

NWPPC News

Fish, wildlife and energy news from the Northwest Power Planning Council

July 2001

Power Supply Outlook Improves for Summer, But at a Cost to Jobs, Fish and the Environment; Winter Power Reliability Remains a Concern

Emergency measures including industrial power curtailments, reduced water spills at dams and temporary generators are easing the Northwest's electricity shortage, but the crisis is not over, according to the latest Council analysis.

Since 1999, the Council has been studying the Northwest and West Coast electricity supply and issuing periodic updates. The latest version of the analysis, completed in June, incorporates weather, water and power data through the middle of the month. The analysis shows that the current power supply, and the outlook for the future, is affected by a complex array of emergency and longer-term efforts. Briefly:

- Demand for power has declined significantly in recent months, but this is largely as the result of industrial cutbacks that have cost the region thousands of jobs.
- Federal dams on the Snake and Columbia rivers generated additional power in the spring by withholding water that would have been spilled to help juvenile salmon and steelhead migrate to the ocean. As a result, some reduction in the survival of fish migrating in the river — those not transported downstream in barges — was anticipated.
- Temporary generators boosted the region's power supply, but these produce more air pollutants than other power plants and are expensive to operate.
- New natural gas-fired power plants in the Northwest will augment the West Coast power supply when they begin operating this summer and fall, but it is not clear that all of that power will stay in the Northwest.
- The Northwest has had some success with new energy conservation efforts and continued emphasis could produce much more savings.
- The region's system of high-voltage transmission lines is stressed by high demand and the addition of new power plants.

POWER News

"The crisis is not over, but the situation—at least for the summer—has improved," Council Chairman

Larry Cassidy said. "The sum of these efforts is that we think the region's power supply will be more reliable this year, and prices may be lower, but everyone should realize that much of the improved outlook comes by way of emergency actions that have cut jobs, curtailed fish operations at the dams and compromised air quality. Short-term fixes are appropriate in times of crisis, but do not provide long-term, sustainable solutions for the region, which is our ultimate goal."

"Everyone should realize that much of the improved outlook comes by way of emergency actions that have cut jobs, curtailed fish operations at the dams and compromised air quality."

—Council Chair
Larry Cassidy

More than 1,900 megawatts of power, nearly enough for the cities of Portland and Seattle combined, will come online this year, and more is anticipated next year. In addition, the Bonneville Power Administration, the region's largest power supplier, has signed agreements with some of its customers to reduce their demand for power. Many electric utilities in the region are doing the same thing.

"It is critical that Bonneville and other regional utilities have negotiated these agreements, as load reductions will help reduce the cost of power and also lower future rate increases," Cassidy said.

Cassidy noted that 2001 remains an extremely dry year and that hydropower generation in the region remains far below average. In late April, the Council recommended the Bonneville Power Administration and U.S. Army Corps of Engineers spill water at John Day, The Dalles and Bonneville dams to help salmon and steelhead migrate, as long as reliability of the region's power supply would not

be jeopardized (See related story on page 4). That is still the Council's position, Cassidy said.

"While the improved power supply may mean that more water can be spilled for fish, the reliability of the power system is critical. Even though conditions have improved, unanticipated power plant outages or increased demand for power could change the picture. So we must continue to be judicious about how our water and power are used," Cassidy said.

The Council's analysis suggests that the probability of a power shortfall next winter has been reduced from about 20 percent to 17 percent, but that is still more than three times the electricity industry standard.

"The region needs to continue improving energy efficiency and building the cleanest generating plants possible to meet future demand for power," Cassidy said.

Here are some brief details of the latest analysis:

- The analysis incorporates approximately 1,000 additional megawatts of load reduction across the summer months.
- The analysis includes approximately 500 megawatts of additional thermal generation across the summer and winter.
- The region should be able to meet load across the summer with some deviations from Biological Opinion hydropower operations in the late spring and early summer, absent unanticipated power plant outages.
- It should be possible to store some hydro energy this summer to improve reliability next winter.
- The probability of having insufficient electricity to meet needs next winter drops to 17 percent, or under 12 percent with additional water storage in Canada.

