

# Section 1: Introduction

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## ***Description of the White Book***

The Pacific Northwest Loads and Resources Study (White Book), which is published annually by BPA, establishes the planning basis for supplying electricity to customers. The White Book presents projections of regional and Federal system load and resource capabilities, along with relevant definitions and explanations. The White Book compiles information obtained from several formalized resource planning reports and data submittals, including those from the Northwest Power Planning Council (Council), individual utilities, 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. 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, including 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.

In this loads and resources study, resource availability is compared with a medium forecast of electricity consumption. The forecasted future electricity demands and contract obligations are subtracted from the sum of contract purchases and the projected capability of existing resources to determine whether BPA and the region will be surplus or deficit. If Federal system resources are greater than loads in any particular year or month, there is a surplus of energy and/or capacity, which BPA may use or market to increase revenues. Conversely, if Federal system firm loads exceed available resources, there is a deficit of energy and/or capacity and BPA would add conservation or contract purchases as needed to meet its firm loads.

This study incorporates information on Pacific Northwest regional retail loads, contract obligations and contract resources; combined with the resource capabilities estimates provided by BPA and regional public agency and investor-owned utility (IOU) customers through their annual PNUCC data submittals for 2000. The following revisions were implemented October 1, 2001 to reflect BPA's 2001 power sales contracts and Exhibit C submittals:

- BPA's obligations to public agency and IOU customers were updated;
- Load reduction agreements for public agencies, IOUs, and DSIs were reflected; and
- BPA's new total retail load forecast for public agencies, IOUs, and DSIs was incorporated. However, the recent Fall 2001 recession is not incorporated in this load forecast.

The loads and resources analysis in this study simulates the operation of the power system under the Pacific Northwest Coordination Agreement (PNCA) produced by the Pacific Northwest Coordinating Group. The PNCA defines the planning and operation of the regional hydrosystem.

The hydroregulation studies for the Snake River and Columbia River projects incorporate measures from the National Marine Fisheries Services (NMFS) Biological Opinion for Salmon (1995 BO) dated March 2, 1995, and the 1998 NMFS Supplemental Biological Opinion for Steelhead (1998 BO) dated May 14, 1998, and the NMFS 2000 FCRPS dated December 21, 2000 (2000 BO). The measures of the previous biological opinions are subsumed in the 2000 BO. These NMFS opinions provide:

- Snake River flow augmentation April 3 through August 31;
- Storage of water January through mid-April for lower-Columbia River flow augmentation April 20 through August 31; and
- Mid-Columbia flow augmentation April 10 through June 30.

The 2000 White Book is presented in two documents: 1) this summary of Federal system and Pacific Northwest region loads and resources; and 2) a technical appendix (available electronically only) which shows the components of the regional loads and resources. Due to concerns over confidentiality, individual customer information regarding loads and other related information are not detailed. This analysis updates the December 1999 Pacific Northwest Loads and Resources Study.

This analysis projects the yearly average energy consumption and resource availability for Operating Years (OY)<sup>1</sup> 2001-02 through 2010-11. The study shows the Federal system's and the region's monthly estimated maximum electricity demand, monthly energy demand, monthly energy generation, and monthly maximum generating capability—capacity—for OY 2001-02, 2005-06, and 2010-11. The Federal system and regional monthly capacity surplus/deficit projections are summarized for 10 operating years.

This document analyzes the Pacific Northwest'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 Pacific Northwest regional power system, which includes loads and resources in addition to the Federal system. The Federal system analysis is presented in section 4, beginning on page 11. The analysis for the Pacific Northwest region is presented in section 5, page 23.

The Administrator's Record of Decision (ROD) for the 2000 White Book is contained in section 8, page 89.

The glossary of terms and a list of acronyms are included in section 9, page 95.

The 2000 Pacific Northwest Loads and Resources Study Technical Appendix and this 2000 Pacific Northwest Loads and Resources Study summary document will be available on BPA's external web site at <http://www.bpa.gov/power/whitebook2000>.

Additional copies of this summary are also available from BPA's Public Involvement Office, toll-free, 1-800-622-4520.

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<sup>1</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 2001-02 is August 1, 2001, through July 31, 2002.

## **Section 2: Background**

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### ***Pacific Northwest Planning Area***

The Pacific Northwest regional planning area is defined by the Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act), enacted in December 1980. It includes Oregon, Washington, Idaho, Montana west of the Continental Divide, and portions of Nevada, Utah, and Wyoming that lie within the Columbia River drainage basin. In addition, any rural electric cooperative customers not in the geographic area described above that were served by BPA on the effective date of the Northwest Power Act are included in the Pacific Northwest planning area.

### ***White Book Study Assumptions***

This traditional loads and resources analysis for the Federal system and Pacific Northwest region has been produced using a specific set of assumptions concerning contracts, non-hydro and hydro resources. The Federal system assumptions are detailed in section 4, Federal System Analysis, page 11. Regional assumptions are presented in section 5, Regional Analysis, page 23.

### ***Load Forecasting***

For this study, load forecasts for each of the customer groups were estimated separately: public agencies, direct service industries (DSIs), IOUs, Federal agencies, and the U.S. Bureau of Reclamation (USBR). The forecasts for the IOUs were developed from data submitted in their PNUCC submittals and their Exhibit C submittals for the 2001 power sales contracts. Similarly, the Federal Agencies, USBR, and public agency load forecasts were developed from their 2001 power sales contracts Exhibit C submittals. DSI load estimates are based on their current power sales contracts with BPA.

### ***Pacific Northwest Hydro and Thermal Resources***

#### **Hydro Resources**

**Hydro Operations Under the PNCA:** Incorporating the NMFS and FWS Biological Opinions into the PNCA has changed the shape of energy production during the PNCA planning year. One aspect of the Biological Opinion is to increase flows in the spring and summer to aid in the downstream migration of juvenile salmon. To do this, reservoirs are no longer drafted to meet firm loads in the fall and winter but are operated to retain as much water as flood control requirements will allow 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. The ability to shift and shape hydro energy production to meet firm loads is greatly reduced as a result.

To demonstrate the variability of the hydro system under the current PNCA, this document presents the Federal system and regional firm surpluses and deficits for OYs 2002 through 2011 for each of the 50 historical water conditions on record (1929 through 1978). The results are shown in exhibits 8 through 27, pages 49 through 58, for the Federal system, and in exhibits 25 through 34, pages 79 through 88, for the region. The information presented in these tables shows the monthly variability of the surpluses and deficits over the 50 water conditions.

**Energy Capability:** This study uses OY 1937 water conditions (the 12-month period from August 1936 through July 1937) to estimate the firm hydro capability in a historical sequence of low water conditions. The critical period represents the period of adverse water conditions during which the hydro system produced the maximum amount of firm energy by drafting the reservoirs from maximum required content to minimum required content.

**Capacity:** The monthly instantaneous capacity of hydro projects is defined as the full-gate-flow maximum available generation at each project, based on the average monthly elevation resulting from 1937 water reservoir levels. 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.

The monthly instantaneous capacity is limited to 10 times the project's average monthly energy production because, at low or minimum water discharge, a plant may not be allowed to release enough water to achieve maximum capacity. The region's hydro projects have constraints and storage limitations within any water condition.

BPA's planning projections reduce the estimated instantaneous hydro capacity to reflect a Federal sustained peaking level of 50 hours per week. This level provides estimated firm hydro capacity that can be maintained each day and continued for weeks at a time. This definition of firm capacity provides a better measure of resource peak capability. The hydro generation also is adjusted to allow for scheduled hydro maintenance, spinning reserves, and forced outages.

**Multiple-Use Planning:** Pacific Northwest hydro projects have many uses in addition to power generation. The projects may provide flood control, supply irrigation for farming, assist in river navigation and recreation, and contribute to municipal water supplies. In addition, constraints also are in place to protect and enhance resident and anadromous fish populations. These non-power uses place operating requirements on the reservoirs and may reduce or increase hydroelectric power 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 Pacific Northwest 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, most likely will increase nonpower requirements on the hydro system and change operating flexibility, the monthly shape of streamflows, and the availability of sustained Federal capacity. Future studies will incorporate any known impacts.

**Hydro Improvements:** BPA has budgeted \$1.2 billion over the next fifteen years for maintaining and improving the reliability of the Federal hydro system. These improvements include reliability increases to decrease forced and planned outages, runner replacements at Grand Coulee and other projects to increase generation and make the turbine operations more fish friendly, and implementation of hydro optimization and operational planning tools to increase the generation of the Federal hydro system.

