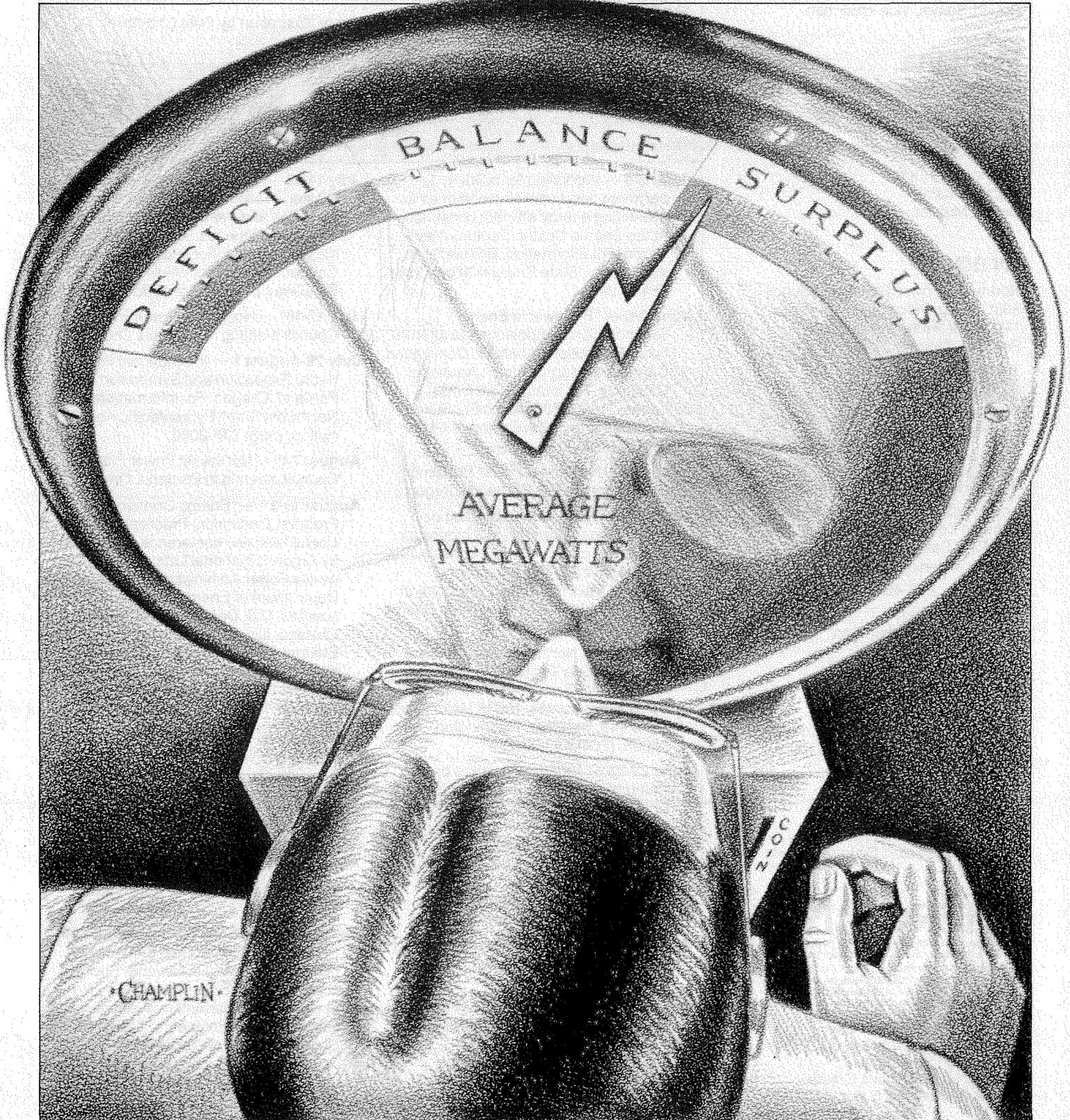


N O R T H W E S T ENERGY NEWS

Volume 4, No. 3

Northwest Power Planning Council

May/June 1985



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NORTHWEST ENERGY NEWS

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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 Adminis-
tration, emphasizing cost-effective conservation and renewable
resources.

Executive Editor: Dulcy Mahar
Graphic Design: Linda Sawaya
News Editor: Steve Engel
Features Editor: Carlotta Collette
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EDITOR'S NOTES

This issue, like previous ones this year, features issues the Northwest Power Planning Council is dealing with as it develops its 1985 power plan. The next issue will include highlights and a synopsis of the entire draft plan, along with instructions for comment.

Because it cannot be completed until the draft is adopted this summer, the next issue will be late. We will publish as close to completion of the draft as is technically possible. —DM

Cover illustration by Dale Champlin

CALENDAR

June 3-4 — Workshop for building department personnel on techniques for evaluating energy efficient construction. At the Seattle Center, Seattle, Washington. For information: Bonnie Scott, Washington State Energy Office, (206) 754-0724.

June 3-6 — "Renewable Energy Technologies Symposium and International Exposition." Anaheim Convention Center and Marriott Hotel, Anaheim, California. For information: Linda Ladas, TMS, 680 Beach St., Suite 428, San Francisco, California 94109. (415) 474-3000.

June 5-6 — Northwest Power Planning Council meeting in Portland, Oregon.

June 6-7 — Workshop for building department personnel on techniques for evaluating energy efficient construction. At the University of Puget Sound, Tacoma, Washington. For information: Bonnie Scott, Washington State Energy Office, (206) 754-0724.

June 18-20 — "Northwest Energy Expo '85" at the Sea Tac Red Lion in Seattle, Washington. For information: Tressel-Lewis & Associates, 10636 Main Street, Suite 443, Bellevue, Washington 98005. (206) 455-9917.

June 22-23 — 1985 short course on the Columbia, "The Columbia Gorge: A Unique American Treasure." Sponsored by the Washington State and Oregon State University Cooperative Extension and Sea Grant Programs. For information: Short Course on the Columbia, 1919 NE 78th St., Vancouver, Washington 98665. (206) 696-6018.

June 26-27 — Northwest Power Planning Council meeting in Seattle, Washington.

July 10-11* — Northwest Power Planning Council meeting in Missoula, Montana.

July 14-19 — 1985 Joint Conference of Western Association of Fish & Wildlife Agencies and Western Division of the American Fisheries Society in Snowmass, Colorado. For information: Colorado Division of Wildlife, 6060 Broadway, Denver, Colorado 80216.

July 17-18* — Northwest Power Planning Council meeting in Portland, Oregon.

July 29-August 1 — International Small Hydro Exposition and Symposium in Portland, Oregon. For information: Northwest Small Hydroelectric Association, (503) 388-2080.

August 7-8 — Northwest Power Planning Council meeting in Portland, Oregon.

August 19-21 — "Energy Conservation Program Evaluation: Practical Methods, Useful Results," conference sponsored by Argonne National Laboratory, Bonneville Power Administration, Illinois Department of Energy and Natural Resources, U.S. Department of Energy in Chicago, Illinois. For information: Gail Ettinger, Evaluation Conference Coordinator, Argonne National Laboratory, Building 362, 9700 South Cass Avenue, Argonne, Illinois 60439.

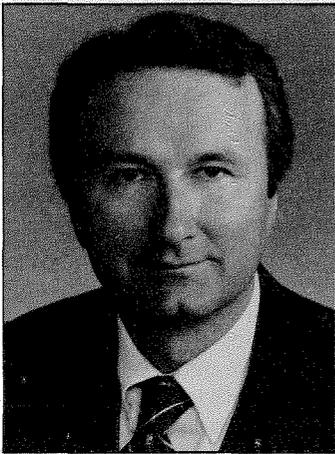
August 28-29 — Northwest Power Planning Council meeting. Call central office for location.

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 25-27 — "Waterpower/'85: An International Conference on Hydro-power" 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.

*Tentative

Compiled by Ruth Curtis



Dave Frohnmayer

Oregon attorney general backs constitutionality

Oregon's attorney general Dave Frohnmayer strongly defended the constitutionality of the Northwest Power Planning Council during argument in Seattle May 9 before the 9th Circuit Court of Appeals.

Frohnmayer represented the four Northwest states and the National Governors' Association in opposing a suit brought against the Council by the Seattle Master Builders Association. The suit disputes both the validity of the Council's model conservation standards and the Council's legal authority to impose them.

Frohnmayer urged the three judges to find that the Council was legitimately formed within the scope of the Compacts Clause of the U.S. Constitution and that the Appointments Clause of the Constitution does not apply to the Council.

The Master Builders have argued that the Executive Branch of the federal government must appoint Council members, because they exercise significant authority over a federal agency, the Bonneville Power Administration. Frohnmayer told the Court that the Master Builders are

misreading the Constitution and case law on this point.

Council members are not federal officers, to whom the Master Builders argument would apply, but are officials of an interstate compact agency, he said. They derive their authority legitimately from their respective states. Congress frequently delegates powers to states in this manner, Frohnmayer added.

He also warned that to find otherwise would threaten the accomplishments and existence of interstate compacts around the country, and could "have profound impacts" because almost every federal program is administered by state agencies. He said the effects of the petitioners' argument "would be monstrous."

Interstate compacts predate the constitution, Frohnmayer said, and the U.S. Constitution protects those forms of consent.

Frohnmayer argued that virtually all federal programs for child support, highways, education and the employment division are administered by the states, but that the various governors, attorney generals and other state officials are in no way subject to appointment by the President or the heads of federal departments.

A decision in the case may take as long as two years, according to Frank Ostrander, the Council's general counsel.

—SE

Council members call for restoring funds in Bonneville budget

Urging restoration of \$72 million cut by the Administration from conservation borrowing authority of the Bonneville Power Administration, Northwest Power Planning Council Chairman Chuck

Collins and Oregon Council member Roy Hemmingway told Congress, "The budget as proposed is not consistent with the Council's 1983 Power Plan."

Collins and Hemmingway addressed the Subcommittee on Energy and Water Development in Washington, D.C., in April. Collins pointed out that "the cheapest resource available to meet future needs [in the Northwest] is conservation—the resource on which Congress placed the highest priority in the Northwest Power Act."

He emphasized that, because "the region is currently

surplus, the Council is not advocating that BPA acquire conservation megawatts—except in areas where conservation opportunities would otherwise be lost."

Collins said, "The Council is concerned that the FY86 Administration budget as proposed would . . . distort conservation spending priorities by virtually ending conservation capability building in the commercial, industrial, agricultural, and governmental sections."

Collins argued that "a classic example of . . . a lost opportunity resource is the construction of new residences in the region." —SE

Northwest Council members toured Boeing's giant facilities in Washington state as part of their research on major industrial electricity users (see story page 24). The building they are in is 6.1 million square feet—or the equivalent of 104 football fields. From left are Roy Maus, Boeing; Roy Hemmingway, Don Godard, and Gerald Mueller, the Council; Ken Canon, Industrial Customers of Northwest Utilities. That's a 747 in the background.



IN THE NEWS

continued

New powerhouse plan will save more fish

New operating procedures at Bonneville Dam's second powerhouse should save the lives of millions of young salmon and steelhead trout trying to get to the ocean this spring.

Northwest Power Planning Council Chairman Chuck Collins has commended the Army Corps of Engineers on its timely plan to meet the Council's requirements for an 85 percent fish passage efficiency (the percentage of fish that are diverted away from the turbines).

In 1982, a \$23 million, state-of-the-art juvenile fish bypass system was completed at the second powerhouse to divert the young fish from the turbines. However, when operation of the facility was measured in 1983, it showed unusually low fish passage efficiencies.

Consequently, the Council called on the Corps to solve the problems at the powerhouse and, in the interim, to develop a plan that would include sufficient spill levels to prevent fish passage through the turbines, or shut the powerhouse down during the spring migration.

The Corps plan calls for operation of the dam's first powerhouse as much as possible, with complete shutdown of all turbines at the second powerhouse from 8 p.m. to 7 a.m., when the majority of the fish will be passing.

During daylight hours, the units at the second powerhouse will be operated only when necessary to reduce the spill over the dam that could pull upstream migrating adult salmon from the top of their fish ladder back down through the spillgates.

The Corps is continuing its work to come up with long-term solutions. —CC

DSI Options Study issued by Bonneville

No recommendations were included in a draft report on the Bonneville Power Administration study of direct service industry (DSI) options, issued in April. Bonneville will produce its conclusions in June, following a public comment period that ended May 10, said Terry Esvelt, DSI options project manager.

Published results of the studies, however, show that "increased interruptibility looks the best at this point," according to Wally Gibson, manager of system analysis and rates for the Northwest Power Planning Council. "But there's more work being done," he added.

Rates for direct service industries—mostly aluminum smelters—have increased dramatically over the last six years, from .3 cents per

kilowatt hour in 1979 to 2.7 cents in 1984, before dropping toward 2 cents in a series of emergency reductions. World aluminum prices in recent years have plummeted, leaving some DSIs on the verge of shutdown.

The Bonneville study followed an earlier Council study which recommended increasing the amount of reduced-rate interruptible power sold to DSIs. Bonneville's study looked at other ideas from around the region, including variable rates that would move up or down along with world aluminum prices; paying for modernization of plants to reduce electrical use; and a continuation of the periodic rate reductions (the so-called "fire sales") that have been used in recent months. —SE

FERC's new procedure assesses dam damages

The Federal Energy Regulatory Commission (FERC) adopted its staff's proposal for a Cluster Impact Assessment Procedure (CIAP) in April.

