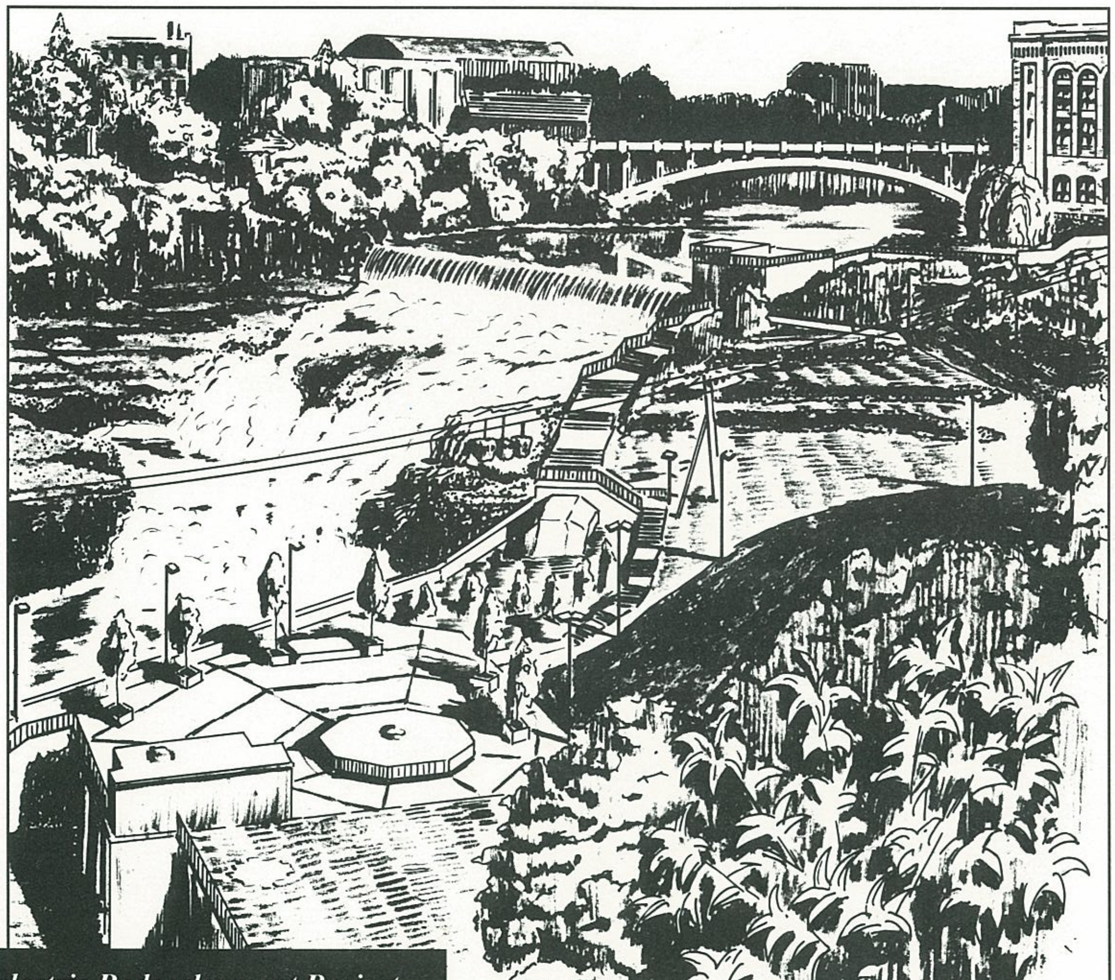
1993 Electric Integrated Resource Plan



Monroe Street Hydroelectric Redevelopment Project, Completed November 1992

WWP

The Washington Water Power Company

April 1993

Summary Report

Technical Information

The Technical Information appendix serves as a companion document to this Summary Report. It is intended to provide additional detail. The reader may find that it contains some of the same text as the Summary Report. The author took this approach so that the Technical Information volume may stand alone.

Benchmarks

The Washington Water Power Company's last least cost plan was published in April 1991. Since that time, WWP has been involved in many activities which support the company's commitment as a low-cost provider of energy services. This 1993 Integrated Resource Plan updates the company's resource planning activities. As the reader may be interested in specific topics, the following "benchmarks" provide a reference to some key information contained in this report.

Benchmark	Page	Summary
Achievements, 1991-1992	8	New demand-side management and a hydro upgrade program were implemented. Enhanced integrated planning techniques and internal coordination. Completed new long-term sales agreements.
1991 Action Plan Progress Report	8, Appendix A	Updates action items listed in the 1991 Least Cost Plan.
1993 Near-Term Action Plan	87	Continue with demand-side management activities, hydro upgrade opportunities and combustion turbine licensing. Continue to explore transmission and wholesale opportunities.
Avoided Cost	47	Based on IRP results, new avoided costs will be lower than current rates. Preliminary calculations indicate that 20-year levelized rates will range from 3.4 to 4.6 ¢/kWh (1992 dollars).
Capacity Planning	67, Appendix I	Peak deficits begin in 1994. The proposed Rathdrum combustion turbine will help meet system capacity needs. A new planning model will aid in future peak study efforts.
Corporate Commitment	6	Integrated resource planning, cost management and cost-effective customer growth goals support the commitment to competitive and stable rates, customer service, and social and environmental responsibility.
Demand-Side Resource Assessment	28, Appendix F	Resource assessment indicates that 136 aMW are available at or below 3.0 ¢/kWh. Preliminary commercial end use modeling (CEDMS) results helped identify resource costs and availability.
Demand-Side Resource Acquisition	31, 54	The preferred resource plan calls for approximately 15 aMW in 1993 and 17 aMW in 1994.
Emerging Issues	39, Appendix G	The potential effects of transmission access, the National Energy Act, Clean Air Act and the proposed federal energy tax will be closely monitored.
Energy Needs	12	Near-term resource acquisition will extend the company's surplus to 1999.
Environmental Externalities	48, Appendix G	Demand-side resources receive a 10% conservation credit.
Existing Resources	5, Appendix C	In general, consist of hydroelectric (340 aMW), thermal (446 aMW), contracts (346 MW) and past conservation efforts (30 aMW).
Fuel Cost Assumptions	58	Expected conditions for fuel price and capital escalation associated with new resources development.
Levelized Cost Calculations	Appendix F	Resource costs are calculated over the individual life of each resource.
Load Forecast	21, Appendix D	The medium-growth projection for energy loads is 1.4% annually.
Modeling Methods	55, Appendix H	The Strategic Resource Planning Model (SRPM) received several significant enhancements in 1992.
Public Involvement	17, Appendix B	Efforts included Technical Advisory Committee Meetings, modeling workshops and forums open to the general public.
Risk and Uncertainty	61, Appendix H	Addressed directly through the resource plan evaluation process. Risk analysis was used to consider multiple planning uncertainties and help to identify the most robust energy strategy.
Scenario Analysis	63, Appendix H	The effects of low-load growth (0.7%), high-load growth (1.8%), loss of resource, high natural-gas prices, carbon tax and loss of load were examined.
Service Area Demographics	3	WWP currently serves approximately 257,000 electric and 170,000 natural-gas customers.
Service Area Economic Forecast	21, Appendix D	90% of all economic activity occurs in Spokane and Kootenai counties. Mining closures in north Idaho have offset some of the growth in these areas.
Supply-Side Resource Assessment	33, Appendix F	Approximately 200 aMW of new resources available at or below 4.0¢/kWh.
Transmission Interconnections	51	WWP received a Presidential Permit for a proposed interconnection to British Columbia.
Transmission Planning	82	New transmission facilities will reliably serve new loads and integrate existing and new resources.
Wholesale Opportunities	81	The company will continue to investigate new opportunities, like strategies for "firming nonfirm," that add value to the existing system.

Introduction

Beyond Least Cost Planning

Least cost planning represents a utility's responsibility to meet customer demand for energy services at the least total cost to both the utility and its customers. Success in meeting this responsibility is generally determined by the utility's ability to:

- Forecast future energy needs.
- Assess energy supply and demand-side options.
- Develop action plans which support a least cost resource strategy.

While the formal guidelines for developing a least cost plan are set forth by the Washington Utilities and Transportation Commission (WAC 480-100-251) and the Idaho Public Utilities Commission (Order No. 22299), the process has evolved into an effort to fully integrate all resource management activities. In addition to the consideration of resource needs and alternatives, the Integrated Resource Plan presents an energy resource strategy which also reflects:

- Contributions from the public and other interested parties.
- Consideration of social and environmental responsibilities.
- Evaluation of potential risks and uncertainties.
- Coordination with related business activities.

This evolution to integrated resource planning adds some necessary complexity to an already dynamic resource planning process. The Washington Water Power Company (WWP) believes the benefits of this ongoing change are reflected in the following report.

Integrated Resource Plan Objectives

WWP's 1993 Integrated Resource Plan (IRP) is intended to meet several important goals:

- Respond to the planning requirements of both the Washington Utilities and Transportation Commission (WUTC) and the Idaho Public Utilities Commission (IPUC).
- Share WWP's commitment, and supporting business initiatives, as a low cost energy provider.
- Serve as an update to WWP's April 1991 least cost plan report, "Managing Electrical Options for the Future."
- Summarize those activities, analyses and issues which contribute to the development of potential resource strategies.
- Communicate WWP's preferred strategy for meeting expected energy needs over the 20-year planning horizon.
- Identify near-term action plans which provide for the successful implementation of the preferred energy resource strategy.
- Provide a framework for the internal coordination of related resource management activities.

The IRP report is presented in two volumes. This Summary Report is organized into chapters which address the IRP objectives. Supporting data and analyses are documented in separate appendices and gathered in the companion volume entitled Technical Information.

Acknowledgment

This report is an accumulation of the efforts of many individuals both inside and outside the company. WWP wishes to thank those who have contributed to the development of this plan. In order to respond to the uncertainties associated with resource planning, the plan is updated every two years. The company looks forward to these future efforts and the continued opportunity to involve all interested parties in the planning process.

The Company and Its Commitment

This chapter begins with a brief company profile. It discusses how WWP's business activities, including integrated resource planning, support the company's commitment as a low cost provider of energy services. Recent achievements, including action items from the 1991 Least Cost Plan, are summarized. The chapter concludes with an overview of WWP's current long-term energy needs and preferred resource strategy.

The Company

WWP is an investor-owned utility providing electric and natural gas services to the Inland Northwest. The company's geographically and economically diverse electric service territory extends over a 26,000 square mile area of eastern Washington and northern Idaho. Based in Spokane, Washington, WWP serves approximately 257,000 electric customers and approximately 170,000 natural gas customers. Figure 1 locates WWP's electric service territory.

Figure 1

WWP Electric Service Territory

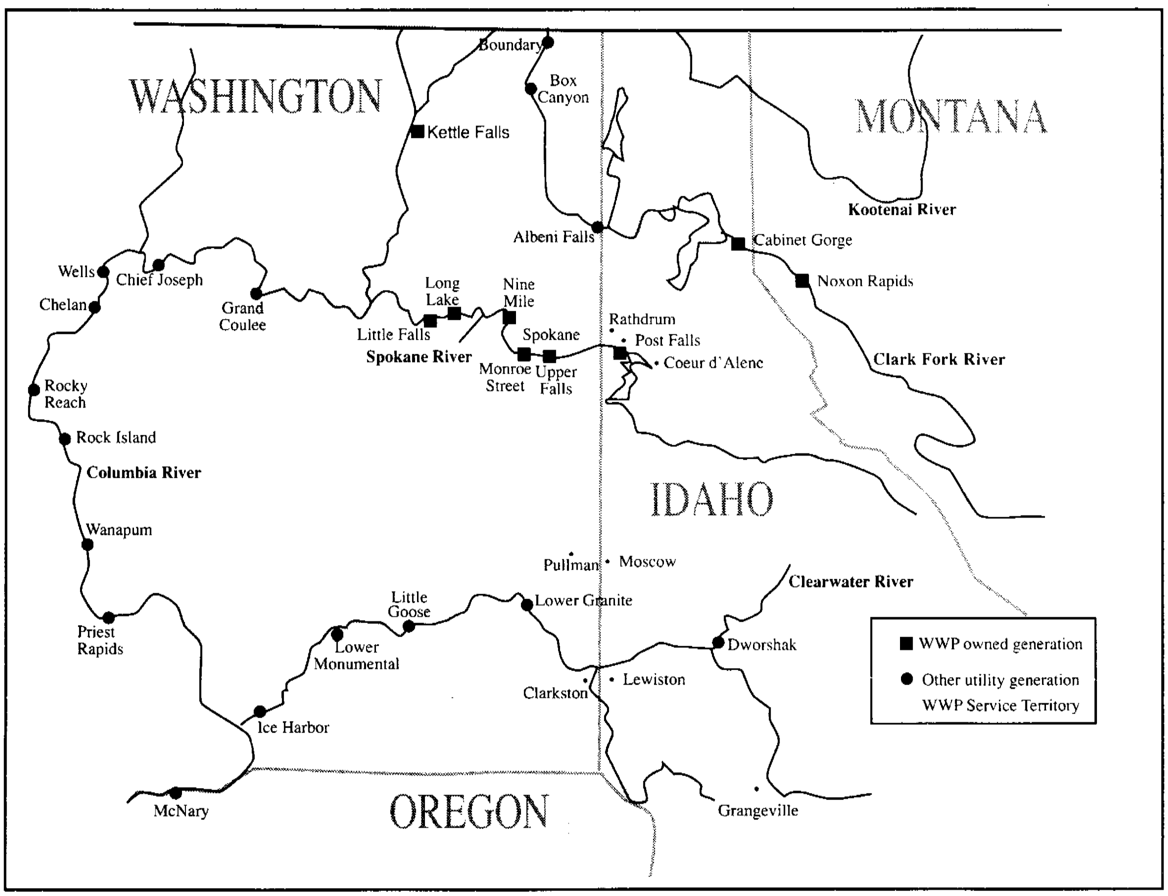
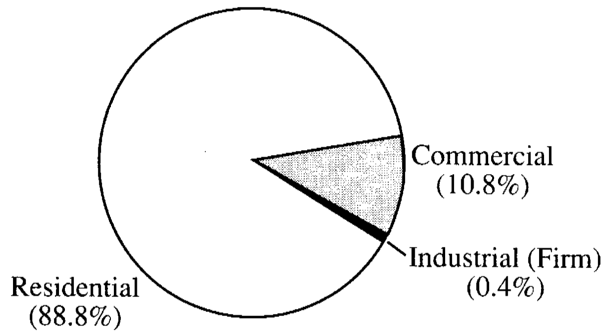


Figure 2 illustrates the present composition of WWP's electric customer base.

Figure 2

WWP Electric Customer Base



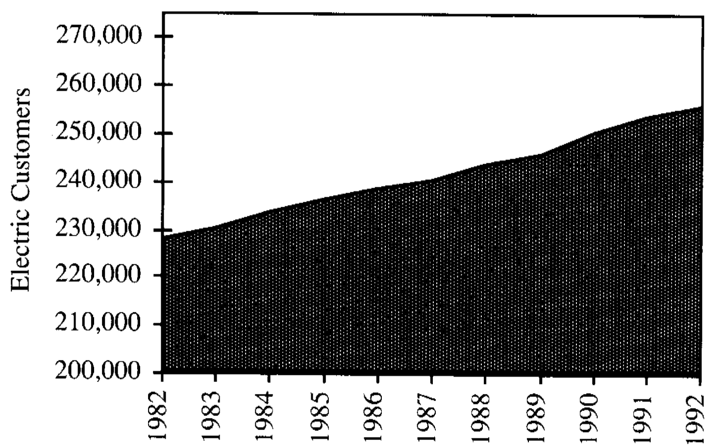
Electric Customers
(As of 1992)

Residential	227,575
Commercial	27,781
Industrial (Firm)	972
Total	256,328

Over the past ten years, the company has added an average of approximately 2,800 new electric customers per year. Historical trends in customer growth are shown in Figure 3.

Figure 3

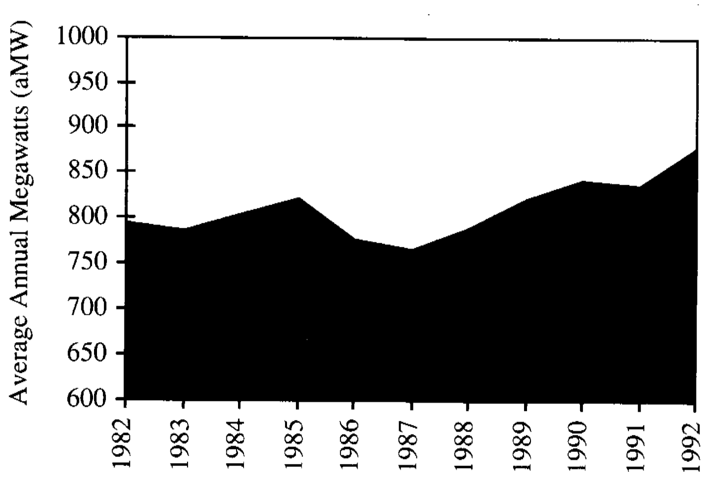
Trends in Customer Growth



While the number of customers grew at a rate of about 1.2 percent, their combined energy requirements increased at the slower rate of about 0.75 percent per year. This trend in electrical usage is shown in Figure 4.

Figure 4

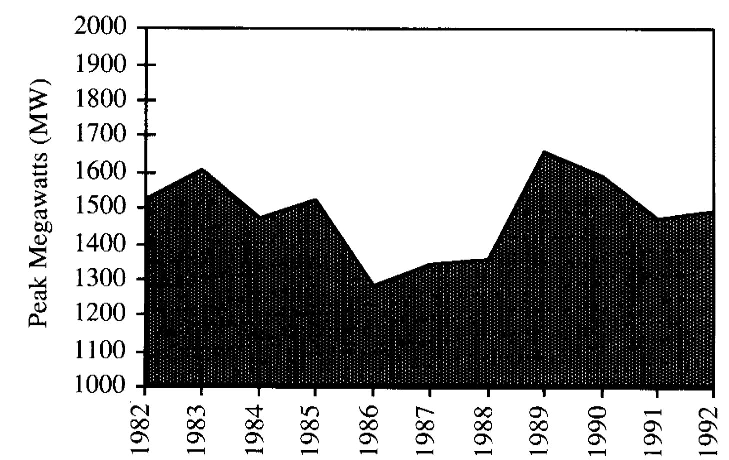
Trends in Annual Electric Usage



Due primarily to customer heating requirements, WWP operates as a "winter peaking" utility. In February 1989, the company served a record one-hour peak electric demand of 1660 MW. Figure 5 lists trends in peak electrical usage for the last ten years.

Figure 5

Trends in Peak Electric Demand



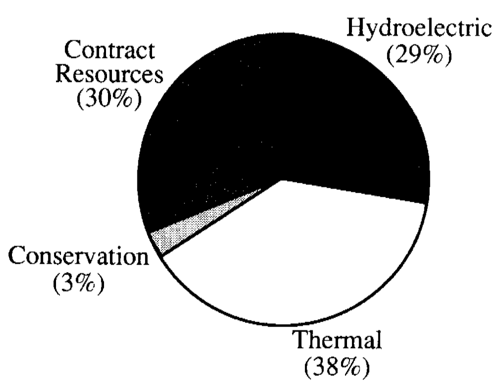
To meet these electric customer requirements, WWP relies on a diverse mix of both supply- and demand-side resources. The existing resource base consists primarily of:

- WWP-owned hydroelectric and thermal generation.
- Savings from WWP conservation programs.
- Contract resources, including utility purchases and exchanges, cogeneration and PURPA contracts, and the purchase of power from four existing Columbia River hydroelectric projects.

Figure 6 illustrates how these resources combine to provide WWP with a reliable and flexible supply of electrical generation. WWP's hydroelectric energy capability, shown in Figure 6, is based on critical or adverse streamflows. Although the company uses critical water conditions for planning purposes, annual hydroelectric generation is dependent upon actual streamflow conditions. A review of existing resources appears in Appendix C.

Figure 6

Existing WWP Resource Mix



Resource	Energy Capability
WWP RESOURCES	
Hydroelectric	340 aMW
Thermal	446 aMW
Conservation (1978-91)	30 aMW
CONTRACT RESOURCES	
Hydroelectric	113 aMW
Cogeneration	64 aMW
Utility Purchases	169 aMW
Total Resources	**1162 aMW**

In addition to its role as a combination gas and electric company, WWP also owns subsidiary operations, most of which are managed under the Pentzer Corporation. Pentzer oversees diversified operations in the areas of real estate, energy and technology development. Holdings include the following major businesses and business activities:

- Pentzer Energy Services
- Spokane Industrial Park

WWP is also a major investor in Itron, a leading supplier of hand-held data collection systems.

The Commitment

This decade promises to be one of heightened competition for the utility industry, with many challenges facing the company, its customers and its regulators. To help meet these challenges, WWP begins with its commitment to:

- Remain a low-cost provider of energy services.
- Maintain rate stability.
- Continue to provide high levels of customer service.

The need to maintain WWP's position as a low-cost provider of energy services and also keep rates stable speaks directly to the company's competitive environment. Success in remaining competitive will directly benefit WWP's customers who rely on the company for cost-effective energy services. WWP recognizes that business needs and society's needs cannot be viewed independently. The company will continue to be an advocate for the efficient and safe use of electricity and natural gas, a steward of natural resources and a leader in the community.

The company will achieve these goals by focusing on activities that help manage costs, optimize resource capabilities and address social responsibilities. Three key business strategies are designed to guide these activities and support the company's commitment. They also promote the type of innovation and achievement required for WWP to remain viable into the next century.

- **Cost Management** involves reviewing every aspect of the company's operations for possible improvement. Efforts include controlling non-revenue spending, managing overhead and improving operating efficiency. Cost management goals are balanced against customer needs for safe and reliable energy services.
- **Customer Growth** means the company will add new customers in a cost-effective manner. Cost-effective growth provides additional revenues and allows the company to spread unavoidable fixed costs over a larger customer base. Well-planned growth encourages rate stability for all customers.
- **Integrated Resource Planning** is a key element of WWP's efforts to remain a low-cost provider of energy services. Through the planning process, the company selects the best resources to meet customer long-term energy needs. The resource selection process considers the cost, efficiency and environmental impact of available resource options. Integrated resource planning provides the framework to coordinate related planning activities. Through an expanded public involvement effort, the public's concerns regarding resource development are addressed.

WWP's 1993 Integrated Resource Plan report highlights past achievements and describes in detail the company's current resource planning activities.

The Achievement

Since publication of the April 1991 Least Cost Plan, WWP has recorded many achievements. WWP is proud of these results and the positive impact they will bring to the company and its customers. A number of these accomplishments meet the objectives of action plan items listed in the 1991 Plan. These corporate and least cost planning achievements are highlighted below:

1991

- **WWP successfully acquired the natural gas properties of CP National Corporation.** Operating as WP Natural Gas (WPNG), the operating division now serves 65,000 customers in Oregon and Northern California. This acquisition has increased the total number of WWP gas customers by over 60 percent.

1991 ACTION ITEM: TRANSMISSION CONSTRAINTS ➤

- **WWP and BPA determined a plan of service to eliminate a transmission system bottleneck between Montana and the Pacific Northwest.** Both parties will share in the cost and benefits of new facilities required to increase power transfer capability between these two regions.
- **A fisheries habitat improvement project on WWP's Long Lake reservoir earned the company an unprecedented fourth Washington State Environmental Excellence Award.** Previous awards honored a cooperative peregrine falcon release program, the Kettle Falls Generating Station, and reclamation activities at the Centralia Coal Mine.

1992

1991 ACTION ITEM: DEMAND-SIDE RESOURCES ➤

- **WWP received approval for new tariffs which allowed the company to implement comprehensive demand-side management programs.** Under tariffs approved by both the WUTC and the IPUC, WWP is aggressively pursuing energy savings from conservation and fuel efficiency programs. Program implementation gives priority to low income customers, but will provide all customers the opportunity to reduce their electric bills.
- **WWP reached agreement with the Citizens Utilities Company to purchase all of Citizens electrical distribution assets located in northern Idaho.** WWP acquired these properties for approximately $1.2 million. Previously acting as a wholesale supplier to Citizens, WWP now directly serves an additional 2,000 residential and commercial customers.

1991 ACTION ITEM: SYSTEM EFFICIENCY ➤

- **A rebuilt Monroe Street hydroelectric project became operational.** The original project, constructed in 1890, consisted of five small generators with a peak capability of 6 MW. The rebuilt facility consists of a single, more efficient unit. Utilizing the same hydraulic capacity, Monroe Street can now produce approximately 14 MW. Based on an evaluation of potential improvements at all existing hydroelectric facilities, WWP is actively pursuing capability upgrades at its Nine Mile and Cabinet Gorge plants.

1991 ACTION ITEM: COMPETITIVE BIDDING ➤

- **WWP completed its first all-source competitive bidding process.** In accordance with a recent WUTC rule (WAC 480-107), WWP completed a review of new electric resource proposals submitted in response to its 1991 Request For Proposal (RFP). Under the RFP process, WWP evaluated but did not pursue bids for five conservation and ten generation projects.

1991 Action Item: Purchases and Sales ➤

1991 Action Item: Transmission Interconnections ➤

1991 Action Item: Creston Plant ➤

Additional 1991 Action Items: ➤

- **WWP refinanced $120 million in mortgage bonds, medium term notes and preferred stock.** By taking advantage of recent drops in interest rates, the company expects to reduce its annual after-tax debt service expense and preferred dividend cost by about $1.5 million.
- **WWP entered into a long-term agreement to sell 150 MW of electrical capacity to Portland General Electric (PGE).** Under this agreement, WWP will supply PGE with energy during peak load hours and, in exchange, receive return energy during light load hours. Revenues gained from this sale will exceed all costs, including any requirements for WWP to secure back-up generating capacity. As a result, the present value of WWP's total electric revenue requirement will be reduced by approximately $50 million over the contract life.
- **The company pursued cost containment and continuous productivity opportunities.** Through a 10-year agreement with EDS Incorporated, the company has contracted for data processing services which were previously supported by WWP. In addition to other benefits, this "outsourcing" of computer services is expected to reduce the present value of the company's revenue requirement by approximately $7.5 million.
- **WWP's thermal generating facilities set records for plant performance.** Because WWP is a hydro-based utility, the availability of economic thermal generation was extremely important during the severe drought conditions encountered in 1992.

1993

- **WWP received a Presidential Permit for construction of a transmission interconnection with British Columbia.** With this permit, the company could seek to build a transmission interconnection capable of transferring up to 800 MW of resources from Canada to the Pacific Northwest. WWP is currently evaluating the need and potential benefits for such transactions.
- **WWP allowed the license for the proposed Creston Generating Station to expire in February 1993.** The proposed coal-fired facility is no longer a preferred resource option for the region. WWP will seek to recover approximately $11.2 million of the Creston investment in future electric rate adjustments.
- **WWP selected a site in northern Idaho as the preferred location for the proposed development of a 176 MW simple-cycle combustion turbine facility.** With natural gas as the primary fuel source, the combustion turbine would support WWP's existing resource base in meeting system capacity needs. If the project proceeds, the facility could be operational in 1995.

In addition to the accomplishments noted above, WWP addressed the entire list of 1991 action plan items during the past two-year planning cycle. Progress was made in the following areas:

- **Load Forecasting:** The company successfully implemented a commercial end-use forecasting model that will be used to produce commercial sector forecasts. In addition, the company has incorporated a separate economic model for Kootenai County into the forecast process.
- **Demand-Side Resource Acquisition:** Through its new demand-side tariffs, WWP acquired an estimated 5.79 aMW of energy savings in 1992. The levelized utility cost of these demand-side resources is estimated at 2.8 ¢/kWh.
- **Planning Model Enhancements:** Modifications to the Strategic Resource Planning Model (SRPM) enhance the model's ability to reflect actual system operation and to incorporate risk assessment into resource selection decisions.

ADDITIONAL 1991 ACTION ITEMS: ➤

- **Electric System Loss Savings:** Electric network planning studies identified new facilities which maintain reliability and reduce electrical system losses.
- **Cogeneration Development:** The company completed studies to determine the feasibility of cogeneration opportunities within the service territory. Under a new ten-year agreement that became effective in January 1992, the company is purchasing up to 59 MW of cogeneration from the Potlatch Corporation.
- **Firming Nonfirm Hydro Resources:** Consistent with the regional power plan, WWP examined the feasibility of installing combustion turbines to back-up production of nonfirm energy from the company's existing hydroelectric system.
- **Mid-Columbia Contract Extension:** WWP is currently participating in negotiations with Grant County PUD for the purchase of energy produced by the existing Priest Rapids and Wanapum hydroelectric facilities.

A complete report on the 1991 Action Plan appears in Appendix A.

The Outlook

This section describes the company's plans for meeting long-term energy and capacity needs. WWP's has reviewed the resource strategies outlined by Washington State[1] and the Northwest Power Planning Council.[2] The company's long-term strategies are consistent with these plans.

