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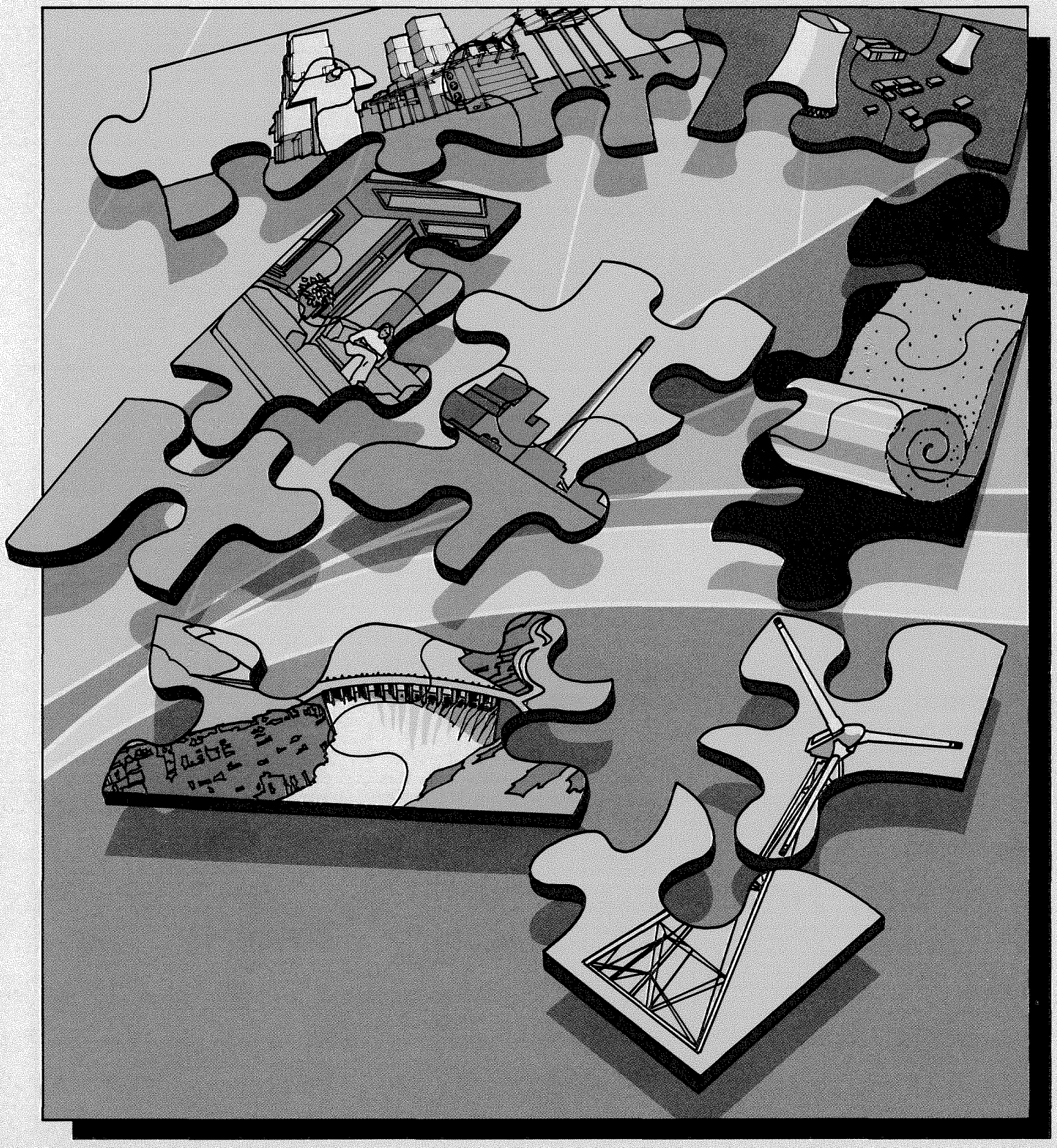

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The Northwest Power Planning Council is required to develop a program to restore the Columbia fisheries and a regional electric energy plan, to be carried out by the Bonneville Power Administration, emphasizing cost-effective conservation and renewable resources.

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EDITOR'S NOTES

This special issue of *Energy News* features highlights of the Northwest Power Planning Council's Draft 1985 Power Plan. Several members of the Council's central and state office public involvement staffs contributed to this issue. They are—in alphabetical order—Carlotta Collette, Ruth Curtis, Steve Engel, Beth Heinrich and Mickey Riley.

The full text of the Draft 1985 Power Plan is available. See the order form on the back cover. Instructions for comment on the draft appear on page 27 of this issue.

Because we waited until the Council approved the draft plan for release, this issue is not in our usual sequence. It replaces the July/August issue.

Scattered throughout this issue are facts about the Northwest's power supply system culled from the draft plan. They were illustrated by Portland artist Michael Cacy, who also illustrated our cover.–*DM*

CALENDAR

September 4-5—"Wind Energy in Montana" in Livingston, Montana. Sponsored by the Montana Department of Natural Resources and Conservation and Windbooks, Inc. For information: Montana Wind Energy Association, P.O. Box 1376, Livingston, Montana 59047-1376. (406) 333-4484.

September 7-12—American Fisheries Society and International Association of Fish and Wildlife Agencies Conference in Sun Valley, Idaho. For information: Steve Barton, Idaho Department of Fish and Game, P.O. Box 25, Boise, Idaho 83707.

September 18-19—Northwest Power Planning Council meeting in Portland, Oregon.

September 21—"Solar '85—A Conference on Energy Challenges," the 1985 annual conference of the Solar Energy Association of Oregon, held at Timberline Lodge on Mt. Hood, Oregon. For information: Phil Barrett, Solar Energy Association of Oregon, 2637 S.W. Water Ave., Portland, Oregon 97201. (503) 224-7867.

September 23-24—"Third Alternative Energy Financing Conference" in New York, New York. Sponsored by Public Utilities Reports, Inc. For information: Laurie Pystrak, Public Utilities Reports, Inc., 1700 N. Moore St., Arlington, Virginia 22209. (800) 368-5001.

September 24-25—Conference on "The 1985 Draft Power Plan" in Spokane, Washington. Sponsored by the Northwest Public Power Association and the Public Power Council. For information: (206) 694-6553 or (503) 289-9411.

September 25-27 —"Waterpower/'85; An International Conference on Hydropower" in Las Vegas, Nevada. Sponsored by the U.S. Bureau of Reclamation. For information: American Society of Civil Engineers, 345 E. 47th St., New York, New York 10017.

October 9-10—Northwest Power Planning Council meeting in Missoula, Montana.

October 17-18—Conference on "Moisture Problems in Residential Construction: Separating Myth from Reality" at Seattle Airport Hilton. Sponsored by Washington Energy Extension, Oregon State Extension Energy Program and Puget Power. For information: Chuck Ebert, Washington Energy Extension Service, Seattle University, Seattle, Washington 98122. (206) 626-6225.

October 22-25 —"World Energy Engineering Congress" of the Association of Energy Engineers in Atlanta, Georgia. For information: Association of Energy Engineers, 4025 Pleasantdale Rd., Suite 340, Atlanta, Georgia 30340. (404) 447-5083.

October 30-31—Northwest Power Planning Council meeting in Boise, Idaho.

Compiled by Ruth Curtis

Introducing the Draft 1985 Power Plan

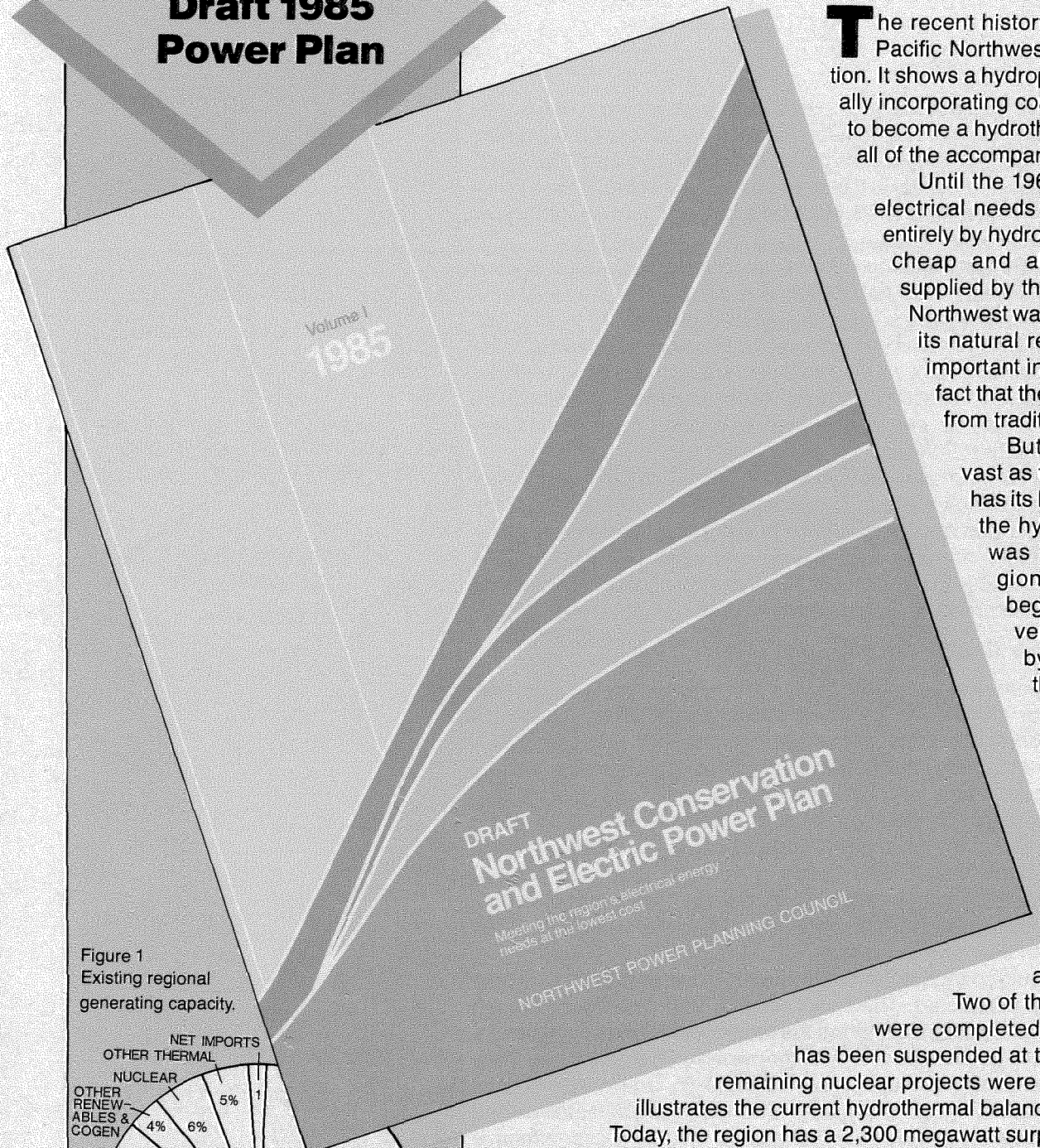
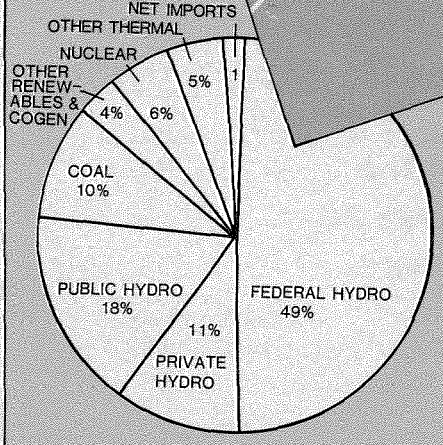


Figure 1
Existing regional generating capacity.



The recent history of electricity in the Pacific Northwest is a story of transition. It shows a hydropower system gradually incorporating coal and nuclear plants to become a hydrothermal system—with all of the accompanying growing pains.

Until the 1960s, the Northwest's electrical needs were served almost entirely by hydropower. Thanks to the cheap and abundant electricity supplied by the region's rivers, the Northwest was able to capitalize on its natural resources and attract important industries, despite the fact that the region is a long way from traditional markets.

But even a system as vast as the Columbia River's has its limits, and, as most of the hydroelectric potential was developed, the region's energy planners began to anticipate severe energy shortages by the 1980s. During the 1960s and 1970s, 17 coal and ten nuclear plants were planned to supplement the hydropower system. Of these, 11 coal plants were built, two are nearing completion and four are on hold. Two of the ten nuclear plants were completed, while construction has been suspended at two other plants. The remaining nuclear projects were terminated. Figure 1 illustrates the current hydrothermal balance.

Today, the region has a 2,300 megawatt surplus of electricity that could last from five to more than 20 years, depending upon how fast the region grows. Paying for these plants—some of which are not now needed—has made the surplus expensive to the region and its ratepayers. In fact, in historical terms, the surplus is not unusually large; what is unprecedented is the cost of this surplus. The total investment in terminated and suspended nuclear plants, alone, is $7 billion.

Much of the regional advantage of low-cost electricity has been lost. Because it is important for economic vitality that costs of electricity be kept as low as possible, the Draft 1985 Power Plan offers steps to reduce and control future electrical costs.

Highlights of the Draft 1985 Power Plan

During the preceding decades, electrical energy planning had focused largely on making sure that the region had ample power to support a growing economy. Now, the expensive surplus has taught the region a lesson. Overbuilding resources can be as detrimental to the region as underbuilding. A fundamental purpose of the power plan is to strike as close a balance between resources and needs as possible.