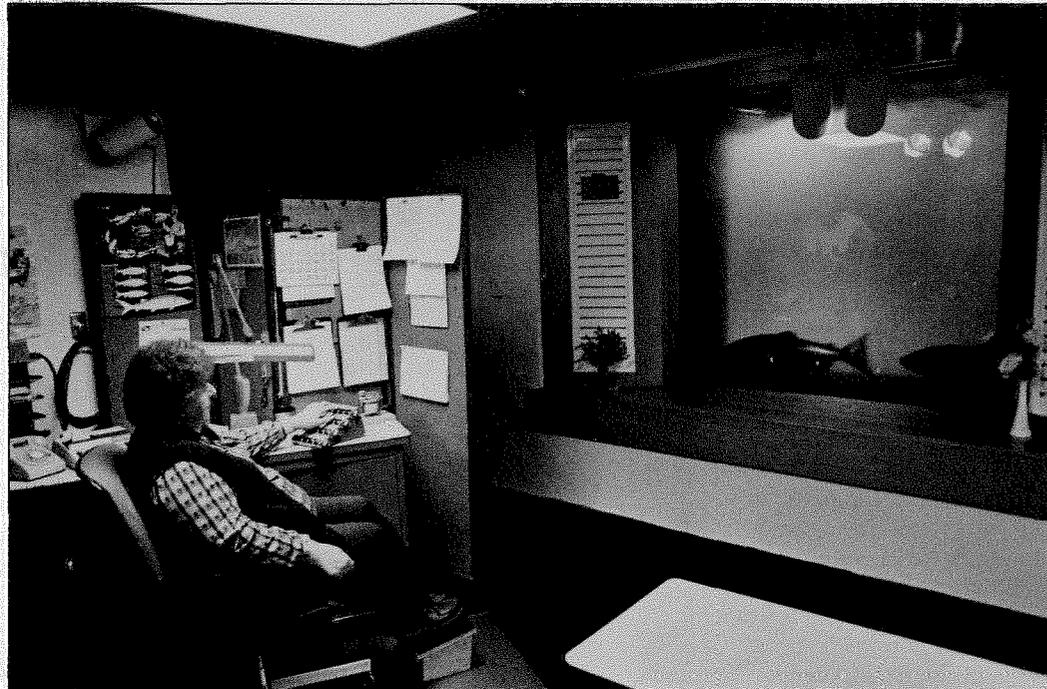
It's heartening news to some fisheries advocates who have argued with FERC that such a procedure was essential to determine the cumulative effects of siting more than one hydroelectric dam on any given stretch of a river.

The Northwest Power Planning Council also called on FERC to develop such procedures in its Columbia River Basin Fish and Wildlife Program.

The problem the CIAP will address occurs when two or more dams cause a string of damages to fish and wildlife in an area where one dam might have been less destructive.

If each dam is looked at in isolation from the others on

Theresa Titchenal of the Corps of Engineers counts adult fish passing through Bonneville Dam's second powerhouse. A tour of the dam and fish counting facilities was part of a media conference set up to tell the story of the water budget and the interagency cooperation it involves. The water budget is a unique project to help young fish reach the ocean safely (see story page 26). The conference was cosponsored by the Northwest Power Planning Council, Water Budget Center, Corps of Engineers, and Bonneville Power Administration.



that stream, the collective impacts of all the dams may not be accurately understood. Looking at all proposed and existing dams on a stream reach should provide a clearer picture of the implications of development.

"FERC's new strategy is a positive step," according to Ed Sheets, the Council's executive director. "There are many important issues that still need to be resolved. The Council is relying on the flexibility implied in FERC's procedure."

The first rivers to be treated to FERC's new assessment will include two from the Northwest, the Salmon River in Idaho and the Snohomish River in Washington, and one, the Owens River, in California. — CC

Screens, beds improved at Yakima Basin dam

Spring chinook and steelhead smolts trying to navigate past the Sunnyside Dam on the Yakima River will find the going easier this spring. Financed by the Bonneville Power Administration, fish bypass screens and changes in the river bed at the dam have considerably improved circumstances for the young fish.

The new screens were installed and operating in time to guide this year's migrants on their way down the river to the sea. They are the first of about 20 fish passage improvements in the Yakima Basin called for in the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program. The Bureau of Reclamation is conducting the engineering review and technical oversight.

The old screens at Sunnyside, set perpendicular to the fast flow of water at the dam,

tended to trap the young migrants rather than direct them back to the main river channel. To correct the problem, new state-of-the-art screens were set at a 45-degree angle to the flow of the river, and the dam's channel was widened and deepened to slow the water down.

Because of the large spawning habitat that still exists there, the Yakima Basin is important to the overall restoration of fish runs in the Columbia River Basin. Unfortunately, migrating fish trying to reach the habitat have to contend with severely reduced flows due to irrigation draws on the river, and inadequate fish passage facilities at most of the irrigation dams.

In the 1970s, returning spawners in the Yakima only numbered in the hundreds. Last year more than 2,000 adult returns were counted. A spawning survey last fall spotted more than twice as many salmon redds (gravel nests where eggs are laid, fertilized and hatched) than in the previous year. The increases are encouraging signs for the basin that once had more than 650,000 anadromous fish returning to it each year.

"The fishery agencies estimate that these projects will increase Yakima River fish runs tenfold," says Ed Sheets, executive director of the Council. "That's a good investment for ratepayers. It will restore salmon to one of the best habitats in the Columbia River Basin." — CC

Three committees aid in setting fish goals

Three new advisory committees have been formed to aid the Northwest Power Planning Council in its fish and

wildlife program goal setting process.

The Losses and Goals committee will address salmon and steelhead losses attributable to hydropower development and operations, and goals for remedying those losses.

The Production Planning Advisory Committee will work basinwide to determine the potential fish production levels that can be achieved.

The third committee, Resident Fish Substitutions, will help the Council with strategies for those areas where anadromous fish are locked out by the dams. In these cases resident fish that do not migrate to the sea can be substituted for the lost salmon and steelhead resource.

Each of the committees has eight members, representing fisheries agencies, the basin's Indian tribes, the Bonneville Power Administration, other utilities and interested members of the public.

The Council will also be setting up a fourth advisory committee to look at hydroelectric system operations.

All advisory committee meetings are open to the public. Agendas and minutes of meetings are available on request. — CC

June Energy Expo comes to Northwest

The latest electrical products and information will be the subject of a three-day conference featuring 90 speakers and 120 exhibits at the SeaTac Red Lion Inn, June 18-20.

Northwest Energy Expo 85 ("Progress through Partnerships" is its theme) is being sponsored by Puget Sound Power & Light, Seattle City Light, Tacoma Lighting Division and Snohomish County Public Utility District.

In addition, the Northwest Power Planning Council is one of 20 groups endorsing and participating in the Energy Expo. Others include a broad array of business, utility and city/county associations. Seminars and displays will explain the residential and commercial applications of model conservation standards, among other energy consuming and conservation methods, services and ideas.

The full three-day slate costs \$125, but special arrangements may be possible. Call Jim Croft (206-462-3810) or Jim Kennedy (206-462-3748). Tickets are available at the site. Exhibits are free. — SE

Sunnyside Dam in Yakima Basin





A NEW PLAN TAKES SHAPE

Public participation is key to its success

by Ruth Curtis

The Northwest Power Plan is a blueprint used to develop an adequate, efficient, economical and reliable supply of electricity. It affects not only the homeowner paying a monthly electric bill, but the economic health of the entire Northwest. The region's attractiveness to business and industry depends in large part on its supply of inexpensive electricity.

Because the Northwest is not static, but constantly changing, the plan is regularly examined and updated to maintain its relevance. This process is going on throughout 1985, two years after the first Northwest Power Plan was adopted. The Council is reviewing its assumptions and directions and rewriting the original plan to meet the region's changing conditions.

Work on the plan began with the Council analyzing the region's economic growth potential and developing a forecast of the expected demand for electricity. To meet this demand, renewable and nonrenewable resources, such as the Washington Public Power Supply System nuclear plants and coal plants, were examined to determine both their availability and cost effectiveness. Resources that are reliably available and cost effective are included in the plan's resource portfolio.

The Council is looking at the amount of conservation available in the North-

west and at programs, such as the model conservation standards, designed to capture that conservation potential. The plan treats conserved electricity as a resource in its own right, and in fact is required by Congress to give it first priority, as long as it is cost effective.

The Council also is looking at the way the electric system functions in the Northwest to see if it can be improved. What should be the roles of the different institutions in the region? Is critical water planning the best planning base to use? How useful are combustion turbines as supplements to the hydroelectric system?

Particularly important are such questions as these: What is the future of the unfinished nuclear plants? What is the most appropriate power system treatment of the Northwest's aluminum industry? How should out of region power sales and purchases be structured? What role will conservation play in the region's future?

Throughout this process, public involvement plays a key role. Because so many people are affected by the plan, their input is necessary to make it relevant. "A key element of the Council's success is that all of its analysis is reviewed by the public and all of its decisions are made in public. This process improves the information and leads to a better plan," according to Ed Sheets,

executive director of the Council.

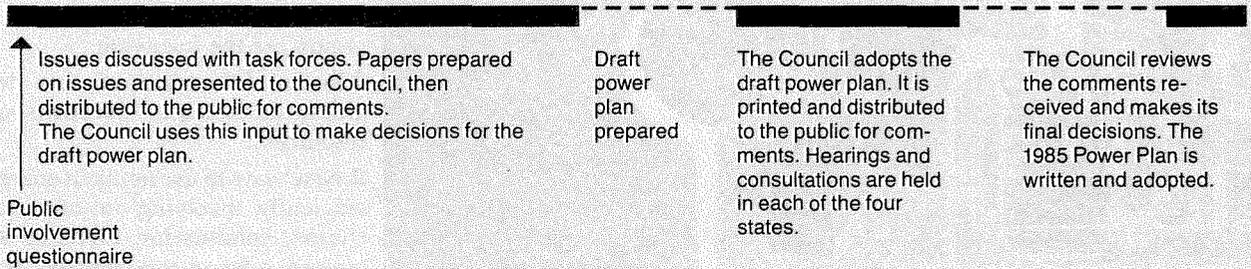
The public has been involved since work began on the new power plan. Starting last summer, advisory committees and task forces were formed to examine and advise the Council on specific issues. Since early winter, these and additional issues have been discussed in papers that have circulated widely in and out of the region. Comments have been solicited and used by the Council in making preliminary decisions on the issues.

Both these issue papers and advisory committee meetings are announced in the newsletter, *update!*, which is mailed to more than 10,000 people. This spring, an advertisement was run in ten regional newspapers soliciting names for both the *update!* and the draft plan mailing lists.

The draft plan will be published this summer, providing yet another opportunity for the public to comment on any or all of the issues. The comment period will close near the end of September following hearings on the draft held in each state earlier that month. Dates will be announced both in the media and Council publications. In the fall, the Council will review all the comments received, make its final decisions, and write the 1985 power plan, which will be adopted in December.

1985 POWER PLAN PROCESS

1984 1985
 NOV DEC JAN FEB MAR APRIL MAY JUNE JULY AUG SEPT OCT NOV DEC



NOTE:

Dates shown are only approximate at press time and will be refined. Call the Council's central office for exact dates. The Council meets every three weeks and allows opportunities for oral comment. See calendar on page 2 for meeting dates and locations.

Public information and involvement questionnaire

When work began on the new power plan last fall, this magazine published a public involvement questionnaire. The Council wanted to be sure that the people of the Northwest have access to information on the decisions being made and opportunities for involvement in those decisions.

"The people who responded to the questionnaire were very helpful in showing us where our program was succeeding and where there were problems," says Dulcy Mahar, director of public involvement for the Council. "We'd like to thank every one who took the time to fill it out and send it in."

While most of the respondents felt the Council's information system keeps them well informed, many were not aware of all the opportunities for public involvement.

The most common concern expressed was how hard it was to get to Council meetings. The meetings, held in all four states, are generally located in major metropolitan areas, with good travel connections, to save time and money. These cities are also often the state's media centers (several people thought the Council should improve its media coverage).

To help people who cannot attend meetings stay informed, a synopsis of each meeting is sent out with the agenda for the next meeting. *update!* was also introduced to publicize issue papers which deal with the items on meeting agendas and to provide information and deadlines for written comment. All written comment which meets the deadline is reviewed and is given the same weight as any other comment received.

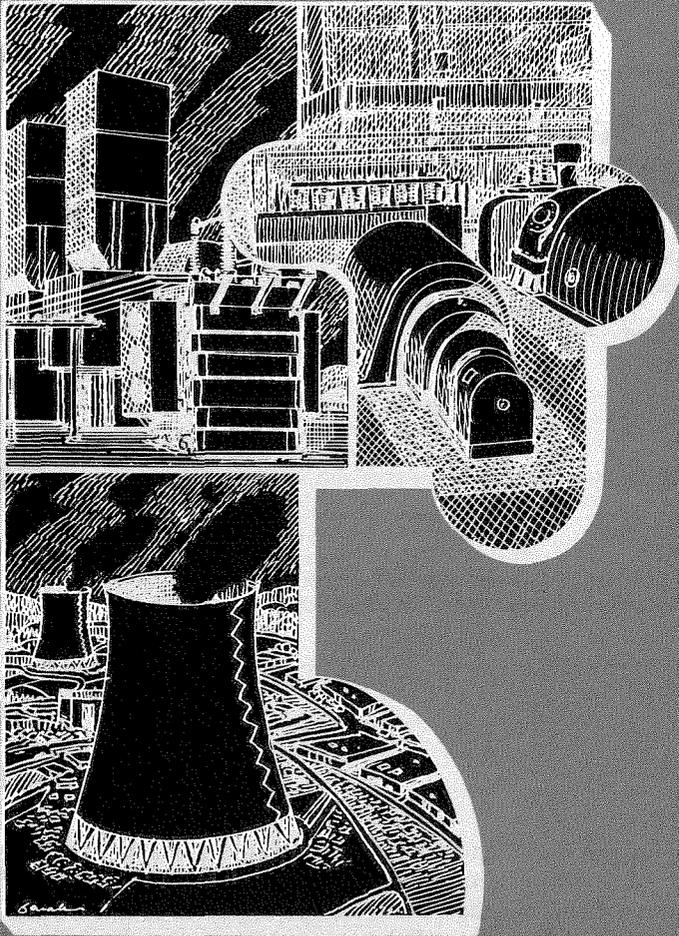
There were a variety of views on the Council's publications. Some people thought they were too technical, while others felt they were not technical

enough. The Council does provide different levels of publications. Articles in *Northwest Energy News* are intended to help the layperson understand the Council's work. Issue papers and staff reports go into more detail and so are necessarily more technical and may require some background knowledge.