Meeting Energy Needs

Although some portions of WWP's service territory have experienced a surge in growth, long-term energy requirements are being offset by other near-term events including:

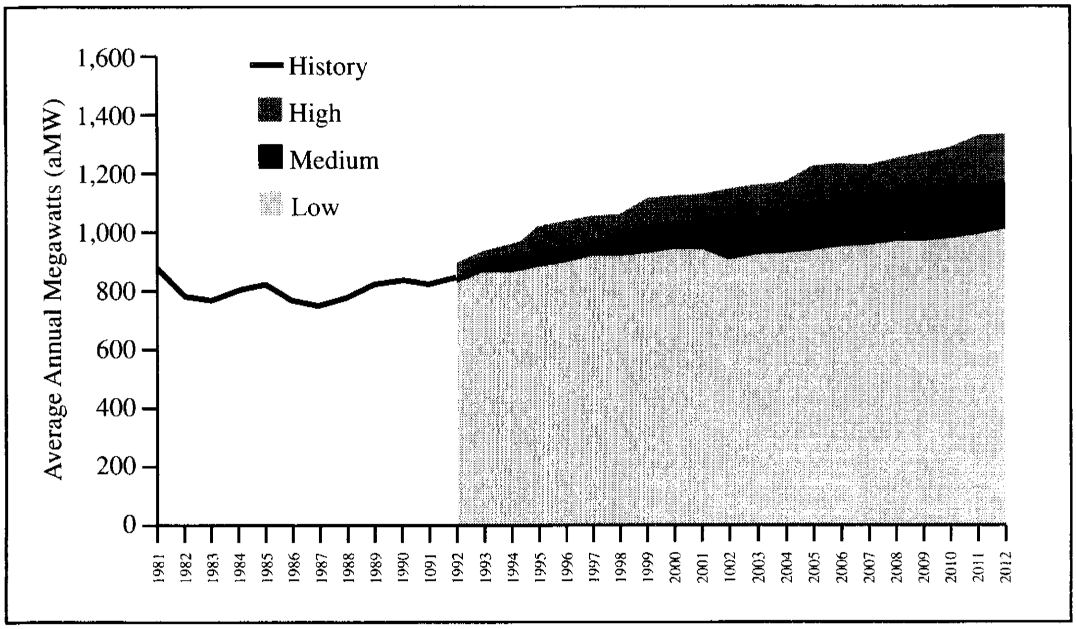
- Closure of mining operations in northern Idaho.
- Reduced forecasts as submitted by the company's large industrial customers.
- Expiration of contracts with three "wholesale for resale" customers (WWP Schedule 61 customers).

As shown in Figure 7, WWP expects that system energy needs will most likely grow at an annual rate of 1.4 percent. For the period 1993 through 2011, this prediction for medium growth corresponds to an increase in energy demand of 260 aMW. Predictions for potential high and low annual growth rates are 1.8 percent and 0.7 percent, respectively, and correspond to long-term increases in energy demand of 358 aMW and 118 aMW.

1 "Washington's Energy Strategy: An Invitation to Action," January 1993, published by the Washington Energy Strategy Committee.
2 "1991 Northwest Conservation and Electric Power Plan," published by the Northwest Power Planning Council.

Figure 7

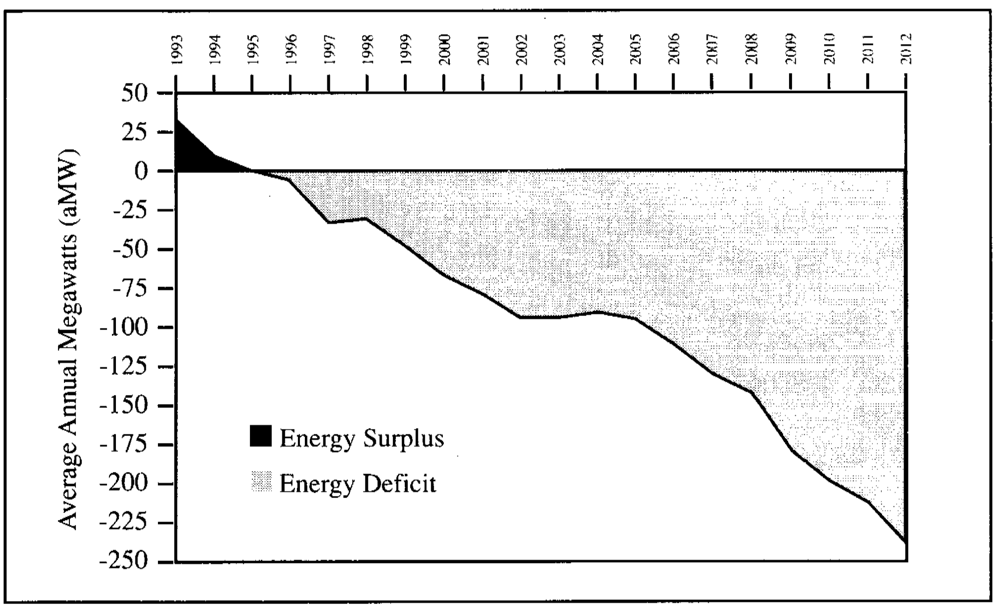
Forecast Energy Loads



Given the medium growth level shown in Figure 7, and without the addition of any new resources, WWP is predicting a near-term energy surplus.[3] Figure 8 shows that this surplus extends through 1995. Beyond 1995, the company faces some energy deficits. However, these deficits remain less than 100 aMW until the year 2006, exceeding 200 aMW near the end of the planning horizon.[4]

Figure 8

Energy Surplus/ Deficit Without New Resources



Through careful planning and design, the company can meet any long-term energy deficits. In its assessment of new demand-side and supply-side resources, WWP has identified a full menu of economic and environmentally preferred resource development options. Based on the evaluation described in Chapter 7 of this report, WWP has selected the following mix of resources as the best strategy for meeting long-term energy needs.

3 Appendix E is a detailed tabulation of WWP's long-term requirements and resources. It serves as the basis for this plan.
4 These deficits include consideration of WWP's 50 aMW planning criteria. Under this criteria, WWP relies on its own surplus resulting from better than critical streamflows or short-term energy purchases to serve the first 50 aMW of energy deficit. The deficits shown in Figure 8 are in addition to any deficits served by this planning criteria.

Figure 9

New Resource Additions Selected to Meet Long-Term Energy Needs

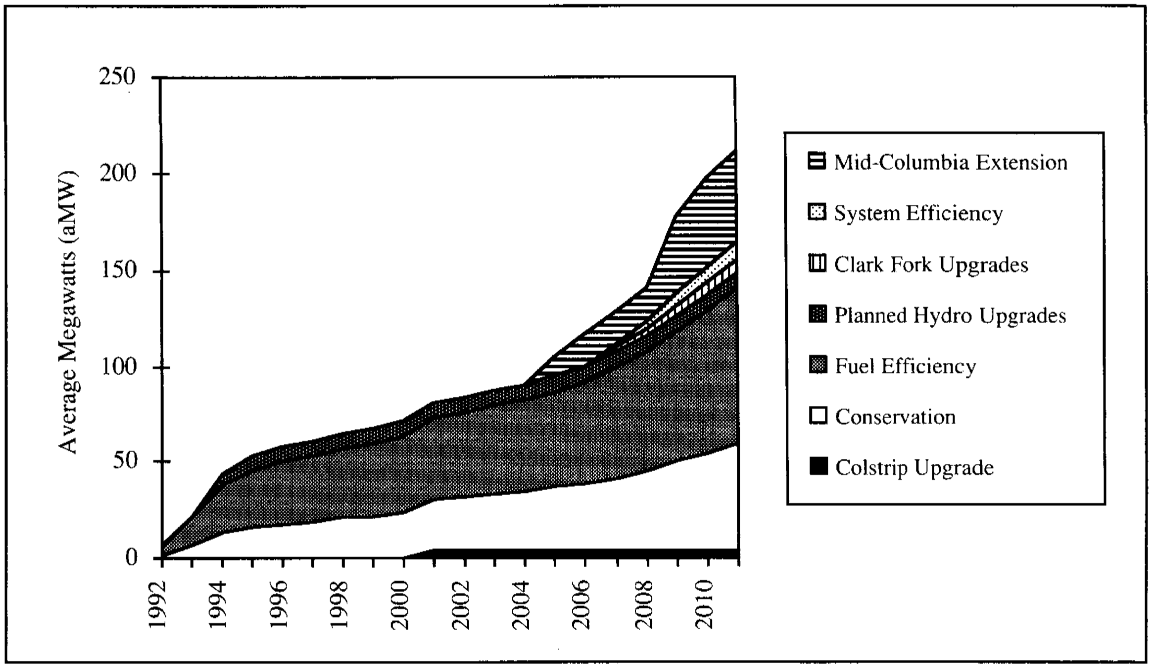


Figure 9 indicates that the company intends to pursue a combination of demand-side and supply-side resources. Specifically, WWP will rely on the following programs or developments:

Figure 10

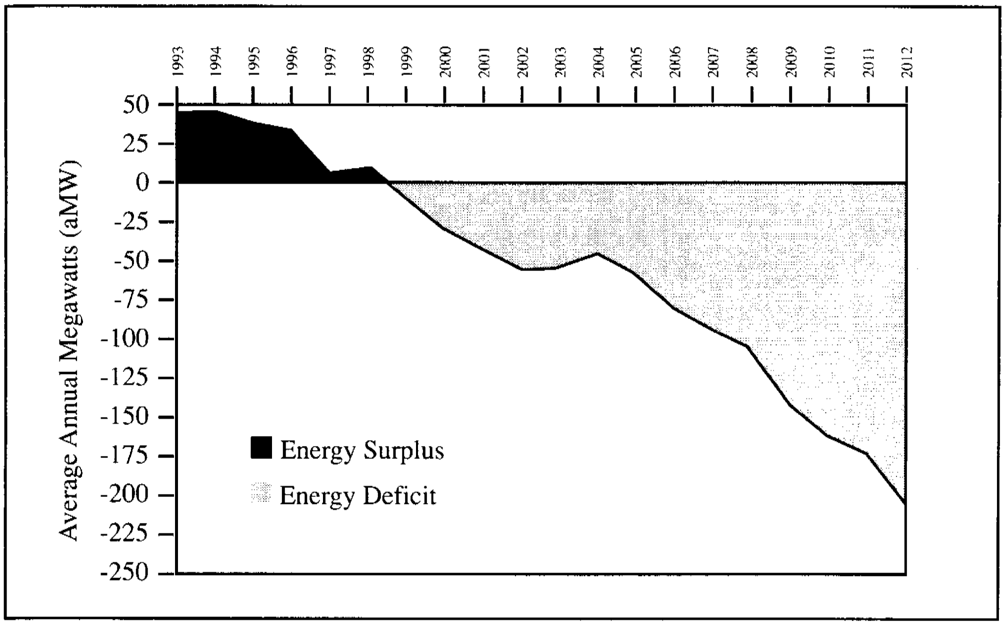
WWP's Energy Resource Acquisition Strategy

Resource Type	Projected resource acquisition: cumulative additions for 1993-2011	
Conservation	Energy savings by reducing customer usage.	55 aMW
Fuel Efficiency	Energy savings gained by the replacement of electric space and water heating equipment with more fuel-efficient natural-gas equipment.	81 aMW
System Efficiency	Energy savings gained by the reduction of losses on WWP's electric transmission and distribution system.	10 aMW
Hydro and Thermal Plant Improvements	Additional energy supplied by maximizing the capability and efficiency of existing WWP hydroelectric and thermal facilities.	19 aMW
Contract Extensions	An economic supply of energy generated by existing Columbia River hydroelectric facilities, purchased through an extension of some of WWP's "Mid-Columbia Contracts."	47 aMW
Total		**212 aMW**

The company's near-term plans call for the acquisition of conservation and fuel-efficiency resources and an upgrade of WWP's Cabinet Gorge Hydroelectric Unit No. 1. In 1993 and 1994, WWP's demand-side management programs will target a total of 12 aMW of conservation and 20 aMW of fuel-efficiency resources. Turbine runner replacement and rewind of the Cabinet Gorge unit is scheduled for 1994 completion. It will provide approximately 5 aMW of firm energy. These new demand-side and hydroelectric efficiency resources will add 37 aMW of new resources to the existing resource base. Figure 11 shows that as a result of these near-term resource additions, WWP's first energy deficit is delayed to the year 1999.

Figure 11

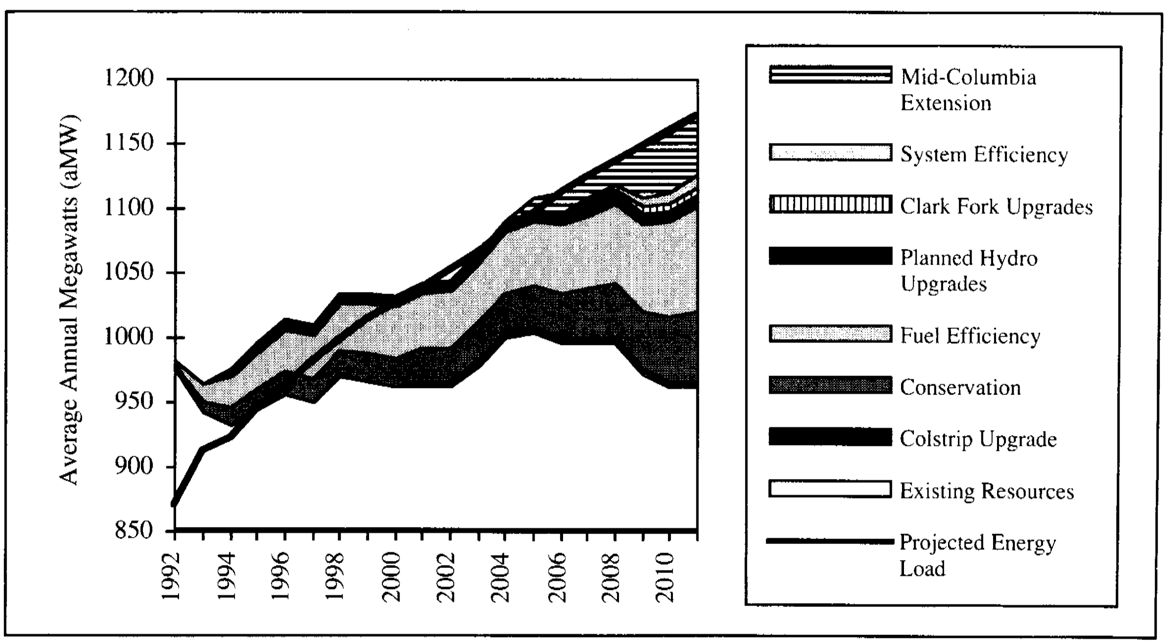
Energy Surplus/ Deficit Including 1993 and 1994 Planned Resource Additions



Beyond 1994, WWP will look to a continuation of the company's demand-side management programs, other system efficiencies and the extension of existing mid-Columbia power purchase contracts. Figure 12 illustrates how this preferred strategy combines with the company's existing resource base to meet projected energy needs.

Figure 12

WWP Plans to Meet Long-Term Energy Needs



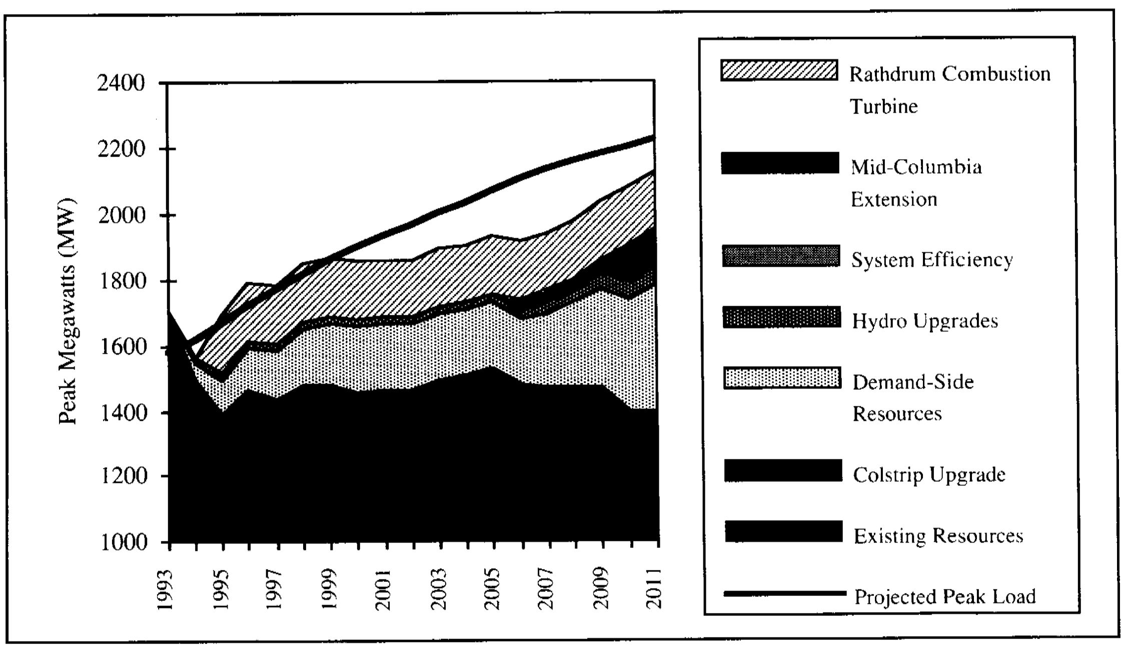
The energy resources acquired under the preferred strategy will extend the company's near-term energy surplus to the year 1999. The company believes this approach reflects the specific nature of the individual resources, especially conservation, which must be acquired over time to realize its full energy potential. External factors, such as federal relicensing requirements, may mandate the schedule for efficiency improvements at the company's hydro facilities. This short-term surplus will help the company mitigate some of the uncertainty associated with forecasting energy needs and predicting events which impact resource capability. WWP will attempt to mitigate any surplus resource costs through its wholesale marketing efforts.

Meeting Capacity Needs

Based on the forecast of peak requirements, the company is facing some immediate capacity deficits. While the resources planned to meet the company's energy needs will also help meet peak loads, additional capacity resources are required. As a result, WWP has proposed the installation of a 176 MW natural-gas-fired simple-cycle combustion turbine. Revenues from WWP's wholesale marketing efforts will offset the cost of the project and eliminate the need to recover the project costs through customer electric rates. As shown in Figure 13, the addition of the proposed Rathdrum combustion turbine e---nsures that the company has adequate generating capability until the year 2000. The company's capacity planning efforts are further described in Chapter 8.

Figure 13

WWP Plans to Meet Long-Term Capacity Needs



The Planning Process

The Integrated Resource Plan is an important part of the company's efforts to effectively manage its resources. This chapter describes the role of the plan in more detail. As development of the IRP represents a marriage of process and technical analysis, this chapter focuses on those elements which comprise the planning process. It includes WWP's ongoing efforts to expand public involvement and to improve coordination of all planning activities.

The Role of Integrated Resource Planning

The primary role of the IRP is to provide direction for energy resource acquisition. While this direction reflects WWP's best efforts to predict future energy needs, assess resource options and identify uncertainties, it is not an absolute. The company will need to respond to many unforeseen events, issues and opportunities over the 20-year planning horizon. The direction or strategy outlined in this report addresses the company's current view of the future. It also provides some of the flexibility required to respond to unforeseen events.

As a strategy, the IRP provides direction. As a process, the IRP represents the company's efforts to develop a low-cost strategy that:

- Adequately responds to the forecast of long-term energy needs.
- Incorporates the perspective of the public and other interested parties.
- Appropriately identifies and addresses regional and national energy issues.
- Is consistent with the corporate commitment.

WWP follows a logical process to determine which potential resources best meet customer needs. This dynamic process is designed to be flexible enough to allow the company to adequately respond to constantly changing load and resource conditions. At minimum, the resource strategy is reviewed annually, coinciding with the development of the company's latest load forecast. The process is also initiated whenever significant changes to the existing conditions are foreseen, either as a result of current or future events. The company's resource acquisition decision process is described below:

- Resource Needs

  Forecasts of energy and peak customer demand are combined with contractual obligations to determine an estimate of the company's long-term resource requirements.

- Resource Assessment

  WWP's review of resource options includes an assessment of demand-side and supply-side resources.

- Resource Screening

  The resource portfolio contains low-cost alternatives that are compatible with existing system operation, have acceptable environmental impacts and can be matched against the resource need.

- Resource Evaluation and Analysis

  WWP's Strategic Resource Planning Model (SRPM) is used to compare the performance of various resource strategies.

- Resource Plan Recommendation

  The preferred plan represents a low-cost and flexible plan for the company and its customers. It meets forecasted needs and addresses many of the issues and uncertainties associated with resource management.

- Resource Plan Approval

  Internal and public review is used to finalize the resource plan.

- Resource Plan Implementation

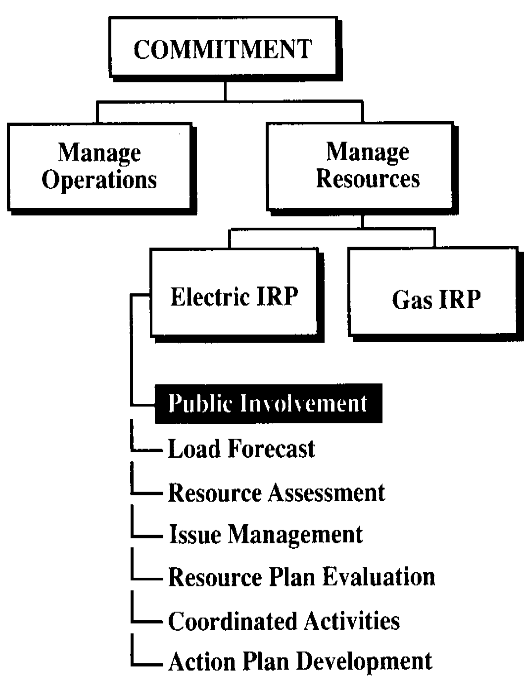
  Short-term action plans outline the steps and responsibilities required to accomplish the final resource plan.

The Components of Integrated Resource Planning

Figure 14 lists all of the elements of process and analysis which combine to form the IRP. The remainder of this chapter focuses on the planning process. Specifically, the company's public involvement and internal and external coordination efforts are described.

Figure 14

The Components of Integrated Resource Planning



Public Involvement

The 1993 IRP reflects the company's efforts to expand both the nature and the scope of its public involvement activities. In addition to scheduled meetings of the WWP Technical Advisory Committee (TAC), the company identified a need to better involve the general public in the planning process. The company addressed this need by holding public forums and by meeting with individual groups on a project-specific basis.

An effective public involvement process requires examination of both technical results and policy issues. In the technical area, the company sponsored a series of workshops to review computer models used in the planning process. Along with the technical elements associated with demand-side management, participants in WWP's DSM Issues Group (DIG) address policy issues such as regulatory incentives.

Highlighted below are WWP's public involvement activities completed or initiated during this planning cycle.

Public Forums: WWP sponsored public meetings to review the resource planning process and results. The public was invited to four meetings held in various locations within the service territory.

Technical Advisory Committee (TAC): Comprised of customer groups, governmental agencies and environmental organizations, the TAC reviews all of WWP's resource planning activities. WWP sponsored nine meetings of the TAC.

Technical Workshops: WWP held workshops regarding the company's commercial end-use forecasting model (CEDMS) and the Strategic Resource Planning Model (SRPM).

DSM Issues Group: As an advisory group, the DIG consists of technical experts, consumer advocates and members of the regulatory commission staff. Initiated in September 1992, the DIG process is scheduled to continue through the spring of 1994.

Project Specific Activities: WWP made numerous presentations to interested groups and individuals regarding the proposed development of hydroelectric and combustion turbine resources.

As part of the ongoing design of the public process, WWP will rely on its policy for "social responsibility." Described in Appendix B, this policy will help guide all of WWP's future public involvement activities.

Internal Coordination

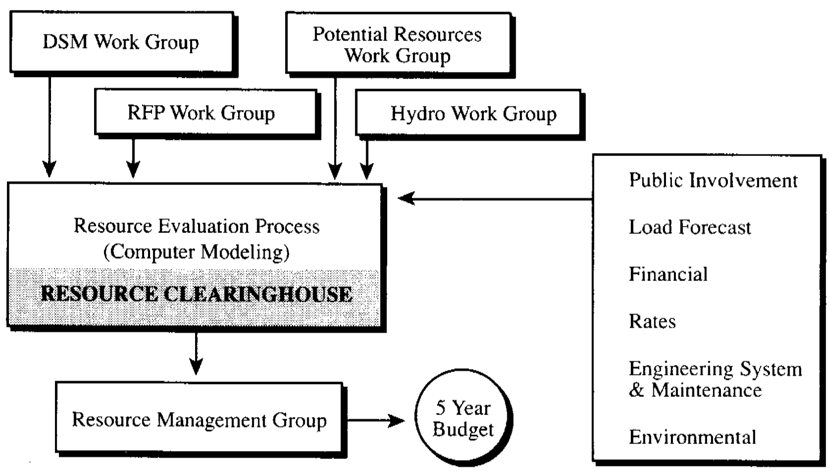
While WWP's 1993 IRP provides direction for the acquisition of future resource needs, the company relies on separate but coordinated efforts to manage related business activities. Internal coordination ensures consistency among the company's efforts in electric resource planning, electric wholesale marketing, electric system planning and natural gas resource planning. WWP's recent efforts to improve internal coordination of these planning activities are summarized below.

Resource Clearinghouse

In early 1992, the company identified a need to better coordinate electric resource decisions among individual departments and with the company's existing budgeting process. To respond to this need, the "Resource Clearinghouse" was formed. Figure 15 illustrates the Resource Clearinghouse concept.

Figure 15

WWP's Resource Clearinghouse



The goal of the Resource Clearinghouse, which is comprised of technical specialists throughout the company, is to review equally all proposals for resource development. Utilizing analytical results, public input and business judgment, the Resource Clearinghouse Technical Group recommends a resource strategy for the company. This recommendation is reviewed by the Resource Management Group, which provides the necessary input to the budgeting process. For WWP, the results of the Resource Clearinghouse effort are reflected in a long-term resource strategy which is consistent with the corporate commitment as well as the near-term budgeting requirements.

Organizational Changes

WWP completed significant organizational changes in 1992. As a result of changes at the executive level, the senior vice-president of rates and resources now oversees the following departments:

- Engineering
- Hydro Production and Construction
- Power Supply
- Rates and Tariff Administration

This flattening of the company's organizational structure will provide coordination benefits similar to that of the Resource Clearinghouse.

Capacity Planning

While this IRP focuses on developing a strategy to meet customer energy needs, capacity planning involves an assessment of resource capability available to peak demand. As the capacity needs of the company and the region increase, additional emphasis will be placed on these efforts. A description of WWP's current capacity planning activities is described in Chapter 8.

Wholesale Marketing

The company's electric wholesale marketing efforts provide input to the Resource Clearinghouse process. During 1992, WWP reinforced its wholesale marketing efforts. Long- and short-term marketing efforts were combined to improve coordination and to increase the resources dedicated to wholesale marketing activities. The new wholesale team, guided by WWP's Electric Wholesale Guidelines, will pursue opportunities that provide benefits to the company and its customers. These guidelines, and WWP's recent wholesale activities, are described more fully in Chapter 8.

Network Planning

Reliability of service continues to be the mandate of WWP's network planning activities. Coordinated facility planning at both the transmission and distribution level ensures that customer needs for reliable and secure energy services are met as efficiently as possible. Additional discussion of WWP's transmission planning criteria and planned facility development appears in Chapter 8.

Natural Gas Resource Planning

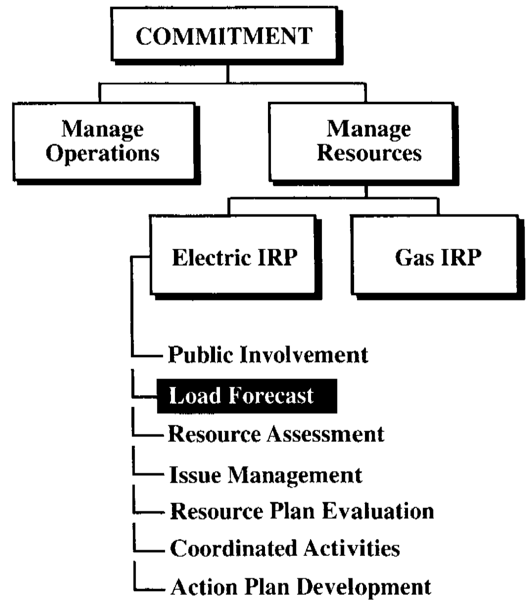
Long-term planning for natural gas resources is described in a separate integrated resource plan document. Published in February, the company's "1993 Natural Gas Integrated Resource Plan," addresses natural gas requirements for both WWP and WPNG customers.

