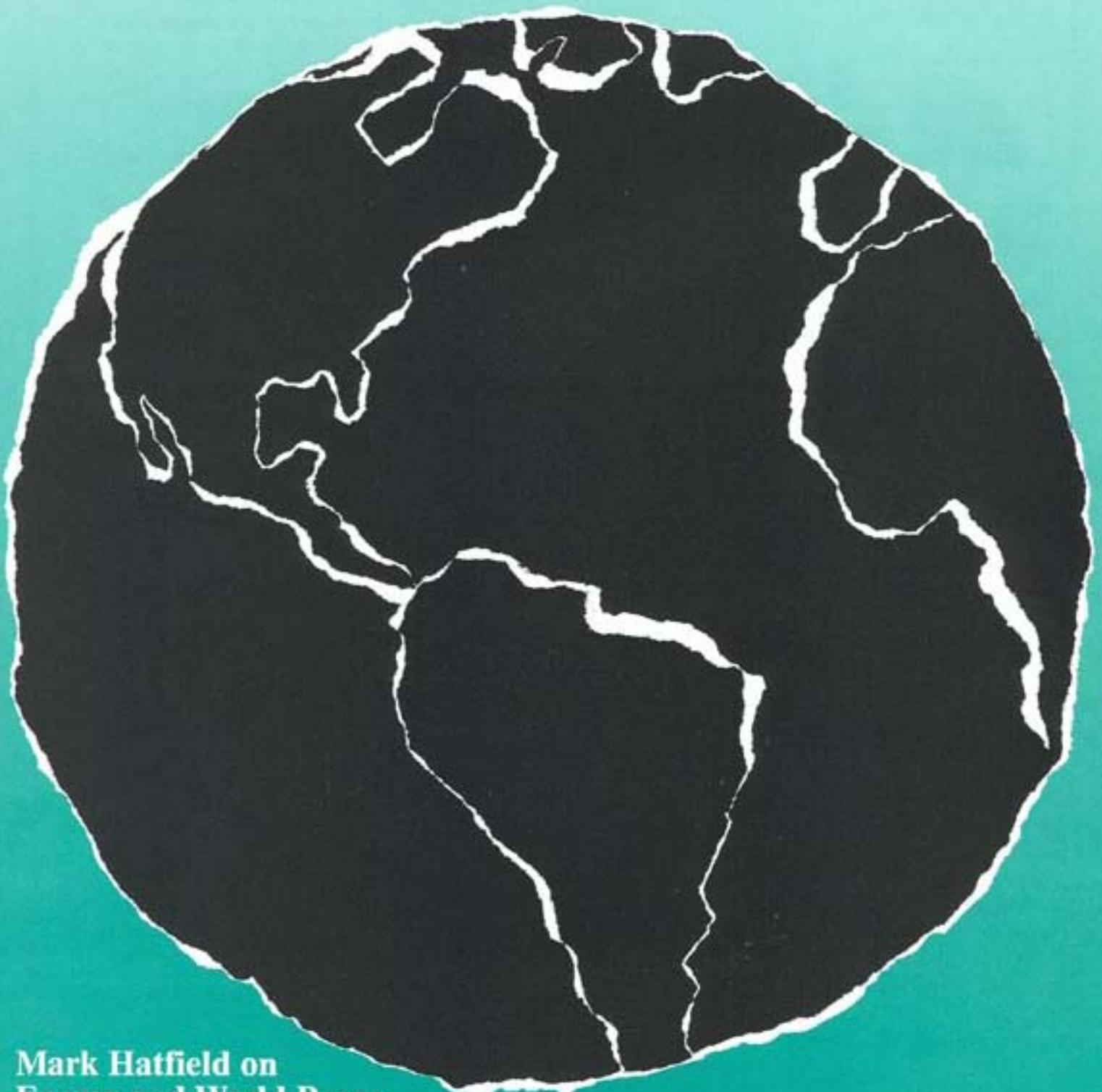


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**Mark Hatfield on
Energy and World Peace**

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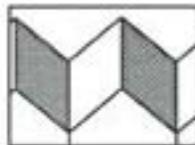
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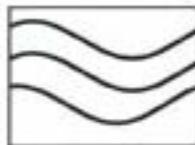
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Editor's Notes

April 22, 1990 marks the twentieth anniversary of Earth Day. In towns and cities around the world, 1970 was the year when varied and sometimes shared environmental crises caught people's attention. Unfortunately, after 20 years, the litany of environmental bad news is still a long one.

But, something happened in the Pacific Northwest midway between then and now. The four Northwest states formed an interstate compact to change the way power planning is conducted in this region and to rebuild the remnant runs of salmon and steelhead on the Columbia River. Now energy efficiency is viewed as the resource of first choice, and thousands of people across the region are working together to protect our fish and wildlife.

Oregon Senator Mark O. Hatfield was a critical player in 1980, when Congress passed the Northwest Power Act, giving impetus to this region's turnaround. He remains an ally today. Energy News is honored that the Senator offered us his observations on the connection between what we do or fail to do and the likelihood of world peace.

This issue's cover illustration is by Lyn Nance.

Fueling the Future

by Oregon Senator Mark O. Hatfield

The wise use of energy for world peace.

From South Africa to Eastern Europe, the potential for peace in our troubled world seems more promising today than at any time in recent memory. But while current headlines are full of negotiations and troop withdrawals, a story that one day could shatter our fragile peace has been all but ignored.

As recently as 1985, the United States imported less than a third of its oil. Today, imports account for almost 50 percent of the oil used in this country, and domestic oil production is at its lowest level since 1963.

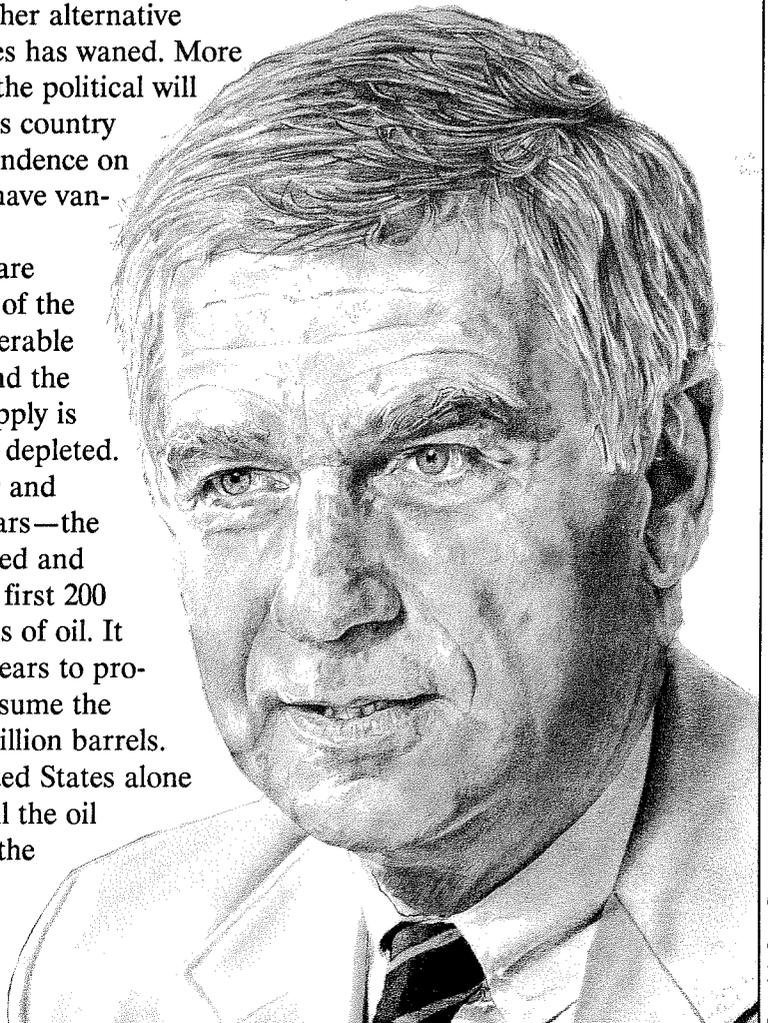
A decade ago, as lines grew and prices soared at gas stations across the United States, Americans began to come to grips with the fact that oil is a finite resource. Conservation efforts and the search for other alternative energy sources became top political priorities. The Pacific Northwest led the nation in these endeavors.

But today, despite the fact that oil imports have returned to his-

toric highs and indeed far exceed the level during the first oil embargo in 1973, interest in conservation and other alternative energy sources has waned. More importantly, the political will to remove this country from its dependence on oil seems to have vanished.

The facts are clear: a third of the world's recoverable oil is gone, and the remaining supply is rapidly being depleted. Between 1859 and 1968—109 years—the world produced and consumed its first 200 million barrels of oil. It took just 10 years to produce and consume the second 200 million barrels.

If the United States alone were to use all the oil remaining in the world at its current consumption rates, the



Portrait by Lynn Carson

wells would serve us for another 300 years. Because the United States uses only one-fifth of all world oil, however, those wells could run dry in only 60 years.

Current debates over where and how to drill for oil in this country soon may be rendered irrelevant by a nation desperate to maintain its quality of life and economic productivity. Indeed war over access to the diminishing supply of oil may be inevitable unless the United States and other countries act now to develop alternatives to their dependence on oil. The presence of more than 40 U.S. Navy warships and more than 17,000 U.S. troops in the Persian Gulf several years ago, and the suggestion by two U.S. presidents in the last two decades that nuclear retaliation could be considered an appropriate response to closure of the Gulf, underscore this point.

The obvious question: what are we doing about it? The answer, unfortunately, is not very much.

A decade ago, the federal government's annual budget for the research and development of solar and renewable energy was \$770 million. This year, that budget has shrunk to \$140 million. Although the administration's recently submitted budget would increase that funding to \$175 million next year, the level remains unacceptably low.

Conservation efforts have fared better by comparison. Federal funding for all conservation efforts has gone from \$300 million in 1980 to \$436 million this year. Unfortunately, however, the administration has proposed spending only \$215 million next year.

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Both the government and individual citizens have been lulled by low gas prices into a false sense of complacency. Last year, Americans drove their cars and trucks an estimated 2 trillion miles, 400 million miles more than they did in 1980. After increasing 24 percent between 1976 and 1986, our ability to use energy more efficiently in everything from our cars to our industries has actually begun to decline.

Moreover, we are exporting our dependence: 80 percent of all World Bank funds for electric power generation in developing countries goes toward diesel generators and fuel. Developing countries around the world increasingly are forced to spend vast sums of their precious foreign exchange importing oil.

As efforts undertaken in the midst of the last oil embargo a decade ago suggest, it is possible to change course. The development of a national energy policy and a renewed commitment to conservation and the search for other energy alternatives must be

made national priorities, sooner rather than later.

Toward that end, the Department of Energy has begun to develop a national energy plan. This initiative was first suggested in an amendment I offered last fall in the Senate Energy Committee. It will involve assessing all of our current and potential energy sources as well as determining the least expensive and most environmentally sound approach to meeting our future energy needs.

The national energy strategy will likely rely heavily on the experiences gained in the Pacific Northwest. The expertise of the Northwest Power Planning Council has been tapped by the Department of Energy as its model for least-cost power planning.

In addition, Congress last fall passed legislation authorizing increased spending for the research and development of renewable energy and energy-efficiency strategies.

Perhaps these and other initiatives will head us in the right direction, but dependence on oil is not exclusively an American problem. Any effective strategy for turning off our current course must also include an international consensus on the issue. As a world scientific leader *and* as an international peacemaker, the United States should work with industrialized and developing nations to create and implement effective and safe energy alternatives.

At the moment, the United States and the rest of the world are running on empty. Unless action is taken now, we all may find ourselves stalling out in the middle of a third world war. ■■

Comparing Consequences

by Carlotta Collette

Evaluating environmental effects of electrical resources.

If the first eight decades of this century can be called the "Age of Technology," this last decade is likely to begin the "Age of the Environment." Until recent years, most people figured the earth's ecosystem was too vast, irreducible and ultimately too resilient to be irreversibly harmed by human activities.

The twentieth century witnessed the testing of that theory. By most measures, there were more technological breakthroughs in the past 100 years, or for that matter, in just the past 50 years, than in all the rest of history combined. But that same period also marked the depletion of more essential natural resources, such as fossil fuels, groundwater and topsoil, than ever before. And the residual results of that resource use are only now becoming measurable.

Most remarkable of these environmental aftershocks is the cli-

mate change known as "global warming," thought to be brought on by increasing concentrations of carbon dioxide and other gases in the atmosphere. Some scientists point to the fact that six of the hottest 10 years of recorded weather occurred in the 1980s as indication that a climate transition is taking place. They have measured carbon dioxide concentrations in the atmosphere over time and found them to have increased roughly 15 percent in the past 30 years.

Furthermore, other gas dis-

charges from fuel burning, such as sulfur dioxide and nitrogen oxides, result in near-term environmental problems such as acid rain. Whether this new pollution leads to the significant worldwide changes some

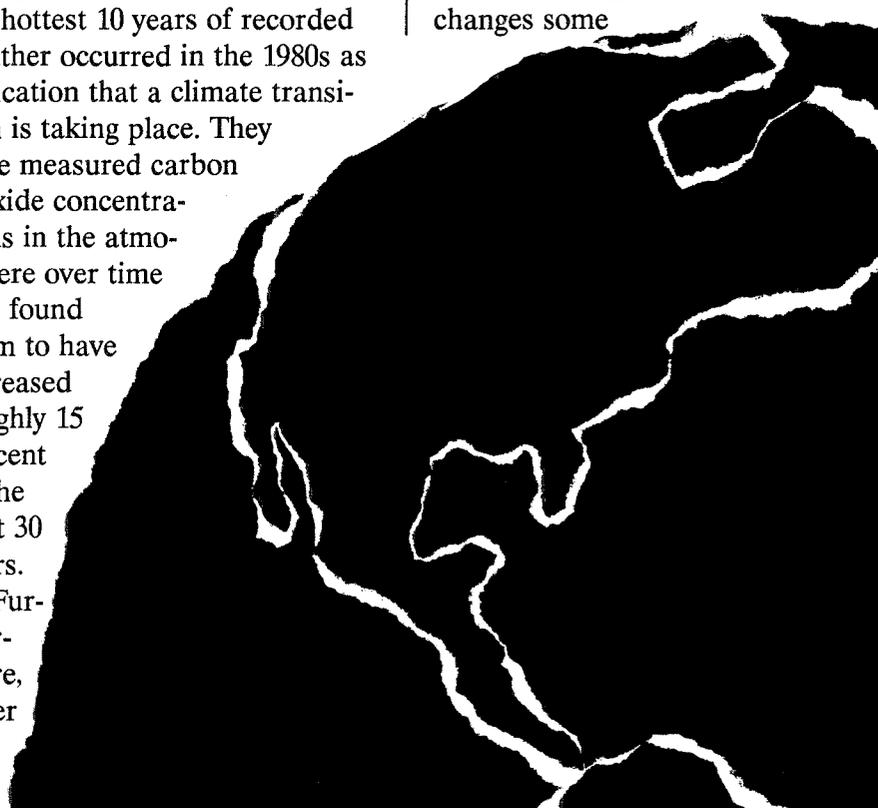


Illustration by Lyn Nance

scientists predict is still a question, but there is clear cause for concern.