Under average water conditions, it is estimated that the combination of these hydro improvements will preserve and create up to 1,133 aMW by OY 2016, of which 712 aMW are associated with preserving the existing level of Federal hydro system generation capability from degradation and the remaining 421 aMW is potential additional Federal hydro generation. The contribution of these hydro improvements under critical water conditions is estimated to be up to 355 aMW by OY 2016, of which about 76 aMW are associated with

preserving the existing level of Federal hydro system generation capability and the remaining 279 aMW is potential additional Federal hydro generation. The total amount and timing of annual megawatts realized over the next fifteen-year period is dependent on the timely completion of the scheduled installations and the success of the optimization changes. The estimated increases in generation are associated with the current level of fishery operations. If future fishery operations decrease the flexibility of the hydro system operations and/or increase the amount of spill, the annual megawatt contribution of the hydro improvements will likely decrease.

The 2000 White Book does not include the contribution of all budgeted hydro improvements and assumes a maximum increase in Federal hydro generation of up to 62 aMW due to turbine runner replacements under critical water conditions through OY 2011. This analysis will be refined in future studies.

### **Non-Hydro Resources**

The expected output of regional non-hydro resources is based on the energy and capacity capabilities submitted to BPA by the project owners. These projects include: nuclear, coal, gas-fired, oil-fired and such renewable resources as wind, geothermal, solar, and biomass projects. The plant output was reduced to allow for scheduled maintenance, spinning reserves, and forced outage reserves. Merchant plants, whether planned or already under construction, but without contracts to utilities in the Northwest, are not included as regional resources because there is no assurance that the power production from these facilities will be sold in the Northwest.

### ***Analysis of Federal System Firm Loads and Resources***

BPA is a federal power marketing agency charged with the power and transmission responsibilities to serve the firm electric load needs of its customers. BPA does not own generating resources. BPA's customer loads and contractual obligations, combined with the Federal and non-Federal resources from which BPA acquires the power it sells, are collectively called the Federal system. BPA owns and operates the primary transmission grid, which includes more than 14,700 circuit miles of power lines in the Pacific Northwest.

The Federal system loads are made up of BPA's sales to other Federal agencies, its regional public agencies, and other firm contractual obligations to deliver power.

The hydro resources of the Federal system include 31 dams owned and operated by the USBR and the U. S. Army Corps of Engineers (Corps), plus hydroelectric projects owned by the City of Idaho Falls, Energy Northwest (ENW) (formerly Washington Public Supply System), and Lewis County Public Utility District (PUD). BPA is the designated marketer of Federal power generated by USBR and Corps hydroelectric projects. BPA also markets the thermal generation from the Columbia Generating Station (formerly WNP-2) nuclear plant, operated by ENW, and the output from renewable power plants, primarily wind turbines, under contract to BPA. The expected generation production from these 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 is assumed from wind. The Federal system analysis is shown in section 4, beginning on page 11.

### ***Analysis of Regional Firm Loads and Resources***

The Pacific Northwest regional analysis contains the Federal system loads and resources, plus non-Federal regional loads, contractual obligations, and generating resources. The region has several groups that represent load sectors: the Federal system, public agencies, DSIs and IOUs. The regional hydro resources are owned and operated by various Federal entities,

public agencies, 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 23.

### **Canadian Treaty Downstream Benefits**

The Columbia River Treaty between the United States and Canada enhanced the use of storage in the Columbia River Basin. The Canadian Treaty projects provide downstream 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 as determined by a joint Determination of Downstream Power Benefits. BPA's obligations under the Columbia River Treaty vary during the study period.

### **Canadian Entitlement to Columbia Storage Power Exchange (CSPE) Through March 31, 2003**

Canada agreed to sell its share of the downstream power benefits, called the Canadian Entitlement, for 30-year periods beginning with the completion of each of the three Canadian Treaty Projects (Mica, Duncan, and Arrow). The Canadian Entitlement was sold to the Columbia Storage Power Exchange (CSPE), a Pacific Northwest corporation that was formed to buy the Canadian benefits for resale to participating Pacific Northwest utilities. The Canadian Entitlement sale to CSPE began to expire April 1, 1998, 30 years after the completion of the first Treaty Project, and fully expires March 31, 2003.

### **Canadian Entitlement to Canada, Beginning April 1, 1998**

A portion of the Canadian share of downstream power benefits began to return to Canada April 1, 1998, 30 years after the first Treaty Project was completed. All remaining Canadian

**Table 1**

#### **Canadian Entitlement to Canada – Energy and Capacity Obligations<sup>1</sup>**

**ENERGY IN AVERAGE MEGAWATTS**

<b>OPERATING YEAR</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007<sup>2</sup></b>	<b>2008<sup>2</sup></b>	<b>2009<sup>2</sup></b>	<b>2010<sup>2</sup></b>	<b>2011<sup>2</sup></b>
Investor-Owned Utilities	44	55	78	77	67	63	63	62	50	46
Public Agencies	30	38	55	55	64	67	66	66	77	81
Federal System	213	274	395	396	395	393	391	390	388	388
Other Entities	5	6	9	9	9	9	9	9	9	9
Total Energy Obligation <sup>3</sup>	292	374	537	537	535	532	529	527	524	524

**JANUARY CAPACITY IN MEGAWATTS**

<b>OPERATING YEAR</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007<sup>2</sup></b>	<b>2008<sup>2</sup></b>	<b>2009<sup>2</sup></b>	<b>2010<sup>2</sup></b>	<b>2011<sup>2</sup></b>
Investor-Owned Utilities	80	78	140	144	119	113	113	112	86	86
Public Agencies	53	53	98	103	126	120	119	118	152	151
Federal System	640	501	922	912	915	928	930	931	922	924
Other Entities	9	9	16	17	16	16	16	15	16	16
Total Capacity Obligation <sup>3</sup>	783	642	1,176	1,176	1,176	1,176	1,176	1,176	1,176	1,176

<sup>1</sup> Actual capacity and energy deliveries began April 1, 1998.

<sup>2</sup> Estimated values for operating year 2007 through 2011.

<sup>3</sup> Totals may not be off due to rounding.

downstream power benefits will revert to Canada on April 1, 2003, 30 years after the third Treaty Project was completed. The Canadian Entitlement to Canada is included in each participating utility's loads and resources balance as a delivery to BPA. Participating utilities in this contract are owners of the five non-federal U.S. dams on the mainstem of the Columbia River. BPA then delivers the total Canadian Entitlement to Canada as shown in table 1, page 6, as a Federal export.

### ***Major Changes and Sources of Uncertainty***

This Study reflects major product changes that will affect loads and resources. One of these is the addition of the Slice Product as part of the BPA's 2001 power sales obligations.

#### **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. These uncertainties include:

- Changes in loads or available resources resulting from deregulation of retail sales in the electrical power industry;
- The success of BPA's future purchasing and marketing efforts, including contracts and augmentation purchases and conservation;
- Volatility in short and long term Market prices;
- Deviation of forecasted loads due to changes in estimated load growth rates or variations in the Pacific Northwest economy;
- Failure of existing or contracted generating resources to operate at anticipated times and levels; and
- Additional changes in existing hydro system operation in response to programs developed to address the Endangered Species Act or other environmental considerations.

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

#### **Contractual Uncertainty**

BPA signed new 2001 power sales contracts with its customers that began October 1, 2001. Subsequently, BPA negotiated load reduction agreements with all of its customer classes.

- Public agency customers signed either 5- or 10-year contracts. This study assumes that the public agency customers' net requirements will be met by BPA through September 30, 2011. BPA's actual obligations to their full service customers may be higher or lower during the study horizon;
- The IOU's signed 10-year contracts. For October 1, 2001 through September 30, 2006, the net amount of BPA's IOU power sales contract obligations is up to 258 aMW through September 30, 2006. For the period October 1, 2006 through September 30, 2011, the IOUs may be offered rights to take a total of 2,200 aMW from BPA. This study assumes that the IOU customers will take the settlement amount of 2,200 aMW in power. During this timeframe, BPA's actual obligations to the IOU customers may be lower; and
- BPA's DSI customers signed 5-year contracts beginning October 1, 2001 through September 30, 2006. Because of economic conditions the DSI customers' loads may be lower than the maximum contractual loads, adjusted to reflect buy-downs, assumed in this analysis. 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 on post-September 30, 2006 firm DSI power sales.

## **Section 3: Changes in the 2000 Pacific Northwest Loads and Resources Study**

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This section describes the major changes in the assumptions of the 2000 Pacific Northwest Loads and Resources Study compared to the 1999 study. Other changes are reflected in the data for each utility contained in the 2000 Pacific Northwest Loads and Resources Study Technical Appendix. The 2000 Technical Appendix will be available on BPA's external web site at <http://www.bpa.gov/power/whitebook2000>. The 2000 Technical Appendix presents auxiliary tables (A-tables) that contain aggregate information summarized by customer type.

### ***Firm Load Changes***

The 2000 White Book presents an updated customer-by-customer regional load forecast. The forecast is based on entity submittals provided for the 2001 power sales contracts and/or the PNUCC data submittals. The information and growth trends were checked with Federal Energy Regulatory Commission (FERC) filings, when available. The load forecasts were developed for each of the following customer groups and reflect applicable load reduction agreements.