While many of the gas planning activities are naturally separate from electric resource planning, common elements are coordinated. Specifically, inputs to the company's forecast of electric and natural gas requirements are coordinated. Impacts to both systems were considered in the design of WWP's demand-side management programs.

External Coordination

WWP also participates in, or monitors, many activities which affect the regional energy picture. Many of these activities are sponsored by the Pacific Northwest Utilities Conference Committee (PNUCC), of which WWP is an active member. Examples of WWP's PNUCC participation include the Wind Advisory Task Force and the Environmental Cost Work Group. This type of external coordination and involvement is critical to the company's efforts to identify those issues which may have economic or operational consequences.

The Forecast



WWP's electric forecast provides the basis for many of the company's planning and budgeting activities. This chapter describes the development of the load forecast as it applies to the 1993 IRP. A summary of current energy projections is followed by a general description of forecast inputs, assumptions and methodologies. The chapter concludes with a summary of all forecast results, including projections for alternative load growth scenarios used in development of the company's energy resource strategy. Additional forecast details are contained in Appendix D.

The Current View

Although WWP's service territory encompasses 26,000 square miles, 90 percent of all economic activity occurs within Spokane and Kootenai counties. The quality of life enjoyed in the Inland Northwest has led to a recent surge in growth, especially in Kootenai County. Industry growth is characterized primarily by light-manufacturing facilities.

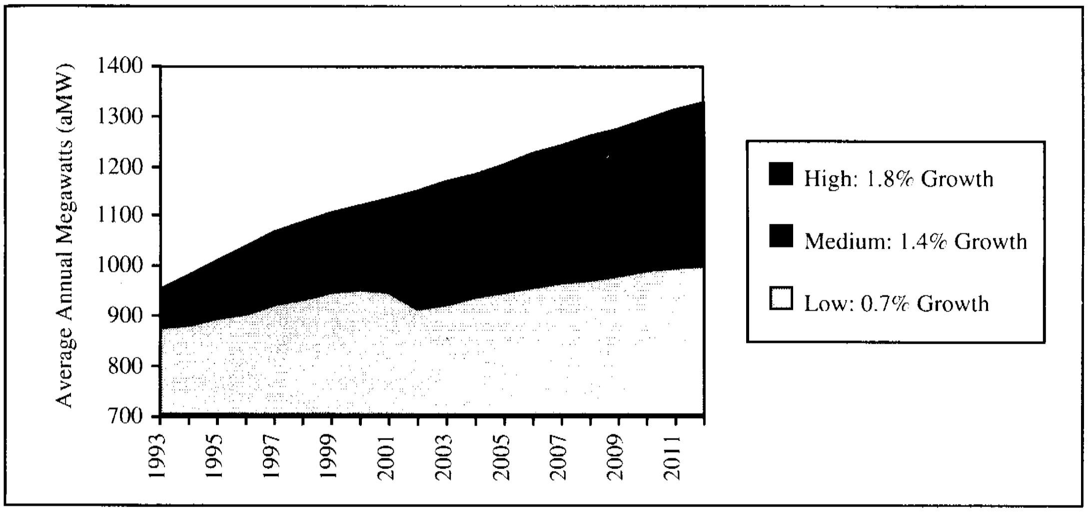
While WWP is projecting some continued growth for these areas, other events have an opposite effect on the company's long-term forecast. In addition to impacts of the national economy, some of WWP's traditionally large customers are eliminating expansion plans or even terminating operations. This is especially true of north Idaho's mining industry, where low metal prices have forced the closure of many operations. Another factor impacting the company's forecast is the expiration of contracts with WWP's Schedule 61 (wholesale for resale) customers. WWP's obligations to serve Modern Electric, and the municipalities of Chewelah and Plummer, expire in 1993. The combined effect of reduced large customer forecasts and expiration of Schedule 61 contracts are captured in the company's load forecast.[5] Compared to the company's 1991 forecast, the combined effect of these events translates to a 72 aMW reduction in the 1995 load projection.

[5] WWP's 1993 IRP assumes a two-year extension of Schedule 61 contracts. However, current indications are that the majority of this electric load will be served by another utility beginning sometime before 1995.

WWP's 20-year energy forecast is prepared annually. Results of the official forecast are used internally and also distributed to external entities. While the annual forecast focuses on projections of the most likely (or medium) load growth, high and low growth scenarios are developed biennially to meet IRP objectives. Figure 16 illustrates the current projections for high, medium and low load growth as determined by the forecast.[6] Annual growth rates are calculated for the period 1993 through 2011.

Figure 16

Energy Forecast Results



The information shown in Figure 16 shows WWP's energy forecast prior to any load reductions associated with demand-side management. One of the IRP's objectives is to treat all energy options equally. Thus,demand-side management is viewed as a resource along with traditional supply-side alternatives.

Inputs and Methodology

The company's current forecasting methodology integrates econometric and some end-use techniques. The econometric models relate electric consumption to weather, economic and price variables. These models are developed using historical information dating back to 1978. The econometric models, together with forecasts of local economic activity, form the basis for the company's customer and sales forecasts. To complete the forecast, survey techniques are employed to project loads for WWP's large-load customers.

The company is currently gaining experience with end-use forecasting techniques. In early 1992, WWP acquired a commercial end-use forecasting model. The Commercial Energy Demand Modeling System (CEDMS) will allow the company to better address the impact of market intervention activities in the commercial sector. WWP's 1995 forecast will reflect full CEDMS implementation. In addition, the company will implement end-use techniques as a means of improving forecasts for the residential sector.

A 20-year energy forecast considers many inputs. Economic and demographic projections, along with forecasts of residential, commercial and industrial customers and sales, are summarized in Figure 17.

[6] WWP's low-growth scenario assumes the potential loss of some large industrial load. This assumption appears as a load decrease in the year 2002.

The Nation

National economic assumptions are provided by McGraw-Hill/Data Resources Inc. (DRI).[7] In its review of the U.S. economy, DRI provides long-term projections for three scenarios. DRI's "Trend" alternative provides input to WWP's medium load growth scenario. DRI's "Optimistic" and "Pessimistic" alternatives provide national economy inputs to WWP's high and low load growth scenarios, respectively.

The Inland Northwest

WWP maintains econometric models which forecast economic activity in both Spokane and Kootenai counties. Each county model produces separate detailed forecasts of:

- Population
- Employment
- Income

Economic inputs are supplied by Tucson Economic Consulting (TEC), a contractor specializing in regional economic modeling and forecasting. Historical economic data is obtained from official county and state sources. Individual results of these local forecast elements are determined for the three WWP load growth scenarios.

Other local inputs to the forecast include:

- Large Load Customer Requirements
- Price and Elasticity Effects
- Weather Effects

[7] DRI document: "Review of the U.S. Economy (Long-Range Focus), Winter 1991-92.

Forecast Results

Figure 17 summarizes the input and results of the company's electric forecast. Projected growth rates for electric sales are shown as well. With the exception of price elasticities and weather, all values represent annual growth rates.

Figure 17

Forecast Input and Results Summary

	High	Medium	Low
The Nation	DRI Optimistic Scenario Inflation: 3.40%	DRI Trend Scenario Inflation: 4.20%	DRI Pessimistic Scenario Inflation: 5.9%
The Inland Northwest			
Population	1.30%	1.10%	0.80%
Employment	2.40%	2.00%	1.40%
Personal Income	2.70% Inflation Adjusted	2.30% Inflation Adjusted	1.70% Inflation Adjusted
Weather	105% of Normal	Normal	95% of Normal
Price Elasticity			
Residential	-0.20	-0.20	-0.20
Commercial	-0.25	-0.25	-0.25
Industrial (Washington)	-0.15	-0.15	-0.15
Industrial (Idaho)	-0.35	-0.35	-0.35
Electric Prices			
Nominal	2.16%	2.20%	1.86%
Real	-1.20%	-1.90%	-3.50%
Electric Sales			
Residential	2.00%	1.80%	1.60%
Commercial	3.10%	2.70%	2.30%
Industrial	2.60%	0.90%	-3.30%
Combined Sales[8]	1.80%	1.40%	0.70%

WWP's forecast of annual energy sales forms the basis for the company's resource planning activities. Figure 18 lists annual energy loads for the high, medium and low forecasts.

In addition to the forecast of annual energy requirements, the company produces a peak load forecast. WWP projects monthly peak demand over the 20-year planning period and uses the forecast results in its capacity planning efforts.

WWP's January peak load forecast, as produced for the medium growth scenario only, is shown in Figure 19. Similar to the tabulation of annual energy requirements, the peak demand forecast is shown absent the effects of any demand-side management activities.

[8] Combined Sales forecast includes street lights and projected Schedule 61 sales.

Figure 18

Annual Energy Forecast

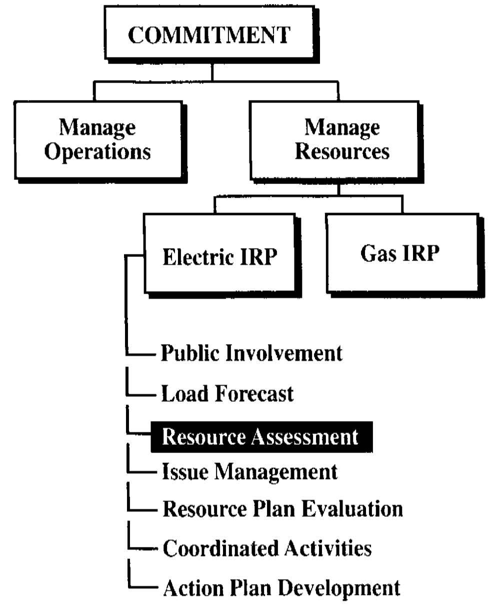
Year	High (aMW)	Medium (aMW)	Low (aMW)
1993	954	912	878
1994	983	921	879
1995	1011	944	896
1196	1040	961	907
1197	1067	981	922
1998	1088	998	934
1999	1108	1014	946
2000	1121	1026	954
2001	1135	1039	950
2002	1151	1052	915
2003	1168	1067	923
2004	1186	1082	937
2005	1205	1097	949
2006	1225	1112	960
2007	1242	1124	967
2008	1259	1136	974
2009	1276	1148	981
2010	1294	1160	989
2011	1312	1172	996
2012	1329	1184	1003

Figure 19

Peak Demand Forecast

Year	January Peak Demand (MW)
1993	1576
1994	1613
1995	1668
1197	1768
1998	1814
1999	1856
2000	1893
2001	1929
2002	1963
2003	1998
2004	2033
2005	2068
2006	2101
2007	2130
2008	2153
2009	2177
2010	2201
2011	2226
2012	2250

Resource Assessment



WWP has identified many potential resources that may be used to meet long-term projections of energy and peak demand. This chapter discusses the cost and availability of these demand-side and supply-side options. While cost is the primary criteria used to screen potential alternatives, other factors help to select the best resources. A general description of WWP's resource criteria helps identify these additional considerations.

The Options

Events that affect WWP's long-term resource picture are numerous and sometimes unexpected. A continual assessment of available resource alternatives helps WWP respond to constantly changing conditions. Potential new resources include:

- Resource proposals submitted under the Washington state competitive bidding process.
- Qualifying facilities under the Public Utilities Regulatory Policies Act (PURPA) of 1978.
- Unsolicited proposals for new resource development or utility power purchase agreements.
- WWP programs to acquire demand-side resources.
- WWP efforts to upgrade existing facilities or construct new ones.
- Cooperative regional efforts to develop new conservation and supply-side resources or transmission opportunities.
- Existing or emerging technologies.

Through these means, WWP is able to develop a full menu of resource options. The supply curve shown in Figure 20 illustrates the availability and price of firm energy produced by both demand-side and supply-side options. Resource cost data is based on WWP evaluations as well as information from the Northwest Power Planning Council. Levelized energy rates are calculated in 1992 dollars.[9] They reflect utility costs and are levelized over the individual life of each resource.

[9] Unless otherwise specified, all resource costs are in 1992 dollars. Rates are nominally levelized using a discount rate of 8.97%.

Figure 20

New Energy Resource Supply Curve

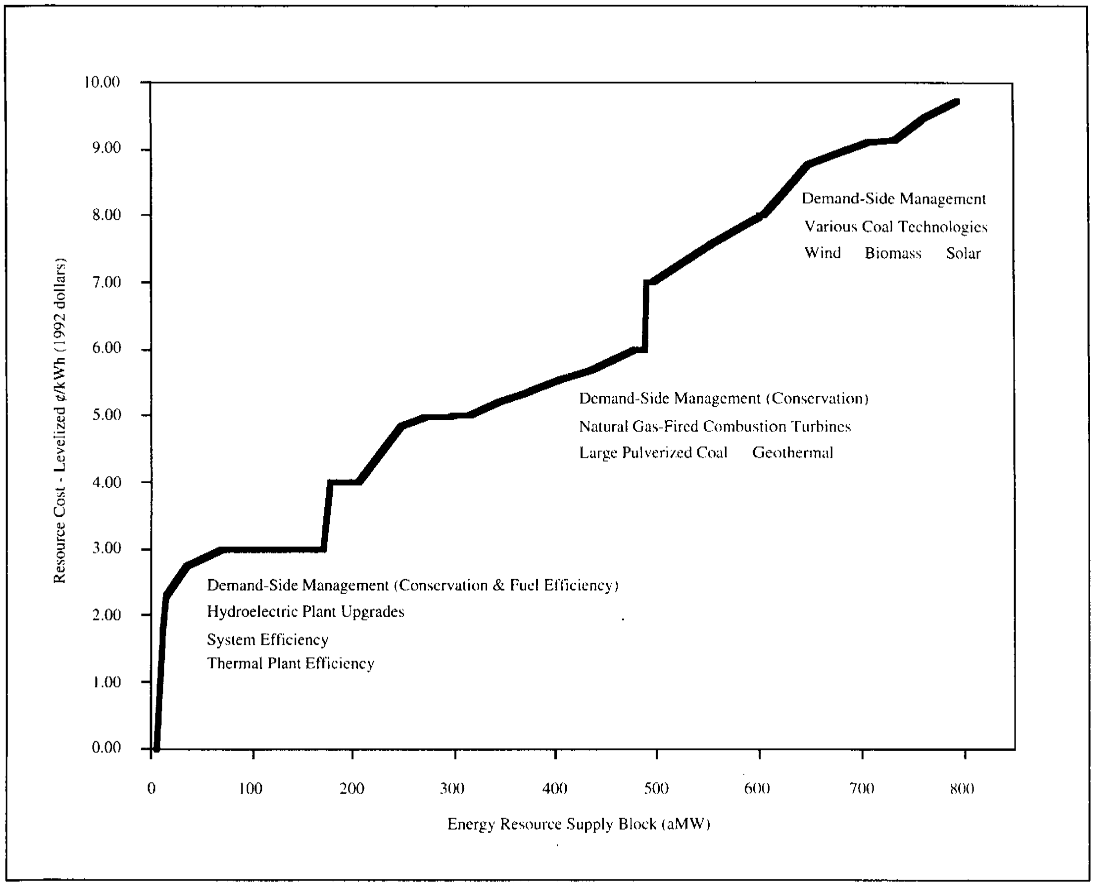


Figure 20 indicates that approximately 200 aMW are available at a rate of 4.0 ¢/kWh or below. This block of resources essentially matches the company's long-term energy needs. The most economic energy resources available to WWP are also the most environmentally preferred. In general the list of economically and environmentally preferred energy resources includes:

- WWP conservation and fuel-efficiency programs.
- Efficiency and upgrade opportunities at the company's existing hydroelectric and thermal generating facilities.
- Efficiency opportunities on the company's electric transmission and distribution system.

WWP's supply curve provides valuable information regarding the relative price of energy resources available to meet the company's long-term energy needs.The energy resources supply curve serves as the starting point for the additional evaluation of potential new resources. The following assessment of demand-side and supply-side resources describes individual alternatives. Appendix F contains additional detail regarding these new resources.

Demand-Side Resources

This assessment discusses the availability and cost of demand-side resource opportunities. It focuses on WWP's current demand-side management program activities. The company's plan to measure energy savings and evaluate the overall effectiveness of each program is summarized. Cost-effectiveness tests that compare the price to be paid for demand-side resources with the cost of the company's alternative resource are also described.

Assessment

The current assessment of demand-side resources is based on:

- The company's past conservation acquisition efforts (1978 - 1991).
- An April 1991 assessment "Evaluation of Demand-Side Management Options for WWP."
- WWP's 1991 test program, which evaluated the replacement of residential electric space and water heating equipment with natural gas equipment (1991 $witch $aver program).
- Initial commercial sector assessment results from WWP's commercial end-use forecasting model.

These efforts and the company's current demand-side management activities, provide information to develop supply curves for individual resource opportunities. The supply curve information shown in Figure 21 represents WWP's current estimates of the cost and availability of these resources. The levelized rates, which range from 3.0 ¢/kWh to 8.0 ¢/kWh, reflect WWP's costs to acquire the electric savings from each demand-side opportunity. Resource costs reflect a 10 percent conservation credit for all measures. Fuel-efficiency measures receive an additional credit that represents incremental capacity benefits.

Figure 21

Demand-Side Resource Supply Curve

Demand-Side Activity by Sector	3¢/kWh	4¢/kWh	5¢/kWh	6¢/kWh	7¢/kWh	8¢/kWh
Residential			**Cumulative aMW**			
Electric to natural-gas fuel efficiency						
Space heat	35.0	43.0	48.0	51.0	52.0	53.0
Water heat	40.0	43.0	45.0	46.0	47.0	48.0
Electric Conservation						
Weatherization	1.0	3.0	5.0	6.0	7.0	8.0
Low-income weatherization	0.0	0.0	0.0	0.0	2.0	2.0
Low-flow shower heads	4.5	4.5	5.0	5.0	5.0	5.0
Compact fluorescent lighting	0.5	1.0	1.5	2.0	2.5	3.0
Residential new construction	0.0	0.5	0.5	0.5	0.5	0.5
Manufactured home acquisition (MAP)	0.0	0.0	0.6	0.6	0.6	0.6
Commercial/Industrial						
Electric to natural-gas fuel-efficiency						
Combined space & water heat	6.5	8.0	10.0	11.0	12.0	12.5
Electric conservation	48.5	63.0	69.0	74.0	75.0	75.5
Total Demand-side Resource Potential	**136.0**	**166.0**	**184.6**	**196.1**	**203.6**	**208.1**

WWP's current programmatic efforts and future resource assessments will be used to refine supply curves for individual resources. The current information provides input to the company's resource planning model. The model is used to help determine the nature and timing of demand-side resource acquisitions.

Current WWP Demand-Side Activity

In 1992, WWP received regulatory approval for new tariffs that allowed the company to implement comprehensive demand-side management programs that provide all customers the opportunity to reduce their electric bills. Under tariffs approved by both the WUTC and the IPUC, WWP is pursuing energy savings from conservation and fuel-efficiency programs. Program implementation gives priority to low income customers. Consistent with the 1992 tariff filing, WWP is currently operating the following demand-side management programs.

Residential Energy Exchanger Program

The Energy Exchanger program is designed to encourage customers to replace their existing electric space and water heat equipment with natural-gas equipment. The program is available to all customers who use WWP electricity as their primary source for space and water heating.

Residential Weatherization

WWP has offered weatherization incentives to its electric space heat customers since 1978. The revised weatherization program offers customers grants toward the installation of many energy saving measures including insulation, energy-efficient windows, water heater wraps and set-back thermostats. A weatherization incentive is also offered to customers who participate through the low-income community action program (CAP) agencies.

Low-Flow Shower Head and Faucet Aerator Distribution

Energy-efficient shower heads and faucet aerators are being made available to all electric and gas water heating customers in Washington and Idaho.

Compact Fluorescent Light Bulb Rebates

Under this program, customers who purchase compact fluorescent light bulbs can receive a rebate of up to $7 per bulb.

Residential New Construction

The residential construction program supports the implementation of the applicable Washington state residential energy codes. In Idaho, the program supports jurisdictions that have adopted the Northwest Energy Code.

Manufactured Home Acquisition

The Manufactured Home Acquisition program (MAP) is a regional program that supports manufactured home builders who produce and distribute energy-efficient, electrically heated homes.

Commercial/Industrial Electric Efficiency

This program targets commercial and industrial customers who install energy-efficiency measures.

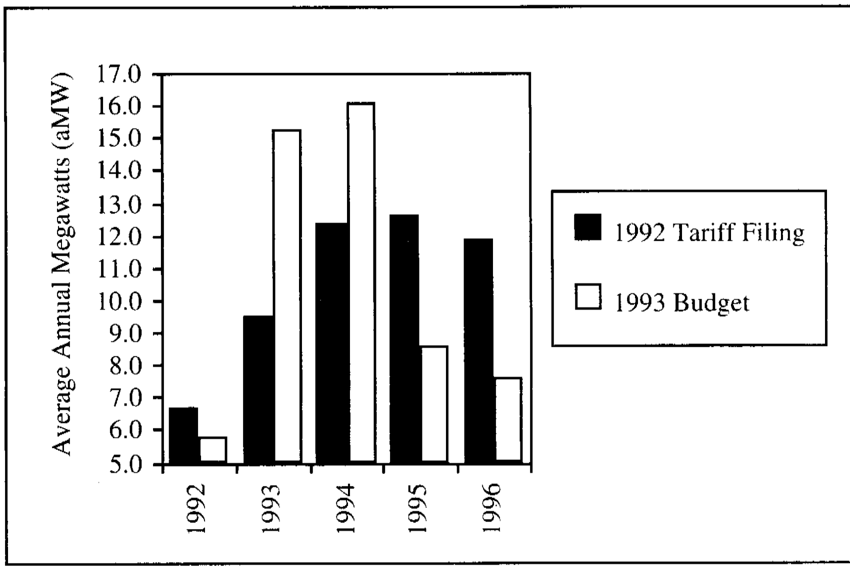
Commercial/Industrial Fuel Efficiency

The commercial/industrial fuel-efficiency program is designed to encourage customers to replace electric end uses with natural gas end uses. To qualify for the program, the new gas end use must be at least 40 percent efficient.

WWP's 1992 tariff filing included demand-side savings targets for program activity through 1996. Updated incremental energy savings and annual expenditure estimates are shown in Figures 22 and 23. Along with the company's resource needs, these new estimates reflect delayed program implementation, 1992 program success and program modifications for 1993 and beyond.

Figure 22

Current Demand-Side Savings Estimates

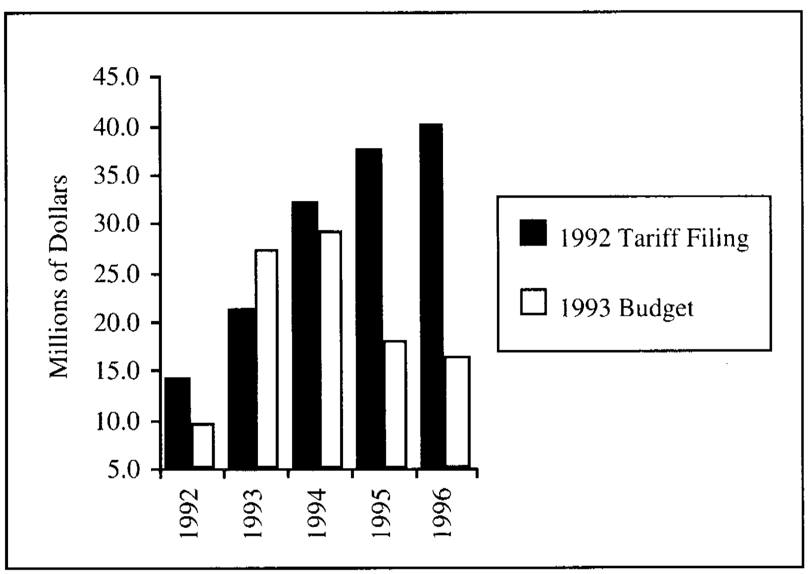


① $ reduction after 94

② cheaper & faster

Figure 23

Current Demand-Side Budget Estimates



Measurement and Evaluation

The measurement of the company's 1993 demand-side management programs is described in WWP's 1993 Demand-Side Management Measurement and Evaluation Plan. This plan is the result of a cooperative effort between the company and its DSM Issues Group (DIG). It outlines the evaluation of eight WWP electric and gas demand-side programs.

The 1993 measurement and evaluation plan represents the company's first comprehensive evaluation effort. Goals of the plan are to:

- Provide for counting program savings as soon as participants complete installations and before the company conducts detailed evaluations of savings impacts.
- Estimate the capacity and energy savings actually achieved for the demand-side programs.
- Provide data necessary for performing cost-effectiveness tests from a total resource cost and utility cost perspective.
- Supply information essential to the company for making changes to various aspects of ongoing programs.

Two key components of this evaluation effort are the impact and process analyses. The impact analysis quantifies the energy impacts of each program. It answers the question "How much energy savings did the program achieve?" In contrast, the process evaluation answers the question "How well did the program operate?" Both analyses will provide valuable information about the near-term success of WWP's demand-side management efforts.

Cost-Effectiveness

Cost-effectiveness tests provide a means of comparing the price to be paid for demand-side resources with the cost of the company's alternative resource. WWP uses two types of tests to evaluate the cost-effectiveness of demand-side opportunities. The "Utility Cost Test" (Utility Test) and the "Total Resource Cost Test" (TRC Test) provide different types of information. Both are important. The application of each test may vary depending upon the type of resource or type of program being evaluated.

Utility Test

From the utility's perspective, the determination of cost-effectivenes is a direct calculation involving only the company's costs associated with the demand-side resources. These costs primarily include the utility rebate or contribution (grant), program administrative costs and measurement and evaluation costs.

The total costs paid by the utility for the energy savings are compared with the value of these savings as represented by the utility avoided cost. Other types of utility benefits such as electrical system loss savings or incremental capacity benefits may upwardly adjust the avoided cost or be credited as a reduction to the cost of the demand-side resource.

A demand-side resource passes the Utility Test as long as the total cost paid by the utility is equal to or less than the utility's avoided cost.

TRC Test

A TRC test compares the cost paid by all parties for the demand-side resource with the cost of the alternative resource as represented by the utility avoided cost. The TRC test captures any additional costs paid by the customer or any other third party. Participant costs are generally represented by measure (equipment) costs that remain after payment of the utility grant.

A TRC test compares these total costs with energy benefits received by the utility (as represented by avoided costs) as well as other non-energy benefits that may be received by the customer, such as increased comfort, reduced electric bills and new energy-saving equipment. Depending upon the type of demand-side program, the TRC test may quantify some or all of these benefits. In quantifying these benefits, the TRC test recognizes that the customer, to some extent, is willing to pay for them.

The TRC test views cost-effectiveness from a societal perspective. A demand-side measure passes the TRC test when the total price paid by all parties does not exceed the value of the resource as represented by the avoided cost. The TRC test is used to determine the maximum cost-effective funding level for each WWP program. The details of the TRC test as it applies to WWP are currently being developed through the company's DSM Issues Group (DIG).

Not every demand-side measure may pass these cost-effectiveness tests. However, special conditions, such as regulatory requirements or the need to raise conservation awareness and maintain program infrastructure, may otherwise direct the company to pursue these resources.

Supply-Side Resources

As the acquisition of demand-side resources advances, supply-side resources are no longer viewed as the only means of producing energy. However, supply-side resources will continue to offer some unique benefits to the resource portfolio. This assessment of supply-side opportunities focuses on options which best meet the company's needs for low-cost, flexible and environmentally preferred resources.

Assessment

WWP's current assessment of supply-side energy resources is based on:

- An evaluation of potential upgrades at all existing company hydroelectric facilities.
- The company's 1991 competitive bidding process.
- Unsolicited proposals for resource development and sales.
- An evaluation of cogeneration opportunities within the WWP service territory.
- Information contained in the 1991 Northwest Conservation and Electric Power Plan.

Supply-side resources may be developed by the company, by another utility or by an independent power producer. The overview of available supply-side options begins with a summary of WWP opportunities and is followed by a discussion of other supply-side opportunities.

WWP Development Opportunities

WWP's current energy development opportunities include:

- Upgrades at the company's existing hydroelectric facilities.
- Turbine rotor replacements at the Colstrip coal-fired plant.
- Electric transmission and distribution loss savings.

Capacity development opportunities include:

- The installation of a natural-gas-fired simple cycle combustion turbine.
- The construction of a second powerhouse at WWP's existing Long Lake hydroelectric plant.

Figure 24 summarizes the generating potential and associated firm energy costs for hydroelectric upgrades, Colstrip efficiency and electric system energy savings. Firm energy resource costs are levelized over a 35-year life for each project.