As power system planners responsible for meeting the future electric energy needs of the Pacific Northwest, the Northwest Power Planning Council has always reviewed environmental impacts of the resources it studies. But given the likelihood that the U.S. Congress and other regulating bodies will tighten restrictions on power plant discharges—considered a major source of atmospheric pollution—and other ecological effects of power development, the Council, too, is stepping up its examination of these effects.

The Council's resource analysis incorporates both the expected up-front cost of designing, siting and building facilities such as power plants, as well as the more difficult-to-quantify costs of ameliorating or coping with any environmental repercussions from the resource's development.

The development

costs used in the Council's analysis already include whatever developers will be expected to pay to meet existing environmental regulations. For example, the expected cost of building a nuclear power plant includes the money the developer must set aside to store radioactive waste from the plant and to decommission the plant when it is retired. Coal costs cover the expense of scrubbing coal plant discharges to meet current national and the most stringent state regulations.

However, given national and international concern about atmospheric degradation, the Council has tried to anticipate potential additional expenses. A good example of this is the Council's emphasis on indoor air quality in homes that meet its model conservation building standards for electrically heated homes. The Council went well beyond existing building codes in setting air quality standards for these homes and added these costs to the price it expected to have to pay for the energy savings.

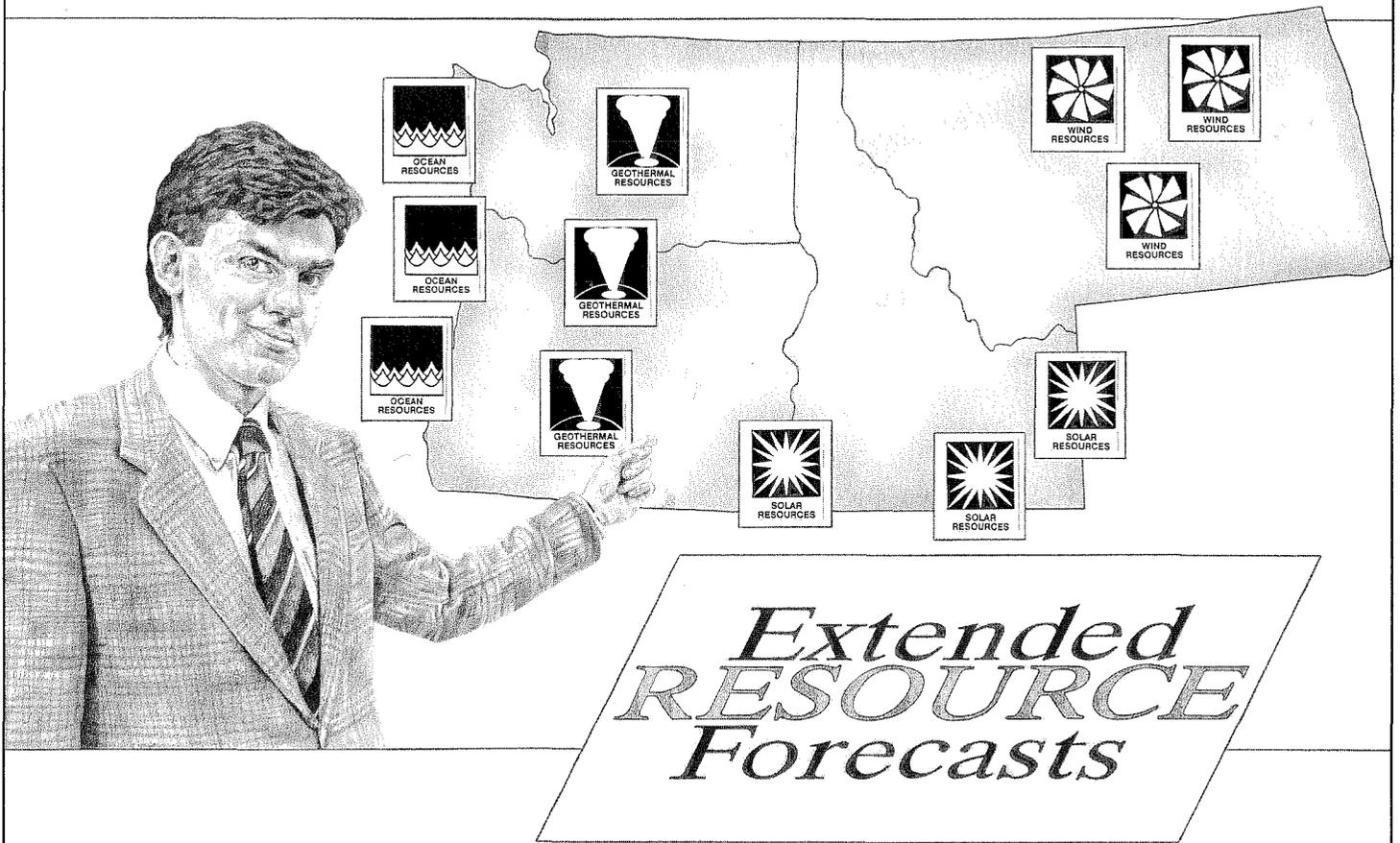
Now the Council is adding a further step—a detailed environmental inquiry after its economic and engineering resource reviews. Whether development of a particular resource would increase air pollution or damage wildlife habitat, create unacceptable noise

levels or deplete groundwater, is being explored. The final product will be a more thorough picture of the price society will pay for each resource option. The resources and their near-term and long-term consequences can then be compared fairly. With this analysis, the Council can weigh resource costs and environmental consequences in making judgments about resource cost-effectiveness.

For example, some energy-efficiency improvements that might have been more expensive than the price of power from new coal plants—roughly 10 cents per kilowatt-hour—could still be considered for the resource portfolio. In some cases, resources that cost slightly more than specific other resources might actually be acquired first, because they also have fewer environmental impacts.

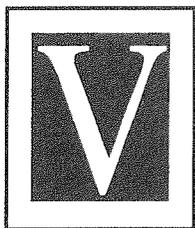
Environmental and land-use considerations may even influence the amount of a resource that can be developed. Reliance on resources such as geothermal (using naturally occurring underground hot water to generate electricity), for example, may be limited by the fact that much of the hottest water resides under prized parklands.

By taking a long look at the wake of resource choices, the Council and the region can better ensure that the Northwest's power plan and its electrical future are truly the least-costly options in the broadest sense. ■■



by Carlotta Collette

Some future resources may be as difficult to predict as the weather.



irtually all planning, by definition, is an exercise in calculated fortune telling. In the Northwest Power Planning Council's power system planning, the horizon now extends a decade into the next century. That's a considerable time frame to predict across with any certainty.

Furthermore, the subject of the planning process is remarkably complex—incorporating expectations about the expansion or decline of an entire region, the

development and testing of several technologies, and investments of enormous amounts of money. The risks are great.

Estimates of how much electricity the four Northwest states will need over the next 20 years must be matched with resources that will be economical, reliable and available when they are needed. Then a set of activities must be identified to move the plan into reality.

While there exists a wealth of information regarding currently available resources, speculation must fill the gaps in knowledge

about the technologies that may be available down the road. In some cases, the technology has been tested elsewhere, but its adaptability in the Northwest and the amount of it that can be made available still need to be studied. The Action Plan outlines the means to fill in those knowledge gaps.

In past planning efforts, the Council and the region had the luxury of excess power; an electricity surplus that postponed the need to make large capital expenditures for new power plants. But that surplus has all but disap-

Speculation must fill the gaps in knowledge about the technologies that may be available down the road.

peared. It's decision time in a more critical and potentially more costly sense than the region has had to confront in more than a decade.

How successfully this planning achieves its goal of meeting the electric energy needs of the Northwest at the lowest possible cost depends in large measure on the relative quality of both the known information and of assumptions about the uncertain future. Of particular value in the Northwest's process is the intense public scrutiny that accompanies every step in the planning. By exposing the Council's assumptions to a broad audience, the odds of drawing in the best possible information are increased.

The Council's planning process can be roughly divided into three major areas: 1) determining what future energy needs might be by drawing some conclusions from economic and demographic trends, 2) reviewing all potential sources for that energy, whether they offer new supplies or reduce demand so new supplies are not needed as quickly, and 3) producing the list of actions needed to actually acquire the necessary resources.

To best capture the fullest, if not the most precise, picture of the Northwest in 2010, the Council describes a spectrum of likely growth patterns. Any possible growth or shrinkage in the region's economy (which leads directly to the amount of electricity used) is likely to fall within this range. It spans more than 14,000 megawatts of new energy use on top of current use of about 16,500 megawatts.

Such a broad range encourages regional focus away from the traditional single-point forecast used in the past to drive power plant construction. The Council's reasoning has been that not even the best minds and machines can pin-point the future with enough certainty to gamble millions or, as in the Northwest's recent history, billions of dollars on one estimate.

Nonetheless, resource planners do have to make projections and invest capital on those forecasts. The key to minimizing risk is to start with the least risky resources. At the Council, resource decisions take direction from the Northwest Power Act, which mandates that the Council select the most cost-effective resources first. When several resources have the same costs, the Act gives top billing to conservation, then those resources that are renewable, such as hydropower, wind or solar. The Act calls next for review of generating resources that make use of waste heat (cogeneration) and thermal resources that have high fuel-conversion efficiencies. Only after these have been duly considered, more conventional generating resources such as coal and nuclear plants can be turned to.

The resource list the Council develops is called the resource portfolio, but unlike an investment portfolio, it is not a package of already purchased options. Resources in the Council's portfolio have been selected and ranked based on their known or expected costs, availability, environmental consequences of their development and their compatibility with the existing power system.

But the portfolio is not a "buy list." It was developed using elaborate computer models that compare resource needs, costs and availability illustrating these in charts that are known as "supply curves." The supply curves suggest how much of each resource can be expected at specified costs to best meet the region's electricity needs. But additional resources may appear, or young technologies mature over the coming decades. Some of these could displace resources in the portfolio or cause some of them to shift in emphasis.

Certainly, resources that appear first in the portfolio, such as energy savings, are most likely to be developed first. While those scheduled for after the turn of the century are more vulnerable to being changed or replaced as they become more or less cost-competitive with rapidly maturing technologies.

In addition, each resource category includes a range of costs for that resource. For example, the cheapest category, conservation, includes measures that run from virtually free to those that are on a par with other more expensive resources. Less costly hydropower projects, for example, may be developed ahead of more

expensive conservation, assuming they are environmentally acceptable and compatible with the existing power system.

The Action Plan portion of the power plan will lay out interim activities to test and develop resources that are promising, but not yet ready for the portfolio. Resources in the portfolio will serve as cost and compatibility comparisons—benchmarks by which all other resources are measured.

They are the best choices for the money today, and some of them may hold their positions in the foreseeable future. But others may not.

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The whole power plan is meant to be a flexible document, one that can be adapted to changing circumstances. The Action Plan coordinates this ongoing adaptation by integrating

research activities with other necessary steps to ensure new resource development. As the need for electricity grows, the Action Plan helps bring about a regional consensus on which resource alternatives to select, and how and when to acquire them.

The Council has made preliminary decisions about some resources it is considering for inclusion in the resource portfolio (see box). The complete list and an Action Plan will be included in the draft power plan, which is scheduled to be released this summer. ■■

Resources Under Consideration

In the next 20 years, if the Pacific Northwest continues to grow at its current pace or better, the region could need as much as 14,000 megawatts more electricity than is currently being used on a guaranteed or firm basis.

Few people expect this level of economic activity to be sustained for that long a stretch, but the Northwest Power Planning Council has to contemplate every probability when it prepares strategies to meet the region's future energy needs. In its current planning process, the Council reviewed the costs and availability of resources that could provide electricity over the next 20 years. For its resource portfolio analysis, the Council has made preliminary decisions to use the following resource amounts to find the best resource mix:

Biomass (wood wastes, other burnable wastes)	115 megawatts
Coal plants	4,800 megawatts
Cogeneration (using an existing heat process)	2,200 megawatts
Conservation	3,200 megawatts
Hydropower efficiency (improving existing projects)	110 megawatts
Geothermal (using subsoil hot water)	350 megawatts
Hydropower	410 megawatts
Gas or oil-fired combustion turbines	2,500 megawatts
Nuclear	1,690 megawatts
Solar	(quantity not estimated)
Transmission system improvements	300 megawatts
Wind	400 megawatts

The Billion-Dollar Question

by Gordon Lee

Energy demand and direct service industries.

It seems paradoxical, but the healthier the Pacific Northwest's aluminum

industry gets, the more difficult it becomes to predict how much energy it will use in years to come.

That's the dilemma the Northwest Power Planning Council and the Bonneville Power Administration face as the region enters the 1990s. The Northwest's aluminum plants and other heavy users of electricity are going strong, consuming one of every six kilowatt-hours sold in the region. But whether their demand for power will remain robust well past the turn of the century is an open question.