A few people mentioned they didn't know whom to call for information or updates on various issues. Callers need only call one division, Public Information and Involvement, at the toll free numbers listed below. If this staff doesn't know the answer, it will find it, or route the caller to the appropriate person.

GET INVOLVED IN THE 1985 POWER PLAN

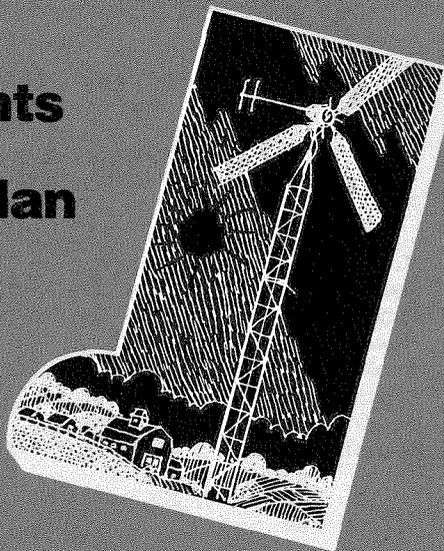
1. Use the order form on the back cover to order the Draft Power Plan (available this summer).
2. If you are not already receiving the newsletter, *update!*, use the same form to be added to its mailing list. The newsletter comes out every three weeks with the Council meeting agenda and describes available publications, meetings, and other opportunities for public involvement.
3. To get more information, call the Council's Public Information and Involvement Division at 1-800-222-3355 in Washington, Idaho, or Montana, 1-800-452-2324 in Oregon, or 503-222-5161. Or call your state Council office (see page 2).
4. Let the Council know what you think about the Draft Power Plan. Either send your comments to the central office (see page 2) or appear at a hearing in your state (schedules will be sent out in *update!*). ■



Rethinking Resources

New developments in the regional power plan

by Steve Engel



Three major developments confront the Northwest Power Planning Council in its efforts to shape a 20-year resource portfolio for the new regional power plan. Among the changes this plan will present to the region are the following:

- 1** Reduced forecasts of new demand, along with lesser amounts of new resources.
- 2** New ways to use nonfirm energy more efficiently, involving out-of-region purchases, combustion turbines and increased sales of interruptible power to the aluminum industry.
- 3** A breakout of resources and loads for the public and private utilities that shows a significant split between when the two groups will need new energy resources (see separate story).

Less power needed

In the working stage of the resource portfolio, the staff see less new hydro than during the 1983 plan, less new conservation—and a greater likelihood that Washington Public Power Supply System nuclear plants 1 and 3 will be needed in only the higher load growth scenarios. (Early results suggest a likelihood of postponing completion of these plants for a considerably longer time. They are being analyzed in comparison with other new resources in this portfolio, while in 1983 they were considered part of the resources either existing or under construction.)

A regional growth forecast significantly lower than that in the 1983 plan is a central reason for planning lesser amounts of new resources. The four demand scenarios have declined an average of 12 percent from the 1983 projections—primarily because the economic recovery anticipated in 1983 is beginning later for the Northwest.

Reduced projections of economic activity, and consequently of population, mean less load—and fewer opportunities for conservation than were shown in the 1983 portfolio. Preliminary staff work at the Council indicates that the conservation available for the 1985-2005 planning period is about 12 percent less than the 5,500 megawatts in the 1983 plan. Conservation numbers include energy savings expected from tighter new buildings, and from irrigation, commercial and industrial efficiencies. (The amount actually achievable runs lower, because of different levels of mar-

ket penetration and the varying effectiveness of programs.)

New information and policies also influence some of the proposed reductions. For example, new hydropower resources in the portfolio may amount to little more than a quarter of the 920 megawatts in the 1983 plan. According to Jeff King, Council resources analyst, this reduced amount includes all known potential developments consistent with the Council's fish and wildlife program and with other environmental considerations. It excludes previous sites that would produce peak output at times the rest of the hydrosystem could not efficiently accommodate the energy. Almost all of the new hydro proposed for this portfolio would be added to existing projects or would be installed on irrigation and flood control projects. Costs to the region would, of course, be lower than if the hydro generation required entirely new structures.

New nonfirm strategy

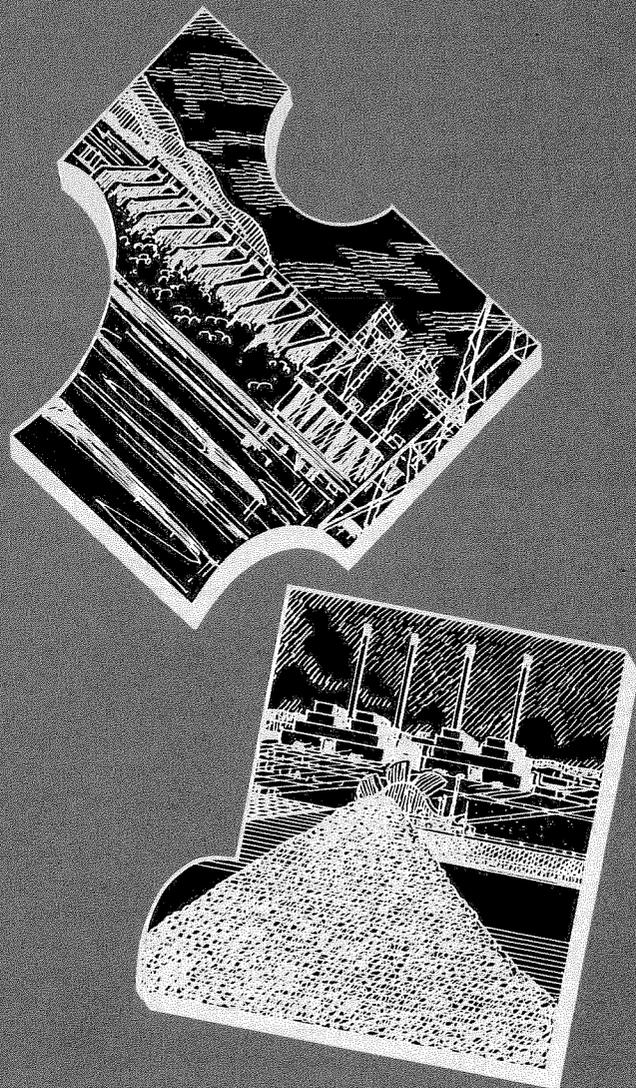
An important opportunity for developing less new generation is being explored in the preliminary resource portfolio. It involves a proposed new strategy for managing the region's nonfirm surplus energy — primarily by developing ways of making it more reliable, or firm, and by using it to serve more of the volatile aluminum company loads.

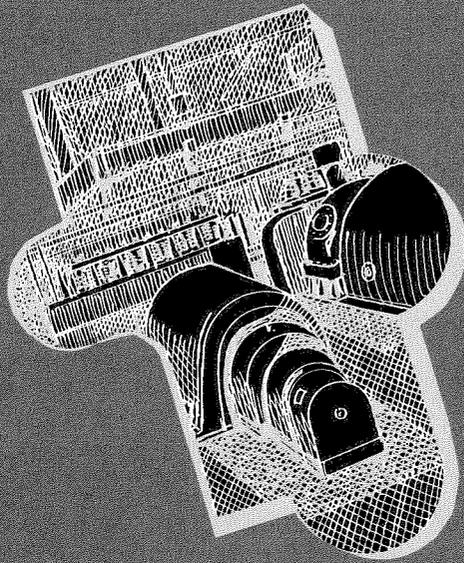
Nonfirm energy is the amount available in all but "critical water" (historic low) conditions. The amount varies with weather and snowpack. It is called nonfirm because it is not available every year. The regional power system is currently required to plan resources that will meet firm contracts even during low water years. In most years, available hydropower exceeds critical water by a considerable margin — on average by about 3,500 megawatts, enough power to supply the needs of 3.5 cities the size of Seattle for a year. When it's available, this excess or nonfirm energy is sold to regional and out-of-region customers.

Currently, the aluminum companies rely on nonfirm — or interruptible — energy for one fourth of their load (about 1,000 megawatts). This portion of their load is said to be "operated as if firm," however, because Bonneville is obliged to use all the flexibility of the hydro system to maintain service.

In recent years, rising electricity rates and falling world aluminum prices have pushed several of the region's aluminum smelters to the point of shutdown. The

New hydropower resources may amount to little more than a quarter of the amount in the 1983 plan.





The Council is also exploring the use of combustion turbines or out-of-region purchases to meet firm loads in higher forecasts.

future of this industry poses several important challenges for the region. First, the industry employs over 9,000 people directly and supports many more indirect jobs. Second, aluminum operations provide a significant part of the Bonneville Power Administration's revenue. If a portion of these smelters were to go out of business, other Bonneville customers would pay higher rates until the additional surplus power could be sold.

Third, the industry is extremely volatile. The long-term future is uncertain for many of this region's older, less efficient plants. In the short term, many of the Northwest plants "swing" with the price of aluminum — as the price falls, these plants are shut down temporarily. During the last five years, power use by

the aluminum smelters has fluctuated by approximately 1,000 megawatts, or 10 percent of Bonneville's load.

The problem facing power planners is how to deal with this volatile load, according to Council Executive Director Ed Sheets. "At some point, utilities may have to decide whether they will pay over a billion dollars to restart a nuclear plant or build a new coal plant to serve a load that may go out of business during the next 20 years," Sheets says, adding, "It's very hard to make a good business decision under those circumstances." Sheets points out, "Power sales contracts for the aluminum companies obligate Bonneville to serve their 3,000 megawatt firm load. That means the future of this industry is extremely important to

power planners. It also means there are benefits to reducing the uncertainty associated with this load."

A solution the Council has explored would help the aluminum smelters stay in business and would reduce the need for new firm resources in the future. It would involve voluntary arrangements to give the smelters rate discounts in return for increasing the interruptibility of their power supply. The Council's staff analyzed a case where an additional quarter of the aluminum company load became interruptible in return for a 9 mill (.9 cents) per kilowatt hour reduction on that 1,000 megawatts. This plan would mean a loss of revenue for Bonneville in the short term. In the long term, though, the region would be able to avoid building expensive new power plants.

"We found that this example would have a net benefit for the power system of more than \$1 billion," says Wally Gibson, Council manager for system analysis and rates.

"A key element of this proposal is developing mechanisms to protect the employees and local communities that serve the aluminum plants," says Kai Lee, a Washington Council member. "If a billion dollars in benefits are on the table we ought to be able to work out creative solutions to the problems."

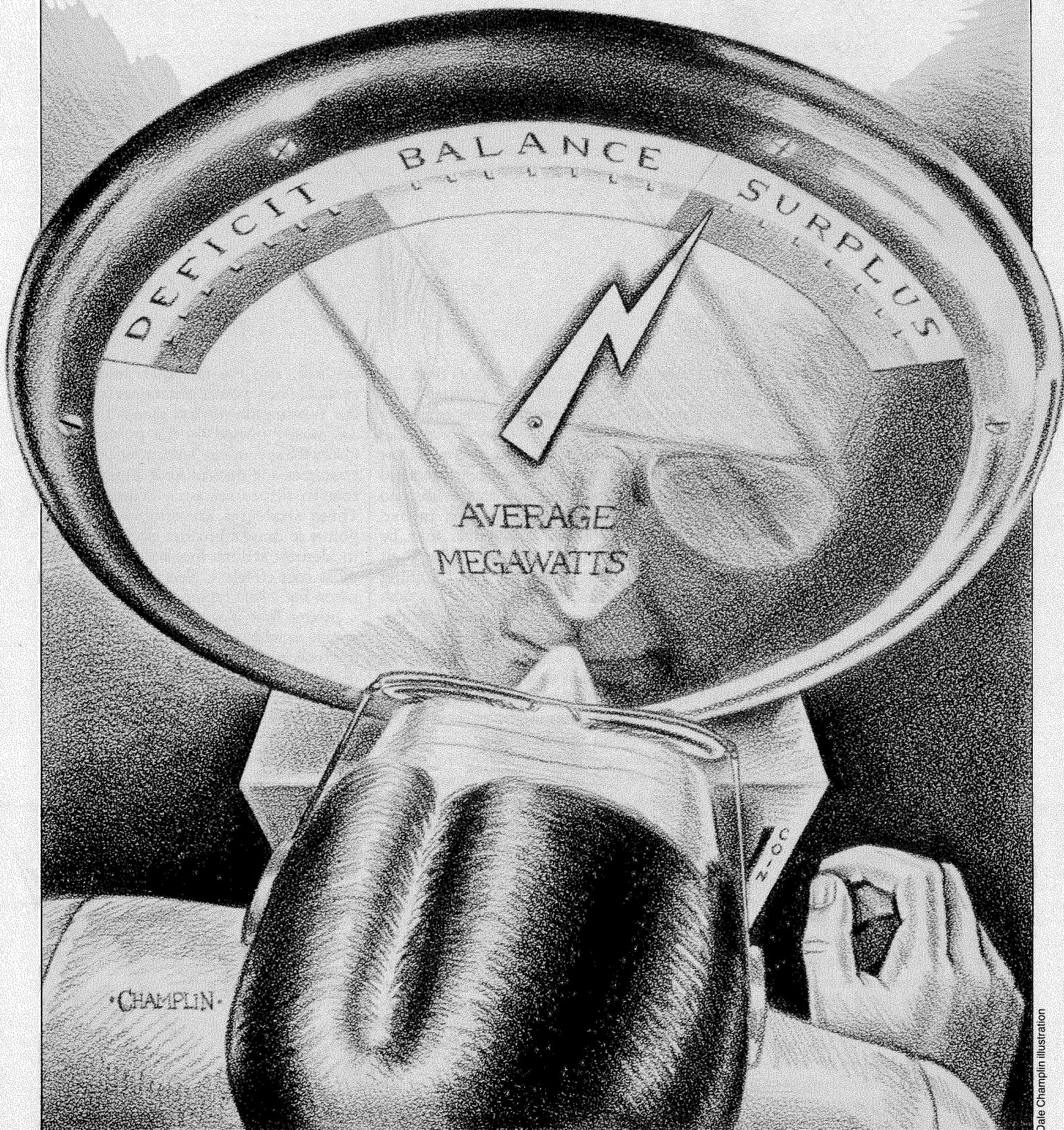
Another idea being explored by the Council is to use combustion turbines or out-of-region purchases to meet firm loads in higher load forecasts. Both Canada and California have resources that Bonneville could import for short periods. Combustion turbines (small generating units run on oil or natural gas) appear to be cost effective and reliable ways of firming up nonfirm energy. They are cheap to build and, though expensive to operate, would only be needed about 16 percent of the time, Council studies estimate. Staff is looking at the inclusion of as much as 2,000 megawatts of nonfirm energy, particularly in the higher load growth scenarios.

