

Striking a Balance Between Energy and the Environment in the Columbia River Basin

Winds of Change: Montana taps its wind power potential, boosting the Northwest supply of renewable energy



In one of the windiest places of one of the windiest states, the Judith Gap Wind Energy Center set records for electricity generation in its first year of operation, stirring gusts of enthusiasm for the future of wind power in Montana.

The 135-megawatt Judith Gap wind farm in central Montana spreads across 14,300 acres in Wheatland County, about 100 miles east of Helena. The project, which began producing electricity in December 2005, includes 90 turbines rated at 1.5 megawatts apiece that sit atop 260-foot-tall towers. The project produces enough electricity for about 30,000 homes. Electricity generated at the project is sold to NorthWestern Energy, which serves customers throughout Montana.

The Judith Gap facility is the first large commercial wind power plant in Montana. Invenergy, the Chicago-based energy-development company, built the Judith Gap plant and is pleased with its results so far. An Invenergy official told the Great Falls Tribune in December that the turbines at the Judith Gap plant have been the most productive of any sold by their manufacturer. This is due in large part to wind speeds at the site, which routinely are 25 to 35 miles per hour. The Judith Gap wind farm is one of two large-scale wind energy facilities in the state. The other is the 9-megawatt Horseshoe Bend project near Great Falls.



There will be more.

Montana is an energy-rich state, with vast reserves of coal, natural gas, and wind. The American Wind Energy Association ranks Montana fifth in the nation for wind-energy potential behind North Dakota, Texas, Kansas, and South Dakota. Montana also is a wind-power-friendly state. There are no fewer than nine tax incentives in state law to encourage wind power development, as well as financial incentives such as revenue bonds issued by local governments in support of wind power developments, and programs run by electric utilities for landowners as well as for wind power developers. Land-

owners are paid royalties for leasing their land for wind farms, and counties receive payments from a portion of the taxes the state collects from the wind farm operators. For example, Wheatland County is expected to earn \$1.2 million annually from a wind-power tax on the Judith Gap project. The money will be spent on economic development, according to the Great Falls newspaper.

It should be no surprise that wind power developers have a keen interest

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Legislation, Approved and Proposed, Encourages Renewable Energy Development in Northwest States

Renewable energy development likely will get a boost in the Northwest as the result of a renewable energy requirement approved by Washington voters last November and, if it passes, a bill under consideration this year by the Oregon Legislature.

Initiative 937, approved by Washington voters, requires large utilities—those with more than 25,000 customers—to obtain 15 percent of their electricity from renewable resources by 2020, and also to reduce demand for power through investments in cost-effective energy conservation. Eligible renewable resources include new hydropower (existing hydropower supplies two-thirds of the electricity used in the state and so was not included as an eligible resource), and from generators powered by wind, the sun, geothermal heat, landfill gas, ocean tides and waves, gas from sewage treatment plants, and uncontaminated biomass such as wood waste from timber harvests.

The initiative requires that by January 1, 2010, the qualifying utilities must establish and publish a target for energy conservation for the following two-year period and also meet the first of several incremental targets for renewable energy use. These incremental targets increase over the following 10 years so that the utilities are getting 15 percent of their power from renewable sources by 2020. The law also provides for utilities to pay fines to the state if the targets are not met. Money collected in fines would be used to pay for energy conservation projects.

In Oregon, meanwhile, the Legislature will take up a bill this year that would establish a renewable energy portfolio standard requiring that 25 percent of the state's electricity come from renewable energy by 2025. The requirement would apply to electric utilities and energy service providers that serve at least 1 percent of Oregon's electricity load. This would

affect the three investor-owned utilities that serve Oregon customers—PacifiCorp, Portland General Electric, and the Idaho Power Company—and also the nine largest consumer-owned utilities. The 25-percent requirement is large enough so that most of the new load growth for the affected utilities likely would be provided by renewable energy.

Other electric utilities in Oregon also would be affected. The 28 utilities that collectively serve less than 1 percent of Oregon's electricity load would be required to meet 60 percent of their retail load growth by 2025 with renewable energy—likely through purchases of renewable energy from the Bonneville Power Administration.

The proposed law would set interim targets for all of the utilities to meet over time, culminating in 25 percent renewable energy by 2025. Eligible resources include wind, solar, wave, geothermal, biomass, hydro-

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Notes From the Chair

Energy policy continues to dominate the news these days as governments and the private sector struggle to address growing concerns about the impact of burning fossil fuels on climate change, as well as our dependency on foreign sources of oil. In this issue of the Council Quarterly, we explore what steps the Northwest is taking to answer these critical energy questions.

The status of renewable energy initiatives in the region is discussed in a story that reviews the latest legislation approved by Washington state voters in November, and how individual states are tailoring these kinds of policies to their specific goals. The story on the success of the first large commercial wind power plant in Montana is an especially good example of that state's commitment to developing alternative energy sources. Also in this edition, Rachel Shimshak, executive director of the Renewable Northwest Project, talks about the growth of renewable energy in the region, its impact on our economy, and what we may be seeing in the future. And, in a first-hand look at China's exploding growth, former Council attorney John Volkman describes his trip to Beijing to attend a symposium on that country's proposed hydrosystem. It's a vivid reminder of why our energy sources matter, and of just how very small the world has become.

Our Far-Flung Correspondents: A Report from Beijing

John Volkman, former general counsel for the NWPC, submitted this story on his recent trip to Beijing, China.