- Public agency, USBR, and Federal Agencies load forecasts developed from their 2001 power sales contracts Exhibit C submittals;
- IOU load forecasts developed from data submitted Exhibit C submittals for the 2001 power sales contracts and their PNUCC submittals; and
- DSI load estimates based on their current power sales contracts with BPA.

This is the first total update of the regional load forecast since the 1996 Rate Case.

### ***BPA's 2001 Power Sales Contracts***

This analysis includes BPA's 2001 power sales contract obligations. BPA incorporated the new contract terms for the Federal and public agencies, IOUs, and DSIs beginning October 1, 2001. The 2001 power sales contracts include Federal and public agency obligations, the new Slice Product, the IOU Residential Exchange Settlement, public and IOU load reduction and rate mitigation measures, and buy-down agreements with BPA's DSI customers are detailed below:

- The Federal and public agency customers signed either 5- or 10-year contracts. Some of the public agencies signed up for the new 10-year Slice of the System Product (see Slice of the System Product, page 9). This study assumes that the Federal and public agency customers' net requirements will be met by BPA through September 30, 2011. BPA's obligations were reduced to reflect load reduction agreements, especially in the OY 2002;
- The IOU's signed 10-year contracts. For October 1, 2001 through September 30, 2006, BPA's IOU obligations were reduced through a combination of rate mitigation and power purchase programs. The net amount of BPA's IOU power sales contract obligations is up to 258 aMW through September 30, 2006. For the period October 1, 2006 through September 30, 2011 this study assumes that the IOU customers will take the settlement amount of 2,200 aMW in power; and



- While BPA's DSI obligations were contracted up to 1,442 aMW through to September 30, 2006, the agency bought down most DSI Federal loads through 2003. Most DSI obligations are shown to return in 2004 through 2006; however, in actual operation, the DSI obligations may be lower due to economic conditions.

**Slice of the System Product:** Slice is a requirements power product that provides a fixed percentage of the energy generated by the FCRPS to several public preference customers. The Slice product differs from traditional requirements products in that the power sold through Slice is shaped to BPA's generation output of the FCRPS rather than the purchaser's load. The Federal resources and contracts that comprise the Federal System Slice resources stack are shown below in table 2.

**Table 2**  
**Federal System Slice Resources**

<b>Federal Slice Resources and Contracts</b>	
1.	Federal Regulated hydro
2.	Federal Independent hydro
3.	BPA's CER to Canada
4.	Non-Federal (NFD) CER(CSPE) to BPA
5.	NFD CER(CAN) to BPA
6.	BPA to NFD for CSPE
7.	BPA to NFD for Supplemental Capacity deliveries
8.	NFD to BPA for Supplemental Replacement
9.	James River Wauna
10.	Columbia Generating Station
11.	Federal Non-Utility Generation (NUGS)
12.	Federal Pumping Loads
13.	Federal Restoration

Table 3, page 10, shows the Slice customers that purchased 22.63 percent of the output of the Federal System Slice Resources. Because the Slice sale is a percentage of the generation output of the FCRPS, the actual deliveries of power will vary. During certain parts of the year and under certain water conditions, power deliveries will exceed the purchaser's net firm requirements. As a consequence, the Slice product combines both the sale of requirements and surplus power.

**Table 3****2002 Power Sales Contracts Slice Customers**

Slice Customers			
1.	Benton County PUD #1	14.	Lane Electric Cooperative, Inc.
2.	Blachly-Lane Electric Cooperative	15.	Lost River Electric Cooperative, Inc.
3.	Central Electric Cooperative	16.	Northern Lights, Inc.
4.	Clatskanie People's Utility District	17.	Okanogan County Electric Cooperative
5.	Clearwater Power Company	18.	Okanogan County PUD #1
6.	Consumer's Power, Inc.	19.	Pend Oreille County PUD #1
7.	Coos-Curry Electric Cooperative, Inc.	20.	Raft River Rural Electric Cooperative, Inc.
8.	Douglas Electric Cooperative, Inc.	21.	Salmon River Cooperative
9.	Eugene Water & Electric Board	22.	Seattle City Light
10.	Fall River Rural Electric Cooperative	23.	Snohomish County PUD #1
11.	Franklin County PUD #1	24.	Umatilla Electric Cooperative Assoc.
12.	Grays Harbor PUD #1	25.	West Oregon Electric Cooperative
13.	Idaho Falls, City of		

The Slice product can only be combined with the Slice Block Partial Service Product. The Slice Block product, when purchased in conjunction with the Slice product, may be increased in the fiscal year (FY)<sup>1</sup> 2007 through 2011 period to cover load growth that occurred during the FY 2002 through 2006 period. During the Subscription period, Slice purchasers had a choice of a 10-year Block purchase or a 5-year Block purchase. After the conclusion of a 5-year Block purchase, the customer may establish a new 5-year block purchase at then current rates. The Block purchased with Slice is at a 100 percent load factor for each month.

***Firm Resource Changes***

The 2000 White Book analysis reflects the following resource changes compared to the 1999 study:

- New hydroregulation studies that incorporate the assumptions of the current PNCA, including the Columbia River streamflow requirements of the 2000 NMFS Biological Opinions (2000 BO); and
- New independent hydro and Non-Utility Generating resources including the Dworshak small hydropower project; Foote Creek 1, Foote Creek 2, Foote Creek 4 wind projects; Stateline wind project; Condon wind project; and the Ashland solar project.

<sup>1</sup> Fiscal Year (FY) is the 12-month period October 1 through September 30. For example, FY 2001-02 is October 1, 2001, through September 30, 2002

## Section 4: Federal System Analysis

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The Federal system loads and resources analysis is based on the following assumptions:

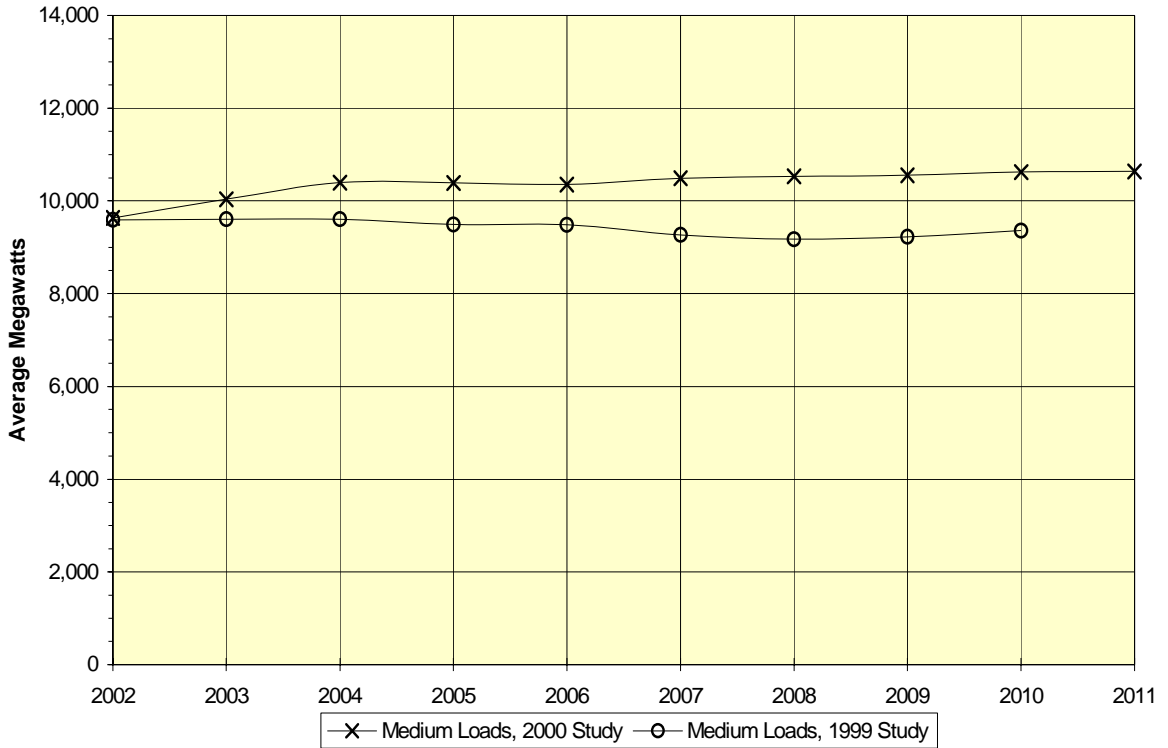
- Load forecasts and capacity availability reflect normal weather conditions;
- The region experiences medium load growth;
- The PNCA, which expires June 30, 2003, is replaced with a like agreement;
- Generating resources include all operating requirements currently adopted by the hydroelectric project owners and the firm planning assumptions for assured resource capability in the PNCA;
- BPA's power sale contract obligations to Federal and public agency customers' will continue through September 30, 2011. BPA's power sales contracts to the Federal agencies and USBR for October 1, 2006 through September 30, 2011 were not fully reflected in this analysis. The full amount of these contracts will be reflected in future studies;
- BPA's power sale contracts to IOU customers for the period October 1, 2001 through September 30, 2006, reflect reduced actual power deliveries for financial considerations. For the period October 1, 2006 through September 30, 2011, the IOUs will take actual power deliveries of 2,200 aMW;
- BPA's power sales contracts to DSI customers began October 1, 2001, and continue through September 30, 2006;
- All existing Federal contractual arrangements not included under BPA's power sales contracts will expire by the terms of their agreements and are not renewed;
- Federal surplus firm power sales and capacity/energy exchange agreements with the cities of Burbank, Glendale, and Pasadena are shown capacity/energy exchange mode throughout the study period;
- The Federal surplus firm power sales and capacity/energy exchange agreement with SCE is terminated;
- The Federal surplus firm power sale with the cities of Modesto, Santa Clara, and Redding (MSR) will terminate September 30, 2005;
- The Federal surplus firm power sale with the Bay Area Rapid Transit District (BART) is shown through the study horizon, however, the contract actually terminates July 1, 2006. This will be reflected in future studies;
- Sustained capacity limits are 50 hours per week;
- Capacity surplus/deficit values do not reflect potential nighttime return problems on the Federal system; and
- Transmission losses are treated as a resource reduction.