Figure 24

WWP Energy Resource Development Opportunities

WWP Resource Opportunity	Incremental Capacity (MW)	Incremental Firm Energy (aMW)	Firm Energy Levelized Cost (¢/kWh)
Hydroelectric Plant Upgrade			
Monroe Street (completed in 1992)	8.9	5.8	3.3
Upper Falls	1.7	0.8	1.7
Nine Mile Falls			
Without incremental pool raise	11.1	1.7 8 aMW	2.4
With incremental pool raise	13.1	3.1	1.8
Cabinet Gorge			
Unit No. 1	10.0	5.1	0.0
Unit No. 2	10.0	1.6	4.0
Noxon Rapids			
Unit No. 1	10	0.9	5.0
Unit No. 3	10	1.6	4.0
Colstrip Thermal Efficiency			
Turbine rotor replacement for Units No. 3 and No. 4	6.0	5.0	1.6
Electric System Efficiency			
Transmission and distribution loss savings	20.0	20.0	2.7

The firm energy cost for each hydroelectric upgrade opportunity reflects a credit for incremental capacity and nonfirm energy available from the project. In the case of Cabinet Gorge Unit No.1, these benefits completely outweigh the cost of the project, thereby yielding a firm energy cost of zero. Upgrades for Cabinet Gorge Unit No.1, Upper Falls and Nine Mile represent the company's most economic hydroelectric options. The company is currently proceeding with the Cabinet Gorge No.1 and Nine Mile (without pool raise) projects. Additional study will finalize the scope and timing of the Upper Falls project.

Turbine rotor replacement opportunities at Colstrip will increase generation without any increase in fuel (coal) consumption. WWP and the other Colstrip owners are currently evaluating the timing and scope of this thermal efficiency opportunity.

Decisions to construct new facilities, upgrade existing equipment and reconfigure the existing electrical system are part of WWP's network or system planning activities. Constructed primarily for their reliability benefits, these projects also represent the opportunity to capture cost-effective electric system loss savings. These system efficiency resources are realized as individual transmission and distribution projects are completed.

The resource opportunities shown in Figure 24 above are sources of both incremental capacity and firm energy. Other opportunities, like the second Long Lake powerhouse and the Rathdrum combustion turbine facility, are considered primarily to meet system capacity needs. While both of these facilities will also produce energy, project development is generally based on their costs as capacity resources. A description of these capacity projects and their costs are contained in Chapter 8.

Purchases and Exchanges

The company reviews unsolicited proposals for power purchases on an ongoing basis. These proposals are typically sponsored either by other utilities or by developers of independent power projects.

WWP currently has long-term purchase rights to power output from four mid-Columbia River hydroelectric plants. Each of these contract purchases represents a very low-cost and flexible resource for the company. Contracts with Grant County PUD for Priest Rapids and Wanapum plant output expire in 2005 and 2009, respectively. WWP is actively pursuing a Grant County offer to extend the sale under a new long-term agreement. Negotiations are expected to be completed sometime in 1994.

New power purchase and sales opportuniuties will be pursued as they become available. By maintaining an active involvement in regional wholesale energy markets, the company will be able to focus on the best opportunities. Each of these opportunities is considered as a potential means of meeting WWP's energy and capacity needs or the needs of the region. WWP's existing utility contracts are described in Appendix C.

Cogeneration Opportunities In WWP's Service Territory

Since 1991, studies to determine the feasibility of cogeneration development in the WWP electric and gas service territories focused on industrial facilities and state universities.[10] Comprehensive studies were completed with Inland Empire Paper, Kaiser Aluminum and a major food processor in Grant County. Study results indicated that the cost of installing cogeneration facilities ex-

[10] Under a 1991 agreement, the company is currently purchasing up to 59 MW of cogeneration from the Potlatch Corporation's Lewiston, Idaho plant.

ceeded the cost of other WWP resource options but that these facilities might be considered as regional resources. On this basis, an Inland Empire Paper cogeneration project was proposed, but eventually rejected, under BPA's recent competitive bidding process.

Competitive Bidding

WWP's 1991 competitive bidding process (RFP) provided the company some information about the type, availability and price associated with new resources. Supply-side resource options were dominated by proposals to produce energy from natural-gas-fired combustion turbines. These projects also represented the lowest cost supply-side proposals. Only one small renewable resource was offered at a price below WWP's Washington avoided cost ceiling. Figure 25 summarizes the type of projects which passed the company's initial project review. Because of the confidential nature of the RFP process, bid prices are combined and represented by a range rather than on an individual project basis.

Figure 25

1991 Competitive Bidding Process: Supply-Side Proposal Summary

Resource Type	Proposals	Firm Energy (aMW)	Levelized Cost (¢/kWh)
Renewable	1	3	
Natural-Gas-Fired			5.0 - 5.7
Cogeneration facility	4	100	
Independent power producer	3	87	
Total	**8**	**190**	

Due primarily to reduced energy needs, WWP did not pursue any of the projects offered under the 1991 competitive bidding process. Although the company's next RFP is currently scheduled for September 1993, the company will seek to defer the process to better match the timing of projected energy needs.

PURPA

The Public Utilities Regulatory Policies Act (PURPA) of 1978 requires utilities to purchase power from cogeneration and small power production facilities which qualify under PURPA rules. Active discussions regarding new PURPA projects are limited to the potential development of a small project (300 kW) to be located in northern Idaho.

Regional Resource Data

Published by the Northwest Power Planning Council (NWPPC), the 1991 Northwest Conservation and Electric Power Plan provides regional data regarding the costs for a variety of resource options. WWP uses this data to complete a generic assessment of these supply-side resources. This regional information is summarized in Figure 26.

Figure 26

Regional Resource Cost Data

Resource Type	Levelized Cost (¢/kWh)
Coal Plants	
Large pulverized coal	7.6
Small pulverized coal	9.1
Atmospheric fluidized bed combustion (AFBC)	9.1
Combustion Turbines	
Simple-cycle combustion turbine (SCT)	6.0
Combined-cycle combustion turbine (CCCT)	4.8
Coal gasification combined cycle (IGCC)	8.8
Renewable Resources	
Biomass	11.3
Geothermal (Cascade)	7.9
Wind (Blackfoot Hills, Mt.)	9.5
Solar (Photovoltaic)	26.3

Selecting the Best Resources

WWP's resource assessment focuses on the cost of available options. While cost is the primary criteria used to evaluate these options, it is not the only one. The portfolio of preferred options includes resources that:

- **Can be matched against the customer needs.** Since different types of resources have different ratios of capital to operational costs, the nature of the resource requirement must be considered. For example, system energy and capacity needs may be met by different types of resources.

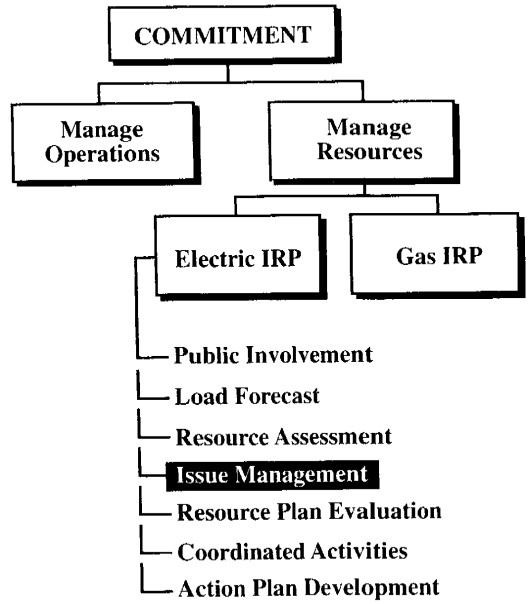
- **Add value to the existing system.** Options which are compatible with operation of the existing system are favored. A combustion turbine that could be used to firm the company's nonfirm hydroelectric resources is an example of a resource that adds value to the existing system.

- **Represent a proven technology.** WWP monitors technology advances that improve the economy and availability of alternative energy supplies like wind and solar resources. In general, the company relies on other entities to support the research and development of these options.

- **Can be successfully licensed and permitted.** Any impacts due to resource development must fall within local, state and federal requirements. WWP's environmental and social responsibility extends from the stewardship of existing resources to the development of new ones.

The company's commitment as a low-cost provider of energy services makes an ongoing resource assessment an important part of the planning process. New information regarding capital and operational costs, as well as the risks associated with each resource option are evaluated as it becomes available.

Resource Management Issues



In addition to the forecast of customer energy needs and the assessment of new resource options, WWP identifies issues that may affect the operation of the existing system or the resource selection process. This chapter describes current and emerging issues and their potential impact on the company. The status and impact of each of these issues determines how they are addressed in the resource planning process. Some are addressed directly through scenario planning. Others are identified as future action plan items or as part of ongoing activities.

Figure 27 summarizes current resource management issues, their potential impact and how each issue is currently addressed within the planning process. This summary is followed by individual descriptions of each issue. A broader review of these issues appears in Appendix G.

Figure 27

Resource Management Issues Summary

Issue	Potential Impact	Addressed in Planning
1992 National Energy Policy Act Provisions of the Energy Act are intended to promote competition, energy efficiency and environmental protection.	Impacts are currently unknown. A full review of the 1992 Energy Act is required.	1993 Action Plan Item
Transmission Access The National Energy Act gives the FERC the authority to order a transmitting utility to provide transmission access.	WWP expects no immediate impacts.	1993 Action Plan Item
1990 Clean Air Act Amendments By the year 2000, Centralia will be required to reduce emission of sulphur dioxide (SO_2) by 30%.	Many compliance solutions exist. At the extreme, Centralia generation levels would be reduced by about 40%.	Addressed in Scenario Planning

Issue	Potential Impact	Addressed in Planning
Proposed National Energy Tax As proposed by President Clinton, an energy tax would be placed on the heat content of fuels. The tax would be phased in over three years beginning in 1994.	The proposed tax would increase the cost of natural-gas, coal and hydroelectric generation.	1993 Action Plan Item
Endangered Species Act (ESA) Recovery plans for Snake River salmon and other ESA activity could result in operational changes for the Northwest coordinated hydro system.	Operating constraints could reduce generating capability at existing hydro-electric plants.	Addressed in Scenario Planning
Hydroelectric Plant Relicensing FERC licenses expire for some WWP hydroelectric plants beginning in the year 2001.	New license requirements could reduce generating capability and operational flexibility. WWP's relicensing schedule could determine the timing of hydroelec-tric plant upgrades.	Addressed in Scenario Planning
Competitive Bidding Competitive bidding is one of the ways that WWP can evaluate and select potential resources. The company's next RFP is scheduled for September 1993.	The company will seek to defer the 1993 RFP to better match resource needs.	1993 Action Plan Item
PURPA/QF Activity Under PURPA, utilities are required to purchase power from qualifying facilities. PURPA implementation is different for the Washington and Idaho jurisdictions.	Active discussions are limited to the potential development of a small (300 kW) QF in northern Idaho.	Ongoing Activity
Avoided Cost WWP expects to file new avoided costs in mid-1993.	New avoided costs will reflect the company's current energy surplus and the market price of available new resources. Preliminary calculations indicate that new rates will be lower than existing values.	1993 Action Item
Demand-Side Management The aggressive pursuit of demand-side resources presents some new challenges.	With the help of its DSM Issues Group, WWP is addressing many issues includ-ing resource evaluation, cost-effective-ness and financial incentives for the utility.	1993 Action Plan

Issue	Potential Impact	Addressed in Planning
Environmental Externalities The goal of addressing externalities is to more accurately reflect the full cost to society of utility resource decisions.	Analysis completed under WWP's 1991 RFP process found that the inclusion of externalities did not change the overall ranking of resource alternatives.	1993 Action Plan
Global Warming The environmental impact of carbon dioxide is being studied worldwide.	A federal tax on carbon dioxide emissions has been considered.	Addressed in Scenario Planning
Electric and Magnetic Fields The issue of whether exposure to power-frequency electric and magnetic fields (EMFs) could result in adverse health effects has received considerable attention.	Public concerns about EMF are sometimes raised during the transmission line siting process.	Ongoing Activity
Regional Power Supplies In 1993, the 1100 MW Trojan Nuclear Plant was permanently closed.	Through its wholesale marketing activities, WWP could become involved in efforts to meet regional needs for energy and capacity.	Ongoing Activity
Hydroelectric Resource Firming The objective of "firming nonfirm" is to turn lesser valued nonfirm energy into firm energy via a back-up power source.	Results of a 1992 study indicated potential benefits associated with firming WWP's hydroelectric resources. Future study will investigate the need for this potential resource as well as the costs and risks associated with its development.	Potential Wholesale Marketing Activity
Transmission Opportunities The use and development of transmission interconnections allow access to low-cost resources.	In 1993, WWP received a Presidential Permit for a proposed WWP-BC Hydro Transmission Interconnection.	Ongoing Activity

1992 National Energy Policy Act

In October 1992, energy bill HR 776 became the first major energy legislation in 15 years to become law. While the Energy Act covers specific subjects ranging from energy-efficiency to nuclear plant licensing, its major objectives are to promote:

- Competition in power generation.
- Alternative fuels and fuel sources.
- Energy efficiency and conservation.
- Environmental protection.

To fully understand all of the act's potential impacts, a complete review of the measure is required. Based on a cursory review, WWP will closely monitor developments in the following areas:

Figure 28

Key Elements of the 1992 Energy Policy Act

Alternative Fuel Vehicles	A proportion of existing fleet vehicles will require alternative fuel capability. Tax rebates for electric cars could increase electric load.
Exempt Wholesale Generators	A new class of independent power plant that would be exempted from PUCHA regulation and PURPA restrictions is created.
Transmission Access	FERC is provided with broader authority to order transmission access and to set transmission wheeling rates.
Integrated Resource Planning	Current Northwest practices for integrated resource planning are basically reinforced. Energy-efficiency standards are outlined. A least-cost energy strategy for the federal government will be developed.
New Resource Development	Clean-coal technologies are supported. Renewable energy development is supported through federal incentives and permanent tax credits. The development of new hydroelectric resources faces higher regulatory and economic barriers.

As the implementation of the Energy Act unfolds, future planning activities will address those issues that specifically affect WWP's ability to manage existing and future resources.

Transmission Access

One of the most controversial aspects of the National Energy Act gives the Federal Energy Regulatory Commission (FERC) the authority to order a transmitting utility to provide transmission access (wheeling) to another utility, independent power producer or PURPA qualifying facility when such transmission access is determined by the FERC to be in the public interest. The transmitting utility may be required by the FERC to expand the capacity of its transmission system in order to accommodate a request for transmission access.

Although WWP expects no immediate impacts from the transmission access legislation, the company is actively participating in the formation of a regional transmission group (RTG). The RTG will allow utilities to address transmission access issues through coordinated transmission planning, dispute resolution mechanisms and data collection activities. The RTG may provide a local alternative to the FERC should transmission access disputes arise.

Clean Air Act Amendments of 1990

Legislation passed in 1990 included substantial amendments to the federal Clean Air Act. Title IV of the 1990 Clean Air Act Amendments (CAAA) deals with Acid Deposition Control. It will have major impacts on utilities that rely on coal-fired generation. Goals to significantly reduce emissions of sulphur dioxide (SO_2) and nitrous oxide (NOx) will occur in two phases. Phase I affects 110 plants nation wide. Phase II affects over 2000 sources including the Centralia coal-fired plant of which WWP owns 15 percent.

As a "Phase II" plant, Centralia will be required to meet certain emission standards by the year 2000. For Centralia, this means an SO_2 reduction of approximately 30% over current emission rates or the purchase of sufficient allowances to operate at its current rate. Potential compliance options include conventional scrubbing, low-sulfur coal, clean-coal technology, reduction in output or capacity factor and the purchase of SO_2 allowances. Conventional scrubbing costs are estimated to be between $600 million and $800 million. Costs are being developed for the most likely compliance scenarios. They include some combination of the following:

- Low-sulphur coal.
- SO_2 reduction through clean coal-technology.
- Natural gas as primary fuel.
- SO_2 allowances either purchased or pooled among the plant owners.

WWP also owns 15 percent of Colstrip coal-fired units No.3 and No.4. Both Colstrip units have sufficient SO_2 allowances to operate under the CAAA.

Reduction in NOx emissions will be required by both Centralia and Colstrip prior to the year 2000. Advanced burner design technology will be used to meet the new NOx emission standards. Based on 15 percent ownership of both plants, WWP's share of NOx compliance costs will total approximately $6 million. In addition to these emission requirements, the CAAA establishes a new operating permit program that will assess a permit fee for each regulated pollutant. WWP's share of these federal fees for Centralia and Colstrip combined is estimated at $120,000 annually.

Since it has the capability to burn natural gas, WWP's Kettle Falls wood-fired generating station is listed as an affected unit under the acid deposition regulations. Although natural gas is currently used only during plant start-up and shut-down, SO_2 allowances issued in 1992 by the Environmental Protection Agency (EPA) are sufficient for 100 percent natural-gas operation.

Proposed National Energy Tax

In February 1993, President Clinton proposed a national energy tax as a means of reducing the federal deficit. The proposed broad-based energy tax is expected to curb U.S. oil imports by some 350,000 barrels per day by the year 2000 but not hinder the domestic production of fossil fuels and other energy sources. The proposed plan would impose a tax based on the heat content of fuels as measured in British Thermal Units or BTUs. The tax promotes conservation and is geared toward reducing the consumption of imported oil and fuels with a greater environmental impact, such as coal. The "BTU tax" would be phased in over three years beginning July 1, 1994.

For WWP, the proposed energy tax would mean increases in the cost of natural gas, coal and hydroelectric generation. Although it is too early to predict the specific impact, these additional production costs would lead to some increase in the retail price of natural gas and electricity.

Endangered Species Act (ESA)

In 1990, five salmon runs located within the Snake and Columbia River basins were petitioned for protection under the Endangered Species Act (ESA). These actions resulted in the listing of the Snake River sockeye as "endangered" and the Snake River spring/summer chinook as "threatened."

In response to these actions, the Northwest Power Planning Council initiated a four part process to amend its Columbia River Basin Fish and Wildlife Program. This process was to provide the National Marine Fishery Service (NMFS) with a comprehensive regional recovery plan for the listed Snake River salmon and to provide protection for other threatened Pacific Northwest fish runs.

Thus far, measures which have been adopted and implemented through the Planning Council's amendment process have not directly impacted generation levels at WWP-owned and operated hydroelectric facilities. However, generation levels at each of the four mid-Columbia projects from which the company receives power under long-term purchase agreements are being impacted. The size of this current impact is relatively small, amounting to less than one percent of the company's total hydro generating capability.

A long-term recovery plan for the Snake River salmon is to be drafted by late 1993. The results of the recovery plan will determine the nature of any further impacts to WWP's hydroelectric capability.

Actions to save the Snake River salmon, as well as any future ESA activity, could affect the company's hydroelectric resources. While these ESA impacts are largely unknown, the company will continue to monitor and participate in all regional ESA activities. Efforts will focus on meeting fish and wildlife needs while minimizing generation and economic impacts.

Hydroelectric Plant Relicensing

WWP is now planning for the successful relicensing of its existing hydroelectric generating facilities. Over the next 10 to 15 years, the company will be involved in efforts to relicense hydroelectric generation facilities on the Spokane and Clark Fork rivers. Figure 29 lists those plants and their associated FERC license expiration dates.

As a result of the Electric Consumers Protection Act of 1986, the FERC must give equal consideration to energy conservation, fish and wildlife protection, the enhancement and preservation of recreational opportunities and other aspects of environmental quality. WWP's relicensing activities will focus on balancing environmental concerns with the need to preserve resource capabilities. Preliminary investigations indicate that mitigative measures that become a condition of the FERC license could result in a loss of both generating capability and operational flexibility.

WWP's relicensing activities will attempt to mitigate these potential losses of generating capability and flexibility. At the same time, the company will look to comply with FERC requirements for maximizing the efficiency of each facility. These efforts could determine a need to schedule hydroelectric plant improvements ahead of the company's overall resource requirements.

Even though WWP's first major FERC license does not expire until the year 2001, the company has already begun its relicensing planning efforts, including environmental impact assessments, agency consultation and public involvement. Completion of these activities is expected to culminate in the successful relicensing of WWP's hydroelectric resources.[11]

Figure 29

FERC License Expiration Dates for WWP Hydro Plants

WWP Facilities	Location	Peak Capability	FERC License Expiration Date
Cabinet Gorge	Clark Fork River in Northern Idaho	230 MW	2001
Noxon Rapids	Clark Fork River in Northwestern Montana	555 MW	2005
Spokane River Plants: **Post Falls** **Upper Falls** **Monroe Street** **Nine Mile Falls** **Long Lake**	Spokane River in Northern Idaho and Eastern Washington	132 MW	2007

[11] WWP is currently in a relicensing process for its 1.2 MW Meyers Falls plant on the Colville River. A new license for this small project is expected by mid-1993.

Competitive Bidding

Competitive bidding is one way WWP can evaluate potential resources. Completed under the WUTC bidding rule, the 1991 Request for Proposal (RFP) was the company's first competitive bidding experience. This first process provided the company with some knowledge of the cost and availability of new resources and experience with treating environmental externalities. There is no competitive bidding process in the state of Idaho.

WWP's 1991 RFP also provided some insight into potential improvements to the bidding process. Suggested improvements would promote true market pricing of proposed resources and allow the utility additional flexibility to pursue the best resources at the lowest cost.

Under the current WUTC rule, WWP's next RFP is scheduled for issue in September 1993. However, due to a lack of near-term resource needs, the company will seek to defer the 1993 bidding process.

PURPA

The Public Utilities Regulatory Policies Act (PURPA) of 1978 requires utilities to purchase power from cogeneration and small power production facilities that qualify under PURPA rules. These facilities are commonly known as qualifying facilities or QFs. As shown in Figure 30, implementation of the PURPA legislation, including the price to be paid a prospective QF developer, is different for each of WWP's two state jurisdictions.

Figure 30

PURPA Obligation

State	Project Size	PURPA Obligation	Power Purchase Price
Washington	< 1 MW	Yes	Washington avoided cost rates as determined for the WUTC competitive bidding process (RFP).
	> 1 MW	Requirements are satisfied under the WUTC competitive bidding process.	The Washington avoided cost rates as filed with the RFP represent the price ceiling used for project evaluation.
Idaho	< 10 MW	Yes	Idaho avoided cost rates as determined by an IPUC methodology.
	> 10 MW	Yes There is no competitive bidding process in the state of Idaho.	Subject to special hearing before the IPUC.

Why is this in PURPA – it does not qualify under the rules!

Under several existing contracts, WWP receives power from both thermal and hydroelectric QF facilities. A contract with a northeast Washington wood-waste cogeneration facility expires in May of 1994. Any extension of this contract will depend on the cost of the resource as compared with available WWP alternatives.

Avoided Cost

In general, the avoided cost is meant to represent the incremental cost of new electric resources available to the utility. Avoided cost rates reflect the price of power from the avoided resource or resource mix. These rates are often applied to the purchase of energy from PURPA qualifying facilities. In some cases, the avoided cost is used to determine the cost-effectiveness of potential resource alternatives.

Currently, WWP calculates a separate avoided cost for its Washington and Idaho jurisdictions. In Washington, the avoided cost is filed as part of the competitive bidding process. The Idaho avoided cost is calculated and updated according to IPUC regulation. Because of the different methodologies, current Idaho avoided cost rates are somewhat higher than the Washington rates.

Based on the recent energy forecast and the availability of economic resource alternatives, WWP's deficit period has been delayed. This result, and resource cost information gained from the 1991 bidding process, will be incorporated into revised avoided costs for the company. The new avoided cost rates will reflect the company's current energy surplus and the market price of available new resources. Initial investigations based on these factors indicate that the current rates will be reduced.

Avoided costs are one indicator of the incremental cost of new resources. WWP's Strategic Resource Planning Model (SRPM) produces another type of indicator. The SRPM calculates the incremental cost of new resources weighted by resource type for potential resource strategies. Unlike the avoided costs based on a surrogate resource, the SRPM calculates a rate based on actual resources selected to meet projected load. For WWP's preferred strategy, SRPM calculates a 20-year levelized resource cost of approximately 3.4 ¢/kWh.

The company intends to file new Washington and Idaho avoided cost rates by mid-1993. In the state of Washington, this filing will be consistent with regulations as outlined in WAC 480-107-050. Based on preliminary calculations and SRPM results, 20-year levelized rates are expected to fall somewhere between 3.4 ¢/kWh and the current Washington rate of 4.6¢/kWh.

Demand-Side Management Issues

WWP's preferred long-term energy strategy calls for the acquisition of approximately 136 aMW of demand-side resources. This means that almost 65 percent of the company's new resource additions will come from conservation and fuel efficiency programs. Careful management of these programs is expected to result in the cost-effective acquisition of these environmentally preferred energy supplies.

The pursuit of demand-side resources presents some special challenges to all utilities. Through its DSM Issues Group (DIG), WWP is working now with state regulators and other interested parties to address important topics such as:

- Resource evaluation and measurement.
- Program review and modification.
- Utility financial incentives.
- Resource cost-effectiveness.
- Low-income programs.
- Continued resource assessment.

To ensure these issues are addressed in a timely manner, WWP and the DIG participants have agreed to complete their efforts by March of 1994. Significant progress has already been made in many of these areas.

The company recently completed its 1993 Demand Side Management Measurement and Evaluation Plan. This plan outlines the comprehensive evaluation of eight WWP electric and gas programs.

WWP's concern for resource efficiency is applied to the design and delivery of the company's demand-side programs. Ongoing program review identifies the need for any modifications that will reduce costs, improve customer satisfaction and eliminate market barriers. Several program adjustments have been identified and will be implemented through the DIG process.

A total resource cost methodology is being developed as part of the DIG process. This methodology ensures that the total price paid for the demand-side resource is less than or equal to the cost of alternative resources.

A primary challenge for WWP and its DIG advisors will be continual management of the company's demand-side programs. Adjusting programs to match demand-side acquisitions to resource needs will be an ongoing process.

The pursuit of cost-effective demand-side resources can provide benefits to the utility and its customers. However, along with the benefits of improved end-use efficiency comes a reduction in utility electric revenues which cover utility fixed costs. The company's Energy Exchanger fuel-efficiency program requires that participants make a monthly payment to WWP for a 60 month period. These payments are designed to help WWP recover this lost margin. For other WWP programs, the lost margin is deferred for later recovery.

As part of DIG process, the involved parties are working together to determine financial incentives that will encourage the utility to make the acquisition of cost-effective demand-side resources an even higher priority.

Environmental Externalities

While WWP has always made consideration of the environment an important part of resource management and acquisition, the treatment of environmental externalities is a relatively new and complex input to the planning process. In general, the goal of addressing externalities is to more accurately reflect the full cost to society of utility resource decisions.

There is currently no consensus as to the best methodology for treating externalities. Within the utility community, most efforts follow a two-step method that attempts to:

- Quantify any harmful production effects that are not included in the direct costs of producing electricity.
- Apply the cost of these negative externalities to the cost of new resource alternatives.

Application of this method is intended to add to the private cost paid by consumers so that the full societal cost is recognized. Beyond the arguments over specific methodologies, there is also disagreement among some parties as to whether or not current utility efforts and environmental regulations, such as the 1990 Clean Air Act Amendments, will provide similar benefits.

The current focus on environmental externalities presents additional challenges for WWP in maintaining the delicate balance between economics and the environment. The company's past experience with externalities is primarily the result of regulations associated with the Washington state competitive bidding process. Under WWP's 1991 competitive bidding process (RFP), guidelines for evaluating resource options included a trial mechanism to account for environmental externalities. While the intent of this methodology was primarily to address the impacts associated with different resource options, it also provided developers with information about which types of resources are preferred by the company. As a result of this analysis, WWP found that the inclusion of externalities had some impact on the scoring of individual projects, but it did not change the overall ranking of resource alternatives.

Environmental costs are being investigated to various degrees by various entities. In response to Executive Order 90-06, the Washington State Energy Office (WSEO) has completed some studies of the environmental costs of energy resource development. In 1992, WWP reviewed three WSEO reports. These reports examine actions other states are taking in regard to environmental externalities, the treatment of economic impacts in externalities evaluations and the monetization and quantification of environmental impacts.

Through a PNUCC Environmental Cost Committee, utilities in the Pacific Northwest are also cooperating to better understand the impact of externalities. In March 1993, this committee published a report that summarizes regional utility experience in treating environmental externalities.[12]

In its assessment of available new resources, WWP has identified many resource options that can be developed economically and with minimal environmental impact. For new demand-side resources, the company will continue to apply a 10 percent conservation credit as well as recognize their electric system loss savings benefits. For other types of resources, WWP will continue to monitor and participate in state and regional efforts to clarify the externalities issue.

Global Warming

As defined by the 1990 Clean Air Act, all U.S. industries must comply with national efforts to reduce emissions of certain pollutants. While the Clean Air Act identifies acceptable limits for emissions of sulphur dioxide (SO_2) and nitrous oxide (NOx), the environmental impact of other air pollutants such as carbon dioxide ($C0_2$) is still being investigated.

Efforts to determine the effects of carbon dioxide on the global climate are being studied in many international arenas. At the federal level, the government has considered assessing a tax on CO_2 emissions. Regional utility efforts to examine a "carbon tax" have found that even a modest tax on carbon dioxide could overwhelm the effects of all other externalities.[12] The result could affect the selection of new resources.