If you missed the Council's November meeting in Coeur d'Alene and instead found yourself standing on a certain street corner in Beijing, you could have seen me trooping from my hotel on Nanheyuan Street across town to the International Symposium on Hydropower Development and Conservation. The symposium was organized by the Chinese National Development and Reform Commission, The Nature Conservancy, and several Chinese hydropower agencies.

The symposium was focused on a particular problem: Monsoons drop a lot of precipitation on the Dangla Mountains of western China, on the Tibetan Plateau. The area is drained by the Mekong River to the south and the Yangtze River to the east, ending in the East China Sea at Shanghai. The massive Three Gorges Dam is located on a middle reach of the Yangtze. About 400 kilometers upstream from the slack water of the Three Gorges reservoir, the Chinese propose to build four more dams which the conference termed the "Jinsha Jiang" dams (Jinsha Jiang being another name for the Yangtze). The smallest is expected to generate 6 gigawatts, about the generation of Grand Coulee. The largest will generate about twice as much, 12.6 gigawatts. Can dams of this scale be managed to protect the ecology of the 400-kilometer reach between these dams and the end of the Three Gorges pool? To The Nature Conservancy, the answer could protect a biologically rich area with 170-odd fish species, more than 70 of which are endemic. The Chinese are interested in the concept, which resonates with the Chinese ideal of harmony: One should not seek too much of this and leave too little of that. We should develop creatively, not destructively.

"The Chinese propose to build four more dams ... the largest will generate about twice as much [as Grand Coulee] ... 12.6 gigawatts."

John Volkman

The Nature Conservancy is working with Chinese authorities on this question, and the November 14-15 symposium was a formal kick-off. A number of eminent Chinese hydropower officials



Vendor, in Beijing, selling leeks.

were lined up for presentations. The Chinese also wanted to learn about other nations' experiences, and so the Conservancy brought in its own team, led by David Harrison, and a group of outsiders: two Canadians (Eric Weiss and Hugh Smith from BC Hydro), two Brazilians (Roberto Pereira d'Araujo and Dr. Maria Elvira Pieiro Maceira), and two Americans (Dan Luecke, a consulting hydrologist experienced in flow

issues on the Upper Colorado, and me, to talk about the Columbia). We spent the first day listening to presentations and a second day talking about where to go next. Both days involved a certain amount of Moutai, a purportedly non-toxic liquor derived from sorghum. Toasts, which are an important part of the interaction, demand Moutai.

I urged the Chinese to take advantage of the fact that these dams don't yet exist. At this point, they can modify dam structures without having to remove concrete. No one has yet begun to rely on the dams' energy, so the economics of operational alternatives are less dire than they will be later. In the Columbia, this kind of flexibility is history. The Northwest's experience, I argued, demonstrates that modifying built

structures and lucrative operations is extraordinarily difficult and expensive, and the ecological effects uncertain. Granted, the ecological benefit of structural modifications and alternative operations may be no more certain before the dams are built. But there is more room

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power, and other renewable resources that were in operation after January 1, 1995.

Oregon already has a law that promotes energy conservation. That 1999 law requires the state's two largest utilities, Portland General Electric and PacifiCorp, to collect a 3-percent "public purposes charge" from their customers. This money is invested by the Oregon Energy Trust, which began operation in 2002, in cost-effective energy conservation and also to help pay the above-market costs of renewable energy resources and encourage energy market transformation in Oregon. The restructuring law also dedi-

cated a separate portion of the public-purpose funding to energy conservation efforts in low-income housing energy assistance and in K-12 schools.

Montana and Idaho also have encouraged renewable resource development, but in different ways.

Montana's Legislature adopted the Renewable Power Production and Rural Economic Development Act in 2005. The law requires that 10 percent of the electricity sold in Montana come from renewable sources by 2010 and 15 percent by 2015. The law created a renewable energy credit tracking system and gave utilities the option to trade renewable energy credits outside the state. The legislation establishes a cost cap that encourages utilities to invest in renewable energy that is cost-competitive with conventional generation.

Idaho's Legislature, meanwhile, considered a bill several years ago that would have established renewable energy targets, but ultimately rejected the concept of specific standards in favor of providing tax breaks for renewable energy developments. Accordingly, the state provides a sales tax rebate for construction of renewable energy plants. [CQ](#)

Renewable energy power plants under construction in the Northwest in January 2007

Project	Location	Type	Capacity (MW)	Service Date
Big Horn	Klickitat County, WA	Wind power	200	12/06
Emmett	Emmett, ID	Wood Waste cogeneration	11	2007
Klondike III	Wasco County, OR	Wind power	221	2007
Marengo	Columbia County, WA	Wind power	140	8/07
Raft River	Cassia County, ID	Geothermal	13	11/07

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to experiment with protective regimes before deciding whether to intensify operations.

It was a great trip. Our Nature Conservancy and Chinese hosts were wonderfully hospitable. I saw the Forbidden City and the Great Wall. We ate excellent food and met interesting people. I wouldn't have missed any of it. I say nothing about Moutai.

But to get a fuller impression, picture this: Much of old Beijing has been cleared and replaced by modern 10-20 story office and apartment complexes.