### ***Federal Firm Energy Loads***

In this study, the Federal system firm loads include BPA's firm sales to Federal agencies, and current obligations to regional public agencies, IOUs and DSIs under their 2001 power sales contracts. The Federal loads also include Federal and public agency intra- and interregional contracts. The methods and assumptions used to complete this year's load forecast are discussed under Load Forecasting, page 8.

The Federal system firm energy loads for OY 2001-02 through 2010-11 are shown in figure 1, page 12. They are also presented in exhibit 1, page 33. The monthly values for OY 2001-02, 2005-06, and 2010-11 assuming 1937 water conditions are shown in exhibits 2 through 4, pages 37 through 39.

**Figure 1**  
**Federal Firm Energy Load Projections**  
**Under Normal Weather Conditions**  
**2000 BPA Medium Load Forecast**



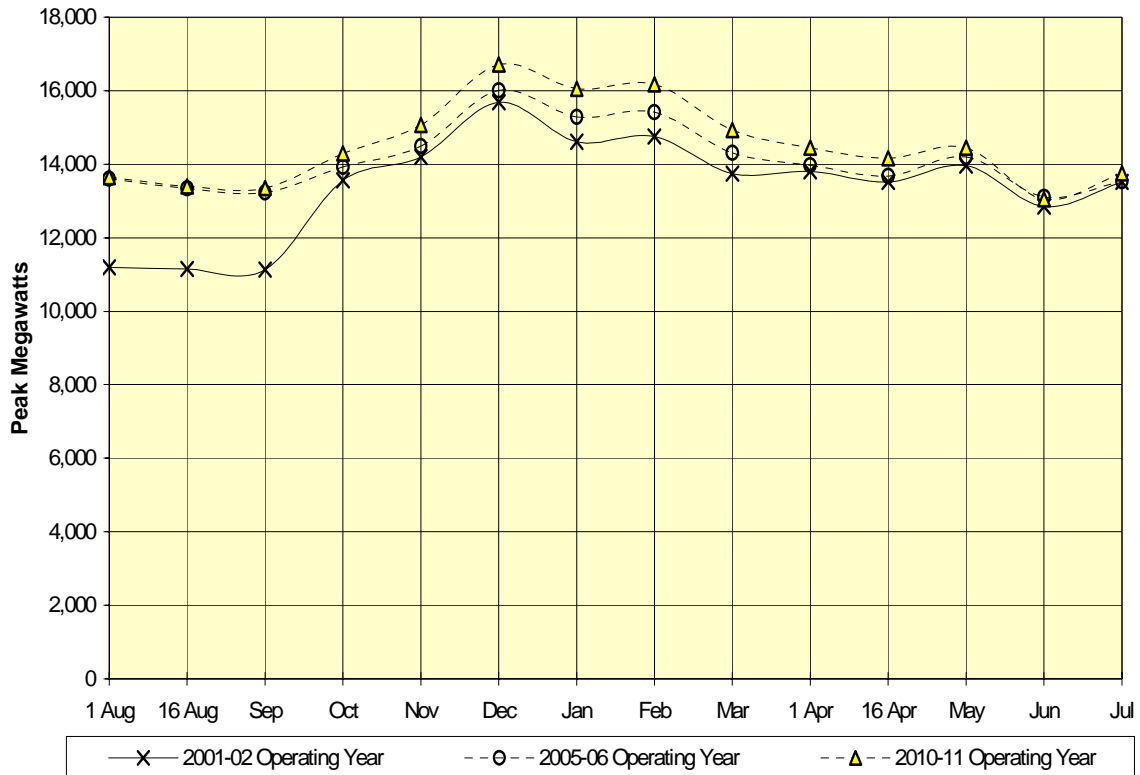
## Federal Firm Peak Loads

Figure 2, below, shows the Federal firm peak loads for OY 2001-02, 2005-06, and 2010-11. The figure shows the expected 1-hour monthly demand under the 2000 BPA load forecast. These forecasts assume that public agencies will purchase capacity from BPA under their power sales contracts to meet peak loads not served by their own resources. Federal loads also include Federal and public agency intra- and interregional contracts. The peak loads are estimated based on normal weather conditions with a 50-percent probability that the actual peak load would be exceeded. The peak load projections are reduced by a diversity component to address the fact that all peak electrical demands do not occur simultaneously throughout the region.

The monthly Federal firm peak loads are presented in exhibits 5 through 7, pages 43 through 45.

**Figure 2**

**Federal Monthly Firm Peak Load Projections  
Under Normal Weather Conditions  
for OY 2001-02, 2005-06, and 2010-11  
Medium Loads**



### **Federal Firm Resources**

Table 4, below, summarizes the Federal system firm energy resources and contracts available to meet Federal firm loads for OY 2001-02. Federal system firm energy resources are comprised as follows: 67 percent from hydroelectric power, 10 percent from one nuclear power plant, and 23 percent from BPA's firm contracts and small thermal and renewable resources.

**Table 4**

**Federal Firm Resources for OY 2001-02<sup>1</sup> Based on 1937 Water Conditions  
Capacity Based on January 2002**

<b>Project Type</b>	<b>Sustained Peak Capacity (MW)</b>	<b>Generating Peaking Capacity % of Total</b>	<b>Firm Energy (aMW) 12-Month Average</b>	<b>Firm Energy % of Total</b>
<b>Hydro</b>	13,595 <sup>2</sup>	79	6,840	67
<b>Nuclear</b>	1,162	7	1,000	10
<b>Firm Contracts/Small Thermal Resources</b>	2,385	14	2,317	23
<b>TOTAL FEDERAL RESOURCES</b>	17,142	100	10,157	100

The Federal system hydro resources from which BPA markets power are detailed in table 5, page 15. 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. The non-Federal owned resources, return energy associated with BPA's existing capacity/energy exchanges, contractual resources, and other BPA hydro-related contracts are shown in table 6, page 16.

Combined, these resources represent BPA's available firm resources. A detailed listing of Federal generating resources is available electronically in BPA's 2000 Pacific Northwest Loads and Resources Study Technical Appendix (available on BPA's external web site at <http://www.bpa.gov/power/whitebook2000>).

<sup>1</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 2001-02 is August 1, 2001, through July 31, 2002.

<sup>2</sup> The hydro capacity is reduced by the Sustained Peaking Adjustment of 5,404 Peak MW.

**Table 5**

**Federal System Hydroelectric Projects**

Project	Initial Year of Service	Number of Units	Nameplate Rating (MW)	OY 2001-02	
				Instantaneous Generating Capacity <sup>1</sup> (peak MW)	Firm Energy <sup>2</sup> (aMW)
<b>U.S. BUREAU OF RECLAMATION HYDROELECTRIC PROJECTS</b>					
Grand Coulee	1941	27	6,465	5,391	1900
Grand Coulee Pump Gen.	1973	6	314	314	0
Hungry Horse	1952	4	428	333	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
<b>TOTAL USBR PROJECTS</b>		53	7,478	6263	2107
<b>U.S. ARMY CORPS OF ENGINEERS HYDROELECTRIC PROJECTS</b>					
Chief Joseph	1955	27	2,458	2,053	1,047
John Day	1968	16	2,160	2,211	801
The Dalles w/fish turbines	1957	24	1,808	2,074	515
Bonneville w/fish turbines	1938	20	1,093	861	429
McNary	1953	14	980	992	548
Lower Granite	1975	6	810	811	212
Lower Monumental	1969	6	810	768	214
Little Goose	1970	6	810	771	209
Ice Harbor	1961	6	603	589	97
Libby	1975	5	525	544	161
Dworshak	1974	3	400	417	118
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
<b>TOTAL CORPS OF ENGINEER PROJECTS</b>		153	12,957	12,489	4,576
<b>TOTAL USBR AND CORPS PROJECTS</b>		206	20,445	18,752	6,683

<sup>1</sup> Maximum generation under optimum conditions assuming January 2002 under 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.