Factors that could worsen the outlook include:

- New resources that do not come on line as anticipated.
- Extended power plant outages that were not expected.
- Expected load reductions that do not occur.
- Generating resources located in the region are not fully available to meet Northwest demands.
- Major transmission system problems.

Factors that could improve the outlook include:

- Increased precipitation over the rest of the year.
- More new power plants.
- More voluntary conservation. ■

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Bridging the Generation Gap

Energy analysts have dubbed the unusual set of circumstances that brought about the West Coast's current energy crunch this year the "perfect storm." The combination of dry weather in the hydropower-dependent Northwest, generation plant construction that has not kept pace with demand, and California's ill-conceived deregulation plan, all converged this year resulting in the threat of rolling blackouts and reduced spill at dams this spring to aid the migration of endangered fish. The Northwest Power Planning Council's June analysis predicts a 17 percent chance of a power shortfall next winter, more than three times the electricity industry standard.

The good news is that the Pacific Northwest's power outlook for summer has improved, in part because many utilities and companies have installed temporary generators, and several permanent power plants are due to come online this summer and over the next two years. The Northwest Power Planning Council estimates that temporary generating capacity through 2001 will reach 1,306 megawatts, more than enough power for a city the size of Seattle. The net anticipated capacity, temporary and permanent, to be added through 2002 is about 3,100 megawatts.

While there is satisfaction in knowing we are not expected to experience the kind of rolling blackouts and disruptions in service this summer that have plagued California, it is important to consider the price we are paying to keep the lights on.

Most immediately, what are the consequences of using these temporary diesel generator sets, the

less efficient and more polluting than other types of generation, since the fuel most often used, diesel oil, produces particulates, sulfur dioxide, nitrogen oxides and heavy metals. The use of natural gas, although cleaner, is more expensive and not always available.

Another downside is the cost of providing power — about \$150.00 per megawatt hour. Earlier this year that was about half the market price; at the end of June it was about double the market price, making the plants uneconomical to operate.

Washington Governor Gary Locke signed an order earlier this year that allows utilities and private developers to begin the installation of temporary generators without an air permit, although they are required to secure a permit once it is installed. Jeff King, the Council's senior resource analyst, estimates that there are approximately 68 temporary generators that are either operating or are planned.

The timeframe of permits for temporary generators varies from state-to-state: Permits for Washington and Idaho last for up to one year; the length of time varies in Oregon; and in Montana a permit lasts two years.

The scenario for building permanent power plants is also robust. Many are planned to come online in the next two years: 21 in Washington, 12 in Oregon, three in Idaho, and one in Montana. In all, the Council expects the added capacity from these plants to be more than 4,000 megawatts.

While there is no question the need for more

the heat produced from electrical generation, a by-product that is normally wasted — also could become more widely used as people are encouraged to reap the most from their energy investments. Several high-efficiency cogeneration projects are planned for completion in the next two years. ■

New Idaho Members Appointed to the Council

Idaho Governor Dirk Kempthorne appointed two new members to the Council earlier this year.

Jim Kempton, of Albion, replaces retiring Council member Todd Maddock. Kempton was a member of the Idaho House of Representatives where he served on the House Revenue and Taxation Committee and chaired the Transportation and Defense Committee. Earlier, he served for two years on the Environmental Affairs Committee.

After working in the Pentagon as Department of Defense liaison to the Secretary of Commerce on international co-production programs, he returned to Idaho in 1981 and was engaged in ranching until 1990, when he was elected to the Legislature. Today, he is co-manager of a family farm operation and remains a state Board of Education-appointed member of Idaho EPSCoR, a National Science Foundation "Experimental Program to Stimulate Competitive Research."

Also new to the Council is Judi Danielson, who replaces Council member Mike Field. Danielson has served three full terms in the Idaho Senate, most recently as Senate Majority Caucus Chair and vice-chair of the Senate Resources and Environment Committee. She also served in the Idaho House of Representatives from 1988 to 1994.