The Northwest Power Planning Council, an interstate compact agency authorized by the Northwest Power Act of 1980, was set up to develop a 20-year electrical power plan for the Northwest—as well as a program to protect and restore the fish and wildlife affected by hydroelectric development in the Columbia River Basin. The overall goal of the Council's plan is to achieve the lowest cost electrical energy future for the Pacific Northwest. At the same time, it must ensure there is sufficient and reliable electrical energy to support the highest likely economic growth in the next 20 years.

The Council's first power plan was released in 1983. The Northwest Power Act requires that the plan be reviewed at least every five years, but because of the changing energy picture and the Council's wish to incorporate the latest technology and information, the Council has chosen to develop a new plan this year. The draft plan has been published to solicit public comment. The final plan, which will take into account this comment, is scheduled for adoption in December 1985.

Highlights of the Draft 1985 Power Plan

An underlying theme throughout the draft plan is a call for regional cooperation. The Council is not talking about a vague philosophical attitude, but instead a series of specific cooperative actions which could save the Pacific Northwest $3.8 billion in the next 20 years. (See Figure 2.) The Council strongly believes regional cooperation is the best strategy for realizing a low-cost electrical energy future.

One of the keys to this cooperation will be the role assumed by the Bonneville Power Administration, the region's federal power marketing agency. Currently, Bonneville serves about half the region's electrical power needs—100 of the 115 public utilities and a small portion of one investor-owned utility's needs. The other half of the regional electricity load is served by investor-owned utilities and public utilities with their own generation.

This situation could change in the near future because of disparities in how the current surplus is distributed. The public utilities, with their access to the federal base system (principally power from the federal dams) appear to have a much larger share of the surplus. But the investor-owned utilities could need new resources within the decade if economic growth is rapid. By law Bonneville must supply power to any utility which requests it. Therefore, the investor-owned utilities could turn there when they have exhausted their own cost-effective resources.

If the investor-owned utilities do turn to Bonneville, the agency's obligations to supply power could double in the next 20 years. (See Figure 3.) Even with this doubled load, it would be cheaper to the region as a whole for Bonneville to supply power than for the investor-owned utilities to develop their own generating resources. The utilities are deterred from turning to Bonneville by the fact that there is currently no policy for a competitively-priced, predictable rate for power from new resources. Since one of the biggest uncertainties before the region today is what demands, if any, will be placed on Bonneville in the next 20 years, such a policy could significantly reduce uncertainty.

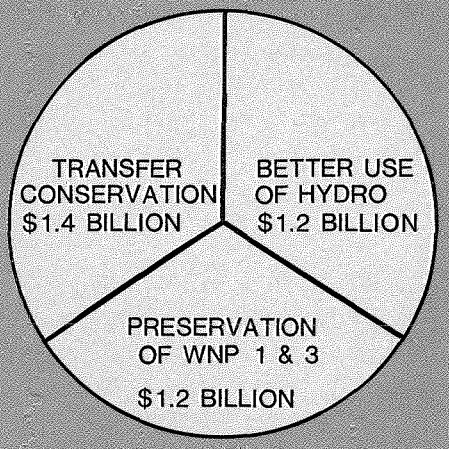


Figure 2
Benefits of regional cooperation.

A series of specific cooperative actions could save the Pacific Northwest $3.8 billion in the next 20 years.

Cooperation among power institutions is essential to keep future electrical power costs down. This cooperation is particularly important in three areas:

First, the need to develop regionally cost-effective conservation before turning to more expensive resources. The resource disparity among utilities could result in a situation in which conservation went undeveloped in the service areas of utilities with a surplus, while other utilities turned to higher cost or higher risk resources. That could cost the region as a whole $1.4 billion more for electricity than if all cost-effective conservation were developed first.[1] The draft plan calls for mechanisms to transfer conservation between utilities.

Priorities in the 1985 Draft Plan

The common thread running through the Draft 1985 Power Plan is cooperation. The ability of the region's power institutions to work together to develop regional resources, rather than each pursuing entirely independent paths, can greatly reduce the cost of electrical energy in the Pacific Northwest.

- The most important near-term priority is to save "lost opportunity" resources, those resources which, if not developed now, could be lost to the region.
- The Bonneville Power Administration also needs to assume a stronger regional role. It needs to develop a low-cost and predictable rate for power from new resources so that utilities will be able to turn to Bonneville rather than developing their own more expensive resources.
- Mechanisms must be found so that the region's utilities can develop resources, particularly conservation, on a regional basis. Bonneville should support sales of conservation between utilities.
- Bonneville must address the issue of allocating costs for potential options, such as WNP-1 and 3, and work toward eliminating barriers that block their construction so they can be completed if their power is needed.
- Strategies should be developed to make better use of the hydropower system, particularly the large amount of nonfirm power that is produced in average to good water years. Ways should be explored to back up this power so that it can serve firm loads.
- Regional organizations need to build the capability to deliver conservation in all sectors so that it is ready and reliable when needed.
- The region must find ways to reduce the uncertainty created by fluctuations in aluminum industry loads.
- Electrical power purchases and sales between regions will be studied so that their potential for mutual benefit can be clarified and realized.

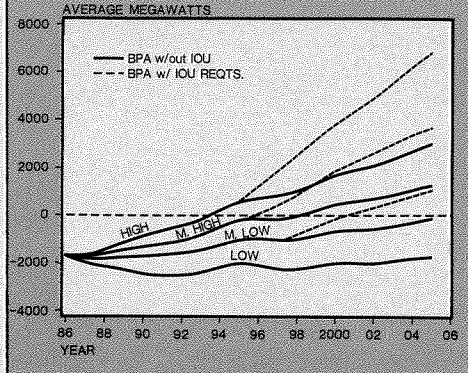


Figure 3
BPA resource requirements
with and without investor-owned utilities.

[1]This cost and the following ones are determined by what the region would have to pay if it needed new power and had to turn to more expensive resources to supply it.

Planning for Flexibility

Second, cooperation is key to allocating the cost of acquiring and holding potential resource options that provide flexibility for the regional power system. The costs of preserving two partially completed Washington Public Power Supply System nuclear plants (WNP-1 and 3) can range between $24 million and $72 million a year. Currently, Bonneville pays the bulk of this cost. Bonneville does not appear to need the output of these plants unless the investor-owned utilities place substantial loads on the agency. The uncertainty of these loads has led to dissatisfaction about who pays for the preservation costs. A system to allocate costs equitably could enhance preservation of the two plants, which have a value of $1.2 billion to the region.

Third, the need to make better use of the hydropower system also requires cooperation. Specifically, the draft plan addresses better ways to use the hydropower that is available in all but the driest years. Because hydropower depends on the weather—rainfall and snowpack—the amount of power varies from year to year as well as within a year. Planning for the system is based on critical water, the lowest water available in over 100 years. However, the difference between critical water and average water produces enough electricity to serve four cities the size of Seattle. This additional power is called nonfirm because it is not always available. Strategies to "firm-up" this power so that it could serve firm loads could save the region $1.2 billion. Bonneville needs to develop a policy for allocating nonfirm energy to serve customers whose loads are growing.

Other uncertainties facing the region

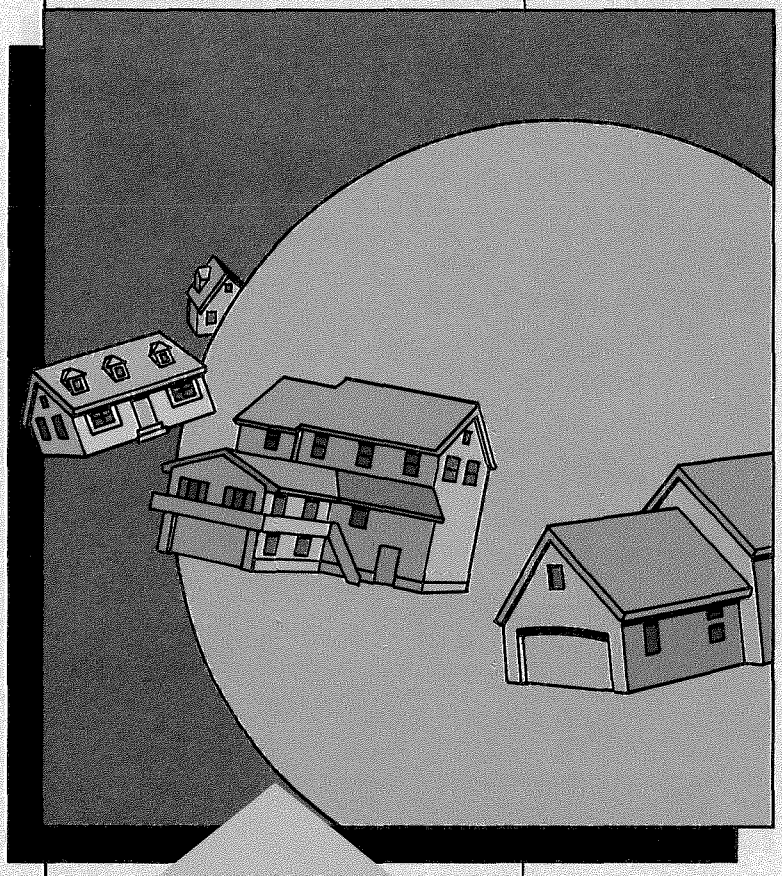
The volatility of the direct service industries represents a major uncertainty for the region. These industries, primarily aluminum plants, use so much electricity (15 percent of the regional load) that they buy directly from Bonneville. Because of economic factors, the Northwest aluminum plants tend to operate as "swing" plants, operating when aluminum prices are high and shutting down when they are not. In the last five years, the power used by these plants has fluctuated by as much as 1,000 megawatts. The long-term future of these plants in the region is also uncertain.

Incomplete data on conservation programs create another uncertainty. While much progress has been made—principally through the adoption of the model conservation standards in six Washington areas and other code and building practice improvements spurred by the standards—much remains to be done. The Council's first power plan called for Bonneville to develop and test programs to build capability for conservation across all sectors—residential, agricultural, commercial, industrial and governmental. Building capability means developing and testing programs so that they are ready to use if the region needs them. With the exception of the residential sector, the region still has little conservation experience. Bonneville needs to develop such programs across all sectors.

The future of WNP-1 and WNP-3—plants which could provide 1,600 megawatts—is also a question mark. While the Council has found the plants cost effective, it has also identified a number of legal and financial barriers to their completion. The region cannot rely on future power from these plants until these barriers are overcome.

The potential for future out-of-region sales and purchases is largely unknown. The Council will conduct a West Coast energy study to gain information on import and export opportunities.

The following sections of this issue highlight key parts of the Draft 1985 Power Plan. These summaries are not in a chapter-by-chapter sequence because some issues are covered in several chapters of the draft plan. For a chapter-by-chapter synopsis, turn to page 28.



In 1983, regional firm sales of electricity to the final customer totaled 14,569 average megawatts. That's enough electricity to heat 11 million homes in the Northwest. Built end to end, that many homes would circle the earth four times at the equator.

PLANNING FOR FLEXIBILITY

It is impossible to forecast with certainty how much electricity the Northwest will need at any point over the next 20 years. Demand can rise and fall from one year to the next, and it can change sharply or gradually. The task of the Northwest Power Planning Council is to develop a plan capable of responding to unpredictable changes so that resources closely match needs whether economic growth is high or low.

Michael Cacy illustration

Choosing flexible resources

Major electricity generating plants with long construction periods require critical decisions many years before their power may be needed. By the time a plant is built, the demand for new electrical power may not have materialized. Long lead times, large plant sizes and high costs increase the risk inherent in energy planning. Therefore, the Draft 1985 Power Plan emphasizes smaller, lower-cost resources, with shorter lead times between the decision to acquire the resource and the time the resource actually begins producing power.

Flexibility is a key strategy in the draft plan, and conservation programs meet this objective particularly well. They can be started quickly and built up or cut back depending upon the region's needs for electricity. They can be acquired in small increments—individual buildings and local projects—which begin generating (saving) energy immediately. Moreover, conservation does not involve lengthy periods of siting, licensing, design and construction.

The plan identifies nearly 4,000 megawatts of conservation savings that can be achieved through a variety of measures and actions at a cost lower than almost any other source of electricity.

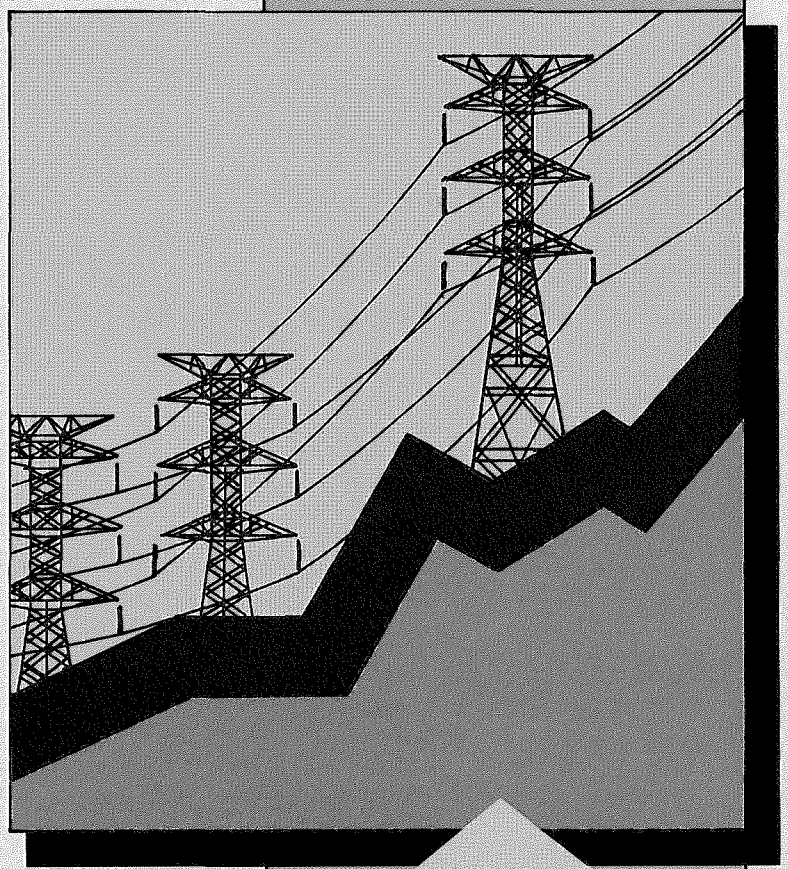
The region will need to build generating resources only as the Northwest economy takes an upward turn, thus increasing the demand for electricity. Even then, in keeping with the principle of flexibility, the first new generating resources would be small hydropower turbines at existing dams, irrigation and flood control projects. Coal plants would be built only if high growth continues and all other cheaper electrical power resources have been exhausted.