If the DSIs continue to operate at high levels in the 1990s, utilities might then decide to build a base load resource to replace the combustion turbines or purchases.

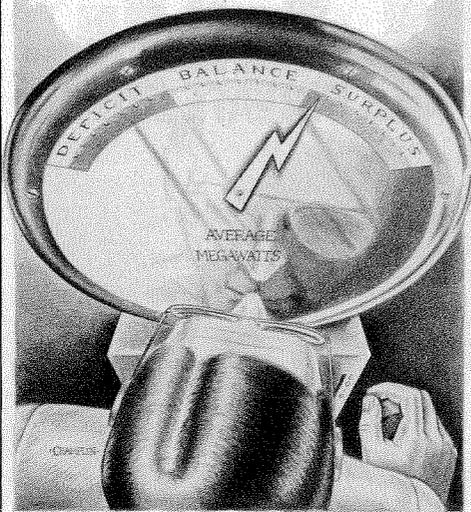
The preliminary draft resource portfolio is undergoing extensive analysis, to establish the selection and sequence of all resources that will provide the least expensive and most reliable energy. This portfolio will be published in the draft plan due out in late July. ■

WEIGHING NEEDS

BUILDING A PLAN TO WORK FOR BOTH PUBLIC AND PRIVATE POWER



WEIGHING NEEDS



When the Northwest Power Act envisioned power planning for the Pacific Northwest, the Bonneville Power Administration was seen as the lead developer and marketer of that power. The first power plan (adopted in 1983) anticipated a coalescing of utilities (both public and private) under the Bonneville umbrella. Bonneville was expected to acquire all new resources for the region, and the region as a whole would use existing resources efficiently to stretch them out over a longer period.

It was a logical assumption given Bonneville's ability to spread the risks of over- or under-building resources and its access to lower interest rates to finance new generating resources. In fact, the Act could compel Bonneville to meet the energy requirements of the entire region, including the public utilities (PUDs), the Direct Service Industries (DSIs — primarily aluminum smelters) and the investor-owned utilities (IOUs).

But only 44 percent of the total regional electric load is now being served by Bonneville. Only one private utility (Puget Sound Power and Light) has a contract for Bonneville to supply a small part of its power. The rest of Bonneville's market is made up of 117 public utilities and 15 Direct Service Industries.

A new complication has emerged — the Council's preliminary analysis points to the likelihood that Northwest public utilities will experience electricity

surpluses for a longer period than the private investor-owned utilities. The private utilities (which are currently only minimally served by Bonneville) may need new generating resources in as few as eight years, if energy demand grows at a fast pace. And Bonneville is no longer seen as the only port in bad weather. Utilities, like ships, may be pulling in elsewhere, or dredging their own harbors. The Council's planning staff has been trying to anticipate who will turn where, under what circumstances and approximately when.

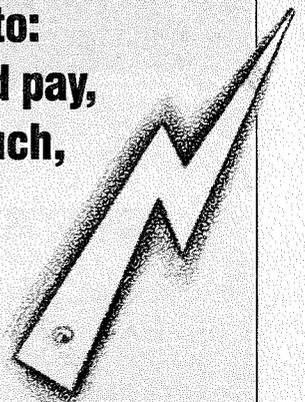
One thing is certain: if the Council's new power plan is to effectively accommodate the future electric needs of the region, the remaining 56 percent of the electric load should be participating in the planning process. According to Jim Litchfield, director of the power planning division at the Council, the institutions that are particularly important in establishing the region's energy policies are: (1) *all* utilities, including Bonneville, public and private utilities; (2) the state public utility commissions which regulate the private utilities; (3) state and local governments which represent consumers and are often called on to legislate aspects of power planning (as in the model conservation standards which must be adopted by bodies other than the Council); (4) state energy offices; and (5) direct service industries.

Given the apparent imbalance of resources between the private and public

utilities, and the fact that potentially available new power generators (such as the Washington nuclear plants 1 and 3) are mostly owned by the public, the Council has come up with three possible strategies for determining Bonneville's role in future resource acquisitions. These strategies are simply starting points to draw a broader circle together to identify actions that will ensure the most cost-effective electricity is there when the *whole* region needs it.

In the first planning strategy Bonneville would continue to be treated as the resource developer and provider for the entire region. The concern with this strategy stems from Bonneville's need to spread its expenses out over all its purchasers. If new resources are developed now, specifically to serve the private

**The big questions
boil down to:
who should pay,
for how much,
and when?**



by Carlotta Collette

By raising the issues, the Council hopes to bring the best minds in the region to work together.

utilities in their future need, public utilities and DSIs could pay disproportionately for power they may not need for quite some time.

The second alternative calls for Bonneville to be the primary supplier and developer for only the public utilities and the DSIs, recognizing the situation that pretty much exists now, but assuming only limited future Bonneville requirements from the privates. The private utilities remain essentially on their own. They would develop their own resources when they need them. They could still buy power from Bonneville when it's available, but new generating potential would be the responsibility of the investor-owned utilities themselves. Bonneville would serve the public utilities and the DSIs. The major drawback in this strategy is the loss of regionwide risk sharing and cooperation as seen in the Northwest Power Act.

The third possible process would have Bonneville continue to be responsible for acquiring *major* new resources, while the IOUs purchase their own conservation and develop smaller generating projects to extend their surplus as far as possible. When the IOUs need significant new power, they would turn to Bonneville (with seven years prior notice according to current power sales contracts). The public utilities are spared the expense of developing electricity they don't need, and the private utilities have Bonneville, as the regional entity, there to cushion

risks and lessen interest rates for developing major new thermal power.

The big questions boil down to: who should pay, for how much, and when? They are difficult to answer because the rates process and resource allocations in the Northwest are extremely complex. Take, for example, the case of conservation. If an IOU turns to Bonneville for more power, Bonneville may choose to secure that power from the public utilities in the form of conservation, because it is the least expensive resource. Given the size and possible duration of the public utilities' surplus, how much conservation should they be called on to provide? How can conservation, as the most cost-effective resource, be acquired from the publics and sold to the privates which need it? The publics will be paying for conservation that the privates need, and because of rate pools contained in the Act, the publics may be unable to charge the privates the full cost of acquiring those resources.

"By identifying and raising these issues, the Council hopes to bring the best minds in the region to work toward developing mechanisms that will enable the private utilities to purchase conservation resources from the public utilities instead of turning to more expensive generating resources," Ed Sheets, the Council's executive director explained.

Right now there appear to be substan-

tial impediments to an easy transfer of conservation resources. This could result in a situation where the region is building expensive coal plants to meet private utility demand, while inexpensive conservation opportunities — weatherizing buildings in public utility service areas — go untapped. "In essence, half of the region would have developed its own conservation and would be paying substantial sums for new generating resources, while the other half would be holding undeveloped, low cost conservation resources for want of the demand to justify their development. Certainly this is precisely the type of outcome the Northwest Power Act was enacted to avoid," Sheets said.

The apparent lack of mechanisms to transfer resources from public utilities to privates also affects the fates of two mothballed nuclear plants owned by the Washington Public Power Supply System.

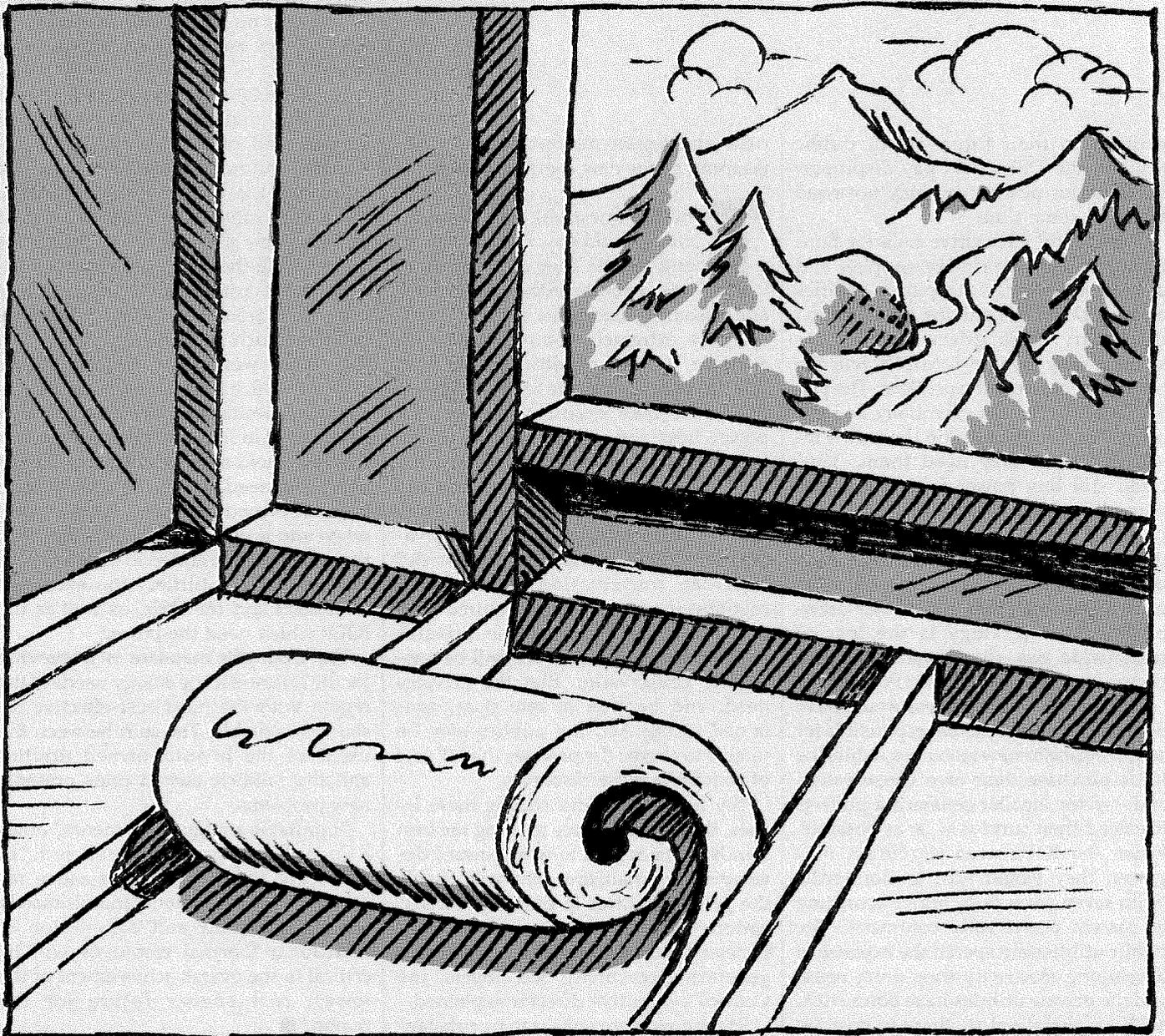
If the private utilities place loads on Bonneville that use up the Bonneville surplus and other less expensive resources, and new thermal resources are called for, the nuclear plants could be more cost effective to complete than building new coal plants. But the tab for maintaining them in a state from which they can be cost-effectively restored and completed would be picked up by the utilities which own them.

In other words, the region's public utilities, which have a long-term surplus of power, would foot the bill (between \$24 and \$72 million each year for the two plants) to hold onto assets that will most likely be needed first by the private investor-owned utilities. Furthermore, when and if those plants are completed, their costs will be added to the rates paid by the public utilities, the exchange customers and the DSIs, as well as the IOUs which need the power.

The Council's mandate is to provide for the future electric energy needs of the region with the most cost-effective resources available. The split between the needs of the investor-owned utilities and the publicly-owned ones presents new problems.

"Equitable energy investments," notes a Council issue paper on the subject, "in capability building, new resource research and development, and ultimately the development and completion of additional thermal resources will be critical to the overall achievement of the lowest cost energy future for the region." ■

CONSERVATION:



it still makes sense

by Dulcy Mahar

It's been called the "new Grand Coulee" and "stretching the river." The heroic imagery refers not just to energy conservation . . . but to a new way of looking at energy

conservation. Under the Northwest's unique planning system, conservation is considered the equivalent of a generating resource rather than a reduction in energy demand.

In 1973, the world oil crisis spawned a new nationwide spirit — the conservation ethic. Less than four years later, when low snowpacks threatened to produce industrial "brownouts" and the Bonneville Power Administration issued "notices of (energy supply) insufficiency" to its customers, that energy conservation ethic was brought home dramatically to the Northwest.

Today, energy conservation is still a hot topic. But today it's controversial because the Northwest has an energy surplus which could last for up to a decade or more. Now there are those who are beginning to question the need for any conservation during what could be a long-term surplus.

The Northwest Power Planning Council is not among the doubters. As was the case in its 1983 plan, the Council's new 1985 plan will use conservation as its premier new resource. For one thing, Congress, through the Northwest Power Act, mandated "an energy conservation program to be implemented under this Act, including, but not limited to, model conservation standards." To underscore its importance, Congress gave conservation a 10 percent price advantage. This

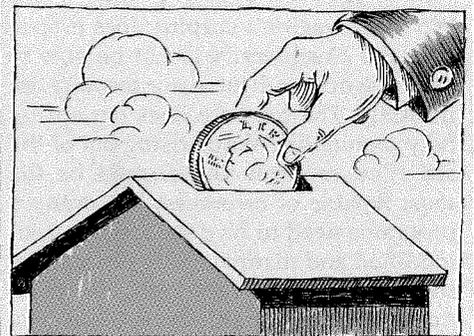
emphasis on conservation is not to say that the Council doesn't carefully question and analyze how much conservation and what type should be developed.