Danielson has a background in natural resource issues, having served as chair of the Western Legislative Forestry Task Force and as a member of the Public Lands Subcommittee of the Council of State Governments-West. She also played a key role in the development of Idaho's proposal for state management of federal forest lands. ■

	Projects	Units	Capacity
Generator Sets Using Fuel Oil	51	444 (estimated)	681 MW
Generator Sets Using Natural Gas	8	238 (estimated)	282 MW
Gas Turbines	5	17	314 MW
Miscellaneous & Unknown	4	18 (estimated)	29 MW

choice for many commercial operators trying to meet their load requirements? Long used as back-up generation by businesses requiring uninterrupted service, the current energy shortage has sparked an expansion in the use of this well-established technology, for they are relatively easy to install.

Typically, a diesel generator set, which is around seven feet high and 25 feet long, is installed in a semi-truck trailer that can be easily sited at a substation or other point of easy interconnection. Trailer-mounted oil tanks are located nearby for those installations using fuel oil, and portable transformers and switchgear are used for interconnection to the transmission grid. The individual generator sets typically produce from one to two megawatts. The units are sited in clusters ranging in size from one to 50 units. Both Clark Public Utilities, Vancouver, Washington and Tacoma Power are using generators — Clark's uses natural gas and Tacoma's, fuel oil — that produce 50 megawatts of electricity.

The downside to diesel generators is that they are

generating capacity is warranted, according to King, "The downside to all this activity may be seen in the loosening of environmental regulations for both temporary and permanent generation. This may result in some poorly sited and inadequately controlled permanent plants."

But there may be some positive developments to come from our energy woes as well. King sees the renewed interest in conservation as an economical and effective means to acquiring power as encouraging. Also encouraging is the development in what he terms, "controlled demand reduction." One way this works is when utilities offer special compensation to customers, usually industrials, to interrupt their service during peak periods of use with little or no impact to the customer. It is part of a growing trend to better manage electricity demand.

Another area that has received greater focus of late is investment in renewables such as wind. In response to its request for proposals for wind generation projects, the Bonneville Power Administration received 25 proposals adding up to about 2,600 megawatts of wind power. Most of the proposed sites are in Oregon (10) and Washington (8). The rest are distributed among Idaho, Montana, Wyoming and Canada. Because wind speed varies, the 2,600 megawatts capacity of the proposals will likely translate into about 850 average megawatts of power—more than enough power to meet the needs of the city of Portland. And PacifiCorp also has agreed to purchase 350 megawatts of power from two wind farms, Stateline on the Washington/Oregon border, and Rock River, located in Wyoming. Wind has become more competitive, both because of the current energy market, and as a result of technological advances and reductions in the cost of wind power development.

Finally, with the greater emphasis on efficiency, co-generation — the process of capturing and using



Clark Public Utilities Director of Operations Andy Huck (left) shows a local reporter the inner workings of one of the natural gas powered temporary generators the utility will use to augment its power supply this summer.



Jim Kempton



Judi Danielson

Solution to West Coast Power Crisis Includes Transmission as Well as Power

In a situation akin to trying to pour more water through a funnel than the funnel can handle, new megawatts of electricity soon will be coursing through the funnel of the region's high-voltage electricity transmission system. While the power supply is increasing in response to the regional and West Coast electricity crisis, the transmission system is not. By the end of 2002, about 3,100 new megawatts of electricity will be online in the Northwest, according to an analysis by the Power Planning Council.

While adding more megawatts to the power supply will help ease the West Coast power crisis, the new power will intensify transmission constraints that already exist and make it even clearer that the region's high-voltage transmission system, parts of which are 30 years old, needs upgrades and expansions.

At best, the transmission system has been made to work more efficiently and handle more power in recent years, but construction of new lines is not keeping pace with construction of new power plants. In short, the system is stressed.