Options—a flexible approach for generating resources

In its 1983 Power Plan, the Council developed an "options" approach to acquiring new resources. Optioning involves securing all the necessary permits for a project, completing initial design work, acquiring rights to a location—and then, if the electricity it would generate is not needed, keeping the project "on the shelf" until conditions warrant construction. The relatively small investment required in the preparation stages gives a resource sponsor time to evaluate power needs more accurately. This approach reduces the time and risk in building new generating resources. (See Figure 4.)

If energy demand takes an unexpected downturn, the plant can be delayed or terminated, and the region won't have committed to the entire cost of constructing an unneeded plant. If exceptionally rapid growth occurs, optioning cuts down the time needed to get a producing resource. A coal plant, for example, can be completed in five years rather than ten, once the process of siting, licensing and initial design is completed.

The options concept separates decisions related to expensive construction from those related to the time-consuming but relatively inexpensive preconstruc-



About 7 percent of the electricity generated at a power plant is "lost" in transmission before it gets to its ultimate point of use. The plan's resource portfolio includes 34 megawatts of efficiency improvements to decrease these losses in the Bonneville transmission and distribution system.

Michael Cacy illustration

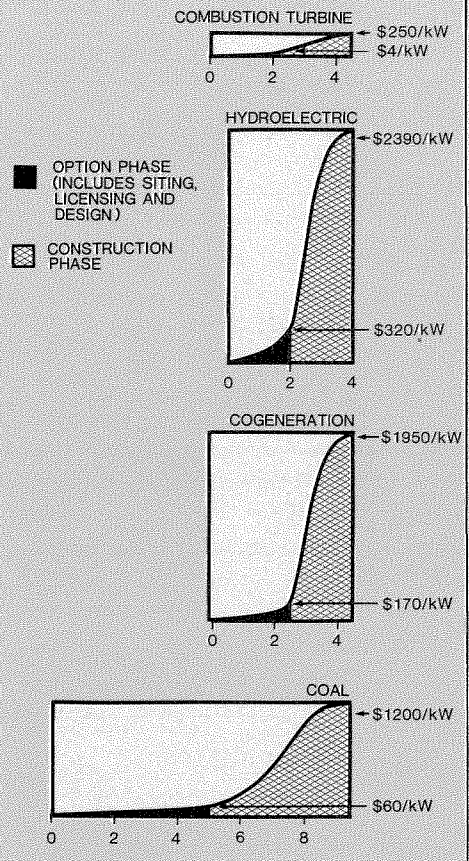


Figure 4
Cost and timing of optioning and constructing resources.

The task of the Council is to develop a plan capable of responding to unpredictable changes.

tion activities. An effective options planning strategy moves decisions to commit large sums of capital as close as possible to the time the power will be needed. This reduces the opportunity for surprises and lessens the probability of building an unneeded project.

The options approach also delays the environmental impacts of power plant construction and operation until the region actually needs the energy generated by those plants.

The Council has planned for enough options to meet the needs of a booming Northwest economy. If the economy grows more slowly, some options would be held until needed or even abandoned if not needed. The Draft 1985 Power Plan gives decision makers a means to assess conditions as they develop and to respond appropriately. Within the range of forecasts that bracket the plausible growth in demand for electricity, the actual demand for electricity might evolve along any of hundreds of directions. These are called load[2] paths. Decisions to option and to build resources have been tested against many load paths, to see which choices produce adequate supplies of electricity at the lowest cost.

Based on the outcome of this analysis, the Council determined that the region's electrical energy future will be most secure if options are planned for all but the top ten percent of the possible loads. However, the region should only plan to *build* resources to a level halfway between the highest and lowest tested load paths. The remaining options will keep the region ready to respond quickly in the event of higher growth in demand.

DEVELOPING THE FORECAST

Nearly every aspect of the power plan stems from the Council's forecasts of the Pacific Northwest's demands for electricity in the next 20 years. The crystal ball has given way to sophisticated computer models, yet despite today's electronic wizardry, demand forecasts remain highly uncertain.

Dealing with uncertainty

To address this uncertainty, the Council has developed a range of probable electricity demands for the next 20 years, rather than a single "best-guess" forecast. (See Figure 5.) This range includes four forecasts for future growth in demand—high, medium-high, medium-low and low. Actual demand is expected to fall between the high and low forecasts, and is most likely to fall between medium-high and medium-low. This range allows planners to prepare resources for a number of growth patterns. This ability to respond to change minimizes the region's exposure to risks from unanticipated shifts in the growth of demand for electricity.

The traditional role of demand forecasts could be described as deterministic; that is, a best-guess determined the amount of new electricity generation needed. The Council's forecasts have a more integral role in power planning in three ways. First, they help define the extent and nature of uncertainty. Second, the level of demand is not independent of resource choices, but will respond to the costs of those choices. Third, sophisticated computer demand models are used

[2]Load refers to the amount of electrical power needed.

to assess the potential impacts of choosing conservation rather than building new generating resources.

History indicates that the demand for electricity generally parallels economic activity. Therefore, economic and demographic forecasts were incorporated into the plan in order to assess the region's future growth in the demand for electricity. Demand is also affected by the relative prices of competing fuels. The forecasts examine the results of various trends and assumptions concerning these fuel prices.

Some major economic and demographic trends have emerged which will affect demand for electricity. The aging of the population is expected to shape consumption patterns, increase productivity, and push up wage levels. It should also spur capital investment aimed at replacing labor with technology. From 1960 to 1980, employment in non-manufacturing industries increased at a rate nearly 70 percent higher than in manufacturing industries. Non-manufacturing employment in 1980 accounted for 81 percent of the regional total. Meanwhile, the region's large resource-based industries—lumber, aluminum and basic chemicals—have continued to stagnate and are not expected to be important sources of economic growth. While industrial growth is taking place in the Northwest, it tends to be in light manufacturing or service industries, rather than the traditional heavy users of electricity.

The four demand forecasts

The range of forecasts is similar to that in the 1983 Power Plan. The high forecast assures that the Council's plan will accommodate record regional economic growth should it occur. Under the high-growth forecast, demand could grow at a rate of 2.7 percent per year until the year 2005. Such growth would require an increase in electricity equivalent to the power from 15 nuclear plants the size of Washington Public Power Supply System Nuclear Project 2.

Forecast demand for electricity

	Actual (Average Megawatts)	Forecasts (Average Megawatts)				Growth (Rate)
	1983	1985	1990	2000	2005	1983-2005
High	14,569	15,569	18,100	23,344	26,415	2.7%
Medium-high		15,407	16,799	20,343	22,021	1.9%
Medium-low		15,320	15,560	17,789	19,047	1.2%
Low		15,079	13,669	14,616	15,290	0.2%

Figure 5
Forecast demand for electricity.

Nearly every aspect of the power plan stems from the Council's forecasts of electricity demand.

In the high growth forecast, total regional employment would increase at a rate of 3.2 percent annually. That is 130 percent faster than employment-growth estimates for the nation's high-growth case and represents about 70 percent more jobs by the year 2005 than in the Council's low forecast. The high forecast also shows a 2.0 percent population growth rate. In the high-growth scenario the region's economy would fare better, relative to the nation, than it has ever done in the past. The large resource-based industries, such as forest products, aluminum, agriculture and basic chemicals, would remain vital to the region's economy, but are not expected to contribute new jobs. Instead, the electronics, trade and services industries are expected to expand rapidly.

In the medium-high scenario, regional employment would grow 2.4 percent per year and population 1.5 percent. This regional employment growth rate is twice as fast as the medium forecasted national employment growth. This scenario anticipates that rapid growth in high technology industries and the commercial sector will be coupled with moderate levels of activity in the resource-based industries.

In the medium-low growth forecast, regional employment is expected to grow at a rate of 1.5 percent annually, or 125 percent of the medium forecasted national rate. Population would increase by 0.8 percent. The medium-low estimate also shows traditional industries encountering low economic activity while other manufacturing industries and the commercial sector experience moderate growth levels.

Employment under the **low-growth forecast** is expected to increase by only 0.5 percent annually, 40 percent slower than projections in a low-growth national forecast. This implies a relative performance well below that which has characterized the Northwest in the long term. Total population is projected to increase 0.2 percent annually, while growth in non-manufacturing industries will be offset by declines in many of the larger traditional industries.

Electricity prices

The Council's forecasts of electrical rates indicate relatively stable prices for the Northwest over the next several years. The exact price outlook, however, varies substantially in the different forecasts because of the different amounts of new resources required in each forecast. Nearly all new resources cost more than existing resources, and adding new resources will undoubtedly raise electrical rates. Expanding the region's reliance on conservation will postpone this need to turn to expensive generating resources.

The Council's range of forecasts is the product of the most sophisticated forecasting tools. Those tools identify the economic uncertainty facing the power system and frame the problem to be managed. Ignoring uncertainty could lead to a Northwest resource glut and unnecessary rate increases or, on the other side, to a shortage of power and stifled economic growth.

EVALUATING RESOURCES

In considering resources for its plan, the Council first had to look at the region's existing electrical power system, then assess what new resources would be needed to meet a wide range of growth in energy demand. Resources had to be cost effective and forecast by the Council to be available and reliable. They had to be compatible with the existing hydropower system and they had to be environmentally sound and protective of fish and wildlife.

Conservation resources

Conservation measures improve the efficiency with which electricity is either produced or consumed. The Northwest Power Act considers conservation to be equivalent to resources that generate electricity, because each megawatt saved need not be produced at a new power plant. Buildings that cut down heat loss, through insulation and tightening, require less electricity for heating. Energy savings and consumer cost savings can also be realized from devices that improve the efficiency of commercial lighting, irrigation pumps, water heaters, dam turbines, metal smelting processes, and a host of other applications.

The first ten resources in the Council's plan are all conservation measures. (See Figure 6.) It is a huge resource—over 4,000 megawatts, equal to the output of more than eight coal plants. Yet it is highly flexible, because the energy can be acquired in small or large increments, and programs can start up or slow down quickly to match the region's requirements. On average, conservation savings over all sectors cost only 2.1 cents per kilowatt-hour. By comparison, energy from a new coal plant costs 5.5 cents per kilowatt-hour.

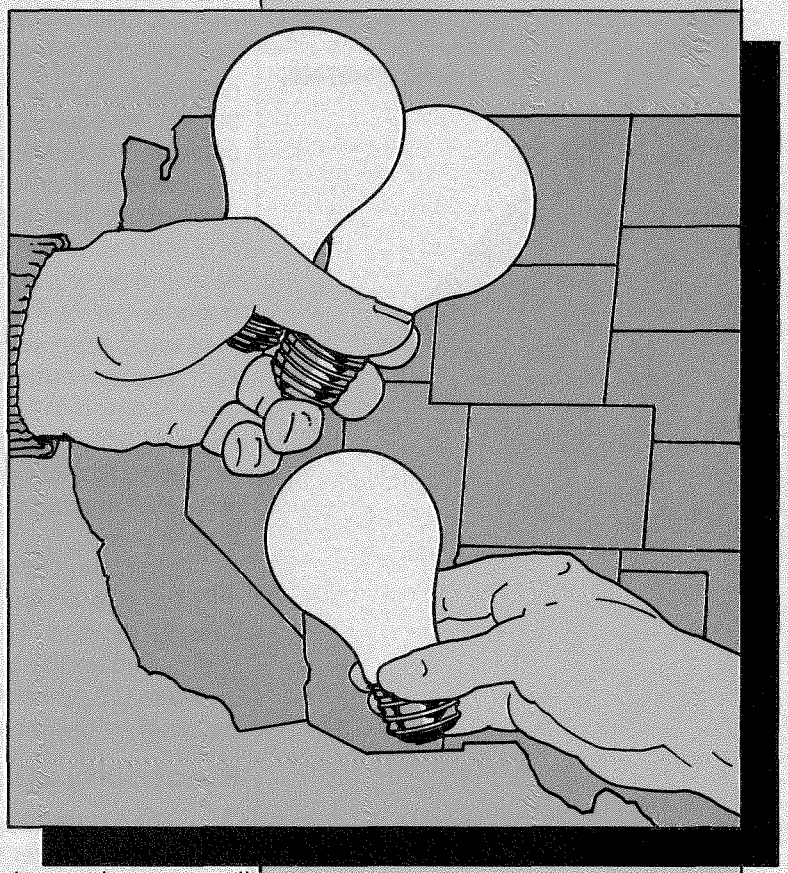


Figure 6

Resources in the Draft Plan

RESOURCES[1]	HIGH LOAD SCENARIO (avg. Mw)	RESOURCES[1]	HIGH LOAD SCENARIO (avg. Mw)
MCS Residential	723	Existing Commercial	848
MCS Commercial	416	Existing Industrial	549
Refrigerators & Freezers	430	Existing Agriculture	167
Water Heat	516	New Hydro	255
System Efficiency Imp.	121	Nonfirm Strategies	1,962
Mobile Homes	38	Cogeneration	330
Existing Residential	432	Coal (7 units)	3,164

[1]These estimates have adjusted the conservation savings for transmission losses. Since the Council's systems analysis is conducted at the point of generation, conservation estimates at the point of end use need to be increased by 7.5 percent to be comparable to generation.