There were a number of reasons the Congress put such heavy emphasis on conservation and a number of reasons why the Council considers that emphasis so vital — even during a time of surplus.

Conservation is the ideal resource for reducing planning uncertainty.

Saving an opportunity

First, and probably most relevant to the current debate, a surplus is by its very definition temporary. The current surplus may be around five, ten, fifteen . . . or more years. But it's not likely to last 40, 50, or 60 years. Houses built today, however, will last that long — some as many as 100 or more years. And those houses, built to today's codes and practices, will continue to swallow up elec-



tricity at an inefficient rate long after the surplus is history.

Not only is retrofitting buildings with energy efficient features more expensive than building them efficiently in the first place, it will not produce comparable energy savings. In some cases, retrofitting isn't even feasible. For this reason, the Council put its emphasis on model conservation standards for new buildings.

The potential for losing an opportunity exists in other sectors as well. For example, industry decisions made today on whether or not to build cogenerators* will affect the availability of that useful resource in the near future. Major capital investments in inefficient industrial and irrigation equipment may not seem to be much of a problem now, but such new purchases as old equipment wears out will prolong the use of energy-draining techniques in future years when the energy may be needed.

*Cogenerators produce electricity as a by-product or concurrently with other processes.

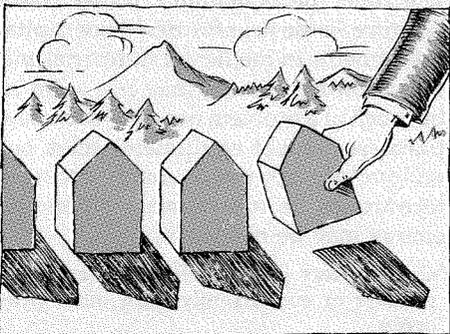
When the region's surplus does evaporate, the Northwest will not be able to flip a switch and turn on any resource instantly.



Building the capability

When the region's surplus does evaporate, the Northwest will not be able to flip a switch and turn any resource on instantly. The resource does not spring fully mature like Venus rising out of the sea. Conservation may indeed be the most flexible of resources, but even its programs need to be developed, tested, modified and maintained to ensure that they are available and reliable when needed. The capability to conserve energy must be built over time.

The general aim of the Council's program is to build the capability of the region's conservation system to ensure that as the current power surplus diminishes, Bonneville, utilities, state and local governments, and the private sector will be able to acquire cost-effective conservation at a pace geared to meeting long-run conservation targets. In addition to bolstering the region's conservation systems, the programs are designed to promote efficiency, diversity, competition, and equitable distribution among the various sectors in providing conservation services.

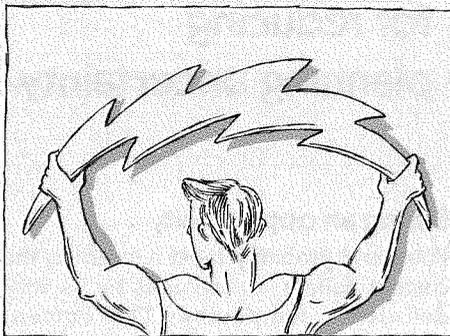


Reducing the risk of uncertainty

Conservation is the ideal resource for reducing planning uncertainty. It can be acquired in small increments, each of which begins generating (saving) energy immediately. Because there isn't a lengthy period of siting, licensing, design and construction for conservation, it can be modified quickly and easily to respond to changing conditions. The energy "generated" can be concurrent with or closely following the capital investment. This allows a close match of resources with needs.

On the other hand, major electric generating plants with long construction periods require critical decisions many years before the power might be needed. A coal plant for example can take ten years to complete, while a new nuclear plant might take more than 16 years. Long lead times increase the risk posed by the uncertainties inherent in energy planning.

Regional planners don't know what will happen in ten years. If the Northwest were to need a new coal plant in 1995, it would have to commit to the resource now. With conservation, the region can develop it in increments — such as through a series of programs. By 1995, these programs could equal the output of the coal plant.

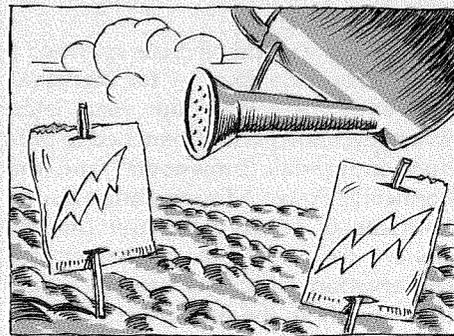


The most flexible resource

Conservation is the most flexible resource because, once a program is designed, it can be scaled up or down. Conservation programs can be initiated quickly, and the rate of implementation

can be adjusted over time to fit actual needs.

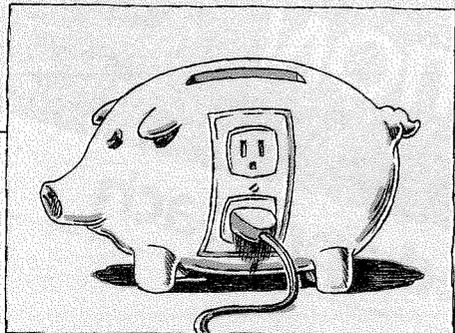
The Bonneville Power Administration's residential weatherization program is an example. The program has been tested and proven. In response to the current surplus, the program is being held at current levels of activity. If the region were expecting more rapid energy demand growth, the program could be expanded by increasing marketing efforts and paying larger incentives. At current levels, the program can be preserved and maintained so that when higher load growth returns, the region can quickly increase the rate at which weatherization savings can be acquired.



Growing with need

One of the beauties of conservation is that, unlike any other resource, the more it is needed, the more of it is available. If the region experiences high population and economic growth, more electricity will be needed. But, because more homes will be built, the potential to conserve electricity will increase proportionately. The actual rate of conservation development from now to 2005 (the Council uses a 20-year planning period) will depend, in large part, on the level of population and economic activity that occurs. Thus, the Council's resource portfolio for its high growth forecast contains significantly more conservation than that required under its low growth forecast.

If the Northwest has a "spirit" or "ethic" that is uniquely ours, it's a concern for the environment.



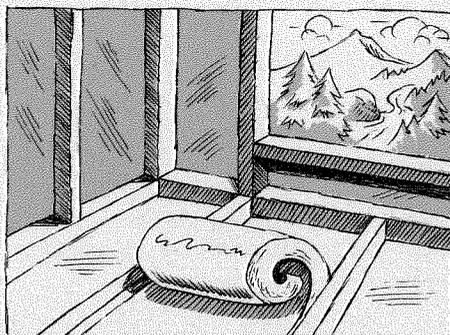
Saving the region money

A resource is inexpensive only in comparison to other resources. The Council considers a resource cost effective if it produces power at an "incremental system cost" less than another resource. This means that conservation, per se, is not used in the Council's planning resource portfolio, but only that portion of conservation that is cost effective relative to other resources — and meets the tests of availability and reliability that other resources must meet.

In the first plan, a 4 cents per kilowatt hour limit was selected for conservation. No measure which cost more than that was included. The limit represents a level of conservation investment that, in the Council's analysis, is cheaper than any thermal power plant that might have been needed in the 20-year planning period. The same principle — using only conservation that is cheaper than the cost of new thermal (i.e. coal) — will be applied in the new plan. The actual cost figure will be adjusted in the 1985 plan due to inflation, but the cost relationship to other resources will remain the same.

In determining costs in its original plan, the Council chose to measure costs from the perspective of the ratepayer as a whole. For example, conservation costs are measured as the total cost of installing a measure, regardless of who pays what portion of the cost of the measure — the ratepayer directly or the ratepayer acting through the utility. The Council opted for a policy of determining cost effectiveness on the basis of "life cycle" costs and benefits. Under this policy, the region would acquire those resources which over their entire life provide lower incremental system-costs than the operation of the current system plus new resources. This policy reduces the region's revenue requirements.

As for the effects on ratepayers, the Council isn't claiming that widescale implementation of conservation measures will keep electrical rates from rising. But the acquisition of new resources in order of cost effectiveness (that is, developing the lowest cost resource — conservation — first) should keep any rate increases significantly smaller than they would have been otherwise.

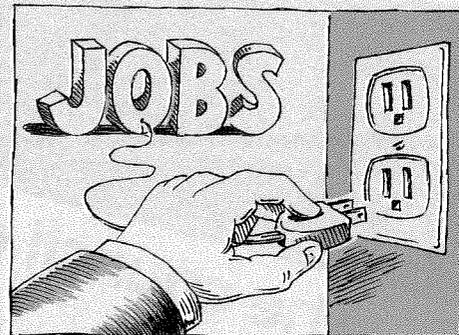


Considering the environment

If the Northwest has a "spirit" or "ethic" that is uniquely this region's, it is manifested in a concern for the environment. The environmental benefits of conservation are substantial. First, reducing the need for new electricity can help the region avoid or keep to a minimum the construction of conventional energy resources with their accompanying environmental impacts.

Since conservation "generates" electricity without fuel or transmission lines, it eliminates most of the air or water pollution, noise, solid waste, or land use impact associated with other resources. The production of conservation devices (insulation, storm windows, etc.) may include some environmental impact, but the impact relative to the amount of electricity "produced" is vastly more benign than the impact on the environment of a coal plant producing the equivalent amount of energy.

Environmentally, conservation compares favorably to hydro resources as well as thermal resources. Conservation is not likely to harm fish and wildlife.



Supporting the economy

The economic effects of widespread energy conservation could have an enormous ripple effect. Certainly, cheap electricity is what drew several industries to the Northwest in the first place, and anything that gives the region a competitive edge in electrical costs will not only help retain industry already here but will continue to attract more development.

There is also evidence that conservation itself is a job-intensive industry. In 1984, the Washington firm of H. Glen Sims and Associates released a study commissioned by the Northwest Conservation Act Coalition which indicated adoption of the Council's model conservation standards would create nearly 19,000 Northwest jobs and generate \$137 million in business income annually. The report compared the benefits of saving energy by constructing new energy efficient buildings with the benefits of producing that energy from new coal plants. Over the lifetime of houses built in the ten-year period covered by the study (1992-2002), the region could increase its employment by more than 180,000 job years.

There is also the economically-related fact that the Northwest's environment is a selling point to businesses and individuals moving into the state and to tourists visiting it. It may be hard to measure the effect. But anyone who has ever been asked the question "Where are you from," knows it is a factor if they have ever gotten the response: "Oh yes, you're from God's country." ■

MODEL CONSERVATION STANDARDS

The council considers a phased approach

A decision on how — and whether — to revise the schedule for regionwide adoption of the Council's residential model conservation standards (MCS) was set for the June 5-6 meeting of the Northwest Power Planning Council, in Portland, Oregon.

As this article went to press, the Council was contemplating two courses of action: to enter rulemaking that would amend the residential MCS portion of the Regional Energy Plan by July; or to include the issue in the overall plan revision process that begins in July when the Draft Plan is issued and concludes with adoption of the new plan this December.

Motivating an early rulemaking process, according to Council Executive Director Ed Sheets, is "the need to give utilities and local governments as much notice as possible of what they have to do in the coming year."

The staff proposal to phase in the MCS calls for utilities to announce by January 1986 their plans to meet a January 1987 Phase One deadline.

The Council staff proposed this phased scheduling in a March 1985 issue paper reviewing the standards for the new plan. Phase One would include all elements of the present standards except for walls with insulation levels higher than R-19 (R-levels indicate insulating effectiveness) and the air infiltration package (a continuous air/vapor barrier and air-to-air heat exchangers). Phase Two would require these measures in building codes or alternative packages by January 1989.

The current Northwest Power Plan, developed by the Council in 1983, calls for adoption of the entire MCS package in all Northwest jurisdictions by January 1986. Utilities in jurisdictions which do not attain the standards — either through building codes, incentives, marketing programs, or a combination of all three — could be subject to a 10 percent surcharge on electricity they purchase from the Bonneville Power Administration.

The reason for the surcharge is to recover additional costs incurred because the electric energy savings attributable to the MCS have not been achieved. Among these costs would be the purchase of new generating resources.

According to studies by Council staff, phasing in the standards would cost the region \$23 million in energy savings. But according to Ed Sheets, "the additional time provided by new deadlines will give more builders the chance to learn how to install the measures cost effectively. We also expect the market to mature during that period, improving the quality, cost and availability of energy-saving products."

Early cost data from a regionwide builder training effort, which was not designed to be a cost test, showed that 85 to 100 percent of the participants could achieve cost-effective installation of almost all building components necessary to meet the standards. (Cost effectiveness means at or below the Council's cut-off point — 5.5 cents per kilowatt hour.) The exceptions to this success rate occurred for some builders of R-25 and R-31 walls and with the infiltration package. Even on the first attempts, between 50 and 80 percent of the builders were able to stay below the cost effectiveness levels on these items.

by Steve Engel

Data from this Residential Standards Demonstration Program "can't be considered fully representative of all builders in the region," Sheets said. "These are trainees learning new techniques, and their first results no more show what they can do than the first-day products of a typing class predict the ultimate skill levels." Sheets added that the numbers are based on a sample of only 110 homes, and that not all the information has been reported yet. Nonetheless, he said, the trends are reinforced "by written comment and anecdotal information from early adopters of the standards."

Public comment on the phasing proposal has lasted six weeks, bringing a range of views and information. At the Council's meeting in Seattle, April 24-25, several commenters urged the Council to accept the newly passed Washington State building code as a sufficient response to Phase One of the model conservation standards. The new Washington code calls for double- rather than triple-glazed windows, and sets lower R-values for doors and floors. "This code achieves approximately 80 percent of the Phase One energy savings," Sheets observed.

Several commenters expressed the belief that the Washington code would meet the Phase One standards if it is accompanied by extensive market penetration of the Super Good Cents homebuilding program, and perhaps by utility-sponsored incentives to build to Phase Two standards.