<sup>2</sup> Firm energy from a 12-month annual average assuming OY 2002 under 1937 water conditions.

**Table 6**

**Non-Federal Owned BPA Resources and Contracts  
Capacity Based on January 2002**

Project	Type	Operator	Date in Service	OY 2001-02	
				Capacity (peak MW)	Firm Energy (aMW)
<b>EXISTING NON-FEDERALLY OWNED BPA RESOURCES</b>					
Columbia Generating Station	Nuclear	ENW	1984	1,162	1,000
Packwood Lake	Hydro	ENW	1964	30	10
Idaho Falls Bulb Projects	Hydro	City of Idaho Falls	1982	18	19
Cowlitz Falls	Hydro	Lewis County PUD	1994	13 <sup>1</sup>	26
Big Creek Hydro Unit	Hydro	Mission Valley	1981	1	0
Clearwater	Hydro	State of Idaho DWR	1998	0	1
Dworshak Small Hydropower	Hydro	State of Idaho DWR	2000	4	4
James River Wauna	Cogen.	Clatskanie PUD/EWEB	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	31
Condon Wind Project	Wind	Condon Wind Project, LLC	2002	0	7
Ashland Solar Project	Solar	Ashland, Oregon	2000	0	0
<b>TOTAL NON-FEDERALLY OWNED BPA RESOURCES</b>				1,260	1,141
<b>FIRM CONTRACTS</b>					
Canadian Entitlement for CSPE (non-Federal)				43	21
Canadian Entitlement for Canada (non-Federal)				142	79
Canadian Imports				0	0
Pacific Southwest Imports				289	208
Inland Southwest Imports				45	60
Eastern Imports				189	94
Pacific Northwest Purchase				1,826	1,824
Supplemental & Entitlement Replacement Energy				0	46
<b>TOTAL BPA FIRM CONTRACTED RESOURCES</b>				2,534	2,332
<b>TOTAL NON-FEDERALLY OWNED BPA RESOURCE CONTRACTS</b>				3,794	3,473

**Federal Firm Energy Surplus/Deficit Projections**

The Federal firm annual energy surplus/deficit projections under 1937 water conditions for OY 2001-02 through 2010-11 are presented on page 17; in table 7, and graphically in figure 3. Using the assumptions detailed on page 11, the Federal system is expected to be surplus in OY 2002 and have energy deficits less of than 1,000 aMW in OY 2003 through 2006. In OY 2007 through 2011 the deficit climbs to over 2,000 aMW. BPA will most likely meet these deficits using a combination of methods described in Federal Resource Adequacy,

<sup>1</sup> Operational capacity is 70 MW, but is restricted in January.



page 22. The components of the 10-year annual Federal energy loads and resources balance under 1937 water conditions are presented in exhibit 1, page 33.

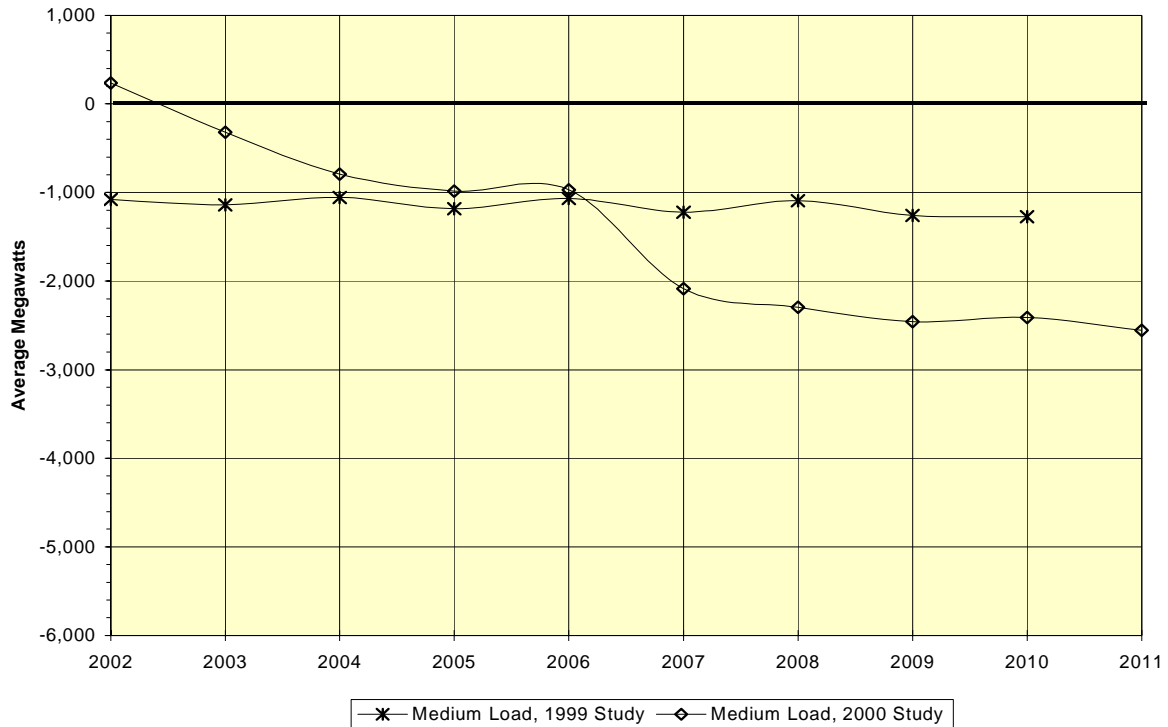
**Table 7**

**Federal Firm Energy Surplus/Deficit Projections Assuming Existing Loads, Resources, and Contracts Under 1937 Water Conditions**  
**Annual Energy in Average Megawatts**

Operating Year <sup>1</sup>	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Federal S/D</b>	236	-318	-792	-982	-967	-2,084	-2,297	-2,456	-2,409	-2,557

**Figure 3**

**Federal Firm Annual Energy Surplus/Deficit Projections Under 1937 Water Conditions**  
**Operating Year<sup>1</sup> Annual Energy in Average Megawatts**



<sup>1</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 2001-02 is August 1, 2001, through July 31, 2002.

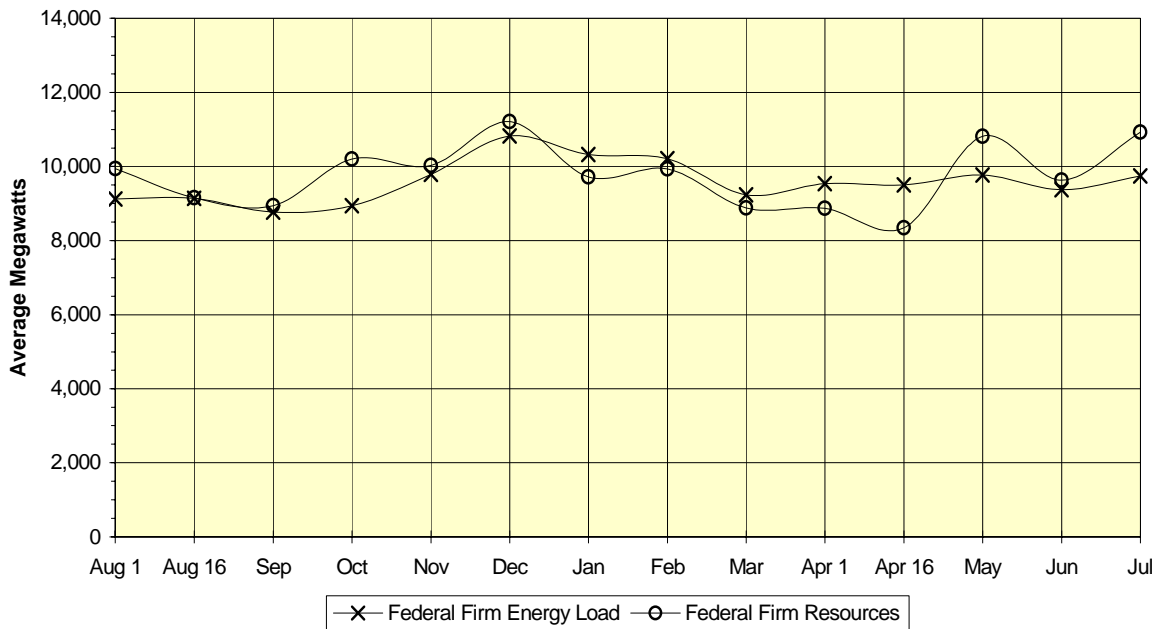
To depict the monthly variability of the loads and resources study, the monthly Federal system energy components under 1937 water conditions for OY 2001-02, 2005-06, and 2010-11 are shown in exhibits 2 through 4, pages 37 through 39. Figure 4, below, graphically illustrates the monthly Federal system firm energy loads and resources for OY 2001-02. This figure demonstrates the monthly timing of Federal system surpluses and deficits under the provisions of the PNCA.