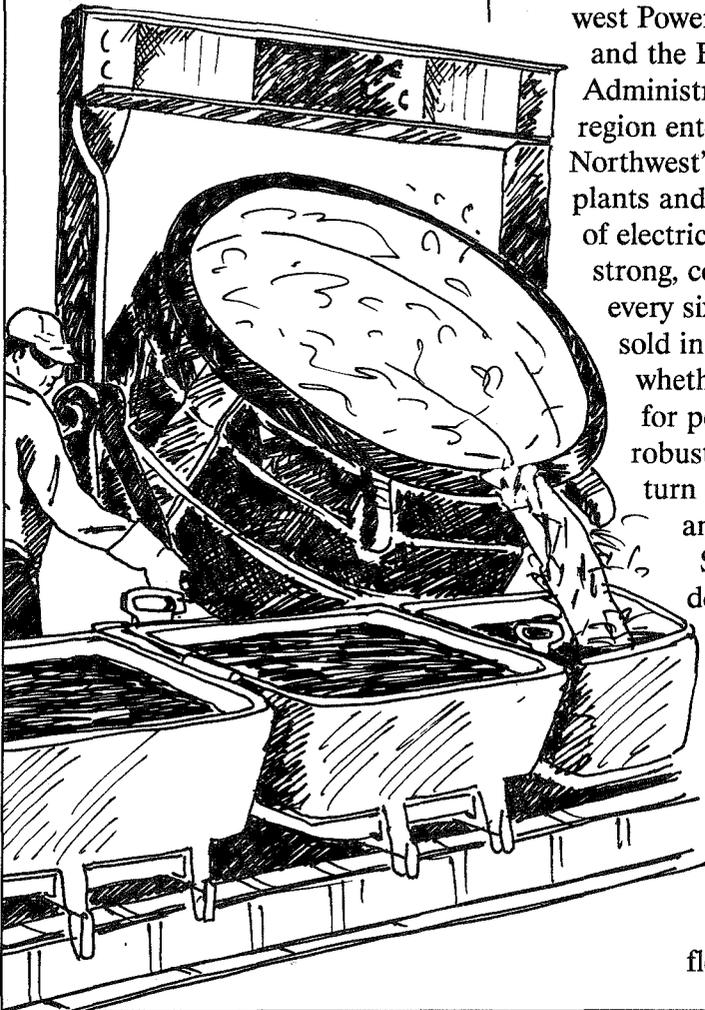
Several billion dollars could turn on the answer to that question.

If the region guesses correctly that large industrial demand will continue to flourish, it likely

will build a series of new power projects and conservation efforts to satisfy growing energy needs in the region.

But if it guesses incorrectly and takes steps to meet an expected demand that doesn't materialize, the four Pacific Northwest states could end up with unused or underused new generating facilities, potentially worth several billion dollars. That could mean skyrocketing rates, which would further depress demand, a condition the Northwest experienced in the early 1980s with the ill-fated nuclear plant construction projects of the Washington Public Power Supply System.

Industry representatives are bullish about the long-term fortunes of large industrial power consumers in the Northwest. "There's a high probability we'll be here if the environment is right," says John Carr, executive director of Direct Service Industries Inc., a Portland, Oregon-based trade group representing many of the region's largest in-



dustrial customers. "The Council should plan on meeting the industries' current load, plus reasonable growth."

Recent history is no guide. In the late 1970s, when metals prices were high, the Northwest's aluminum industry flourished, and its demand for energy was strong. But by the early 1980s, falling metals prices and rising energy costs squeezed the region's aluminum producers. Plants closed or restricted operations, and the industry's demand for power plummeted. Today, the industry has bounced back, production in the region is close to full capacity, and the industry's demand for energy is near an all-time high.

That cyclical pattern of demand from the region's largest industrial power customers, the direct service industries, is one of the more perplexing forecasting challenges that confront the Council as it begins to write a draft 1990 Power Plan for the region.

Continued or growing demand for energy from these customers could mean the region soon will have to commit to new sources of power. A fall in demand from these customers, or their departure from the Northwest, on the other hand, could postpone the day the region will have to obtain new resources.

"These industries play a crucial part in our long-range planning for the region's power needs," says Tom Trulove, Council chairman. "However, the volatility of their demand for power complicates forecasting. And the longer we look out, the more that volatility becomes an influencing factor."

Direct service industries pose two separate but related power

The Northwest's aluminum plants and other heavy users of electricity are going strong, consuming one of every six kilowatt-hours sold in the region.



planning difficulties for Trulove and the rest of the eight-member Council: it's hard to predict swings in direct service industry power use or to predict how long these industries will remain in the region. The first difficulty relates to the industries' fluctuating demands for power, swings that depend on the price of aluminum. Plants that may have a strong demand for power one year may scale back operations the next, in the wake of an aluminum price drop.

The other difficulty relates to the tenuous hold the Northwest has on the aluminum industry. The region's competitive energy costs today mean that plants here may be able to operate long after other plants in the United States might become uneconomic. But that advantage has its limits.

The longevity of the industry in the Northwest depends on world metals prices and on the relative cost of production in the Northwest compared with other locations. Lower energy and labor

costs elsewhere in the United States or abroad could attract some, or all, of the region's producers to relocate, with obvious implications for the Northwest's resource needs well into the next century.

Edward Sheets, executive director of the Council, puts the questions the Council must address in the 1990 plan succinctly. "Should we assume that all the direct service industries in the region will remain over the next 20 years? What probability should the Council attach to all the plants remaining here? And if they remain here, should the Council assume their demand for power will grow or shrink?"

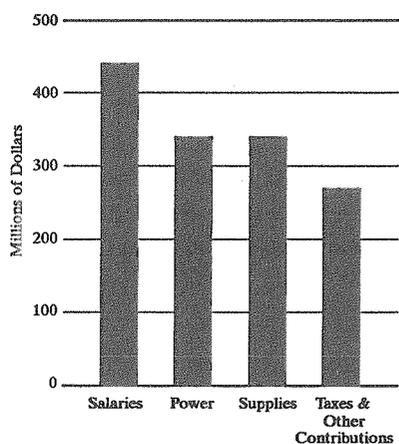
The answers to these questions will become particularly relevant in the mid-1990s. Where for much of the past decade the region produced a comfortable surplus of power, robust economic growth in the past several years has consumed much of that excess. And under the most likely economic growth conditions, that excess could disappear altogether by the middle of this decade.

The direct service industries are a group of 13 industrial customers operating 19 plants in the Northwest that use so much electricity they buy it directly from Bonneville rather than from utilities. Most of the direct service plants are primary aluminum smelters and related aluminum fabricating facilities. The remainder produce other products, including metals and chemicals.

Many of the direct service industries date to the Second World War, and had a special service relationship with Bonneville before Congress passed the Northwest Power Act

in 1980. That law continued the special relationship by treating direct service industries as a distinct customer class. These industries over the past 10 years have employed an average of more than 10,000 people annually in the Northwest, bought some \$350 million worth of power yearly and paid annual wages in excess of \$400 million, according to Direct Service Industries Inc. statistics.

Average 10-Year Direct Service Industries' Contribution to the Northwest Economy (1978-1988)



Source: Direct Service Industries Inc.

Those averages mask wide swings in the industries' consumption of energy, and their place in Bonneville's revenue picture. For example, the aluminum industry alone bought \$380 million worth of power from Bonneville in Fiscal Year 1987. A year later, as a result of a spike in demand brought on by rising aluminum prices, the industry's energy purchases jumped to \$692 million.

In simple terms, the direct service industries perform a special service for Bonneville. It works this way: in exchange for somewhat lower electricity rates, the industrial customers agree to

let part of their service be interrupted when low water levels behind hydropower dams or heavy customer demand squeezes Bonneville's energy supplies. While that interruptibility gives the region's power system more flexibility to meet demand during extraordinary circumstances, it means more uncertainty for direct service industry production schedules.

Bonneville's contracts with these industries allow it to interrupt part of the service to any of them under certain conditions: inadequate spring runoffs, resources fail to come on line or operate as expected, or the stability of the region's electrical system is in jeopardy.

But for resource planning purposes, Bonneville treats three-quarters of the direct service industry load just like it treats customers receiving guaranteed supplies of power, known in industry lingo as firm power. This means that Bonneville's and the Council's plans identify ways the Northwest can meet 75 percent of direct service industry demand with guaranteed supplies of power. The remaining quarter, known in planning jargon as the top quartile, isn't treated as a firm power load in the region's resource planning.

At the end of 1989, according to industry statistics, direct service industries used 3,240 megawatts of firm and nonfirm electricity, equal to about one-sixth of the region's demand of nearly 18,250 megawatts. That's an 85-percent jump from the 1,750 megawatts direct service customers consumed during the 1982-83 recession.

The size of today's direct service industry demand, equal to more power than three cities the size of Seattle would consume, means that a relatively small number of customers play a large role in the Council's calculations of future power needs for the Northwest.



The size of today's direct service industry demand, equal to more power than three cities the size of Seattle would consume, means that a relatively small number of customers play a disproportionately large role in the Council's calculations of future power needs for the Northwest. Moreover, that role could be larger. Their contracts with Bonneville allow these customers to take up to 3,750 megawatts.

The aluminum industry dominates the Northwest's direct service customers. Ten aluminum smelters account for more than 90 percent of the direct service industry's total demand. Those

plants account for 40 percent of the United States' primary aluminum production capacity and more than 10 percent of the world's capacity.

Past and current Council forecasts have assumed that if the Northwest experiences high economic growth all those aluminum smelters will remain over the next 20 years. A drop in world aluminum prices, more foreign government subsidies to promote indigenous aluminum industries, or lower demand for aluminum could force the region's producers to shut down operations or move them elsewhere.

In its 1989 Supplement to the 1986 Power Plan, the Council assumed that if the region experiences medium-high growth, 91 percent of current aluminum capacity would remain. In the Council's medium and medium-low forecasts, 82 percent and 66 percent of capacity would operate, respectively. And if the region experiences low economic growth, only half its capacity would operate over the next two decades.

To complicate matters, detailed Council analyses also recognize that the region's economic growth may not go hand-in-hand with the direct service industries' need for power. In certain cases, for example, the direct service industry demand for energy may grow at a high pace, while that of the region as a whole may be at a medium-high or medium-low level. The reverse also could hold true.

All this translates into a range of potential direct service industry demand for electricity. At the high end, the Council predicts that these customers could consume 3,248 megawatts of firm

**Direct Service Industry
Forecast of Total Electricity Demand
(Average Megawatts)**

	<u>1989 Actual</u>	<u>2010 Forecast</u>
High	3,240	3,248
Medium-high	3,240	2,861
Medium	3,240	2,476
Medium-low	3,240	2,006
Low	3,240	1,537

Source: 1989 Supplement to the 1986 Northwest Power Plan

and nonfirm power in 2010, almost unchanged from current consumption levels. At the low end, the region's total direct service customer load could fall to 1,537 megawatts, a 53-percent drop from today.

The most recent data received by the Council staff suggest that demand over the next 20 years may be stronger than previous plans outlined, and that these ranges may need to be raised in the 1990 plan. But even with those revisions, direct service industry demand for energy could remain below today's level in all but the high-growth case.

Representatives of the direct service industries argue that even revised forecasts would be pessimistic, and that the region should plan to meet the direct customers' full load.

"We don't believe the Council should speculate that demand will fall off," says Carr, Direct Service Industries Inc. "It should plan to meet today's load plus reasonable load growth."

Carr points to two factors, put in place in the mid-1980s, that have stabilized direct customer

demand for power and revitalized the aluminum industry: Bonneville's variable rates and its conservation/modernization program.

In 1986, Bonneville instituted a variable rate for aluminum direct service customers in response to a recession throughout the industry. The rate pegs the price of power to the price of aluminum on world markets. The higher the price of aluminum, the more the customers have to pay for electricity. Should aluminum prices fall, so too do the companies' power costs. The rate also set ceiling and floor levels, above or below which prices wouldn't go.

Federal energy regulators in 1986 approved the variable rate for seven years. They will have to renew that approval in 1993.

At the same time, Bonneville instituted the conservation/modernization program for aluminum smelters. Through this program, Bonneville pays part of the cost of improving the efficiency of smelters. In return, smelters agree to take less power than their contracts with Bonneville say they're

entitled to. This program enables smelters to become more energy-efficient, which means they can stay competitive at lower aluminum prices.

“Once those things went into place, plants were reopened in the region by entrepreneurs,” Carr notes. “The solution is working and will continue to work. The appropriate planning assumption is that the companies will be here if the environment is right, that is, if the variable rate stays and if the companies receive adequate power supplies.”

The variable rate has been a boon for Bonneville during the past two years, Carr notes. It pumped \$500 million more into Bonneville’s coffers than the agency expected in 1988 and 1989, when low water and reduced electricity sales to California could have squeezed its income.

However, the direct service industries’ contracts with Bonneville expire in 2001. It’s anyone’s guess whether current arrangements will continue past the turn of the century.

Carr predicts the next contracts will resemble the current ones closely. “I don’t know their form, but I’d be surprised if they’d be radically different. The assumption should be that they’ll look very similar.”

But other observers say the new contracts likely will differ from the ones that direct service customers have operated under since 1981.

“In the short term, for the next decade, the contracts and economic conditions will determine the direct service load,” says William Drummond, manager of the Public Power Council, a Portland-based organization representing the Northwest’s consumer-owned utilities.

“Looking beyond the next contract, that is, beyond 2001, I don’t believe you have to assume existing contractual aspects will remain.”

The next few years will be crucial. Bonneville intends to place new contract proposals before all its customers, not just direct service industries, by 1995. The shape of those contracts, and the impact direct service energy demand will have on the availability of power for other customers, could have major implications for long-range power planning in the region.