The proposed Phase One of the residential model conservation standards still calls for extensive insulation (shown being unloaded below) and other heat loss prevention measures. Phase Two, beginning two years later, would require air/vapor barriers, such as those being installed in bottom photo, and air-to-air heat exchangers. The delay would enable more builders to acquire specialized installation skills and would give time to develop a good supply of proven products.



Mayor Doug Sutherland of Tacoma, the region's first early adopter of the standards, argued that the phased approach was too extreme a reaction to "a temporary inefficient adjustment period" that would occur anytime a market attempts new practices. He urged that the Council "maintain the momentum it has started." However, acknowledging "the likelihood that you will delay part of the standards," Mayor Sutherland said he hoped the Council and Bonneville would "use the year to work with manufacturers to assure that tested products are available." ■



PACKAGING POWER

OUT-OF-REGION SALES



by Steve Engel

In recent years, the Northwest utility industry has fastened large hopes to the plan of selling its surplus electricity in hungry Southwest markets. Those revenues could help pay for resources, soothe ratepayers, and — for those who care about such things — raise profits.

Although out-of-region sales brought more than

\$700 million to the Bonneville Power Administration and other Northwest generating companies during 1984, potential sales could far exceed that amount. One obstacle to shipping more power south has been the limited capacity of the transmission lines — the Northwest-Southwest Intertie. This bottleneck also pushed prices down, because competitors could only guarantee themselves access by underbidding each other for buyers.

In 1984, a series of negotiations with California interests produced a memorandum of understanding to finance and construct a third interregional AC transmission line. This 1,600 megawatt, \$450 million project would expand intertie capacity by a third.

Meanwhile, from September through December 1984, Bonneville's new Near-term Intertie Access Policy brought \$98 million more from California utilities than during the same period a year before. The policy provided higher price levels, along with more equitable allocation formulas for the tieline. In addition, the policy freed up transmission capacity by bumping cheap British Columbia hydropower to the back of the priority list.

In another move to increase sales opportunities, a number of Northwest utilities joined with Bonneville to pursue an Agency (or System) Sale — an agreement to pool their surplus energy for the purpose of fashioning long-term contracts. Such contracts command a

higher price because they're more reliable than interruptible or short-term agreements, they permit the buyer to defer new resource investments, and they extend into the years ahead when power will cost more.

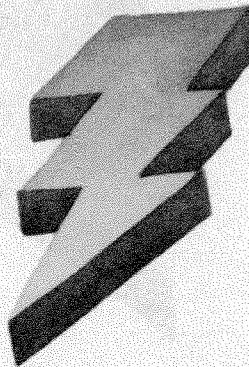
But few other areas of endeavor, even in the uncertain world of electrical marketing, are subject to such rapid whiplash as out-of-region power sales. The region's sellers may soon be forced to reassess their ideas about how to sell more power to the sunny Southwest. Among the cherished assumptions suffering confrontation these days are that the demand in the Southwest is enormous, that acquiring more transmission capacity would clearly benefit both regions, and that long-term contracts would be a major factor in nailing down more markets.

Almost before the ink had dried on November's third AC intertie memorandum of understanding, reports from the California Energy Commission, the California Public Utility Commission and several utilities expressed severe doubts about the economic benefits of investing \$350 million in the project (the California share). These groups argue that the potential market is much smaller than projected, demand is growing sluggishly, and the price of fossil fuel has dropped to the point where it can generate electricity for 3.3 cents per kilowatt hour.

"Basically, the Californians are engaging in a little pre-negotiation posturing," asserts Rod Boucher, Pacific Power and Light's vice president for power resources. Boucher calls it "playing Electric Chicken. We see who swerves first. They really need the power now and they'll need it even more in the future. But they'd like to get a lower rate from the Northwest."

Boucher acknowledges that the entire Southwest is overbuilt with thermal resources, and most of the new plants are low-operating-cost nuclear facilities. But

he also points out that California utilities saved an estimated \$2.5 billion last year by using imports to displace their thermal resources. He believes they aren't likely to turn down an energy faucet that would pay for itself so quickly.



**"Last year was
the first time we
got a fair price
for our power."**

—Merrill Schultz

Of course, the savings won't be as large because Northwest power isn't as cheap as it used to be. Northwest sellers, at least, are pleased about that. "Last year was the first time we got a fair price for our power," says Merrill Schultz, executive director of the Intercompany Pool, an association of private utilities. In a phrase repeated by several of the region's exporters, Schultz says Bonneville's new Near-term Intertie Access Policy "is working well."

But on yet another front, "The steam has gone out of long-term sales," says Schultz. Plenty of electricity heads down the transmission lines every day—it was 94 percent full last year, resulting in the sale of some 35 million megawatt hours out-of-region. But almost all the sales are made in day-to-day and week-to-week transactions. Out-of-region utilities apparently see no reason to sign long-term contracts during the Northwest's enduring surplus—not when they can buy the power reliably on the spot market, at less cost, and with less risk of being locked into an expense that may not always be justified. "They don't see any reason to feel anxious about the price or the supply," says Bob Lamb, assistant director of Bonneville's division of power resources planning.

Spokesmen at Portland General Electric and Pacific Power & Light put a brave face on the situation—they claim the always-slow discussions are proceeding satisfactorily. "These negotiations are like breeding elephants," says Dick Dyer of Portland General Electric—referring to the long gestation period, and perhaps also to the massive, unpredictable partners. But Lamb sums it up by saying, "The parties express interest. They hold discussions. They do a bunch of analysis. But it just isn't happening."

The Northwest Power Planning Council takes a particular interest in the regionwide effects of any long-term transac-

tions, and of a long-term access policy Bonneville is scheduled to adopt in mid-1986. According to Council Chairman Chuck Collins, "If the region sells off inexpensive resources, it could find itself building expensive ones to serve utilities that run out of power." In November, the Council issued a statement expressing its belief that "intertie access is of great importance to accomplishing the goals established by the Northwest Power Act, including provision of cost-effective resources and protection against environmental damage." A policy that results in a lot of costly new building to support out-of-region sales "would not appear to be consistent with the Council's plan," Collins says.

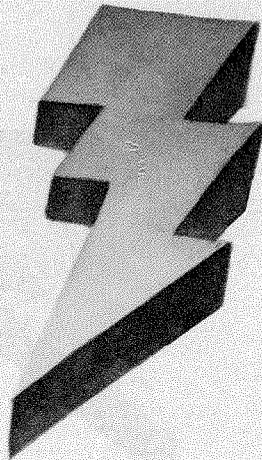
At the time this article went to press, the Council was considering public comment on a staff proposal to give priority long-term access on the intertie to sales which benefit and protect the region. Seasonal exchanges of energy would receive some priority (Southwest loads peak in the summer, with air-conditioner use; Northwest loads peak with winter heating). If one utility's long-term sale deprives another utility of intertie access, the proposal also suggests that the one which gains compensate the one which loses.

The proposal favors transactions that include callback provisions. Bonneville's out-of-region capacity exchanges are already subject to a five-year callback, and the agency's energy agreements carry a 60-day option. Federal law requires these limits to protect the preferential right of Northwest public utilities to Bonneville power. Callback conditions only apply to private utility sales if Bonneville resources back up the deal. PGE's Dick Dyer argues that callback constraints cause difficulty in making deals and getting the best price.

Competition in the American market is sacred — and obligatory. But some power brokers contend that the Californians see before them such a wealth of

"These negotiations are like breeding elephants."

—Dick Dyer



Northwest sources, and so many eagerly competing prices, that, in the words of one negotiator, "They must think they're in heaven." "Everyone believes they can make a better deal on their own," says Mike McCoy, chief of Bonneville's generation planning branch. McCoy believes that all sellers would remove constraints and maximize their gains with power pooling agreements, "using real cooperation and coordination."

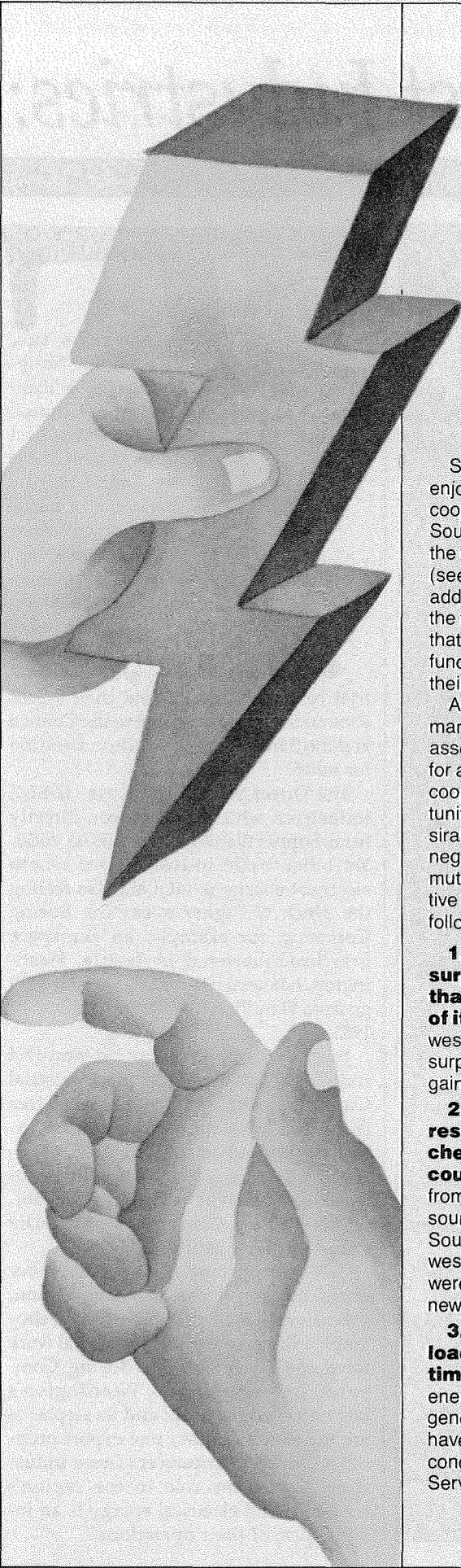
This kind of organized sale exists in other regions, but it can be a delicate thing — for, as Merrill Schultz says, "Sure there are tremendous advantages to it. There's only one disadvantage. You could spend the rest of your life in the slammer for accommodation in restraint of trade." It's called the Sherman Antitrust Act.

This convincing obstacle to collaboration among sellers has "pretty much truncated the actions available to us," says Maureen Flynn, Bonneville's manager for access policy. Sellers can offer a product and a price to their broker — Bonneville — but they can only go so far in talking things over with each other. This kind of strait jacket "makes it difficult for us to put together any kind of package that individual utilities can't provide on their own," says Bob Lamb.

The latest extra-regional marketing devices contemplated for Bonneville's arsenal include a share-the-savings arrangement and a firm power displacement rate. Both packages have been proposed for the 1985 rate case. Share-the-savings would give Bonneville half the money an out-of-region buyer saves by not using more expensive resources. The firm displacement concept would permit Northwest utilities to serve their in-region customers with Bonneville power, while selling their own, more expensive thermal energy out-of-region.

Both measures will increase the Southwest's cost to buy Northwest power. Firm displacement rates, at 3.1 cents, will also raise the costs for in-region utilities that want to use a reliable federal surplus to help them sell their own.

Rod Boucher notes this upward trend in prices with approval (though he questions how many utilities will participate in the high firm displacement structure). Boucher says, "It's only good management to put the price closer to the value. The region is finally starting to get what the electricity is worth." ■



TRADING POWER

INTERREGIONAL COOPERATION

Since 1968, the Northwest has enjoyed the benefits of interregional cooperation with Canada and the Southwest, in energy planning and in the operation of connected systems (see examples below). But a variety of additional opportunities may exist for the three regions to cooperate in ways that would save all of them considerable funds and reduce uncertainty about their energy future.

According to Tom Foley, Council manager for conservation and resource assessment, "The prime requirements for achieving benefits from interregional cooperation are to identify the opportunities, including availability and desirability of added transmission, and to negotiate agreements that produce mutual benefits." Among the cooperative structures he points out are the following:

1. One region can buy another's surplus resources more cheaply than developing new resources of its own. For example, the Northwest has been selling much of its surplus electricity to California, to the gain of both regions.

2. One region can build new resources and sell them more cheaply than another region could build on its own. Hydropower from British Columbia and thermal resources from Alberta might serve the Southwest and a post-surplus Northwest more cheaply than if these regions were to construct their own new thermal plants.

3. Two regions have system loads that peak at different times. Exchanges of capacity and/or energy allow both regions to build fewer generating resources than they would have otherwise required. A recent study conducted jointly by Arizona Public Service Company and the Intercom-

pany Pool estimates such exchanges between the Northwest and Southwest could achieve cumulative fuel savings and capital deferrals of between \$130 and \$860 million from 1995 through 2004.