For purposes of this plan, WWP's scenario analysis also investigates the potential effect of a carbon tax. Until this controversial issue is resolved, quantifying the environmental impact of CO_2 emissions will continue to be difficult.

[12] PNUCC Report: "Environmental Effect of Resources: The Northwest Experiment," March 1993.

Electric and Magnetic Fields (EMF)

The issue of whether exposure to power-frequency electric and magnetic fields (EMFs) could result in adverse health effects has received considerable attention. These fields are present virtually everywhere in our society, since they are associated with the operation of electrical transmission and distribution facilities, as well as with the use of home and office appliances.

The issue of potential health effects resulting from EMFs is one where public concern exceeds scientific evidence available to date. The concern is often at variance with the consensus of the scientific community. This controversial issue has been reviewed by over 20 major scientific groups since 1975, with several major evaluations (in the U.S. and abroad) completed and released in 1992. The available research does not demonstrate that a hazard to human health exists from exposure to these fields.

WWP recognizes its public obligation to become openly and actively involved in this issue. The company's activities include:

- Support of independent scientific research.
- Monitoring of scientific and regulatory developments.
- Using the resources of its EMF task force for the collection and distribution of comprehensive and up-to-date information.
- Developing responsible policies related to this issue.

As one example of these activities, WWP's EMF task force, with the assistance of scientific consultants, provides annual updates to the City of Spokane on the state-of-the-art of scientific research relevant to the EMF issue.

Regional Power Supplies

In early 1993, Portland General Electric (PGE) decided to permanently close its Trojan Nuclear Plant. Efforts to replace this 1100 MW of regional power supply could affect both near-term and long-term energy markets. Operational requirements placed on the federal hydroelectric system to support fish and wildlife recovery may also constrain regional power supplies. Through its wholesale marketing efforts, WWP may help meet regional needs for energy and capacity.

Regional coordination to meet unexpected power shortages is outlined in the proposed Share-the-Shortage Agreement. This agreement outlines operating procedures including the allocation of available energy surpluses and load curtailments which could be implemented in response to regionwide deficits.

Firming Nonfirm Hydroelectric Resources

WWP's existing hydroelectric facilities provide a significant portion of the company's annual energy requirements. Depending upon streamflow conditions, annual production from these facilities can fluctuate over a wide scale. For planning purposes the company defines hydroelectric production based on streamflows recorded for a specific four-year period of low-water conditions. This critical period[13] is used to calculate the amount of firm energy production from existing and proposed hydroelectric projects. Generation which exceeds this firm capability is defined as secondary or nonfirm energy.

The objective of firming non-firm energy is to turn the lesser-valued nonfirm energy into firm energy through a back-up power source. Since the availability of nonfirm hydroelectric energy is contingent upon rainfall, snowpack and the operability of the region's thermal plants, its deliverability cannot be guaranteed without a firm resource as a back-up.

As a hydroelectric based utility, WWP has the opportunity to pursue "firming nonfirm" strategies. In 1992, the company completed a detailed feasibility study. This study assumed 92 aMW of nonfirm energy would be firmed and sold under a long-term contract. Depending upon availability and cost, this contract would be supplied by either existing WWP hydroelectric resources or by operation of a 100 MW simple-cycle combustion turbine. Results of this analysis indicated that by firming its own hydroelectric resouces the company could potentially realize an economic benefit of approximately $30 million on a net present value basis. Future investigations will provide additional information on the cost and need for this potential resource, as well as the risks associated with its development. Results of WWP's 1992 study are contained in Appendix J.

Transmission Opportunities

WWP must expand its electric transmission system in order to maintain reliable service to new and existing customers. Through interconnections with other utilities, WWP may also use transmission facilities to access low-cost resources, new energy markets or both. These interconnections are carefully planned so as to maintain or improve system reliability.

The company's geographic location and existing interconnections allow WWP to pursue the purchase and sale of energy on a short-term and long-term basis. Through these types of transactions, WWP can reduce resource costs for the company and for the region.

Depending on its cost, a new transmission interconnection may eliminate the need to develop a new generating resource. WWP will continue to evaluate and promote the development of new interconnections that allow for the reliable transfer of low-cost energy supplies. Current transmission activity is summarized below:

WWP-BC Hydro Transmission Interconnection

In October 1987, WWP filed an application with the Department of Energy (Office of Fuels Programs) for a Presidential Permit for a proposed WWP-BC Hydro Transmission Interconnection. The permit is required to construct an international interconnection. Following this application, WWP completed environmental[14] and system reliability studies which address permit requirements. In 1993, the Department of Energy (DOE) issued a Presidential Permit for the proposed interconnection.

[13] The "Critical Period" is currently defined as the 42 month period from September 1928 to February 1932.

[14] Environmental studies for the proposed WWP-BC Hydro Transmission Interconnection are contained in the Department of Energy's "Final Environmental Impact Statement," published in October 1992.

During the Presidential Permit process, WWP reduced the scope of the original interconnection project. Initial project transfer capability was reduced from 1000 MW to 800 MW and an existing WWP substation was selected as the preferred Spokane area terminal. These changes eliminated 25 miles of transmission line, reduced the project cost and provided increased flexibility for staged construction of the interconnection.

If constructed, the WWP-BC Hydro Interconnection would provide additional transmission capability between Canada and the Pacific Northwest. This additional capability would allow WWP and other regional utilities direct access to resources in British Columbia and Alberta.

WWP is continuing to evaluate the need and potential benefits of the proposed Canadian interconnection. Among these benefits are the access to new resources and additional coordination of the Canadian and Northwest reservoir systems. Economic evaluations of the interconnection must consider the impact of the new British Columbia government and its development of an energy export policy. Study results will determine the future of the interconnection project.

Pacific Intertie

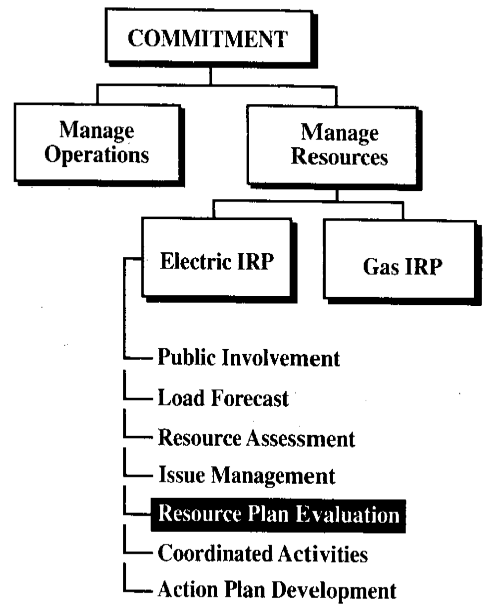
In early 1993, BPA and other participants in the California-Oregon Transmission Project (COTP) completed construction of a third 500kVAC interconnection between the Pacific Northwest and California. This project will increase the transfer capability of the existing Pacific AC Intertie (PACI) from 3200 MW to 4200 MW. By the end of 1993, the PACI will be expanded to a capability of 4800 MW. WWP's evaluation determined that participation in the PACI upgrade was currently not a cost-effective option for the company.

To the extent that it is economically available, WWP will pursue opportunities to gain transmission capability on the existing Pacific Intertie.

Other Opportunities

WWP is currently not participating in the development of any other transmission interconnections. The company is evaluating and will continue to evaluate other interconnection opportunities as they are proposed.

Resource Plan Evaluation



This chapter describes the selection of WWP's preferred resource strategy. An overview of the company's resource planning model includes a discussion of modeling capabilities and recent enhancements. The planning model is used to evaluate alternative strategies and determine the resource plan most likely to minimize costs to WWP customers. The results of this analysis, as well as key inputs, assumptions and evaluation criteria, are described. Planning uncertainties are addressed using both risk assessment and scenario analysis. These important studies also influence the selection of the preferred plan. Their results are documented here as well.

WWP's Preferred Energy Resource Strategy

With a relatively modest level of long-term energy needs, and a large menu of cost-effective resource options, the company is currently in a good position to choose the general direction for future resource acquisitions. WWP's preferred energy strategy represents a balance of demand-side and supply-side options that focus on improving the efficiency of the existing resource base.

The company's evaluation of alternative resource plans identified the timing of demand-side resource acquisition as having the primary influence on individual plan performance. Risk analysis results indicate that careful management of WWP's demand-side programs will have a key role in supporting the company's commitment to rate stability. Scenario analysis results reinforce the need to maintain flexibility and diversity within the new resource portfolio and to protect the capability of the existing resource base. Given these results, selection of this preferred resource plan was primarily based on the following considerations:

- Revenue Requirements: The preferred strategy is one of the lowest-cost options. It is not the lowest-cost plan. The lowest-cost strategy is one that would require the company to stop and then restart demand-side management activities.
- Demand-side Resource Acquisition: The preferred resource strategy reflects a level of demand-side aquisition that best tracks WWP's resource needs without having to temporarily terminate program activity.
- Risk and Uncertainty: The preferred plan performs reasonably well under all conditions. It provides the necessary flexibility to respond to changing load and resource needs.

Figure 31 lists the cumulative resource acquisitions as outlined by WWP's preferred strategy. The remainder of this chapter describes the analysis that supports the selection of this plan. Appendix H contains additional details about the company's resource planning model and associated analysis.

Figure 31

Preferred Strategy for New Energy Resource Acquisition (Cumulative aMW)

Resource Acquisition Activity	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Colstrip Thermal Efficiency (Units No.3 & No.4)	0	0	0	0	0	0	0	0	0	5
DSM Additions by year	7	15	17	6	5	3	4	3	4	4
Conservation	2	7	14	16	18	19	21	22	24	26
Fuel-Efficiency	5	15	25	29	32	34	36	38	40	42
Planned Hydroelectric Upgrades (Cabinet No.1, Nine Mile & Upper Falls)	0	0	5	8	8	8	8	8	8	8
Clark Fork Hydroelectric Upgrades (Cabinet No.2, Noxon No.3 & No.4)	0	0	0	0	0	0	0	0	0	0
Electric System Efficiency (Transmission & Distribution Loss Savings)	0	0	0	0	0	0	0	0	0	0
Mid- Columbia Extension (Grant County PUD Contract)	0	0	0	0	0	0	0	0	0	0
Total	**7**	**22**	**44**	**53**	**58**	**61**	**65**	**68**	**72**	**81**

Resource Acquisition Activity	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Colstrip Thermal Efficiency (Units No.3 & No.4)	5	5	5	5	5	5	5	5	5	5
Conservation	27	29	30	32	34	37	41	45	50	55
Fuel-Efficiency	44	46	48	50	53	57	62	68	74	81
Planned Hydroelectric Upgrades (Cabinet No.1, Nine Mile & Upper Falls)	8	8	8	8	8	8	8	8	8	8
Clark Fork Hydroelectric Upgrades (Cabinet No.2, Noxon No.3 & No.4)	0	0	0	0	0	3	3	6	6	6
Electric System Efficiency (Transmission & Distribution Loss Savings)	0	0	0	0	0	2	4	6	8	10
Mid- Columbia Extension (Grant County PUD Contract)	0	0	0	10	17	17	17	40	47	47
Total	**84**	**88**	**91**	**105**	**117**	**129**	**140**	**178**	**198**	**212**

The Strategic Resource Planning Model

The Strategic Resource Planning Model (SRPM) is an analytical model used by WWP to facilitate long-term integrated resource planning. SRPM calculates the economic and financial implications of utility resource acquisition decisions. Using an analytical technique called "Monte Carlo simulation," SRPM also explicitly accounts for key planning uncertainties, and allows for examination of tradeoffs between expected costs and risk. For any given set of planning assumptions and resource decisions, the model provides outcome indicators such as rates, revenue requirements, new resource costs, plus other key financial indicators. SRPM effectively addresses the following objectives:

- Accommodates the full range of potential supply-side and demand-side resources.
- Allows explicit treatment of key sources of planning uncertainties and risks.
- Combines the benefits of simulation and optimization modeling approaches.
- Captures sufficient operational detail to result in realistic resource operation and system expansion decisions.
- Provides sufficient output detail to capture tradeoffs among key planning criteria.

SRPM Enhancements

In 1992, the company made significant improvements to SRPM's capability. The enhanced model better reflects actual system operation and incorporates risk into resource selection decisions. These enhancements include the following capabilities and improvements.

<u>Economic Dispatch:</u> The updated SRPM includes sophisticated algorithms that control the operation of existing resources and new resources added over the planning horizon. For each resource, SRPM determines a capacity factor that reflects the actual hours of operation after consideration of:

- Energy resource balance (surplus or deficit).
- Average annual price of secondary (nonfirm) energy.
- Resource-specific variable costs and minimum and maximum run levels.

By incorporating the results of production costing models as input parameters, SRPM now offers a degree of realism not typically found in annual resource planning models.

<u>New Resource Selection:</u> SRPM adds new resources on the basis of:

- Energy resource balance.
- Resource-specific costs (fixed and variable) calculated on a present value revenue requirements basis.
- User-specified constraints.

New resources are added or taken out[15] of the resource mix in accordance with energy needs, unit size and resource cost. User-specified constraints provide flexibility to compare planned resources to new options.[16] SRPM calculates the levelized life-cycle costs for each resource and selects the lowest-cost alternatives to meet resource needs.

Risk and Uncertainty: Monte Carlo simulation techniques provide the capability to incorporate uncertainties associated with fuel price, load growth, secondary energy price and other parameters directly into the evaluation process. This approach to risk assessment helps WWP identify resource strategies that provide the best outcome given the effects of an interaction between all key planning uncertainties.

Risk and uncertainty are also addressed through scenario analysis. Scenario analysis illustrates the implications of a specific future event, such as the loss of an existing resource or new environmental policy, on a given resource strategy.

Other Enhancements: Other specific model improvements include:

- Non-production costs, such as transmission and distribution capital expenditures, are now correlated to system load growth.
- Additional supply curves allow demand-side resources to be input on a program-specific basis.
- The model incorporates the effects of price elasticity on expected loads.

[15] New resources can be specified as *discretionary* or *non-discretionary*. Discretionary resource acquisition is controlled by the algorithms descibed here. Non-discretionary resources (committed or assumed to be acquired under all possible conditions) are acquired as specified by the user.

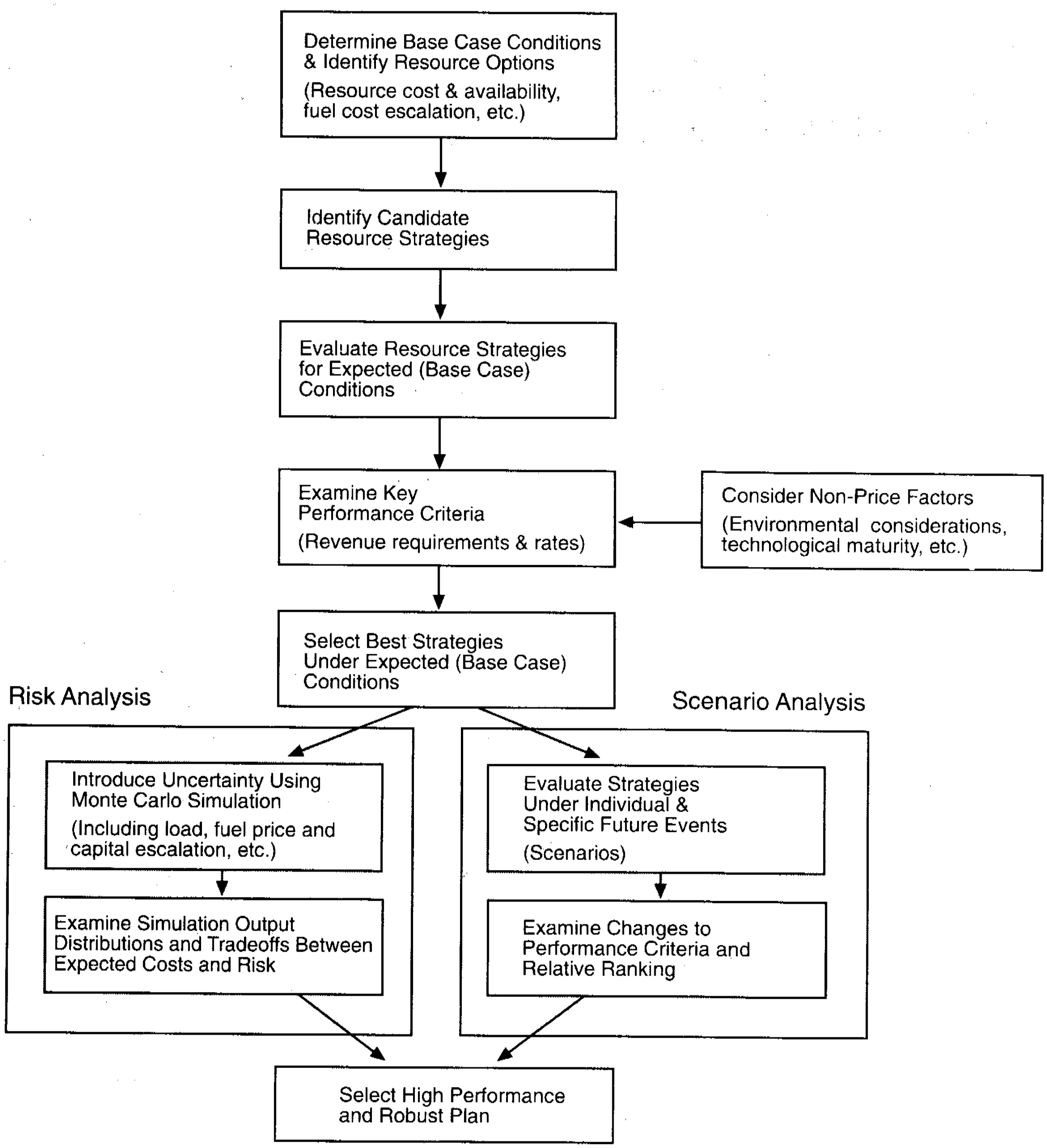
[16] Unlike many models, SRPM does not simply defer planned resources when they are not needed. Instead, the long-run economics for each possible resource are evaluated in each year.

Resource Plan Evaluation Process

Figure 32 illustrates how the SRPM is used to evaluate the best resource strategies and select the preferred resource plan.

Figure 32

Resource Plan Evaluation Process



Expected Conditions and Resource Strategies

The resource evaluation process begins with the development of base case study conditions. As shown in Figure 33, the base case is represented by WWP's medium-growth energy forecast and expected values for fuel costs and capital escalation rates.

Figure 33

Resource Plan Evaluation: Expected Conditions

Parameter	Base Case Value Input ($1992 dollars)
Medium Forecast Energy Load Growth Rate	1.40%
Inflation: Average Annual Rate	4.20%
Natural Gas	
Fuel Cost	1.81 $/MMBtu
Fuel Price Escalation: Average Annual Rate	7.50% (Nominal) 3.07% (Real)
Coal	
Fuel Cost	1.65 $/MMBtu
Fuel Price Escalation: Average Annual Rate	4.90% (Nominal) 0.58% (Real)
Capital Escalation: Average Annual Rate	3.10 % (Nominal) -1.15% (Real)
Weighted Average Cost of Capital	10.50%

SRPM requires inputs describing new demand-side and supply-side resources, as well as potential energy purchases. Expected costs for these alternatives are based on the company's resource assessment. A wide array of potentially cost-effective energy resource options were identified for model analysis. With a finite number of inputs available, the cost and capability of some options were combined to provide more modeling flexibility. All of the resource alternatives listed below were input into SRPM. Resource cost information is detailed in Appendix H.

- Conservation: Includes weatherization, compact fluorescent lighting, low-flow shower heads, and energy-efficiency measures for all customer sectors.
- Fuel-Efficiency: Includes electric to natural-gas space and water heating conversions for all customer sectors.
- Planned Hydroelectric Upgrades: Includes upgrades at WWP's Cabinet Gorge, Nine Mile and Upper Falls plants.
- Clark Fork Upgrades: Includes hydroelectric upgrades at WWP's Cabinet Gorge and Noxon Rapids plants.
- Colstrip Thermal Efficiency: Turbine rotor replacement for Colstrip Units No.3 and No.4.
- Combined-Cycle Combustion Turbine: A new natural-gas-fired unit.
- Small Gas Cogeneration: A new 25 MW natural-gas-fired combined-cycle combustion turbine cogeneration facility.

- Purchases: Energy purchases from other utilities, including the mid-Columbia contract extension, and qualifying (PURPA) facilities.

Candidate resource strategies were developed from the above menu of resource alternatives. Each potential strategy represents a different combination of new resource options with respect to mix and timing. Each strategy includes total resources sufficient to meet long-term energy needs. An "all supply-side mix," or "an all demand-side mix," represent extreme examples of potential strategies.

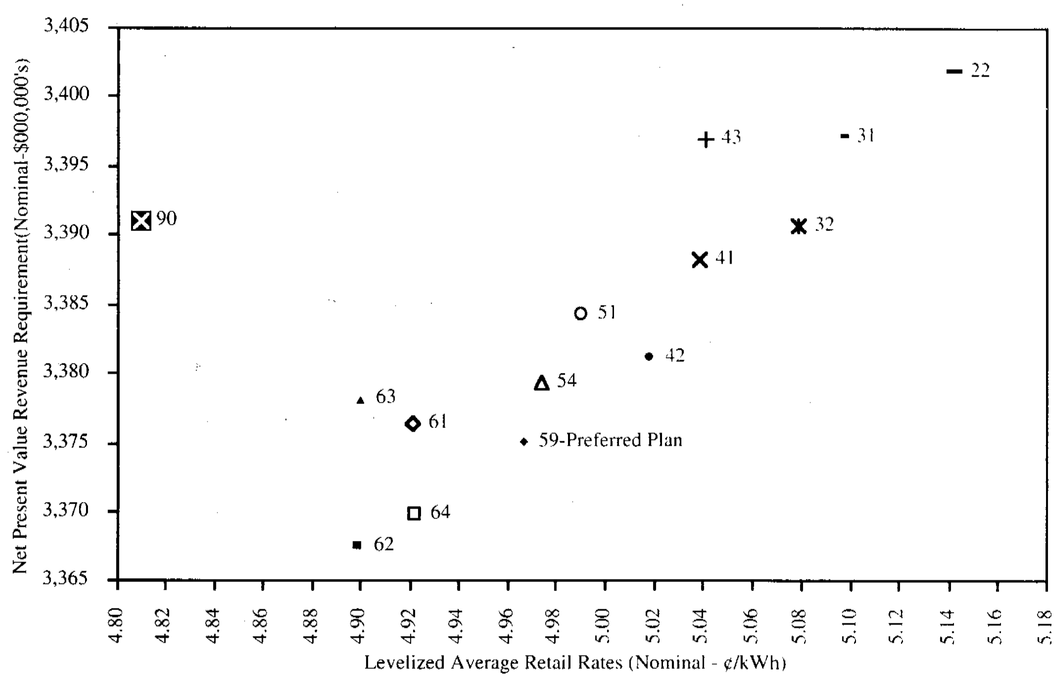
For the initial analysis, WWP examined over 50 different resource strategies. The company's resource needs were met by either allowing SRPM to choose the best options or by fixing the timing for acquisition of specific resources. One of the advantages of this approach is that it allows a comparison of strategies dependent upon large supply-side resources with those based more heavily on the acquisition of demand-side resources.

Plan Performance Under Expected Conditions

Each potential resource strategy was evaluated under base case conditions. Key performance results, including rates and revenue requirements, were examined for each alternative. The lowest cost resource strategies are those which have the lowest net present value of revenue requirements (NPVRR). Figure 34 plots the NPVRR and levelized average rates[17] for the lowest cost plans.

Figure 34

Rates and Revenue Requirements For Potential Resource Strategies



[17] The rate information output by SRPM is used only to compare the performance of alternative strategies and not as a forecast of actual electric rates.

The primary difference between the resource strategies shown in Figure 34 is the timing of demand-side resource acquisition. For example, Cases 61 through 64 represent one level of acquisition. Cases 51, 54 and 59 correspond to another level, and so on. With the exception of Case 90, each plan acquires approximately 130 aMW of demand-side resources over the planning period.

Case 90 emphasizes supply-side resources. It assumes demand-side management activities completely terminate after 1993 and the acquisition of only 22 aMW of demand-side resources. Although Case 90 is not the lowest cost plan, it does result in the lowest rates. Case 22 represents the other extreme. Compared to the other plans, it represents accelerated acquisition of demand-side resources. It results in the highest costs and the highest rates.

The evaluation of rates and revenue requirements compares resource strategies and determines common resource elements. The analysis indicates that the level of demand-side resource acquisition has the most significant affect on plan performance. WWP's hydroelectric and Colstrip upgrades, electric system efficiencies and mid-Columbia contract extensions are common to each low-cost plan. The timing of these supply-side resources is impacted by the level of demand-side acquisition.

The purpose of this base case analysis is to identify resource strategies which minimize both rates and revenue requirements under expected conditions. Although Cases 62 and 64 best satisfy these criteria, they would require the company to stop and then restart its demand-side management programs. The preferred plan, Case 59, is the lowest cost plan that allows the company to maintain program activity over the planning period. On a net present value basis, the cost of this preferred plan exceeds the lowest cost plan by less than $10 million.

While revenue requirements and rates are the key financial information used to determine this preferred resource plan, the SRPM calculates other parameters. Figure 35 summarizes the performance of the preferred strategy under expected conditions.

Figure 35

Performance Results for WWP's Preferred Energy Strategy

Nominal Net Present Value Revenue Requirement ($000,000's)	Real Net Present Value Revenue Requirement ($000,000's)	Nominal Revenue Requirement Growth (%)	Levelized Nominal Rates (¢/kWh)	Nominal Rate Growth (%)	Real Rate Growth (%)	Incremental New Resource Cost (Levelized ¢/kWh)
3,375	1,454	2.97	4.97	2.03	-1.97	3.41

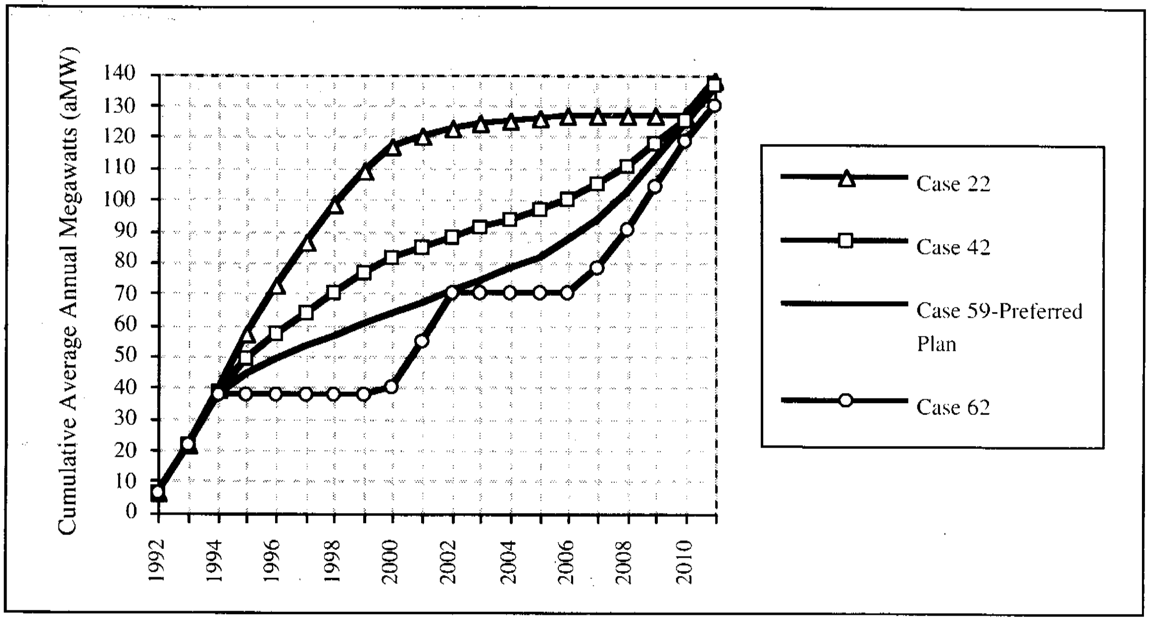
Based on SRPM results, Figure 35 indicates that nominal rates are expected to grow at an average of about 2.0 percent per year. Absent the effects of inflation, real rates are expected to decrease. The incremental new resource cost reflects the mix of resources selected to meet forecast loads. Its low value indicates that WWP's moderate energy needs can be met with a combination of low-cost demand-side and supply-side resources.

Risk and Uncertainty

Because of the impact that demand-side resources have on plan performance, the company focused its risk and scenario analysis on varying levels of demand-side acquisition. In addition to the preferred plan, three other resource strategies were selected for these studies that introduce risk and uncertainty into the resource plan evaluation. Figure 36 illustrates the levels of demand-side resource acquisition that correspond to these four strategies.