Note: This list reflects changes made after the draft plan was published. The text of Chapter 5, Volume II in the Draft 1985 Power Plan contains these numbers, but a corresponding table was not corrected.

Northwesterners use nearly twice as much electricity per person as the nation in general. This is due to the region's large supply of low-cost hydropower. Forecasts show that, while this use will remain well above national levels, recent price increases will cause growth in use to slow or even decline in the future.

Michael Cacy illustration

At lower growth rates, conservation could supply almost all of the region's needs over the next 20 years.

Some conservation measures can only be installed during one brief period of opportunity, or the power savings will be lost forever. New buildings, new appliances, new irrigation systems and new industrial facilities must come equipped with energy efficient features. These features either cannot be added later or they cannot be added as cost effectively.

Because of this timing factor, along with its flexibility and low cost, its availability in large amounts and its benign environmental effect, conservation dominates the Council's portfolio of resources. At lower growth rates, conservation could supply almost all of the region's needs over the next 20 years. Almost half of the medium-high growth rate through the year 2005 could be met by conservation, and almost all medium-high growth through 1993.

Some conservation programs can be deferred until the region needs them. But the model conservation standards—energy efficiency levels for new residential and commercial buildings—are included in this plan, as they were in 1983. The energy savings from energy efficient buildings constructed now will continue long after the surplus ends.

Discretionary conservation programs include weatherizing existing residential and commercial buildings and installing technologies that increase the efficiency of existing industrial and commercial processes and irrigation systems. They are called discretionary because action on these resources can be delayed until they are needed. Improvements to the efficiency of the existing hydropower system and the regional transmission and distribution system are also discretionary at this point.

Additional savings are expected as more efficient refrigerators, freezers and water heaters reach the market, and from increased energy efficiency in mobile homes.

Generating resources

New hydropower amounting to 255 megawatts is included in the Draft 1985 Power Plan—a little more than a fourth of the total new hydropower in the 1983 plan. Recent efforts to license new hydropower sites have met with significant concern over environmental issues, fish and wildlife impacts, and scenic and recreational effects. Until it completes a regional hydropower assessment study in 1986, the Council is considering new hydropower development only at existing dams and existing non-power sites such as flood control and irrigation projects.

Only projects that would be available and reliable and would cost less than a coal plant were considered. The average cost (over its lifetime) of this resource, as a block, is 1.8 cents per kilowatt-hour. The bulk of new hydropower generation would be developed when conservation programs can no longer keep up with the pace of load increase.

Nonfirm energy is the amount of energy the region's hydropower system produces in excess of the hydropower available during the lowest water flow years (based on records kept since 1879). It is called nonfirm because, since it depends on the weather, it is not always available. The Council examined a number of strategies to make nonfirm energy more reliable, so it could be used to serve new and existing firm loads. Just under 2,000 megawatts of nonfirm energy are included in the resource portfolio. (See the special section on "Better use of the hydropower system" for more information about this new addition to the portfolio.)

Cogeneration is the simultaneous generation of electricity and useful heat energy. This heat can be used for industrial processes or for space heating. For example, a pulp mill burns waste materials in a boiler to produce steam, which can be used to heat pulp dryers. If high-pressure boilers are installed, steam turbine-generators can produce electricity between the boiler and the pulp dryers.

The resource portfolio includes 330 megawatts of cogenerated electricity, which can be developed at less than the 5.5 cent per kilowatt-hour cost of new conventional coal projects. This estimate is based on a survey of Northwest industrial plants. Because of the surplus, it appears that new cogenerated energy will not be needed until at least the latter part of the 1990s. The region and the Council have time to study the overall potential and cost of this resource.

Coal is the resource of lowest priority and highest cost included in the portfolio. Substantial quantities of coal are available, and new coal plants can be added if electrical loads grow rapidly or other resources prove unavailable. Council cost estimates are based on plants of 603 megawatt capacity and 75 percent availability.

WNP-1 and WNP-3

The Council found that two unfinished nuclear plants in Washington could have considerable value to the region if their output is needed within the next 20 years. Completing these plants—Washington Public Power Supply System Nuclear Projects (WNP) 1 and 3—could save the region as much as $1.2 billion compared to building new coal plants to supply the same amount of power. (See Figure 7.) However, the planned resources must be both reliable and available, as well as cost effective. Barriers to the completion of WNP-1 and 3 led the Council to consider the plants unavailable at present for the portfolio of resources. The Council has identified actions that need to be taken to resolve these barriers so the region can use these cost-effective resources if and when it needs them.

A major uncertainty surrounding WNP-1 and 3 involves the inability to get conventional low-cost financing to complete them. Pending litigation and current lack of need for the plants obstruct access to the bond market. Another barrier is the disparity between ownership of the plants and any likely need for them. Public agencies own WNP-1 and all but 30 percent of WNP-3, yet the power from these plants would probably not be needed to serve public utility loads over the 20-year planning period.

The question arises of how to pay for preservation and eventual construction of the plants. The Bonneville Power Administration is now paying 85 percent of the preservation costs. Unless substantial new loads are placed on the agency by the investor-owned utilities, the power from the nuclear plants will not be needed in the next 20 years. Consequently, Bonneville is paying for the preservation of resources it may never have cause to complete and some of its customers believe these costs are not properly shared among the region's ratepayers. This problem emphasizes the need to lower preservation costs to the minimum possible level and to begin efforts to address the allocation of preservation and potential construction costs.

WNP-1 and/or 3 may be included in a future portfolio when barriers to their completion are removed. In the meantime, the portfolio includes resources that could replace the plants if they are not available to meet future load growth.

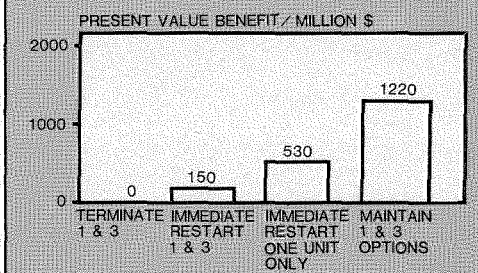


Figure 7
Value of WNP-1 and WNP-3.

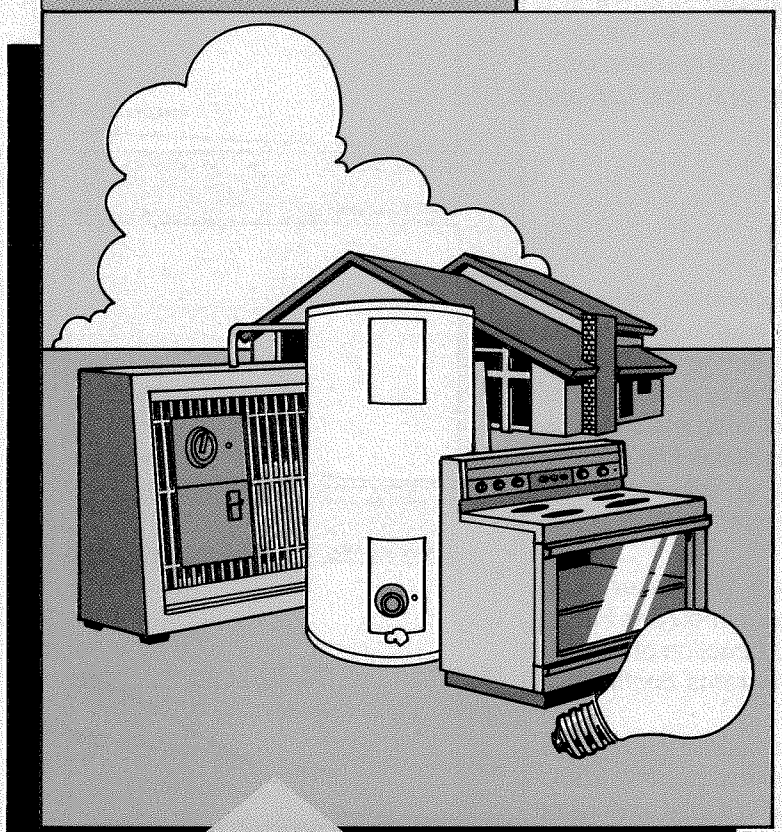
Other resources

The Council regards certain other resources as promising, but not presently available. These resources, primarily renewable energy resources, hold considerable promise for meeting the region's future energy needs. However, at present they fail to meet one or more of the criteria for inclusion in the resource portfolio. Geothermal costs, supplies and technology, for example, are not yet demonstrated in this region. Solar and wind costs are greater than the cost to build new coal plants. Use of municipal solid waste to power steam-electric plants is blocked by poor public acceptance and limited siting opportunities.

Promising resources include:

- The development of several hundred megawatts of hydropower that will require resolution of potentially unacceptable environmental impacts;
- The use of the region's apparently vast geothermal resource;
- Electricity gained as a byproduct of municipal solid waste burning;
- Production of electricity using either solar-thermal or solar-photovoltaic technologies;
- Wider application of wind energy technologies;
- Additional cogeneration opportunities that do not currently appear to be cost effective.

The draft power plan includes measures to continue demonstrations, feasibility studies and monitoring of all these technologies in the hope that their use will eventually be competitive with resources currently in the Council's resource portfolio.



In 1983, the region's residential sector consumed 5,216 average megawatts of electricity—about 36 percent of the region's total. Space heating is the largest category of electricity consumption in the sector; water heating is second. One-quarter of the electricity is used to operate lights and appliances.

Michael Cacy illustration

SCHEDULING RESOURCES

The resource portfolio describes the amount and type of new electrical power resources the Northwest needs to acquire, and in what sequence, to meet regional electricity needs over the next 20 years. The concept of a resource portfolio is analogous to an investor's portfolio. Both the Council and an investor choose the best mix of investments to reduce risk and maximize benefit. The Council seeks lowest cost; the investor desires greatest return. Like the investor, the Council must use judgment in considering attributes that cannot be quantified.

The Northwest Power Act requires the Council to give priority to resources which the Council determines to be most cost effective—that is, given all costs over the life of a measure or resource, it produces electricity at a lower price per kilowatt-hour than the next least expensive, and similarly available and reliable,

measure or resource. The Act also gives first priority to conservation, then to renewable resources, to generating resources using waste heat or generating resources of high fuel conversion efficiency, and finally to all other resources.

In selecting the resource portfolio described below, the Council first estimated the availability, reliability and cost of conservation and generation technologies. The Council also developed a range of forecasts of future energy demand. These forecasts indicate when the region will need new energy sources and how large that need is likely to be under low, medium-low, medium-high and high growth.

Different combinations of resources were then analyzed to arrive at a resource mix that provides the lowest cost of constructing and operating all resources in the portfolio. These costs include measures needed to eliminate or reduce each resource's impact on the environment in general, and fish and wildlife in particular.

Resource schedules

The timing and extent of new resource development depend on the level of regional electrical load growth. The Council has outlined a least-cost resource plan for all regional loads (see Figure 8), and a schedule for Bonneville's obligations if it continues to serve only its present customers, primarily public utilities and direct service industries. (See Figure 9.) The Council also developed a resource plan for Bonneville to follow if the investor-owned utilities first develop their own low-cost resources and then turn to Bonneville for help in meeting increased loads. (See Figure 10.) This last schedule resembles the overall regional schedule.

In all load growth scenarios for the regionwide plan, all conservation development begins before new generating resources are acquired. (See Figure 11.) During the early years at higher load growth rates, construction of smaller generating resources takes place while conservation programs continue to expand.

If the highest load growth occurs, it will probably consume the region's current surplus by 1990. (See Figure 12.) All major conservation programs would have to be brought up to full speed in the early 1990s, achieving a total savings of over 4,000 megawatts by the year 2005. The high load case requires the region to develop all the hydropower available at existing projects—approximately 255 megawatts—by 1993. The third major resource acquisition strategy, better use of nonfirm power, begins in 1994, with the full 1,960 megawatts achieved by 1998. The full 330 megawatts of cogeneration resources are secured by 1998. By the year 2000, the high load scenario requires the region to begin adding new coal plants to the power system. Seven large coal plants are needed by 2005.

The medium-high load scenario has the region beginning conservation programs in 1991. New building activity would grow more slowly than in the high load case, so only about 3,400 megawatts of conservation are available. Medium-high growth requires the region to develop all available hydropower by 1996, and employ all new nonfirm energy strategies over the period from 1997 to 2003. Cogeneration facilities would be acquired through 2004. By 2005, the region would need to purchase one additional coal plant.

