2906	626	2177	315	1937	2988	1424	1680	4158	4577	6837	4235	2260	2649
1953 Federal Surplus/Deficit	2997	1198	-135	503	246	-381	336	2547	-107	-478	1160	4364	6643	4026	1707
1954 Federal Surplus/Deficit	3124	2000	198	797	233	970	2016	2793	1278	3360	2640	5171	6143	4752	2493
1955 Federal Surplus/Deficit	4122	3115	2831	1395	746	1115	-10	-1482	-979	450	16	2288	7459	5823	1920
1956 Federal Surplus/Deficit	2896	3285	88	1265	1017	3289	5270	1949	3646	4141	6075	6884	7448	4201	3605
1957 Federal Surplus/Deficit	3254	2510	140	920	24	1140	1710	-835	901	4705	2951	6429	7159	2443	2229
1958 Federal Surplus/Deficit	2134	754	-222	647	155	-261	1226	1456	1505	689	3550	5772	5621	2006	1789
1959 Federal Surplus/Deficit	2162	1040	-124	543	641	1903	4741	3142	1504	2868	2089	4061	6098	4558	2596
1960 Federal Surplus/Deficit	2996	2332	2610	3354	2110	2797	2995	101	1322	6001	3921	3595	4433	3052	2833
1961 Federal Surplus/Deficit	3292	905	-47	697	368	234	1765	2169	2189	2908	2912	4328	7028	2592	2194
1962 Federal Surplus/Deficit	2349	1412	-415	612	134	-513	1641	-860	-582	4296	4622	3752	3563	3278	1412
1963 Federal Surplus/Deficit	2811	1835	-177	1118	786	1881	1979	712	558	542	837	4558	4194	2996	1801
1964 Federal Surplus/Deficit	3520	2049	273	431	191	-142	1509	-93	-624	1613	1707	3340	7120	5339	1816
1965 Federal Surplus/Deficit	3030	2745	880	1522	328	3486	5787	4319	3193	2636	4501	5603	4984	2548	3259
1966 Federal Surplus/Deficit	3093	2513	228	1051	376	1059	2629	-351	-322	3349	1559	3665	3019	3369	1665
1967 Federal Surplus/Deficit	3336	1658	-315	505	134	205	3046	3730	655	2281	1053	2415	6675	4645	2155
1968 Federal Surplus/Deficit	3095	2417	332	863	264	898	2531	1791	1469	-799	934	2526	4820	4294	1884
1969 Federal Surplus/Deficit	3258	2556	1289	1641	1162	1763	4596	3269	1941	5133	4649	6682	4691	3232	3172
1970 Federal Surplus/Deficit	3188	1258	-134	633	259	21	2121	1719	-91	-315	1754	3590	5160	1366	1466
1971 Federal Surplus/Deficit	1990	905	-412	622	352	-104	3799	5298	2695	3369	4120	7036	6892	4525	2991
1972 Federal Surplus/Deficit	3213	3439	497	713	272	1039	3601	4906	5294	5644	2591	6738	7338	4961	3567
1973 Federal Surplus/Deficit	3768	3136	953	883	138	1279	2984	-1523	-689	-930	-858	739	2215	1700	936
1974 Federal Surplus/Deficit	1883	207	-508	241	-164	2079	6278	5259	4028	4929	5567	6153	7465	6202	3611
1975 Federal Surplus/Deficit	3276	3411	901	392	156	127	2402	1282	2711	1716	1987	4489	5618	5224	2375
1976 Federal Surplus/Deficit	2093	1371	270	1296	1430	4394	4629	3142	2118	4870	3669	6242	3689	4767	3165
1977 Federal Surplus/Deficit	4688	4345	3462	1039	163	-237	583	-1900	-1374	-1082	-1393	597	826	515	579
1978 Federal Surplus/Deficit	1917	27	-532	68	-51	-71	1707	146	2583	1731	2490	4011	3349	3383	1473
Top Ten Percent	2703	2496	256	1058	614	2703	5134	4229	3819	4257	4628	6243	6106	4356	3463
Middle Eighty Percent	2721	1632	240	873	345	722	1984	839	981	2016	2395	4297	4733	3166	1880
Bottom Ten Percent	2401	1070	-278	525	212	-372	-941	-1625	-730	-325	-890	11	1601	1348	73

Exhibit 15: OY 2013 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resource Study
2012 - 2013 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Federal Surplus/Deficit	2968	910	-248	385	117	-360	153	-1980	-645	-662	-974	-654	1388	1746	85
1930 Federal Surplus/Deficit	1588	689	-362	551	285	-377	-1950	-996	-590	-284	-562	-713	1291	1977	-14
1931 Federal Surplus/Deficit	2065	955	-240	495	250	-329	-1899	-1954	-816	253	-1200	-192	807	1078	-147
1932 Federal Surplus/Deficit	1931	480	-213	408	134	-433	-1872	-2108	600	3169	4954	4805	4155	2907	1137
1933 Federal Surplus/Deficit	3242	2320	-14	572	-111	507	2680	1823	-618	622	1484	3144	6443	5292	1963
1934 Federal Surplus/Deficit	2778	3086	597	1706	1622	4879	5847	4151	2687	5878	5210	4259	620	2524	3114
1935 Federal Surplus/Deficit	1338	-14	-395	307	-153	49	2131	2486	-1116	409	2190	2404	2997	2893	1130
1936 Federal Surplus/Deficit	2777	977	-226	508	160	-366	-1182	-1939	-411	-391	1892	5949	2654	1851	802
1937 Federal Surplus/Deficit	2507	723	-327	550	210	-388	-1683	-1763	-642	-432	-697	-250	763	1329	-96
1938 Federal Surplus/Deficit	2112	348	-335	713	81	-296	2936	-228	1655	2527	2684	5004	3384	2474	1602
1939 Federal Surplus/Deficit	1865	550	79	632	150	-402	564	-1644	-63	451	1246	3654	1292	1957	690
1940 Federal Surplus/Deficit	2696	844	-319	747	105	-185	-107	-850	1885	1371	2022	2309	2039	1335	869
1941 Federal Surplus/Deficit	1767	418	-369	534	-15	218	439	-1908	-547	-779	-773	396	1613	687	114
1942 Federal Surplus/Deficit	1536	559	6.0	470	-137	1789	3095	-1273	-1137	-76	700	2043	4592	3443	1188
1943 Federal Surplus/Deficit	3221	2267	-26	531	-18	26	2311	1479	2316	5521	4843	4942	4386	3547	2285
1944 Federal Surplus/Deficit	3004	2189	-34	639	180	-424	525	-1906	-1071	-610	-1131	-668	527	517	0.9
1945 Federal Surplus/Deficit	1625	45	-255	336	150	-420	-1831	-1487	-782	-537	-875	2309	3636	1901	307
1946 Federal Surplus/Deficit	1798	1328	-443	642	162	-345	968	880	2411	2989	3936	5296	3792	3373	1813
1947 Federal Surplus/Deficit	3312	1965	202	518	133	2611	3327	2417	2683	1377	2812	4429	3477	3007	2295
1948 Federal Surplus/Deficit	3315	1370	29	2725	1119	1532	3190	-56	1272	1605	3753	6435	7155	3825	2687
1949 Federal Surplus/Deficit	2907	3383	923	818	53	261	1114	-225	3498	1664	4663	5313	3292	1227	1882
1950 Federal Surplus/Deficit	1591	79	-639	537	-26	-623	1380	2825	4260	4059	3857	4194	6244	3932	2240
1951 Federal Surplus/Deficit	2518	2827	359	1553	1614	3625	4709	4631	2920	3918	4395	5339	2654	3849	3173
1952 Federal Surplus/Deficit	3006	2931	664	2180	313	1936	2966	1337	1662	4139	4563	6338	3594	2242	2546
1953 Federal Surplus/Deficit	3022	1221	-99	502	243	-384	307	2461	-126	-498	1143	3864	6003	4008	1602
1954 Federal Surplus/Deficit	3150	2025	234	797	230	967	1993	2707	1260	3341	2625	4672	5502	4735	2389
1955 Federal Surplus/Deficit	4148	3140	2872	1396	743	1113	-38	-1577	-1001	430	0.9	1785	6819	5807	1815
1956 Federal Surplus/Deficit	2921	3310	125	1266	1013	3290	5249	1863	3630	4123	6061	6385	6809	4184	3502
1957 Federal Surplus/Deficit	3280	2535	177	921	21	1138	1685	-928	885	4686	2936	5931	6520	2425	2124
1958 Federal Surplus/Deficit	2159	776	-186	647	152	-266	1201	1367	1489	669	3536	5274	4981	1987	1685
1959 Federal Surplus/Deficit	2188	1064	-87	544	638	1901	4719	3056	1486	2849	2074	3562	5458	4540	2492
1960 Federal Surplus/Deficit	3022	2357	2650	3357	2108	2798	2972	11	1304	5983	3907	3095	3792	3034	2730
1961 Federal Surplus/Deficit	3318	928	-10	697	365	229	1740	2083	2173	2889	2895	3829	6388	2574	2090
1962 Federal Surplus/Deficit	2374	1436	-379	611	130	-518	1616	-951	-605	4277	4608	3252	2922	3261	1307
1963 Federal Surplus/Deficit	2836	1860	-141	1119	783	1880	1956	625	536	523	820	4059	3553	2978	1697
1964 Federal Surplus/Deficit	3546	2074	310	431	187	-147	1483	-184	-646	1593	1691	2840	6480	5323	1711
1965 Federal Surplus/Deficit	3055	2770	918	1524	326	3486	5766	4234	3177	2617	4486	5104	4343	2530	3156
1966 Federal Surplus/Deficit	3119	2537	266	1052	374	1056	2605	-441	-344	3330	1543	3165	2377	3351	1561
1967 Federal Surplus/Deficit	3362	1681	-280	504	130	202	3023	3645	637	2262	1035	1914	6035	4628	2051
1968 Federal Surplus/Deficit	3120	2442	369	863	261	894	2508	1705	1452	-821	916	2023	4180	4276	1780
1969 Federal Surplus/Deficit	3284	2581	1329	1644	1159	1761	4574	3184	1924	5114	4634	6183	4051	3214	3069
1970 Federal Surplus/Deficit	3213	1280	-98	634	256	17	2095	1633	-110	-336	1739	3090	4519	1348	1361
1971 Federal Surplus/Deficit	2015	927	-376	621	348	-107	3777	5213	2679	3350	4106	6538	6252	4508	2888
1972 Federal Surplus/Deficit	3239	3465	534	713	269	1036	3579	4821	5279	5626	2576	6240	6698	4945	3464
1973 Federal Surplus/Deficit	3794	3161	990	883	134	1276	2962	-1617	-711	-952	-878	234	1570	1682	831
1974 Federal Surplus/Deficit	1908	228	-473	239	-167	2076	6257	5174	4013	4911	5553	5655	6826	6186	3507
1975 Federal Surplus/Deficit	3302	3437	938	391	152	123	2379	1195	2694	1696	1971	3989	4978	5207	2271
1976 Federal Surplus/Deficit	2119	1395	308	1298	1427	4398	4607	3056	2102	4851	3655	5743	3047	4749	3062
1977 Federal Surplus/Deficit	4714	4370	3503	1040	158	-241	555	-1995	-1398	-1106	-1414	91	179	494	473
1978 Federal Surplus/Deficit	1942	48	-496	66	-55	-75	1681	55	2567	1712	2474	3512	2707	3366	1368
Top Ten Percent	2728	2520	293	1059	611	2702	5112	4144	3804	4239	4614	5745	5466	4339	3360
Middle Eighty Percent	2746	1655	277	873	342	719	1959	750	963	1996	2379	3797	4092	3148	1775
Bottom Ten Percent	2426	1093	-242	524	208	-376	-971	-1720	-753	-347	-913	-495	955	1330	-34

Exhibit 16: OY 2014 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resource Study
2013 - 2014 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Federal Surplus/Deficit	2946	886	-272	357	83	-396	118	-1962	-676	-690	-1005	-196	2023	1754	159
1930 Federal Surplus/Deficit	1565	665	-386	522	252	-413	-1988	-976	-621	-311	-593	-256	1925	1985	59
1931 Federal Surplus/Deficit	2042	932	-264	465	216	-365	-1936	-1936	-847	229	-1232	266	1441	1086	-74
1932 Federal Surplus/Deficit	1909	456	-237	379	100	-470	-1910	-2090	571	3144	4930	5267	4792	2915	1211
1933 Federal Surplus/Deficit	3219	2298	-37	544	-144	472	2649	1849	-647	597	1458	3606	7080	5300	2038
1934 Federal Surplus/Deficit	2756	3064	576	1680	1589	4850	5816	4177	2660	5853	5185	4722	1252	2532	3190
1935 Federal Surplus/Deficit	1315	-37	-418	278	-186	12	2100	2512	-1145	384	2164	2864	3633	2901	1205
1936 Federal Surplus/Deficit	2755	955	-249	480	127	-402	-1218	-1920	-441	-417	1867	6412	3291	1859	877
1937 Federal Surplus/Deficit	2485	699	-350	522	177	-424	-1720	-1744	-673	-459	-727	206	1396	1337	-23
1938 Federal Surplus/Deficit	2089	326	-358	684	49	-332	2905	-205	1628	2503	2659	5466	4021	2482	1677
1939 Federal Surplus/Deficit	1842	527	56	605	117	-438	531	-1625	-93	427	1219	4116	1925	1965	764
1940 Federal Surplus/Deficit	2674	821	-342	719	73	-221	-143	-831	1858	1346	1998	2770	2673	1343	943
1941 Federal Surplus/Deficit	1745	395	-393	506	-47	183	403	-1889	-578	-804	-800	855	2248	695	188
1942 Federal Surplus/Deficit	1514	536	-17	442	-169	1753	3065	-1252	-1168	-100	674	2505	5229	3451	1262
1943 Federal Surplus/Deficit	3199	2246	-49	503	-51	-9.9	2280	1503	2290	5496	4819	5404	5023	3555	2361
1944 Federal Surplus/Deficit	2982	2167	-57	611	146	-460	491	-1888	-1103	-637	-1161	-210	1161	524	74
1945 Federal Surplus/Deficit	1603	21	-279	306	116	-456	-1869	-1468	-814	-564	-907	2771	4274	1909	381
1946 Federal Surplus/Deficit	1775	1306	-467	613	129	-380	934	903	2384	2964	3911	5758	4429	3381	1889
1947 Federal Surplus/Deficit	3290	1944	180	491	100	2576	3297	2442	2656	1353	2787	4892	4114	3015	2371
1948 Federal Surplus/Deficit	3293	1348	6.4	2699	1086	1499	3159	-34	1245	1581	3728	6898	7791	3833	2763
1949 Federal Surplus/Deficit	2885	3361	901	791	19	225	1082	-205	3471	1640	4639	5775	3929	1235	1957
1950 Federal Surplus/Deficit	1569	55	-663	509	-59	-658	1349	2849	4233	4034	3832	4657	6882	3940	2315
1951 Federal Surplus/Deficit	2496	2805	336	1527	1581	3593	4679	4656	2893	3893	4370	5802	3292	3857	3250
1952 Federal Surplus/Deficit	2984	2910	642	2154	280	1902	2935	1363	1634	4115	4538	6801	4232	2250	2622
1953 Federal Surplus/Deficit	3000	1199	-122	474	209	-420	271	2487	-154	-523	1117	4327	6641	4016	1677
1954 Federal Surplus/Deficit	3128	2003	212	770	197	931	1962	2733	1233	3316	2600	5135	6140	4743	2465
1955 Federal Surplus/Deficit	4126	3118	2852	1370	711	1078	-73	-1558	-1033	406	-24	2246	7456	5815	1890
1956 Federal Surplus/Deficit	2899	3289	102	1239	980	3259	5218	1889	3604	4098	6036	6848	7446	4192	3578
1957 Federal Surplus/Deficit	3258	2513	154	894	-13	1103	1653	-908	858	4662	2911	6394	7157	2433	2200
1958 Federal Surplus/Deficit	2137	752	-209	619	118	-302	1169	1390	1462	645	3511	5736	5619	1995	1760
1959 Federal Surplus/Deficit	2165	1041	-111	516	606	1868	4689	3082	1458	2825	2049	4024	6096	4548	2568
1960 Federal Surplus/Deficit	3000	2336	2630	3331	2075	2766	2942	34	1276	5958	3882	3558	4429	3042	2806
1961 Federal Surplus/Deficit	3296	905	-33	670	332	193	1708	2108	2147	2865	2869	4291	7025	2582	2166
1962 Federal Surplus/Deficit	2352	1413	-403	584	96	-555	1583	-929	-636	4252	4583	3714	3559	3269	1382
1963 Federal Surplus/Deficit	2814	1838	-164	1093	751	1846	1925	650	505	498	793	4521	4190	2986	1773
1964 Federal Surplus/Deficit	3524	2052	288	403	153	-183	1451	-162	-677	1569	1665	3303	7118	5331	1786
1965 Federal Surplus/Deficit	3033	2748	896	1498	293	3452	5735	4259	3151	2592	4462	5567	4980	2538	3232
1966 Federal Surplus/Deficit	3097	2516	244	1025	341	1020	2574	-418	-375	3305	1517	3628	3013	3359	1636
1967 Federal Surplus/Deficit	3339	1658	-303	476	97	166	2992	3670	609	2237	1008	2377	6672	4636	2126
1968 Federal Surplus/Deficit	3098	2421	346	836	228	859	2477	1731	1426	-847	889	2483	4817	4284	1856
1969 Federal Surplus/Deficit	3262	2560	1308	1618	1126	1727	4544	3209	1898	5090	4610	6646	4688	3222	3145
1970 Federal Surplus/Deficit	3191	1257	-121	607	222	-20	2062	1658	-139	-361	1713	3552	5157	1356	1436
1971 Federal Surplus/Deficit	1993	904	-400	593	314	-142	3746	5239	2652	3325	4081	7000	6890	4516	2963
1972 Federal Surplus/Deficit	3217	3443	511	686	236	1000	3548	4847	5252	5601	2551	6702	7335	4953	3540
1973 Federal Surplus/Deficit	3772	3139	968	856	100	1241	2931	-1597	-742	-978	-906	692	2205	1689	905
1974 Federal Surplus/Deficit	1886	204	-497	209	-201	2041	6226	5200	3986	4886	5528	6117	7463	6194	3583
1975 Federal Surplus/Deficit	3280	3415	916	363	118	87	2348	1220	2667	1672	1947	4452	5615	5215	2346
1976 Federal Surplus/Deficit	2097	1374	286	1271	1394	4368	4577	3082	2076	4827	3630	6206	3685	4757	3139
1977 Federal Surplus/Deficit	4692	4349	3483	1013	125	-277	521	-1976	-1430	-1134	-1444	549	811	500	546
1978 Federal Surplus/Deficit	1919	25	-520	37	-89	-111	1648	76	2540	1687	2450	3974	3345	3374	1443
Top Ten Percent	2706	2498	270	1032	578	2669	5081	4170	3777	4214	4590	6207	6103	4347	3437
Middle Eighty Percent	2724	1633	254	845	308	684	1927	773	934	1971	2354	4259	4729	3156	1851
Bottom Ten Percent	2404	1070	-266	495	175	-411	-1007	-1701	-784	-374	-944	-38	1589	1337	39