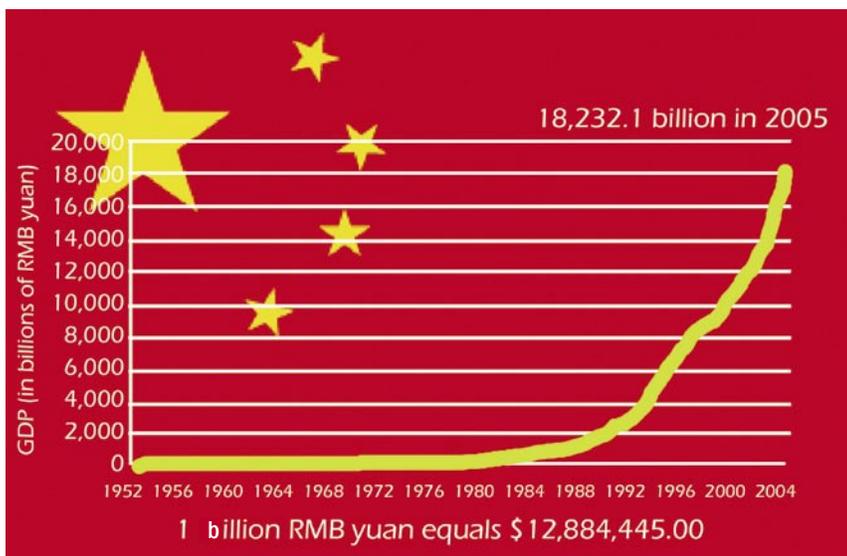
The city goes on forever, like an alternative version of Los Angeles, complete with mega shopping malls. Shopping, consuming is a prime activity. Much of the population now drives cars.

Beijing's new highways are wide and modern, but they are clogged with cars. One Chinese man told me that 10 years ago, 90 percent of the population was on bicycles; now 90 percent are in cars, and as far as I could tell, none is a hybrid. You see people wearing surgical masks to avoid air particulates and you wish you had something like it. All of this is the product of a booming economy.

You can imagine how much energy it took to produce a boom of this scale. And this is just the way it is now. China plans to double its gross domestic product by 2020. This should mean that fewer people live below the poverty line — a great thing. But it is also a level and pace of economic growth that the world hasn't seen before. The environmental consequences are worrying at best, especially given U.S. greenhouse gas emissions.

Perhaps China will make different decisions than we made when the Columbia River was developed. Maybe they will find a way to protect the 400-mile reach below the Jinsha Jiang dams. Maybe the U.S. and China and everyone else can avoid the worst effects of climate change and still maintain healthy economies. But standing on a street corner in Beijing, feeling its economic engine race and breathing the air it produces, it is not easy to imagine how we will do it. [CQ](#)

People's Republic of China's Nominal Gross Domestic Product 1952 to 2005



Northwest Q & A: Rachel Shimshak

Rachel has been the director of the Renewable Northwest Project since its inception in 1994. During her tenure, RNP has supported the implementation of more than 1,400 megawatts of wind, geothermal, and solar resources in the Northwest. In 2005, she was chosen by the governor of Oregon to represent the state on the Western Governor's Association Clean and Diversified Energy Advisory Committee, and she was chosen by the four Northwest governors to serve on the Comprehensive Review of the Northwest Energy System in 1996. Before moving back to the Northwest, Rachel was the policy director for the Massachusetts Division of Energy Resources where she worked on electricity, natural gas, oil, conservation, renewables, and emergency planning issues. Prior to that, Rachel was the legislative director for a Massachusetts consumer group, and an advocate in Colorado and Washington, D.C. She has served on the boards of several non-profit, clean energy and educational organizations, and she is currently the secretary of the Bonneville Environmental Foundation. Rachel graduated from the University of Oregon and is a native Oregonian.

Interest in renewable energy over the past few years has been tremendous. Where do you think this momentum will lead? What is your long-term (say 2030) vision for the Northwest's electric power system?

Our goal for the Northwest is to steadily shift the mix of new generating resources away from fossil fuel and nuclear power, and toward renewable generation such that we have 25 percent by 2025.

You've been an advocate of renewable energy for a long time. How is the current energy environment different from when you started at the Renewable Northwest Project?

It's completely different! When RNP first began our work in 1994, costs of conventional fuels were relatively low, the

"Many utilities are finding new renewable projects to be their least-cost option for meeting their future needs."

Rachel Shimshak, director
Renewable Northwest Project



risk of carbon regulation and the impact of global warming were distant concepts, and there were no tangible examples of new renewable resources. Because "a few good men" (and they were men) from the region's utilities saw the long-term economic and environmental benefits of investing in new, homegrown, renewable resources, the fear factor was reduced and the region's first wind project was built in 1997. Today the Pacific Northwest is home to nearly 1,600 megawatts of wind. And our region, along with the rest of the country, now considers energy independence, global warming, and sustainability high priority issues. Public policies enacted in each of the states and at the federal level now support the investment in renewables.

Along with the obvious environmental benefits of using renewable energy, what are the economic benefits of renewable energy? Can you give examples of how different renewable projects have affected the communities where they've been sited?

Renewable energy projects help stabilize customer rates over the long term because they have no fuel cost and are very predictable—similar to a 30-year mortgage. Many utilities are finding new

renewable projects to be their least-cost option for meeting their future needs.

RNP just released a new fact sheet showing that the seven most recent wind projects in the region (2005-2006) provided \$1.3 billion in new capital investment while employing 1,400 people in construction of the projects and creating millions of dollars of property tax revenues and royalty payments to farmers. In Union County, Oregon, they estimate that the 100 megawatt project there will generate \$10 million for the county over the next 20 years.

As originally enacted, the federal production tax credits were intended to phase out as market parity was reached with competing resources. In light of all the wind development we're seeing, what circumstances would eliminate the need for these tax credits?

All forms of energy development benefit from policies at the federal and state level, and renewables are no different. To address global warming and to accelerate our energy independence, policies will continue to be needed.