Resource Schedules

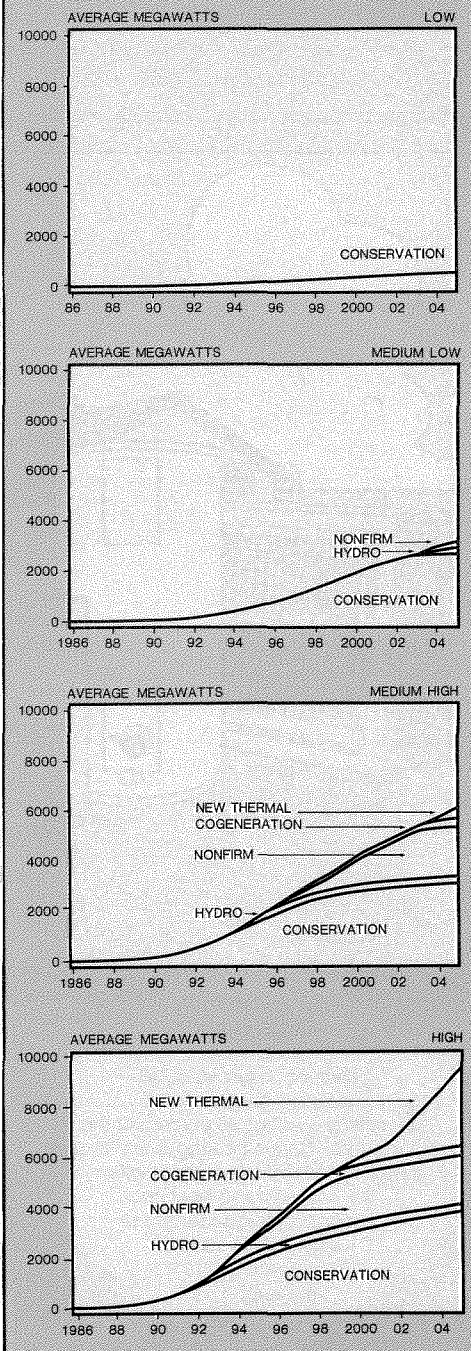


Figure 8
Resource schedule for the region as a whole.

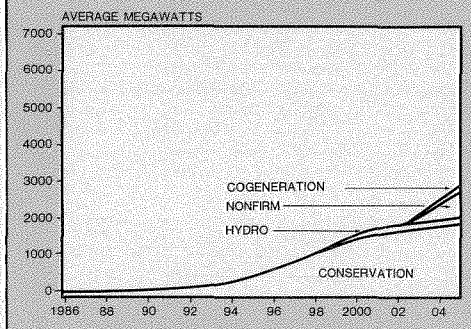


Figure 9
Resource schedule (high load forecast) for Bonneville's current customers only.

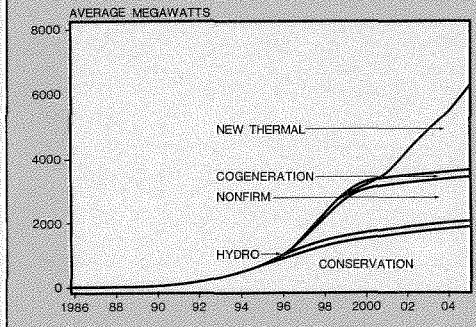


Figure 10
Resource schedule (high load forecast) for Bonneville with investor-owned utilities. (This graph assumes the investor-owned utilities develop their own conservation resources before turning to BPA.)

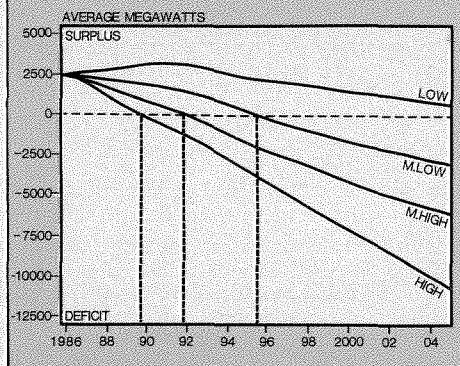


Figure 12
Regional electricity surplus and deficit.

The medium-low scenario requires few new resources. The current regional surplus is exhausted by about 1993, and conservation programs begin at a relatively slow pace in 1994. Lower building activity reduces the overall conservation opportunity to slightly more than 2,700 megawatts. This conservation is largely in place by 2003. By 2005, the region needs all available hydropower and secures about 200 megawatts of power from new nonfirm strategies.

If low loads occur, the region need not acquire any additional resources beyond the model conservation standards.

If Bonneville continues to serve only its current customers, conservation alone meets all requirements through the year 2005, in all but the highest load forecast. In the high scenario, conservation acquisition other than lost opportunity resources does not need to begin until 1996, reaching 2,000 megawatts of savings by the year 2005. In addition to this conservation, Bonneville would need to add 125 megawatts of hydropower, about 500 megawatts of nonfirm energy strategies, and 165 megawatts of cogeneration. Without additional investor-owned utility loads, Bonneville does not need to add new coal plants.

If Bonneville is called on to meet investor-owned utility loads, it will need to accelerate the acquisition of conservation in areas served by public utilities. Assuming load growth halfway between the two medium scenarios, Bonneville would need to start its conservation programs six years earlier than it would on its own, and achieve about 1,100 megawatts of savings by 2005. This is almost three times as much as would be needed without investor-owned utility loads.

Investor-owned utilities appear to have less surplus power than Bonneville. They will need new resources much sooner, and will have to turn to higher cost resources if they cannot gain access to the substantial conservation opportunities in public utility service areas.

Figure 11

Resources needed for the region as a whole—
Average Megawatts on-line by year 2005

	Load scenario (with year of first acquisition*)			
	High	Medium High	Medium Low	Low
Conservation	4,240	3,449	2,729	547
	1986	1986	1986	1986
New Hydro	255	225	255	n
	1993	1995	2003	
Nonfirm Strategies	1,962	1,962	178	n
	1994	1997	2004	
Cogeneration	330	330	n	n
	1994	1996		
Coal	3,164	452	n	n
	2000	2005		

n = not needed at all by 2005

*Resources will be developed at different rates, depending on regional need. The years given in the shaded area indicate the first arrival of the energy, not the year the resource is optioned or construction begins.

PREVENTING LOST OPPORTUNITIES

Given the current surplus, the Draft 1985 Power Plan does not call for immediate acquisition of any major new resources—except "lost opportunity" resources. If not developed now, the cost effectiveness of certain resources could be lost forever. The primary example of such a resource is in the construction of new energy efficient buildings. Long after the current electricity surplus runs out, houses and commercial buildings built to current practice will still exist. And they will use approximately twice the energy they would have been using had they been built right in the first place.

For some savings it's now or never

That's why the model conservation standards for new construction are a priority in the Council's plan to secure the electricity needed by the region over the next 20 years. These standards set efficiency levels for space heating homes and for lighting, heating, air conditioning and ventilating commercial buildings.

For some electrical savings, it's now or never. Many conservation measures can't be added later for the same costs. Some things, such as very thick wall insulation, call for major reconstruction to install once a house is built. The expense at a later date may be prohibitive, while other measures may not be feasible to install at all after construction.

Built-in generating possibilities

The need to make use of opportunities as they arise is also true for some generating technologies. The opportunity to generate electricity with available water flows should be anticipated when new municipal water and hatchery supply systems are developed. Solid waste incinerators could be designed to recover energy for power generation. Landfills could be provided with methane collection systems for use in power generation.

These are examples of systems that have excess power available as a part of their operation. Their future use as power generators can be secured now by designing and constructing them so that generating equipment can be added easily later, when the power is needed. Making use of their waste energy to generate electricity would require less lead time, expense and environmental impact than developing other facilities specifically for power generation.

An inventory of opportunities

The Council's 1983 Power Plan called on the Bonneville Power Administration to develop an inventory of resources that could be lost to the region unless they are planned for or developed now. Bonneville's preliminary assessment includes the opportunities listed above, but also describes situations, such as the sale of the Northwest's current surplus power to other regions, where, unless provisions to recall the power are made now, the power may not be available when the Northwest once again needs it.

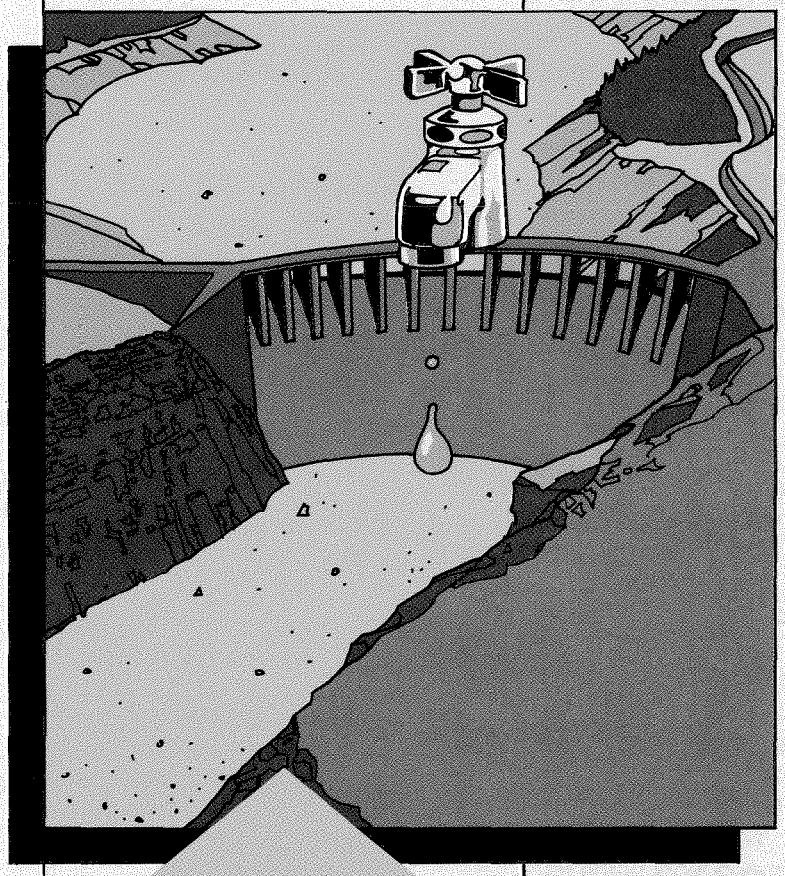
The Council's draft plan directs Bonneville to expand its study, specifying which resources will be most cost effective, when they need to be developed and what near- and long-term costs will be entailed.

BETTER USE OF THE HYDROPOWER SYSTEM

The Draft 1985 Power Plan introduces a new resource into the portfolio. The plan calls for strategies to use 2,000 megawatts of nonfirm hydropower. Nonfirm power gets its name from the fact that it is not always available.

The Northwest hydropower system

The annual energy capability of the Northwest hydropower system varies widely, depending upon rainfall and the accumulated snowpack. The available hydropower also varies dramatically within a single year, with the Columbia River discharging about 73 percent of its natural runoff between April and October and only 27 percent from November to March, when electrical loads are highest. Upstream storage projects enable the regulated flow to match the pattern of the region's loads, but only 40 percent of the runoff can be stored.



The worst water conditions on record for the Columbia River system are the four-year sequence from August 1928 to March 1932 and the more severe two-year sequence from September 1943 through April 1945. These periods are the base for hydro system planning.

Michael Cacy illustration

Electrical resources are planned, and long-term contracts are signed, on the basis of a minimum capability of the streamflow and reservoir system—a standard called "critical water." Critical water is the worst sequence of low water conditions encountered since recordkeeping began in 1879. In most years, however, the hydropower system produces far more power than this minimum.

The average annual output of the hydropower system exceeds critical energy capability by 33 percent, or approximately 4,100 megawatts—an amount equal to the output of five nuclear plants, and enough to supply four cities the size of Seattle for a year. During a good year the annual capability can be as much as 50 percent greater than critical period capability. The hydropower that exceeds the critical water production level is nonfirm power.

It is sold in and out of the region far more cheaply than what the region would have to pay for new resources. Currently, the highest priority uses for nonfirm power are to serve a quarter of the load required by direct service industries and to replace the most expensive Northwest generating resources. If more nonfirm power is available, California utilities and other out-of-region markets can buy it. Nonfirm energy that is not sold is sometimes spilled over dams.

If this nonfirm energy could be "firmed up"—that is, made more dependable—it has the potential to save the region $1.2 billion over the next 20 years by reducing the need to build new thermal plants. These savings are based on 2,000 megawatts of nonfirm energy backed up by combustion turbines.

Firming up nonfirm power

Council studies for the Draft 1985 Power Plan assessed the risks and benefits of different strategies for making better use of the large amounts of

nonfirm hydropower available in most years. These strategies include the following ways to back up nonfirm energy so it can meet some of this region's firm loads:

1. intermittent use of combustion turbines;
2. short-term purchases of energy from other regions;
3. increasing the interruptible portion of the direct service industries' load (mostly aluminum companies). Under this voluntary plan, the nonfirm energy load of a company could be curtailed (interrupted) during periods of hydropower shortage in exchange for rate discounts.

The Council is not recommending a particular strategy at this time, but has called on the region to take further steps to study and confirm this resource for meeting future need. At the earliest, under highest load growth conditions, the Council anticipates a need for increased use of nonfirm energy by 1994.

Reliability is the key to increasing the value of nonfirm power. The nonfirm power has to be "firmed up" or "backed up" by other sources of energy so it can be counted on as a firm supply. Council studies show that combustion turbines—the most expensive backup method—would still be cost effective. These small oil or gas-burning plants are relatively cheap and quick to build and, although their fuel costs make them expensive to operate, they would only be needed, on average, 16 percent of the time. In combination with nonfirm energy, they would produce electricity more cost effectively than new coal plants and most cogeneration projects.

THE ACTION PLAN

Because the future is by definition uncertain, the Council developed an Action Plan that outlines short-term goals and activities to begin implementation of the 20-year power plan, yet provides flexibility to accommodate change. By regularly reviewing and updating this Action Plan, the Council will be able to accelerate or slow down the development of conservation and other resources, to keep pace with the region's growth and need for power.