Federal Surplus/Deficit by Water Year
PNW Loads and Resource Study
2014 - 2015 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Federal Surplus/Deficit	2916	857	-324	306	28	-435	79	-2059	-709	-721	-1037	-708	1369	1722	23
1930 Federal Surplus/Deficit	1535	636	-438	470	197	-451	-2029	-1072	-654	-341	-625	-768	1270	1954	-77
1931 Federal Surplus/Deficit	2013	903	-315	413	161	-404	-1977	-2033	-880	199	-1264	-246	786	1055	-210
1932 Federal Surplus/Deficit	1879	427	-289	327	45	-510	-1951	-2187	540	3115	4901	4758	4139	2884	1076
1933 Federal Surplus/Deficit	3190	2270	-87	493	-199	433	2612	1755	-679	568	1428	3097	6427	5269	1904
1934 Federal Surplus/Deficit	2726	3036	526	1630	1535	4814	5779	4083	2630	5824	5156	4212	597	2500	3056
1935 Federal Surplus/Deficit	1286	-66	-469	226	-241	-27	2062	2419	-1176	355	2134	2354	2980	2870	1071
1936 Federal Surplus/Deficit	2725	927	-300	428	72	-441	-1257	-2017	-473	-447	1839	5903	2638	1827	742
1937 Federal Surplus/Deficit	2455	671	-402	470	122	-462	-1761	-1841	-705	-489	-759	-306	741	1306	-158
1938 Federal Surplus/Deficit	2060	297	-409	632	-6.2	-370	2867	-300	1597	2473	2630	4957	3368	2450	1543
1939 Federal Surplus/Deficit	1813	498	5.1	553	61	-477	493	-1721	-125	397	1189	3606	1269	1933	629
1940 Federal Surplus/Deficit	2644	792	-394	668	18	-260	-183	-927	1828	1317	1969	2260	2018	1311	808
1941 Federal Surplus/Deficit	1715	366	-444	455	-102	145	363	-1986	-610	-833	-830	344	1594	663	52
1942 Federal Surplus/Deficit	1484	507	-69	390	-224	1715	3027	-1348	-1201	-130	645	1995	4576	3419	1128
1943 Federal Surplus/Deficit	3169	2218	-100	452	-106	-49	2243	1408	2259	5467	4790	4895	4370	3524	2226
1944 Federal Surplus/Deficit	2952	2139	-109	560	90	-499	451	-1985	-1136	-668	-1192	-722	506	492	-61
1945 Federal Surplus/Deficit	1572	-7.9	-330	254	61	-495	-1910	-1565	-847	-595	-939	2261	3621	1877	245
1946 Federal Surplus/Deficit	1745	1278	-518	561	74	-419	895	808	2354	2935	3883	5249	3776	3350	1754
1947 Federal Surplus/Deficit	3260	1915	129	439	44	2538	3259	2349	2626	1323	2758	4382	3461	2983	2237
1948 Federal Surplus/Deficit	3263	1320	-45	2648	1031	1461	3122	-129	1215	1551	3700	6389	7138	3802	2629
1949 Federal Surplus/Deficit	2855	3333	851	740	-36	186	1043	-301	3441	1610	4610	5266	3276	1203	1823
1950 Federal Surplus/Deficit	1539	26	-715	457	-115	-697	1311	2755	4203	4005	3803	4147	6229	3908	2181
1951 Federal Surplus/Deficit	2466	2777	285	1477	1526	3557	4641	4563	2863	3864	4341	5293	2639	3825	3116
1952 Federal Surplus/Deficit	2954	2881	592	2104	225	1864	2898	1269	1602	4085	4510	6292	3579	2219	2488
1953 Federal Surplus/Deficit	2970	1170	-174	422	154	-459	231	2394	-185	-552	1088	3817	5987	3985	1543
1954 Federal Surplus/Deficit	3098	1975	161	719	142	892	1924	2640	1202	3287	2572	4626	5487	4712	2331
1955 Federal Surplus/Deficit	4096	3090	2802	1319	656	1040	-113	-1655	-1066	376	-52	1736	6803	5783	1755
1956 Federal Surplus/Deficit	2869	3260	51	1189	925	3222	5181	1796	3573	4069	6008	6338	6793	4161	3444
1957 Federal Surplus/Deficit	3228	2485	103	844	-68	1065	1615	-1004	827	4632	2883	5884	6504	2401	2065
1958 Federal Surplus/Deficit	2107	723	-260	567	63	-341	1130	1295	1432	615	3482	5227	4965	1964	1626
1959 Federal Surplus/Deficit	2136	1012	-162	465	551	1830	4652	2989	1427	2795	2021	3515	5442	4517	2434
1960 Federal Surplus/Deficit	2970	2307	2581	3281	2020	2729	2904	-61	1245	5929	3853	3049	3776	3010	2672
1961 Federal Surplus/Deficit	3266	876	-84	619	277	153	1670	2015	2116	2835	2839	3782	6372	2551	2032
1962 Federal Surplus/Deficit	2322	1384	-454	532	40	-594	1545	-1024	-669	4223	4554	3205	2906	3237	1247
1963 Federal Surplus/Deficit	2785	1810	-215	1042	696	1808	1888	557	472	469	764	4012	3537	2955	1639
1964 Federal Surplus/Deficit	3494	2024	237	351	98	-222	1413	-257	-709	1539	1636	2794	6464	5299	1651
1965 Federal Surplus/Deficit	3003	2720	846	1447	238	3414	5698	4166	3120	2563	4433	5058	4327	2507	3098
1966 Federal Surplus/Deficit	3067	2488	193	974	286	981	2537	-513	-407	3276	1488	3119	2359	3328	1501
1967 Federal Surplus/Deficit	3310	1629	-355	425	41	127	2955	3577	578	2208	979	1868	6019	4604	1992
1968 Federal Surplus/Deficit	3068	2393	295	785	173	820	2440	1637	1395	-878	860	1972	4164	4252	1721
1969 Federal Surplus/Deficit	3232	2532	1258	1567	1071	1689	4506	3116	1867	5060	4581	6137	4035	3190	3012
1970 Federal Surplus/Deficit	3161	1228	-173	556	167	-59	2023	1565	-171	-390	1684	3043	4503	1325	1302
1971 Federal Surplus/Deficit	1963	874	-452	541	258	-181	3709	5146	2621	3296	4052	6491	6237	4485	2829
1972 Federal Surplus/Deficit	3187	3415	461	635	181	961	3511	4753	5222	5572	2523	6193	6682	4921	3406
1973 Federal Surplus/Deficit	3742	3111	917	805	45	1203	2894	-1694	-775	-1009	-937	180	1550	1658	770
1974 Federal Surplus/Deficit	1856	175	-549	157	-256	2003	6189	5106	3956	4857	5500	5608	6809	6162	3448
1975 Federal Surplus/Deficit	3250	3387	865	311	62	48	2310	1126	2636	1642	1918	3942	4962	5184	2212
1976 Federal Surplus/Deficit	2067	1346	235	1221	1339	4332	4539	2989	2045	4797	3601	5696	3032	4726	3005
1977 Federal Surplus/Deficit	4662	4321	3434	962	69	-315	481	-2073	-1464	-1165	-1475	37	156	467	410
1978 Federal Surplus/Deficit	1889	-4.5	-572	-15	-144	-150	1609	-19	2510	1658	2421	3465	2692	3342	1308
Top Ten Percent	2676	2470	219	981	523	2631	5044	4077	3747	4185	4561	5698	5450	4315	3303
Middle Eighty Percent	2694	1604	203	794	253	645	1888	678	903	1942	2325	3749	4075	3124	1716
Bottom Ten Percent	2374	1041	-317	444	120	-450	-1047	-1798	-817	-404	-975	-550	934	1306	-97

Section 8: Pacific Northwest Regional Exhibits

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Exhibit 18

Regional Annual Energy Analysis Under 1937-Water Conditions for 10 Operating Years

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Exhibit 18: OY 2006 through 2015 Annual Energy

Loads and Resources - Pacific Northwest Region
PNW Loads and Resource Study
2006 - 2015 Operating Years
1937 Water Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	2006 Avg.	2007 Avg.	2008 Avg.	2009 Avg.	2010 Avg.	2011 Avg.	2012 Avg.	2013 Avg.	2014 Avg.	2015 Avg.
Firm Regional Loads										
Regional Firm Loads	20309	20797	21210	21529	21815	22095	22396	22736	23023	23334
Exports	1397	1030	930	841	934	895	841	803	790	754
Federal Diversity	0	0	0	0	0	0	0	0	0	0
Total Firm Regional Loads	21707	21826	22140	22370	22749	22990	23237	23539	23813	24088
Non-Firm Regional Loads										
Regional Non-Firm Loads	11	11	11	11	11	11	11	11	11	11
Total Non-Firm Regional Loads	11	11	11	11	11	11	11	11	11	11
Total Loads	21717	21837	22151	22381	22760	23001	23248	23550	23823	24099
Hydro Resources										
Regulated Hydro	10622	10650	10686	10703	10721	10736	10748	10762	10773	10779
Independent Hydro	1083	1083	1083	1083	1086	1091	1091	1091	1091	1091
Operational Peaking Adjustment	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	11705	11734	11769	11787	11807	11827	11838	11853	11864	11870
Other Resources										
Small Thermal & Misc.	17	17	17	17	17	17	17	17	17	17
Combustion Turbines	2188	2462	2514	2521	2500	2502	2524	2524	2524	2538
Renewables	80	80	80	80	80	80	80	80	80	80
Cogeneration	1975	1975	1975	1975	1975	1975	1975	1975	1975	1975
Imports	1283	1188	1180	1026	972	856	786	788	794	800
Large Thermal	6153	5874	6165	5936	6168	6044	6209	6057	6243	6119
Non-Utility Generation	1258	1262	1303	1311	1312	1315	1315	1316	1316	1316
Resource Acquisition	0	0	0	0	0	0	0	0	0	0
Total Other Resources	12954	12858	13234	12867	13025	12790	12906	12756	12949	12846
Total Resources	24660	24592	25003	24654	24831	24617	24744	24609	24813	24715
Reserves & Maintenance										
Hydro Reserves	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0
Regional Hydro Maintenance	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12
Spinning Reserves	0	0	0	0	0	0	0	0	0	0
Regional Transmission Losses	-695	-693	-705	-695	-700	-694	-697	-694	-699	-697
Total Reserves, Maintenance & Losses	-707	-705	-717	-707	-712	-706	-710	-706	-711	-709
Total Net Resources	23953	23887	24287	23947	24119	23911	24034	23903	24101	24007
Surplus/Deficits										
Firm Surplus/Deficit	2246	2060	2146	1576	1370	921	797	364	289	-81
Total Surplus/Deficit	2235	2050	2136	1565	1359	911	786	353	278	-92

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Exhibits 19 – 21

Regional Monthly Energy Analysis Under the 2004 BPA White Book Load Forecast for 1937-Water Conditions

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Exhibit 19: OY 2006 Monthly Energy

Loads and Resources - Pacific Northwest Region
PNW Loads and Resource Study
2005 - 2006 Operating Year
1937 Water Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
Firm Regional Loads															
Regional Firm Loads	19541	19480	18297	18647	20559	22548	23200	22208	20604	19500	19560	19035	19457	20115	20309
Exports	1639	1640	1636	1339	1321	1335	1331	1330	1319	1332	1323	1229	1463	1499	1397
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Regional Loads	21180	21120	19933	19986	21880	23883	24531	23538	21924	20832	20883	20264	20920	21614	21707
Non-Firm Regional Loads															
Regional Non-Firm Loads	0	0	14	0	0	0	3.5	23	54	34	34	0	0	0	11
Total Non-Firm Regional Loads	0	0	14	0	0	0	3.5	23	54	34	34	0	0	0	11
Total Loads	21180	21120	19947	19986	21880	23883	24535	23561	21978	20866	20917	20264	20920	21614	21717
Hydro Resources															
Regulated Hydro	13506	10480	8466	10420	11618	11782	9974	8634	9808	9594	9368	9812	13004	12477	10622
Independent Hydro	1042	1069	1003	974	893	974	788	802	949	1217	1273	1561	1597	1154	1083
Operational Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	14548	11549	9469	11393	12510	12756	10761	9436	10757	10810	10641	11373	14600	13632	11705
Other Resources															
Small Thermal & Misc.	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Combustion Turbines	2409	2435	2522	2438	2350	2370	2382	2376	2069	1593	1595	1549	1821	2364	2188
Renewables	80	80	80	81	86	84	85	84	84	83	83	58	80	80	80
Cogeneration	2104	2104	2109	2116	2122	2120	2127	2125	1502	2117	2117	1057	2108	2097	1975
Imports	1246	1219	1136	1308	1409	1610	1486	1395	1198	1151	1138	988	1132	1356	1283
Large Thermal	6300	6285	6300	5743	6322	6322	6322	6322	6322	6254	6007	5113	6322	6322	6153
Non-Utility Generation	1359	1358	1240	1172	1193	1180	1161	1166	1183	1362	1362	1134	1514	1429	1258
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	13515	13498	13404	12875	13500	13703	13581	13485	12375	12578	12319	9916	12995	13665	12954
Total Resources	28063	25047	22873	24269	26010	26459	24342	22921	23132	23388	22961	21289	27595	27296	24660
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Hydro Maintenance	-30	-25	-8.6	-9	-3.8	0	0	0	-5.2	-7.4	-7.6	-20	-14	-49	-12
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Transmission Losses	-791	-706	-645	-684	-733	-746	-686	-646	-652	-659	-647	-600	-778	-768	-695
Total Reserves, Maintenance & Losses	-821	-730	-653	-693	-737	-746	-686	-646	-657	-667	-655	-620	-792	-818	-707
Total Net Resources	27243	24317	22219	23575	25273	25713	23656	22274	22475	22722	22306	20669	26803	26479	23953
Surplus/Deficits															
Firm Surplus/Deficit	6062	3197	2287	3590	3393	1830	-876	-1263	551	1890	1422	405	5883	4865	2246
Total Surplus/Deficit	6062	3197	2273	3590	3393	1830	-879	-1286	496	1856	1389	405	5883	4865	2235

Exhibit 20: OY 2010 Monthly Energy

Loads and Resources - Pacific Northwest Region
PNW Loads and Resource Study
2009 - 2010 Operating Year
1937 Water Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
Firm Regional Loads															
Regional Firm Loads	21127	21065	19831	20183	22166	24271	24696	23621	21939	20928	20989	20440	20927	21654	21815
Exports	982	982	990	931	912	921	918	917	911	931	923	822	992	985	934
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Regional Loads	22109	22046	20821	21115	23078	25192	25614	24537	22850	21859	21912	21261	21918	22639	22749
Non-Firm Regional Loads															
Regional Non-Firm Loads	0	0	14	0	0	0	3.5	23	54	34	34	0	0	0	11
Total Non-Firm Regional Loads	0	0	14	0	0	0	3.5	23	54	34	34	0	0	0	11
Total Loads	22109	22046	20835	21115	23078	25192	25617	24560	22905	21893	21946	21261	21918	22639	22760
Hydro Resources															
Regulated Hydro	13636	10583	8546	10518	11738	11904	10067	8720	9895	9685	9443	9878	13102	12607	10721
Independent Hydro	1042	1070	1004	974	893	974	788	802	950	1217	1274	1562	1612	1169	1086
Operational Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	14678	11653	9549	11493	12632	12878	10855	9522	10844	10902	10717	11440	14714	13776	11807
Other Resources															
Small Thermal & Misc.	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Combustion Turbines	2780	2757	2841	2750	2734	2759	2707	2685	2387	1904	1906	1586	2170	2710	2500
Renewables	80	80	80	81	82	84	85	84	84	83	83	58	80	80	80
Cogeneration	2104	2104	2109	2116	2122	2120	2127	2125	1502	2117	2117	1057	2108	2097	1975
Imports	956	930	874	885	990	1116	1070	1045	967	915	905	860	963	1040	972
Large Thermal	6348	6348	6348	6348	6348	6348	6348	6348	6205	5537	5597	5544	5919	6348	6168
Non-Utility Generation	1400	1400	1297	1226	1226	1208	1196	1204	1222	1381	1380	1356	1558	1473	1312
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	13684	13636	13565	13423	13519	13651	13550	13508	12383	11954	12005	10478	12815	13765	13025
Total Resources	28363	25289	23114	24915	26151	26529	24404	23030	23227	22856	22722	21918	27529	27541	24831
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Hydro Maintenance	-30	-25	-8.6	-9	-3.8	0	0	0	-5.2	-7.4	-7.6	-20	-14	-49	-12
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Transmission Losses	-799	-712	-652	-702	-737	-748	-688	-649	-655	-644	-641	-618	-776	-775	-700
Total Reserves, Maintenance & Losses	-829	-737	-660	-711	-741	-748	-688	-649	-660	-652	-648	-638	-790	-824	-712
Total Net Resources	27534	24552	22454	24204	25409	25781	23716	22381	22567	22204	22074	21281	26738	26716	24119
Surplus/Deficits															
Firm Surplus/Deficit	5425	2505	1634	3089	2332	589	-1898	-2157	-284	345	162	19	4820	4077	1370
Total Surplus/Deficit	5425	2505	1619	3089	2332	589	-1901	-2180	-338	311	128	19	4820	4077	1359