“This issue won’t be resolved soon,” says Jim Litchfield, director of power planning at the Council. “We need to keep this in mind as we look at power issues in the 1990s.” ■

BONNEVILLE POWER ADMINISTRATION’S DIRECT SERVICE INDUSTRIES

	Company Name	Plant Location	Primary Products	Contract Demand (MW)	Electricity Capacity (MW)
Aluminum	Alcoa	Wenatchee, Washington	Primary Aluminum	360	216
	Columbia Aluminum	Goldendale, Washington	Primary Aluminum	296	279
	Columbia Falls Aluminum Company	Columbia Falls, Montana	Primary Aluminum	427	343
	Intalco	Ferndale, Washington	Primary Aluminum	468	459
	Kaiser	Mead, Washington	Primary Aluminum	738	411
	Kaiser	Tacoma, Washington	Primary Aluminum	1	149
	Northwest Aluminum	The Dalles, Oregon	Primary Aluminum	174	161
	Reynolds	Troutdale, Oregon	Primary Aluminum	701	253
	Reynolds	Longview, Washington	Primary Aluminum	2	419
	Vanalco	Vancouver, Washington	Primary Aluminum	235	230
		Total Aluminum			3,399
Non-Aluminum	Alcoa, Northwest Alloys	Addy, Washington	Ferro-Silicon and Magnesium	3	67
	ACPC	Vancouver, Washington	Aluminum Cable	5	3
	Carborundum	Vancouver, Washington	Silicon Carbide	34	0 ⁴
	Georgia Pacific	Bellingham, Washington	Chlorine and Caustic Soda	34	34
	Gilmore Steel	Portland, Oregon	Ferro-Alloys and Calcium Carbide	30	0 ⁵
	Kaiser	Trentwood, Washington	Aluminum Plate	1	67
	Nickel Joint Venture	Riddle, Oregon	Ferro-Silicon, Nickel	120	103
	Oremet	Albany, Oregon	Titanium	18	11
	Pacific Carbide	Portland, Oregon	Calcium Carbide	9	0 ⁴
	Atochem	Portland, Oregon	Chlorine and Caustic Soda	84	78
	Port Townsend Paper Corp.	Port Townsend, Washington	Paper Products	17	13
	Alcoa, Vanexco	Vancouver, Washington	Aluminum Extrusions	3	4
		Total Non-Aluminum		351	380
Total ⁶			3,750	3,300	

Notes: 1) Included with Kaiser Mead, 2) Included with Reynolds Troutdale, 3) Included with Alcoa Wenatchee, 4) Plant has been dismantled, 5) Currently served by PGE, 6) Contract demands not reduced for expected conservation/modernization program savings.

Point of View

John Ellis

with Dulcy Mahar

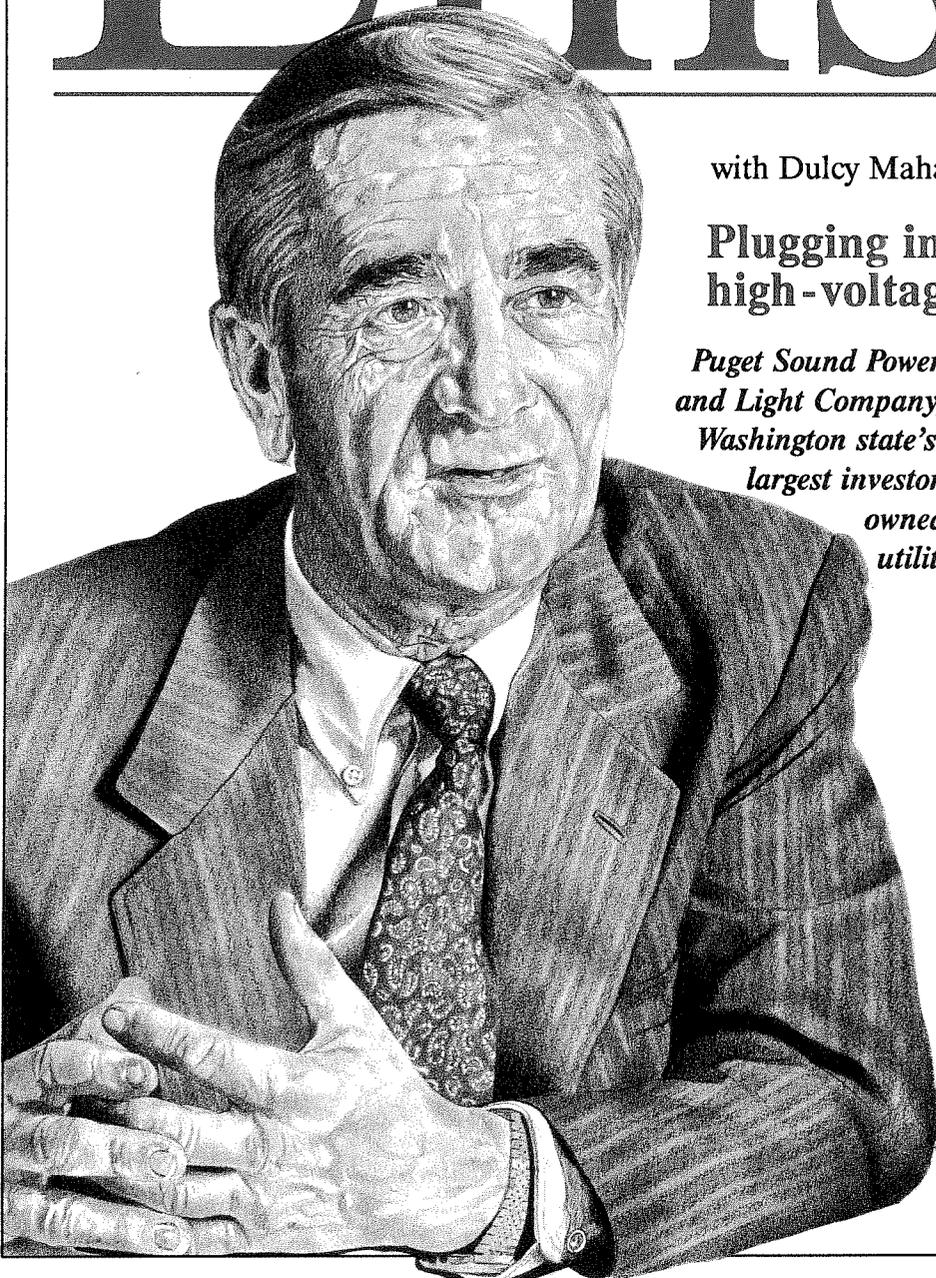
Plugging into Puget Power's high-voltage chief executive.

Puget Sound Power and Light Company, Washington state's largest investor-owned utility,

is in a unique position in the Northwest. Its service area, which includes 1.5 million customers in northwestern Washington, happens to be the fastest growing part of the region by a considerable margin.

For Puget Power, there was no electricity surplus in the 1980s. It was, in fact, the only investor-owned utility, other than some short-term purchasers, to buy firm power from the Bonneville Power Administration. Currently, Puget Power depends on others for more than 60 percent of its power.

To meet the rapidly accelerating demands for electricity and stay profitable, Puget Power has had to get out in front of everyone with innovative programs



**“Least cost”
cannot
simply mean
the
least dollar
cost
of the
particular
program or
resource.**

and policies. As a result, it has racked up an impressive list of firsts. Puget Power was the first Northwest utility to develop a least-cost plan. It has spent more than any utility, outside of Bonneville, on conservation programs. It was the first to seek resources through a bidding system, and it is about to embark on another first for the region, conservation transfers.

Puget Power's chairman and chief executive officer, John Ellis, is also in a unique position. Not only is he well respected within the region for aggressive utility leadership, but he is also a national utility industry spokesperson, frequently appearing before Congress and other major forums. This year he is chairman of the Edison Electric Institute, a national organization of investor-owned utilities.

Ellis came to the utility via legal service. As a partner in a law firm, he had served the utility as its chief legal counsel. In 1970, he accepted an offer to join Puget Power as chief operating officer with the provision “that I would never have to practice law again.” He became president and chief executive officer in 1976. Three years ago, he was named chairman of the board while retaining his position as chief executive officer.

He is active on a number of industry and civic boards, and has reaped a fair share of honors, including Seattle's First Citizen Award.

By his own definition, Ellis is a “jack of all trades.” He plays in a band, flies an airplane, skis, plays tennis and builds boats. “I just love to do everything in the world,” he says.

Ellis and his wife, Doris, live in Bellevue, where Puget Power is headquartered. Like his four children, he was born and raised in the Seattle area. His graduate and undergraduate degrees are from the University of Washington.

Q. Yours was the first investor-owned utility in the Northwest to get involved in least-cost planning. Are you far enough along to see some results? How does least-cost planning help you address future uncertainty?

We're now about to go to the [Washington Utilities and Transportation] commission with our second plan, so we've operated long enough under the first plan that we're getting a better feel for

how the whole operation works.

In order to come up with a plan that makes sense, you're required to look at your load forecast, your resource plans and how things like conservation may integrate into such plans. You find yourself looking at external factors perhaps in a way you hadn't earlier. I'm referring to such things as the long-range outlook for supply and the price of various fuels, and even such items as potential national policies that may impact air quality or matters of that type.

You can't derive a real least-cost plan without taking all those elements into account. The reason I say that is that least cost cannot simply mean the least dollar cost of the particular program or resource. It has to involve all of the various costs and an analysis of all of the risks involved in any particular course of action. This may ultimately lead to a dollar cost that is actually higher than the cost of some other action, but which overall may be the “least cost.”

Q. You're talking about accounting for the cost in terms of risk, as well as the actual dollars and cents price tag on the resource.

Exactly, for example, today if you were simply looking at a generating plant, everything else being equal, you would probably select a combustion turbine. It's the easiest to site, cheapest to finance, and, at least today, the fuel supply is the cheapest. But, if you were to analyze that resource against other resources, you

would also ask yourself such questions as: how stable is the fuel supply, how stable is the price, can the plant be operated under various air quality classifications, etc., before you could decide what the real cost is.

Another thing that has to be taken into account is that we have a moving target. If I'd had a least-cost plan four years ago, I would probably have had a significant item in deriving load requirements that related to wood stoves. Today I'd have to take that out, because air quality says that resource is no longer available to us when we need it, which is at the peak of our load.

We have the same thing with respect to solid waste power generating. In our last report, we still thought solid waste was a very viable and immediate resource. Now, with the difference in public attitude that's arisen in just two years, it's very doubtful.

So this time in our DARE [Demand and Resource Evaluation] report—which is our least-cost plan—we've attempted to create a number of widely divergent scenarios to apply some of this risk analogy to. These scenarios deal with load growth, economic growth, resource availability, etc. We ask ourselves what would happen if we had high growth, and air pollution restrictions made it impossible to acquire a certain resource?

Unfortunately, the pressure on utilities will be, initially at least, to say least cost simply is whatever will cost the least that particular first year. That's the way it's looked at in a rate case. That pressure may force utilities to make decisions that don't make long-term sense.

Q. Puget Power has been the most aggressive utility in the region in marketing conservation programs. What are your experiences with conservation?

We have been involved in conservation, both peak and energy,¹ since 1970. We became significantly active in the late '70s as a defense mechanism, because our load was growing faster than the resources we planned to build. In fact, in 1980 we perceived we were in such difficult shape that we asked for a moratorium on our obligation to hook up electric heat customers.

So that's the atmosphere that our conservation programs started in. It wasn't one of trying to do something as a public relations message. Our attitude has been; get some cost-effective conservation, so we can keep our load growth within bounds.

Our total investments and expenses for conservation programs exceed \$200 million. We were fortunate that, when we went into the conservation investment program, our legislature granted us a 2-percent additional return in equity for conservation investments. We certainly hope that continues, although it's currently at issue.

The thing we've been frustrated about has been the inability to pass sensible conservation codes, so that we wouldn't be out there policing construction. I think the regional Council may have erred a bit in this area with their insistence on very rigid MCS [model conservation] standards. This may have delayed more broad implementation of weatherization codes. I'm not sure the slight difference in effectiveness was worth the delay. But maybe the debate is about over.

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All in all, I really have nothing but good to say about conservation.

Q. What, if any, barriers have you run into in implementing conservation, particularly regulatory barriers?

The major regulatory problem we have with conservation, and most people don't understand this, is that as we make conservation investments we don't receive anything to compensate us for even the carrying cost of that investment. This is true between the time we make the investment and the time we have a rate decision. Thus, we may have an investment on our books for several years with no return and no carrying charge attached.

1. Peak refers to the highest demand for power during a stated period. Energy here refers to average annual energy generated.

I think it would be most helpful to utilities if we had some current way of collecting a return on conservation investments as they're made, or an updating procedure, rather than having to go from rate case to rate case. I know our commission is looking at some method of doing that now.

We also have recently had a very serious situation where the IRS [Internal Revenue Service] is taking positions on conservation investments that could result in significant tax penalties to utilities offering conservation. One proposal would make some conservation payments received by customers taxable income. I testified on that issue recently before the [U.S.] Department of Energy, asking if they can't do something about it. That's the sort of thing that can turn a program around overnight, just bang, and it shouldn't be happening.

Q. Puget Power is also pioneering in another conservation area, that of conservation transfers—where a utility with surplus electricity sells some of its conservation savings to a utility that needs the power. Yours will be the first such arrangement in the Northwest. What is its status?