Under critical water conditions, Federal hydro resources are generally operated at lower power production levels during the January through March timeframe because the reservoirs store water then to 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 varies greatly depending upon water conditions in the Pacific Northwest. Exhibits 8 through 17, pages 49 through 58, illustrates the Federal firm energy surplus/deficit projections under the 50-water years of record.

**Figure 4**

**Federal Monthly Firm Energy Loads and Resources for OY 2001-02<sup>1</sup>  
Assuming 1937 Water Conditions  
Medium Load Forecast**



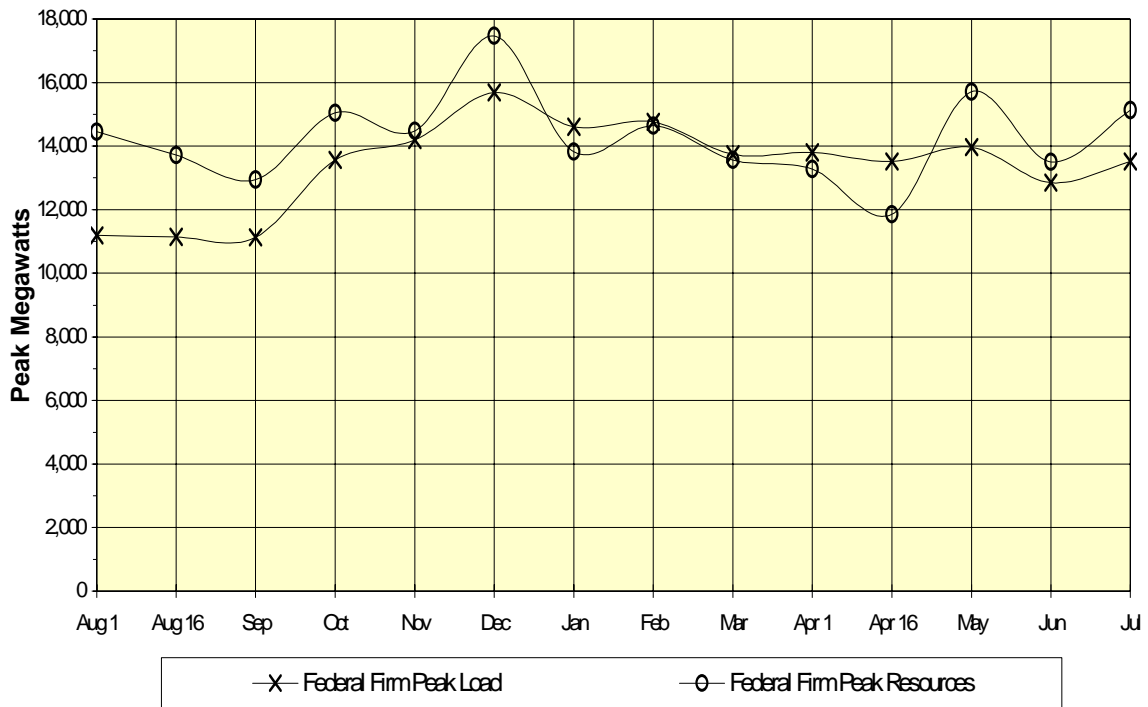
<sup>1</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 2001-2002 is August 1, 2001, through July 31, 2002.

### Federal Firm Capacity Surplus/Deficit Projections

Figure 5, below, shows the monthly Federal system peak loads and resources for OY 2001-02 under 1937 water conditions assuming normal weather conditions and a 50 percent probability that the actual peak loads will be exceeded. This figure illustrates the timing and magnitude of the Federal system capacity surpluses and deficits in any operating year.

**Figure 5**

**OY 2001-02 Federal Monthly Capacity Loads and Resources  
Under Normal Weather Conditions  
Peak in Megawatts**



The study assumes that there are no nighttime return problems from future capacity sales. Nighttime return problems can occur when replacement energy from capacity sales combined with minimum hydro generation, the output from other Federal resources, and other Federal contract returns are greater than BPA's nighttime load. The following factors contribute to nighttime return problems:

- Low Federal system loads;
- Additional nonpower hydro requirements that dictate minimum streamflows; and
- The inability of ENW's Columbia Generating Station, nuclear resource to cycle from day to night.

These requirements restrict the ability to accept nighttime return energy, even though there is surplus generating capability during the daytime. These constraints are common in summer and fall, when BPA's nighttime loads are low. BPA's future Federal surplus capacity transactions may include provisions to:

- Limit return energy to a percentage of contract demand;
- Defer energy returns to a time more favorable to system operation; or
- Request cash payment in lieu of return energy.

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

- Limitations on moving water between projects, including upstream storage;
- Pondage limitations due to hydraulic imbalance from reservoir to reservoir; and
- Navigation and recreation constraints, including restrictions on the rate of rise or fall of tailwater and forebay elevations.

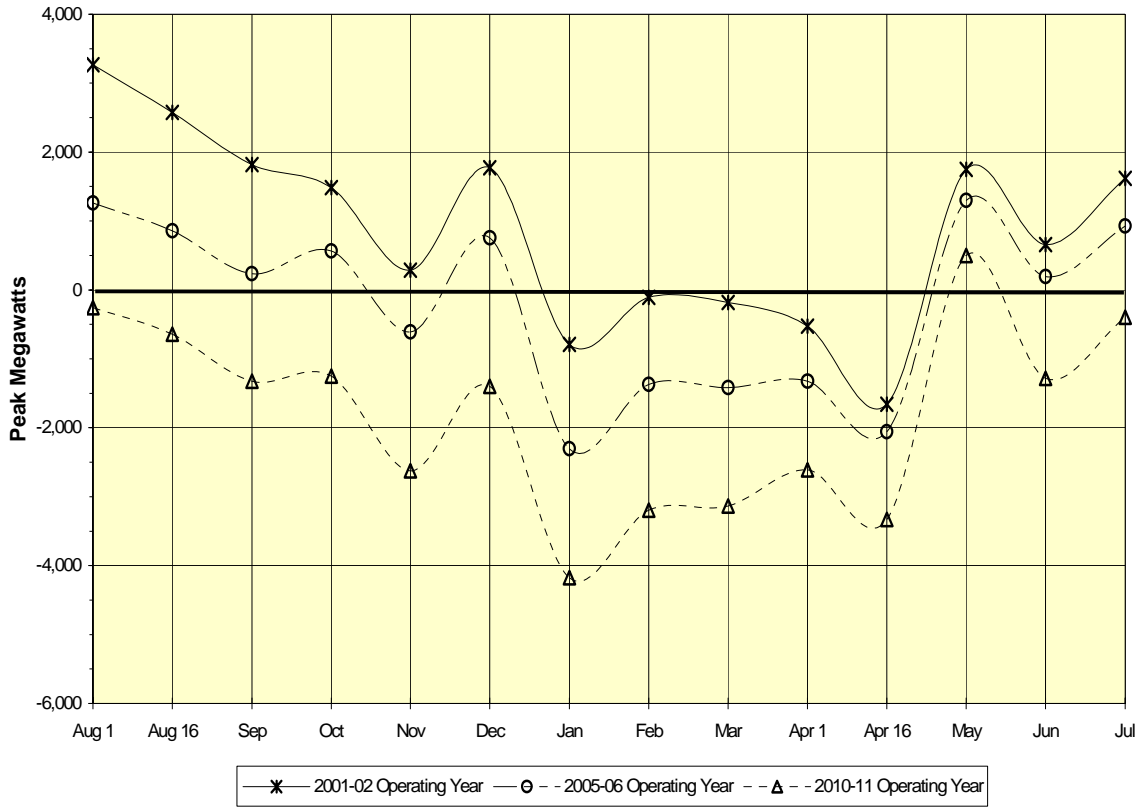
If BPA makes additional market purchases, any added capacity will increase capacity available to the Federal system.

Figure 6, page 21, shows the Federal firm capacity surplus/deficit projections for OY 2001-02, 2005-06, and 2010-11.