Electricity deregulation, which began under the National Energy Policy Act of 1992, is partly to blame for the lack of new high-voltage transmission facilities. Just as deregulation discouraged new investments in power plants, deregulation also discouraged investors from committing the millions of dollars necessary to build new transmission lines. That is because the price of wholesale electricity fluctuates with supply and demand, and so there is no guarantee that investments will be recovered in rates once the new power plants, or new transmission lines, are built.

Transmission problems, while they have not attracted as much attention as power supply problems, have not escaped attention within the industry. The Northwest Power Pool, an association of electric utilities that coordinates the operations of its members, reported that while the winter peak power load is expected to increase 12 percent between 1998 and 2008, transmission circuit miles are expected to increase only 2 percent.

The Western Systems Coordinating Council, in a report on the summer 2001 power supply outlook, reported that transmission constraints in California will exacerbate power supply problems this summer when weather-related demand increases — particularly transmission between northern and southern California. The WSCC is an association of western electric utilities and one of 10 regional electric reliability councils in the country that comprise the North American Electric Reliability Council.

According to the report, transmission constraints will contribute to blackouts in California this summer:

“Based on current projections, resource deficiencies and transmission constraints are likely to result

in the curtailment of interruptible and firm customer loads both during peak periods and at other times due to energy limitations during the 2001 summer within the California Independent System Operator control area, unless conservation or assistance from other areas is greater than projected.”

Transmission constraints will make it more difficult for the Northwest to help California with additional power, if there is any to share, the WSCC reported.

“Some new generation will be coming onto the transmission system in the summer of 2001. The transmission work must be done now if the region is to benefit from the new generation.”

—Bonneville Power Administration

The WSCC report also assessed high-voltage transmission in the Pacific Northwest, concluding that “all major Northwest transmission facilities are anticipated to be available, and the transmission system is expected to be adequate for projected ... transfers.” But the report also pointed to potential problems, ironically the result of industrial cutbacks that reduce transmission capacity:

“The reduction of industrial loads [in the Northwest] may create more restrictive transmission constraints in areas where through-flow of power can have an impact, as follows:

- Transmission constraints in Western Montana are expected to reach internal east-to-west limits at lower hydroelectric generation levels than previously experienced due to an approximately 700-megawatt reduction in industrial load in the area.
- Transmission constraints on the Northwest-Canada Intertie also will be affected due to a 200-megawatt reduction in industrial load just south of the Canadian border. This will reduce the north-to-south transfer capability and increase the south-to-north capability based on local load and generation conditions.”

Investor-owned utilities that operate their own transmission lines in the Northwest are experiencing

the effects of increased demand for power, as well. But the biggest impact is on the biggest regional transmission owner, the federal Bonneville Power Administration.

Bonneville recently reported that in the last five years, use of its transmission system has increased by 4.7 percent, but no new facilities have been built. Bonneville's biggest lines, its system of 500,000-volt lines, are 30 years old. Bonneville has experienced a rapid increase in the use of its system since transmission became a commodity business. From dozens of transactions per day before energy deregulation, Bonneville now schedules literally thousands of transactions per day.

In the past 14 years, Bonneville has made operational and mechanical changes to its system and split off its transmission business operations as a separate division, but built no new lines. Today, the buffer of transmission capacity originally built into the system appears to be gone, Bonneville has reported.

Transmission is constrained throughout the Northwest. There are constraints between Montana and states to the west, between John Day Dam on the Columbia River and points to the north, and across the Cascade Mountains in both Oregon and Washington. Bonneville plans major work at existing substations to install new equipment and reinforce existing transmission lines. Bonneville also recently committed to proceed with a \$35 million project to replace aging equipment at the Celilo Converter Station, which is the northern end of the Direct Current Pacific Intertie. The DC Intertie connects the Northwest to Southern California, where the southern terminus is at Sylmar just north of Los Angeles. With the replacements, the DC Intertie will maintain its capacity of 3,100 megawatts; the other alternative was to derate the capacity of the line by about half.