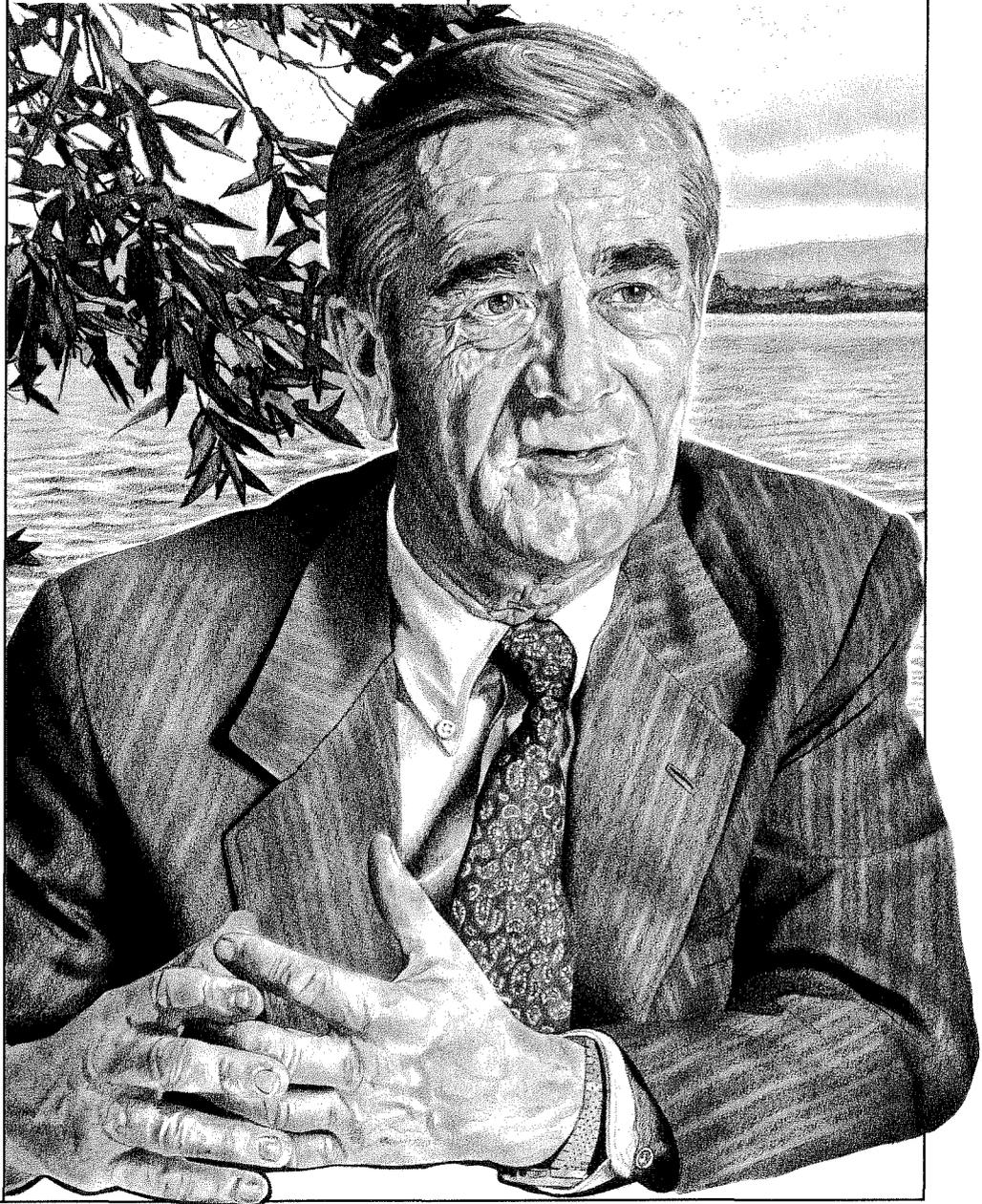
I guess the status is that the agreements have been executed. I think everyone involved in it right now is kind of wondering just exactly what it is that they've done. Our problem has been, how in the world do you create a resource that is a firm, long-term resource as far as the acquiring utility is concerned, a resource that it can treat therefore as an addition to its resource stack?

Naturally, the party on the other side wishes only to provide you with that resource for as long as it doesn't need it itself. So that's where the arguments have come. Whether our current formula will work or not is what everybody is waiting to see. The potential is there, no question, but the mechanics are the difficulty.

There again, it's very important that we receive regulatory treatment that recognizes this as an appropriate investment and doesn't defer or delay it in some way.

Q. Puget Power is also the first Northwest utility to use bidding as a way of getting resources. What has your experience been in this area?

Interestingly enough, the bid [request for proposals] that we put out was a combined demand- and supply-side bid. We asked for a hundred megawatts in resources. We received a great deal more in terms of bids, some 1,200 megawatts, of which at least a third to a half were legitimate resources. We've narrowed those



down now to where we're looking at the most favorable bids at this point.

Most were supply-side bids. The amount on the demand side was relatively small. It's particularly interesting that, on the supply side, most of the top bids we received fall in the cogeneration category.

A disturbing part of the bids was that, on the generating side, most involved projects fueled with natural gas. I have a concern as to just how much gas there's going to be around to burn and what the price will be. I do think

that the most legitimate place for gas to be burned, if it does come in short supply, is in a cogenerating plant, where we can achieve both the industrial use and some electricity as well. So I'm pleased to see the cogenerators stepping up here.

Another reason that I was pleased with the process is that most of the supply bids are in our service territory and provide us with generation near load, which is what we so desperately need as transmission problems multiply.

Q. What is the status of your interest in a new power transmission intertie line to BC Hydro, British Columbia's power company, and a third AC intertie line to the Southwest?

I believe that the single most important aspect to a successful future for this company is obtaining transmission access to the north and to the south. By access, I mean access totally under our control and not subject to control by competitors in the marketplace. The reason I say that is that Puget Power is in a sense isolated in that we are here in the northwest corner of the state.

We need to be able to look to markets and supplies in the southwestern part of the United States and to seasonal and other diversities that exist down there. We need to be able to look north to British Columbia for supplies, markets and reservoir storage.

We need to be able to pursue those independently of some other entity's own needs. That's the reason we have been pushing so hard for ownership-equivalent interest in the third AC line south and our BC Hydro interconnection.

The BC thing is well along. It's a relatively short line, only 19 miles long. It has another benefit to our system in that it provides significant system stability in the north end of our system, which we need pretty badly.

The Southwest represents potential additional resources over time. They have large nuclear plants down there that are currently surplus. They are potential markets for those seasons when we have energy to sell, so we can keep our own costs down. It's not



simply a matter of an exchange for winter versus summer. It's also that free path, which allows us to get more efficiency out of our system and they theirs.

Q. What do you see as the long-term role for Bonneville? How should it best fit in the regional scheme?

My problem is that I have become darn close to being the old timer in the industry now.

In my earlier days around here, Bonneville's role was to administer the hydro projects on the Columbia River and elsewhere, to supply its requirements preference customers² and its industrial customers, and to see to the appropriate distribution of preference power.

Also, kind of through consent of all of us through the years, Bonneville built the regional transmission grid. This was treated in essence as a common carrier for everyone to use, upon payment of a reasonable charge. And then, of course, the intertie was built, and Bonneville was given the authority to sell excess power to California. But at that time, we intended to make it clear by provisions in the law that federal hydropower in the Northwest was to have a regional preference.

In the last few years, as Bonneville has become more market-oriented, its approach with respect to the use of its transmission facilities and its sale of federal power outside the region has changed significantly.

Its transmission policies now resemble those of a large utility attempting to guarantee its own market, rather than that of a public entity making access available to all. In addition, for economic

I believe that Bonneville's role should be a broad one, but I fear that in their need to look at the bottom line, they have neglected their regional responsibility from time to time.

reasons, Bonneville is frequently engaging in transactions out of the region, which impose additional costs and supply risks on non-preference customers within the region.

I believe that Bonneville's role should be a broad one, but I fear that in their need to look at the bottom line, they have neglected their regional responsibility from time to time. On the plus side, I don't believe Bonneville has ever been better administered.

Q. What do you see as the biggest issues before the region?

Well, supply, obviously, and cost right along with it. They're equally dependent on each other. The single big issue is, are we willing to pay the kind of costs that will be necessary to secure a long-term supply, or are we going to take risks in order to achieve lowest-level costs and jeopardize that supply?

I sound like I've been talking only about [supply-side] resources, and I don't intend to. I think there is a yet untapped conservation potential in this region, and we've got to get going on it. But it has to be viewed as something that relates to all fuels and not just electricity.

I don't want to be in the position I was in during the early '80s, where gas supplies were cut off to residential customers because of a lack of supplies in Canada, or in the late '70s, when people were coming to us to throw in an electric furnace, because their oil costs were skyrocketing. I think we need to pursue conservation programs that apply to all sources of energy.

2. Preference refers to priority access to federal power granted to public bodies and cooperatives. Regional preference would include investor-owned utilities in the region, as well.

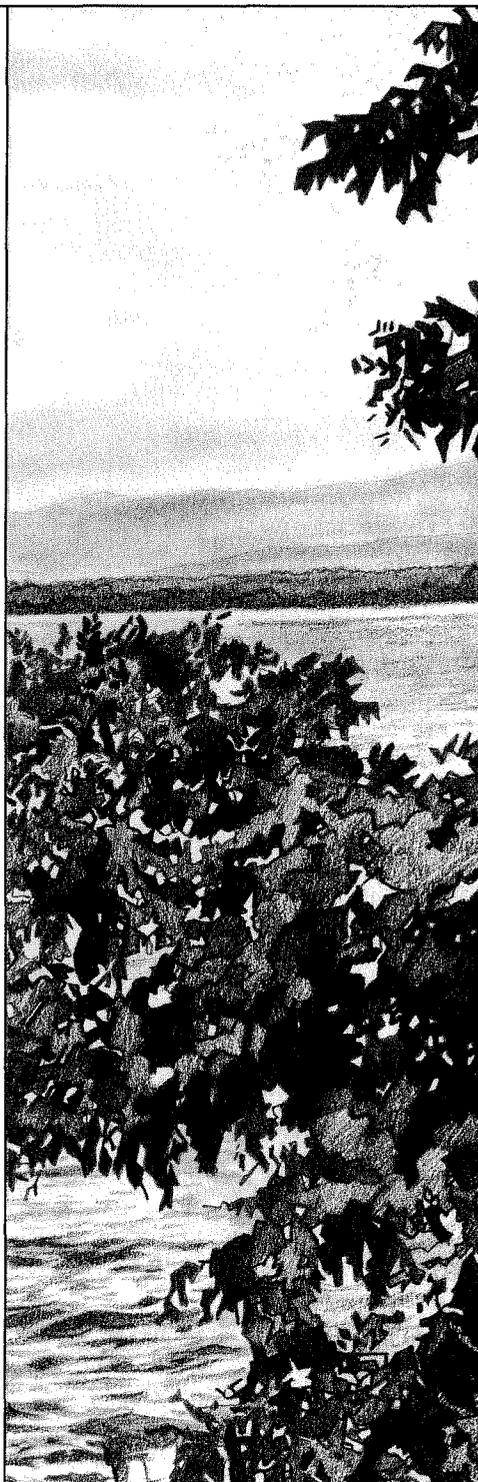
This has nothing to do with competition. It has to do with the fact that all energy supplies over time will be tighter, that all will be more expensive. That applies to use for automobiles, houses, industry and everyone else. The only way that's [conservation programs for all fuels] going to happen, is when the consumer sees the real cost of energy. Consumers need to understand that the rates today are perhaps artificially low and may not be adequate in the future.

Q. There is a perception among some people that Bonneville is making near-term rate stability the end-all, at the risk of higher costs in the longer term.

That's exactly what I'm saying. I don't blame them. The political pressure on an agency like Bonneville to maintain rates at the lowest possible level is so great that it forces them to do some of the things I've described. For example, they're attempting to sell power as expensively as possible outside the region and, in the course of that, making it only available to us at that more expensive rate. Remember, we're not a preference customer, so we don't get that same kind of break.

Q. We've talked about Bonneville, but what long-term role do you see the Council having in the region?

I was one of the people who wrote the regional act and who spent the better part of two-and-a-half years lobbying for the creation of the Council. And I've had any number of people who have asked me in the last few



years if I had to do it over again would I. I admit that I've had to think pretty hard on it, but the conclusion I've reached is, yes I would.

A regional planning body—a body to *help* the region plan, not to plan for the region, by the way—was a good idea, and it still is. Now, I think they've had it easy so far. They have yet to be

involved in the kind of situation we created them to handle, which is a period of continuing need for resources to serve growth and a shortage of resources. They have never had to make a tough balancing decision.

As wild as some of the arguments have been on fish, etc., the fact still is that the Council has been on the side of the gods on that one. They've thrown more cost on electric ratepayers, but without any great objection from that group, and certainly have achieved grand social objectives as a result!

But they've never had a situation of such shortage that they had to balance solving that issue with the issue of supply and the economy and all those other things that we assumed they would be dealing with when we created them. So I say, so far, it's been an easy job; it's been a snap, in fact.

We will find out if the Council really works as we get closer to this shortage time. Then we'll find out if they really provide the forum where all of the public interests can be brought together, and a single course of action can be agreed on, and a regional consensus built upon which action can be pursued. And, we aren't at that point yet, but we're getting very close.

Q. As the Council develops its new power plan, what are some things you want to see come out of that plan?

I'm really scared about this idea of firming up secondary energy³ with combustion turbines. It sounds great on paper, but it really should be called supplying the next 3,000 megawatts of generation with natural gas. That's basically what you say when you say you'll firm up secondary.

We've just got to look at other alternatives besides that one. Firming nonfirm is an example of the easy out, because it sounds so easy.

Q. What are the alternatives you would look at, assuming that we will need a lot more than conservation in the higher growth scenarios?

I think the Council needs to speak up, for example, before the Department of Energy and indicate that we will need to have a way that we

can build coal plants in the region.

We have built coal plants in this region in the last 15 years, all of which are fully scrubbed, all of which are burning low-sulphur coal. In terms of the environment generally, we have nothing at all to be ashamed of. This region needs to make itself heard nationally if we begin to look at restrictions on building appropriate fossil fuel plants because of the quality of performance by others in other parts of the country.

I don't think we should penalize consumers by making it impossible to build an appropriate fossil fuel-fired plant here. I really feel strongly on that issue. We risk the reliability of our system for every year we duck getting on with the question of where are our resources really going to come from. That means looking for sites; that means encouraging clean coal technology; that means, God forbid, getting back with a good hard look at nuclear. Those are the things that planners are supposed to be doing.

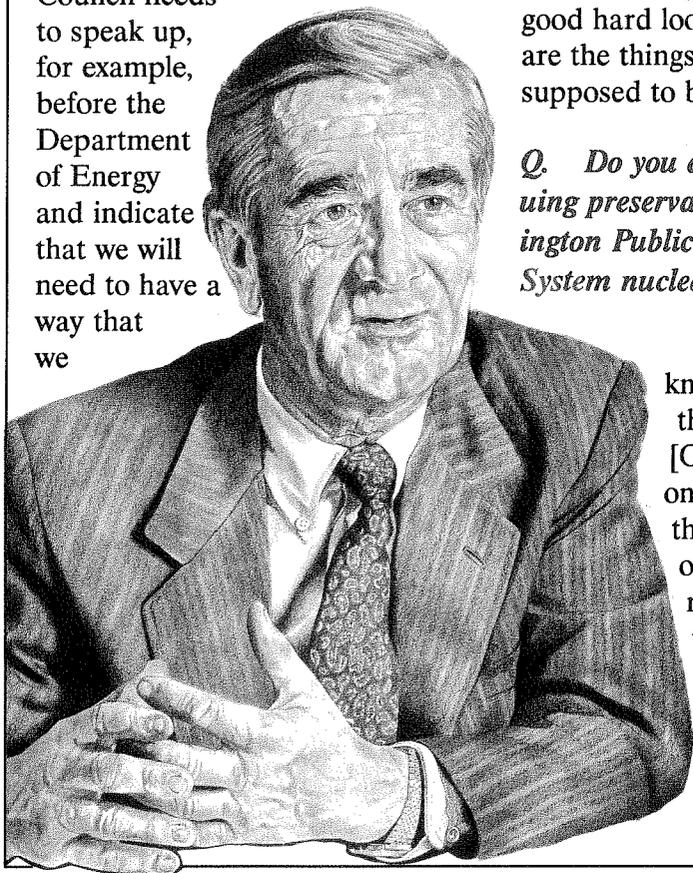
Q. Do you advocate the continuing preservation of the Washington Public Power Supply System nuclear projects 1 and 3?