Figure 36

Potential Demand-Side Resource Acquisition Strategies



Risk Analysis

The base case analysis described in Figure 34 identifies the best resource strategies under expected conditions. Risk analysis that employs Monte Carlo simulation techniques incorporates uncertainty into the resource plan evaluation. For Monte Carlo analysis, base case input parameters are replaced by ranges of values. Each input range is identified by high and low limits or by statistical distributions. For example, energy loads are bounded by the high and low forecast. Secondary energy rates, fuel price and capital escalation rates are represented by normal probability distributions.

Given these ranges of uncertainties, SRPM uses Monte Carlo techniques to generate a random value for each input parameter. Based on these inputs, rate and revenue requirement results are calculated for each simulation. The results of 500 simulations were evaluated for each of the four resource strategies. This analysis allows examination of tradeoffs between expected costs and associated risk. By examining the results shown in Figures 37 and 38, the company can identify the resource plan that is considered to be the most robust[18].

[18] In this context, robust is defined as a strategy that provides good outcomes over a broad range of potential future conditions.

Figure 37

Risk Analysis Results-Revenue Requirements

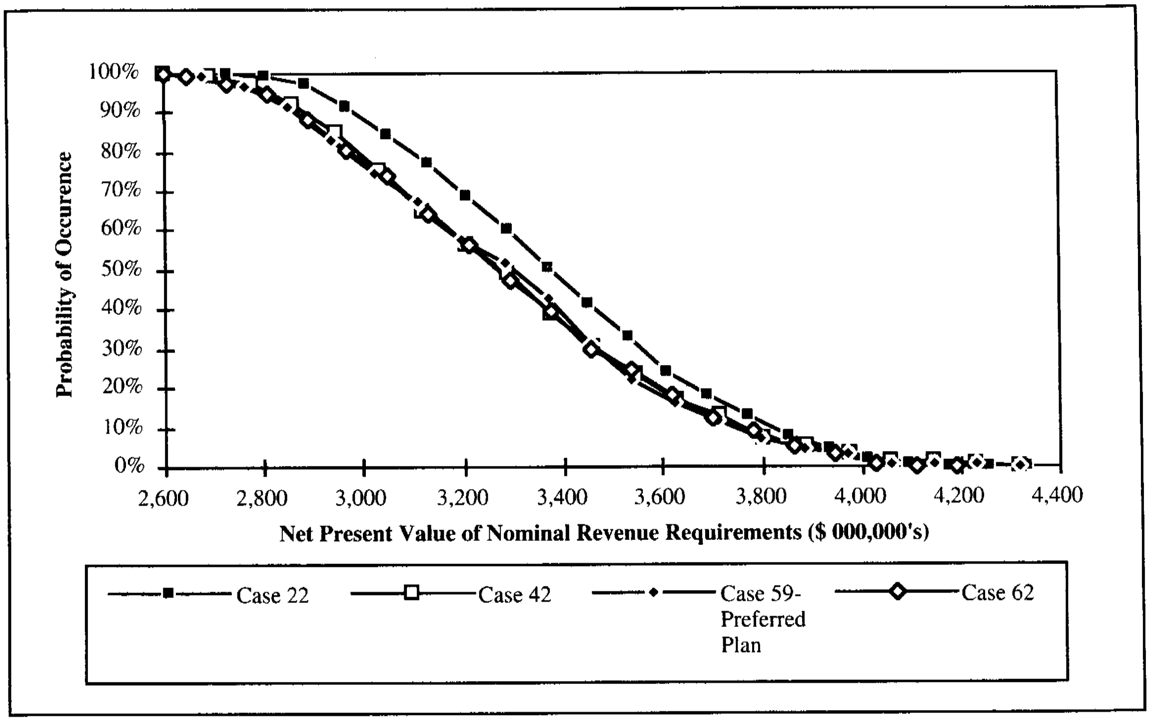
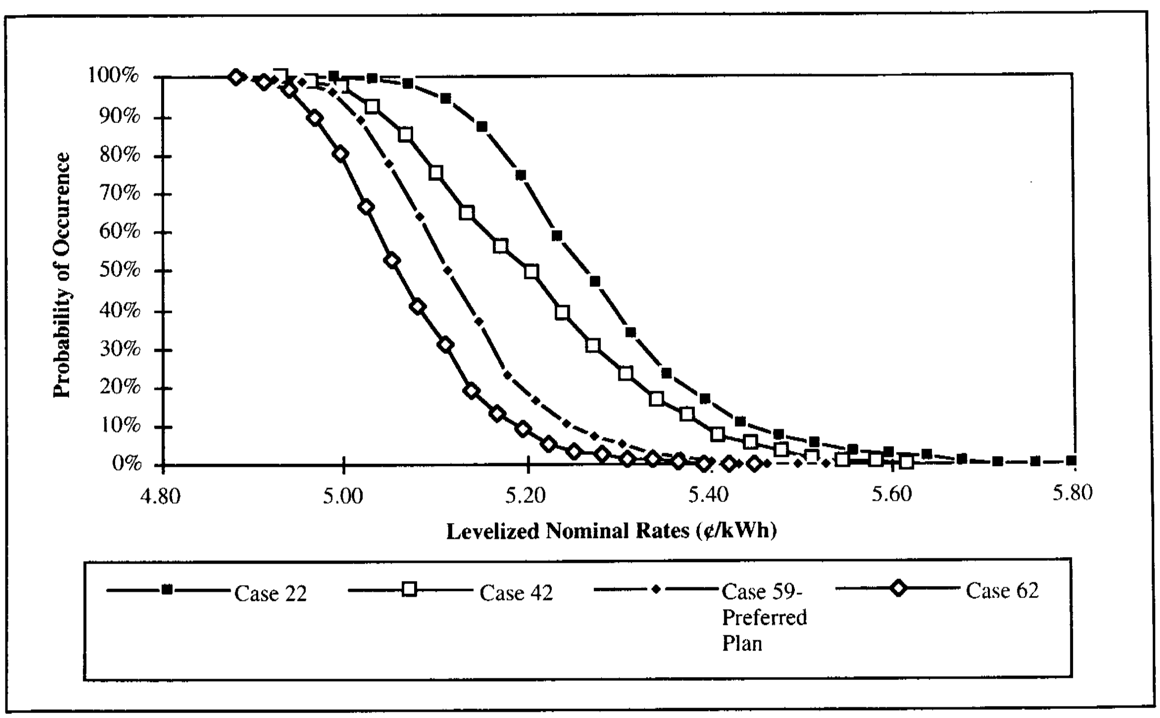


Figure 37 indicates that uncertainty has a similar effect on the cost of each resource plan. Since each plan consists of low-cost hydroelectric and demand-side resources, capital cost and fuel price escalation does not substantially affect the relative performance of these strategies. Case 22 reflects accelerated demand-side acquisition. It exhibits higher costs and slightly higher risks than the other plans.

Figure 38

Risk Analysis Results-Rates



The effects of uncertainty on long-term rates is shown in Figure 38. Cases 59 and 62 exhibit lower rates for all potential conditions. Even though it results in higher rates, Case 59 is once again preferred over Case 62 because it does not require WWP to temporarily terminate its demand-side management activities.

Scenario Analysis

Scenario analysis is another way to incorporate risk and uncertainty into the planning process. Scenario analysis allows the potential impacts of specific parameters such as high load growth or the loss of a resource to be examined in isolation. If a resource strategy retains a high ranking over a set of diverse set of scenarios, it can be viewed as a high performance and robust plan.

For this evaluation, the company selected scenarios that test resource plan performance under potential and extreme events. In the case that one of these events becomes a reality, the scenario analysis results provide the company with some insight as how to best respond to the new conditions. WWP's analysis included examination of the following scenarios:

- **Low Load Growth:** WWP's low load estimate (0.7 percent annual growth) serves as the basis for this scenario.
- **High Load Growth:** The forecast of high load growth (1.8 percent annual growth) serves as the basis for this scenario.
- **Loss of Resource:** The loss of resource scenario assumes that in 1998, the company could experience some loss of generating capability. The resource loss could be the result of environmental factors such as the Endangered Species Act, the Clean Air Act or mitigation measures associated with hydroelectric plant relicensing. As the specific nature and scope is unknown, WWP evaluated the loss of 25 aMW and 150 aMW from the existing resource base.
- **High Natural Gas Prices:** This scenario assumes that a doubling of natural-gas prices occurs in the year 1997. These higher prices are assumed to affect the company's electric to natural-gas fuel-efficiency programs. Program activity is halted after 1997.
- **Carbon Tax:** Although the environmental effects of carbon dioxide (CO_2) are still under study, the federal government has considered a "carbon tax" as a way to reduce CO_2 emissions. Potential effects were evaluated by taxing CO_2 emissions on existing and planned resources beginning in 1996. Tax levels of $22 and $100 per ton were considered.
- **Loss of Load:** This scenario examines the effects of losing a large block of retail electric load. The probability of such an occurence is most likely in the industrial sector and could be the result of a customer's decision to implement cogeneration, seek another supplier or otherwise bypass WWP.

The effect of each of these scenarios is summarized in Figures 39 and 40. These figures illustrate the potential impacts to revenue requirements and rates for each of the four resource strategies.

Figure 39

Scenario Analysis Results-Revenue Requirement Impacts

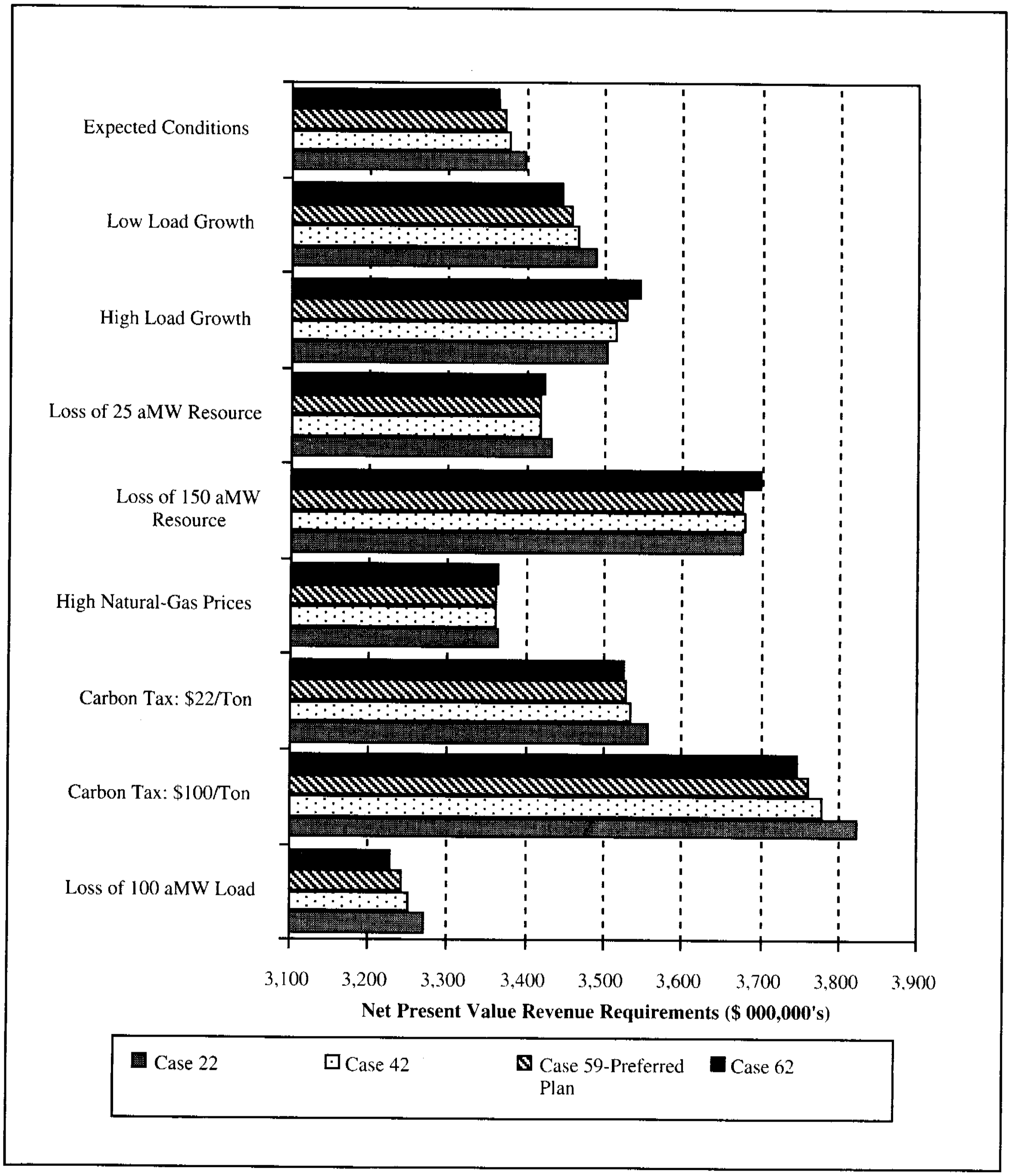


Figure 39 shows that the preferred plan is the lowest cost plan under the loss of resource and high natural gas price scenarios. It is never the highest cost plan. Case 62 is lowest cost plan for the low load growth, loss of load and carbon tax scenarios. However, it is highest cost plan under the high load growth and loss of resource scenarios. Figure 39 also indicates that in all cases the loss of a large block of the company's existing resources or a high carbon tax would have the most significant effect on long-term revenue requirements. This result points out the importance of protecting the capability of existing resource base.

Figure 40

Scenario Analysis Results-Rate Impacts

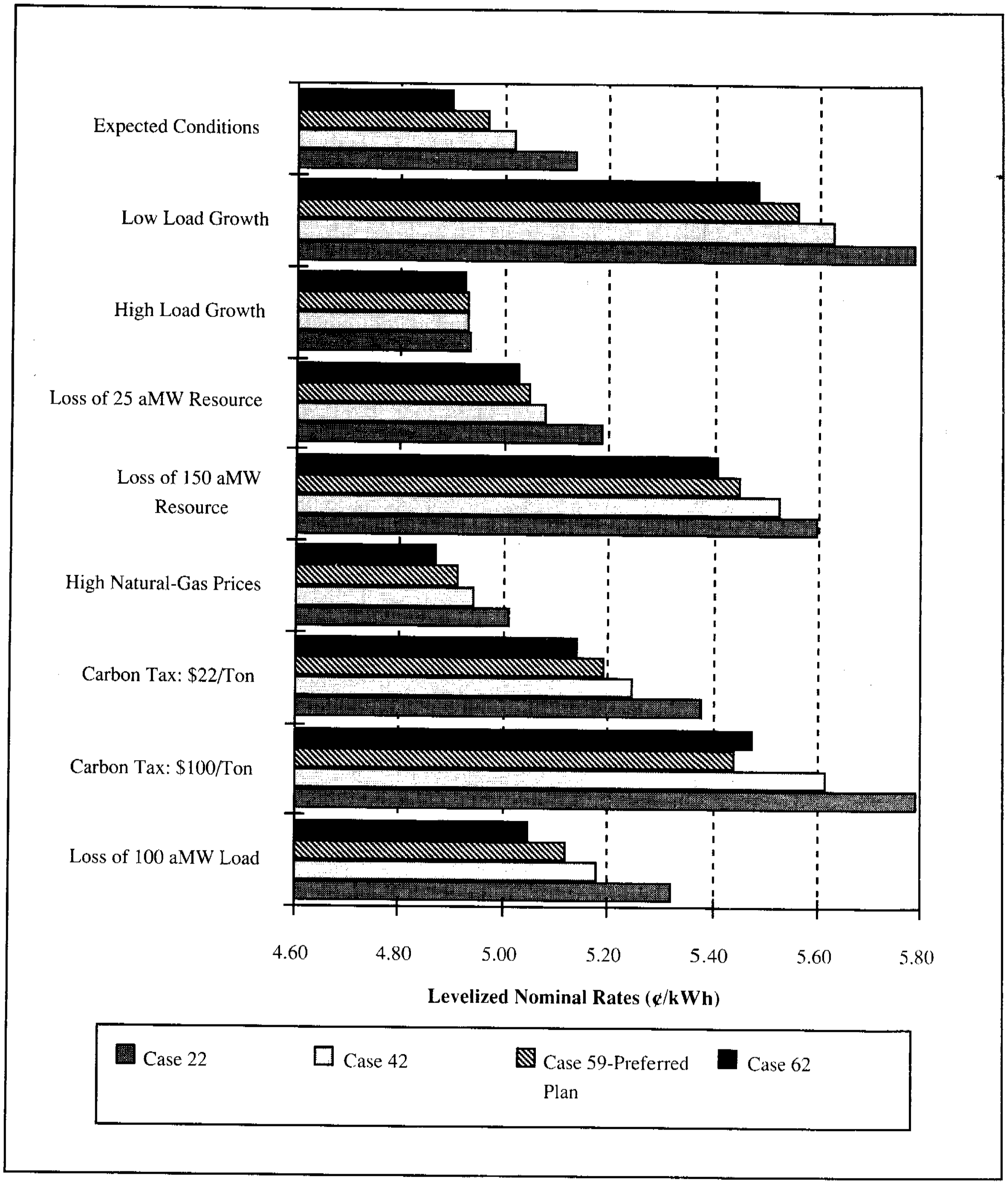
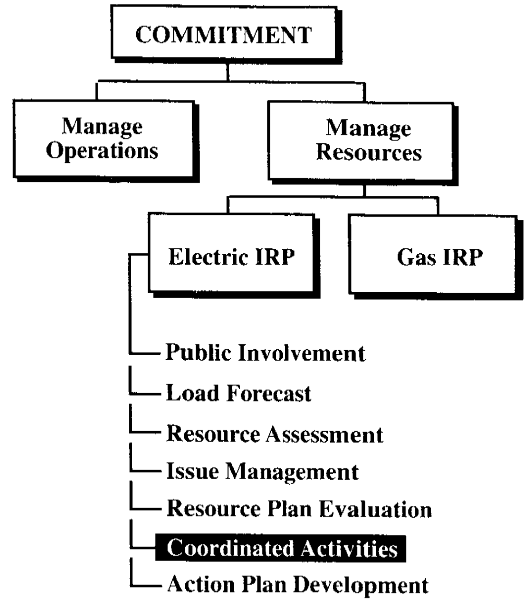


Figure 40 shows the variability of rates resulting from each of the scenarios. For all but one scenario, Case 62 results in the lowest rates. The preferred plan ranks next in terms of rate performance. Low load growth, the loss of a large resource and a high carbon tax have the most effect on rates. In order to maintain the commitment as a low-cost provider of energy services, the company must be able to respond to such events. The preferred resource strategy is expected to provide the necessary flexibility to adjust to future conditions.

Coordinated Planning Activities



The primary objective of the IRP is to develop a long-term plan for meeting WWP's energy requirements. This chapter discusses other planning activities that are coordinated with these energy planning efforts. It includes a summary of the company's capacity planning, wholesale marketing and transmission planning activities. This chapter concludes with an overview from WWP's 1993 Natural Gas Integrated Resource Plan.

Capacity Planning

In the past, WWP and other Pacific Northwest utilities have relied on the region's considerable hydroelectric resources to meet system capacity needs. But with increasing peak requirements, and the potential for reduced resource flexibility, the era of capacity surpluses is coming to an end. Now facing peak deficits, regional power planners are focusing more attention on capacity resource needs.

WWP's resource planning efforts have always included an assessment of system capacity needs. Recognizing the need to emphasize these efforts and to develop a low-cost resource strategy, the company has been involved in many capacity planning activities. Since 1991, the company has:

- Reviewed the current peak forecasting methodology and results.
- Developed new capacity planning tools.
- Assessed available capacity resource options.
- Proposed the installation of a new simple-cycle combustion turbine.

This section describes plans for meeting the company's capacity needs.The development of a new planning model is also summarized. Additional information is contained in Appendix I.

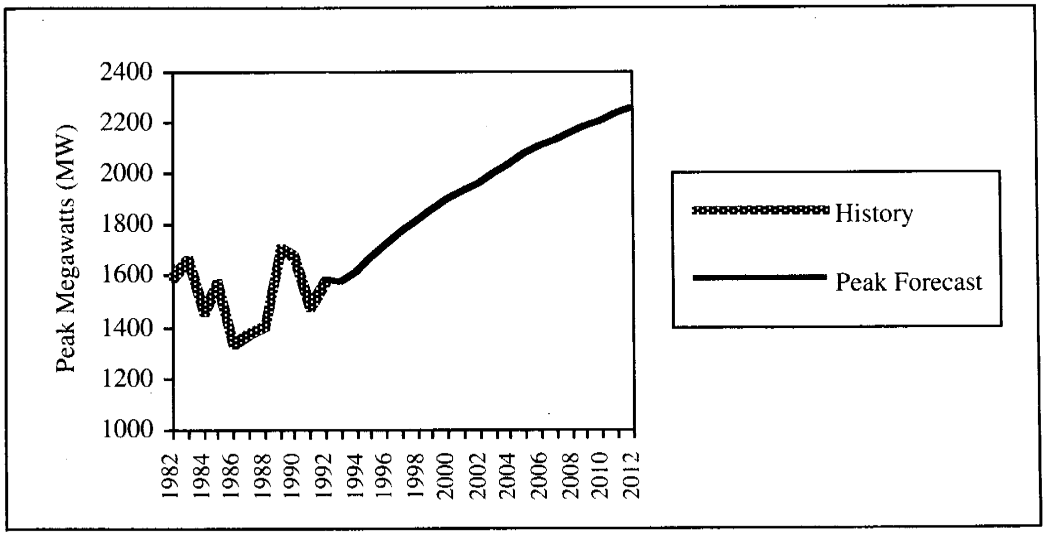
Capacity Requirements

Capacity requirements include a forecast of the company's native peak load, contract obligations and reserve requirements.

Similar to the energy forecast, WWP projects monthly peak demand over the 20-year planning period. The peak-load forecast is produced for the medium-growth scenario only. The company's highest peak load typically occurs during the winter months of November through February. This peak, one-hour demand, which is forecast to occur sometime during this period, is based on an average daily temperature[19] of eight degrees Fahrenheit. Although WWP's service territory may experience colder temperatures, the company forecast needs are determined by the eight degree day. This forecast of peak loads is shown in Figure 41.

Figure 41

WWP's Peak Load Forecast



Weather has a significant effect on peak loads. Based on recent analysis of historical temperature data for the Spokane area, the forecast temperature falls in the 97th percentile. In other words, 97 percent of the winter days are expected to average eight degrees or warmer. This cold spell analysis also indicates that Spokane experiences about three days per year when daily temperatures average eight degrees or colder.[20] An average daily temperatures of 32 degrees corresponds to the 50th percentile. This weather information is used to determine a relationship between temperature and peak loads. As average temperatures drop below eight degrees, peak loads are expected to increase at a rate of about 11 MW per degree.

WWP's obligation to provide capacity to other utilities primarily includes contracts with Puget Power, Pacific Power and Portland General Electric (PGE). The agreements with Pacific Power and Puget Power expire in 1997 and 2004, respectively. The PGE contract began in 1992 and terminates in the year 2016. Under a seasonal exchange agreement with Pacific Gas & Electric (PG&E), WWP provides energy and capacity to PG&E in the summer and receives a like amount during the winter months. This exchange agreement ends in 2011.

[19] Average daily temperature is the average of the high and low temperatures recorded for the day.

[20] In winter 1992-93, WWP recorded three days with average temperatures at or below 8 degrees fahrenheit.

A reasonable level of planning reserves helps the company ensure adequate generating capacity during periods of extreme weather or unexpected plant outages. WWP's capacity reserves include components for cold weather, generator forced outages and contingencies such as river freeze-up at hydroelectric plants. Although they vary by year, capacity reserves are approximately 12 percent of the company's total resources.

The combination of the forecast peak loads, contract obligations and reserve requirements represents the company's long-term capacity requirements. These total capacity requirements are compared with WWP's existing peak-resource capability and contract rights to determine a capacity surplus or deficit for each year. Figure 42 shows the current projection of capacity deficits without any new resources.

Figure 42

Capacity Surplus/ Deficit Without New Resources

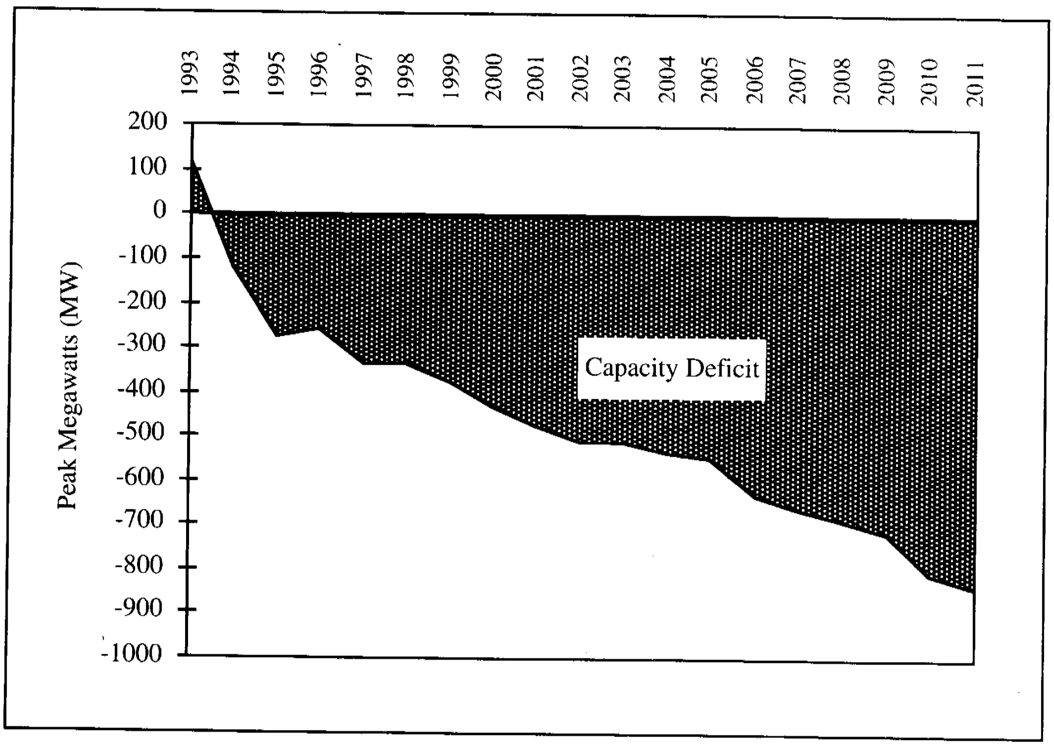


Figure 42 indicates that WWP is facing some immediate peak deficits. As described in Chapter 6, the company is also monitoring many issues that could affect the long-term capability of the existing resource base. Uncertainties associated with the Clean Air Act Amendments, the Endangered Species Act and relicensing of the company's hydroelectric plants represent additional capacity planning considerations.

Capacity Versus Energy Resources

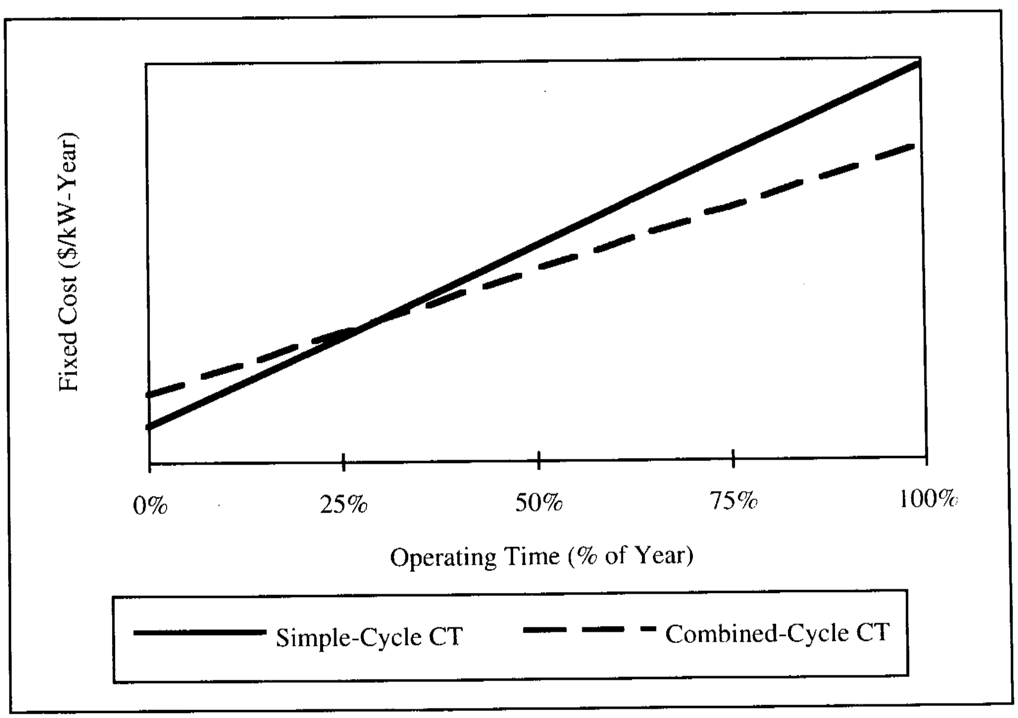
Because they are constructed to meet different types of needs, capacity and energy resources have different installation costs and operating characteristics. Resources that are constructed to meet "base load" or "intermediate load" needs are expected to operate on a nearly continual basis and provide substantial amounts of energy. These resources typically have high installation and low operating costs. Base-load resources include coal and nuclear plants and combined-cycle combustion turbines. Hydroelectric plants are considered for meeting intermediate load needs.