Among other possibilities cited in a recent Council issue paper:

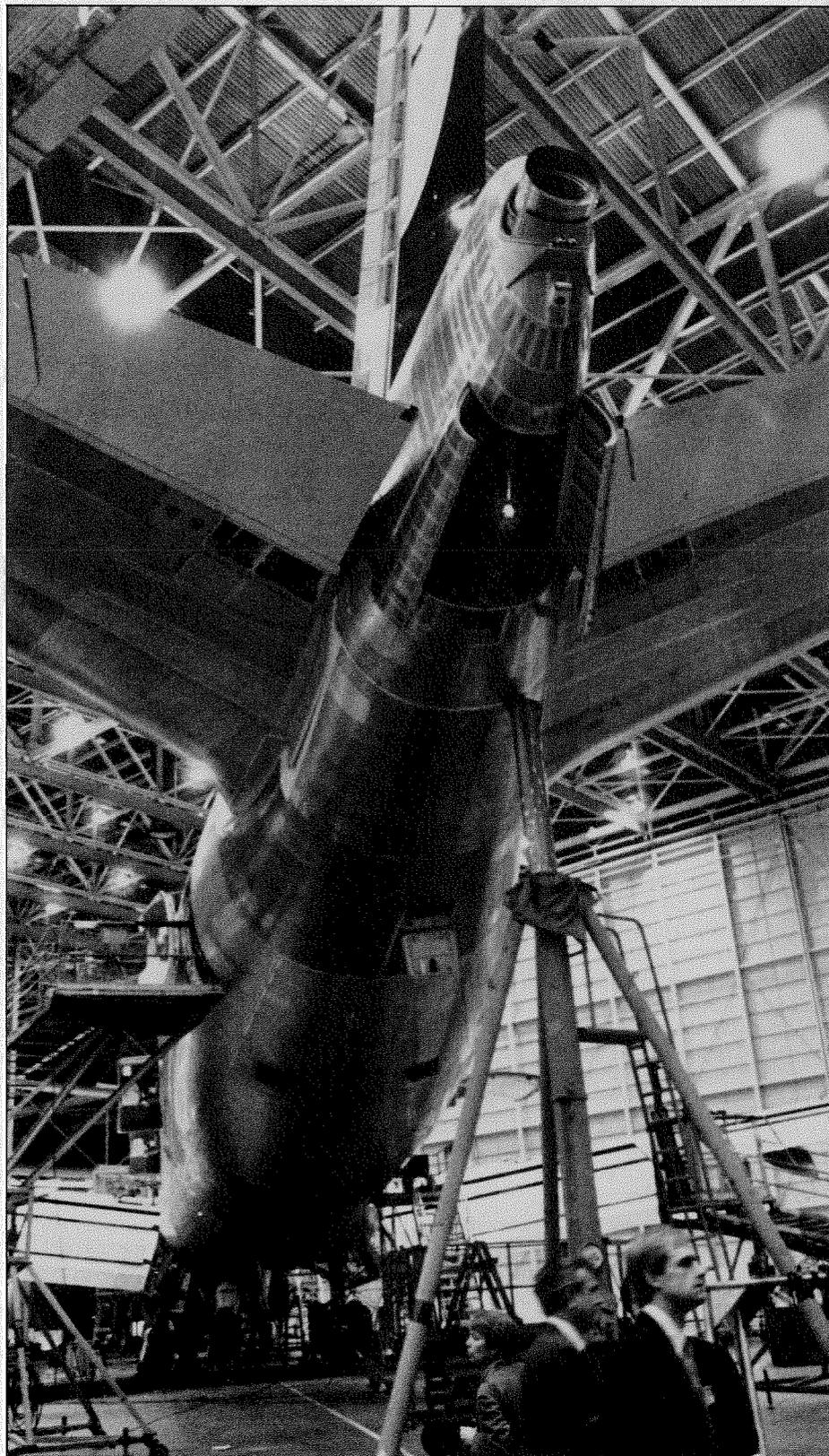
- The Northwest could pay the Southwest to maintain, rather than retire, its older, oil-fired generation. This arrangement could save the Northwest the expense of building new combustion turbines costing about \$500 million.
- The Bonneville Power Administration and British Columbia Hydro could combine their surplus resources to fashion a long-term firm sale to California. B.C. Hydro often cannot sell directly to the Southwest, and Bonneville is somewhat limited in its ability to make long-term firm sales.
- Coordination of B.C. Hydro and Bonneville could lead to more efficient operation of the two systems. The additional power and/or dollars could be shared by both systems. The arrangement could also improve fish flows.

A recent Bonneville study estimated that, if California and the Northwest can work out agreements to expand transmission capacity between them, net benefits to this region could range from \$1.8 billion to more than \$3 billion over the next 20 years.

The potential value of cooperative actions has led the Council staff to recommend a West Coast energy planning effort. In the proposal, technical personnel would first identify opportunities and constraints for mutually beneficial cooperative agreements. Later, as conditions warrant, negotiations could begin between and among inter-connected regions.

—SE

Northwest Industries:



Two years ago, when the Northwest Power Planning Council drafted its first energy plan, it did so against the backdrop of a citizens' movement seeking rate relief. Although that movement now seems relatively mute, today many of the region's industrial customers have raised their voices about rates and are turning to the Council and the Bonneville Power Administration for relief.

The Direct Service Industries (DSIs), industries which buy power directly from Bonneville, have been most vocal. Yet other basic industries for whom electrical energy is vital are also feeling the pinch of higher rates. The Boeing Company, for example, an aerospace firm headquartered in Seattle, Washington, has seen its annual electricity bill go from \$1 million in 1972 to \$9 million in 1985.

Boeing is one of about 30 non-DSI industries that make up the Industrial Customers of Northwest Utilities (ICNU). These industries, which include pulp and paper, chemical, steel, wood products, electronics, and aerospace, rely heavily on electricity. But, unlike the DSIs, they buy power directly from their local utility.

"One important fact to remember about the non-DSIs," says Ken Canon, executive director of ICNU, "is that they employ 98 percent of the industrial work force of the region. The Boeing Company, for example, is Washington's largest single employer and its airplanes are the state's number one export product and income producer. These industries play a key role in the region's economy, and electrical energy is an integral part of their operations."

Key Players

COMPANIES LIKE BOEING RELY ON ELECTRICITY

Four members of the Council toured the Boeing plant in Everett and Boeing Computer Services in Bellevue, Washington recently. "Perhaps the most interesting part of the tour for me," said Montana Council member Gerald Mueller, "was hearing about the different grades of power needed by the company and the way in which Boeing has adapted to meet those needs."

The Everett plant requires what might be called "raw" electricity to run boilers for steam production, while the Bellevue Computer Center requires a very "pure" and very reliable grade of electricity.

"Steam makes up approximately 55 percent of our energy needs at the Everett facility," says Wes Engstrom, Energy Office manager for Boeing, "and it is used primarily for heating and cooling the huge facilities where the airplanes are painted."

A typical 747 receives 600 pounds of paint — the equivalent of three people and their luggage. "For each temperature cycle, the complete surface of the (232-foot-long) plane must be heated, which means the whole facility must be heated to the required temperature," says Engstrom.

In order to adjust to varying prices of energy sources over the last ten years, Boeing has gone to a four-fuel boiler system. Three of its boilers run on bunker C oil and natural gas, as well as on contaminated jet fuel. "And in 1977 we added another boiler to run on electricity," says Engstrom. The multiple boiler system allows flexibility to adjust to price variations in energy sources.

"This kind of flexibility," says Oregon Council member Roy Hemmingway, "presents a real opportunity for the region. It's an opportunity to make use of electricity when hydro is abundant and to switch to other fuels when it is scarce."

Undoubtedly the most valued use for electricity is for operating the huge computer systems at Boeing's Computer Center. The 60-acre complex, which

houses a 200,000-square-foot center, provides services for customers within the Boeing system and engineering and scientific time-sharing services to others.

Reliability is such a crucial element to this super-computer system that the whole Boeing Company could literally be out of business if it lost power for one week, according to Engstrom. "We're talking not just about undelivered airplanes and other products but the potential loss of information, our own as well as that of our customers," he emphasizes.

Boeing has gone to great lengths to protect the ability to collect, analyze and deliver information. The computer facility houses two large rooms: one is completely filled with over 1,800 battery cells, the other houses ten diesel generators. Together they make up the UPS system — uninterrupted power supply.

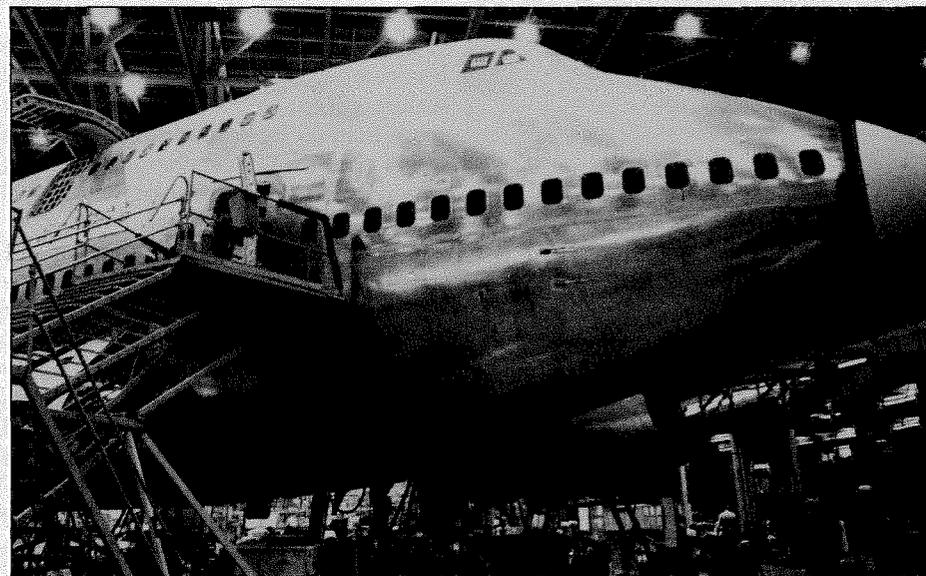
The batteries in the UPS system are floating "on line" so that if there is a problem with the power supply from Puget Power, the batteries take over without interruption. In addition to this backup, several layers of disaster recovery plans make it possible to reconstruct at least a portion of one of the data centers within 24 hours. The whole UPS system represents millions of dollars invested to ensure power reliability.

Boeing's extensive efforts to provide flexibility in its fuel source and to protect its supply of power indicate how important energy is to its production. For some ICNU industries, electrical energy costs, as a percent of production, can run quite high — as much as 25 percent.

"Obviously this is one of the reasons so many of these industries, including some of the very old industries, have spent the money to make their plants more efficient," says Ken Canon. "Longview Fibre, for example, is over 50 years old, yet its plant is as energy efficient a plant as any around."

All of these factors lead the industrial community to play a very active role in the Council's planning process. "We're looking at all the Council issues that have a direct impact on us," says Canon, "from conservation and cogeneration to the forecast and resource acquisition. Resource acquisition is extremely important to us because it determines what goes into the rate base and what we will ultimately be paying for."

As the Council maps out its resource portfolio in the draft power plan, activity among the region's industrial customers, both DSIs and non-DSIs, will undoubtedly intensify. "We can't just look at the DSIs and not worry about the other industries," says Mueller. "It's important that we pay attention to the fate of all of the region's industries." ■



Boeing 747s are assembled in the company's Everett facility. In foreground at left are Mickey Riley, Wes Engstrom and Ken Canon. At right, a 747 being prepared for Cathay Pacific Airlines.

BETTERING THE ODDS

The water budget on the Columbia



This April came on warm.

By the middle of the month, more than ten million tiny salmon and steelhead trout were already heading downstream from the many reaches of the Columbia River system. They were cued by the rise in water temperatures and launched from hatcheries along the Columbia and Snake Rivers and tributaries.

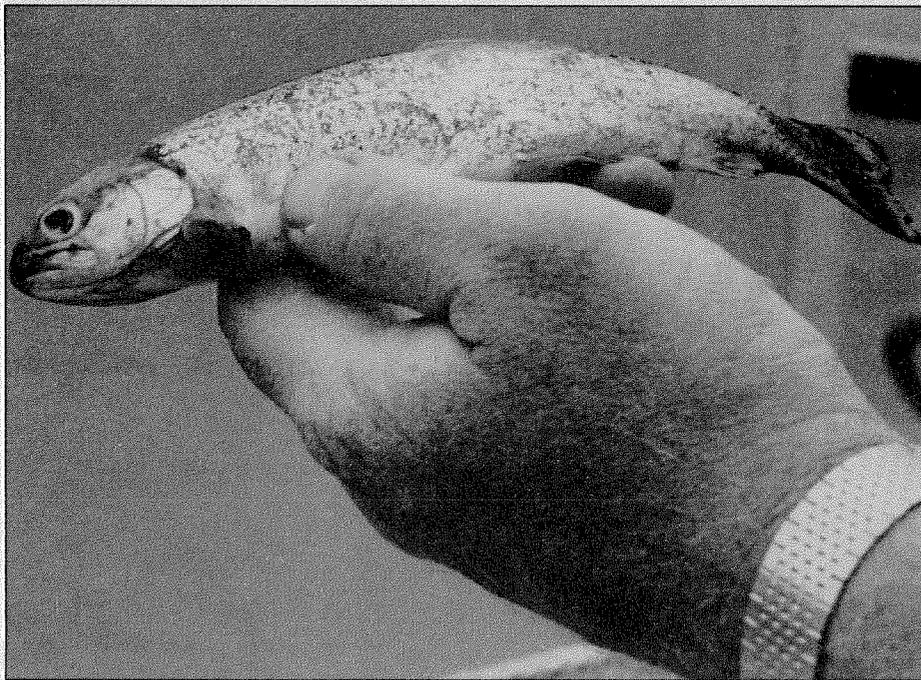
Their goal was the North Pacific where less competition for food in the coastal waters will enable the young fish to grow more than 30 inches, adding at least as many pounds. To get there, they must ride the Columbia (some of them travel more than 500 miles), and the dam-constrained river can be particularly uncooperative in the spring. Odds are seriously stacked against the juvenile migrants.

If they have any genetic memory they might recall a more rambunctious Columbia River. It was a river they could race from source to mouth in rarely more than two weeks. Speed is essential, because these fish have an agenda. They are physiologically adjusting from freshwater to saltwater environments,

and they must complete the biological change at approximately the same time they hit the first salt water in the estuary. This process (called smolting) takes about 30 days. Within that time they must make their way past the concrete dams massed across their path at varying intervals. If they fail, it's likely they will die as disease and predators, along with the dams themselves, take their toll.

The dams are not only formidable walls with sharp blades that can spin in their depths; they have also, historically, held back the April through June thaw, stalling the fish in cold reservoirs. The water was released from these manmade lakes if power was needed, if farms required withdrawals for irrigation, or if the reservoirs needed lowering for flood

Speed is essential, because these fish have an agenda.



Above, steelhead smolt. Left, predators await stunned smolts at downstream side of dam.

control. Concerns for the migrating smolts ranked low on the list of river management priorities.