I honestly don't know the answer there. I read a [Council issue] paper on that recently, and there were two pieces out of it that struck me. One is, will the technology be good when we finally decide to get going again? The other had to do with who manufac-

tured the plant and what the operating capacity factors of plants built by various manufacturers were.

I also had the impression that the paper didn't reach any conclusions, and I kind of agreed with the approach. I think it was pretty sensible to say that, obviously, if the plants reach the point where they're technological no good any more, you've got to get rid of them. And even if today, with its current technology, one probably wouldn't be cost-effective, you might as well not mess with it further. Clearly, some additional tough-minded study should be done before a final decision is made.

I do feel that some time relatively soon we'll see the nuclear technology back in some form or the other. I think, with global climate changes, restrictions on fossil fuel, supply problems with gas and the potential of foreign problems with oil, that we are simply going to have to have some other central station alternative to go with the rest of our menu of resources. But don't ask me to get in front of that one.



3. Secondary energy is another name for nonfirm power. Nonfirm power is hydropower that is available above the critical water (historical low) level. Because it depends on the weather, it cannot be guaranteed and thus cannot be sold to meet firm power loads. The Council has been considering proposals to firm up this power by backing it up with gas-fired combustion turbines during those times when secondary power is not available.

Q. I'm not sure that many of our readers know what Edison Electric Institute [EEI] is. What is it, and what are the big issues before it currently?

Edison Electric Institute is the association of all of the investor-owned utilities in the United States. Collectively, they probably supply over 80 percent of the nation's electricity. In general, as chairman, I'm kind of the chief spokesman for the industry on those matters we can agree on.

The top issue before EEI is clean air. I can't tell you what a complicated, enormous issue that is for the country and for utilities. It's clear that the sort of emissions reductions that are being asked for are going to cost a great deal of money. The estimates run from \$20 billion to \$50 billion or more. The question becomes, who pays those costs? Are they spread generally across the country, or do they apply to those plants that are the offenders?

Perhaps the bigger question is, what will the impact of this law be on the ability to build any kind of fossil fuel-fired plant in the future? I'm not just talking about coal, although it's principally affected. I'm also talking about oil and, to some degree, natural gas.

What the industry is afraid of, costs aside, is that the law could be put in a form where coal-fired generation, at least as we know it now, could simply not be built in some parts of the country. And, strangely enough, it may not be built in those parts of the country where the cleanest coal plants exist today.

The reason for that is that regulation starts with the performance of plants today and assumes you can't get any dirtier than that. So our plants in Montana, which are perhaps the cleanest in the country, start at a level where you can't possibly reduce anything further. If you go East where you're starting at levels that are 10, 20 or 30 times the rate of emissions of our plants, you have a lot of ability to further reduce emissions. The current proposals, in effect, allow you to use these reductions as credits to build other plants.

The second issue in the industry is transmission access. That's a hot issue throughout the country, as transmission becomes more important.

And the third issue is what we call industry structure; some people call it deregulation. It's the growth of a new breed of generating company called an independent power producer, which would be able to sell pretty much free of regulation at market price and not at cost-based rates. That's a major issue.

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Will the industry be restructured to accommodate those entities, or, in fact, will the industry itself ultimately deregulate at the generating side? Don't expect an answer to that in the next three days. ■■

Laying the Conservation Foundation

by Ruth L. Curtis

Bonneville's resource program starts to build a firm footing.

How solid a building is and how many problems appear over its life depends in many ways on how well its foundation is constructed. In the world of electricity and acquiring new resources, the same principle applies.

The Bonneville Power Administration this winter released a plan for acquiring new electrical power resources for the Northwest. The Draft 1990 Resource Program describes Bonneville's proposed actions to develop conservation and generating resources during the period 1992-1993, plus longer-term conservation efforts through 1997. While the Northwest Power Planning Council is generally in agreement with Bonneville's plan, the Council has expressed some concern about near-term activities that constitute the foundation of the plan.

"We are concerned that more action is needed this year and next, so Bonneville can make the transition to the energy-efficiency and generating resource pro-

grams they have proposed for 1992 and 1993," said Council Chairman Tom Trulove.

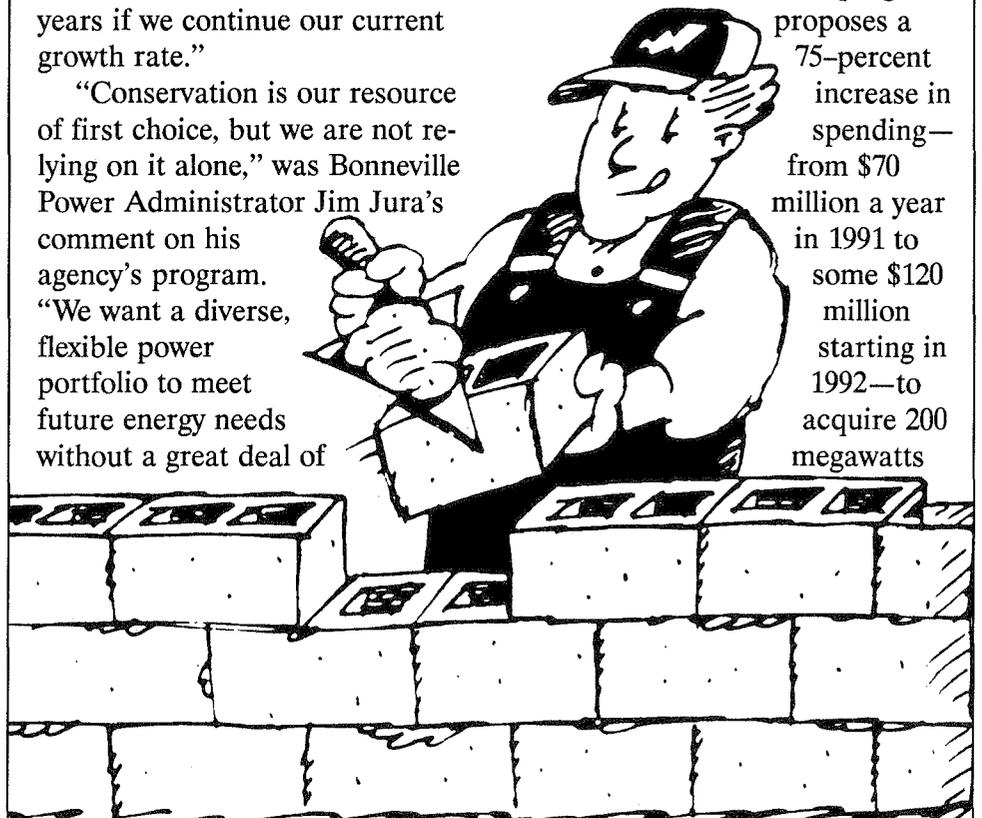
"There is also a question about whether Bonneville's conservation targets are high enough—especially given the fact that the Bonneville system could need to serve substantial amounts of additional load in the next few years if we continue our current growth rate."

"Conservation is our resource of first choice, but we are not relying on it alone," was Bonneville Power Administrator Jim Jura's comment on his agency's program. "We want a diverse, flexible power portfolio to meet future energy needs without a great deal of

financial risk."

Trulove agrees with that. "However, we're concerned that Bonneville is planning to build a major conservation effort, but due to the lack of progress on conservation in the past, the foundation may not be in place for this kind of buildup."

For conservation, the program proposes a 75-percent increase in spending—from \$70 million a year in 1991 to some \$120 million starting in 1992—to acquire 200 megawatts



of efficiency savings between 1992 and 1997. The program also calls for buying power from new generating resources, including a geothermal demonstration project, and making some existing generating plants more efficient. As a contingency plan, Bonneville proposes to take an option on two 420-megawatt combustion turbines that can be fired up when needed to meet peaking energy demand.

As the Northwest's electricity surplus has disappeared, and the specter of a power deficit looms on the horizon, the region is looking intently at new resources to meet growing needs. Conservation—the more efficient use of energy—is considered by the Council and Bonneville to be the most attractive of the possible new resources. It is a large resource, amounting to more than 3,000 megawatts if economic growth is robust, and it costs less than half as much as new generating resources.

Energy efficiency is also a flexible resource; many conservation programs automatically match the growth in energy demand when new buildings are constructed to be energy-efficient. Furthermore, conservation programs can be developed much more quickly than most new power plants, providing that the groundwork of program design and experience is in place before the program needs to be built up.

The Council has led this effort with its long-range planning for the Northwest's electricity future. Bonneville has been working to take the Council's 20-year power plan and translate it into near-term action.

During the power surplus, the Council urged Bonneville to establish a solid base of conservation programs to provide a stable transition when the energy is needed. In its 1983 Power Plan, the Council noted that Bonneville and the region's utilities had little experience with conservation programs, except for those dealing with weatherizing existing homes. The Council called for the region to build the capability to acquire all types of energy savings at a pace that would meet the region's future needs. This capability means demonstrating the ability to get a specified amount of energy savings at a set cost within a specific time period. The plan particularly recommended specific programs in the commercial and industrial sectors.

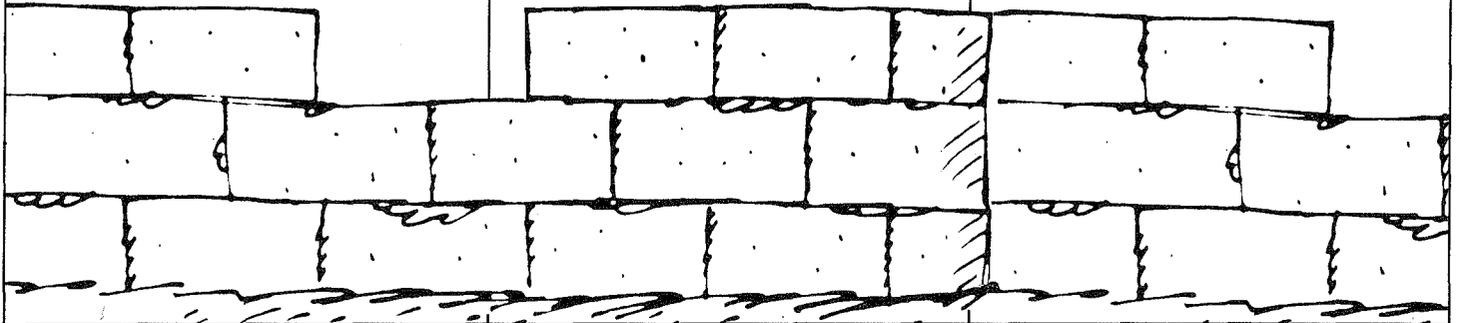
Expanding conservation efforts as soon as possible will also help secure some very cost-effective resources that could be lost to the region forever if they are not captured at the appropriate time. These so-called "lost-opportunity" resources include new office buildings that must be made energy-efficient when they are constructed. Weatherizing these structures later is expensive

“There is a question about whether Bonneville's conservation targets are high enough.”

—Tom Trulove

and can never achieve the same level of efficiency.

A year ago, the Council assessed Bonneville's conservation efforts. From 1981 through 1987, Bonneville became a regional and national leader in implementing energy-efficiency programs. The agency invested nearly \$685 million in all its conservation efforts. Of this, \$248 million was spent on building the capability to acquire conservation, and \$437 million went toward actually acquiring 185 megawatts of conservation savings. These savings cost 1.4 cents per kilowatt-hour—a real bargain compared to 10 to 12 cents per



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—Jim Jura

kilowatt-hour electricity from new generating plants.

While Bonneville achieved a number of milestones with conservation, much more needs to be done. The good news is that the region has extended its proficiency in reducing energy waste in existing homes through weatherization and in new homes by encouraging energy-efficient building techniques.

The bad news is that progress in the commercial and industrial sectors has been much slower. The Northwest still does not know how to design region-wide programs to capture the sizeable energy savings in these sectors. Furthermore, cost and savings data, and a trained labor force are still not available.

The Council has regularly asked Bonneville to expand its efforts in the conservation arena. And it has not been alone. In July, when reviewing Bonneville's budget, the U.S. Senate Committee on Appropriations stated:

Given the declining surplus of electricity in the Northwest, the Committee is concerned that several objectives in the least-cost plan have not yet been achieved. BPA [Bonneville] shall continue its efforts to increase staff and other support in Fiscal Years 1990 and 1991 for lost-opportunity conservation programs, including pilot programs in the commercial and industrial sectors. The objective of these efforts should be to gain sufficient experience and capability so that in Fiscal Year 1992 BPA is able to operate programs designed to capture all cost-effective lost opportunities in its customers' service territories.

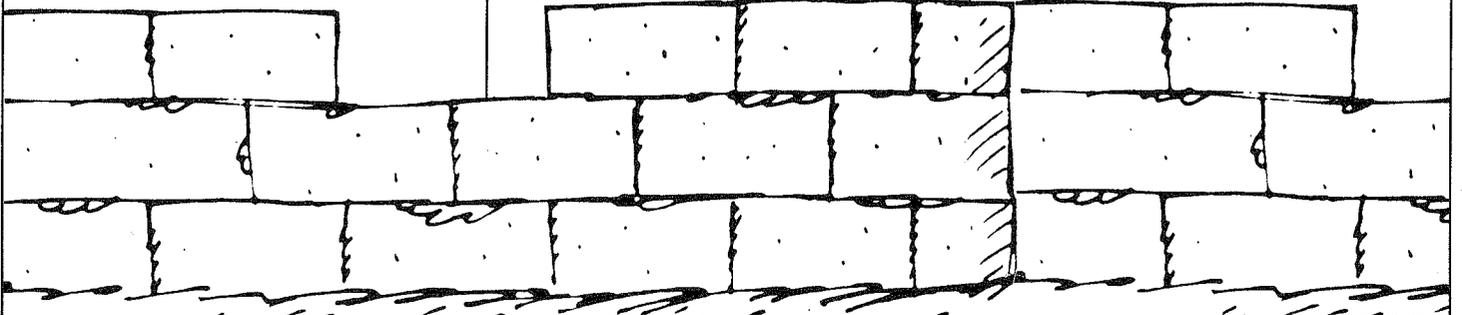
That same month, the heads of Seattle City Light, Tacoma City Light and the Eugene Water and Electric Board wrote Jura to say that they were “vitaly interested in the direction of Bonneville Power Administration resource acquisition programs over the next one to two years... given the diminishing size of the surplus, we think now is the time to

revisit appropriate levels of BPA conservation funding.”