It's often said that the Northwest is an ideal location for wind energy production, not only because the wind blows a lot in certain areas, but because of the existence of our hydroelectric system. Could you explain why wind and hydro generation are so compatible?

The Northwest is blessed with a generous endowment of renewable energy potential, including wind. We also have a strategic advantage because of the hydro system. Due to the ability to store clean power, the hydro system makes a good battery for an intermittent resource like wind. It isn't the only flexible fuel, but it's the most efficient one.

Given the good fit between hydro and wind, and also considering the heightened concern over climate change issues, do you favor a more lenient definition of "renewable resources" that would include facilities like pulping chemical recovery cogeneration plants and large hydro-power projects consistent with the regional Power Act?

The Northwest has a lot of wind, solar, geothermal, and biomass resources. Wave energy appears to have promise for the region as well. We support further development of those resources. Pulping liquid, or black liquor, seems most appropriately used in high-efficiency cogeneration, or CHP, which is an energy efficiency measure.

Wind generation has developed at an aggressive pace in the Northwest, and in other parts of the country as well. Is there another resource that you see on the horizon that could follow a similar trajectory? What key issues need to be resolved with respect to this resource?

We're very interested in the activities underway with wave energy at Oregon State University. As with any new resource, siting, environmental impacts, and transmission will be important issues to address. Solar continues to be popular, and we are hopeful that California's solar initiative, combined with the actions of other Western states, will give rise to additional technological breakthroughs and cost reductions.

A major concern in the region has been how to integrate renewable resources—like wind power—into the Northwest's power system without compromising the system's reliability. You participated in a working group of energy experts to address this issue. Do you feel that progress was made? What would you like to see emerging from the Wind Integration Action Plan a year from now, five years from now? Are there hurdles not considered in the action plan that need to be overcome with respect to wind power?

The Council and the Bonneville Power Administration have joined with technical staff at the region's utilities to prepare a strong action plan for wind integration. The draft plan indicates that the region can integrate at least 6,000 megawatts of wind, and the recommendations in the plan will help reduce the cost of that integration to accommodate even more wind. No adverse effects on system reliability are expected. To reduce costs and make room for higher levels of wind, we have work to do on coordinating activities between control areas, and on new transmission planning and financing. I am hopeful that this effort will move us forward to the benefit of customers and renewables. Like I always say, planning is good, but doing is better.

It seems that each Northwest state is fashioning its own path to increase renewable energy investments. Do you have any thoughts about the different policy choices—for example, the use of a public benefit fund over renewable portfolio standards?

Each state has adopted, or is considering, public policies that meet the goals of making the electricity system more efficient, prioritizing clean resources, and addressing global warming. Renewable energy standards are a good tool to create a market for clean energy and allow utilities the flexibility to choose resources that best fit their systems. We support a variety of public policies that help reach the goal of gradually increasing the amount of new renewable energy serving the region's load.

Do you envision a time when non-hydro renewable resources will provide a significant portion of our baseload energy resources?

The Northwest is very lucky that the foundation of our energy system is renewable. We now need to build on that renewable base and diversify the electricity system with new renewables to meet our future energy needs. That will help us keep our treasured quality of life here in the Northwest. I'm an optimist, so I can envision a time when nature, technology, and innovation will allow the system to meet our needs with clean energy.

What would you like to see on the federal level in terms of energy policy?

Meaningful, mandatory limits on carbon dioxide emissions. A law with specific timelines and goals and no grandfathering of fossil resources. That will finally internalize the externalities, send the right signal to investors, and stimulate utilities to begin to fashion resource plans that target reduced levels of carbon emissions



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in Montana. Six projects are planned for construction that would total 1,280 to 1,380 megawatts of capacity. These would join the Judith Gap and Horseshoe Bend wind farms, and also a number of much smaller wind turbines in Montana that produce about 5 megawatts total for sale to electric utilities including North-Western Energy and the Idaho Power Company. Individually, those small turbines produce less than 5 percent of the electricity produced by the big turbines at Judith Gap. Each of the Judith Gap turbines, for example, could produce enough power for 300 Montana homes, given the average per-home electrical consumption in the state, if the turbines could be operated continuously.

They can't however, and that issue is not unique to Montana. Wind power is a variable resource, and therein lie several unique challenges for wind power developers and utilities—not just in Montana, but wherever the big turbines spin.

When the wind blows, wind turbines make electricity. When the wind stops, so does the electricity. What happens then? Do the lights go out?

Clearly, they don't—and can't. Periods of strong winds, and therefore wind power production, do not always match up with periods of peak consumption by electricity customers. What's needed, then, is a reliable backup supply for the doldrums. That's a particularly important challenge for NorthWestern Energy because by law the utility cannot own any generating plants.

"We have to have a regulation resource to help balance the wind power," said Casey Johnston, Manager of System Operations and Control Center (SOCC) for NorthWestern. "We have to buy that resource from other entities. Primarily it's hydropower, but in the future that could go away because the regulation providers may need it to back up their own wind power supply."

The next available resource to back up wind is power from natural gas-fired generators, and that power could be more expensive than hydropower. It's important, therefore, for customers to understand wind power's constraints as well as its benefits, Johnston said. "There is a cost for wind integration, and you

"Montana will continue to pursue projects like the Judith Gap Wind Project that can be part of a successful energy portfolio."

Bruce Measure

Montana council member

don't see that addressed in a lot of the news about wind generation resources. We have to have resources to balance the wind generation when the wind isn't blowing, and the customer pays that cost."