In contrast to energy resources, facilities added primarily to meet capacity needs are expected to operate less frequently. Actual operation is determined by peak requirements and economic conditions. Because capacity resources are relied upon to respond quickly to changing system conditions, operating flexibility and control are important characteristics. Compared with energy resources, capacity resources generally have lower capital costs and higher operating costs. The ability to economically dispatch a peaking resource to meet system needs provides operational flexibility and eliminates the higher incremental operating costs during periods of dispatch. Simple-cycle combustion turbines are a good example of a peaking resource. Because of their flexibility to follow load, hydroelectric facilities can also be used to meet peak demand.

Figure 43 helps to illustrate the relative costs of installing and operating capacity resources versus energy resources.[21] It shows that a simple-cycle turbine is a more economic choice for peaking applications.

Figure 43

Peaking Resources are Expected to Operate Less Frequently than Base Load Energy Resources



[21] Figure is for illustrative purposes only. Resource cost data is based on information contained in the 1991 Northwest Conservation and Electric Power Plan. Natural-gas fuel costs reflect current WWP estimates.

Meeting Capacity Needs

In addition to resources planned to meet the company's energy needs, WWP has proposed the installation of a pair of simple-cycle combustion turbines to satisfy projected capacity needs. As shown in Figure 44, these planned energy resources and the Rathdrum combustion turbines will have a significant effect on the company's capacity deficits.

Figure 44

WWP Plans to Meet Long-Term Capacity Needs

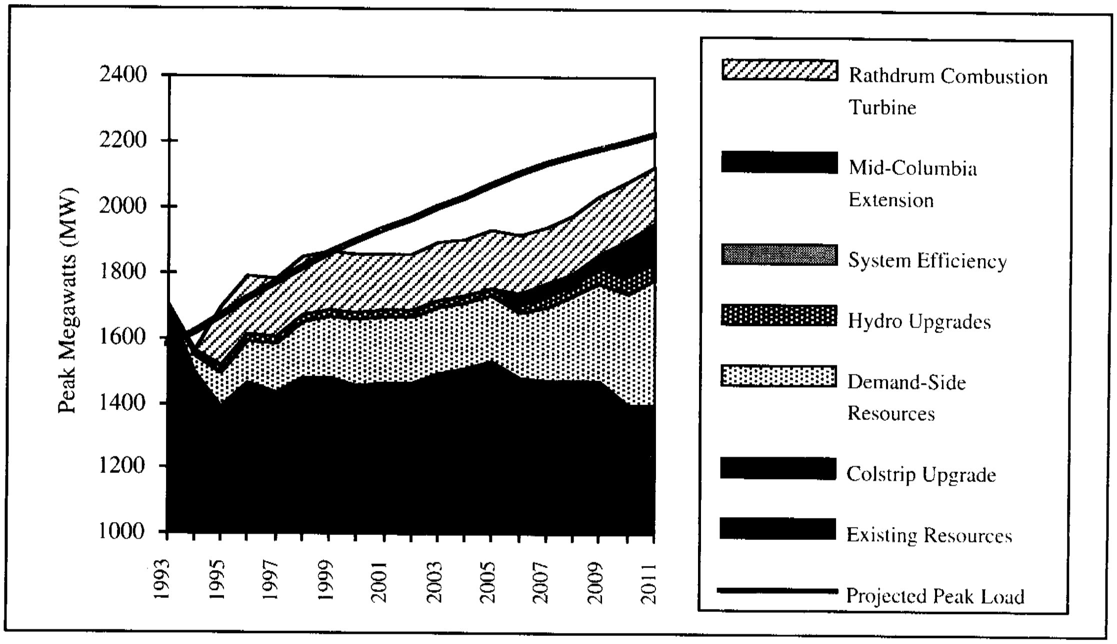


Figure 44 shows how WWP's planned demand-side, hydroelectric and other resources contribute to meeting a portion of the projected peak load. The addition of the Rathdrum combustion turbine ensures that the company has adequate generating capacity contribution until the year 2000. The nature and scope of these planned resources and their capacity is described below.

Demand-Side Resources

Demand-side resources are a key element of the company's strategy to meet long-term energy needs. The preferred plan calls for the acquisition of 50 aMW through 1996 and 136 aMW through 2011. A significant portion of these energy savings are expected to come from the company's fuel-efficiency programs. Under the preferred plan, the company plans to acquire approximately 81 aMW of fuel-efficiency savings. According to the demand-side assessment in Chapter 5, this represents all but 12 aMW of the 93 aMW of fuel-efficiency savings available at or below a levelized cost of 5 ¢/kWh.

WWP's demand-side management programs will also have a significant impact on the company's coincident peak load. Because they completely remove electrical equipment capacity from the system, fuel-efficiency programs that replace electric heating equipment with natural-gas equipment will have the most effect. Since fuel-efficiency program savings will be at the same load factor as the prior electric load, every 1 aMW of energy reduction is expected to provide a coincident peak reduction of about 3.6 aMW.

Conservation programs like weatherization provide electric efficiency and will also achieve some coincident peak reduction. However, for demand-side measures where existing electric equipment is not removed, the company is uncertain that coincident peak reduction will be as great as expected under the fuel-efficiency programs.

To date, regional efforts to estimate demand-side resource potential have focused primarily on energy savings and less on peak load reduction. For planning purposes, WWP has estimated the peak reduction associated with demand-side resources planned under the preferred resource strategy. WWP's measurement and evaluation activities will include a review of available utility research into the capacity impacts of demand-side resources. This review is expected to help the company refine its own estimates.

Hydroelectric Resources

Hydroelectric resources are sources of both energy and capacity. Their peaking capability is dependent upon the amount of water available. Storage projects that have the ability to draft reservoirs have more flexibility than run-of-river type projects that rely strictly on river flows. Noxon Rapids and Long Lake are WWP's primary storage projects. This ability to store water, and utilize it when most needed, is called shaping. The ability to shape the hydroelectric system adds great flexibility and value to the company's resource portfolio.

WWP recently investigated the costs associated with maximizing the output of the company's existing hydroelectric resources. Many of these plant modernization and efficiency improvement opportunities represent cost-effective energy supply alternatives. Each project will also add some amount of new hydroelectric capacity. As shown in Figure 45, hydroelectric upgrades planned between 1994 and 2009 will provide approximately 14 aMW of energy and 53 MW of capacity.

Figure 45

Hydroelectric Upgrades as Potential Capacity Resources

WWP Hydro Plant	Potential Capacity Increase (MW)	Installed Capacity Cost ($/kW)	Potential Firm Energy Increase (aMW)	Firm Energy Levelized Cost (¢/kWh)	Estimated On-Line Date
Upper Falls	1.7	1,353	0.8	1.7	1995
Nine Mile Falls					
Without Pool Raise	11.1	1,027	1.7	2.4	1995
Cabinet Gorge					
Unit No. 1	10.0	550	5.1	0.0	1994
Unit No. 2	10.0	450	3.5	4.0	2007
Noxon Rapids					
Unit No. 1	10.0	450	0.9	5.0	2009
Unit No. 3	10.0	450	1.6	4.0	2009
Total	**52.8**		**13.7**		

Efforts are currently under way to extend the existing mid-Columbia purchase agreements with Grant County PUD. The company estimates that new Grant County contracts will provide 47 aMW of energy and 105 MW of capacity. The final results will depend on the terms and conditions negotiated. WWP also intends to negotiate the extension of existing agreements with Douglas County PUD and Chelan County PUD. All of these mid-Columbia contract extensions will help WWP meet long-term energy and capacity needs.

Combustion Turbines

Combustion turbines are often considered as capacity resources. Compared to other supply-side alternatives, they have lower capital installation costs and shorter licensing and construction times. Natural gas and oil are typical combustion turbine fuels. Many units have dual-fuel capability. Relatively short start-up times and high ramp-rates allow the units to be used for load-following. Technology advances associated with the combustion process have improved turbine fuel efficiencies and reduced emissions.

Operating costs and primary fuel are important considerations for all resources. These costs are more critical for facilities that would operate to serve base or intermediate load needs. Combined-cycle units that have a lower heat rate (higher fuel efficiency) than simple-cycle units are better suited to serve these base load needs.

Simple-cycle turbines are less expensive to construct than combined-cycle facilities. Because they are installed primarily as a system back-up to meet peaking needs, a higher heat rate (lower fuel efficiency) is acceptable. Dual-fuel capability provides resource reliability and can help offset fuel-cost increases.

WWP currently owns and operates one natural-gas-fired simple-cycle combustion turbine facility. The Northeast Combustion Turbine, located in northeast Spokane, provides the company with 68 MW of peaking capability. In early 1993, WWP selected a site near Rathdrum, Idaho, as the preferred location to install 176 MW of simple-cycle combustion turbine capacity. Following is a summary of the Rathdrum Combustion Turbine Project development. Additional project details appear in Appendix I.

Proposed Rathdrum Combustion Turbine Project

The proposed Rathdrum Combustion Turbine Project involves the installation of two natural-gas-fired simple cycle combustion turbines and associated equipment. Natural gas has been selected as the primary fuel with leased natural gas storage as a back-up fuel source. Each unit is a General Electric 7111EA combustion turbine with a winter rating of approximately 88 MW. Actual project output depends on fuel type and atmospheric conditions.

The estimated capital cost of the turbine project is $70 million, or approximately $400 per kilowatt. The company anticipates receiving all necessary permits and approvals by July 1993. Based on this timing, ground breaking for site preparation will take place in the third quarter 1993 with the majority of construction activity scheduled for 1994. Commercial operation would begin in January 1995. Although the cost and availability of fuel supplies will ultimately determine how the Rathdrum turbines are operated, the project could be utilized for up to 4,500 hours per year based on restrictions of the air quality permit that is being requested by the company.

In addition to satisfying immediate and future capacity needs, the Rathdrum project as it is currently proposed offers many other benefits including:

- Approximately $1 million per year in property tax revenue for the taxing districts in Kootenai County, Idaho.
- Approximately $130 million in direct benefits for WWP customers. Revenues from a contract with Portland General Electric will offset the cost of the project and eliminate the need to recover the project capital costs through customer electric rates.
- Between 80 and 100 construction jobs and at least 3 permanent jobs.
- Infrastructure improvements for the local community that include the paving of roads and improvements to Rathdrum municipal water system.

All environmental considerations associated with development of the proposed project are being addressed through the permitting process. Each of these concerns will be addressed by the company's commitment to exceed requirements of all pertinent environmental regulations.

Other Capacity Resources

The planned resources described above will satisfy the company's immediate capacity needs. Alternatives that were considered are more expensive and do not have the same type of flexibility and reliability offered by the Rathdrum combustion turbine. Some options, like the proposed BC Hydro Transmission Interconnection, cannot be developed in time to meet the immediate needs. This project and other resources will be considered as ways for meeting future capacity needs.

Long Lake Redevelopment

An additional hydroelectric upgrade opportunity exists at the company's Long Lake plant. This project involves the construction of a second powerhouse for the installation of one or two new 60 MW generators. Additional Long Lake generating capacity would allow the company to more fully utilize the existing hydraulic resource. Detailed studies have focused on the development of a single 60 MW unit project. The Long Lake expansion project may be considered as a future capacity alternative. Capacity costs for the this project are estimated at $1,000 per killowatt.

WWP-BC Hydro Transmission Interconnection

In March 1993, the Department of Energy (DOE) issued a Presidential Permit authorizing a license to construct a 230,000 volt (230 kV) transmission line connecting the BC Hydro system in southeastern British Columbia with WWP's system in northeastern Washington. The proposed WWP-BC Hydro Transmission Interconnection consists of approximately 110 miles of new 230kV transmission line and would have an initial transfer capability of 800 MW. The capital cost of the interconnection is estimated to be $150 per kilowattt but does not include the cost of resources that would have to be purchased from Canadian suppliers.

In conjunction with the proposed interconnection, WWP has signed a Memorandum of Understanding (MOU) to purchase 200 MW of capacity from BC Hydro. The delivery of 200 MW of capacity depends on the construction of the interconnection. A contingency agreement calls for the purchase of 50 MW of capacity and is subject to the availability of firm transfer capability on the existing transmission system.

The decision to proceed with construction of the interconnection project depends on several factors including a policy recommendation by the British Columbia government regarding the long-term export of firm electricity. Project approval is also required by Canadian regulatory agencies.

Utility Purchases

WWP assesses the cost and availability of capacity from other utilities on a regular basis. The existing capacity exchange with Pacific Gas & Electric (PG & E) allows both utilities to take advantage of seasonal load diversity. WWP's ability to enter into additional exchange agreements is limited by low summertime hydroelectric conditions and maintenance requirements.

The surplus capacity available from other utilities, especially outside the Northwest, is often based on the cost to operate oil and gas-fired combustion turbines. A typical capacity purchase may also include the purchase of a minimum amount of energy. The cost to acquire these resources also includes the cost of electrical transmission (wheeling) and losses.

The company continually monitors capacity purchase opportunities. These potential purchases are compared to other capacity alternatives and pursued when they prove to be a cost-effective option.

Time-of-Use Rates

Time-of-use rates are based on the concept that there is a significant differential in the cost to supply power during peak-load hours versus off-peak load hours. Time-of-use rates are designed to discourage energy usage during heavy-load hours. Because time-of-use rates require the utility to install additional metering equipment, implementation for residential customers is considered costly. If the peak- and off-peak differential becomes significant, industrial and commercial time-of-use rates may become feasible. The company intends to further assess the feasibility of time-of-use rates in order to meet future capacity needs.

Load Control

Load control is being implemented by some utilities in the eastern United States. It involves the periodic switching of appliances, such as water heaters, during periods of peak demand. It requires the utility to install special control equipment. WWP's current fuel-efficiency program is considered a more cost-effective way of reducing peak demand associated with residential space and water heating equipment.

Hydroelectric Pumped Storage

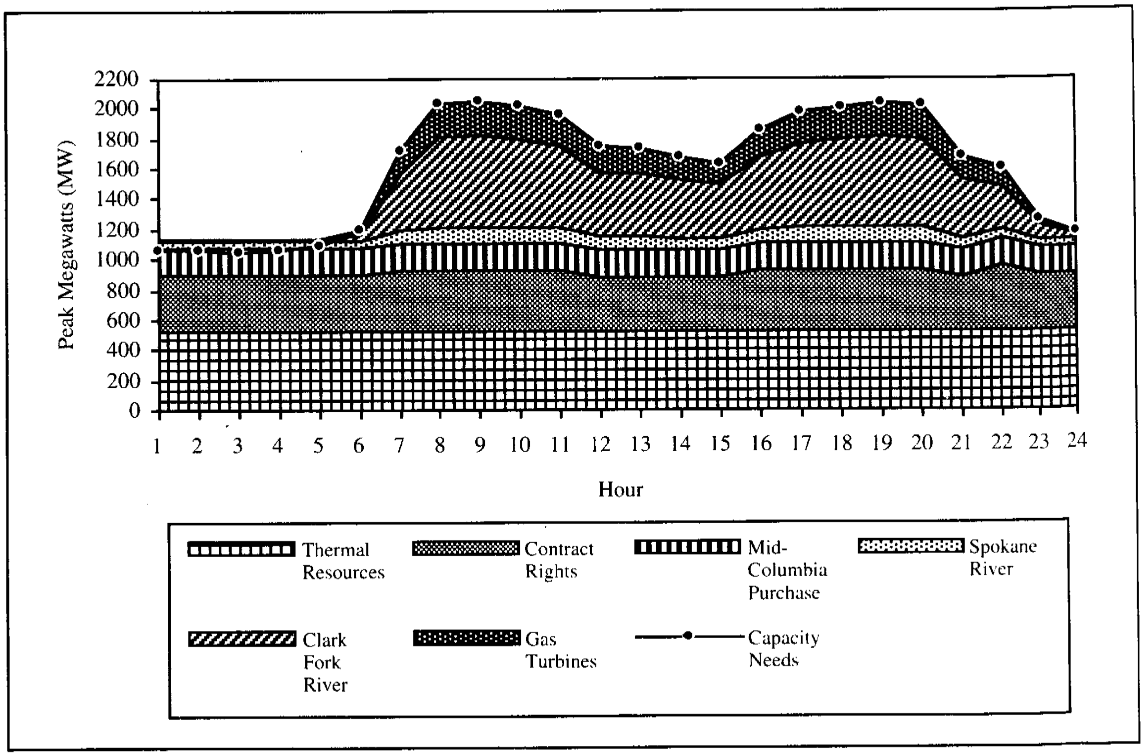
Across the nation, there has been a renewed interest in pumped storage opportunities. Individual projects are being promoted in Washington, Oregon and Idaho. Pumped storage facilities rely on water stored in reservoirs to generate electricity during heavy-load hours. During the light-peak hours, the water is pumped back to the reservoirs. The disadvantage is 50% more energy is required to fill the reservoir than is generated. Capital costs for pumped storage are also significant. Although these costs are very site-specific, most fall in the range of $1,000 to $1,500 per kilowatt.

A New Capacity Planning Tool

In 1992, WWP began development of an additional planning tool that allows the company to evaluate capacity needs and resources on a daily basis. By incorporating variables that affect both load and generation, the model approximates operation of the company's resources. Inputs for daily load shape, river flows, reservoir draft limits and maintenance outages help to evaluate resource capability and needs under extreme conditions. Additional development of the new planning tool is scheduled for 1993. Figure 46 illustrates model results from a preliminary study.

Figure 46

Preliminary Capacity Planning Model Results



The study results shown in Figure 46 reflect how WWP resources might be operated to meet peak loads forecast for a January 1995 day. Resources are stacked according to typical operating procedures. Thermal resources and contract rights serve the base-load needs. WWP's mid-Columbia purchase and run-of-river hydroelectric resources are used to serve intermediate needs. To the extent possible, the company's Clark Fork river plants (Cabinet Gorge and Noxon Rapids) are shaped to follow peak loads. Combustion turbine capability, including the Northeast and the proposed Rathdrum plant, is used to meet any remaining peaks.

The conditions studied in Figure 46 are fairly extreme. Total capacity requirements include the January 1995 peak-load forecast of 1,573 MW. The daily load shape is based on actual data recorded for a January 1993 day that had an average daily temperature of five degrees Fahrenheit. All contract obligations are assumed to be met over the peak-load hours. Each of the company's thermal plants are operating to full capacity, but streamflows reflect the average of the lowest flows over the last ten years.

Under the conditions studied, the company's Noxon reservoir would be drafted to its current limits. WWP would rely on its combustion turbine peaking capability to meet loads during the peak hours. For the peak hour of the day, 231 MW of the total available 244 MW of turbine capability would be utililized. Under less severe conditions, the combustion turbines would be required to operate much less, if at all.

WWP believes that the new planning tool represents a valuable asset for evaluating future capacity needs and opportunities. Additional model information and preliminary study results are contained in Appendix I.

Wholesale Marketing

WWP has always maintained an active involvement in wholesale marketing activities throughout the region. Through both short-term and long-term purchase and sales agreements, the company is able to acquire cost-effective resources and market surpluses. These activities directly impact the company's ability to maintain its competitive position and to support its commitment to rate stability. WWP will continue to pursue opportunities that optimize the use of the company's resources and, in turn, return benefits to the company and its customers. This section describes recent activities, including a summary of the company's electric wholesale guidelines.

A Coordinated Effort

In 1992, WWP completed organizational changes to combine the company's short-term and long-term wholesale marketing efforts. This change serves to improve coordination and reinforce wholesale marketing activities. Marketing efforts are directed by the company's electric wholesale guidelines and coordinated with the integrated resource planning process.

Wholesale Marketing Guidelines

As a generator and distributor of electric energy, WWP's primary responsibility is to provide adequate and low-cost supplies of reliable electric power to its retail customers. However, there may be periods (daily, weekly, monthly, seasonally and annually) when WWP has generating resources available in excess of its own customers' needs. By entering into wholesale transactions with other electric utilities, WWP can utilize both the unused capability of its resources and the unused capability of resources on other utilities' systems. Maximizing the use of these resources can generate additional revenues that help maintain the lowest possible rates for WWP's customers.

Types of Transactions

Wholesale transactions generally fall into three broad categories.

- Support the Integrated Resource Plan.

  The IRP process identifies a preferred resource strategy for meeting energy needs as determined by the long-term electric forecast. The actual surplus or deficit that WWP experiences in the future will depend on the resources selected, actual loads and stream flow conditions. Wholesale marketing will be used to effectively manage any resource surpluses or deficits by both acquiring and selling power as needed to keep WWP in load-resource balance. With successful wholesale marketing, retail electric rates will be lower than they would be without this activity.

- Increase the value of WWP's system.

  WWP's existing supply-side resource base has a certain level of flexibility. By combining this flexibility with other resources (newly constructed or purchased), WWP can create products that are customized to its wholesale customers' needs, while continuing to provide dependable electric service to its retail customers.

- Create additional net revenues.

  WWP often has the opportunity to acquire resources and resell them at a profit. Brokering energy on the short-term market is an example of such a transaction. These transactions may or may not involve the acquisition of long-term resources. Such transactions will only be pursued if they provide net revenue requirement benefits.

Only those opportunities that help make WWP a low-cost supplier of electric service to retail customers will be pursued.

Length of Transactions

The length of wholesale sales and purchases of power can generally be divided into three time frames:

- Real-time transactions: The hour-by-hour secondary purchases and sales transactions that are initiated among utility dispatchers and schedulers as they operate the system to meet load throughout the course of a day.
- Short-term transactions: Block sales or purchases of power for a few weeks or several months and can include the period of time through the end of the next season (winter or summer).
- Transactions that involve long-term power sales and purchases: Any transactions that last two or more years.

Real-time and short-term transactions occur frequently among utilities and may often be speculative. The possible adverse impacts from these transactions are reduced because the short duration of the transactions don't allow time for large losses to accumulate. Long-term transactions generally are not speculative in nature. The potential of being locked into an unfavorable contract for the long-term makes the risk assessment more critical during the development of the transaction.

Benefits

Benefits of wholesale marketing are obtained when the revenues of the transactions exceed the revenue requirements to serve the transaction. The resources used to satisfy wholesale transactions may come from existing resources, new resources, or through service contracts with independent power producers or other utilities.

Past Marketing Efforts

WWP's past wholesale marketing activities have resulted in some unique transactions and benefits. Some examples include:

- Transactions that convert daily nonfirm sales to long-term firm sales.

  The primary purpose of WWP's long-term marketing efforts in the late 1980s was to convert daily non-firm surplus power sales to long-term firm sales. This focus made efficient use of WWP's generating resources and maximized revenues while the resources were surplus to the needs of WWP's retail customers. Examples of these sales are the firm sales to Puget Power and PacifiCorp.

- Transactions resulting from unique relationships.

  The Montana Load Control agreement provides load control services to Montana Power Company (MPC). With this arrangement, MPC can increase generation from its Kerr hydro units. Since these units are upstream from WWP's hydro plants, WWP also realizes increased generation. This unique relationship allows MPC to receive increased generation and load control services while WWP receives increased generation and additional compensation for load control services.

- Transactions resulting from diversity and/or differences in external forces that exist among utilities.

  An example of this kind of transaction is the recent agreement with the Northern California Power Agency (NCPA). In this transaction, WWP purchases capacity from BPA, adds energy from the WWP or neighboring systems and then sells both capacity and energy to NCPA. WWP was needed to facilitate this sale because BPA is prohibited from selling long-term firm capacity to parties outside the Northwest without a five-year recall provision. All three parties will benefit from this unique transaction.

The company will continue to pursue these and other kinds of opportunities as they present themselves.

Recent Long-Term Purchases and Sales

Since 1991, WWP completed two new long-term sales contracts to the Northern California Power Agency (NCPA) and Portland General Electric (PGE). These agreements are summarized below.

Northern California Power Agency (NCPA)

Under this agreement, WWP is selling to the NCPA capacity and energy for an 18-year term. The starting date is based on the availability of the California-Oregon Transmission Project that was energized in March 1993. Service under this agreement also commenced in March 1993. Upon five years' notice, but not earlier than June 30, 2001, either party may terminate the agreement. NCPA shall purchase 50 MW capacity and associated energy from WWP (at a daily load factor of up to 100 percent). To support the energy portion of the sale, WWP will purchase nonfirm energy on the daily spot market or supply it from its daily surpluses. A capacity purchase from BPA is used to support the contract's capacity component.

Portland General Electric (PGE)

For the term March 1992 through October 1994, WWP is selling to PGE 100 MW of capacity (10 hours per day, 50 heavy load hours per week). In June 1992, the company signed a long-term capacity sale with PGE for an additional 50 MW beginning November 1992 through October 1994, and a total of 150 MW for the period November 1994 through December 2016. In all cases, PGE must return to WWP all of the energy associated with the capacity deliveries within 168 hours (one week).

This sale represents an additional capacity obligation for WWP. In order to help satisfy this obligation, WWP has proposed the installation of the Rathdrum natural-gas-fired simple-cycle combustion turbines. Beginning in 1995, the 176 MW facility would be available to help satisfy the company's capacity needs. The cost of this facility is offset by the revenues gained from the PGE capacity sale. The remaining benefits will be passed on to WWP's electric customers.

The company's Strategic Resource Planning Model (SRPM) was used to help illustrate the benefits of this wholesale transaction. In this sensitivity study, the revenue requirement associated with the Rathdrum Combustion Turbine Project and the PGE contract revenues were both input to the SRPM. Figure 47 shows the sensitivity study results as they compare with the base case that does not include the PGE revenues and turbine installation costs.

Figure 47

A Recent Capacity Sale Provides Benefits to WWP Customers

	Net Present Value Revenue Requirement (Nominal $ 000,000's)
Base Case (Without PGE Contract Revenues & Combustion Turbine Installation Costs)	3,375
Sensitivity Case (Includes PGE Contract Revenues & Combustion Turbine Installation Costs)	3,352

Figure 47 shows that the PGE transaction more than offsets the cost to install the proposed Rathdrum combustion turbines. Revenue requirements are lower than they would otherwise be without the PGE transaction. Although this SRPM analysis is helpful in identifying the benefits of the PGE contract, detailed economic analysis is used to more accurately calculate these results.[22] Based on these detailed studies, the company estimates a net present value revenue requirement benefit of approximately $36 million.

Potential Marketing Opportunities

Some examples of potential WWP wholesale marketing activities include:

- WWP-BC Hydro Transmission Interconnection

  In order to make this a viable resource, the cost of the transmission line plus the cost of power delivered over it must be competitive with other resources available to meet the company's needs. The project may be considered to meet a combination of retail and wholesale customer needs.

- Lost Opportunities

  For a variety of reasons, some resource development options may represent lost opportunities. As a result, the company may choose to develop these resources even though they are not currently needed to serve WWP's retail load. Any resources that are developed before the retail loads materialize will be sold temporarily until it is needed by WWP's retail customers. Demand-side management and hydroelectric upgrades are examples of potential lost opportunities. Relicensing requirements could mandate the schedule for upgrading WWP's existing hydroelectric facilities. Wholesale marketing can be used to help mitigate resource development costs if demand-side resources and hydroelectric resources are pursued prior to the company's needs.

- Firming Nonfirm

  As a hydroelectric based utility, WWP has the opportunity to pursue "firming nonfirm" strategies. In 1992, the company completed a detailed study that examined the feasibility of installing a simple-cycle combustion turbine to back-up production of nonfirm energy from the company's existing hydroelectric system. Results of this analysis indicated that by firming its own hydroelectric resources, the company could potentially realize an economic benefit of approximately $30 million on a net present value basis. Future investigations will provide additional information on the cost and need for this potential resource as well as the risks associated with its development. The use of the proposed Rathdrum turbines as a back-up source for hydroelectric resource firming will be included in these future studies.

WWP has the tools and the expertise to selectively take advantage of wholesale market opportunities that reduce the total cost of resources for its retail customers. Active involvement in wholesale marketing allows WWP to understand available resource opportunities and to take advantage of those resources which enhance its existing resource mix. The company will continue to investigate all new opportunities as they become available.

[22] The PGE capacity sale extends through the year 2016. The SRPM analysis considers revenue only through 2011.