Exhibit 21: OY 2015 Monthly Energy

Loads and Resources - Pacific Northwest Region
PNW Loads and Resource Study
2014 - 2015 Operating Year
1937 Water Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
Firm Regional Loads															
Regional Firm Loads	22690	22627	21234	21618	23608	25959	26388	25299	23423	22326	22387	21858	22376	23236	23334
Exports	819	817	828	779	756	757	716	716	715	745	737	632	800	785	754
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Regional Loads	23508	23444	22062	22397	24364	26716	27104	26015	24138	23071	23124	22490	23176	24021	24088
Non-Firm Regional Loads															
Regional Non-Firm Loads	0	0	14	0	0	0	3.5	23	54	34	34	0	0	0	11
Total Non-Firm Regional Loads	0	0	14	0	0	0	3.5	23	54	34	34	0	0	0	11
Total Loads	23508	23444	22077	22397	24364	26716	27107	26038	24193	23104	23158	22490	23176	24021	24099
Hydro Resources															
Regulated Hydro	13717	10650	8594	10576	11803	11970	10121	8770	9951	9745	9486	9920	13157	12687	10779
Independent Hydro	1057	1084	1018	988	907	974	788	802	950	1217	1274	1563	1612	1169	1091
Operational Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	14774	11734	9612	11564	12710	12945	10909	9573	10901	10963	10761	11482	14769	13857	11870
Other Resources															
Small Thermal & Misc.	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Combustion Turbines	2815	2794	2877	2770	2744	2768	2741	2717	2424	1946	1948	1742	2195	2725	2538
Renewables	80	80	80	81	82	84	85	84	84	83	83	58	80	80	80
Cogeneration	2104	2104	2109	2116	2122	2120	2127	2125	1502	2117	2117	1057	2108	2097	1975
Imports	754	726	710	712	807	934	892	873	802	748	744	701	803	883	800
Large Thermal	6348	6348	6348	6348	6348	6348	6348	6348	6305	6330	6298	4515	5515	6348	6119
Non-Utility Generation	1399	1400	1299	1227	1234	1215	1204	1213	1230	1388	1387	1357	1551	1473	1316
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	13517	13469	13439	13271	13353	13487	13414	13377	12364	12629	12594	9446	12268	13624	12846
Total Resources	28290	25203	23051	24835	26063	26431	24323	22949	23265	23591	23355	20929	27037	27480	24715
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Hydro Maintenance	-30	-25	-8.6	-9	-3.8	0	0	0	-5.2	-7.4	-7.6	-20	-14	-49	-12
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Transmission Losses	-797	-710	-650	-700	-735	-745	-686	-647	-656	-665	-658	-590	-762	-774	-697
Total Reserves, Maintenance & Losses	-827	-735	-658	-709	-739	-745	-686	-647	-661	-672	-666	-610	-776	-823	-709
Total Net Resources	27463	24469	22392	24126	25325	25686	23637	22302	22604	22919	22689	20319	26261	26657	24007
Surplus/Deficits															
Firm Surplus/Deficit	3955	1025	330	1728	961	-1029	-3466	-3713	-1534	-152	-435	-2171	3084	2636	-81
Total Surplus/Deficit	3955	1025	316	1728	961	-1029	-3470	-3736	-1589	-185	-469	-2171	3084	2636	-92

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Exhibits 22 – 24

Regional Monthly Capacity Analysis Under the 2004 BPA White Book Load Forecast for 1937-Water Conditions

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Exhibit 22: OY 2006 Monthly Capacity

Loads and Resources - Pacific Northwest Region
PNW Loads and Resource Study
2005 - 2006 Operating Year
1937 Water Year
[27] 2004 White Book

12/31/2004

Capacity in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul
Firm Regional Loads														
Regional Firm Loads	25608	25636	24280	26267	28768	31233	32374	31005	28387	26103	26154	25745	25993	26422
Exports	2916	2916	2910	2396	2292	2308	2305	2305	2294	2299	2299	2243	2787	2717
Federal Diversity	-772	-768	-743	-778	-687	-515	-552	-533	-705	-662	-667	-774	-782	-792
Total Firm Regional Loads	27752	27784	26447	27884	30372	33026	34126	32776	29976	27741	27786	27214	27998	28346
Non-Firm Regional Loads														
Regional Non-Firm Loads	25	25	39	25	25	25	28	48	79	59	59	25	25	25
Total Non-Firm Regional Loads	25	25	39	25	25	25	28	48	79	59	59	25	25	25
Total Loads	27777	27809	26486	27909	30397	33051	34155	32824	30055	27800	27845	27239	28023	28371
Hydro Resources														
Regulated Hydro	31082	30866	31173	31068	31284	30941	30373	30519	30473	29832	29592	29643	31105	31179
Independent Hydro	1870	1852	1841	1826	1782	1769	1717	1830	1922	1971	1998	2077	2075	1930
Operational Peaking Adjustment	-2840	-5808	-9346	-7261	-7363	-7986	-10403	-10554	-9256	-8920	-9304	-8246	-6226	-4814
Total Hydro Resources	30111	26910	23668	25632	25704	24724	21687	21795	23138	22883	22286	23473	26953	28295
Other Resources														
Small Thermal & Misc.	30	30	30	30	33	33	33	33	30	30	30	30	30	30
Combustion Turbines	3593	3598	3786	3620	3348	3354	3531	3347	3341	2711	2707	2634	2692	3412
Renewables	84	84	84	85	86	88	89	88	88	87	87	84	84	84
Cogeneration	2210	2210	2215	2222	2229	2214	2234	2231	1597	2223	2223	1417	2213	2189
Imports	1453	1421	1298	1476	1715	1890	1852	1841	1390	1283	1297	1180	1393	1570
Large Thermal	7026	7026	7026	6286	7051	7051	7051	7051	7051	7051	6521	5792	7051	7051
Non-Utility Generation	1364	1364	1264	1174	1137	1111	1082	1111	1149	1303	1303	958	1458	1412
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	15759	15732	15702	14893	15599	15741	15872	15701	14646	14687	14168	12095	14920	15748
Total Resources	45870	42642	39370	40526	41302	40465	37559	37496	37784	37570	36454	35568	41873	44043
Reserves & Maintenance														
Hydro Reserves	-1648	-1636	-1651	-1645	-1653	-1635	-1605	-1617	-1620	-1590	-1580	-1586	-1659	-1655
Small Thermal & Misc. Reserves	-364	-364	-369	-357	-342	-340	-348	-340	-310	-318	-318	-256	-324	-356
Contract Reserves	-67	-62	-59	-87	-55	-65	-61	-59	-41	-42	-44	-55	-60	-66
Large Thermal Reserves	-1054	-1054	-1054	-943	-1058	-1058	-1058	-1058	-1058	-1058	-978	-869	-1058	-1058
Regional Hydro Maintenance	-4595	-4032	-3787	-3208	-2935	-2037	-1561	-2286	-2626	-2751	-2483	-2360	-2202	-3720
Spinning Reserves	-869	-802	-728	-770	-786	-786	-726	-706	-728	-720	-696	-708	-843	-841
Regional Transmission Losses	-1249	-1162	-1063	-1123	-1155	-1157	-1079	-1053	-1052	-1042	-1017	-996	-1197	-1218
Total Reserves, Maintenance & Losses	-9845	-9113	-8711	-8133	-7983	-7078	-6438	-7119	-7435	-7520	-7115	-6830	-7342	-8914
Total Net Resources	36026	33529	30660	32393	33319	33387	31121	30377	30349	30051	29338	28738	34531	35129
Surplus/Deficits														
Firm Surplus/Deficit	8274	5745	4212	4509	2946	361	-3005	-2399	373	2310	1552	1524	6533	6783
Total Surplus/Deficit	8249	5720	4173	4484	2921	336	-3034	-2447	294	2251	1493	1499	6508	6758

Exhibit 23: OY 2010 Monthly Capacity

Loads and Resources - Pacific Northwest Region
PNW Loads and Resource Study
2009 - 2010 Operating Year
1937 Water Year
[27] 2004 White Book

12/31/2004

Capacity in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul
Firm Regional Loads														
Regional Firm Loads	27585	27564	26051	28023	30737	33447	34393	32794	30000	27796	27911	27539	27888	28248
Exports	2009	2009	2005	1904	1824	1833	1830	1831	1825	1840	1840	1761	1974	1981
Federal Diversity	-861	-857	-837	-863	-765	-568	-596	-577	-767	-722	-728	-816	-839	-858
Total Firm Regional Loads	28733	28716	27218	29064	31796	34712	35627	34047	31058	28914	29023	28484	29022	29372
Non-Firm Regional Loads														
Regional Non-Firm Loads	25	25	39	25	25	25	28	48	79	59	59	25	25	25
Total Non-Firm Regional Loads	25	25	39	25	25	25	28	48	79	59	59	25	25	25
Total Loads	28758	28741	27258	29089	31821	34737	35655	34095	31137	28973	29082	28509	29047	29397
Hydro Resources														
Regulated Hydro	31082	30866	31173	31068	31284	30941	30374	30519	30473	29833	29592	29643	31105	31179
Independent Hydro	1870	1852	1841	1826	1782	1769	1717	1830	1922	1971	1998	2077	2075	1930
Operational Peaking Adjustment	-2738	-5651	-9244	-7083	-7165	-7826	-10240	-10423	-9169	-8790	-9171	-8136	-6055	-4632
Total Hydro Resources	30214	27067	23769	25810	25902	24883	21851	21927	23226	23014	22420	23584	27125	28478
Other Resources														
Small Thermal & Misc.	30	30	30	30	33	33	33	33	30	30	30	30	30	30
Combustion Turbines	4000	3795	3983	3817	3545	3551	3728	3544	3538	2908	2904	2182	2889	3609
Renewables	84	84	84	85	86	88	89	88	88	87	87	84	84	84
Cogeneration	2210	2210	2215	2222	2229	2214	2234	2231	1597	2223	2223	1417	2213	2189
Imports	1209	1175	1067	1055	1151	1321	1283	1282	1186	1075	1090	1075	1251	1255
Large Thermal	7080	7080	7080	7080	7080	7080	7080	7080	7080	6410	6410	6492	6550	7080
Non-Utility Generation	1386	1386	1302	1198	1142	1125	1104	1132	1171	1324	1324	1213	1487	1437
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	15999	15760	15762	15487	15266	15413	15551	15390	14690	14057	14069	12493	14504	15684
Total Resources	46212	42827	39531	41297	41168	40296	37402	37317	37916	37071	36488	36077	41629	44162
Reserves & Maintenance														
Hydro Reserves	-1648	-1636	-1651	-1645	-1653	-1635	-1605	-1617	-1620	-1590	-1580	-1586	-1659	-1655
Small Thermal & Misc. Reserves	-385	-375	-381	-368	-352	-351	-359	-351	-321	-329	-328	-246	-335	-367
Contract Reserves	-37	-32	-32	-33	-24	-33	-30	-30	-20	-19	-22	-40	-47	-39
Large Thermal Reserves	-1062	-1062	-1062	-1062	-1062	-1062	-1062	-1062	-1062	-962	-962	-974	-983	-1062
Regional Hydro Maintenance	-4595	-4032	-3787	-3208	-2935	-2037	-1561	-2286	-2626	-2751	-2483	-2360	-2202	-3720
Spinning Reserves	-876	-811	-737	-796	-796	-794	-735	-715	-737	-730	-722	-715	-840	-851
Regional Transmission Losses	-1260	-1168	-1068	-1145	-1151	-1152	-1074	-1047	-1056	-1028	-1018	-1010	-1191	-1222
Total Reserves, Maintenance & Losses	-9863	-9117	-8717	-8257	-7973	-7065	-6426	-7108	-7443	-7408	-7114	-6932	-7257	-8917
Total Net Resources	36349	33711	30814	33041	33195	33231	30976	30209	30473	29663	29374	29146	34372	35245
Surplus/Deficits														
Firm Surplus/Deficit	7617	4994	3595	3976	1399	-1481	-4651	-3838	-584	748	351	662	5350	5874
Total Surplus/Deficit	7592	4969	3556	3951	1374	-1506	-4679	-3886	-664	689	292	637	5325	5849

Exhibit 24: OY 2015 Monthly Capacity

Loads and Resources - Pacific Northwest Region
PNW Loads and Resource Study
2014 - 2015 Operating Year
1937 Water Year
[27] 2004 White Book

12/31/2004

Capacity in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul
Firm Regional Loads														
Regional Firm Loads	30036	30018	28228	30143	33218	36250	37062	35419	32373	29922	29977	29606	29975	30716
Exports	1870	1870	1869	1793	1717	1718	1616	1617	1617	1646	1646	1547	1753	1754
Federal Diversity	-908	-903	-884	-908	-801	-594	-626	-607	-804	-759	-765	-858	-885	-909
Total Firm Regional Loads	30999	30985	29214	31028	34134	37375	38052	36428	33185	30809	30858	30295	30843	31561
Non-Firm Regional Loads														
Regional Non-Firm Loads	25	25	39	25	25	25	28	48	79	59	59	25	25	25
Total Non-Firm Regional Loads	25	25	39	25	25	25	28	48	79	59	59	25	25	25
Total Loads	31024	31010	29253	31053	34159	37400	38081	36476	33265	30868	30917	30320	30868	31586
Hydro Resources														
Regulated Hydro	31082	30867	31173	31068	31284	30941	30374	30520	30473	29833	29592	29644	31105	31180
Independent Hydro	1870	1852	1841	1826	1783	1769	1717	1830	1922	1971	1999	2077	2075	1930
Operational Peaking Adjustment	-2676	-5551	-9182	-6982	-7049	-7736	-10145	-10346	-9110	-8703	-9094	-8067	-5961	-4522
Total Hydro Resources	30276	27167	23831	25911	26018	24974	21946	22003	23285	23101	22497	23654	27219	28588
Other Resources														
Small Thermal & Misc.	30	30	30	30	33	33	33	33	30	30	30	30	30	30
Combustion Turbines	4000	3795	3983	3817	3545	3551	3728	3544	3538	2908	2904	2424	2889	3609
Renewables	84	84	84	85	86	88	89	88	88	87	87	84	84	84
Cogeneration	2210	2210	2215	2222	2229	2214	2234	2231	1597	2223	2223	1417	2213	2189
Imports	981	945	910	897	958	1133	1098	1101	1033	917	933	928	1082	1099
Large Thermal	7080	7080	7080	7080	7080	7080	7080	7080	7080	7080	7080	4672	5930	7080
Non-Utility Generation	1387	1387	1303	1198	1151	1134	1113	1142	1180	1334	1334	1215	1481	1438
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	15772	15531	15606	15330	15082	15234	15376	15219	14547	14579	14591	10770	13709	15529
Total Resources	46047	42698	39437	41242	41099	40207	37322	37222	37832	37681	37089	34424	40927	44117
Reserves & Maintenance														
Hydro Reserves	-1648	-1636	-1651	-1645	-1653	-1635	-1605	-1617	-1620	-1590	-1580	-1586	-1659	-1655
Small Thermal & Misc. Reserves	-386	-375	-381	-368	-352	-351	-360	-352	-322	-329	-329	-259	-335	-367
Contract Reserves	-27	-21	-21	-22	-29	-38	-34	-34	-24	-24	-26	-30	-37	-29
Large Thermal Reserves	-1062	-1062	-1062	-1062	-1062	-1062	-1062	-1062	-1062	-1062	-1062	-701	-890	-1062
Regional Hydro Maintenance	-4595	-4032	-3787	-3208	-2935	-2037	-1561	-2286	-2626	-2751	-2483	-2360	-2202	-3720
Spinning Reserves	-875	-811	-736	-797	-800	-798	-738	-718	-740	-733	-725	-681	-822	-852
Regional Transmission Losses	-1255	-1164	-1065	-1144	-1148	-1149	-1071	-1044	-1053	-1045	-1035	-965	-1172	-1220
Total Reserves, Maintenance & Losses	-9847	-9102	-8703	-8245	-7979	-7070	-6431	-7113	-7447	-7534	-7239	-6581	-7116	-8906
Total Net Resources	36200	33596	30734	32996	33120	33137	30891	30110	30386	30147	29850	27843	33811	35211
Surplus/Deficits														
Firm Surplus/Deficit	5202	2610	1520	1968	-1013	-4238	-7161	-6319	-2799	-662	-1009	-2453	2968	3650
Total Surplus/Deficit	5177	2585	1481	1943	-1038	-4263	-7190	-6367	-2879	-721	-1067	-2478	2943	3625

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Exhibits 25 – 34

Regional Energy Surpluses and Deficits for 50-Historical Water Conditions

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Exhibit 25: OY 2006 Monthly 50-WY Energy