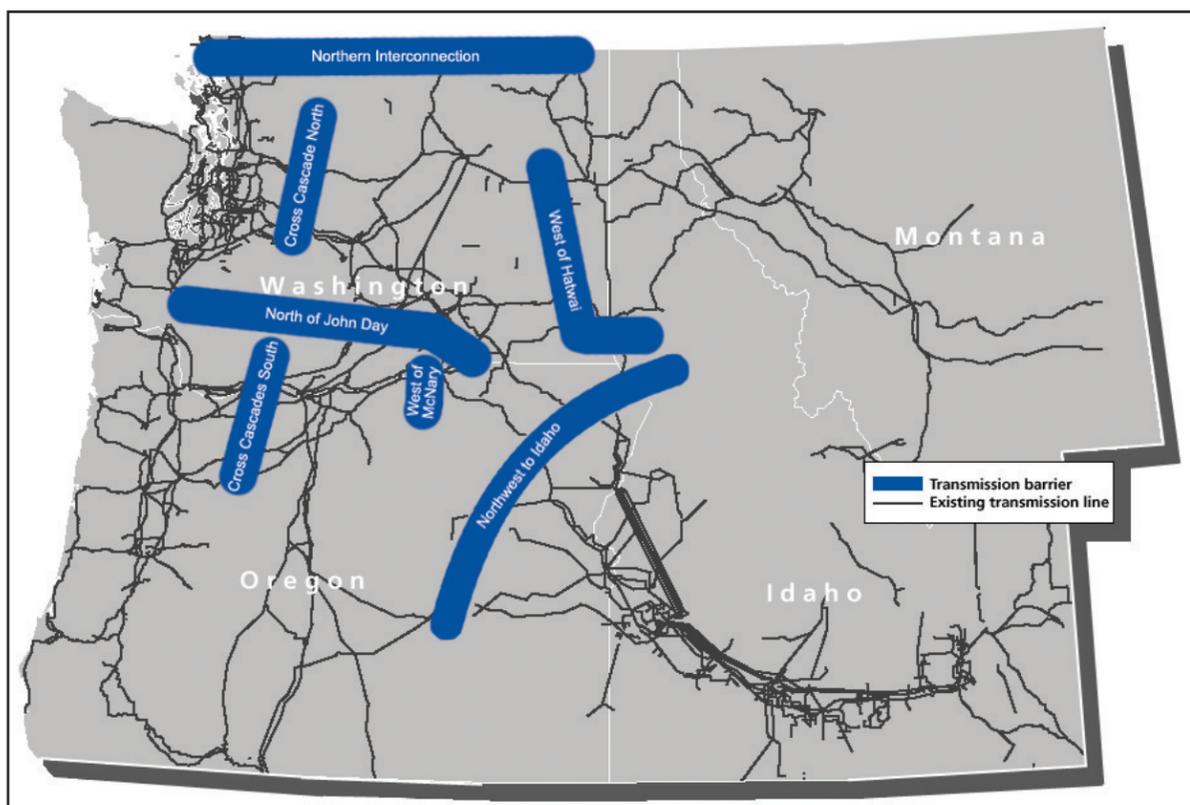
Meanwhile, Bonneville's Transmission Business Line, which manages the high-voltage transmission system, estimates it will need to spend \$1.3 billion between 2002 and 2006 to replace aging facilities, reinforce connections to existing customers and connect with new generating plants. But that may not be enough. Bonneville estimates it may need more money to remove constraints, supply new demands for power and integrate new generating plants into the transmission system. Congress will have to approve increased borrowing authority over Bonneville before the upgrades can proceed.

A proposed regional transmission organization, RTO West, will have the authority to manage existing transmission lines, including Bonneville's, and build new lines. Transmission owners are creating the organization in response to an order from the Federal Energy Regulatory Commission (FERC) that such organizations be created around the country to improve the efficiency of high-voltage transmission and lower its cost.

RTO West has not been approved by the FERC, and it likely would take five years or longer after that approval for RTO West to complete the planning and construct new lines.