“The first increment [of new resources] should come from continued pursuit of residential conservation while the infrastructure for such programs remains intact,” the three utilities wrote. “In the commercial sector... funding levels need to be increased and new programs initiated if we are to move smoothly toward optimal resource acquisition. In the industrial area, only two programs... have been undertaken—an insufficient level of activity to make long-term program decisions.”

Trulove, speaking for the Council, concurred with the comments of the three public utilities. “The time is approaching in the Northwest when we will need new sources of electricity. What we do now will determine how cheaply we can acquire those new resources.”

Bonneville's draft program was released in December for public comment. The final version is expected in July 1990. ■■



m c s u p d a t e

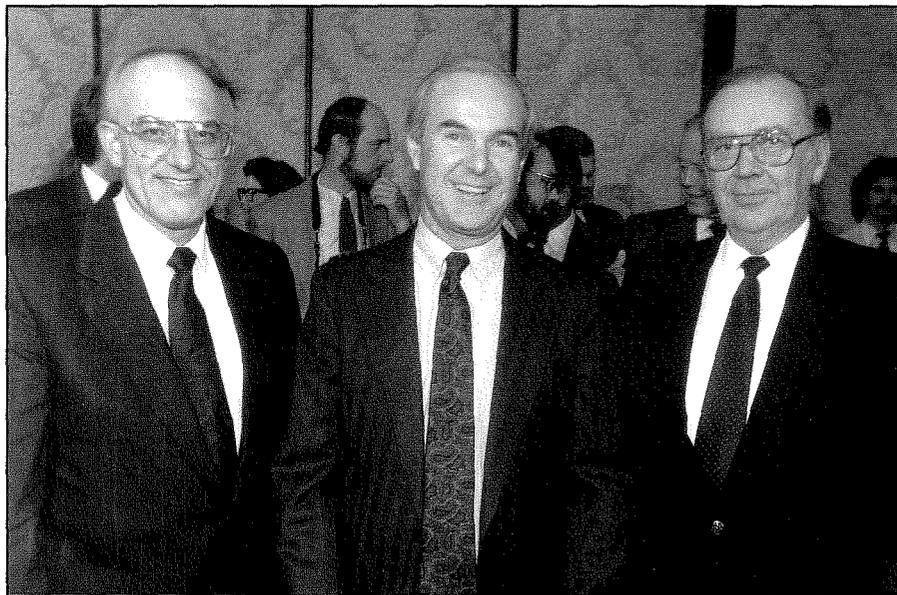
by Judi Hertz

Evergreen State marches ahead on model conservation standards.

"The Washington state legislature has blazed a trail for the rest of the states in the region." That's how Tom Trulove, chairman of the Northwest Power Planning Council, characterized the January passage through both state chambers of a law adopting model conservation standards for new residential construction in Washington.

The standards, sometimes referred to as the Northwest Energy Code, were developed by the Council to save electricity in new electrically heated homes and other buildings in the region. The key features of the bill include a building code equivalent to the Council's standards with some minor alterations and a code for non-electric homes that is identical to that in a bill the legislature considered last year. This year's bill also retains the former bill's requirements for indoor air quality in electrically heated homes.

Passage of the statewide energy code, which takes effect July 1991, coincided with a celebration marking the 50th city or county in Washington to adopt the code locally. Since 1984, when the city of Tacoma, Washington, became the first jurisdiction to make the model conservation standards part of its building code, over 70 other cities and counties in Idaho, Washington and Montana have adopted these standards.



Washington Governor Booth Gardner is flanked by that state's Power Council members, Tom Trulove (left, Council chair) and Ted Bottiger, after signing into law the new statewide energy code.

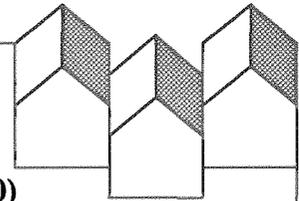
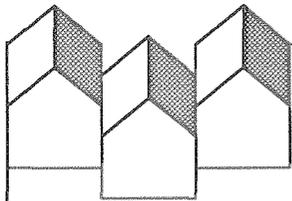
The state of Oregon amends its statewide building code every three years and is considering the Northwest Energy Code for 1992.

"We salute the farsighted leadership of local governments who have been adopting the model conservation standards since 1984," Trulove noted. "The sum of all their adoptions totals close to 70 percent of all new electrically heated housing starts in Washington."

Through September 30, 1989, 6,343 multifamily units and 3,029 single-family homes had been built to the standards. This construction amounts to approximately \$20 million in energy savings (money the Bonneville Power Administration would have

spent acquiring electricity) and results in approximately 2.3 megawatts saved for the region. These numbers include some savings in megawatts and dollars accrued as a result of improved building codes, as well as savings from homes built through utility-sponsored efficient-home marketing programs such as Super Good Cents and Comfort Plus.

The following are the jurisdictions adopting the Northwest Energy Code and the date of adoption.

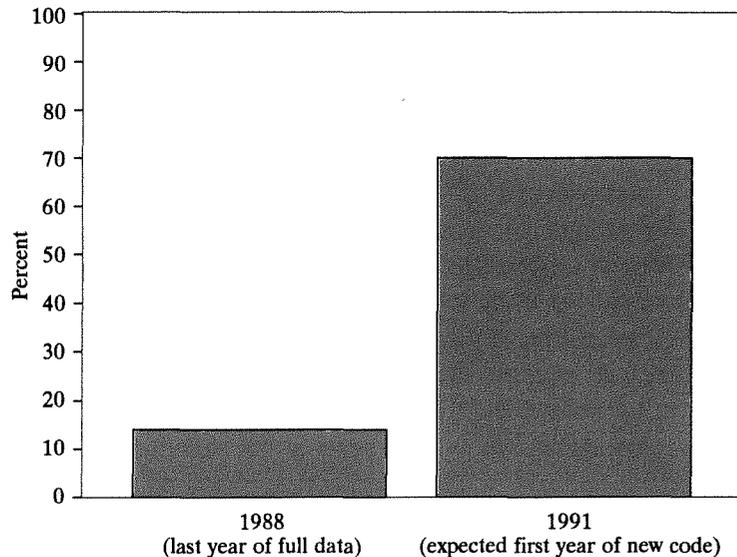


NORTHWEST ENERGY CODE ADOPTERS

(Cities/Counties Adopting as of February 20, 1990)

WASHINGTON	WASHINGTON (cont.)	IDAHO
Blaine 1988	Newport 1988	Albion 1987
Bremerton 1989	Okanogan 1989	Ammon 1987
Brier 1989	Omak 1990	Bingham County 1987
Cathlamet 1987	Pateros 1989	Blackfoot 1987
Cheney 1986	Pend Oreille County 1987	Bonnors Ferry 1987
Columbia County 1986	Port Angeles 1990	Bonneville County 1986
Cusick 1988	Port Orchard 1989	Burley 1987
Elma 1985	Pullman 1987	Declo 1987
Ephrata 1989	Quincy 1989	Franklin 1987
Everett 1989	Republic 1985	Harrison 1989
Ferry County 1989	Royal City 1989	Heyburn 1987
Fife 1986	Snohomish 1989	Idaho Falls 1986
Fircrest 1986	Snohomish County 1989	Iona 1986
Franklin County 1989	Soap Lake 1989	Kootenai County 1989
Grand Coulee 1987	Spokane 1987	Latah County 1990
Granite Falls 1990	Spokane County 1987	Minidoka 1987
Ione 1988	Stanwood 1984	Minidoka County 1987
Kennewick 1990	Sultan 1989	Moscow 1988
King County 1989	Tacoma 1983	Nampa 1990
Kitsap County 1989	Tonasket 1989	Nez Perce Tribe 1989
Lacey 1990	Twisp 1989	Orofino 1988
Lincoln County 1989	Warden 1989	Rupert 1988
Mason County PUD #3 (utility) 1989	Winthrop 1989	Shelley 1987
McCleary 1984	Yakima Indian Nation 1989	Soda Springs 1989
Metaline Falls 1988		Ucon 1987
Milton 1986		
Monroe 1990		
	MONTANA	
	City of Missoula 1988	

**Regional Impact of
Washington's New
Statewide Energy Code on
Percent of Electrically
Heated Homes Being
Built to the Full Model
Conservation Standards.**



FISH BYPASS FUNDS BEGIN TO

FLOW



Then Vice-President George Bush on a 1988 Oregon fishing trip.

by Steve Crow

Protection for young salmon and steelhead gains White House support.

For the first time in recent history, a president's budget request to Congress includes support for a major program of repairs to mainstem Columbia River dams. These repairs will save millions of young fish attempting to migrate downstream. The bypass channels and screens covered by the \$15-million appropriation will divert

the tiny migrants from deadly turbines at four federally owned dams.

President George Bush put the bypass money in his administration's 1991 budget at the urging of a coalition of regional and congressional representatives. Key Northwest Senators—Mark Hatfield and Bob Packwood of Oregon, and Jim McClure of Idaho—worked closely with ad-

ministration budget officials for months to develop the budget proposal.

The safe-passage improvements had been the consensus position of a broad spectrum of Northwesterners representing utilities, fish and wildlife agencies, Indian tribes, the Bonneville Power Administration and the Northwest Power Planning Council. They were called for in the Coun-

cil's Columbia River Basin Fish and Wildlife Program in 1982, and reaffirmed in subsequent years. The fish and wildlife program uses wholesale power revenues from Bonneville to finance habitat repair, new hatcheries and other enhancement activities in the Columbia Basin.

By pass improvements were seen as a critical piece of the integrated effort to recover some of the salmon runs lost to the region because of the development of the river for hydroelectricity. Bypass channels and screens can cut in half the number of fish annually slaughtered by turbines during their trip down the Columbia to the ocean. Without the facilities, millions of fish produced at ratepayers' expense to reseed waters above the dams would be lost.

Concurrence among regional power and fish entities led in 1987 to an expedited schedule to complete the changes by 1994. But this schedule was predicated on funds being made available in the federal budgets for the U.S. Army Corps of Engineers to construct the facilities.

Unfortunately, the Corps never requested adequate funds to continue the bypass program. While there was support for funding from the regional Corps' office, any progress was wiped out by officials in Washington, D.C., as annual budget proposals advanced through the bureaucracy. In Fiscal Years 1988, 1989 and 1990, the final Corps' budget requests, in effect, proposed to terminate the fish bypass program.

In 1988, after Congress intervened and added funds for the bypass program, the Corps even refused to spend the funds allo-



Bypass channels and screens can cut in half the number of fish annually slaughtered by turbines.



cated by Congress. This delay, along with other factors, caused about a three-year slippage in the completion date of 1994 and increased total costs of the program. In response to the Corps' resistance and delays, Congress specifically directed the agency in appropriations legislation to spend the funds as allocated by the legislature.

Since then, Congress, at the request of the Northwest, approved and directed spending of \$28.2 million for new and improved bypass facilities at six mainstem dams. These funds paid for new barges, designed to collect and transport fish from upriver to below the dams; fish loading and holding facilities; development and testing of longer turbine screens; and for the start of construction on a new bypass system at Lower Monumental Dam, which has no fish bypass facilities.

Congress also provided funds for the design and development of new bypass facilities at Ice Harbor Dam and The Dalles Dam. Nevertheless, Corps budget officials in Washington, D.C., continued to express reservations about requesting federal funds in the future for bypass facilities, es-

pecially for Ice Harbor and The Dalles.

Tom Trulove, the Council's chairman, led this year's effort to include the funds in the presidential budget and is complimentary about the shift in policy. "This represents a dramatic change in the priorities of the federal budget. It marks a significant change, not just in tone, but in policy. It reverses the approach taken over the last five years by the previous administration to effectively terminate the bypass program. More than any other factor, this strong, consistent support of the entire congressional delegation, led by House Speaker Tom Foley and Senator Mark Hatfield, laid a foundation for approval of the 1991 budget item."

The 1991 budget request to Congress represents enhanced support for the fisheries resources in the Pacific Northwest. But all the news isn't good.

The 1991 budget still does not include adequate funds for bypass facilities at two projects the Corps opposes—Ice Harbor and The Dalles. Instead, the Corps proposed another costly study for these projects. Of the two dams, Ice Harbor is ready for final design and construction without further delay. On the other hand, The Dalles requires continued funding for design and testing of screens and bypass facilities. This budget falls short of addressing those two dams.

Nevertheless, the new White House policy on fish bypass funding, reflected in the 1991 budget request to Congress, is a major step forward in the region's efforts to rebuild the salmon and steelhead runs in the Columbia River Basin. ■■

Budget bashes Bonneville again!

Every year since the beginning of the Reagan administration, the president's budget proposal has called for faster repayment of the Bonneville Power Administration debt to the federal Treasury. 1990 is no exception. President George Bush reiterated the notion that Bonneville and four other federal power-marketing agencies should repay what they owe the U.S. Treasury at accelerated rates. All the money the agencies spent before 1974 to build such things as dams and transmission systems would have to be repaid on a revised schedule and at floating interest rates rather than at the fixed interest rates they currently pay.

If the president has his way, Bonneville's \$653 million 1991 repayment would be increased by

\$590 million. Wholesale power rates in the Northwest would have to be increased substantially to cover the payment hike.

Bush's budget also proposes a limit on Bonneville's ability to borrow money for conservation programs and transmission equipment. The Northwest Power Act mandated that conservation be treated the same as any other power resource.

"When Bonneville wishes to acquire energy savings, it should be able to finance those purchases by borrowing the money and paying it off over time with interest, the way any utility would finance the construction of a new power plant," argues Ed Sheets, executive director of the Northwest Power Planning Council.

"Instead, this budget proposes to change the rules and take away important tools the region has to meet its energy needs." This switch in policy comes at a time when the region's energy needs are growing, and new resources will be needed. "Conservation is our best resource buy," notes Sheets. "We shouldn't be penalized for trying to acquire energy savings."