Regional Surplus/Deficit by Water Year
PNW Loads and Resource Study
2005 - 2006 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Regional Surplus/Deficit	7754	3959	2672	3851	3850	2012	1931	-1347	610	1134	1410	450	6899	5257	2776
1930 Regional Surplus/Deficit	4424	2992	2069	3604	3449	1725	-952	882	622	1797	1441	-119	5481	5275	2280
1931 Regional Surplus/Deficit	5133	3377	2332	3578	3511	1522	-663	-1416	404	2054	924	76	4637	4028	1979
1932 Regional Surplus/Deficit	4751	2463	2123	3269	3284	1596	-442	-1227	3356	7923	11377	9452	11727	7820	4518
1933 Regional Surplus/Deficit	7815	6048	2745	3829	4169	3987	7201	5288	768	3964	4884	6668	15962	13146	6260
1934 Regional Surplus/Deficit	7452	7474	4086	6971	7255	12135	13530	10591	7551	12872	11473	8636	5109	6426	8494
1935 Regional Surplus/Deficit	4091	1909	1955	3610	4233	3275	6641	7242	-218	2825	5762	5601	9702	7804	4762
1936 Regional Surplus/Deficit	6660	4037	2383	3640	3455	1587	192	-1053	1143	1795	5912	11730	9056	5482	3901
1937 Regional Surplus/Deficit	6062	3197	2273	3590	3393	1830	-879	-1286	496	1856	1389	405	5883	4865	2235
1938 Regional Surplus/Deficit	5408	2490	2141	4158	4247	2774	7973	2061	4983	6661	8067	10510	10354	7241	5646
1939 Regional Surplus/Deficit	5080	2828	3016	3930	3755	2209	3670	-395	1764	3182	4646	7634	5955	5948	3780
1940 Regional Surplus/Deficit	6427	3337	2226	4061	3367	2657	2184	1635	5522	4763	5917	4763	6393	3973	3917
1941 Regional Surplus/Deficit	4522	2647	2041	3713	3235	2908	2757	-828	697	837	1437	1104	5827	3215	2449
1942 Regional Surplus/Deficit	4330	2757	2456	3455	2695	6135	6932	314	-438	2208	3597	4543	11679	8647	4405
1943 Regional Surplus/Deficit	7470	5941	2665	3644	4085	3370	6544	5672	6253	13104	11558	10518	12316	10225	7027
1944 Regional Surplus/Deficit	7732	6181	2931	4104	3812	2313	2848	-825	-51	1158	1107	-312	4207	3039	2513
1945 Regional Surplus/Deficit	4626	2040	2090	2945	3100	1739	-356	-41	344	1414	1471	5326	10259	5965	3012
1946 Regional Surplus/Deficit	4926	4032	2138	4216	4186	2831	4893	4699	6702	7990	10038	11250	11223	8964	6216
1947 Regional Surplus/Deficit	7965	5629	3310	4024	4435	8307	8542	7543	7193	5585	8318	8693	10213	7817	6986
1948 Regional Surplus/Deficit	7907	4362	3029	8916	6396	5745	8424	2631	3865	5522	9158	12533	16943	9881	7653
1949 Regional Surplus/Deficit	7614	8462	4732	4712	4059	3333	3951	2615	8685	5686	11014	10942	10223	5010	6221
1950 Regional Surplus/Deficit	5100	2272	1907	4170	4426	2124	5488	8067	10167	10174	10092	8825	15743	11096	7153
1951 Regional Surplus/Deficit	7350	7911	3839	6626	7749	10705	11463	12411	8003	10098	10888	11226	9403	10072	9135
1952 Regional Surplus/Deficit	7534	7558	4349	7786	4769	6849	7711	5622	5333	9721	10931	12705	10765	6809	7547
1953 Regional Surplus/Deficit	7524	4095	2756	3653	3710	1892	4331	7476	1729	1511	4733	8677	15034	10489	5723
1954 Regional Surplus/Deficit	8049	5844	3361	4584	4468	5410	6633	8049	4859	8960	7425	9422	14024	12491	7370
1955 Regional Surplus/Deficit	9703	8199	8322	5736	5678	4923	1912	-40	-71	3544	2138	4219	16209	14022	6059
1956 Regional Surplus/Deficit	7642	8139	3241	6272	6640	9428	12447	6648	8943	10589	13801	12892	17015	10758	9531
1957 Regional Surplus/Deficit	8311	6967	3445	5324	4079	5744	5630	1778	4067	10695	7745	12085	15709	6706	6785
1958 Regional Surplus/Deficit	5776	3355	2560	4109	3834	2748	5317	5859	4790	3853	8517	11043	12981	6001	5833
1959 Regional Surplus/Deficit	5785	3945	2835	4060	5627	6924	11184	8417	4718	8166	6996	7771	13857	11252	7424
1960 Regional Surplus/Deficit	7432	6464	8316	10170	8304	8185	7456	3068	4599	13393	9857	7090	11264	8205	7936
1961 Regional Surplus/Deficit	7929	4149	2941	4230	4890	3387	6239	7090	6011	7588	7139	7910	15008	7171	6523
1962 Regional Surplus/Deficit	6053	4496	2166	4087	3934	2167	5510	889	674	10237	11156	7257	9259	8340	5021
1963 Regional Surplus/Deficit	7262	5230	2706	5194	5733	6905	5799	4776	2936	3767	4164	8280	10282	7810	5886
1964 Regional Surplus/Deficit	8213	5659	3467	3849	4498	2779	5577	2215	738	5652	5596	6568	16404	13050	5976
1965 Regional Surplus/Deficit	7909	7490	4833	5914	4534	9811	13183	10967	7858	7326	11153	10593	12145	7587	8697
1966 Regional Surplus/Deficit	7832	7157	3631	4955	4445	4803	7418	1522	1550	8469	5294	6945	8423	8695	5563
1967 Regional Surplus/Deficit	7751	5314	2481	3875	4102	3894	8364	9599	2925	7162	4709	5209	15377	11249	6629
1968 Regional Surplus/Deficit	7478	6482	3544	5180	4547	4704	7503	6637	5247	1191	4012	4716	11549	10103	6109
1969 Regional Surplus/Deficit	7670	7149	5707	6590	6520	6620	10936	8485	5699	12178	11321	12747	11432	8271	8514
1970 Regional Surplus/Deficit	7757	4207	2971	4317	4259	3026	6635	6077	1706	2302	5261	7054	12643	5136	5299
1971 Regional Surplus/Deficit	5515	3450	2388	4177	4525	3088	10062	13068	7313	8779	10004	12930	15876	11924	8269
1972 Regional Surplus/Deficit	8357	8587	4032	4606	4753	5250	9602	12346	13012	14129	8339	12514	16613	12587	9585
1973 Regional Surplus/Deficit	9325	8030	4914	4693	4178	5940	7862	-216	723	706	1857	1394	6315	5034	4233
1974 Regional Surplus/Deficit	4627	2189	1823	3295	3799	7562	14631	13279	9855	11800	12646	11666	17123	15093	9480
1975 Regional Surplus/Deficit	8597	8536	4727	3616	4119	3881	7114	4709	6802	5320	6055	8925	13632	12880	7055
1976 Regional Surplus/Deficit	6331	5142	3736	5838	7280	11957	11668	8664	5955	11490	9423	11791	10217	11905	8767
1977 Regional Surplus/Deficit	10985	10265	9388	4762	3709	2220	2775	-936	-576	288	292	526	3458	2815	3255
1978 Regional Surplus/Deficit	4605	2057	1624	2559	3714	3176	5505	2683	6641	5622	7108	8229	9027	9027	5157
Top Ten Percent	6861	6394	3334	5327	6044	8980	11962	10670	9154	11621	11019	12018	14074	12083	9299
Middle Eighty Percent	7009	5153	3478	4671	4479	4372	6199	4302	3863	6081	6954	8009	11511	8394	5990
Bottom Ten Percent	5575	3679	2329	3718	3480	2060	622	-695	434	1541	1260	231	5207	4084	2291

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Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Regional Surplus/Deficit	7486	3460	1885	3986	3982	2093	2132	-1130	831	1322	1513	-688	5758	5362	2592
1930 Regional Surplus/Deficit	4141	2493	1283	3735	3585	1808	-760	1104	845	1989	1543	-1260	4341	5385	2096
1931 Regional Surplus/Deficit	4855	2881	1545	3708	3646	1606	-470	-1198	626	2248	1023	-1061	3499	4139	1795
1932 Regional Surplus/Deficit	4475	1969	1336	3400	3418	1673	-251	-1010	3583	8129	11507	8335	10599	7935	4338
1933 Regional Surplus/Deficit	7540	5552	1960	3964	4304	4068	7417	5530	995	4165	4994	5541	14843	13273	6085
1934 Regional Surplus/Deficit	7179	6986	3307	7114	7390	12238	13763	10844	7794	13091	11607	7524	3962	6537	8325
1935 Regional Surplus/Deficit	3814	1415	1172	3742	4366	3354	6855	7487	12	3022	5877	4471	8565	7920	4584
1936 Regional Surplus/Deficit	6389	3542	1598	3774	3591	1670	392	-835	1366	1985	6028	10615	7923	5593	3721
1937 Regional Surplus/Deficit	5784	2699	1485	3722	3529	1912	-685	-1067	719	2047	1490	-738	4736	4973	2050
1938 Regional Surplus/Deficit	5130	1997	1354	4291	4384	2856	8186	2294	5216	6863	8184	9396	9218	7355	5470
1939 Regional Surplus/Deficit	4799	2322	2232	4066	3888	2290	3880	-172	1990	3378	4759	6510	4811	6057	3598
1940 Regional Surplus/Deficit	6153	2840	1439	4197	3504	2738	2384	1858	5759	4959	6042	3634	5251	4081	3737
1941 Regional Surplus/Deficit	4243	2151	1255	3848	3371	2992	2954	-608	920	1035	1551	-29	4685	3319	2266
1942 Regional Surplus/Deficit	4047	2258	1669	3588	2830	6217	7156	537	-217	2402	3708	3413	10550	8766	4226
1943 Regional Surplus/Deficit	7198	5443	1879	3779	4218	3450	6759	5904	6490	13317	11684	9404	11186	10343	6853
1944 Regional Surplus/Deficit	7451	5683	2143	4239	3944	2393	3050	-608	169	1346	1213	-1447	3062	3141	2328
1945 Regional Surplus/Deficit	4342	1540	1303	3076	3233	1819	-165	177	564	1603	1569	4200	9126	6079	2828
1946 Regional Surplus/Deficit	4641	3530	1351	4348	4321	2914	5096	4930	6941	8192	10161	10138	10093	9080	6039
1947 Regional Surplus/Deficit	7692	5133	2526	4160	4569	8388	8769	7782	7432	5786	8435	7575	9086	7933	6812
1948 Regional Surplus/Deficit	7629	3858	2243	9063	6530	5834	8644	2858	4102	5720	9279	11425	15829	10008	7482
1949 Regional Surplus/Deficit	7337	7971	3949	4850	4192	3412	4161	2837	8929	5887	11139	9824	9087	5117	6044
1950 Regional Surplus/Deficit	4817	1769	1119	4302	4560	2206	5701	8304	10414	10382	10216	7706	14624	11217	6979
1951 Regional Surplus/Deficit	7067	7417	3054	6767	7882	10800	11692	12665	8244	10305	11014	10114	8265	10193	8965
1952 Regional Surplus/Deficit	7257	7063	3567	7930	4905	6935	7929	5860	5564	9929	11056	11597	9632	6924	7375
1953 Regional Surplus/Deficit	7247	3588	1969	3786	3844	1974	4527	7720	1962	1707	4843	7553	13910	10609	5546
1954 Regional Surplus/Deficit	7772	5346	2577	4722	4603	5491	6848	8294	5094	9163	7541	8308	12902	12616	7197
1955 Regional Surplus/Deficit	9433	7707	7553	5877	5813	5009	2113	179	150	3742	2258	3084	15093	14153	5883
1956 Regional Surplus/Deficit	7367	7649	2456	6412	6771	9520	12677	6891	9183	10800	13935	11783	15899	10880	9362
1957 Regional Surplus/Deficit	8035	6469	2660	5462	4212	5826	5841	2000	4301	10902	7866	10979	14591	6816	6610
1958 Regional Surplus/Deficit	5494	2850	1773	4244	3968	2826	5527	6091	5029	4049	8635	9926	11860	6109	5656
1959 Regional Surplus/Deficit	5502	3445	2049	4197	5761	7009	11411	8667	4949	8371	7113	6651	12737	11371	7251
1960 Regional Surplus/Deficit	7157	5969	7545	10319	8440	8277	7681	3300	4832	13614	9982	5965	10133	8320	7764
1961 Regional Surplus/Deficit	7655	3646	2157	4367	5026	3466	6451	7332	6251	7792	7251	6793	13890	7283	6349
1962 Regional Surplus/Deficit	5776	4001	1378	4223	4067	2246	5720	1119	896	10441	11287	6133	8123	8457	4843
1963 Regional Surplus/Deficit	6987	4731	1919	5333	5868	6992	6016	5014	3159	3966	4281	7155	9154	7926	5710
1964 Regional Surplus/Deficit	7938	5159	2684	3985	4631	2857	5788	2446	960	5848	5707	5442	15286	13180	5799
1965 Regional Surplus/Deficit	7632	6994	4052	6056	4670	9895	13415	11218	8098	7527	11280	9478	11014	7699	8526
1966 Regional Surplus/Deficit	7553	6654	2848	5093	4581	4883	7633	1756	1773	8681	5411	5822	7287	8813	5387
1967 Regional Surplus/Deficit	7481	4815	1695	4010	4236	3974	8582	9848	3158	7366	4818	4080	14260	11370	6454
1968 Regional Surplus/Deficit	7205	5988	2761	5318	4683	4785	7718	6879	5483	1382	4126	3582	10425	10219	5934
1969 Regional Surplus/Deficit	7397	6653	4930	6732	6655	6707	11162	8736	5933	12390	11449	11639	10307	8386	8344
1970 Regional Surplus/Deficit	7479	3708	2185	4454	4392	3105	6841	6317	1936	2496	5380	5926	11511	5246	5120
1971 Regional Surplus/Deficit	5232	2943	1600	4310	4657	3170	10282	13323	7551	8983	10129	11823	14757	12047	8097
1972 Regional Surplus/Deficit	8082	8095	3250	4742	4888	5331	9820	12599	13264	14347	8460	11405	15496	12716	9417
1973 Regional Surplus/Deficit	9054	7538	4132	4830	4312	6023	8078	5.1	945	900	1968	256	5176	5142	4052
1974 Regional Surplus/Deficit	4349	1691	1035	3425	3932	7643	14865	13534	10102	12012	12778	10553	16007	15225	9311
1975 Regional Surplus/Deficit	8320	8044	3946	3751	4251	3961	7328	4948	7038	5521	6168	7804	12505	13008	6880
1976 Regional Surplus/Deficit	6049	4637	2953	5978	7413	12056	11897	8911	6195	11703	9546	10680	9081	12030	8597
1977 Regional Surplus/Deficit	10716	9774	8622	4901	3841	2301	2978	-718	-357	476	399	-609	2312	2919	3073
1978 Regional Surplus/Deficit	4327	1561	837	2690	3847	3252	5711	2909	6881	5827	7225	7107	7887	9144	4978
Top Ten Percent	6583	5898	2549	5465	6177	9070	12190	10920	9398	11833	11147	10907	12949	12209	9130
Middle Eighty Percent	6733	4656	2694	4807	4614	4455	6412	4536	4095	6282	7072	6888	10382	8510	5814
Bottom Ten Percent	5295	3182	1542	3851	3615	2142	818	-475	656	1733	1364	-907	4065	4191	2107

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Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Regional Surplus/Deficit	7707	3888	2589	3950	3583	1788	1794	-1348	567	1057	1480	79	6817	5246	2677
1930 Regional Surplus/Deficit	4347	2922	1987	3694	3193	1507	-1109	891	584	1725	1503	-493	5412	5276	2183
1931 Regional Surplus/Deficit	5068	3314	2248	3665	3252	1308	-818	-1413	365	1986	986	-288	4580	4031	1884
1932 Regional Surplus/Deficit	4686	2398	2043	3360	3023	1366	-602	-1225	3319	7886	11517	9134	11687	7834	4432
1933 Regional Surplus/Deficit	7761	5992	2666	3929	3908	3765	7103	5351	741	3927	4975	6336	15933	13195	6188
1934 Regional Surplus/Deficit	7401	7442	4024	7091	6993	11958	13465	10677	7560	12865	11612	8341	5030	6428	8435
1935 Regional Surplus/Deficit	4024	1843	1884	3701	3968	3048	6538	7313	-236	2766	5859	5251	9634	7823	4681
1936 Regional Surplus/Deficit	6613	3975	2305	3738	3198	1372	52	-1050	1103	1726	5995	11415	9008	5486	3815
1937 Regional Surplus/Deficit	5996	3127	2188	3684	3137	1613	-1030	-1279	460	1786	1455	20	5793	4859	2136
1938 Regional Surplus/Deficit	5342	2430	2060	4253	3993	2552	7867	2098	4964	6616	8165	10202	10287	7254	5567
1939 Regional Surplus/Deficit	5010	2748	2939	4029	3490	1983	3557	-382	1729	3119	4727	7296	5880	5946	3689
1940 Regional Surplus/Deficit	6372	3270	2143	4162	3113	2435	2044	1643	5510	4695	6036	4408	6320	3968	3828
1941 Regional Surplus/Deficit	4451	2581	1959	3812	2977	2691	2607	-824	657	783	1537	749	5748	3200	2354
1942 Regional Surplus/Deficit	4252	2687	2370	3546	2431	5908	6854	325	-481	2137	3676	4189	11629	8674	4318
1943 Regional Surplus/Deficit	7425	5883	2583	3743	3818	3138	6434	5692	6235	13076	11670	10212	12257	10237	6948
1944 Regional Surplus/Deficit	7671	6128	2843	4202	3544	2083	2711	-828	-96	1078	1185	-673	4121	3018	2413
1945 Regional Surplus/Deficit	4548	1966	2007	3034	2835	1515	-518	-44	299	1337	1529	4973	10194	5977	2913
1946 Regional Surplus/Deficit	4845	3962	2053	4306	3923	2606	4753	4726	6694	7948	10149	10950	11183	8981	6136
1947 Regional Surplus/Deficit	7918	5571	3232	4120	4169	8068	8466	7583	7190	5544	8424	8370	10177	7835	6911
1948 Regional Surplus/Deficit	7847	4288	2948	9044	6129	5537	8325	2645	3857	5472	9268	12232	16926	9930	7584
1949 Regional Surplus/Deficit	7560	8427	4657	4816	3794	3103	3835	2621	8683	5635	11135	10616	10164	5002	6139
1950 Regional Surplus/Deficit	5022	2192	1820	4261	4162	1902	5378	8105	10179	10134	10209	8509	15716	11124	7078
1951 Regional Surplus/Deficit	7284	7867	3758	6736	7476	10504	11390	12489	7999	10060	11013	10924	9336	10103	9069
1952 Regional Surplus/Deficit	7480	7512	4277	7906	4510	6628	7611	5663	5308	9677	11039	12403	10707	6823	7474
1953 Regional Surplus/Deficit	7468	4016	2670	3747	3449	1671	4173	7530	1712	1459	4819	8348	14991	10515	5641
1954 Regional Surplus/Deficit	7996	5787	3284	4689	4208	5184	6526	8108	4847	8920	7517	9117	14004	12533	7301
1955 Regional Surplus/Deficit	9667	8161	8283	5850	5418	4712	1775	-36	-110	3486	2244	3863	16194	14079	5984
1956 Regional Surplus/Deficit	7590	8102	3162	6383	6369	9219	12375	6699	8933	10567	13936	12590	16996	10793	9468
1957 Regional Surplus/Deficit	8259	6916	3365	5428	3813	5517	5517	1783	4046	10652	7856	11786	15688	6707	6708
1958 Regional Surplus/Deficit	5704	3276	2476	4206	3571	2515	5201	5884	4789	3795	8616	10717	12958	5996	5751
1959 Regional Surplus/Deficit	5711	3875	2752	4162	5360	6703	11104	8494	4696	8135	7105	7458	13833	11279	7354
1960 Regional Surplus/Deficit	7382	6415	8272	10299	8041	7985	7381	3101	4578	13395	9989	6762	11213	8221	7870
1961 Regional Surplus/Deficit	7881	4073	2866	4335	4630	3159	6132	7142	6010	7556	7238	7608	14997	7177	6453
1962 Regional Surplus/Deficit	5991	4435	2081	4189	3668	1938	5397	914	632	10190	11295	6930	9197	8361	4939
1963 Regional Surplus/Deficit	7212	5167	2623	5298	5469	6689	5701	4811	2896	3714	4267	7934	10227	7828	5805
1964 Regional Surplus/Deficit	8163	5596	3392	3948	4232	2550	5466	2248	699	5582	5686	6228	16375	13104	5896
1965 Regional Surplus/Deficit	7857	7442	4763	6030	4277	9576	13110	11034	7849	7277	11269	10278	12081	7591	8626
1966 Regional Surplus/Deficit	7778	7098	3553	5060	4186	4572	7314	1564	1511	8446	5397	6613	8364	8718	5485
1967 Regional Surplus/Deficit	7709	5245	2399	3974	3838	3669	8267	9674	2913	7134	4803	4866	15354	11281	6557
1968 Regional Surplus/Deficit	7431	6436	3469	5284	4286	4475	7397	6687	5237	1120	4113	4355	11513	10122	6031
1969 Regional Surplus/Deficit	7625	7100	5645	6703	6255	6407	10852	8558	5676	12156	11450	12448	11403	8287	8450
1970 Regional Surplus/Deficit	7697	4140	2890	4421	3996	2795	6500	6119	1682	2246	5379	6709	12575	5134	5213
1971 Regional Surplus/Deficit	5444	3369	2297	4270	4256	2857	9956	13143	7298	8731	10124	12627	15842	11954	8194
1972 Regional Surplus/Deficit	8309	8550	3956	4706	4488	5019	9495	12418	13030	14124	8457	12210	16586	12640	9522
1973 Regional Surplus/Deficit	9286	7993	4841	4796	3912	5713	7754	-210	683	645	1951	1024	6248	5030	4144
1974 Regional Surplus/Deficit	4560	2118	1738	3379	3528	7326	14561	13361	9862	11774	12778	11354	17098	15147	9414
1975 Regional Surplus/Deficit	8547	8500	4656	3712	3851	3649	7005	4755	6785	5278	6150	8598	13575	12919	6979
1976 Regional Surplus/Deficit	6266	5075	3659	5944	7009	11758	11590	8729	5946	11464	9538	11482	10146	11944	8698
1977 Regional Surplus/Deficit	10957	10235	9357	4870	3442	1993	2642	-936	-619	213	376	173	3379	2799	3166
1978 Regional Surplus/Deficit	4536	1990	1541	2646	3446	2930	5373	2693	6638	5592	7218	7905	8951	9044	5070
Top Ten Percent	6802	6342	3255	5430	5774	8766	11882	10739	9154	11598	11144	11712	14032	12125	9234
Middle Eighty Percent	6953	5094	3402	4773	4216	4148	6087	4336	3842	6033	7058	7681	11463	8411	5911
Bottom Ten Percent	5507	3614	2245	3811	3221	1840	472	-691	394	1472	1333	-137	5131	4077	2194