Johnston said wind power accounts for 150 megawatts—about 9 percent—of NorthWestern's electric system peak at the moment, and that likely will grow in the future. Additional wind resources in the transmission queue at this point could potentially add another 100 megawatts in 2007 and about the same in 2008 onto the NorthWestern Energy transmission system. NorthWestern isn't discouraging new wind power, Johnston said, but the utility will be careful to ensure that any new wind power that serves its customers can be backed up reliably and economically.

Regulation backup power is one challenge for utilities that buy wind power; another is transmission. Simply put, there are not enough high-voltage transmission

lines to carry all of the electricity the wind power developers hope to develop.

"The wind resource potential is a good thing to know about for long-term planning, but for an individual wind farm it's transmission you need to know about," said Paul Cartwright, senior energy analyst at the Montana Department of Environmental Quality.

In Montana, that challenge is being addressed through the construction of new transmission lines. One that caught the attention of wind power developers is a planned 230-kilovolt line that would link substations near Lethbridge, Alberta, and Great Falls. As with real estate, the three most important factors for wind power development are location, location, location. In this case, location near the new transmission line, which would run through some of the windiest country in the West and would open a fat pipeline for wind power entrepreneurs. As expected, they are lined up to buy space on the line, which is in the permitting phase. The developer, Montana-Alberta Tie, Ltd., hopes to begin construction in April 2007.

"Four wind farms have signed up to fill it," Cartwright said.

A third challenge, related to the regulation and transmission issues, is how to smoothly integrate a variable resource into a crowded transmission system and the baseload power supply while maintaining reliable electrical service. This is difficult because sudden surges of power can shock the system, in a sense, in the same way that a surge of electricity can knock out sensitive electronic equipment like computers. Thus, the variability of wind power could reduce the reliability of the transmission system and the power supply.

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In response to these challenges, the Northwest Power and Conservation Council and the Bonneville Power Administration convened a series of workshops in late 2006 and early 2007 for the region's electric utilities and utility regulators to explore the issues further and develop an action plan for Northwest wind integration. (See fall 2006 edition.)

The Power and Conservation Council anticipates that renewable resources, particularly wind power, will play a major role in meeting the region's future demand for electricity. The Council's Fifth Northwest

power has at least a Class 4 future—strong and sustained, in wind power terminology. Governor Brian Schweitzer sees Montana at the center of America's "wind heartland." He was the first governor in the nation to endorse the "25 x 25 Initiative," a grass-roots effort to pass federal legislation requiring 25 percent of America's energy demand be supplied by renewable energy by 2025, and his administration has streamlined the permitting process for wind power development in the state. Bruce Measure, a Montana member of the Power Council, notes that Montana and Governor Schweitzer

transmission line. Others are contacting NorthWestern Energy, which has a queue of potential wind farms to assess. Still others are studying the windiness of as-yet unclaimed sites.

To Cartwright, it's easy to see the state's vast potential: "There are anemometers all over the place." 



Power Plan, which went into effect in December 2004, calls for meeting future demand for power with a mix of energy conservation and new power plants, with a large emphasis on wind power. The plan calls for achieving 700 average megawatts of new energy conservation between 2005 and 2009, and up to 6,000 megawatts of new wind power over the 20-year planning period.

Many of those new megawatts will be developed in Montana, where wind

are proud to be leaders in the renewable energy arena. "Montana will continue to pursue projects like the Judith Gap Wind Project that can be part of a successful energy portfolio," Measure said. "I appreciate the work that the Council has done, and continues to do, to promote such projects in the region."

Wind power developers are lined up for space on the new Montana/Alberta

Success Stories – John Day Basin

Landowners and Conservationists Join Forces to Protect the John Day Basin

The John Day Basin, perhaps more than any other region in the world, reflects the dramatic developments of the earth's evolution. Located in the north-central part of Oregon, its rugged geography of multilayered ridges and plateaus are the physical remnants of the basin's volcanic past. Its rich deposits of plant and animal fossils provide one of the fullest records of terrestrial history.

The John Day River, one of the main tributaries of the Columbia River, flows west from the Blue Mountains and then north through the deeply carved landscape. It is the longest free-flowing river with wild anadromous salmon and steelhead in the continental United States. It provides some of the best habitat for summer steelhead and one of the few remaining wild spring Chinook runs in the Columbia Basin.

Since 1988, the Grant Soil and Water District has directed funding to a variety of projects to protect and improve the basin's fish and wildlife resources. Securing grants from a number of federal and state agencies, the conservation district



has completed restoration projects to improve habitat in the upper South Fork of the John Day River. Projects have included stream bank stabilization, riparian protection fencing, and rebuilding diversion dams for fish passage. Its most recent endeavor has been to help clear juniper and other invasive weeds from several ranches in the basin. So far, this effort has cut 3,073 acres of juniper and sprayed 4,448 acres of noxious weeds over the past three years.

One of the hallmarks of the conservation district has been the tremendous support it has received from private landowners. Ken Delano, district manager, gives full credit to these partners. "The projects are a huge benefit to them, but it's a public benefit, too," says Delano. "Without the concern and perseverance of the private landowners to stay with these



Before.



After noxious weed control.

projects year after year, we wouldn't be able to do the watershed enhancement in the basin."

Phil St. Clair is one of those landowners, and he also serves as chairman of the Upper South Fork Watershed Council. More than 250 acres of St. Clair's ranch have been treated for weed control. Other project work on the St. Clair Ranch has included adding off-site stock water developments and pasture cross-fencing to improve grazing management. St. Clair, who has played an active role in restoring the basin's habitat since the mid-1980s is equally positive about the conservation district's work, saying "The Grant SWCD has a good track record in the state of Oregon. I brag about them all of the time."