Federal capacity surplus/deficit projections, assuming normal weather conditions and 1937 water conditions for OY 2001-02, 2005-06, and 2010-11, are shown in exhibits 5 through 7, pages 37 through 39.

Figure 6

Federal Monthly Capacity Surplus/Deficit Projections  
Under Normal Weather Conditions



## ***Federal Resource Adequacy***

The Federal system energy and capacity load resource projections are conservative. This analysis assumes Federal system hydro generation under critical water conditions; Federal non-hydro resources operating at expected generation levels; and Federal contract obligations and purchases delivered at maximum contract levels. This analysis includes Federal power purchases or new resources that were signed prior to October 1, 2001. The magnitude of the actual Federal system load resource deficits may be reduced or met by a combination of the following:

- Better than critical water conditions, which increase water flow and water storage, thereby increasing the output of the Federal hydro system;
- Purchase power from new merchant plants operating or under construction in the Pacific Northwest;
- Purchase power from merchant plants operating outside the Pacific Northwest region;
- Supplementing the Federal hydro generation using drafting provisions of the Non-Treaty Storage Agreement through June 30, 2003;
- Purchase off-system storage and exchange agreements that allow for seasonal shaping of Federal hydropower with other Pacific Northwest entities or other regions;
- Potential reduction in BPA's obligations to full service power sales contract customers resulting from the Fall 2001 recession;
- While BPA's DSI obligations were contracted up to 1,442 aMW through September 30, 2006, BPA signed DSI load reduction agreements that reduced the DSI load obligations, especially in the early years. In actual operation, BPA's DSI obligations may be lower than their full contracted amounts due to economic conditions through September 30, 2006; and
- Although BPA's IOU obligations were reduced over the first 5-years of the rate period, for the period of October 1, 2006 through September 30, 2011, this study assumes that the IOU customers will take the settlement amount of 2,200 aMW in power benefits. The actual amount of power taken in this timeframe may be less, lowering BPA's obligations over the last 5-years of the study.

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

## Section 5: Regional Analysis

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The regional loads and resources analysis is based on the following assumptions:

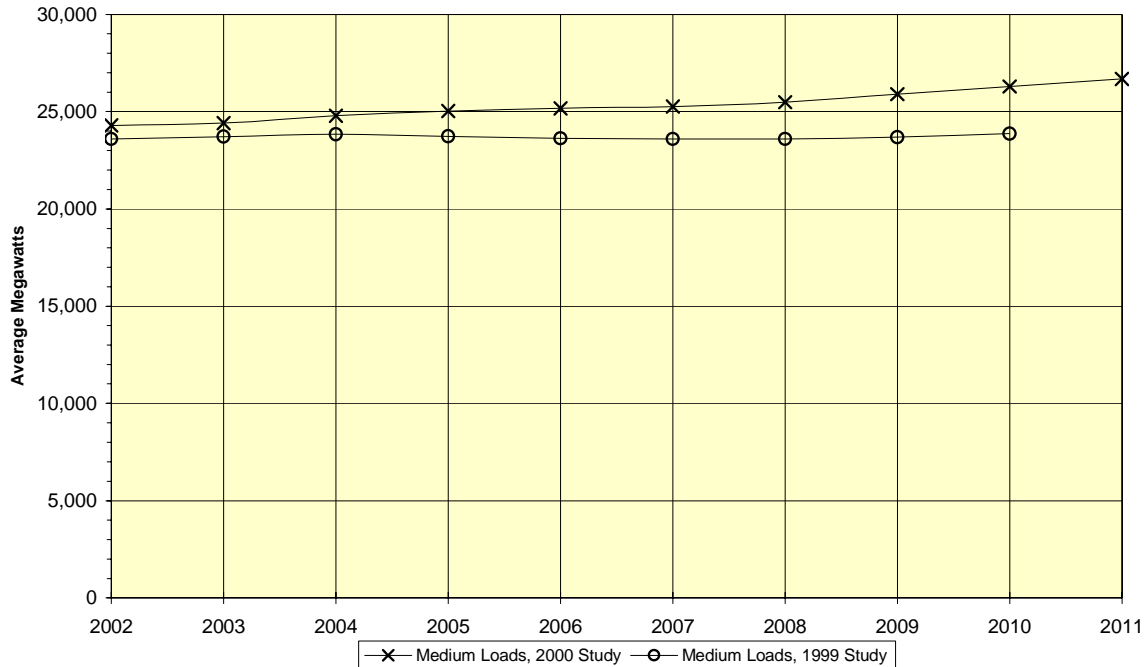
- Load forecasts and capacity availability reflect normal weather conditions;
- The region experiences medium load growth;
- The PNCA, which expires June 30, 2003, is replaced with a like agreement;
- Generating resources include all operating requirements currently adopted by the hydroelectric project owners and the firm planning assumptions for assured resource capability in the PNCA;
- All existing regional contractual arrangements will expire by the terms of their agreements and are not renewed;
- Federal surplus firm power sales and capacity/energy exchange agreements with the cities of Burbank, Glendale, and Pasadena are shown in power sales mode through the study period;
- The surplus firm power sales and capacity/energy exchange agreement between BPA and SCE is terminated;
- The Federal surplus firm power sale with MSR will terminate September 30, 2005;
- The Federal surplus firm power sale with BART is shown through the study horizon, however, the contract actually terminates July 1, 2006. This will be reflected in future studies;
- Sustained capacity limits are 50 hours per week;
- Capacity surplus/deficit values do not reflect potential nighttime return problems on regional entities; and
- Transmission losses are treated as a resource reduction.

### ***Regional Firm Energy Loads***

Regional firm energy loads for OY 2001-02 through 2010-11 based on BPA's 2001 White Book forecast are shown in figure 7, page 24. The load projections also include all intraregional contracts made by Pacific Northwest utilities and the Federal system. The regional firm energy load is also presented in exhibit 18, page 63, and the monthly firm loads for OY 2001-02, 2005-06, and 2010-11 are presented in exhibits 19 through 21, pages 67 through 69. Regional load forecasts no longer include transmission losses, which are now calculated as resource reductions.

Figure 7

**Regional Firm Annual Energy Loads  
2000 BPA Forecast**



**Regional Firm Peak Loads**

Figure 8, page 25, illustrates the regional firm peak loads OY 2001-02, 2005-06, and 2010-11. The figure shows the expected 1-hour monthly demand under BPA's 20001 White Book load forecast. The peak loads are estimated based on normal weather conditions with a 50-percent probability that the forecasted peak load would be exceeded. The projected regional peak loads include all intraregional contracts made by Pacific Northwest utilities, including the Federal system. The peak load projections are decreased by a diversity factor because all peak electrical demands do not occur simultaneously throughout the region.

The monthly regional firm peak loads are presented in exhibits 22 through 24, pages 73 through 75.

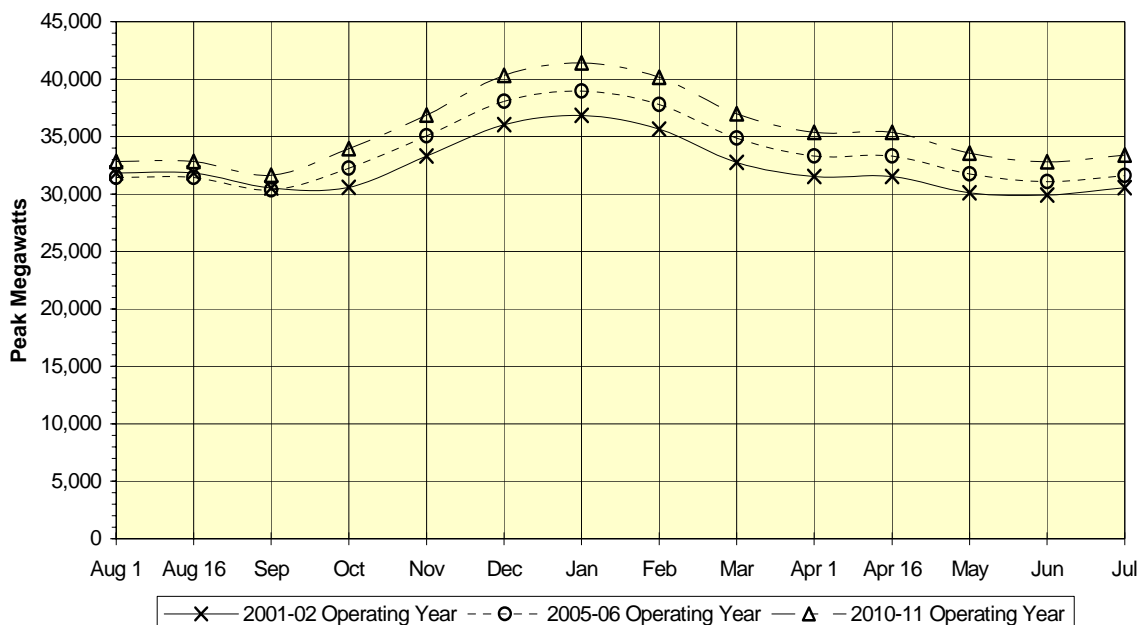
**Regional Firm Resources**

Table 8, page 25, summarizes the regional system resources for OY 2001-02. Hydroelectric resources make up a smaller percentage of the regional resources than of the Federal system resources because the IOU's own most of the thermal resources in the region. These thermal resources are composed primarily of IOU-owned coal, gas, and oil-fired projects and ENW's Columbia Generating Station nuclear plant. Detailed listing of regional generating resources is contained in the 2000 Pacific Northwest Loads and Resources Study Technical Appendix (available on BPA's external web site at <http://www.bpa.gov/power/whitebook2000>).