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Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Regional Surplus/Deficit	7436	3208	1941	3592	3321	1331	1281	-1831	170	408	891	-906	5594	4827	2108
1930 Regional Surplus/Deficit	4071	2243	1339	3333	2934	1051	-1628	412	188	1078	914	-1480	4189	4859	1613
1931 Regional Surplus/Deficit	4795	2636	1599	3303	2993	853	-1336	-1896	-32	1341	396	-1272	3358	3615	1314
1932 Regional Surplus/Deficit	4413	1718	1394	2999	2763	907	-1120	-1708	2926	7244	10944	8161	10471	7418	3864
1933 Regional Surplus/Deficit	7489	5316	2019	3571	3648	3309	6600	4883	349	3285	4394	5361	14720	12783	5624
1934 Regional Surplus/Deficit	7130	6769	3380	6737	6733	11513	12963	10212	7174	12227	11039	7370	3804	6011	7873
1935 Regional Surplus/Deficit	3750	1164	1238	3341	3707	2590	6033	6846	-627	2122	5280	4272	8415	7408	4115
1936 Regional Surplus/Deficit	6342	3299	1658	3379	2939	917	-461	-1533	708	1079	5416	10442	7792	5069	3248
1937 Regional Surplus/Deficit	5723	2448	1539	3324	2878	1158	-1547	-1761	64	1139	868	-968	4567	4441	1565
1938 Regional Surplus/Deficit	5069	1753	1412	3893	3734	2097	7362	1624	4575	5974	7588	9230	9069	6839	5002
1939 Regional Surplus/Deficit	4737	2068	2293	3671	3229	1526	3050	-861	1334	2475	4145	6320	4656	5529	3122
1940 Regional Surplus/Deficit	6100	2591	1495	3804	2854	1979	1530	1163	5122	4050	5461	3429	5097	3551	3260
1941 Regional Surplus/Deficit	4178	1902	1310	3453	2718	2237	2092	-1305	261	140	957	-232	4526	2781	1786
1942 Regional Surplus/Deficit	3978	2009	1721	3186	2171	5451	6353	-154	-878	1492	3095	3210	10412	8260	3752
1943 Regional Surplus/Deficit	7154	5207	1935	3384	3557	2681	5929	5217	5847	12436	11094	9240	11040	9822	6383
1944 Regional Surplus/Deficit	7400	5453	2194	3843	3283	1626	2199	-1311	-494	429	599	-1656	2896	2598	1843
1945 Regional Surplus/Deficit	4273	1286	1358	2673	2574	1058	-1037	-526	-99	688	938	3996	8976	5561	2344
1946 Regional Surplus/Deficit	4570	3285	1404	3945	3663	2151	4241	4251	6307	7306	9573	9978	9968	8566	5570
1947 Regional Surplus/Deficit	7647	4895	2585	3762	3909	7611	7964	7114	6803	4902	7848	7397	8962	7420	6348
1948 Regional Surplus/Deficit	7575	3610	2300	8692	5870	5085	7822	2168	3470	4829	8692	11260	15711	9519	7021
1949 Regional Surplus/Deficit	7289	7754	4012	4459	3533	2645	3327	2141	8296	4992	10560	9642	8946	4585	5574
1950 Regional Surplus/Deficit	4747	1511	1171	3901	3902	1447	4872	7633	9794	9492	9634	7537	14502	10711	6514
1951 Regional Surplus/Deficit	7012	7193	3111	6381	7216	10056	10889	12024	7612	9418	10439	9952	8118	9690	8507
1952 Regional Surplus/Deficit	7209	6838	3632	7552	4250	6175	7108	5193	4917	9035	10463	11431	9489	6408	6911
1953 Regional Surplus/Deficit	7197	3338	2022	3388	3188	1216	3657	7062	1322	816	4239	7373	13775	10101	5075
1954 Regional Surplus/Deficit	7725	5112	2637	4332	3949	4728	6021	7641	4458	8278	6938	8145	12791	12121	6737
1955 Regional Surplus/Deficit	9398	7488	7644	5495	5159	4258	1262	-518	-507	2842	1668	2883	14980	13667	5419
1956 Regional Surplus/Deficit	7319	7428	2515	6027	6108	8769	11873	6231	8545	9928	13362	11618	15782	10380	8906
1957 Regional Surplus/Deficit	7988	6241	2719	5072	3552	5061	5011	1303	3656	10010	7280	10814	14474	6290	6143
1958 Regional Surplus/Deficit	5430	2596	1828	3848	3311	2057	4694	5410	4403	3151	8039	9743	11745	5578	5185
1959 Regional Surplus/Deficit	5437	3197	2104	3805	5100	6249	10603	8028	4305	7494	6528	6486	12619	10865	6791
1960 Regional Surplus/Deficit	7111	5740	7632	9947	7782	7535	6879	2627	4187	12757	9414	5788	9996	7806	7307
1961 Regional Surplus/Deficit	7610	3393	2219	3977	4370	2702	5626	6674	5623	6915	6659	6636	13783	6761	5888
1962 Regional Surplus/Deficit	5718	3758	1432	3831	3407	1480	4890	438	235	9547	10722	5956	7979	7946	4372
1963 Regional Surplus/Deficit	6941	4491	1975	4942	5210	6236	5198	4341	2500	3071	3688	6958	9010	7413	5240
1964 Regional Surplus/Deficit	7892	4920	2746	3590	3971	2092	4959	1773	302	4936	5106	5253	15161	12692	5330
1965 Regional Surplus/Deficit	7586	6768	4118	5676	4018	9121	12608	10568	7462	6634	10694	9306	10864	7175	8063
1966 Regional Surplus/Deficit	7507	6423	2907	4703	3928	4115	6810	1091	1115	7806	4819	5639	7145	8304	4920
1967 Regional Surplus/Deficit	7439	4566	1750	3615	3577	3212	7764	9208	2524	6494	4223	3891	14140	10869	5993
1968 Regional Surplus/Deficit	7160	5762	2823	4927	4027	4019	6893	6219	4850	473	3533	3374	10299	9708	5467
1969 Regional Surplus/Deficit	7355	6426	5003	6349	5995	5953	10350	8092	5287	11516	10876	11476	10189	7872	7888
1970 Regional Surplus/Deficit	7425	3462	2242	4064	3735	2338	5990	5650	1290	1602	4803	5732	11357	4717	4647
1971 Regional Surplus/Deficit	5171	2689	1648	3910	3994	2400	9452	12678	6909	8089	9549	11656	14628	11541	7630
1972 Regional Surplus/Deficit	8039	7877	3310	4348	4227	4562	8991	11953	12645	13487	7882	11239	15372	12228	8960
1973 Regional Surplus/Deficit	9016	7321	4195	4439	3651	5257	7250	-691	286	-1.3	1368	40	5026	4612	3576
1974 Regional Surplus/Deficit	4287	1437	1088	3018	3267	6870	14060	12895	9476	11135	12205	10382	15884	14736	8851
1975 Regional Surplus/Deficit	8276	7827	4011	3353	3589	3191	6500	4285	6396	4635	5571	7624	12359	12507	6414
1976 Regional Surplus/Deficit	5994	4399	3013	5588	6749	11311	11089	8262	5558	10825	8963	10510	8928	11532	8136
1977 Regional Surplus/Deficit	10689	9563	8718	4513	3180	1537	2130	-1419	-1018	-437	-209	-810	2154	2378	2597
1978 Regional Surplus/Deficit	4262	1311	892	2285	3185	2471	4862	2216	6251	4952	6642	6932	7731	8629	4503
Top Ten Percent	6530	5667	2607	5072	5513	8314	11380	10273	8767	10959	10570	10740	12817	11713	8672
Middle Eighty Percent	6681	4417	2755	4415	3956	3693	5581	3863	3451	5390	6480	6707	10246	7996	5345
Bottom Ten Percent	5233	2936	1596	3452	2961	1385	-44	-1172	-2.4	825	747	-1121	3907	3659	1624

Exhibit 29: OY 2010 Monthly 50-WY Energy

Regional Surplus/Deficit by Water Year
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Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Regional Surplus/Deficit	7140	3264	2021	3358	2773	762	932	-2252	-233	-422	151	84	5849	4462	1902
1930 Regional Surplus/Deficit	3771	2299	1419	3097	2388	483	-1983	-5.4	-214	250	172	-490	4445	4494	1407
1931 Regional Surplus/Deficit	4497	2694	1678	3067	2446	285	-1690	-2316	-435	515	-346	-280	3615	3251	1108
1932 Regional Surplus/Deficit	4115	1774	1474	2764	2216	335	-1475	-2129	2526	6421	10219	9163	10735	7056	3661
1933 Regional Surplus/Deficit	7192	5377	2100	3338	3101	2740	6260	4478	-51	2463	3662	6362	14985	12425	5424
1934 Regional Surplus/Deficit	6834	6833	3465	6508	6187	10956	12625	9810	6782	11409	10314	8374	4056	5647	7675
1935 Regional Surplus/Deficit	3452	1221	1320	3105	3160	2019	5692	6443	-1025	1297	4550	5269	8674	7047	3914
1936 Regional Surplus/Deficit	6046	3358	1740	3145	2392	349	-812	-1953	306	252	4684	11444	8054	4706	3045
1937 Regional Surplus/Deficit	5425	2505	1619	3089	2332	589	-1901	-2180	-338	311	128	19	4820	4077	1359
1938 Regional Surplus/Deficit	4771	1811	1492	3658	3188	1529	7020	1213	4179	5151	6858	10234	9329	6477	4801
1939 Regional Surplus/Deficit	4438	2125	2374	3438	2682	956	2706	-1279	934	1650	3411	7320	4910	5165	2918
1940 Regional Surplus/Deficit	5803	2648	1575	3571	2308	1410	1180	745	4728	3225	4734	4426	5352	3187	3057
1941 Regional Surplus/Deficit	3879	1960	1391	3220	2172	1669	1739	-1724	-142	-684	225	763	4782	2415	1581
1942 Regional Surplus/Deficit	3678	2066	1801	2951	1625	4882	6014	-570	-1282	666	2362	4206	10674	7900	3549
1943 Regional Surplus/Deficit	6858	5267	2016	3151	3009	2111	5587	4805	5452	11616	10367	10244	11302	9460	6183
1944 Regional Surplus/Deficit	7102	5514	2274	3610	2734	1056	1850	-1732	-899	-401	-139	-663	3150	2230	1637
1945 Regional Surplus/Deficit	3974	1342	1438	2437	2027	488	-1393	-946	-503	-141	196	4994	9237	5199	2139
1946 Regional Surplus/Deficit	4269	3344	1484	3710	3116	1582	3892	3839	5913	6484	8845	10982	10231	8204	5369
1947 Regional Surplus/Deficit	7351	4955	2667	3529	3361	7041	7626	6706	6409	4079	7119	8399	9225	7058	6148
1948 Regional Surplus/Deficit	7278	3667	2381	8463	5323	4519	7482	1753	3075	4005	7964	12264	15975	9160	6821
1949 Regional Surplus/Deficit	6992	7817	4095	4227	2986	2075	2983	1724	7903	4168	9833	10644	9207	4220	5372
1950 Regional Surplus/Deficit	4447	1566	1251	3666	3354	879	4530	7224	9402	8670	8907	8540	14767	10351	6313
1951 Regional Surplus/Deficit	6714	7255	3192	6151	6668	9494	10551	11622	7218	8596	9713	10956	8378	9330	8308
1952 Regional Surplus/Deficit	6912	6900	3715	7323	3704	5608	6768	4785	4519	8212	9735	12435	9751	6046	6711
1953 Regional Surplus/Deficit	6900	3395	2102	3153	2641	647	3304	6657	925	-7.9	3506	8374	14039	9741	4873
1954 Regional Surplus/Deficit	7429	5173	2719	4100	3402	4159	5680	7236	4063	7455	6208	9149	13056	11762	6538
1955 Regional Surplus/Deficit	9104	7551	7733	5265	4613	3692	912	-937	-911	2017	939	3878	15245	13309	5217
1956 Regional Surplus/Deficit	7022	7491	2596	5797	5560	8206	11535	5825	8151	9108	12638	12622	16047	10020	8707
1957 Regional Surplus/Deficit	7691	6302	2800	4840	3004	4493	4667	886	3260	9187	6552	11818	14739	5927	5942
1958 Regional Surplus/Deficit	5131	2652	1908	3614	2763	1486	4350	4998	4010	2326	7309	10745	12010	5214	4984
1959 Regional Surplus/Deficit	5138	3255	2185	3572	4553	5682	10264	7625	3908	6672	5800	7489	12884	10504	6592
1960 Regional Surplus/Deficit	6814	5802	7720	9718	7236	6972	6541	2215	3790	11939	8688	6789	10258	7444	7109
1961 Regional Surplus/Deficit	7314	3450	2301	3745	3824	2131	5283	6268	5230	6093	5928	7640	14048	6398	5688
1962 Regional Surplus/Deficit	5421	3816	1512	3598	2859	909	4546	25	-169	8724	9997	6958	8240	7585	4170
1963 Regional Surplus/Deficit	6645	4551	2055	4711	4663	5670	4858	3933	2097	2247	2957	7957	9272	7052	5039
1964 Regional Surplus/Deficit	7596	4980	2828	3356	3422	1521	4615	1361	-100	4110	4374	6254	15426	12334	5129
1965 Regional Surplus/Deficit	7290	6829	4202	5446	3472	8553	12270	10164	7068	5811	9967	10310	11125	6812	7864
1966 Regional Surplus/Deficit	7211	6484	2990	4472	3382	3545	6469	681	713	6986	4089	6640	7405	7943	4719
1967 Regional Surplus/Deficit	7143	4623	1830	3381	3030	2642	7424	8805	2128	5673	3490	4891	14405	10510	5793
1968 Regional Surplus/Deficit	6865	5824	2905	4695	3481	3449	6552	5813	4456	-355	2801	4369	10564	9347	5267
1969 Regional Surplus/Deficit	7060	6488	5089	6119	5448	5387	10012	7689	4892	10697	10150	12480	10454	7509	7690
1970 Regional Surplus/Deficit	7128	3519	2322	3831	3187	1767	5643	5243	892	777	4074	6731	11618	4353	4445
1971 Regional Surplus/Deficit	4872	2745	1727	3675	3445	1830	9111	12275	6514	7265	8823	12659	14892	11181	7430
1972 Regional Surplus/Deficit	7744	7940	3392	4115	3680	3992	8650	11549	12254	12669	7155	12242	15637	11869	8761
1973 Regional Surplus/Deficit	8721	7384	4277	4206	3103	4689	6909	-1110	-117	-828	634	1031	5283	4247	3373
1974 Regional Surplus/Deficit	3989	1492	1167	2781	2718	6300	13721	12493	9084	10315	11480	11386	16148	14377	8651
1975 Regional Surplus/Deficit	7980	7890	4094	3119	3040	2621	6158	3877	6000	3812	4841	8626	12621	12149	6214
1976 Regional Surplus/Deficit	5696	4459	3095	5357	6201	10752	10751	7858	5164	10004	8235	11514	9188	11173	7938
1977 Regional Surplus/Deficit	10395	9627	8808	4281	2631	967	1782	-1839	-1423	-1267	-946	182	2407	2010	2392
1978 Regional Surplus/Deficit	3963	1367	972	2049	2637	1899	4515	1800	5857	4131	5914	7935	7991	8267	4301
Top Ten Percent	6233	5727	2689	4840	4965	7749	11042	9869	8374	10139	9844	11744	13080	11354	8473
Middle Eighty Percent	6384	4476	2837	4182	3409	3124	5237	3452	3053	4567	5750	7707	10507	7634	5144
Bottom Ten Percent	4935	2994	1676	3217	2414	817	-397	-1592	-406	-1.9	8.1	-130	4162	3293	1419