In 1982, when the Northwest Power Planning Council adopted the Columbia River Basin Fish and Wildlife Program, the spring fish runs finally acquired equal consideration. The program is aimed at creating better odds for fish survival throughout the 250,000 square mile basin of the Columbia. As the numbers of salmon and steelhead entering the river increase, their safe migration will become even more critical. Consequently, one of the most important (and most expensive) measures in the fish and wildlife program is the water budget, an operation to speed smolts through the reservoirs and on their way to the open sea.

The water budget calls for coordinated flows to move a given amount of water, laden with young fish, through each of the reservoirs below Chief Joseph Dam on the Columbia and Hell's Canyon and Dworshak Dams on the Snake and

Clearwater Rivers. (This spring, like last year's, it is likely that no water budget will be called for on the Snake River. Normal hydropower operations, coupled with natural runoff from the mountain snowpack in Idaho, is expected to produce flows high enough to flush the smolts through the Lower Snake River system and accomplish what the water budget is designed to do.)

To shape the flow of water beginning April 15, when the main body of the fish migration, mostly from hatcheries, begins, two water budget managers, one representing the basin's Indian tribes and the other representing state and federal fish and wildlife agencies, confer with the Bonneville Power Administration, the Bureau of Reclamation, the Corps of Engineers and operators of the non-federal dams. The increased flows end June 15, when, it is assumed, 80 percent or more of the fish, including late migrating natural stocks, have made it through the dams.

The water budget on the Columbia,

the first of its kind in the country, is a product of the cooperation called for by the U.S. Congress in the Northwest Power Act of 1980. In passing the Act, Congress directed the Council to treat the Columbia River as a "system." Increasing flows to move fish through this "system" had been attempted in the past, but there were no binding arrangements. Efforts tended to fragment along traditional adversarial lines, with fisheries agencies, Indian tribes, utilities and dam operators all eventually going their separate ways.

By encouraging collaborative problem solving, the Act set in motion a long overdue process of repairing not just the ecosystem in the basin, but also the institutional interactions.

In 1983, the water budget was tried in an experimental fashion, but 1984 was the first full year of its implementation. In that year, Water Budget Center staff calculated that more than 80 million smolting fish entered the Columbia River. Because of the water budget, their chances of getting to the ocean in less than 30 days were significantly better than in past years.

Like anything new, there were problems to work out, but late this March an agreement was reached between the water budget managers and the dam operators. The agreement defines a new operation that reduces weekly fluctuation of flows and calls instead for predetermined water budget levels based on the runoff forecast. The new flows begin at 120,000 cubic feet per second and escalate gradually to 140,000 cubic feet per second as the fish run picks up. Water budget flows last 45 days. This new regime provides close to optimum flows for the fish and allows project operators and Bonneville to plan power operations in advance of the water budget period, something they were unable to do last year.

Of the approximately 80 million salmon and steelhead smolts that rode the Columbia River system last spring, it's unlikely more than a quarter survived their long downstream migration. Experts believe that the water budget and improvements in fish passage facilities at each of the dams can at least double that number. Increasing the survival rates among fish traversing the Columbia is the number one priority of the Council's Columbia River Basin Fish and Wildlife Program. The program is a coordinated effort to help the river's salmon and steelhead beat the odds. ■

Restoring the Resource

by Carlotta Collette

ASSESSING FISH LOSSES — SETTING GOALS

IN THE OLD DAYS,

they say, the salmon runs in the Columbia were so thick you could walk across the river on the fat backs of the shiny fish. No one talks like that about today's runs. At present, there are no simple figures on just how many fish there really were in the river, nor how many have been lost. All we know is that both numbers are big.



By the time Congress passed the Northwest Power Act, in part to redress the grievances inflicted on the fish by the hydroelectric system in the Columbia Basin, the declining runs of Columbia River salmon and steelhead had reached the crisis stage. There were fears in the fisheries community that the once famed

“shimmering hordes” were already beyond rescue.

To disprove that theory, the Northwest Power Planning Council pulled together historical adversaries to develop strategies for replenishing the resource. Congress set a tight time line for developing the program, and the Council

met that schedule. In doing so, short-term goals that easily fell within the ratepayers’ responsibility were agreed on, and the outer parameters of the program were temporarily set aside.

Now, the Council, working closely with other interested parties, has the task of reasoning through historical



There were fears in the fisheries community that the once famed "shimmering hordes" were already beyond rescue.

data, research studies and oral recollections, to come up with the best estimate of the salmon and steelhead losses attributable to the Columbia River hydro-system.

It's already been a long and very complicated process and one that's only just beginning to take shape, but by next spring, the Columbia River Basin Fish and Wildlife Program will have goals that will, in the words of Council Member Roy Hemmingway, "provide the framework and overall philosophy of the fish and wildlife program. When we have goals in place," Hemmingway added, "we will have a public and clear set of principles by which we can distinguish between acceptable and not acceptable program measures."

Council Chairman Chuck Collins concurred, emphasizing the goals process as a means of defining the limits of ratepayer responsibility for restoring the runs. "Goals will help us determine the size of the playing field," he reasoned.

So, the questions tabled two years ago are now being asked: What is the extent of salmon and steelhead losses attributable to hydroelectric development and operations? What are the appropriate goals for the program? And, what is the best way to achieve these goals?

The questions are as complex as they are compelling. The Columbia River Basin is a biological, geographical, social and cultural system, and many inter-

relationships have influenced the decline of the salmon. Culling out only one source of damage, in this case hydropower, and according specific reparations for only *that* damage, will take a careful search of historical data plus a good deal of informed judgment.

To communicate the Council's findings and encourage a basinwide dialogue on each of the major issues to be explored in the goals process, a series of issue papers will be prepared by Council staff. All of the papers will fit into a framework of four principal elements:

1. a statement of losses, describing the salmon and steelhead production and production capability which has been diminished or destroyed by hydropower development and operations in the basin;
2. a statement of goals and system-wide objectives indicating the scope of fish production to be funded under the Council's program and the major policies for determining the types and location of production to be emphasized;
3. production objectives, the series of short-term, geographically-specific and biologically-feasible production targets planned to lead together, over time, to achievement of long-term basinwide goals; and,
4. methods for measuring and accounting for progress towards goals and objectives.

As they prepare the papers, Council staff will compile information from fisheries managers (including basin tribal groups) and other interested and expert groups.

For information on fish "losses," descriptions of historic runs of salmon and steelhead will be compared with indications of the habitat used by those species, how each species was used (including commercial, cultural, subsistence, ceremonial and religious uses) and which elements (hydropower, lumbering, agricultural development, etc.) contributed to the loss of those fish. In some cases there has already been compensation for some of those losses, and this too will be integrated into the review of data. The primary product will be a draft statement of losses information that will be circulated for public review and considered for Council adoption.

Two of the issue papers are directly related to this loss process. The paper called "Contributions" will look at how hydropower and non-hydropower factors have contributed to salmon and steelhead losses, and the "Basis" paper will consider whether losses or some other factor should be used as the basis for setting program goals. Should hydropower-related losses, current production potential (which may vary from what was actually lost), harvest agreements or other factors provide the rationale for goals?

The Columbia River Basin is a biological, geographical, social and cultural system, and many inter-relationships have influenced the decline of the salmon.

Other papers will raise the arguments for measuring success in returning adults versus smolts; substitutions of resident fish for anadromous fish that are locked out of their former habitats by impassable dams; and whether there should be, or even can be, a realistic emphasis on wild stocks versus hatchery-reared fish.

As a major element of the Council's Hydro Assessment Study (see *Northwest Energy News*; Volume 3, No. 6), data relating to the production potential of the basin will be compiled and analyzed. This will feed directly into the Council's goals process by helping planners set priorities among species and habitats and by describing realistic production targets for both the short and long term.

Once losses and productivity information is available, the Council staff will begin to develop proposals for the goals themselves. Sometime in late summer, the Council will conduct a planning workshop with key resource managers throughout the Columbia Basin. The workshop will emphasize the Council's adaptive management policy as a tool for pulling together proposals for production objectives in a sample area. It is hoped that this experience will open avenues for developing basinwide production objectives.

Throughout the entire goals process, several new advisory committees will complement staff and contractor efforts. In addition, consultations with selected groups and regular discussions at Council meetings will inform and involve the citizens of the Northwest in this comprehensive task.

The Northwest may never again see a time when "you could walk across the river on the backs of the fish." But the goals process is a major part of a unique program that — with continued regional cooperation — could mean there will never be a day when Northwesterners tell stories that begin ... "I remember when you could see fish in the Columbia River." ■



New Energy Secretary John Herrington outlined his priorities, saying, "coal stands atop the field in production of electricity. Nuclear power ranks second, and there is a vast, giant, partially tapped resource called conservation and energy efficiency. These are the advantages we must exploit for the future." (Source: *Western Energy Update*)

Freddie Mac endorses Super Good Cents Homes. The Western regional office of the Federal Home Loan Mortgage Association (Freddie Mac) says it will "consider for purchase, investment quality loans on Super Good Cents homes where the borrowers' debt-to-income ratios exceed our general guidelines." (Source: *Super Good Cents Bulletin*, Bonneville Power Administration)

Conservation is losing momentum according to World Watch Institute. The Washington, D.C., organization predicts energy consumption will triple by the year 2025. Meanwhile, energy use is up, according to the federal Department of Energy, which reported a 6.6 percent increase in the first three quarters of 1984 over the same period in 1983. (Source: *ENERGYgram*, Oregon State University)

Salmon are going to school in Newport, Oregon, and codfish are their teachers. In a research project at Oregon State University's marine sciences laboratory, codfish are teaching salmon smolts, mostly hatchery-reared cohos, how to survive — the hard way. The codfish attack the young coho, picking them off one at a time, until the survivors figure out evasive tactics. The good news is that "feedlot" coho appear to be quick studies. (Source: *National Fisherman*)

More emphasis should be put on sources of indoor pollution, according to a report issued by an advisory committee of the Oregon Department of Energy. "Tight construction that reduces a home's air leakage has been blamed for causing air pollution in homes," reported John Perry, building codes analyst for the Department. "The committee believes the best way to deal with the problem is to remove the sources of pollution in the homes." (Source: *The Oregonian*)

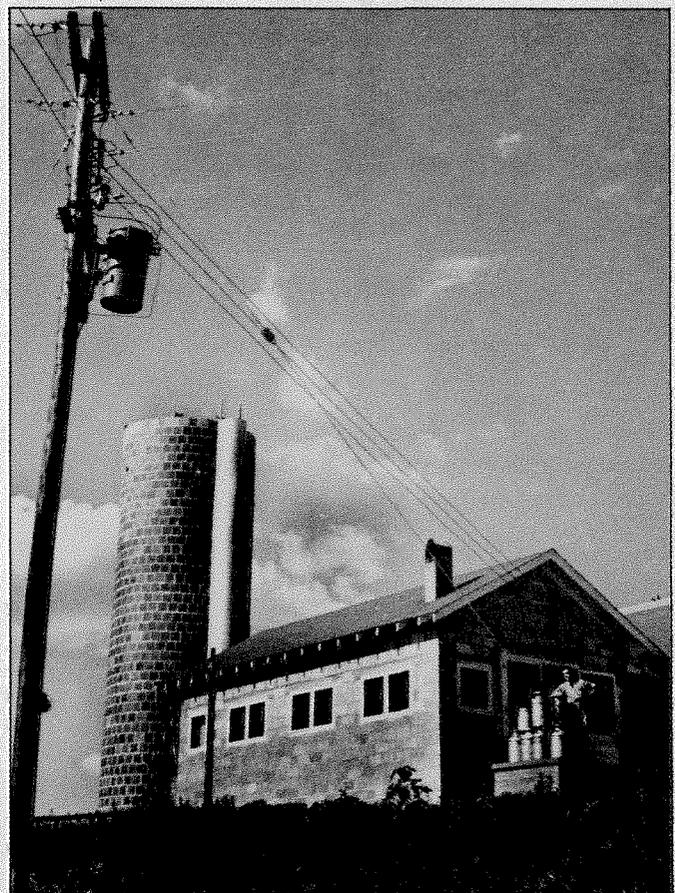
A Northwest school system is the only one in the nation to receive three major energy education awards. The Portland Public Schools Energy Studies Center received the Governor's Award for "Outstanding Achievement in Energy Conservation," the U.S. Department of Energy's "National Award for Energy Innovation," and the National Science Teachers Association's "Exemplary Award for Excellence in Education." The Energy Studies Center is a kindergarten through 12th grade project which integrates energy education into mainstream curriculum.

How do you keep them down on the farm once they've seen the wide world beyond? Oregon fisheries experts are trying to raise rainbow trout that will stay in coastal rivers rather than join their steelhead cousins' migrations. They tried in the 1930s with Utah-bred hatchery trout. They even tried Mexican trout. Both attempts failed. Now they're trying again in an effort to have game fish that can be caught year-round, not just when runs are active. (Source: *The Oregonian*)

An Idaho home built to the standards wins a national award. The Energy Wise home of Coeur d'Alene builder Art Elliott was named grand prize winner in *Shelter Magazine's* Total Home Contest. The home, occupied by the builder's family, is one of four he has built as part of the Residential Standards Demonstration Program, a builder training program for homes built to the Northwest Power Planning Council's model conservation standards. The magazine selected the home on the basis of its livability and energy efficiency from among 117 entries throughout the U.S. and Canada. (Source: *Currents*, Idaho Department of Water Resources)

People often don't weatherize homes for lack of a name. Researchers at the University of California in Santa Cruz turned up the problem when they conducted a study to find out why people don't take advantage of low-cost, high savings weatherstripping, insulation and caulking, yet spend thousands of dollars on solar rooms, wood stoves, and other measures that have longer payback periods. They found that people don't know what to call the simpler process. It isn't repair or maintenance; it isn't beautification; it's not visible or impressive. It's just "stuffing up the cracks." As such, its lack of glamour turned out to be an impediment despite the potential paybacks.

Historical photo



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.)

ISSUE PAPERS

- Accounting/Modeling
COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM
- System Planning Principles
COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM

OTHER PUBLICATIONS

- Draft 1985 Power Plan (available in late July)
- Draft 1985 Annual Report
- Proposed Power Plan Amendment for the Model Conservation Standards
- Final Goals Work Plan
COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM

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