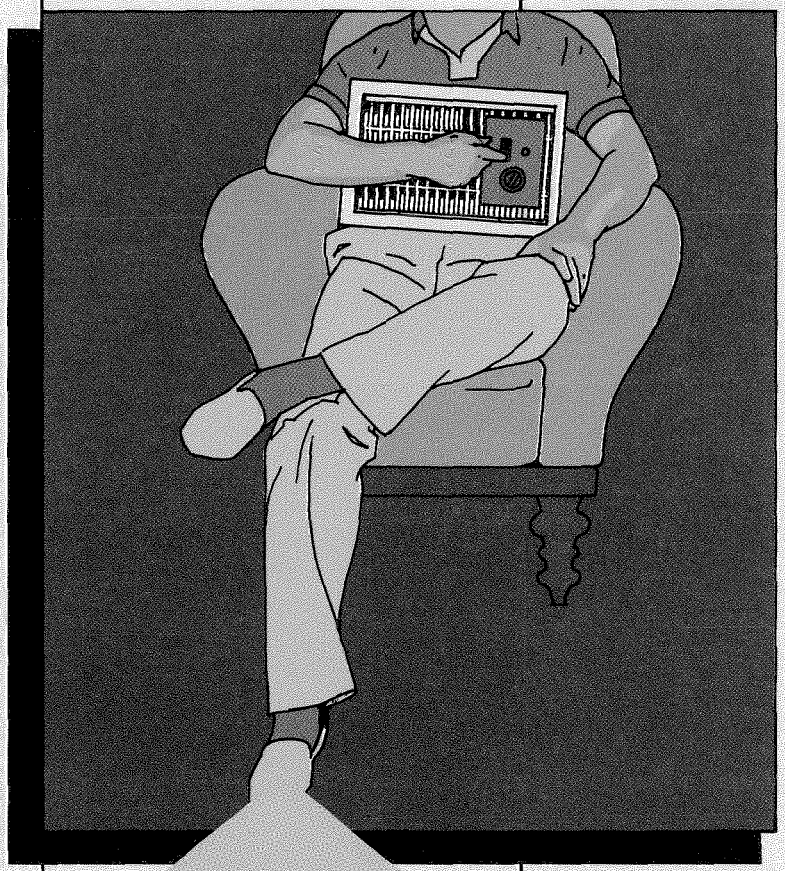
The Action Plan mirrors the plan as a whole, with its emphasis on regional cooperation. While the largest portion of the Action Plan focuses on activities for Bonneville to carry out, there are also sections on Council activities, activities to promote regional cooperation, and a section with recommendations for the region's public utility commissions and investor-owned utilities.

The Action Plan's major focus is a list of objectives to be achieved by the Bonneville Power Administration. Bonneville in turn will develop work plans for achieving these objectives. The Council will review the work plans and call for public comment on them. The Council is giving Bonneville more opportunity to design specific programs than it did in the 1983 plan.

Bonneville's work plans should list the Council's objectives along with a description of the tasks or activities that will achieve those objectives, milestones for expected start and completion dates, and relative level of effort required for each of the major parts of each plan. Bonneville is expected to describe its budget and staffing needs, and consult with interested parties in the development of the work plans. The Council expects to adopt its power plan in December 1985, and expects Bonneville to prepare work plans which would be implemented beginning October 1, 1986.

The major themes of the draft 1985 Action Plan include the following:

- acquire "lost opportunity" resources—those cost-effective resources that, if not pursued now, would be lost to the region forever;
- continue building the capability to achieve conservation in the commercial, industrial and agricultural sectors;
- continue research, data collection and demonstration of promising resources;
- address the issue of allocating costs for potential options, such as Washington nuclear plants 1 and 3, and work toward overcoming barriers to their completion should the power be needed in the future;
- develop strategies to make better use of the hydropower system;
- find ways to reduce the uncertainty created by fluctuations in aluminum industry loads.



The amount of space heating needed in a home is affected by the waste heat from appliances and heat from people. A person contributes about 520 kilowatt-hours per year to the heating of a home in the form of body heat.

Michael Cacy illustration

A primary goal of the Action Plan is the creation of mechanisms to enable utilities with surplus power to transfer conservation to utilities that need power. Equally important are mechanisms for mutually beneficial exchanges of power outside the region.

Research, development and demonstration programs are called for to ensure the region's access to the lowest cost and most reliable resources when they are needed. Demonstration programs help agencies such as Bonneville and state and local governments experiment with and evaluate various mechanisms and strategies for attaining resources. These programs also provide training and a structure so that a delivery system is established and available when needed.

The Council believes that setting these priorities will facilitate Bonneville's meeting both its current loads and additional loads, if and when they appear. If new loads require added resources, the Council will amend the Action Plan to provide for them.

Bonneville activities

The following are brief summaries of major areas of Bonneville activity in the Action Plan.

New residential and commercial buildings

Since most residential and commercial buildings constructed today will last beyond the current surplus, it is important to capture all cost-effective conservation at the time the buildings are constructed. Consequently, the major emphasis in the Action Plan is on promoting the adoption and implementation of programs that achieve energy savings comparable to the model conservation standards. These standards, adopted in the 1983 plan, set energy efficiency requirements for new buildings.

The Council has begun a procedure to amend the model conservation standards in an action separate from this draft plan.[3] For additional details

[3]Proposed changes related to the model conservation standards (MCS) have been introduced as amendments to the 1983 Power Plan, rather than as part of this 1985 draft plan. The purpose was to provide ample notice of changes to the MCS before January 1986, the deadline set in the 1983 plan for implementation of the standards.

regarding these proposed changes, contact the Northwest Power Planning Council. Also, see the news story on page 31 of this issue.

New manufactured housing

A large number of new homes purchased in the Northwest are manufactured homes. Although the federal Department of Housing and Urban Development (HUD) regulates the manufactured housing industry, the Action Plan calls for encouraging more energy efficient construction in these homes through marketing and financial incentives. Working with HUD, Bonneville should aim for a target penetration of 50 percent of all manufactured housing built to the regionally cost-effective limit by 1990. The Action Plan also calls for data collection on cost and performance of these homes.

Existing residential buildings

The region has almost ten years of experience in weatherizing existing homes and has demonstrated the capability to achieve these energy savings. To hold down costs and to minimize increasing the surplus, the Action Plan calls for reducing the size of the existing residential weatherization program to a minimum viable level, which could conceivably be zero, by fiscal year 1987 and maintaining that level through fiscal year 1992.

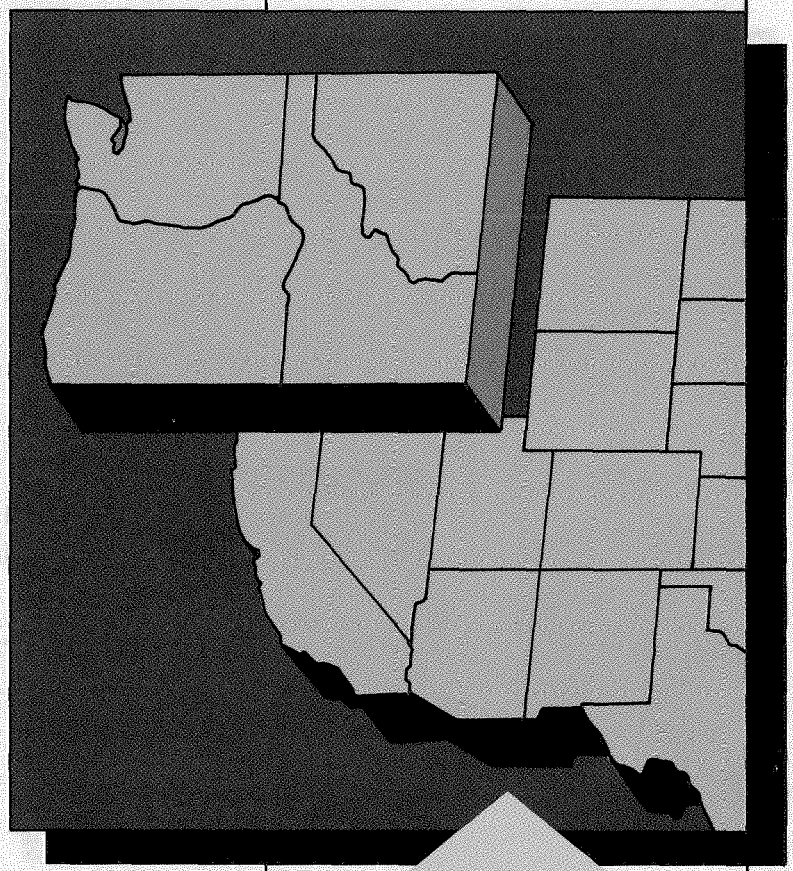
Care should be taken to ensure that energy and dollar savings are not lost through partial weatherization by failing to install those components that cannot be added cost effectively later on.

The residential weatherization program, even at the reduced level, should operate equitably across all segments of the population, achieving proportional penetration rates in low-income and rental housing. The Council also recommends that Bonneville establish a rating system or certification which indicates energy efficiency of weatherized residences. This certification would be used by buyers, sellers, renters, landlords, realtors and bankers as a way to include the cost of heating in the decision to buy or rent a dwelling.

Existing commercial, industrial and irrigation facilities

The Action Plan seeks to determine the size, cost, and availability of conservation in existing commercial buildings, industrial plants and irrigated farms, as well as the lead time and the mechanism for acquiring the conservation. Major activities to achieve these objectives should focus on ensuring that no cost-effective resources are lost in any of the pilot programs.

Commercial: The region is developing the capability to conserve energy in the commercial sector, albeit more slowly than the Council anticipated when the 1983 plan was adopted. To speed this development, activities in this Action Plan include a detailed assessment of results from 1983 plan demonstration projects and research and development of promising energy conservation measures, such as energy management control systems and advanced lighting technologies.



The Northwest's population was 8 million in 1980, an increase of more than twice the rate of U.S. population growth since 1970. This growth was more than one-third faster in the 1970s than during the 1950s and 1960s. Idaho was the region's fastest growing state in the 1970s, the slowest in the 1960s.

Michael Cacy illustration

The Action Plan calls for shared efforts to transfer conservation between utilities and to make better use of the region's hydropower system.

Industrial: Little progress has been made in demonstrating an ability to acquire industrial conservation when needed. The Action Plan focuses on simple, streamlined approaches to acquiring industrial conservation.

Specifically the Action Plan establishes a budget of $5 million each year for fiscal years 1987-1988 and calls for Bonneville to contract with 20 industries to purchase conservation resources. The Action Plan also relies on Bonneville to conduct research and development activities in conjunction with industries to determine the potential costs and savings from efficiency improvements in industrial processes.

Irrigation: The existing incentive program offered by 22 utilities has been well received. The Action Plan calls for continuation of technical and financial assistance to improve and monitor the energy efficiency of new systems, and to develop a program of technical and financial assistance to irrigators to make cost-effective energy conserving changes to their systems.

Residential and commercial appliances

Energy efficient appliances represent a significant source of low-cost conservation savings. The goal in this area is to encourage the Northwest states to establish residential appliance standards equivalent to those going into effect in California by 1992 and to determine the costs and savings of more efficient appliances, especially in the commercial sector. Specific Bonneville activities include technical assistance to states to help them develop appliance standards, documentation of costs and savings from commercial appliance improvements, and exploration of ways to encourage consumers to purchase an energy efficient appliance.

State and local government programs

Action items are designed to strengthen state and local government participation in the full implementation of the plan. The four Northwest states and over 900 cities, towns and counties have a direct interest in and, often, direct legal authority over many elements in the plan.

The Action Plan calls for continuing those programs that provide technical and financial assistance for identifying cost-effective conservation in new and existing commercial and residential areas, and in agriculture and government. Bonneville should continue to support education and training through programs such as the Energy Extension Service.

Training and education for the shelter industry and for those involved in implementing the model conservation standards are also called for. The Institutional Building Program should be maintained at 1985 levels and should be converted from an acquisition program into a research program. The Action Plan encourages state and local governments to explore alternative mechanisms for financing conservation. Strategies such as revolving loan funds, varying incentive levels, and third party contracting can help cost-effective conservation become a reality.

Lost opportunity generating resources

Lost opportunity generating resources are resources which, because of physical, financial or institutional characteristics, may lose their cost effectiveness unless actions are taken to develop these projects or to secure them for future use. Examples include scheduled non-power projects with electrical generating potential, such as municipal water supply systems and solid waste incinerators. Bonneville has begun monitoring potential lost opportunity generating projects.

The Action Plan calls on Bonneville to refine and to expand its inventory of potential lost opportunity generating resources. In addition, Bonneville should develop and implement a process for routine evaluation of potential lost opportunity generating resources and for acquiring or otherwise securing these resources where it is cost effective to do so.

Management of the resource option inventory

Resources that have been secured as options require care to preserve their availability and cost effectiveness. If load growth occurs at the medium-low, or greater levels, options will have to be secured to meet electrical demand.

To ensure that all options are maintained in a condition that allows them to be developed as cost-effective resources when needed, the Action Plan calls for Bonneville to develop and implement a policy for maintaining options in the inventory. This policy must consider physical preservation, renewal of licenses and permits, collection of environmental data and maintenance of land options. Periodic reevaluation of the cost effectiveness of options in the inventory should also be provided.

WNP-1 and WNP-3 are potential options to the region. These plants will be lost to the region unless actions are taken to maintain them and to resolve barriers to their completion. The Action Plan calls on Bonneville to resolve the barriers to completion of WNP-1 and WNP-3 and to reassess and minimize the costs of preserving the two plants.