Delano has been encouraged by the results of the weed control efforts even though noxious weed and invasive species may never be eliminated. He believes there might be reason to do more of it in a basin region that the district has been cleaning up for years. "We'll have enough information to tell us if the juniper treatment is providing more water on a significant level to the watershed flow, and then we'll try to go on with more juniper control and try to build it into everybody's work plan on the private lands," says Delano.

Other basinwide restoration activities have included removing fish-passage barriers by designing and constructing flat-lying stanchion structures, pump stations, and infiltration galleries to replace annually installed irrigation diversions. Over 80 sites have been treated so far. Contrac-

at sites on the Middle Fork, Granite Creek, and Clear Creek; over one million cubic yards of tailing rock have been treated, generating nearly 100 acres of potential floodplain.

"When a restoration effort brings tangible benefits to people, it's going to generate support and trust," says Delano. "The restoration partnership in Grant County has succeeded because of a level of teamwork that's unique in Oregon, and maybe in the Northwest." It's that degree of cooperation and involvement that has made all the difference in the John Day Basin.



Before.



After streambank stabilization.

July 2006 Heat Wave Had Lessons for Energy Planners

You may not remember July 24, 2006, but the people who supply your electricity probably do.

And if they do, probably they cringe.

That's because at 2:30 p.m. on that day, a Monday, in the midst of a heat wave that baked the West Coast for several days, demand for electricity in the Northwest Power Pool area, which includes the four Northwest states, Utah, Northern Nevada, Western Wyoming, British Columbia, and Alberta, peaked at 54,602 megawatts — 2,400 megawatts above normal. Between 1 p.m. and 8 p.m. that day, the power supply situation on the West Coast was tense as power suppliers raced to meet demand.

It was the highest-ever summer peak, and it was an ominous sign. That summer peak was still about 4,000 megawatts — almost four times the amount needed to power Seattle — below the highest-ever winter peak, set in December 1998. But the summer record is significant because it signals an apparent shift in the Northwest to increasingly higher demand in the summer. And that is worrisome because the Northwest relies on hydropower for more than half of its electricity, and most of the hydropower is generated at dams on the Columbia River and its tributaries.

In most years, there is less water in the river system in summer than in winter, and the summer use of that water is more constrained. This means there is less hydropower in summer than in winter. These constraints include requirements for flows and spills to aid salmon and steelhead migration, constraints on reservoir elevations for recreational purposes, and hydropower production limitations

that are designed to assure that reservoirs meet elevation requirements at the end of the spring/summer runoff period. Thus, growing demand for power in summer inevitably will increase the demand on hydropower, and that has implications not only for power prices, which tend to increase as the supply decreases, but also for water storage and river flows, including water spills at dams to help salmon and steelhead migrate in the rivers. This is a long-term challenge for power system operators, and the July heat wave was a reminder that it is time to think about how to keep the power supply reliable, adequate, and affordable during summer months.

Summer heat waves, and the corresponding demand peaks, are not unusual. Hydropower can be managed in ways that ensure the region's power supply remains adequate and reliable, if perhaps expensive, during periods of high demand in both summer and winter. That said, however, why did the July heat wave cause such problems and what lessons did the region's power suppliers learn?

Coincidentally, during 2006, a coalition that included representatives of electric utilities, state regulatory agencies, the Council, and the Bonneville Power Administration, which sells the output of 31 federal dams in the Columbia River Basin, was developing electricity resource adequacy standards for the Northwest. This coalition, known as the Resource Adequacy Forum, asked for an analysis and explanation of the July 24 events. In response, a review group comprising staff from the Council, Bonneville, the Northwest Power Pool, and others, conducted an investigation. In a report issued last September, the committee pointed out a number of factors that contributed to the near-perfect storm of events during the July heat wave that could have triggered widespread power failures, but did not:

- Temperatures were far above normal, coast-wide
- Demand for power was under-forecasted in advance of the weekend, and this affected the power supply and price on Monday (July 24th)
- Two large power plants, one in Montana and the other in Washington, suffered outages, and the output of the region's wind power plants was lower than anticipated
- Some utilities asked their largest customers to use less electricity during the heat wave — "demand-reduction" contracts were in place — but the response was less than anticipated
- Independent power producers in the Northwest were selling large volumes of electricity to California, either directly or through purchases and resale by Northwest utilities, meaning that the power was not available in the Northwest
- Demand for power in Northern and Southern California peaked simultaneously, an event that statistically only happens once every 50 years
- From July 21 through the 24, daytime temperatures hit record and near-record highs (in the high 90s and low 100s) throughout the Northwest, and overnight low temperatures were the warmest ever for those days (above 70 degrees), an event that statistically only happens once every 70 years; this kept demand for power higher by preventing buildings from cooling down overnight.

The review group also noted that the high demand and limited supply of power in the Northwest pushed prices up during the four days of the heat wave, from around \$50 per megawatt-hour before the event to around \$100 and, for a brief period on the 24th, to the \$400 cap set by the Federal Energy Regulatory Commission.

The July 24 event caused the review group to rethink standard assumptions of electricity availability for July. Most importantly, the review group recommended that the planning assumptions and related power system operating protocols be reviewed and that the definition of “emergency” be reconsidered to ensure better communication among operators. The review group also recommended that planners reconsider how much power from independent producers in the Northwest should be included in planning assumptions, given that the owners, who don’t have firm contracts with Northwest utilities, will sell to the highest bidders, and those bidders might be outside the Northwest, as was the case on July 24.