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Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Regional Surplus/Deficit	6910	3031	1849	3204	2562	492	463	-2663	-633	-842	-417	-1256	5042	4041	1454
1930 Regional Surplus/Deficit	3538	2067	1247	2941	2179	214	-2457	-413	-614	-170	-397	-1831	3638	4074	958
1931 Regional Surplus/Deficit	4266	2462	1506	2910	2237	17	-2164	-2727	-836	98	-917	-1619	2808	2832	660
1932 Regional Surplus/Deficit	3884	1541	1302	2608	2006	63	-1950	-2539	2129	6007	9664	7834	9934	6638	3214
1933 Regional Surplus/Deficit	6962	5148	1929	3184	2892	2470	5799	4081	-448	2048	3100	5031	14185	12009	4980
1934 Regional Surplus/Deficit	6604	6605	3297	6357	5978	10696	12165	9414	6390	10998	9758	7045	3246	5228	7233
1935 Regional Surplus/Deficit	3220	989	1150	2949	2950	1749	5229	6046	-1421	881	3990	3935	7870	6629	3469
1936 Regional Surplus/Deficit	5816	3128	1569	2990	2183	81	-1282	-2363	-93	-166	4125	10115	7252	4287	2599
1937 Regional Surplus/Deficit	5194	2273	1447	2934	2123	320	-2374	-2589	-738	-108	-439	-1323	4011	3657	911
1938 Regional Surplus/Deficit	4540	1581	1320	3503	2980	1260	6557	810	3785	4736	6300	8905	8527	6059	4357
1939 Regional Surplus/Deficit	4207	1893	2204	3284	2471	686	2242	-1687	536	1234	2848	5988	4101	4745	2472
1940 Regional Surplus/Deficit	5573	2416	1404	3417	2100	1141	710	337	4335	2808	4177	3092	4545	2767	2611
1941 Regional Surplus/Deficit	3647	1728	1219	3066	1964	1401	1267	-2134	-542	-1100	-337	-573	3976	1993	1134
1942 Regional Surplus/Deficit	3446	1835	1629	2796	1416	4612	5555	-977	-1682	249	1800	2873	9873	7483	3104
1943 Regional Surplus/Deficit	6629	5038	1845	2996	2799	1841	5126	4403	5059	11202	9810	8916	10500	9042	5739
1944 Regional Surplus/Deficit	6872	5285	2101	3456	2523	786	1381	-2143	-1301	-822	-705	-2001	2341	1808	1189
1945 Regional Surplus/Deficit	3741	1109	1266	2281	1816	217	-1867	-1357	-904	-561	-374	3662	8435	4780	1691
1946 Regional Surplus/Deficit	4036	3114	1312	3554	2906	1313	3424	3435	5520	6069	8288	9653	9430	7786	4924
1947 Regional Surplus/Deficit	7122	4726	2497	3375	3151	6772	7166	6307	6017	3664	6561	7069	8425	6640	5705
1948 Regional Surplus/Deficit	7047	3436	2210	8314	5113	4254	7021	1348	2683	3590	7406	10935	15175	8744	6378
1949 Regional Surplus/Deficit	6762	7589	3926	4075	2776	1804	2518	1317	7511	3753	9277	9314	8405	3800	4928
1950 Regional Surplus/Deficit	4215	1333	1078	3511	3144	610	4066	6824	9011	8255	8350	7211	13968	9934	5869
1951 Regional Surplus/Deficit	6484	7027	3022	6000	6458	9231	10091	11226	6826	8182	9156	9628	7576	8913	7866
1952 Regional Surplus/Deficit	6682	6672	3545	7173	3495	5341	6307	4386	4124	7798	9177	11106	8949	5628	6268
1953 Regional Surplus/Deficit	6670	3163	1930	2998	2431	378	2833	6259	530	-424	2945	7044	13239	9323	4429
1954 Regional Surplus/Deficit	7199	4944	2548	3947	3193	3889	5218	6839	3670	7041	5649	7821	12256	11346	6095
1955 Regional Surplus/Deficit	8875	7324	7568	5114	4404	3424	443	-1347	-1311	1601	381	2544	14446	12893	4772
1956 Regional Surplus/Deficit	6792	7263	2425	5646	5349	7942	11075	5427	7758	8696	12082	11293	15247	9603	8265
1957 Regional Surplus/Deficit	7462	6074	2630	4688	2794	4225	4203	478	2867	8772	5994	10489	13940	5508	5498
1958 Regional Surplus/Deficit	4900	2419	1736	3460	2553	1215	3885	4595	3618	1910	6750	9415	11210	4793	4539
1959 Regional Surplus/Deficit	4906	3024	2013	3419	4343	5415	9805	7229	3513	6258	5242	6160	12085	10086	6149
1960 Regional Surplus/Deficit	6585	5573	7556	9569	7027	6707	6081	1812	3395	11528	8132	5459	9457	7026	6667
1961 Regional Surplus/Deficit	7085	3217	2131	3592	3614	1860	4819	5870	4838	5679	5367	6311	13249	5979	5245
1962 Regional Surplus/Deficit	5190	3586	1340	3444	2648	637	4082	-379	-569	8309	9442	5628	7438	7167	3725
1963 Regional Surplus/Deficit	6415	4321	1883	4559	4454	5403	4397	3533	1698	1831	2396	6625	8471	6634	4595
1964 Regional Surplus/Deficit	7367	4750	2658	3202	3212	1250	4151	957	-500	3694	3814	4923	14626	11918	4684
1965 Regional Surplus/Deficit	7060	6601	4033	5296	3264	8285	11810	9768	6676	5396	9410	8981	10324	6393	7422
1966 Regional Surplus/Deficit	6982	6255	2820	4319	3173	3275	6007	279	313	6573	3529	5309	6601	7525	4274
1967 Regional Surplus/Deficit	6914	4391	1659	3227	2820	2372	6963	8409	1734	5259	2929	3560	13605	10093	5349
1968 Regional Surplus/Deficit	6635	5596	2735	4542	3272	3180	6090	5416	4064	-774	2240	3033	9764	8929	4823
1969 Regional Surplus/Deficit	6831	6260	4923	5969	5239	5120	9552	7293	4498	10284	9594	11152	9654	7091	7248
1970 Regional Surplus/Deficit	6897	3288	2151	3678	2978	1496	5177	4845	496	360	3516	5400	10816	3934	4000
1971 Regional Surplus/Deficit	4641	2512	1554	3520	3234	1560	8650	11879	6121	6850	8266	11331	14092	10764	6987
1972 Regional Surplus/Deficit	7515	7712	3222	3961	3470	3722	8188	11153	11864	12258	6598	10914	14837	11453	8319
1973 Regional Surplus/Deficit	8493	7157	4108	4053	2893	4420	6447	-1519	-517	-1246	71	-308	4477	3827	2926
1974 Regional Surplus/Deficit	3758	1259	994	2624	2508	6030	13261	12097	8693	9902	10924	10058	15348	13961	8208
1975 Regional Surplus/Deficit	7751	7663	3925	2965	2830	2350	5695	3478	5607	3398	4282	7296	11819	11732	5770
1976 Regional Surplus/Deficit	5466	4229	2925	5205	5992	10491	10291	7462	4772	9591	7678	10185	8385	10757	7496
1977 Regional Surplus/Deficit	10166	9401	8644	4129	2420	698	1314	-2250	-1825	-1688	-1512	-1156	1597	1586	1945
1978 Regional Surplus/Deficit	3731	1134	800	1892	2427	1627	4048	1395	5466	3717	5357	6605	7188	7849	3856
Top Ten Percent	6003	5498	2518	4687	4755	7483	10581	9473	7983	9726	9288	10415	12279	10937	8031
Middle Eighty Percent	6154	4246	2667	4029	3199	2855	4773	3049	2657	4151	5191	6376	9705	7216	4700
Bottom Ten Percent	4703	2763	1504	3061	2205	548	-869	-2001	-806	-420	-559	-1470	3355	2873	970

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Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Regional Surplus/Deficit	6451	2604	1442	2721	2111	-4.3	224	-2773	-536	-228	252	-1154	5614	3771	1330
1930 Regional Surplus/Deficit	3077	1639	839	2456	1729	-282	-2700	-521	-516	446	272	-1730	4208	3805	834
1931 Regional Surplus/Deficit	3807	2035	1098	2425	1787	-479	-2406	-2837	-739	716	-248	-1517	3379	2562	536
1932 Regional Surplus/Deficit	3425	1113	894	2123	1556	-435	-2192	-2650	2229	6625	10341	7943	10510	6368	3091
1933 Regional Surplus/Deficit	6503	4723	1523	2701	2443	1974	5565	3979	-349	2666	3775	5140	14760	11739	4859
1934 Regional Surplus/Deficit	6145	6180	2893	5877	5530	10208	11932	9313	6494	11616	10436	7154	3814	4958	7113
1935 Regional Surplus/Deficit	2761	562	744	2464	2500	1252	4995	5945	-1321	1499	4666	4041	8444	6359	3347
1936 Regional Surplus/Deficit	5357	2703	1162	2506	1734	-416	-1522	-2473	5.1	450	4802	10224	7827	4017	2477
1937 Regional Surplus/Deficit	4735	1846	1040	2450	1673	-176	-2616	-2699	-640	508	231	-1223	4580	3387	786
1938 Regional Surplus/Deficit	4081	1155	913	3019	2530	765	6322	706	3888	5354	6977	9014	9102	5789	4236
1939 Regional Surplus/Deficit	3748	1466	1798	2801	2021	190	2006	-1795	635	1852	3523	6096	4670	4475	2349
1940 Regional Surplus/Deficit	5114	1989	997	2933	1651	644	470	228	4438	3426	4854	3199	5115	2497	2489
1941 Regional Surplus/Deficit	3188	1301	812	2583	1515	906	1027	-2244	-444	-482	338	-469	4547	1723	1011
1942 Regional Surplus/Deficit	2987	1408	1223	2313	967	4117	5321	-1085	-1585	867	2476	2979	10448	7213	2982
1943 Regional Surplus/Deficit	6169	4613	1439	2513	2349	1345	4892	4299	5162	11821	10487	9024	11075	8772	5618
1944 Regional Surplus/Deficit	6413	4860	1694	2973	2072	290	1142	-2254	-1205	-207	-34	-1898	2911	1536	1065
1945 Regional Surplus/Deficit	3281	681	858	1797	1366	-280	-2110	-1467	-808	54	295	3770	9010	4510	1567
1946 Regional Surplus/Deficit	3576	2689	905	3069	2456	818	3186	3331	5624	6687	8966	9762	10006	7516	4803
1947 Regional Surplus/Deficit	6662	4301	2092	2892	2701	6276	6933	6206	6121	4282	7239	7178	9000	6370	5584
1948 Regional Surplus/Deficit	6588	3010	1804	7834	4664	3760	6787	1241	2786	4208	8084	11044	15749	8474	6257
1949 Regional Surplus/Deficit	6303	7164	3521	3593	2326	1307	2282	1209	7615	4371	9954	9422	8980	3530	4807
1950 Regional Surplus/Deficit	3755	905	671	3027	2694	115	3831	6721	9115	8874	9028	7320	14543	9664	5748
1951 Regional Surplus/Deficit	6024	6602	2616	5519	6009	8741	9858	11125	6929	8800	9834	9736	8151	8643	7746
1952 Regional Surplus/Deficit	6223	6247	3140	6693	3046	4847	6073	4284	4225	8416	9855	11215	9524	5358	6148
1953 Regional Surplus/Deficit	6211	2737	1523	2514	1981	-118	2593	6158	632	195	3621	7153	13814	9053	4307
1954 Regional Surplus/Deficit	6740	4519	2142	3465	2743	3393	4984	6738	3772	7659	6327	7929	12831	11076	5975
1955 Regional Surplus/Deficit	8416	6899	7166	4633	3955	2929	204	-1457	-1215	2219	1059	2650	15021	12623	4651
1956 Regional Surplus/Deficit	6333	6838	2019	5164	4900	7451	10842	5327	7862	9314	12760	11402	15822	9333	8145
1957 Regional Surplus/Deficit	7002	5649	2224	4206	2344	3730	3968	370	2970	9391	6672	10598	14515	5238	5377
1958 Regional Surplus/Deficit	4440	1991	1329	2977	2103	718	3650	4491	3721	2528	7428	9524	11785	4524	4418
1959 Regional Surplus/Deficit	4447	2598	1606	2937	3894	4921	9571	7128	3615	6877	5920	6269	12660	9817	6028
1960 Regional Surplus/Deficit	6126	5148	7153	9089	6578	6216	5848	1707	3496	12146	8809	5568	10032	6756	6546
1961 Regional Surplus/Deficit	6626	2790	1725	3109	3165	1363	4584	5769	4941	6297	6043	6420	13824	5710	5124
1962 Regional Surplus/Deficit	4731	3160	932	2961	2197	140	3846	-485	-472	8927	10119	5736	8013	6897	3603
1963 Regional Surplus/Deficit	5956	3896	1476	4078	4004	4909	4163	3432	1795	2450	3071	6734	9046	6364	4474
1964 Regional Surplus/Deficit	6907	4325	2252	2719	2761	753	3915	851	-403	4312	4490	5031	15201	11648	4562
1965 Regional Surplus/Deficit	6601	6176	3628	4816	2814	7792	11577	9667	6779	6014	10087	9090	10899	6123	7302
1966 Regional Surplus/Deficit	6523	5830	2415	3837	2724	2779	5773	174	411	7191	4206	5418	7175	7255	4153
1967 Regional Surplus/Deficit	6455	3964	1251	2744	2369	1876	6730	8308	1835	5878	3604	3669	14180	9823	5228
1968 Regional Surplus/Deficit	6175	5171	2329	4060	2823	2684	5857	5315	4167	-158	2915	3138	10339	8659	4702
1969 Regional Surplus/Deficit	6371	5835	4520	5488	4790	4626	9319	7192	4601	10902	10271	11260	10229	6821	7128
1970 Regional Surplus/Deficit	6438	2861	1744	3196	2527	999	4940	4744	596	978	4193	5508	11391	3664	3879
1971 Regional Surplus/Deficit	4182	2084	1147	3037	2783	1064	8416	11778	6225	7469	8944	11439	14667	10494	6866
1972 Regional Surplus/Deficit	7056	7287	2816	3478	3020	3226	7955	11052	11968	12876	7275	11022	15412	11183	8198
1973 Regional Surplus/Deficit	8034	6732	3702	3571	2443	3925	6214	-1629	-419	-630	744	-205	5048	3557	2804
1974 Regional Surplus/Deficit	3299	831	586	2139	2058	5535	13028	11996	8796	10521	11602	10166	15923	13691	8087
1975 Regional Surplus/Deficit	7292	7238	3519	2481	2379	1854	5461	3375	5710	4016	4959	7405	12395	11463	5649
1976 Regional Surplus/Deficit	5006	3804	2520	4724	5542	10002	10058	7361	4875	10210	8356	10294	8960	10487	7376
1977 Regional Surplus/Deficit	9707	8976	8242	3646	1970	201	1075	-2360	-1729	-1074	-841	-1054	2165	1314	1821
1978 Regional Surplus/Deficit	3272	707	392	1407	1976	1131	3812	1288	5569	4336	6034	6714	7763	7579	3734
Top Ten Percent	5544	5073	2112	4205	4306	6991	10348	9372	8086	10344	9965	10524	12854	10668	7911
Middle Eighty Percent	5695	3820	2261	3546	2749	2359	4537	2944	2758	4769	5867	6484	10280	6946	4578
Bottom Ten Percent	4244	2337	1097	2577	1755	52	-1111	-2111	-709	196	112	-1367	3925	2603	846