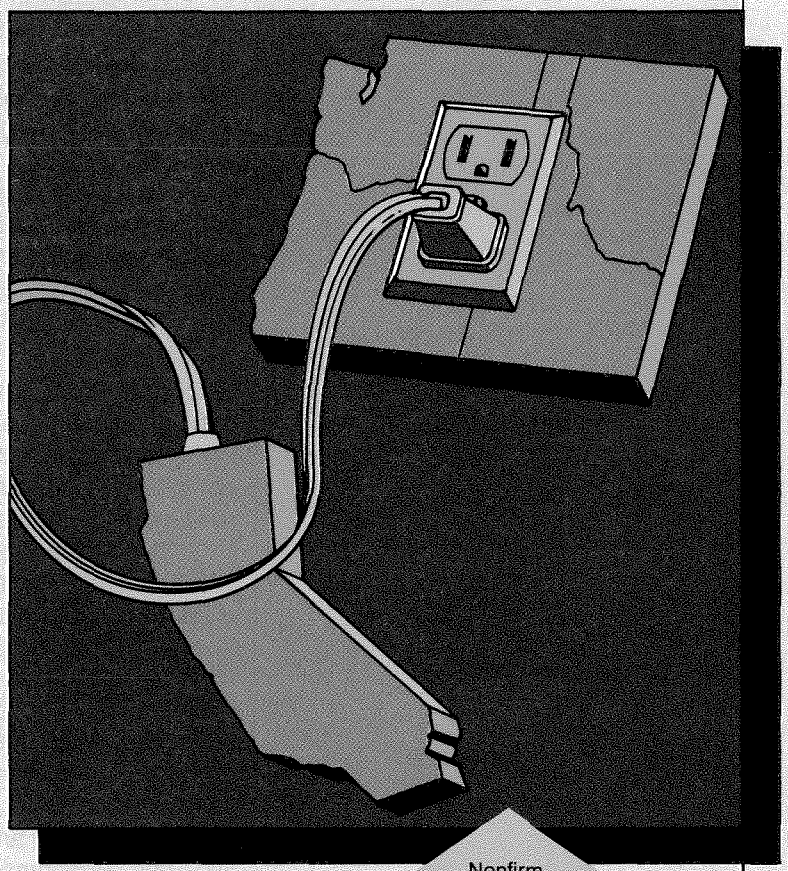
Improvement of Bonneville's ability to develop regional resources

Due to the current surplus, there appears to be no need in the near term for Bonneville to develop major new generating resources. However, occasions may arise for limited resource acquisitions that are consistent with the power plan. These include:

- acquiring resources to test the options concept or other mechanisms for resource acquisition;
- acquiring certain very low-cost resources that have value even during a surplus;
- developing or securing options on resources that would otherwise be lost to the region;
- developing or demonstrating new resource types;
- developing options held in the inventory that have been found to be cost effective.

A concerted effort to study the process for acquiring resources and to resolve areas of concern should be completed prior to the time the region must begin to secure options to meet load growth. The product of this work should be a demonstrated process for acquiring options. Efforts were initiated in the 1983 plan to identify and resolve potential constraints to the options concept. The results of these efforts have been positive and will provide a sound foundation from which further improvements can evolve.

To further improve the ability of Bonneville to develop resources when needed, the Action Plan calls for continued development and demonstration of



Nonfirm energy is currently sold to the direct service industrial customers of the Bonneville Power Administration, the region's generating utilities, and Southwest utilities. From Nov. 1983 through Feb. 1985, Bonneville sold 378 average megawatts to Northwest utilities and 2,278 to Southwest utilities.

Michael Cacy illustration

In order for the Northwest to obtain the lowest cost resources throughout the region, cooperation among regional power entities will be necessary.

the options concept, development and demonstration of methods to evaluate resource cost effectiveness, and a uniform policy for acquiring resources. This policy should be based on the model process for securing resources described in Appendix I-A of the draft plan.

Confirmation of potential resources

Several strategies are potentially available for backing up nonfirm hydropower. They include the use of combustion turbines, power purchases, adjusting critical water standards and increasing electrical load interruptibility. The Action Plan relies on Bonneville to evaluate each of these strategies and to develop and test methods for their implementation.

Intertie access policy

The Pacific transmission intertie system is a resource of great value. Bonneville's long-term intertie access policy could provide an important mechanism for encouraging regional cooperation and appropriate resource development.

The Action Plan calls on Bonneville to allow longer-term sales over the interties and to give priority to transactions that provide the greatest flexibility for meeting future uncertainties. Firm sales with provisions to call back the energy when necessary and seasonal exchanges of power are examples of such transactions.

Access to Bonneville's interties should not encourage resource development that is counter to cost-effective implementation of the plan and should encourage the development of lowest cost resources first. The policy, while assisting in effective use of the current surplus, should not encourage the long-term development of Northwest resources solely for other regions.

Council activities

The Council has included actions which it intends to take as part of its regional power planning and monitoring responsibility.

Planning, research, development and demonstration

Power plans, like any other plans, are only as good as the data that went into the decisions that make up the plans. Continued refinements to the Council's data base are needed. Particular areas of concern include cost, performance and environmental characteristics of the various technologies.

The Council is also concerned that research in support of regional power planning efforts be conducted and supported equitably among the region's utilities. The Council will work with Bonneville to develop a coordinated work plan to maintain and update the resources and technology data base. By coordinating this effort, the Council hopes to avoid duplication of work and expenditures. The work plan will include assessments of potential efficiency improvements to the hydropower system and transmission facilities, and research regarding promising resources such as wind and solar energy.

Monitoring plan implementation

It is important that the Council be aware of how this plan is being implemented and how the region's energy future is unfolding. The Council has developed a program to monitor implementation of the plan. This program also helps the Council respond quickly to correct the plan if regional load growth requires measures not currently in the Action Plan. Quarterly reports on the progress of plan implementors are critical to this monitoring program.

help carry out this study, the Council will assist in the formation of a technical committee of representatives of interested West Coast utilities, planning agencies and utility commissions, including Canadian utilities in British Columbia and Alberta.

This action will ensure that the Council is kept informed about current and future opportunities for interregional cooperative planning. With information provided through this study, the Council can factor import/export opportunities into its planning rather than having to react to activities that are outside of its planning process. The Council will take no part, other than supplying information to interested parties, in trying to establish an agreement among parties.

Activities to promote regional cooperation

In order for the Northwest to obtain the lowest cost resources throughout the region, cooperation among regional electrical power entities will be necessary. The activities contained in this section of the Action Plan include recommendations for Bonneville, the region's public utility commissions and investor-owned utilities to work together to resolve several problems which are currently contributing to the region's uncertain energy future. These recommendations include actions by Bonneville to minimize both the cost and level of uncertainty associated with the rate charged for power from new resources. In addition, Bonneville should develop specific policies for the allocation of new resource costs, including the costs of options such as the Washington nuclear plants. Shared efforts to transfer conservation between utilities and to make better use of the region's hydropower system are also called for.

Recommended activities for the region's public utility commissions and investor-owned utilities

Throughout the development of this draft power plan, the Council has assumed that the region as a whole would cooperate in the process of developing the most cost-effective electrical energy resources first. The Council has demonstrated that as much as $3.8 billion can be saved through such cooperation.

The Action Plan focuses primarily on Bonneville's role, but cooperation from the public utility commissions and investor-owned utilities would greatly contribute to achieving the lowest cost electrical energy future for the Northwest. Consequently, the Council included in its Action Plan several recommendations for public utility commissions and investor-owned utilities.

These recommended actions correspond to those required of Bonneville and include incentives from investor-owned utilities to help achieve regionwide new residential and commercial construction levels that are consistent with the model conservation standards, and coordinated policies for acquiring new resources and selling existing surplus power outside the region. In addition, the Council's Action Plan invites the public utility commissions and investor-owned utilities to join Bonneville in demonstrating new conservation opportunities in the commercial and industrial sectors. ■

Goals of the Draft Plan

The Council developed this draft plan with the following specific goals in mind:

- To provide the region an adequate and reliable supply of electrical energy at the lowest possible cost;
- To select resources following the cost effectiveness principles and priorities in the Northwest Power Act;
- To develop a flexible strategy so that the plan can be modified as conditions change and new information becomes available;
- To encourage the greatest rate predictability and stability for the region;
- To evaluate all resources from a total regional system perspective to ensure their compatibility with the existing hydropower system;
- To select resources with the least adverse impacts on the environment, or those with adverse environmental impacts which can be mitigated;
- To select resources that are consistent with protecting and enhancing fish and wildlife, and that mitigate power system impacts on fish and wildlife.

How to Comment on the 1985 Draft Plan

The comments, written and oral, that the Northwest Power Planning Council receives on this draft power plan are among the most important aspects in the development of the 1985 Power Plan. To ensure that the comments are used most effectively, the Council asks that you follow these guidelines in their preparation:

INSTRUCTIONS FOR ORAL COMMENT AT HEARINGS

Hearings are being held in the following locations:

Boise, Idaho, Downtowner Red Lion	October 17, 1985, 10 a.m.
Missoula, Montana, Village Red Lion	October 11, 1985, 9 a.m.
Salem, Oregon, Employment Building	October 15, 1985, 10 a.m.
Seattle, Washington, Federal Building	October 21, 1985, 9 a.m.

1. Requests for time slots must be made at least two workdays prior to the hearing. Contact Ruth Curtis, information coordinator, at the Council's central office, Suite 1100, 850 S.W. Broadway, Portland, Oregon 97205 (503-222-5161 or toll free 1-800-222-3355 in Idaho, Montana and Washington or 1-800-452-2324 in Oregon).

2. Those who do not sign up for time slots will be allowed to testify as time permits.

3. Use the hearing to *summarize* your written comments. The comments themselves should not be read.

4. Ten copies, if possible, of hearing testimony should be submitted to the Council recorder at the hearings. This person will be sitting at a table near the Council members and will be identified at the start of the hearing by the chairman. When preparing these copies, refer to the instructions below for written comments.

5. A 15-minute guideline is suggested for comments given at hearings. On certain occasions, the number of people signed up to talk may be so large that it will be necessary to impose stricter limits in order to allow all commentors a hearing.

6. Your appearance at more than one hearing is unnecessary. Site scheduling preference will be given to individuals and groups that have not testified at other hearings.

INSTRUCTIONS FOR WRITTEN COMMENT

1. All written comments must be received in the Council's central office, Suite 1100, 850 S.W. Broadway, Portland, Oregon 97205 no later than 5 p.m. on Friday, October 25, 1985. Comments received after that time will not be considered.

2. Comments should be clearly marked "Draft Power Plan Comments."

3. Your written comments should be specific and concise and refer to chapters or page numbers in the plan. Please avoid grouping comments on one page that concern different sections of the plan.

4. If appropriate, submit a "marked up" copy of the draft (or appropriate sections) indicating suggestions and/or revisions. Suggested deletions should be lined out and placed in parentheses, like this (~~Line out portions of the draft to be deleted.~~) Suggested new language should be underlined, like this: <u>Underline all new language</u>.

5. Please type your comments (double-spaced), if possible. And use only one side of the paper.

6. Provide ten copies of all comments and supporting materials if at all possible.

1985 Draft Plan Synopsis

VOLUME I

CHAPTER 1: ELECTRICITY—CORNERSTONE OF THE NORTHWEST ECONOMY

Thanks to the largest coordinated hydroelectric system in the world, the Northwest has historically enjoyed the nation's cheapest electricity. This resource has been critical to the region's economic growth. The goal of the plan is to ensure the Northwest maintains the lowest cost electrical energy future. This chapter details the recent history of electrical development in the Northwest and the actions that led to the Northwest Power Act and the Northwest Power Plan.

CHAPTER 2: THE REGIONAL PICTURE TODAY—PROBLEMS AND SOLUTIONS

Currently the Northwest has a 2,300-megawatt surplus of electricity that could last from five to more than 20 years. This surplus is distributed unevenly among the region's utilities. Through cooperative actions, these differences can be used as opportunities to attain the lowest possible cost energy future for the region. Developing resources on a regional basis could save the Pacific Northwest $3.8 billion.

Cooperation is particularly important in three areas: 1) the need to develop regionally cost-effective conservation before turning to other, more expensive resources; 2) the need to properly allocate the cost of acquiring and holding resource options that provide flexibility for the regional power system; and 3) the need to make better use of the hydropower system.

The chapter also provides an overview of the current status of the region, including uncertainties which influence the Council's power planning strategy.

CHAPTER 3: THE COUNCIL'S PLANNING STRATEGY—RISK MANAGEMENT

This chapter sets out the overall goals of the plan and the Council's planning strategy.

Because the future is not known, the plan must be flexible and able to adapt to changing needs. At the same time it must choose the most cost-effective route to providing enough electricity to meet any demand. The Council's planning strategy evaluates the contribution of specific resources to power system cost by examining the way resources work together over a wide range of possible loads. Risks are lessened by using flexible resources that can be modified to meet changing demands for electricity. Conservation is an example of such a resource.

The plan includes a process called "optioning" to license and design resources and keep them "ready on the shelf" until they are needed. This gives planners additional years to assure that demand levels in the region warrant a decision to enter the expensive construction phase.

CHAPTER 4: FUTURE ELECTRICITY NEEDS

This chapter presents the range of forecasts for electrical energy demand. These forecasts play three roles in the power plan: 1) they are the basis for deciding how much electricity is needed to support a healthy and growing economy; 2) they explore and define the uncertainty surrounding future resource needs; and 3) they are an essential component in assessing the effects of conservation actions taken as part of the Council's power plan.

The analysis examines four forecasts representative of high, medium-high, medium-low and low electrical demand growth in the Northwest. The chapter also details the economic and demographic trends that shaped the forecasts and establishes the assumptions used in these forecasts.