Network Planning

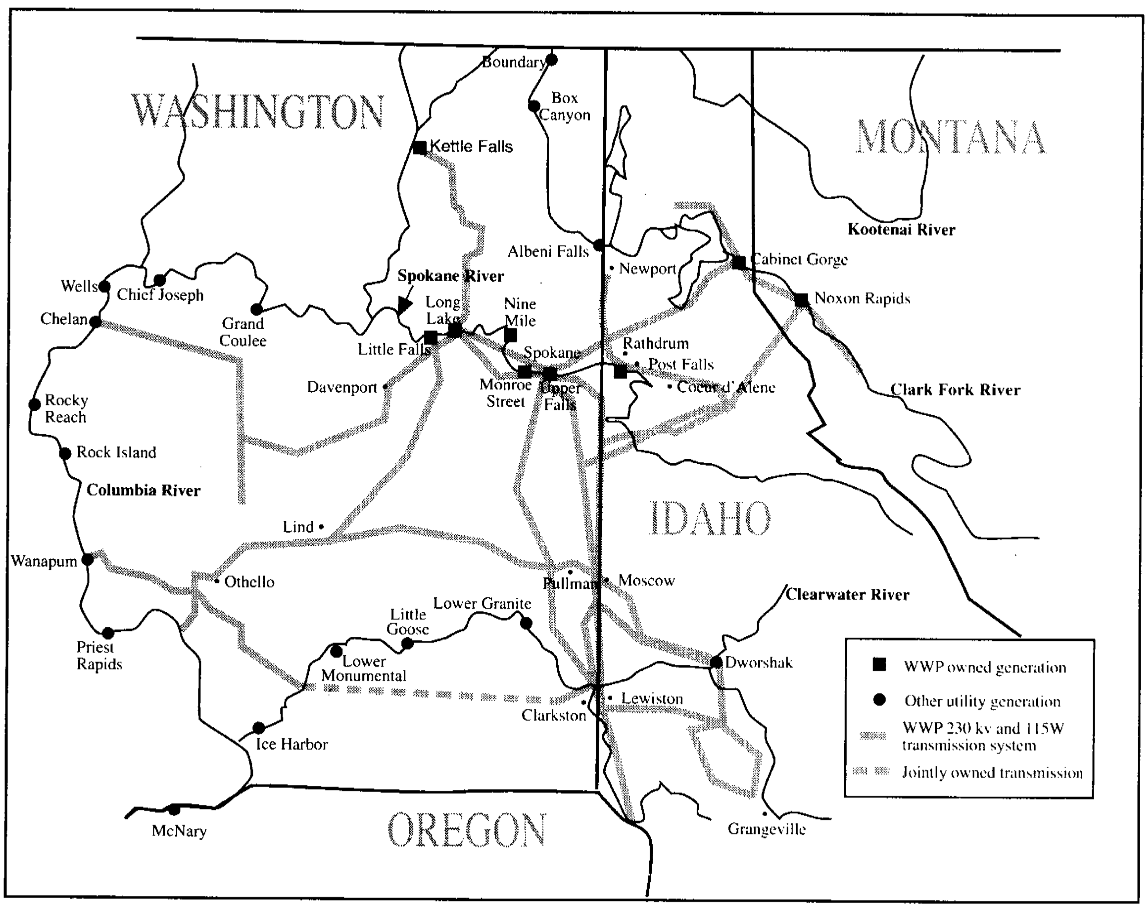
The purpose of WWP's system planning activities is to provide for the orderly and economic expansion of the electric transmission and distribution systems. This discussion focuses on the company's transmission planning efforts.

The Existing System

WWP's bulk transmission system primarily consists of 230 kV and 115 kV facilities. Electric resources produced at WWP generating facilities and throughout the region are transferred on the 230 kV grid and delivered through power transformers to the 115 kV network and eventually to the company's 13 kV distribution system. As of January 1993, WWP owned and operated 545 miles of 230 kV transmission line and 1,490 miles of 115 kV transmission line. Only 3 miles of new 115 kV transmission were constructed since April 1991. Figure 48 illustrates the general location of WWP's existing high voltage transmission system.

Figure 48

WWP Transmission System Map



Transmission Needs

The company's transmission system is planned, designed, constructed and operated to ensure continuity of service during system disturbances and to be consistent with sound economic principles. Detailed planning studies determine the need to reconfigure the existing system or construct new transmission facilities. These studies are guided by WWP's Transmission System and Reliability Criteria. The reliability criteria defines acceptable levels of transmission service for various types of credible system disturbances. It is consistent with regional transmission planning criteria as determined by the Western System Coordinating Council[23] (WSCC).

Given the company's commitment to system reliability and customer service, the need to construct new facilities may be initiated by many factors. In general, new facilities may be required in order to:

- Serve new and existing customers.
- Integrate new resources.
- Maintain or increase intra-area transfer capability.
- Improve system efficiency.

WWP's transmission needs are reviewed on an ongoing basis. These efforts are coordinated with neighboring utilities. Regional transmission activities are coordinated through the WSCC.

Current Transmission Plans

Over the next five years, the company will add facilities to meet growing loads and integrate new resources. Some upgrades and reconfiguration of the existing transmission system will reduce transmission constraints that currently limit energy transfers between Montana and the Pacific Northwest. Together, all of these changes will improve the operating efficiency of the electric network. Although they are subject to change, the company's near-term transmission plans include the following projects:

Integrate New Resources

- Nine Mile Transmission:

  Existing 115 kV transmission will be reconfigured to integrate additional generation from WWP's planned Nine Mile hydroelectric upgrade. Older 60 kV equipment will be removed.

- Rathdrum Combustion Turbine:

  Approximately 0.5 miles of new 115 kV transmission will connect the proposed combustion turbine with the adjacent Rathdrum substation.

Serve Existing and New Customer Loads

- Dry Gulch-North Lewiston 115 kV Transmission:

  Approximately five miles of new transmission line will improve service reliability to Lewiston area loads.

- Othello Switching Station and Associated 115 kV Transmission:

[23] The Western System Coordinating Council is one of nine regional councils that comprise the North American Electric Reliability Council (NERC). The WSCC includes most of the western United States, the Canadian provinces of British Columbia and Alberta, and parts of Mexico.

This project involves reconfiguration of the existing area system, as well as approximately 14 miles of new 115 kV transmission. A new capacitor bank will replace undersized equipment. Project completion will improve service reliability to Othello area loads.

- Shawnee 230 kV and 115 kV Transmission

  The Shawnee transmission work includes approximately 4 miles of new 115 kV transmission. Approximately 30 miles of existing 115 kV line will be replaced with new 230 kV transmission. An existing capacitor bank will be removed. Completion of this project will improve service reliability to loads in the Pullman and Moscow areas.

- Ramsey Switching Station and Associated 115 kV Transmission

  The Ramsey 115 kV project primarily involves reconfiguration of some existing transmission and approximately five miles of new construction. A capacitor bank will also be installed.

- Avondale and Huetter Substations

  Each of these new 115 kV substations will be served from the existing transmission system. These substations and the Ramsey Switching Station are being planned to meet growing loads in Idaho's Kootenai County.

- Greenacres Substation and Associated 115 kV Transmission

  Approximately four miles of new 115 kV transmission will be constructed to serve a new 115 kV substation.

- Otis Orchards 115 kV Transmission

  Approximately three miles of new double-circuit 115 kV transmission will connect the new Otis Orchards Switching Station. A new capacitor bank will also be installed at Otis Orchards.

- Francis and Cedar-Lyons and Standard 115 kV Transmission

  Involves approximately four miles of new 115 kV transmission. This project, as well as the Greenacres and Otis Orchards projects, will serve growing loads and improve reliability in the immediate Spokane area.

Remove Transmission Constraints

In 1991, WWP and BPA determined a plan of service to reduce a transmission system bottleneck between Montana and the Pacific Northwest. The following WWP facility upgrades and reconfiguration will help reduce the so-called "West of Hatwai" transmission constraints.

- West of Hatwai North

  Involves operating changes for existing transmission and reconductor of 115 kV lines located west of Spokane. Reconfiguration of an existing 115 kV switching station (Devils Gap) will provide additional operating flexibility.

- West of Hatwai South

  Approximately seven miles of new 230 kV line construction will result in reconfiguration of the Lewiston area transmission system.

These WWP projects, along with some BPA system upgrades and operational changes, will increase the West of Hatwai transfer capability by almost 1000 MW. This increased capability will reduce the need to limit energy transfers between Montana, Idaho and the Pacific Northwest. WWP and BPA will share the costs and benefits of these efforts.

Improve System Efficiency

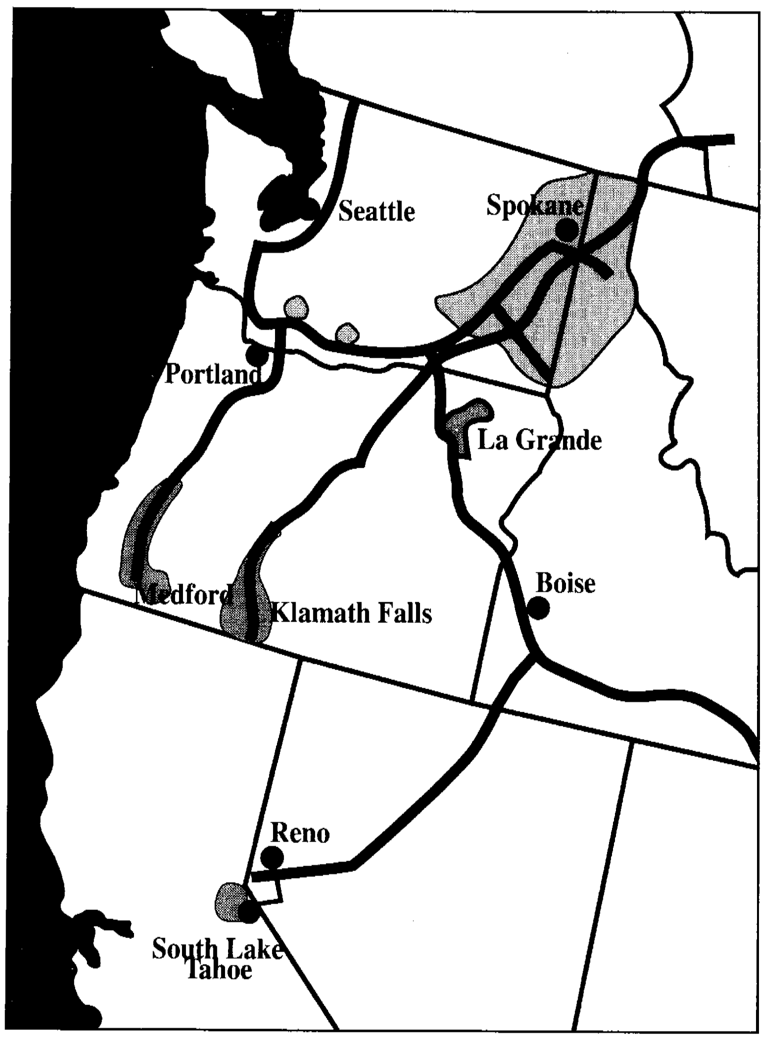
All of the transmission projects described above will provide reliability and allow access to low-cost energy supplies. Study results indicate that these system additions and modifications will also result in approximately 3.7 aMW of transmission loss savings.

Natural Gas Planning

WWP's natural gas service territory is shown in Figure 49. It is followed by an overview that was taken from WWP's "1993 Natural Gas Integrated Resource Plan." The natural gas IRP was published in February 1993.

Figure 49

Natural Gas Service Territory



Overview

The past several years have seen dramatic changes in the natural gas industry which have added to the uncertainties of the industry. Federal deregulation has opened up many new opportunities for utilities and individual customers to access competitive sources of natural gas. It has also opened a "Pandora's Box" of variables which the old, tightly regulated environment never considered.

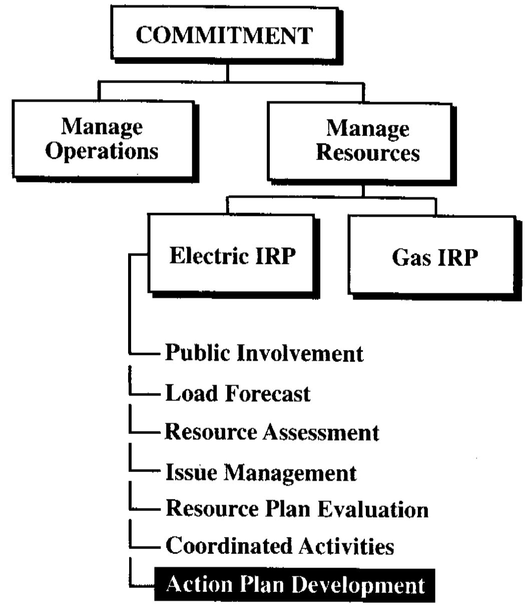
With the interpretation of federal rule-making still in process as individual pipelines attempt to comply with deregulation policies, a climate of regulatory uncertainty has developed nationally. Not only does the local distribution company (LDC) compete with suppliers of alternate fuels, but it now must also vie with gas brokers, producers, agents and even its traditional suppliers — the pipelines. While this competition is a healthy part of a market environment, the roles of all the players are still being determined. One of the benefits of the integrated resource planning process is that it encourages LDCs to address and clarify these issues on a consistent basis.

Developments within the industry cause constant changes to the company. Federal Energy Regulatory Commission (FERC) Order 636 provides an opportunity for an LDC to reduce the fixed costs of interstate pipeline transportation capacity when not being used by allowing temporary releases. This reduces the per therm cost to customers. On the other hand, FERC rate design policy changes cause low load factor transportation customers, such as WWP, to pay more than they previously did.

New markets for natural gas, such as vehicle fuel or fuel cells for buildings, are at various stages of technical and market development.

WWP is positioning itself to take advantage of opportunities brought about by the inevitable changes that will continue to occur.

Chapter 9 Near-Term Action Plan



WWP's preferred energy strategy provides direction for the company's long-term resource acquisitions. The company's near-term action plan outlines activities that will support this strategy and improve the planning process. This chapter describes action items planned for 1993 and 1994. Progress on these activities will be monitored over the two-year planning cycle and reported in the company's 1995 Integrated Resource Plan.

Summary

WWP's near-term action plan is designed to ensure that all new demand-side and supply-side resources are constructed or acquired in a cost-effective manner. Continued improvement in the company's planning process and analytical methods will further reinforce WWP's commitment to integrated resource planning. Action plans have been developed in the following areas. A detailed description follows this summary.

- **Planning Process:** Continue internal and external coordination and public involvement activities.
- **Load Forecasting:** Extend end use modeling techniques to the residential customer class. Enhance the Spokane and Kootenai county models and the peak forecasting methodology.
- **Demand-Side Management:** Continue to operate and refine the current programs. Design and implement new commercial/industrial lighting and motor efficiency programs. Complete the Demand-Side Management Issues Group mandate.
- **Supply-Side Resource Opportunities:** Focus on system efficiencies including hydroelectric and Colstrip plant upgrades and transmission and distribution loss savings. Proceed with the licensing and installation of the Rathdrum combustion turbines. Successfully negotiate with Grant County PUD for a long-term extension of the Wanapum and Priest Rapids power sales contracts.
- **Resource Management Issues:** Continue to monitor and evaluate the effects of national and regional issues including the National Energy Policy Act, transmission access legislation, the Clean Air Act Amendments, the Endangered Species Act and a potential federal energy tax. Respond to other requirements, challenges and opportunities including hydroelectric plant relicensing, competitive bidding, transmission interconnections, avoided cost and environmental externalities.

- **Resource Plan Evaluation:** Continue to utilize and refine the Strategic Resource Planning Model. Refine and enhance the new capacity planning model. Evaluate other planning models and analytical techniques as they become available.
- **Wholesale Marketing Opportunities:** Evaluate sales and purchase opportunities as they become available. Focus on opportunities that add value to the existing system and provide positive revenue benefits.

Many of these activities continue on an ongoing basis. Other action items contain specific schedules for their completion. In all cases, it is necessary to maintain adequate flexibility in order to respond to changing conditions. As a result, specific action items may be adjusted over the course of the two-year planning cycle. Following is a detailed description of the company's 1993 near-term action plan.

Planning Process

1.0 Public Involvement

1.1 Continue to involve interested parties as members of the Technical Advisory Committee.

1.2 Provide involvement opportunities through technical workshops, public meetings and project specific activities as they are required. Implement and refine the company's plan for public participation throughout the service territory. Goals are to outline major issues of mutual concern facing the company and community, and how to address these challenges.

2.0. Internal Coordination

2.1 Continue to utilize the Resource Clearinghouse as a way to better coordinate integrated resource planning and related business activities.

3.0 External Coordination

3.1 Continue active involvement in regional, state and local planning activities.

Load Forecasting

4.0 Residential End-Use Model

4.1 An assessment of the cost and feasibility of developing an integrated natural gas and electric end-use model for the residential class was completed in September 1992. Subject to final budget approval, a contract to perform an assessment similar to the commercial modeling effort is expected to be signed in early 1993, with completion scheduled for mid-1994. The residential end-use model will be used as the baseline forecast for preparation of the 1995 IRP.

5.0 Commercial End-Use Model

5.1 Full implementation of the commercial end-use model is planned for completion in mid-1993. The forecast produced by the commercial end-use model will be used as the baseline forecast for preparation of the 1995 IRP.

6.0 Spokane and Kootenai County Models

6.1 Development of improved and expanded components of the Spokane County and Kootenai County models are planned for mid-1993 and mid-1994. This is an ongoing process. Immediate efforts will focus on addressing the needs of the commercial end-use forecasting model.

7.0 Peak Load Forecast

7.1 Development of an alternative peak load forecast assessment model is planned to be completed by July 1994. This model will utilize daily peak load data, combined with DSM implementation impacts on peak day loads, to provide typical cold day winter season forecasts. It will be used to calibrate the monthly model and to serve as a cross-check on long-term peak demand forecasts.

Demand-Side Management

8.0 Commercial/Industrial Programs

8.1 Continue to implement the commercial/industrial efficiency program (Schedule 91).

8.2 Continue to implement the commercial/industrial fuel-efficiency program (Schedule 90).

8.3 Design and implement a small commercial lighting program by mid-1993.

8.4 Design and implement a motor efficiency program by the end of 1993.

8.5 Continue to assess the demand-side resource potential in the commercial sector using the Commercial Energy Demand Modeling System (CEDMS).

9.0 Residential Programs

9.1 Continue to implement WWP's Energy Exchanger (residential fuel-efficiency) program (Schedule 90).

9.2 Continue to implement the weatherization, shower head/aerators, compact fluorescent, manufactured housing acquisition and residential new construction programs (Schedules 60, 65 and 67).

9.3 Assess the DSM potential in the residential sector using the Residential Energy Demand Modeling System (REDMS) by August 1994 (contingent on implementing REDMS).

10.0 Measurement and Evaluation

10.1 Complete all objectives as outlined in WWP's 1993 Measurement and Evaluation plan.

11.0 Demand-Side Management Issues Group (DIG)

11.1 Complete all DIG activities in early 1994. Corresponding to the 1995 IRP schedule, recommend long-term demand-side management goals for the company.

Supply-Side Resource Opportunities

12.0 Hydroelectric Plant Improvements

12.1 Complete the Cabinet Gorge Unit No.1 turbine upgrade by September 1994.

12.2 Complete the replacement of two Nine Mile turbine-generator units by March 1995.

12.3 Further evaluate all system hydro improvement opportunities and provide recommendations by July 1994.

13.0 Colstrip Thermal Efficiency

13.1 Evaluate the economics of replacing the Colstrip Units No.3 and No.4 high-pressure and low-pressure turbine rotors by April 1993. Recommend a course of action by July 1993.

14.0 Transmission and Distribution Loss Savings

14.1 Monitor the distribution loss savings program of the company.

14.2 Finalize the transmission system loss saving study by August 1994. By October 1994, recommend transmission reconductoring, new construction or other facilities that will provide cost-effective transmission system loss savings.

15.0 Proposed Rathdrum Combustion Turbines

15.1 Under the following schedule, facilitate the installation of two natural-gas-fired simple-cycle combustion turbines.

July 1993	Acquire permits and licensing.
August 1993	Begin construction.
March 1994	Turbines arrive at site.
November 1994	Testing.
January 1995	Available for commercial operation.

16.0 Mid-Columbia Contract Extension

16.1 Negotiate favorable terms and conditions for a long-term extension of the Wanapum and Priest Rapids power sale contracts. Complete negotiations with Grant County PUD by December 1994.

16.2 Implement the steps necessary to extend the contracts with Chelan County PUD and Douglas County PUD.

Resource Management Issues

17.0 Endangered Species Act

17.1 Continue to evaluate the effects to hydroelectric system operation resulting from efforts to protect fish stocks listed under the Endangered Species Act.

18.0 Hydroelectric Plant Relicensing

18.1 By mid-1993, develop a plan for successful relicensing of the company's existing hydroelectric plants under FERC guidelines.

19.0 Competitive Bidding

19.1 To meet regulatory requirements, submit a Request for Proposal (RFP) or alternative to the WUTC by June 1993.

20.0 Avoided Cost

20.1 Based on projected resource needs, file an updated avoided cost with both the WUTC and the IPUC by July 1993.

21.0 Environmental Externalities

21.1 Continue to monitor and evaluate the effects of environmental externalities on new resource acquisition decisions. Continue to recognize the environmental benefit of demand-side resources by applying a 10 percent conservation credit to all programs.

22.0 Clean Air Act Amendments

22.1 Participate with other plant owners to determine the best compliance strategy for the Centralia coal-fired plant.

23.0 National Energy Policy Act and Proposed National Energy Tax

23.1 Continue to monitor and evaluate the effects of the 1992 Energy Policy Act, including the impact of transmission access legislation.

23.2 Evaluate the effects of a proposed federal energy tax ("BTU tax") on the cost of providing energy services.

24.0 Proposed WWP-BC Hydro Transmission Interconnection

24.1 Finalize the economic analysis of the interconnection using the latest information from B.C. Hydro and other participants by October 1993. Recommend to management a decision to build or not to build by December 1993.

Resource Plan Evaluation

24.0 Strategic Resource Planning Model

24.1 Expand the use and capability of the SRPM model as it applies to resource planning. Determine the need for, scope and cost of additional SRPM enhancements.

24.2 By August 1993, evaluate other models that would potentially replace or enhance the company's technical resource planning capabilities.

25.0 Capacity Planning Model

25.1 Continue the development of the company's new capacity planning tools. Complete enhancements before 1994.

Wholesale Marketing

26.0 Resource Needs

26.1 Use wholesale marketing activities to maintain short-term and long-term resource balance.

27.0 New Sales and Purchase Opportunities

27.1 Support evaluation of potential commercial arrangements for the proposed WWP-BC Hydro Transmission Interconnection.

27.2 Identify and pursue those opportunities that add value to the existing system and provide a positive revenue benefit. Finalize at least two new power contracts to other utilities by December 1995 that collectively generate $2 million in annual net benefits.

Glossary of Terms

Average Megawatt (aMW)
A measure of the average rate of energy delivered. One aMW equals 8,760,000 kWh per year.

Avoided Costs
Costs determined by a public utility commission process that are intended to represent the costs a utility would otherwise incur to generate or purchase power if not acquired from another source.

B.C. Hydro
British Columbia Hydro and Power Authority.

Base Loaded
A resource which operates more efficiently without being cycled to meet daily load changes.

BPA
Bonneville Power Administration, the federal power marketing agency for the Pacific Northwest.

Capacity
The maximum load a generator, power plant, or power system can produce or carry under specified conditions.

Capacity Constrained
A condition where a system adds resources for capacity needs rather than energy needs.

Capital Costs
Cost of investment in a new resource, installed $ per kW.

CF (Capacity Factor)
The percentage of a resource's maximum generation capacity that is actually used.

Cogeneration
The sequential production of electricity and useful thermal energy.

CO_2 (Carbon Dioxide)
An emission from fossil fuel burning.

Combined-Cycle CT
Combustion turbine with the addition of a heat recovery boiler and a steam turbine.

Conservation
Reducing electrical consumption with measures that increase the energy efficiency of appliances, motors, building shells, etc.

Critical Period
The historical period of water conditions during which the region's hydro power system would generate the least amount of energy while drafting storage reservoirs from full to empty.

Demand
The instantaneous rate at which electric energy is delivered to or used by a system.

Demand-Side Management (DSM)
The activity of acquiring demand-side resources.

Demand-Side Resources
Resources that can be added to a utility system to reduce customer electric usage, or control the timing or shaping of such usage.

Dispatchability
The ability to operate or not operate a resource for economic reasons.

DSI
Direct Service Industries (certain industrial customers of BPA).

Electrical Energy
The amount of electrical usage or output average over a specified period, e.g. kWh.

EMF
Invisible lines of electric and magnetic fields surrounding an electric conductor, commonly referred to as Electro-Magnetic Fields.

End-Use
The final use of electricity by customers (e.g. lighting, cooking, etc.).

Environmental Externalities
Environmental effects, including environmental benefits, that are not directly reflected in the cost of electricity.

Existing Resources
Those resources that are currently in use, or being developed under contract but not yet in operation.

FERC
Federal Energy Regulatory Commission.

Firm Load
Customer load served by a utility without a contractual provision for curtailment.

Fixed Costs
Costs that do not vary in relation to change in plant output.

Fossil Fuels
Coal, oil, natural gas and other fuels deriving from fossilized geologic deposits.

Fuel Efficiency
Utilizing fuels in applications that produce the greatest end-use efficiency (e.g. conversion of electric space and water heating to natural gas).

Fuel Mix
The make-up of resources used to serve load by fuel type.

GWh
1 gigawatt-hour = 1 million kilowatt-hours.

Inland Northwest
The area of eastern Washington, northern Idaho and western Montana.

IOU
Investor-Owned Utility.

IPPs
Independent Power Producers.

IPUC
Idaho Public Utilities Commission.

IRP
Integrated Resource Plan or integrated resource planning.

kW
1 kilowatt = 1000 watts.

kWh
1 kilowatt-hour = 1000 watt-hours.

Levelized Cost
The present value of a cost stream converted into a stream of equal annual payments.

Load Forecast
The predicted demand for electric power for planning purposes.

Lost Opportunities
Resources, which if not acquired or developed within a certain time, could be lost.

McGraw-Hill/DRI
A national economic forecasting company.

MCS
Model Conservation Standards.

Mill/kWh
One mill equals one-tenth of a cent. Frequently used as a monetary measure when referring to the cost of producing or conserving electricity.

Monte Carlo Simulation
Monte Carlo refers to the traditional method of sampling random variables in simulation modeling. Samples are chosen randomly across the range of the distribution.

MW
1 megawatt = 1000 kilowatts.

MWh
1 megawatt-hour = 1000 kilowatt-hours.

Net System Load
The total load of a system, including both firm and interruptible, within a utilities service area.

Nominal
Rates or costs that include the effects of inflation.

Nonfirm Interruptible Load
Load which can be curtailed in response to a system emergency.

Nonfirm/Secondary Energy
Electric energy having limited or no assured availability.

Nonutility Generation
Generation by producers other than electric utilities.

NWPP
Northwest Power Pool, an organization of electrical utilities.

NWPPC
Northwest Power Planning Council. A federally chartered council comprising Idaho, Oregon, Montana and Washington that establishes policy on Northwest electrical energy, fish and wildlife issues.

O&M
Operation and Maintenance Costs.

Pacific Northwest Coordination Agreement (PNCA)
An agreement signed in 1964 by the federal government and Northwest utilities to agree to operate generating projects as a single entity to make optimum use of the water and storage resources in the region.

Peak
The greatest amount of demand occurring during a specified period of time.

PNUCC
Pacific Northwest Utilities Conference Committee.

Present Value
The worth of future returns or costs in terms of their value now.

PUHCA
Public Utility Holding Company Act.

PURPA
Public Utility Regulatory Policies Act.

QFs
Qualifying Facilities under PURPA (cogeneration and small power production facilities).

Real
Costs or rates that are corrected for the effects of inflation.

Reliability
A measurement of the availability over a defined period regarding the delivery of power to a customer.

Renewable Resource
Resources such as wind, solar, hydro, etc., in which their availability is not limited by use.

Seasonal Output
Electrical output from a resource which varies in amount according to the season.

Supply-Side Resources
Resources that generate an electrical output into the utility system.

TAC
Technical Advisory Committee.

Tariff
A schedule filed by a utility with a regulatory agency describing transactions between the utility and customers in terms of type of service, conditions of service, rates changed and means of payment.

Transmission Availability
Transmission capability between electric utilities available to deliver or receive power .

Variable Costs
Costs that vary in direct proportion with plant output.

Watt
A basic unit of electric power equal to 0.00134 horsepower.

Weatherization
A process of making buildings more energy efficient such as the Home Insulation Program.

Wheeling
The use of one utility system's transmission facilities to transmit power of and for another system.

WNP
Washington Public Power Supply System Nuclear Project.

WSCC
Western System Coordinating Council.

WUTC
Washington Utilities and Transportation Commission.

WWP
The Washington Water Power Company.

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