“The region simply cannot wait that eight to ten years,” according to a May 2001 Bonneville “Keeping Current” publication on transmission. “Some new generation will be coming onto the transmission system in the summer of 2001. The transmission work must be done now if the region is to benefit from the new generation. BPA believes the best way to ensure open competition that will bring down power prices is to have a strong, safe, reliable transmission system when the RTO takes control. BPA's transmission construction project will help the region achieve that goal.”

For more information, visit Bonneville's Transmission Business Line website at: www.transmission.bpa.gov. The Keeping Current publication on transmission is posted on the Bonneville website, www.bpa.gov, under News and Events/Publications/KeepingCurrent. ■



Barriers to Transmission

Council OKs Summer Water Spills at Dams, but Only if Power System Reliability is Not Jeopardized

Water could be spilled at Columbia and Snake river dams this summer to help juvenile salmon and steelhead migrate to the ocean, but only if the reliability of the region's electricity system is not jeopardized, the Council advised the Bonneville Power Administration in late June.

Water that is spilled over dams cannot be used to generate power, and that is a critical consideration given the ongoing drought that has reduced Columbia River flows to about 53 percent of normal and reduced the region's hydropower generating capacity by more than 4,000 megawatts. At the same time, summer spill at the dams has some benefit for juvenile fish that migrate in the river and are not collected for transportation in barges, particularly for Snake River fall chinook salmon, a threatened species, and for fall chinook that originate in the Hanford Reach of the Columbia, the Council acknowledged.

Bonneville's acting administrator, Steve Wright, asked the Council for guidance on summer spill in light of the power system reliability issue. The Council recommended that spills be provided if power system reliability is not further eroded, and if the lost energy can be made up with power purchases at costs that do not jeopardize Bonneville's financial stability.

FISH News

"Based on our latest analysis of the power supply, the region appears to be in about the same position it was at the end of May — right on the cusp of a reliable power system next winter if no water is spilled this summer," Council Chairman Larry Cassidy said. "However, wholesale power prices have dropped significantly in the last month, and so if replacement power for later this year can be purchased now for a reasonable price, spill should be provided this summer."

In a discussion with the Council at its June 26-27 meeting in Pendleton, Oregon, Wright outlined several alternatives for providing summer spill. He said, for example, that increasing the outflow from Dworshak Dam in Idaho could provide water for spilling at dams on the lower Snake and Columbia rivers without decreasing power system reliability. But Idaho Council members Jim Kempton and Judi Danielson objected to the idea. Wright also offered out-of-region power purchases as an option, but said there is some financial risk because the price is not known today.

Council members responded that they were reluctant to get involved in day-to-day decision-making, which they see as the responsibility of dam operators. Additionally, many river-operating options for the summer currently are being negotiated by federal agencies, utilities, Indian tribes, state fish and wildlife agencies and others. For those reasons, the Council decided instead to amend a policy it adopted in April to state that "the summer operating plan should not decrease the currently forecast level of electrical reliability," and that "any additional water storage should be deployed to assure the best benefit to fish."

According to the Council's analysis, there is about a 17 percent probability of power deficits next winter if no water is stored this summer and fall for electricity production next winter. The probability decreases as the amount of water storage increases. If 1,500 megawatt-months of water can be stored, the probability drops to about 12 percent (a megawatt-month is one megawatt delivered for a period of one month). That amount of storage provides the maximum power benefit; storage above that amount doesn't provide much additional benefit because of the rate at which water can be released from the dam.

The analysis acknowledges that such predictions are inexact. For example, reduced demand for power or additional energy conservation could improve the outlook; spilling water, lower runoff and higher-than-expected demand for power could worsen the outlook.

The issue of whether to spill water at dams during spring and summer has biological implications as well as implications for the power supply. Spill is an effective means of moving juvenile salmon and steelhead past the Snake and Columbia river dams, particularly in the spring when the migration peaks, but spilled water can't be used to generate electricity.