“The situation during the July heat wave was not driven primarily by water conditions,” said Wally Gibson, the Council’s manager of system analysis and generation. “The first message of the July 24 peak is that we need to pay attention to summer events like that in the Northwest because we appear to be developing more summer load.”

Historically, summer weather in the Northwest has been mild compared to

the Southwest. As a result, when power demand peaked in the Southwest, the Northwest had surplus power available. But that appears to be changing.

“We have more air conditioning in the Northwest than we used to,” Gibson said. “We’ve always said summer was not a problem for us, but now we can see we are getting a more significant summer peak that will coincide with the West Coast summer peak.”

There are lessons in this for power planners and system operators, he said. First, it is particularly appropriate that the Northwest Resource Adequacy Forum is developing a separate capacity standard for the summer months — separate from the winter standard. “Historically, we haven’t had a summer capacity metric,” Gibson said. Second, the region’s power planners are going to have to re-think how to account for power generated by independent power producers in the summer months. While some of that power may be trapped in the Northwest because there is not enough transmission capacity to send it where it might otherwise go, the rest of it might be contracted in advance by utilities in Califor-

nia. California has a requirement that an adequate supply has to be contracted in advance, based on forecasts of demand. That means California utilities will lock up a supply of electricity a day or two in advance. As happened last summer, that can leave other utilities scrambling to find power on shorter notice as demand climbs. This was a particular problem during the July 2006 heat wave, as July 24 was a Monday and the trading day for Monday is the previous Friday. As temperatures and demand climbed over the weekend, power traders found little power available for sale because so much of the independently owned generation had been locked up by California utilities in anticipation of high demand on Monday. This drove prices up.

“There’s only one day a week that occurs — Friday in advance of Monday — and if the heat wave had occurred in the middle of the week this would not have been such a problem for the Northwest,” Gibson said. “That’s more of an observation than a lesson, but we need to re-think the availability of the independent generation in light of California’s stronger look-forward requirement.” 

Quick Thinking Averts a Crisis

This is the story of how resourceful substation operators in remote north-central Oregon used a fire hose to keep air conditioners running in Southern California — and possibly much of the West Coast — during the late-July heat wave of 2006.

Record-high temperatures that persisted for several days, both during the day and overnight, caused equipment failures that knocked out power to thousands of people up and down the West Coast, particularly in Northern California. But those were scattered outages.

It could have been worse. Much worse.

As reported in a Bonneville Power Administration employee publication, on July 22 at 4 p.m., with the outside temperature hovering around 110 degrees at Bonneville’s Celilo Converter Station just east of The Dalles, Oregon, the operations staff found themselves responding to keeping an overheating AC/DC converter from tripping off. The Celilo Converter Station is the northern terminus of the Pacific Northwest/Pacific Southwest DC Intertie, a major portion of the West Coast high-voltage transmission system. The Intertie routinely carries thousands of megawatts of electrical power between the Northwest and the Southwest.

The coolant temperature for the converter was just a couple of degrees below the temperature at which the converter would shut down automatically on thermal overload. Quick-thinking operators hooked up a fire hose to spray water in front of one of the converter’s radiators, cooling the air before it went into the radiator and effectively forcing the internal temperature down enough to avoid a shutdown. At the time, the DC Intertie was carrying 3,000 megawatts. If the converter had shut down, two-thirds of this load support (2,000 megawatts) would have been lost instantly.

To put it mildly, this would have been noticed throughout Southern California.

But thanks to a fire hose and quick thinking, a crisis was averted.

Bill Booth Appointed to the Council

In January, Idaho Governor Butch Otter appointed Bill Booth to the Northwest Power and Conservation Council. He replaces Judi Danielson, a former state senator from southern Idaho.

Booth is a former Hecla Mining Company executive; he retired as vice president of environmental and governmental affairs in 2002. He has since worked for American Stock Transfer and Trust, a New York-based firm that helps public companies with administrative responsibilities for managing their share-



holder base. “I think my background is a good fit for the Council,” says Booth. “I have a fairly broad Idaho perspective, having lived here for 45 years and having worked primarily in natural resource industries.”

Council members are appointed by their respective governors to three-year terms. Booth grew up on an 80-acre ranch near Post Falls. He earned an MBA from the University of Idaho and served on the transition team for Governor Otter, who was elected last November.



At Portland Reception, Speakers Note 25th Anniversary of the Northwest Power Act

It may be a quantum metaphorical leap, but the “construction” of the Northwest Power Act of 1980 by the United States Congress was a bit like the construction of the Florence Cathedral in Italy.

Tom Karier, chairman of the Northwest Power and Conservation Council, made the analogy at a December reception in Portland honoring the 25th anniversary of the Act and the subsequent formation of the Council. “Imagine the concept of building an immense structure with not much more than a hunch that someone would come along and solve the problem of how to build a dome,” Karier said. “This is not unlike what faced Congress in 1980. There were lots of problems, and not many answers — the energy crisis in the 1970s, the construction five nuclear power plants, which had stalled, utilities were at arms over access to the low-cost federal hydropower, and several groups were lobbying to apply the Endangered

Species Act to the Snake River. It was time to build something, and what Congress did was pass the Northwest Power Act. They built the cathedral, but they left it to others to build the dome.” In fact, the cathedral was completed in the mid-1400s, more than a century after it was begun.

Under the Power Act, the Council develops a plan to assure the region an adequate, efficient, economical, and reliable power supply, and also a program to protect, mitigate, and enhance fish and wildlife that have been affected by hydropower dams of the Columbia River Basin.