Regional Surplus/Deficit by Water Year
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Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Regional Surplus/Deficit	6163	2308	1182	2514	1931	-257	-49	-3341	-1156	-919	-590	-1662	4591	3533	897
1930 Regional Surplus/Deficit	2786	1344	579	2247	1550	-534	-2978	-1085	-1136	-243	-570	-2240	3183	3566	401
1931 Regional Surplus/Deficit	3518	1741	838	2216	1608	-731	-2684	-3404	-1360	29	-1092	-2026	2354	2324	103
1932 Regional Surplus/Deficit	3136	817	634	1914	1376	-690	-2470	-3218	1613	5940	9510	7442	9491	6130	2660
1933 Regional Surplus/Deficit	6215	4431	1264	2494	2265	1722	5299	3423	-966	1980	2940	4638	13743	11503	4431
1934 Regional Surplus/Deficit	5856	5889	2637	5673	5352	9966	11667	8759	5881	10932	9605	6654	2787	4720	6686
1935 Regional Surplus/Deficit	2472	267	486	2255	2321	998	4727	5390	-1938	813	3831	3536	7423	6122	2918
1936 Regional Surplus/Deficit	5069	2410	904	2299	1555	-667	-1796	-3040	-614	-238	3970	9723	6808	3779	2046
1937 Regional Surplus/Deficit	4446	1552	780	2241	1495	-428	-2893	-3266	-1260	-182	-610	-1734	3554	3149	353
1938 Regional Surplus/Deficit	3792	861	654	2811	2352	513	6054	146	3274	4669	6145	8514	8082	5551	3807
1939 Regional Surplus/Deficit	3459	1172	1539	2594	1841	-62	1736	-2360	17	1166	2687	5594	3644	4237	1919
1940 Regional Surplus/Deficit	4825	1695	737	2726	1473	392	195	-336	3825	2740	4023	2695	4090	2258	2058
1941 Regional Surplus/Deficit	2899	1006	552	2377	1337	655	751	-2809	-1064	-1168	-498	-976	3524	1484	579
1942 Regional Surplus/Deficit	2697	1113	963	2105	789	3865	5056	-1648	-2205	181	1642	2476	9429	6976	2552
1943 Regional Surplus/Deficit	5881	4321	1180	2306	2169	1092	4626	3741	4549	11136	9656	8524	10057	8535	5190
1944 Regional Surplus/Deficit	6124	4568	1435	2766	1892	37	869	-2821	-1827	-897	-875	-2406	1885	1296	632
1945 Regional Surplus/Deficit	2991	385	598	1588	1186	-533	-2388	-2033	-1429	-636	-548	3268	7991	4272	1135
1946 Regional Surplus/Deficit	3286	2396	645	2861	2277	567	2914	2771	5011	6002	8134	9262	8987	7279	4374
1947 Regional Surplus/Deficit	6374	4009	1834	2686	2522	6026	6668	5651	5508	3596	6407	6677	7981	6133	5156
1948 Regional Surplus/Deficit	6300	2717	1545	7631	4486	3512	6521	680	2173	3522	7252	10545	14731	8238	5830
1949 Regional Surplus/Deficit	6015	6873	3264	3388	2146	1054	2013	646	7003	3686	9123	8922	7960	3292	4378
1950 Regional Surplus/Deficit	3466	609	410	2819	2515	-136	3563	6164	8503	8189	8196	6819	13525	9427	5320
1951 Regional Surplus/Deficit	5736	6311	2358	5315	5830	8496	9593	10572	6317	8115	9003	9236	7131	8406	7320
1952 Regional Surplus/Deficit	5935	5956	2883	6489	2868	4598	5807	3729	3610	7732	9024	10715	8505	5120	5721
1953 Regional Surplus/Deficit	5923	2443	1263	2306	1801	-370	2318	5604	17	-492	2787	6651	12796	8817	3878
1954 Regional Surplus/Deficit	6451	4227	1884	3259	2565	3141	4717	6183	3158	6974	5495	7429	11813	10840	5547
1955 Regional Surplus/Deficit	8128	6608	6912	4429	3777	2679	-70	-2023	-1836	1533	227	2145	14004	12387	4221
1956 Regional Surplus/Deficit	6045	6547	1760	4960	4720	7205	10577	4772	7249	8629	11929	10902	14805	9096	7719
1957 Regional Surplus/Deficit	6714	5357	1966	4001	2165	3479	3698	-194	2356	8706	5840	10099	13497	5000	4948
1958 Regional Surplus/Deficit	4151	1696	1070	2770	1923	465	3381	3932	3108	1842	6596	9023	10767	4285	3989
1959 Regional Surplus/Deficit	4158	2304	1347	2731	3716	4672	9306	6574	3000	6191	5087	5768	11642	9580	5600
1960 Regional Surplus/Deficit	5837	4857	6900	8886	6400	5969	5582	1147	2882	11462	7978	5066	9013	6519	6119
1961 Regional Surplus/Deficit	6337	2495	1467	2903	2986	1109	4315	5214	4328	5612	5209	5919	12806	5472	4695
1962 Regional Surplus/Deficit	4442	2866	672	2754	2017	-114	3577	-1046	-1093	8242	9289	5235	6993	6660	3173
1963 Regional Surplus/Deficit	5668	3604	1216	3873	3826	4660	3897	2876	1176	1763	2237	6233	8027	6126	4046
1964 Regional Surplus/Deficit	6619	4033	1994	2512	2581	500	3646	290	-1023	3626	3656	4530	14184	11412	4133
1965 Regional Surplus/Deficit	6313	5884	3371	4612	2636	7543	11312	9113	6167	5328	9256	8590	9880	5885	6875
1966 Regional Surplus/Deficit	6234	5539	2157	3632	2546	2527	5506	-385	-209	6506	3372	4917	6153	7018	3724
1967 Regional Surplus/Deficit	6167	3670	991	2536	2189	1623	6463	7754	1220	5192	2767	3167	13163	9586	4799
1968 Regional Surplus/Deficit	5887	4879	2071	3855	2644	2432	5590	4760	3554	-847	2079	2633	9321	8422	4273
1969 Regional Surplus/Deficit	6083	5543	4265	5285	4612	4376	9053	6638	3988	10218	9440	10761	9210	6583	6701
1970 Regional Surplus/Deficit	6149	2566	1484	2990	2347	745	4670	4189	-21	291	3360	5007	10372	3426	3449
1971 Regional Surplus/Deficit	3893	1789	886	2829	2603	813	8151	11225	5612	6783	8112	10940	13650	10257	6438
1972 Regional Surplus/Deficit	6767	6996	2558	3272	2841	2974	7689	10499	11356	12192	6443	10523	14395	10947	7771
1973 Regional Surplus/Deficit	7745	6441	3445	3365	2263	3674	5947	-2194	-1040	-1319	-95	-713	4024	3318	2373
1974 Regional Surplus/Deficit	3009	534	326	1930	1878	5284	12764	11443	8184	9836	10772	9666	14905	13456	7659
1975 Regional Surplus/Deficit	7004	6947	3262	2274	2198	1601	5194	2819	5096	3330	4126	6904	11376	11226	5221
1976 Regional Surplus/Deficit	4718	3512	2262	4520	5364	9760	9793	6807	4262	9525	7524	9794	7941	10250	6949
1977 Regional Surplus/Deficit	9420	8685	7989	3441	1789	-51	802	-2927	-2352	-1766	-1681	-1563	1138	1072	1389
1978 Regional Surplus/Deficit	2982	411	132	1198	1797	878	3541	727	4956	3650	5202	6213	6743	7342	3304
Top Ten Percent	5255	4780	1853	3999	4127	6744	10083	8818	7474	9660	9134	10024	11835	10431	7484
Middle Eighty Percent	5406	3527	2003	3340	2570	2108	4269	2385	2143	4083	5034	5982	9260	6708	4149
Bottom Ten Percent	3955	2042	837	2369	1576	-200	-1387	-2677	-1329	-492	-729	-1876	2900	2364	414

Exhibit 33: OY 2014 Monthly 50-WY Energy

Regional Surplus/Deficit by Water Year
PNW Loads and Resource Study
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Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Regional Surplus/Deficit	5925	2071	965	2267	1651	-570	-344	-3484	-1285	-689	-214	-1303	5153	3266	822
1930 Regional Surplus/Deficit	2547	1107	362	1998	1272	-847	-3277	-1225	-1265	-12	-194	-1881	3745	3300	326
1931 Regional Surplus/Deficit	3280	1505	621	1966	1329	-1044	-2982	-3547	-1489	263	-717	-1666	2915	2058	27
1932 Regional Surplus/Deficit	2898	580	417	1665	1097	-1005	-2768	-3361	1488	6174	9895	7808	10057	5864	2586
1933 Regional Surplus/Deficit	5977	4197	1049	2246	1986	1409	5009	3289	-1093	2214	3322	5004	14309	11236	4358
1934 Regional Surplus/Deficit	5619	5655	2424	5429	5074	9660	11378	8626	5759	11166	9990	7020	3346	4454	6615
1935 Regional Surplus/Deficit	2234	31	271	2006	2042	684	4437	5257	-2064	1047	4214	3900	7988	5855	2845
1936 Regional Surplus/Deficit	4831	2175	688	2051	1276	-980	-2091	-3183	-742	-6.0	4354	10089	7374	3513	1973
1937 Regional Surplus/Deficit	4208	1316	564	1993	1216	-741	-3191	-3408	-1388	49	-233	-1376	4115	2883	278
1938 Regional Surplus/Deficit	3554	626	438	2562	2074	201	5764	9	3150	4903	6529	8880	8649	5285	3735
1939 Regional Surplus/Deficit	3221	936	1324	2347	1562	-376	1445	-2501	-110	1399	3069	5959	4204	3971	1845
1940 Regional Surplus/Deficit	4587	1459	521	2479	1195	78	-100	-477	3703	2974	4407	3059	4651	1992	1984
1941 Regional Surplus/Deficit	2661	770	336	2129	1059	343	455	-2951	-1192	-934	-117	-614	4087	1216	505
1942 Regional Surplus/Deficit	2459	878	747	1857	511	3553	4766	-1787	-2334	415	2024	2840	9996	6709	2479
1943 Regional Surplus/Deficit	5643	4087	964	2058	1890	780	4336	3605	4427	11370	10041	8890	10623	8268	5118
1944 Regional Surplus/Deficit	5887	4334	1219	2518	1612	-276	574	-2964	-1957	-667	-497	-2046	2446	1028	557
1945 Regional Surplus/Deficit	2753	148	381	1339	907	-847	-2686	-2175	-1558	-405	-172	3634	8557	4006	1060
1946 Regional Surplus/Deficit	3048	2161	429	2612	1998	254	2621	2634	4888	6236	8518	9628	9553	7012	4301
1947 Regional Surplus/Deficit	6136	3775	1619	2439	2243	5714	6378	5517	5385	3830	6791	7044	8548	5866	5085
1948 Regional Surplus/Deficit	6062	2482	1330	7386	4208	3202	6232	542	2051	3756	7636	10911	15296	7971	5758
1949 Regional Surplus/Deficit	5777	6639	3050	3141	1867	740	1721	506	6880	3920	9507	9288	8527	3026	4306
1950 Regional Surplus/Deficit	3228	372	194	2570	2236	-449	3272	6029	8380	8423	8581	7185	14091	9161	5248
1951 Regional Surplus/Deficit	5498	6076	2143	5070	5552	8189	9303	10438	6194	8349	9387	9602	7697	8140	7249
1952 Regional Surplus/Deficit	5697	5721	2669	6245	2589	4287	5518	3595	3485	7965	9408	11081	9072	4854	5649
1953 Regional Surplus/Deficit	5685	2208	1047	2058	1522	-683	2022	5471	-108	-258	3169	7017	13362	8550	3805
1954 Regional Surplus/Deficit	6214	3992	1669	3013	2286	2828	4427	6050	3034	7207	5879	7795	12379	10573	5475
1955 Regional Surplus/Deficit	7890	6374	6701	4184	3499	2367	-365	-2165	-1966	1767	611	2509	14570	12120	4148
1956 Regional Surplus/Deficit	5807	6313	1545	4714	4442	6897	10288	4639	7127	8863	12314	11268	15371	8830	7647
1957 Regional Surplus/Deficit	6476	5123	1751	3755	1886	3167	3407	-334	2233	8940	6224	10465	14063	4733	4876
1958 Regional Surplus/Deficit	3914	1459	854	2522	1644	151	3089	3796	2986	2076	6980	9389	11333	4019	3916
1959 Regional Surplus/Deficit	3920	2069	1131	2484	3437	4362	9017	6441	2875	6425	5472	6134	12208	9313	5529
1960 Regional Surplus/Deficit	5599	4622	6688	8641	6123	5660	5293	1010	2757	11696	8362	5432	9579	6252	6048
1961 Regional Surplus/Deficit	6099	2259	1251	2656	2707	795	4024	5081	4205	5845	5591	6285	13372	5205	4623
1962 Regional Surplus/Deficit	4204	2631	456	2507	1737	-428	3285	-1184	-1222	8476	9673	5601	7560	6393	3100
1963 Regional Surplus/Deficit	5430	3370	1000	3628	3548	4350	3608	2742	1047	1997	2619	6599	8594	5860	3974
1964 Regional Surplus/Deficit	6381	3799	1779	2264	2301	186	3354	152	-1152	3860	4038	4896	14750	11145	4060
1965 Regional Surplus/Deficit	6075	5650	3157	4367	2358	7233	11023	8980	6044	5562	9641	8956	10446	5619	6804
1966 Regional Surplus/Deficit	5996	5304	1943	3386	2268	2214	5216	-522	-337	6740	3755	5283	6718	6752	3651
1967 Regional Surplus/Deficit	5929	3434	775	2289	1910	1310	6174	7620	1096	5426	3149	3533	13729	9320	4727
1968 Regional Surplus/Deficit	5649	4645	1856	3608	2366	2119	5301	4627	3431	-615	2460	2995	9887	8156	4201
1969 Regional Surplus/Deficit	5845	5309	4052	5040	4333	4065	8764	6505	3865	10451	9825	11127	9777	6317	6630
1970 Regional Surplus/Deficit	5912	2330	1268	2744	2068	431	4378	4056	-146	525	3744	5373	10938	3159	3377
1971 Regional Surplus/Deficit	3655	1552	670	2581	2323	500	7861	11092	5489	7017	8497	11306	14216	9991	6366
1972 Regional Surplus/Deficit	6530	6762	2343	3025	2562	2661	7399	10366	11233	12426	6828	10889	14961	10681	7699
1973 Regional Surplus/Deficit	7508	6206	3230	3118	1984	3362	5658	-2336	-1168	-1087	285	-353	4586	3051	2299
1974 Regional Surplus/Deficit	2772	297	108	1681	1599	4972	12474	11310	8061	10070	11156	10033	15471	13189	7587
1975 Regional Surplus/Deficit	6766	6713	3047	2026	1918	1288	4904	2685	4973	3564	4510	7270	11943	10960	5149
1976 Regional Surplus/Deficit	4480	3278	2048	4274	5085	9455	9504	6674	4140	9759	7908	10160	8507	9984	6879
1977 Regional Surplus/Deficit	9182	8450	7777	3195	1509	-364	507	-3070	-2482	-1536	-1303	-1203	1698	803	1314
1978 Regional Surplus/Deficit	2744	174	-84	949	1517	565	3248	589	4834	3884	5586	6579	7309	7075	3231
Top Ten Percent	5017	4545	1638	3753	3848	6435	9794	8685	7351	9893	9519	10390	12401	10165	7412
Middle Eighty Percent	5168	3292	1787	3093	2291	1795	3977	2248	2017	4316	5417	6348	9825	6442	4077
Bottom Ten Percent	3717	1806	620	2121	1297	-513	-1684	-2819	-1458	-260	-352	-1516	3461	2097	339

Regional Surplus/Deficit by Water Year
PNW Loads and Resource Study
2014 - 2015 Operating Year
[27] 2004 White Book

12/31/2004

Average Energy in Megawatts	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul	Avg
1929 Regional Surplus/Deficit	5672	1780	717	2002	1395	-859	-621	-3812	-1486	-924	-450	-2097	4124	3019	452
1930 Regional Surplus/Deficit	2293	817	114	1733	1017	-1135	-3556	-1551	-1465	-246	-431	-2676	2714	3053	-45
1931 Regional Surplus/Deficit	3027	1214	372	1701	1074	-1332	-3260	-3875	-1690	29	-955	-2460	1885	1811	-343
1932 Regional Surplus/Deficit	2645	289	169	1400	842	-1294	-3047	-3689	1289	5940	9662	7017	9029	5617	2217
1933 Regional Surplus/Deficit	5723	3907	801	1982	1732	1120	4735	2966	-1292	1981	3088	4213	13281	10990	3990
1934 Regional Surplus/Deficit	5365	5365	2178	5166	4819	9376	11104	8303	5561	10932	9757	6229	2315	4207	6247
1935 Regional Surplus/Deficit	1981	-260	23	1741	1787	395	4162	4934	-2263	813	3980	3108	6960	5609	2476
1936 Regional Surplus/Deficit	4578	1886	440	1786	1022	-1269	-2369	-3510	-942	-240	4122	9299	6346	3266	1603
1937 Regional Surplus/Deficit	3955	1025	316	1728	961	-1029	-3470	-3736	-1589	-185	-469	-2171	3084	2636	-92
1938 Regional Surplus/Deficit	3300	336	190	2297	1819	-87	5489	-316	2952	4669	6297	8089	7621	5039	3366
1939 Regional Surplus/Deficit	2968	645	1077	2083	1306	-665	1169	-2828	-310	1166	2835	5168	3174	3724	1476
1940 Regional Surplus/Deficit	4334	1168	273	2215	940	-211	-378	-804	3505	2740	4174	2267	3621	1745	1615
1941 Regional Surplus/Deficit	2408	480	88	1865	805	55	177	-3278	-1392	-1168	-351	-1407	3057	970	135
1942 Regional Surplus/Deficit	2205	587	499	1593	256	3264	4492	-2114	-2535	181	1791	2048	8968	6463	2110
1943 Regional Surplus/Deficit	5390	3797	716	1794	1635	491	4062	3281	4229	11137	9808	8099	9595	8022	4749
1944 Regional Surplus/Deficit	5633	4045	971	2254	1357	-564	297	-3292	-2158	-903	-733	-2839	1415	781	187
1945 Regional Surplus/Deficit	2499	-143	133	1073	652	-1136	-2965	-2502	-1759	-640	-409	2842	7530	3760	690
1946 Regional Surplus/Deficit	2794	1871	181	2347	1743	-34	2345	2309	4691	6002	8286	8837	8525	6766	3932
1947 Regional Surplus/Deficit	5883	3485	1372	2175	1988	5426	6104	5194	5188	3596	6558	6253	7520	5620	4717
1948 Regional Surplus/Deficit	5808	2191	1082	7123	3953	2915	5958	216	1853	3522	7404	10120	14268	7725	5390
1949 Regional Surplus/Deficit	5524	6349	2803	2878	1612	451	1445	179	6682	3686	9274	8497	7499	2779	3937
1950 Regional Surplus/Deficit	2974	81	-54	2306	1981	-737	2997	5705	8183	8189	8348	6394	13064	8914	4879
1951 Regional Surplus/Deficit	5244	5787	1895	4807	5298	7904	9029	10115	5997	8115	9154	8811	6670	7893	6881
1952 Regional Surplus/Deficit	5443	5432	2422	5982	2335	3999	5243	3271	3287	7732	9176	10291	8044	4607	5281
1953 Regional Surplus/Deficit	5431	1918	799	1793	1267	-972	1745	5148	-307	-492	2936	6226	12334	8304	3436
1954 Regional Surplus/Deficit	5960	3703	1421	2749	2031	2540	4153	5727	2836	6974	5646	7004	11352	10327	5107
1955 Regional Surplus/Deficit	7637	6084	6455	3921	3244	2079	-642	-2493	-2167	1533	378	1717	13542	11874	3779
1956 Regional Surplus/Deficit	5553	6023	1297	4451	4187	6611	10014	4316	6929	8630	12081	10477	14343	8584	7279
1957 Regional Surplus/Deficit	6223	4833	1503	3491	1631	2879	3132	-661	2035	8706	5991	9674	13036	4487	4507
1958 Regional Surplus/Deficit	3660	1169	606	2258	1389	-139	2814	3471	2788	1842	6748	8599	10306	3773	3548
1959 Regional Surplus/Deficit	3667	1778	883	2220	3182	4074	8743	6118	2677	6192	5239	5343	11180	9067	5160
1960 Regional Surplus/Deficit	5346	4333	6442	8378	5868	5374	5019	685	2559	11462	8129	4641	8551	6006	5680
1961 Regional Surplus/Deficit	5846	1969	1004	2392	2452	506	3748	4758	4008	5612	5358	5495	12345	4959	4255
1962 Regional Surplus/Deficit	3950	2340	207	2243	1482	-718	3010	-1510	-1423	8242	9440	4810	6532	6147	2731
1963 Regional Surplus/Deficit	5176	3080	752	3364	3293	4062	3333	2419	847	1764	2385	5808	7566	5614	3605
1964 Regional Surplus/Deficit	6128	3509	1531	2000	2046	-103	3079	-173	-1352	3626	3805	4105	13722	10899	3691
1965 Regional Surplus/Deficit	5822	5361	2910	4104	2103	6946	10749	8657	5846	5329	9408	8165	9419	5373	6436
1966 Regional Surplus/Deficit	5743	5015	1696	3122	2013	1925	4941	-847	-537	6507	3522	4492	5689	6505	3283
1967 Regional Surplus/Deficit	5676	3143	527	2024	1655	1021	5900	7298	897	5192	2915	2743	12701	9073	4358
1968 Regional Surplus/Deficit	5396	4356	1608	3345	2111	1831	5027	4304	3233	-850	2226	2203	8859	7909	3833
1969 Regional Surplus/Deficit	5592	5019	3806	4777	4079	3778	8490	6182	3667	10218	9592	10336	8749	6070	6262
1970 Regional Surplus/Deficit	5658	2040	1020	2480	1813	142	4102	3733	-346	291	3510	4582	9911	2913	3008
1971 Regional Surplus/Deficit	3402	1261	421	2317	2068	212	7587	10769	5292	6784	8264	10515	13188	9745	5997
1972 Regional Surplus/Deficit	6276	6472	2096	2761	2307	2372	7125	10043	11036	12192	6595	10098	13933	10435	7331
1973 Regional Surplus/Deficit	7254	5917	2983	2854	1729	3074	5384	-2663	-1369	-1322	50	-1147	3556	2804	1930
1974 Regional Surplus/Deficit	2518	5.7	-140	1415	1344	4684	12200	10987	7864	9836	10923	9242	14443	12943	7219
1975 Regional Surplus/Deficit	6512	6423	2800	1761	1663	999	4629	2361	4775	3330	4277	6479	10915	10714	4781
1976 Regional Surplus/Deficit	4227	2988	1800	4011	4830	9170	9229	6351	3942	9526	7676	9369	7479	9737	6511
1977 Regional Surplus/Deficit	8928	8161	7531	2931	1254	-652	230	-3398	-2684	-1772	-1539	-1997	667	555	944
1978 Regional Surplus/Deficit	2490	-117	-332	683	1262	276	2972	263	4636	3650	5353	5788	6282	6829	2862
Top Ten Percent	4764	4255	1390	3489	3593	6148	9519	8362	7154	9660	9286	9599	11374	9918	7044
Middle Eighty Percent	4915	3002	1540	2829	2036	1507	3702	1923	1819	4082	5183	5556	8797	6195	3708
Bottom Ten Percent	3463	1516	372	1856	1043	-801	-1963	-3146	-1659	-495	-588	-2310	2431	1850	-32