Spring and summer spills to help juvenile salmon and steelhead migrate to the ocean are recommended in the 2000 Biological Opinion on hydropower operations issued by the National Marine Fisheries Service (NMFS) on behalf of 12 Columbia and Snake river fish populations that are protected under the Endangered Species Act (ESA). Only one of the 12 listed species, Snake River fall chinook, migrates to the ocean in the summer, but there are other important — but not ESA-listed — salmon and steelhead species that migrate in the summer.

The Biological Opinion allows for spills to be reduced or eliminated if there is a power emergency because water that is spilled cannot be used to generate electricity. Federal dam managers, including the Bonneville Power Administration, declared a power emergency earlier this year, and water spills were drastically reduced from Biological Opinion levels in April and May.

According to a biological analysis of summer spill operations by the Council's fish and wildlife staff (posted at the Council's website: www.nwcouncil.org/library/2001/2001-14.htm), summer spill has little or no benefit for juvenile Snake River fall chinook generally because most of those fish are collected and transported downriver in barges for release below Bonneville Dam. But spill has benefits for Snake River fall chinook that are not barged, and also for fall chinook that originate in the Hanford Reach of the Columbia River just upstream of the Tri Cities. The Hanford Reach fish have only one opportunity for collection, at McNary Dam.

An analysis of summer spill options by the NMFS suggests that eliminating spill would reduce survival of non-listed salmon species that originate in rivers downstream of McNary Dam by up to 17 percent, depending on the species and river of origin. That is because those fish cannot be collected for barging — the last dam with a collection system for downstream migrants is McNary. So fish from the John Day, Deschutes, White Salmon, Klickitat and other rivers downstream of that dam must be spilled or go through the turbines. ■

Reducing the Demand for Power

How have we been able to get through this year's energy shortage? One strategy used by the Bonneville Power Administration, and other utilities in the Northwest, has been to buy back electricity from customers, essentially paying them to shut down their operations.

Electricity prices have risen so high this year, that it often costs less to buy back the energy than to purchase it on the wholesale market. The Council estimates that load reductions from buy-backs for summer 2001 will reach approximately 2,800 megawatts (MW).

Besides Bonneville, Portland General Electric and PacificCorp made similar arrangements, as has Idaho Power. Other utilities achieved load reductions when some of their industrial customers decided to cut back production in response to high market prices for power. Although the largest amount of energy has been acquired from aluminum companies, about 1,000 megawatts, Ken Corum, economic analyst for the Council, estimates that around 100 MW has also been purchased from irrigators in Central Washington.

In Idaho, the three largest privately owned electric utilities — Idaho Power, PacifiCorp and Avista — all arranged to pay irrigators to cut back usage this summer. And there are cases where some customers have closed down indefinitely, which Corum estimates amounts to about 270 MW.

Besides the significant amount of energy that has been acquired through buy-backs, Corum believes that the impact of higher prices, where they are evident, has also made a difference.

"Even though most retail prices have not gone up, Seattle City Light, Tacoma Power and Snohomish PUD did raise prices earlier this year up to between 40 - 50 percent," he said.

The response this spring from customers was a cut back in electricity use of between 4 and 5 percent. The energy gained from this reduction in customer use is around 200 MW.

Corum feels that there have been recent developments to how we manage electricity demand in two areas: 1) The buy-backs that cover a period of time over weeks and months; and 2) A development that began about a year ago where utilities buy back electricity a few hours at a time.

Several utilities, including Bonneville, Portland General Electric, Snohomish PUD, PacifiCorp and Idaho Power, have begun what are called "demand exchange" programs.

A utility identifies customers who are willing and able to interrupt their service during peak times. They must also have the right kind of metering that shows when they are using electricity. The utility, looking ahead to the next day, will make an offer to buy back the electricity over the Internet to customers, and if the offer is accepted, a reduction in demand can be achieved the following day. This represents a refinement of the older existing practice of the "interruptible rate," in which utilities compensate a customer for allowing the utility to interrupt their service during peak demand periods.

Managing demand and giving people information about their electricity consumption and its time-of-day cost is the other side of the coin. That knowledge gives people the chance to make better decisions, both for themselves and for the benefit of the power system's reliability. ■

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