**Figure 8**

**Regional Firm Peak Loads for OY 2001-02, 2005-06, and 2010-11  
Under Normal Weather Conditions**



**Table 8**

**Regional Firm Resources for OY 2001-02<sup>1</sup> Based on 1936-37 Water Conditions  
Capacity Based on January 2002**

Project Type	Sustained Peak Capacity (MW)	Generating Peak Capacity % of Total	Firm Energy (aMW) 12-Month Average	Firm Energy % of Total
Hydro	24,592 <sup>2</sup>	67	11,623	55
Coal	4,529	12	4,034	19
Nuclear	1,162	3	1,000	5
Imports	3,038	8	1,749	8
Combustion Turbines	1,538	4	655	3
Non-Utility Generation	1,142	3	1,234	6
Miscellaneous	904	3	802	4
<b>Total Resources</b>	<b>36,905</b>	<b>100</b>	<b>21,097</b>	<b>100</b>

<sup>1</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 2000-01 is August 1, 2000, through July 31, 2001.

<sup>2</sup> The hydro capacity is reduced by the Sustained Peaking Adjustment of 5,404 MW.

## Regional Firm Energy Surplus/Deficit Projections

The regional firm energy surplus/deficit projections for OY 2001-02 through 2010-11 assuming 1937 water conditions are presented below in table 9 and graphically in figure 9. The region experiences firm energy deficits in all study years. The region will most likely meet these deficits using a variety of methods described in Regional Resource Adequacy, page 28.

The regional energy surpluses/deficits are presented in exhibit 18, page 63. Monthly regional firm energy loads and resources balances for OY 2001-02, 2005-06, and 2010-11 are presented in exhibits 19 through 21, on pages 67 through 69. In addition to the monthly variability of the regional surplus/deficit under critical water conditions, the region's surplus/deficit varies greatly depending upon water conditions in the Pacific Northwest. Exhibits 25 through 34, pages 79 through 88, illustrate the regional firm energy surplus/deficit projections under the 50-year water years of record.

**Table 9**

**Regional Firm Energy Surplus/Deficit Projections Assuming Existing Loads, Resources, and Contracts**  
Energy in Average Megawatts

Operating Year <sup>1</sup>	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Regional S/D	-3,798	-4,171	-4,535	-4,951	-5,001	-5,213	-5,388	-5,990	-6,324	-7,124

**Figure 9**

**Regional Firm Annual Energy Surplus/Deficit Projections**  
Energy in Average Megawatts



<sup>1</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 2000-01 is August 1, 2000, through July 31, 2001.

## Regional Firm Capacity Surplus/Deficit Projections

Figure 10, below, shows the region's firm 50-hours-per-week capacity surplus/deficit projections for OY 2001-02, 2005-06, and 2010-11. The regional firm capacity surpluses/deficits incorporate the regional assumptions on page 23.

It is important to note that the capacity surplus values do not reflect potential nighttime return problems on the region's system. Peaking replacement energy from capacity sales is returned at night, when the output of the hydro system and other regional resources could be greater than the region's nighttime load. The following factors contribute to nighttime overgeneration:

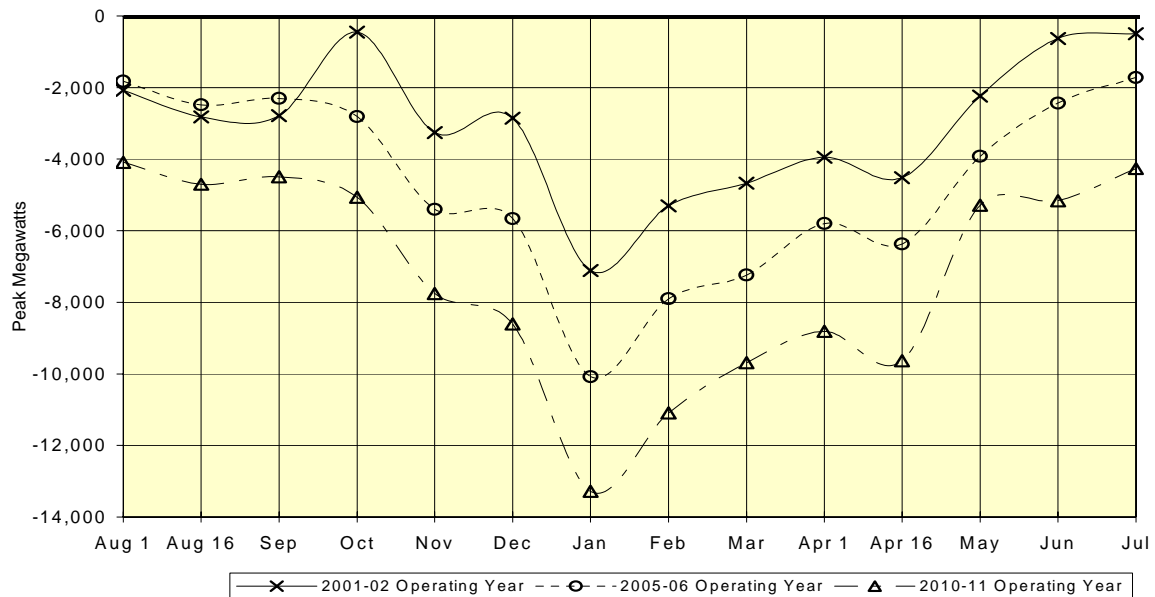
- Low regional system loads;
- Nonpower hydro requirements that dictate minimum streamflows; and
- The inability of the region's thermal resources to cycle from day to night.

These requirements restrict the ability to accept nighttime return energy, even though there is surplus generating capability during the daytime. These requirements are common in summer and fall, when the region's nighttime loads are low. Depending on water availability and economic conditions, return energy from these contracts could create low-priced forced energy sales and may reduce the region's ability to meet firm loads.

Monthly regional firm capacity surpluses/deficits for OY 2001-02, 2005-06, and 2010-11 are presented in exhibits 22 through 24 on pages 73 through 75.

**Figure 10**

### Regional Monthly Firm Capacity Surplus/Deficit Projections Under Normal Weather Conditions



## ***Regional Resource Adequacy***

The region faces challenges to meet loads through the study horizon. The regional energy and capacity load resource projections are conservative. This analysis assumes regional hydro generation under critical water conditions; regional non-hydro resources operate at expected generation levels; and regional contract obligations and purchases delivered at maximum contract levels. With the exception of the Federal system, this analysis does not include regional power purchases or new resources that were not signed prior to December 31, 2000. Specifically to the Federal system, this study includes Federal power purchases or new resources that were signed prior to October 1, 2001. The actual magnitude of regional load resource deficits in the future can change over time. Regional loads and resource development are dependent on regional and local economies, power prices, and aluminum commodity prices. The region has a variety of alternatives that may be considered to meet or reduce future load commitments. They are as follows:

- Better than critical water conditions, which increase water flow and water storage, thereby increasing the output of the regional hydro system to meet load;
- Purchase power from new merchant plants operating or under construction in the Pacific Northwest. New merchant and utility generation currently on-line totals up to 1,250 peak megawatts. These resources were not included in this analysis. Additional merchant and utility projects currently under construction in the Pacific Northwest through OY 2003 total up to 2,600 peak megawatts. All of these resources could be available to the Pacific Northwest, or they could be sold out-of-region as their owners' find markets. As new resources are purchased inside the Pacific Northwest region, they will be reflected in future studies;
- Purchase power merchant plants operating outside the Pacific Northwest region;
- Supplementing regional hydro generation using drafting provisions of the Non-Treaty Storage Agreement through June 30, 2003;
- Purchase off-system storage and exchange agreements that allow for seasonal shaping of regional hydropower with other regions;
- Potential reduction in regional loads due to the Fall 2001 recession; and
- Even though the DSI loads were forecasted at 1,750 aMW through the study horizon, the DSI loads may be lower due to economic conditions through the study horizon.

As the region contracts for power purchases or the generation from new or existing resources, those amounts will be reflected in future studies.