Section 9: Administrator's Record of Decision on the 2004 Pacific Northwest Loads and Resources Study

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Section 9: Administrator's Record of Decision on the 2004 Pacific Northwest Loads and Resources Study (The White Book)

I. Introduction

The 2004 Pacific Northwest Loads and Resources Study (White Book) establishes the Bonneville Power Administration's (BPA) long range planning basis for supplying electric power to BPA customers. The White Book is not an operational planning guide, nor is it used for BPA rate setting purposes under section 7(i) of the Northwest Power Act. The White Book includes projected Federal system and regional loads and resources with detailed technical appendices. The White Book compiles loads, contracts, and resource capability estimates for Pacific Northwest (PNW) public agency, public utility cooperative, U.S. Bureau of Reclamation (USBR), investor-owned utility (IOU), and direct service industrial (DSI) customers obtained from (1) forecasts prepared by BPA; (2) direct submittals to BPA; (3) annual data submittals to the Pacific Northwest Utilities Conference Committee; and (4) data submittals to the Pacific Northwest Coordination Agreement (PNCA) Operating Committee. Hydro estimates are produced using BPA's hydro regulator to forecast PNW hydroelectric energy production by project. BPA uses the White Book to project potential regional and Federal system load and resource estimates over the planning period.

The White Book's long range planning basis for supplying electric power remains important as a valuable planning document for both BPA and the PNW region. BPA will continue to update it and make it publicly available. This 2004 White Book updates the 2003 Pacific Northwest Loads and Resources Study and represents a projection of regional and Federal system load and resource capabilities to be used as input to BPA's resource planning process.

II. Statutory Background

With the passage of the Northwest Power Act in December 1980, Congress directed BPA to assure the Pacific Northwest an adequate, efficient, economic, and reliable power supply. *16 U.S.C. §839(2).* In order to carry out this mandate, BPA was directed by Congress to offer new power sales contracts (PSCs) to its regional firm power customers and to plan and acquire firm resources sufficient to meet these firm power loads. *16 U.S.C. §839c(g).* These initial contracts had provisions that, under certain conditions, allowed purchasers to add or remove their non-Federal firm resources. Notably, the load and resources as determined in the White Book was referenced within such provisions.

Section 5(b)(1) of the Northwest Power Act obligates BPA to serve, in accordance with the terms of contracts, the net firm power load requirements of utilities in the PNW including Federal agencies, public agencies, public utility cooperatives, and IOUs. Section 5(d) authorizes BPA to serve up to a defined amount of the firm power load requirements of its existing DSI customers. *16 U.S.C. §839c(b)(1) and (d*). Under section 5(b)(1), BPA is to offer to sell firm power from the Federal system to meet the firm regional loads of a customer in excess of its firm resources, if any, which the customer must dedicate to use or has dedicated to use for service of its own regional

firm loads. *16 U.S.C. §839c(b)(1)(A) and (B)*. BPA is also to provide electric power for those firm loads that were served by a customer's dedicated resource if the Administrator determines that a customer's dedicated resource is no longer available to serve its loads due to obsolescence, retirement, loss of the resource, or loss of contractual rights. BPA's obligation to supply firm power to its Northwest customers may be adjusted by a determination made under section 9(c) of the Northwest Power Act or section 3(d) of the Northwest Preference Act, regarding a customer's sale or disposition of firm power outside the Pacific Northwest region. 16 U.S.C. 839f(c); 837b(d).

Section 6(a)(2) of the Northwest Power Act obligates BPA to acquire sufficient resources, on a planning basis, to meet its firm load obligations, including its section 5(b)(1) and 5(d) contract obligations. BPA's obligations to provide firm electric power to its utility customers' for their regional firm loads and its contract obligations to provide firm power to its DSI customers comprise the largest portion of BPA's firm power contract obligations. *16 U.S.C. §839c(b)(1) and (d)*.

III. BPA's Utility Power Sales Contract Obligations

In October 2000, BPA executed 5- or 10-year PSCs with Federal agency, public agency, public utility cooperative, USBR, IOU, and DSI customers. Power service under these contracts began October 1, 2001. The following sets forth BPA's 2001 PSC firm power load obligations projected for the 2004 White Book study period:

- BPA's Federal agency, public agency, cooperative, and USBR customers signed either 5- or 10-year PSCs. Some of the public agencies, and cooperatives signed up for the 10-year Slice of the System Product. BPA's PSC and Slice obligations end September 30, 2011; however, this study assumes that BPA will meet these or similar obligation agreements through OY 2015. BPA's total public utility load obligations are estimated to range from 6,748 aMW in OY 2006 to 7,618 aMW in OY 2015. In actual operation, BPA's obligations to serve these customers may be higher or lower than those shown in this analysis;

- The IOU's signed the 10-year Residential Purchase and Sales Agreement (RPSA) settling BPA's obligations under Section 5(c) of the Northwest Power Act to the IOUs. 16 U.S.C. §839c(c)(1). As a result of negotiations in 2001, IOU RPSA settlement firm power deliveries were reduced in exchange for financial considerations through September 30, 2006. This resulted in a net IOU RPSA settlement power delivery of 258 aMW during this time period. For the period October 1, 2006, through September 30, 2011, this study assumes that BPA's IOU RPSA settlement contracts provide only financial benefits and no firm power is delivered. This assumption is consistent with the amendments made to the RPSA contracts by BPA and the IOUs on May 28, 2004; and
- BPA's DSI customers signed 5-year contracts beginning October 1, 2001, through September 30, 2006. BPA's DSI load obligations reflect signed load reduction agreements, contract terminations, and closures through March 31, 2004. BPA's DSI load obligations are estimated to be up to 271 aMW through September 30, 2006. The actual DSI loads may be lower than those obligations included in this study due to new agreements or changes in economic conditions. After September 30, 2006, no DSI Federal service is assumed because the DSIs do not have signed contracts in place for BPA service. However, this assumption does not represent a decision by BPA as to whether or what form of DSI service will be offered post September 30, 2006.

IV. Excess Federal Power

This White Book is not a recalculation of or change in BPA's earlier published calculations of the amount of excess Federal power that may be sold by BPA under Public Law (P.L.) 104-46, *§508(a) and (b).* However, this White Book does provide a calculation of surplus firm power under section 5(f) of the Northwest Power Act. Surplus firm power is the amount of firm power in excess of BPA's total firm load obligations under subsections 5(b), (c), and (d) of the Northwest Power Act. *16 U.S.C. §839c(b); (c); and (d)*. This surplus power, if any, may be sold as either excess Federal power under P.L. 104-46, consistent with BPA's calculations of excess Federal power, or as surplus power under P.L. 88-552, section 5(f) and 9(c) of the Northwest Power Act. *16 U.S.C. §837(a); 16 U.S.C. §839c(f) and 16 U.S.C. §839f(c)*. To the extent that BPA has annual amounts of planned firm power that is surplus to its firm contract obligations, BPA may market all or a portion of that surplus power as excess Federal power. The duration of these sales will be as stated in BPA's Excess Federal Power Policy. For purposes of this White Book, a sale of excess Federal power with delivery occurring for a year or more is considered a firm obligation of BPA and is included as a firm obligation in Federal loads.

V. Federal System Resource Stack

The 2004 White Book reflects expected changes to Federal system resource stack:

- The methodology for calculating the Federal operational peaking adjustment was revised to better reflect the hydro system's monthly maximum operational capability to meet the 1-hour expected peak load;
- Federal system contract purchases were updated; and
- The planned addition of the Fourmile Hill Geothermal plant was postponed until October 1, 2007.

Changes to the Federal resource stack through acquisitions, contract purchases, additional efficiency improvements, maintenance schedules, changes in the operational changes of existing resources, and/or the removal of resources will be reflected in future studies.

CONCLUSIONS:

For the foregoing reasons the methodology and the assumptions in the 2004 White Book are adopted and approved.

Issued in Portland, Oregon on **September 8, 2005** .

/s/ Stephen J. Wright

Stephen J. Wright
Administrator and Chief Executive Officer

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Section 10: Glossary and Acronyms

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Glossary

Average Megawatts (aMW) – A unit of electrical consumption or production over a year. It is equivalent to the energy produced by the continuous use of 1 megawatt of capacity served over a period of 1 year. One average megawatt is equivalent to 8,760 megawatt hours or 8.76 gigawatt hours.

Bonneville Power Administration (BPA) – BPA is a Federal power marketing agency (PMA), responsible for acquiring and delivering power to meet contractual obligations and electrical needs of its customers.

Canadian Entitlement Return (CER) for Canada – The public agencies' obligation to return the Canadian Entitlement allocation to Canada under the Columbia River Treaty that began April 1, 1998.

Capacity – The maximum power that an electrical system or machine such as a hydro powered or thermal powered generating plant can produce under specified conditions, or that a power transmission line can carry.

Capacity Factor – The ratio of the average load on a machine or piece of equipment over a given period to maximum power rating of the machine or equipment.

Cogeneration – The sequential production of more than one form of energy, such as heat and electricity. Large industrial plants often are sources of electricity co-generated as a byproduct of a heating process.

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

Critical Period – That portion of the historical streamflow record during which the recorded streamflows, combined with all available reservoir storage, produced the least amount of energy.

Dedicated Resources – Generating resources owned by a utility and used to serve its firm loads. These resources are declared in each utility's power sales contract with BPA.

Direct Service Industry (Industries) (DSI) – An industrial customer or group of industrial customers that purchase electric power directly from BPA. Most DSIs are aluminum and other primary metal smelting plants.

Energy Load – The demand for power averaged over a specified period of time.

Export – Electricity generated in the Pacific Northwest that is sold to another region, such as California.

Federal Columbia River Power System (FCRPS) – The FCRPS consists of 31 Federal hydroelectric projects constructed and operated by the U.S. Army Corps of Engineers (USACE), U.S. Bureau of Reclamation (USBR).

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

50-Hour Peak Capacity – The amount of capacity that can be sustained for 10 hours a day during peak-load hours for a 5-day week. Methodology superceded. See operational peaking adjustment.

Firm Capacity – Maximum on-peak electrical energy that is considered assured to meet all contractual peak load requirements over a defined period for a customer or customer group.

Firm Energy – Electric power that is considered assured to the customer to meet all contractual energy load requirements over a defined period for a customer or customer group.

Fiscal Year – In this study, fiscal year (FY) is the 12-month period October 1 to September 30. For example, FY 2006 is October 1, 2005, through September 30, 2006.

Forced Outage Reserve – Capacity that is held in reserve, for use in case a generating unit malfunctions.

Forebay – The portion of the reservoir at a hydroelectric plant that is immediately upstream of the generating station.

Historical Streamflow Record – The unregulated streamflow database of the 50 years from August 1928 to July 1978.

Hydroregulation – A study simulating operation of the Pacific Northwest electric power system that incorporates the historical streamflow record, monthly loads, thermal and other non-hydro resources, hydroelectric plant data for each project, and the constraints limiting each project's operation.

Independent Hydro – The output from hydropower plants that are not part of the regulated system. These plants are generally run-of-river. Examples are Cowlitz Falls or other small hydro plants whose output is used to serve load in the utility service territory in which it is located.

Import – Electricity that comes to the Pacific Northwest from another region. Examples would be purchases within the region from Canada, California, or western Montana.

Intra-regional Transfer – Sales of power between two parties within the Pacific Northwest region. Sales from an IOU to a public utility within the region are intraregional transfers, such as firm power sales from BPA to PNW entities.

Investor-Owned Utility (IOU) – A privately owned utility organized under State law as a corporation to provide electric power service and earn a profit for its stockholders.

Load Diversity – An adjustment applied to peak loads to reflect the fact that all peaking electrical demands do not occur simultaneously across the region.

Megawatt (MW) – A unit of electrical power equal to 1 million watts or 1,000 kilowatts.

Non-firm Energy – Electrical power produced by the hydro system that is available with water conditions better than those of the critical period without appreciably jeopardizing reservoir refill. It is available in varying amounts depending upon season and weather conditions.

Non-firm Energy Load – Load served by additional hydro energy available in "better-than-critical period" water conditions or can be interrupted in the event of a power deficiency on the supplying system.

Non-utility Generation – generation that is owned by a third party that is not a utility, such as an industrial customer or an independent power producer.

Operational Peaking Adjustment – Federal hydro system monthly maximum operational capacity that is available to meet the 1-hour expected peak load for each of the 1929 through 1978 historical water conditions.

Operating Year – For this study, operating year (OY) is the 12-month period August 1 through July 31. For example, OY 2006 is August 1, 2005, through July 31, 2006.

Peak Load – The maximum demand for power during a specified period of time. There are usually two peaks to load each day (morning and evening, driven by residential patterns), six peaks to the week (Monday through Saturday, during "working hours"), and one or two months-long peaks to the year depending upon heating and/or cooling needs. The pattern of peak loads is called its "shape."

Power Sales Contract Obligation – Capacity and energy the Federal system is required to provide to Federal agencies, public agencies, cooperatives, USBR, IOUs, and DSIs under their 1981 or 2001 power sales contracts with BPA.

Publicly Owned Utility - One of several types of not-for-profit utilities created by a group of voters, and can be a municipal utility, a public utility district, a cooperative, a mutual company, or a rural electric association.

Region – The geographic area defined by the Pacific Northwest Electric Power Planning and Conservation Act. It includes 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 Northwest Power Planning Act.

Regional Total Retail Load - The sum of all total retail load consumed in the PNW region as defined in the 1980 Pacific Northwest Electric Power Planning and Conservation Act.

Regulated Hydro – Hydropower plants that are part of the Columbia River hydro system that is operated jointly by BPA, the USACE, and the Bureau. Most of these are part of the mainstem system on the Columbia and Snake Rivers.

Renewable Resources – Resources that use solar, wind, hydro, geothermal, biomass, or a similar source of energy that is converted into electricity.

Resource Acquisitions – Conservation or generating resources acquired in order to meet projected firm energy deficits.

Slice of the System Product - A public-preference 10-year power sales contract product based on the customer's net requirements that provides firm and secondary energy using a fixed percentage of the output generated by the Federal system Slice resources.

Spill – Electrical energy that cannot be accepted into the system and must either be sold or spilled due to constraints and limitations of hydro projects.

Spinning Reserves – Reserve generating capacity maintained for immediate response to meet load variations. This provides a regulating margin for controlling the automatic generation and frequency of power in the region and Federal system.

Surplus Firm Capacity – The maximum amount of assured electrical energy above the firm energy loads served by the power system.

Sustained Peak – The peaking capacity necessary to sustain a load for a given period of time.

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

2004 White Book Document Acronyms

aMW	Average megawatt
BiOp	Biological Opinion
BPA	Bonneville Power Administration
CER	Canadian Entitlement Return
Council	Northwest Power and Conservation Council
DSI	Direct Service Industry (Industries)
ENW	Energy Northwest, Inc. (formerly Washington Public Power Supply System)
EPM	Enron Power Marketing, Inc.
FCRPS	Federal Columbia River Power System
FCRTS	Federal Columbia River Transmission System
FERC	Federal Energy Regulatory Commission
FRE	Firm Resource Exhibit
FPS	Federal Power System
FY	Fiscal Year
IOU	Investor-owned utility
IPP	Independent Power Producer
MW	Megawatt
MSR	MSR Public Power Agency, whose members include the Modesto Irrigation District and the cities of Santa Clara and Redding, California
NOAA	National Oceanographic and Atmospheric Administration
NUG	Non-utility generating resources
OY	Operating Year
PGE	Portland General Electric
PNCA	Pacific Northwest Coordination Agreement
PNUCC	Pacific Northwest Utilities Conference Committee
PNW	Pacific Northwest
PP&L	PacifiCorp Power and Light Company
PSC	Power Sales Contract
PUD	Public Utility District
RPSA	Residential Purchase and Sales Agreement
ROD	Record of Decision
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation

Bonneville Power Administration

PO Box 3621 Portland, Oregon 97208-3621

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