If the budget proposal passes, conservation expenditures will be billed against each year's revenues. Today's electricity consumers will pay for energy-efficiency programs out of today's rates, even though the energy savings will benefit ratepayers for 15 or 20 years.

—CC

SHORTS

Atmospheric scientists have confirmed a vital part of the theory that man-made gases contribute to global warming through the greenhouse effect.

According to research conducted at the University of Chicago, water vapor in the atmosphere can amplify the warming effect of carbon dioxide and other gases. That amplification is crucial to the greenhouse theory, which postulates that those gases trap heat in the atmosphere. Without the amplification, future global warming would be negligible, scientists say.

The study, which measured temperature and radiation from satellites, buoys and ships at sea, concluded that amplification takes place and that it is of about the same magnitude as predicted by mathematical models on which forecasts of global warming largely are based. [Source: *The New York Times*, 12/14/89.]

A new wind turbine blade is under development that could cut the cost of wind-generated electricity by as much as 38 percent.

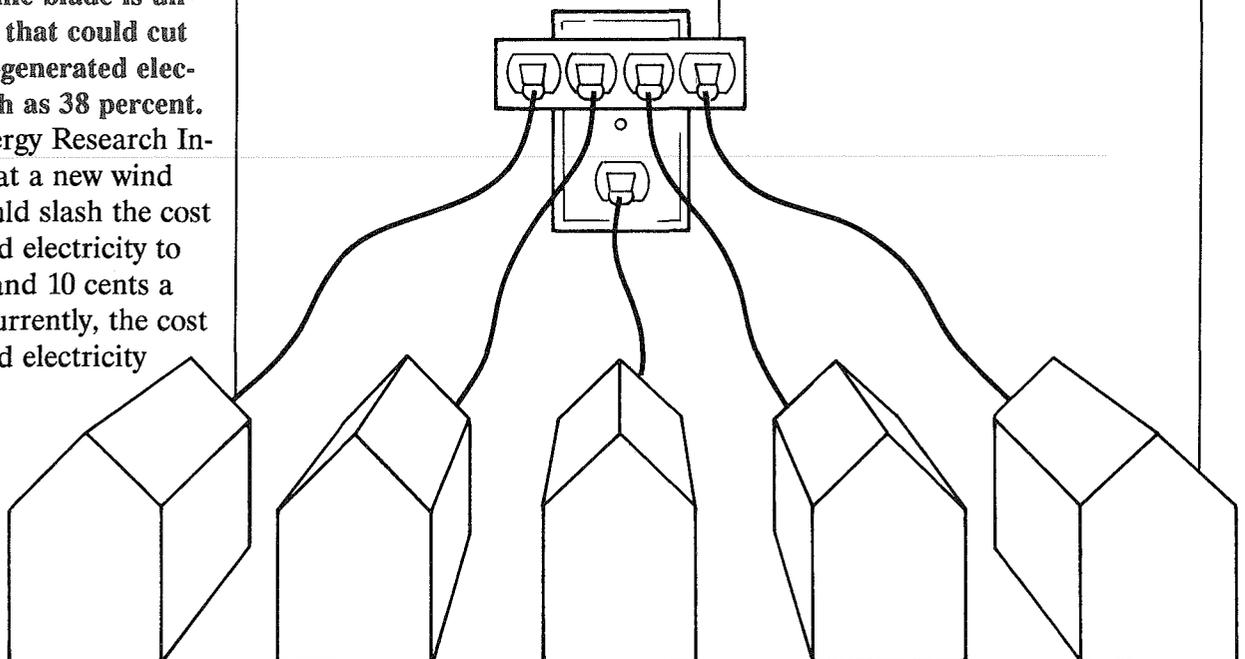
The Solar Energy Research Institute reports that a new wind turbine blade could slash the cost of wind-generated electricity to between 7 cents and 10 cents a kilowatt-hour. Currently, the cost of wind-generated electricity

ranges between 10 cents and 15 cents a kilowatt-hour, according to Northwest Power Planning Council estimates. The new turbine blade is undergoing testing on a wind farm near Palm Springs, California, a place whose turbulent winds have damaged blades routinely. [Source: *DOE This Month* (U.S. Department of Energy), 11/89.]

Model conservation standards may become the norm at new federal housing projects, under amendments to a bill sponsored in the Senate by Alan Cranston of California. The amendments, offered by Senator Tim Wirth of Colorado, would create a task force at the Department of Housing and Urban Development to draft energy-efficiency standards modeled after energy-saving housing features adopted in the Northwest for new housing built by the federal government. [Source: *Clearing Up*, 12/8/89.]

British Columbia has decided to reclaim 600 megawatts of power it has sold to utilities on the U.S. side of the border for the past two decades. BC Hydro, the province's utility, will begin to take back that power, equal to the amount of energy consumed by a city the size of Portland, Oregon, in 1998. The entire Canadian share could be reclaimed by 2003. However, the utility noted that it was open to negotiations about future power sales that could benefit the two countries.

The Canadians can reclaim that power under terms of a treaty between the United States and Canada signed in the mid-1960s. The agreement allowed the Canadians and the United States to share equally in the hydropower produced in U.S. power houses from water stored in three Canadian dams on the Columbia River. [Source: *Seattle (Washington) Post-Intelligencer*, 12/14/89.]



SHORTS

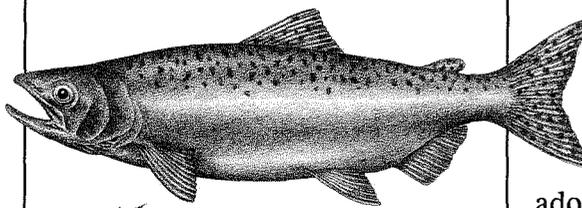
Researchers have announced they've successfully crossbred chinook and chum salmon. Professors Gary Thorgaard of Washington State University and James Seeb of Southern Illinois University said they have created a hybrid "chumook" salmon, mating chum females with chinook males.

The hybrid can adapt to salt-water at an early age, like its chum mother, but its meat resembles its chinook father. If replicated commercially, this combination could boost the yield from salmon net pens, the researchers said. [Source: *The (Vancouver, Washington) Columbian*, 11/16/89.]

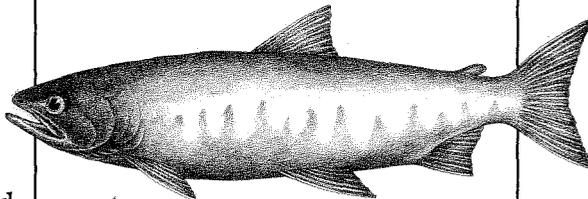
Pacificorp, the Portland, Oregon-based parent of Pacific Power & Light Company, has been named 1989 utility of the year by *Electric Light and Power* magazine. It also was named the "utility to watch" in the 1990s by *Forbes* magazine.

The diversified utility holding company, which took over Utah Power & Light Company last year, received the award for its entrepreneurial spirit, marketing and financial innovations, *Electric Light and Power* said.

In its annual report on American industry, *Forbes* chose Pacificorp as the U.S. utility best positioned for success this decade, citing the Portland company's ability to compete in increasingly volatile markets and its successful diversification moves. [Sources: *Electric Power and Light*, 11/89; *Forbes*, 1/8/90.]



Chinook



Chum

A solar water heater designed by a Eugene, Oregon, company recently was named one of last year's 100 best new products by *Popular Science* magazine.

The magazine cited a passive solar water heater made by Sage Advance Corp. as one of 1989's best new products. The magazine said the water heater's innovative design—which eliminates exposed plumbing, electric motors, pumps and electronics—overcomes many problems common to water heaters in the past. The system heats water using gas bubbles to push liquids warmed by rooftop solar panels through a closed loop of pipes that leads into the water heater. [Source: *Popular Science*, 1/90.]

Oregon has adopted a new wild fish policy aimed at conserving and enhancing populations of native salmon, steelhead and trout. The new policy, adopted earlier this year by the Oregon Fish and Wildlife Commission, for the first time gives the state direction in managing natural fish populations, not just stocks bred in hatcheries. The policy will help the Oregon Department of Fish and Wildlife assess the size and location of wild fish populations in the state and identify which are most in need of help. [Source: Oregon Trout Inc., 1/90.]

The U.S. Department of Energy plans to spend \$336 million on energy efficiency and renewable energy initiatives, including \$35 million in the current fiscal year. Through the year 2000, savings from those initiatives—which include putting in super-efficient lights at federal facilities, toughening lighting standards for commercial buildings and designing new regulatory practices that encourage utilities to invest in conservation measures—could exceed \$32 billion. On the other hand, the department has proposed to cut conservation programs run by state energy offices by \$187 million. The administration is requesting only \$30 million next year, financed from oil overcharge revenues. [Source: U.S. Department of Energy, 1/90.]

—Compiled by Gordon Lee

CALENDAR

March 5-9 - Short Course on Cogeneration Technology in Madison, Wisconsin. Sponsored by the University of Wisconsin. For more information: Charles E. Dorgan, Department of Engineering Professional Development, University of Wisconsin at Madison, 432 N. Lake Street, Madison, Wisconsin 53706.

March 6-8 - "Affordable Comfort IV: Meeting Energy Challenges of the Nineties" conference in Philadelphia, Pennsylvania. Sponsored by the Energy Coordinating Agency of Philadelphia, the Pennsylvania Energy Office, the Bonneville Power Administration, Portland Energy Conservation Inc. and others. For more information: Affordable Comfort Conference, Energy Coordinating Agency of Philadelphia, 1501 Cherry Street, Philadelphia, Pennsylvania 19102, 215-854-8030.

March 14-15 - Northwest Power Planning Council meeting at the Edgewater Village Red Lion in Missoula, Montana.

March 19-22 - "Solar '90" in Austin, Texas, including both the Annual Conference of the American Solar Energy Society and the 15th National Passive Solar Conference and held simultaneously with SOL-TECH 90, an industrial exhibition. For more information: American Solar Energy Society, 2400 Central Avenue, Suite B-1, Boulder, Colorado 80301, 303-443-3130.

April 1-4 - International Solar Energy Conference in Miami, Florida. Sponsored by the American Society of Mechanical Engineers. For more information: Jeff Leonard, American Society of Mechanical Engineers, 345 E. 47th Street, New York, New York 10017, 212-705-7740.

April 4-6 - "Eighth Annual International Energy Efficient Building Conference and Exposition" in Denver, Colorado. Organized by the Energy Efficient Building Association. Sponsored by the Western Area Power Administration, the Solar Energy Research Institute, the Colorado Office of Energy Conservation and others. For more information: Energy Efficient Building Association, Technology Center, University of Southern Maine, Gorham, Maine 04038, 207-780-5143.

April 11-12 - Northwest Power Planning Council meeting at the Eugene Hilton in Eugene, Oregon.

April 23-27 - "Energy and Environment '90" held in Joenköping, Sweden. Sponsored by the International Water Supply Association and the International Association on Water Pollution Control. Contact Elmia Energy and Environment, Box 6066, S-55006, Joenköping, Sweden (56 36 11 9060).

May 9-10 - Northwest Power Planning Council meeting at the Shilo Inn in Idaho Falls, Idaho.

June 13-14 - Northwest Power Planning Council meeting in Spokane, Washington.

July 11-12 - Northwest Power Planning Council meeting at the Outlaw Inn in Kalispell, Montana.

CALENDAR

July 29–August 3 – “Indoor Air '90: The Fifth International Conference on Indoor Air Quality and Climate” in Toronto, Canada. Sponsored by the Building Owners and Managers Association International, the Center for Indoor Air Research, U.S. Department of Energy and others. For more information: Indoor Air '90, c/o Canada Mortgage and Housing Corporation, 682 Montreal Road, Ottawa, Ontario, Canada K1A 0P7, 613-748-2714 or 748-2715.

August 26–September 1 – “1990 Summer Study on Energy Efficiency in Buildings” at the Asilomar Conference Center in Pacific Grove, California. Sponsored by the American Council for an Energy-Efficient Economy. For more information: Lawrence Berkeley Laboratory, ACEEE 1990 Summer Study Office, Building 90H, Berkeley, California 94720, 415-486-7478.

September 23–28 – “World Renewable Energy Conference” in Reading, United Kingdom. Sponsored by the University of Reading. For more information: Professor A.A.M. Sayigh, Congress Chairman, Department of Engineering, University of Reading, Whiteknights, P.O. Box 225, Reading Berkshire, RG6 2AY, UK.

A more detailed calendar of Council committee meetings and consultations is carried each month in *Update!* See order form on back cover.

—Compiled by Ruth L. Curtis

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NORTHWEST
ENERGY
NEWS

Reprinting is encouraged. Please credit the Northwest Power Planning Council.

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

Executive Editor: Carlotta Collette
Art Director: Stephen Sasser
Editorial Board: Ruth Curtis, Judi Hertz, Gordon Lee, Duley Mahar
Production: Judy Gibson

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 they will be sent to you as soon as possible.)

Publications

- 1986 Northwest Power Plan
- 89-1 1989 Supplement to the 1986 Northwest Power Plan
- 1987 Columbia River Basin Fish and Wildlife Program
- 90-1 Staff Issue Paper: New Resources: Supply Curves and Environmental Effects

Revised Draft Subbasin Plans for areas below Bonneville Dam (specify river system)

- | | |
|---|---|
| <input type="checkbox"/> Clackamas River | <input type="checkbox"/> Molalla and Pudding Rivers |
| <input type="checkbox"/> Coast Fork and Long Tom Rivers | <input type="checkbox"/> Sandy River |
| <input type="checkbox"/> Coast Range | <input type="checkbox"/> Santiam and Calapooia Rivers |
| <input type="checkbox"/> Cowlitz River | <input type="checkbox"/> Tualatin River |
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| <input type="checkbox"/> Grays River | <input type="checkbox"/> Willamette River |
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| <input type="checkbox"/> Lewis River | <input type="checkbox"/> Middle Fork Willamette River |
| <input type="checkbox"/> McKenzie River | |

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- Northwest Energy News* (this bimonthly magazine)
- Update!* (monthly public involvement newsletter that contains the Council meeting agenda, deadlines for public comment and a more detailed publications list)

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(Or call Judi Hertz at the Council's central office, 503-222-5161, toll free 1-800-222-3355 in Idaho, Montana and Washington, or 1-800-452-2324 in Oregon.)