CHAPTER 5: THE EXISTING REGIONAL ELECTRICAL POWER SYSTEM

This chapter examines the existing resources and resource capacities available to the region, including hydropower, other renewable and cogeneration resources, coal and nuclear plants, and imported power.

The northwest's hydropower system produces approximately two-thirds of the total electricity used by the region. Thermal generating resources, such as coal and nuclear plants, provide most of the remaining electricity. Even with high economic growth, hydropower would still produce almost half the region's electricity at the turn of the century.

This chapter covers the major operating characteristics of the Northwest's electrical power system.

The Draft 1985 Power Plan is contained in Volume I.

This includes the basic planning strategies, the important regional power issues, the lowest cost mix and schedules for new resource acquisitions, and the Action Plan the region needs to follow to ensure an adequate and reliable supply of electricity at the lowest cost.

Volume II contains the supporting material for the conclusions in Volume I. It describes the analytical work and technical details leading to the policy decisions presented in the plan.

CHAPTER 6: CONSERVATION RESOURCES

Conservation is the Council's priority resource for meeting the Northwest's future electricity needs. With high economic growth, close to 3,900 average megawatts of conservation are available at an average cost of 2.1 cents per kilowatt-hour. This is equal to more than eight coal plants at less than half their cost.

This chapter assesses the amount of new conservation available and its cost. The Council considered cost-effective conservation to be measures whose systemwide cost was less than that of a comparable amount of electricity produced at a new generating facility. In addition, the Northwest Power Act grants conservation a 10 percent cost advantage over other resources.

The chapter breaks conservation down into individual sectors for analysis.

CHAPTER 7: GENERATING RESOURCES

A variety of generating resources are potentially available to meet future Northwest electricity demand. Each was analyzed to determine its availability to the region, its reliability and cost effectiveness. Generating resources that met these criteria are included in the resource portfolio. Others, classified as promising, are recommended in the Action Plan for further research, development or demonstration.

Resources reviewed include coal, geothermal, hydropower, municipal solid waste, natural gas, nuclear power, solar, wind, wood residue, cogeneration and waste heat. Also examined were improvements to the efficiency of existing generation projects and the hydropower system.

The Washington nuclear plants 1 and 3 were found to be cost effective, but a number of legal and financial barriers to their completion make it impossible to rely on power from these plants until these barriers are overcome.

CHAPTER 8: RESOURCE PORTFOLIO

The 20-year resource portfolio identifies what resources must be developed, to what extent, how soon, and in what order. It includes the potential range of future energy needs, and the lowest cost mix of new resources necessary to meet those needs. Like a stock portfolio, the resource portfolio is diversified and carefully selected to lower economic risks faced by the Northwest.

If the region experiences high economic growth, the following resources need to be developed in this order: conservation, available hydropower, better use of the hydropower system, cogeneration, and coal-fired power plants. If growth is low, conservation alone could take care of all the region's new electrical power needs. Resource schedules for medium-low and medium-high growth are also included.

CHAPTER 9: 1985 ACTION PLAN

The Action Plan sets down those steps that must be taken in the near term to realize the long-term goals of the plan. It summarizes the progress made in implementing the 1983 plan and, building on that progress, establishes new direction for the near term. It contains a detailed plan for the Bonneville Power Administration and recommended actions for the region's other power entities, including investor-owned utilities and the public utility regulatory commissions.

Given the current regional surplus of electricity, the Action Plan emphasizes acquiring only lost opportunity resources in the near term. These are resources that must be secured now or they will lose their cost effectiveness forever. It also stresses the need to build the capability to acquire other new resources so that they are available when needed.

CHAPTER 10: CONCLUSION

This chapter is a brief summary of the key points of the plan. It is followed by a glossary of terms used in the plan.

APPENDIX I-A: MODEL PROCESS FOR ACQUIRING RESOURCES

The Council's Options Steering Committee and several of its task forces suggested the Council develop an overall approach to acquiring options on, and the eventual construction of major resources (see Volume I, Chapter 3). In response, the Council developed this model process for acquiring resources, which accommodates acquisitions by both Bonneville and other regional utilities.

APPENDIX I-B: METHOD OF SURCHARGE

The Northwest Power Act authorizes a surcharge on Bonneville customers whose jurisdictions fail to implement conservation measures that achieve savings of electricity comparable to those saved by the model conservation standards. The Council has drafted a methodology for calculating this surcharge.

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1985 Draft Plan Synopsis

VOLUME II

CHAPTER 1: INTRODUCTION

CHAPTER 2: ECONOMIC, DEMOGRAPHIC AND FUEL PRICE ASSUMPTIONS

Economic and demographic assumptions are the dominant factors affecting the forecasts of the demand for electricity. Demand generally parallels economic growth, but is influenced by shifts in the relative price of electricity and other fuels, by changes in the composition of economic activity, and by the gradual replacement of inefficient buildings, factories and machines with more efficient ones.

These influences are extremely important and, at the same time, highly uncertain. The range of future electricity demands included in the plan is designed to reflect the extent of this underlying uncertainty.

CHAPTER 3: FORECAST OF DEMAND FOR ELECTRICITY

This chapter describes in more detail the demand forecasts presented in Chapter 4, Volume I.

CHAPTER 4: FINANCIAL ASSUMPTIONS AND COST EFFECTIVENESS OF CONSERVATION

Financial variables are used in estimating the quantities and costs of resources, projecting future demand for electricity, and simulating the operation of the power system with alternative sets of resources. In all of these analyses, the values for variables such as escalation rates, cost of capital, and discount rates are important because they directly influence the outcome of the analysis. These values must be consistent throughout all of the analysis.

CHAPTER 5: CONSERVATION RESOURCES

This chapter contains detailed descriptions of the calculations used to assess the amount and cost of achievable conservation available to the Northwest.

CHAPTER 6: GENERATING RESOURCES

This chapter details existing resources and the basis for selecting new generating resources. It also provides the distribution of existing resources between public and investor-owned utilities.

CHAPTER 7: BETTER USE OF THE HYDROPOWER SYSTEM

The hydropower system uses the worst sequence of low water conditions on record for planning purposes. In most years, large amounts of hydropower are available in excess of this critical period amount. The Council's studies assessed various strategies for improving the use of this electricity and concluded that such improvements have the potential of saving the Northwest about $1.2 billion by reducing the need to build new thermal plants.

CHAPTER 8: RESOURCE PORTFOLIO

This chapter describes in detail the Council's resource portfolio and the analytical methods and computer models used to develop it.

CHAPTER 9: CONSIDERATION OF ENVIRONMENTAL QUALITY AND FISH AND WILDLIFE

The Act requires the Council to give due consideration to environmental quality and fish and wildlife protection in its plan.

Environmental quality and fish and wildlife concerns were analyzed for various resources. The costs for pollution abatement equipment and fish and wildlife mitigation required under state and federal regulations were included in the estimates of generic resource costs. This information was used in selecting the individual components of the resource portfolio. This chapter describes the process the Council used to give due consideration to environmental quality and fish and wildlife in its preliminary selection of resources.

CHAPTER 10: PUBLIC INVOLVEMENT

An extensive public involvement program is being conducted to ensure widespread participation in the development of the 1985 Power Plan. The distribution of this draft for public comment is part of that effort. None of the decisions in it are final. They are all open to change based on the comments the Council receives.

APPENDIX II-A: METHOD FOR DETERMINING ENVIRONMENTAL COSTS AND BENEFITS

The Council has developed a method for the Bonneville Power Administration to use in assessing the environmental costs and benefits of specific resource acquisition decisions.

APPENDIX II-B: CONDITIONS FOR BONNEVILLE FINANCIAL ASSISTANCE TO HYDROPOWER DEVELOPMENT IN THE REGION

In order to protect the Northwest's fish and wildlife when hydropower projects are developed, various conditions must be met when the Bonneville Power Administration finances or assists with the development of these projects. ■

Public comment sought on proposed amendment to model standards

Hearings were being held throughout the Northwest during August and the first part of September to obtain public comment on an amendment proposed to sections of the 1983 Northwest Power Plan that concern energy efficient standards for new construction. The public comment period closes September 13, 1985, and the Council is expected to make a decision about adopting the amendment at its October 9-10 meeting in Missoula, Montana.

The principal effect of the proposed amendment would be to extend the deadline for adopting the Council's full standards for new electrically heated residential buildings to January 1989, with an interim level of savings going into effect in 1987. Currently, the Council's power plan, adopted in 1983, calls for the full standards to go into effect in January 1986.

The standards are designed to reduce the Northwest's need to build expensive new thermal plants in the future by dramatically reducing energy consumption for new buildings. Homes built to the standards would use approximately 60 percent less energy for electrical space heating than homes built to current practice. Failure to implement the standards or equivalent energy-saving measures would make utilities liable for a 10 percent surcharge on the power they buy from the Bonneville Power Administration. The surcharge, authorized by the Northwest Power Act, is designed to recover the costs to the region of the failure to implement the standards.

Hearings held in September include the following:

- Seattle, Washington, 9 a.m., September 9, 1985, at the Federal Building, Room 2866, 915 Second Avenue.
- Missoula, Montana, 1:30 p.m., September 13, 1985, at the Missoula Sheraton, 200 S. Pattee Street.

The proposed amendment, which is subject to change based on public comments, has the following major features:

The proposal includes a 1987 interim energy savings level for the region which can be achieved through building codes, utility-sponsored marketing programs for energy-efficient homes (such as the Super Good Cents program), utility-funded incentive programs, or a combination of the above. A pre-approved alternative in the proposal involves utilities achieving a percentage of new electrically heated homes built to the model conservation standards. A utility which complies with any of these programs or which develops an alternative program to save an equivalent amount of energy by January 1987 will avoid the surcharge.

By January 1989, new Northwest residences should be built to the Council's current model conservation standards. The 1989 standards include additional conservation features which are cost effective to the region's electrical power system. The Council has proposed that the regional electrical power system, working through Bonneville, provide an incentive payment to new homebuyers for homes built to the 1989 standard.

Equivalent savings for 1987 can be attained if a percent of new homes are built to the full standards. These penetration rates are as follows: Washington, 10 percent; Oregon, 25 percent; Idaho, 42 percent; Montana, 28 percent. The penetration rates are based on differences in energy code enforcement and current building practice in the four states. For example, because Washington recently adopted a stricter new statewide energy code, the difference between building practice and the Council's interim saving level is relatively minimal.

The proposal also includes programs to help homebuilders and local and state governments in the implementation of the model conservation standards.–*SE*

Fish and wildlife program to be amended

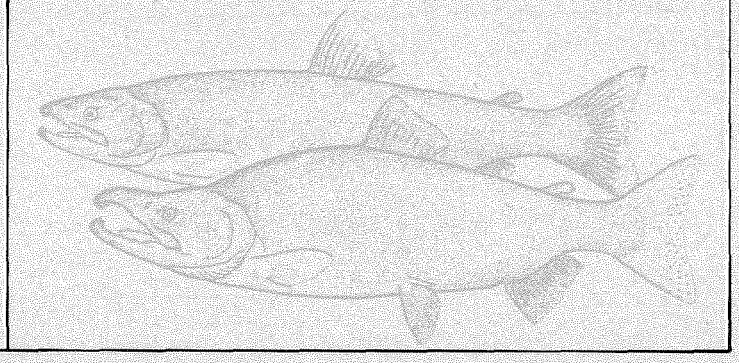
The Northwest Power Planning Council will be accepting recommendations for amendments to its Columbia River Basin Fish and Wildlife Program through December 16, 1985. The program, which was adopted by the Council on November 15, 1982, addresses fish and wildlife losses in the Columbia River Basin that resulted from the development and operation of hydroelectric dams in the Basin.

On October 10, 1984, the Council adopted amendments to the program based on recommendations from over 100 groups and individuals. The current amendment process, like the last one, is open to Indian tribes, federal and state fish and wildlife agencies, water and land management agencies, electric power producing agencies and their customers, and members of the public.

Recommendations should focus on measures which can be implemented by the Bonneville Power Administration, the Bureau of Reclamation, the U.S. Army Corps of Engineers or the Federal Energy Regulatory Commission. These measures must be designed to "protect, mitigate and enhance" fish and wildlife in the basin, including related spawning grounds and habitat, affected by the development and operation of any hydroelectric project on the Columbia River and its tributaries. Care should be taken in making recommendations, to avoid duplicating measures already contained in the program.

The amendment process will include a series of consultations, public hearings throughout the region, public comment at Council meetings, opportunities to make written comment and analysis by the Council and its staff.

All proposed amendments must be submitted on the form developed for this purpose. Copies of this form and related materials are available from the Council. Call Janie Pearcy, Division of Fish and Wildlife, 1-800-222-3355 (Idaho, Montana and Washington), 1-800-452-2324 (Oregon), and 222-5161 in Portland, Oregon.–*CC*



COUNCIL PUBLICATIONS ORDER FORM

Please send me a copy of the following publications of the Northwest Power Planning Council.
(Note: not all publications are available immediately, but will be sent to you as soon as they are.)

PUBLICATIONS

- ☐ Draft 1985 Power Plan, Volumes I & II
- ☐ Fifth Annual Report of the Northwest Power Planning Council
- ☐ Columbia River Basin Fish and Wildlife Program, Amendment Application Form (1985)
- ☐ Draft Compilation of Information on Salmon and Steelhead Losses in the Columbia River Basin

MAILING LISTS

Please add my name to the mailing lists for the following newsletters.
(Note: do not check if you already are receiving them)

- ☐ *Northwest Energy News*
  (this bimonthly magazine)
- ☐ *Update!*
  (public involvement newsletter mailed with the Council meeting agenda)

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