The December event culminated a year of celebrating the Act and its accomplishments. As part of the celebration, the Council and the Bonneville Power Administration honored more than 140 “Power Act Leaders” who have been influential in implementing the Act.

The December reception included guest speakers former U.S. Senator Jim McClure from Idaho, Antone Minthorn, chairman of the Umatilla tribes of Oregon, and Ralph Cavanagh, senior attorney for the Natural Resources Defense Council.

Senator McClure recalled that Congress worked four years on the Power Act in the late 1970s, a period when the Arab oil embargo of 1973 still caused national anxiety about the energy supply and fears of dealing with shortages.

“I rejected the concept that we had to get along with less energy,” McClure said. “The need was to supply energy in the least environmentally damaging way and also the lowest-cost way.”

While McClure saw the promise of the Power Act as creating a greater supply of energy, others, such as Dan Evans, a former governor of Washington at the time and also the first chairman of the

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Council, saw the promise of the Act as improving the efficiency of regional electricity use, and thereby, reducing supply, or at least slowing its growth.

“The Power Act worked because it created a consultative mechanism to discuss and compromise viewpoints,” McClure said. “Compromise is not a dirty word. It’s a way to build consensus and move forward.”

Seeking compromise and building regional consensus, particularly on efforts to mitigate the impacts of hydropower on fish and wildlife of the Columbia River Basin, was a key promise of the Power Act for Indian tribes, said Antone Minthorn, chairman of the board of trustees of the Confederated Tribes of the Umatilla Reservation of Oregon.

“Northwest tribes were instrumental in developing and passing the Power Act,” Chairman Minthorn said. “The Act acknowledges our treaty and the rights it secures. The Act recognizes the duty to consult with the tribes. Projects in the Council’s first fish and wildlife program helped the CTUIR to bring salmon back to the Umatilla Basin after they had been extinct for three-quarters of a century.”

At the same time, though, tribes believe the promise of the Power Act regarding fish and wildlife remains unfulfilled, he said.

“The balance of power and fish and wildlife required under the Act has not been achieved,” Minthorn said. “We have not halted the decline of fish runs; we strive to resolve these divisive issues over how the federal dams can best protect fish.”

Minthorn criticized funding of the Council’s fish and wildlife program as stagnant and insufficient and a source of polarization among upriver and downriver tribes in the Columbia River Basin. “Now is not the time to shortchange the Act’s lofty purpose or turn our backs on fish,” he said.

The December reception also featured an original skeptic of the Power Act, who later became a solid supporter.

“I am here to apologize,” said Ralph Cavanagh of the Natural Resources Defense Council. “It is a fraudulent misrepresentation to associate me with the successful enactment of the Power Act. I lobbied against the Act.”

Cavanagh said that at the time, environmental groups thought the energy-conservation provisions of the Act were mere window dressing on a law intended to encourage the construction of new power plants.

“I need to acknowledge the error,” Cavanagh said. “In fact, the conservation the Northwest has achieved under the Act, some 3,100 megawatts, is enough power for all of Idaho and all of Montana today.” All Northwesterners have benefited, he said.

Steve Wright, administrator and chief executive officer of the Bonneville Power Administration, said the Council “has become a strong working partner, advising and guiding on regional energy

issues.” He said the Council “adapted to circumstances not one of us could have anticipated in the 1980s.

“The Power Act gave the region a tremendous push toward development of energy conservation, and those benefits are spread across the region,” Wright said. “The Act created a great framework for Bonneville to establish its rates. The planning mechanisms in the Act were crucial. Through the Act we are able to decide what we want the power system to be and then drive it toward those things. That is the most important thing in the Act. The power system is the envy of the rest of the country and the world.”

CQ

Letters to the Editor

Our interview of Jack Robertson on the potential of hydrogen energy in the Northwest that ran in the fall edition of the Council Quarterly elicited a strong reaction from a reader who disagreed with Robertson's assertions and criticized the Council for publishing it without comment. The Council Quarterly is a forum for information and ideas. In keeping with that mission, here is the letter from Tom Bender, and Jack Robertson's response.

I was appalled at the five pages devoted to the "hydrogen economy" in the fall '06 Council Quarterly. I found it damaging to the credibility and past competence of the Council. To assert, without comment, in your own publication that "hydrogen is a virtually endless energy source," that it is a "perfect environmental closed loop," that hydrogen "produces effective power output with zero pollutants," while ignoring the high quality, expensive electricity required to obtain the hydrogen totally lacks the editorial and technical competence the Council needs to demonstrate.

"Separate the hydrogen in water from oxygen by an electric current . . . Then use the hydrogen to power a modified combustion turbine . . . And you can generate on-demand power with zero pollution." Sounds magical.

Why are the financial, environmental, and resource costs involved in getting the original electricity ignored? Why not just use that electricity? Burn electricity to generate electricity? Let's get real. What is the net energy of this cycle? Obviously it is negative. Plus you're paying—financially, environmentally, and resource-wise for both the original electricity production cycle and that produced from the hydrogen combustion. What sort of economics is that?

Hydrogen, as discussed in this article, is NOT a source of energy. It is a means of storing and using energy in mobile applications. That may have some merits, but it should be compared with alternatives for avoiding the "need" to transport food halfway around the world, the use of erosion-causing annual plowing of agricultural fields rather than using perennial food crops, etc. And, sure, you can store energy in hydrogen, but you can store it in our existing hydro system, you can power-down peaking turbines, and you can ship surplus elsewhere.

A realistic article on transportation energy (and alternatives) would be welcome. Even more welcome would be articles and initiatives on reducing the need for transportation, for electricity, for energy use in general. Electricity has unique energy quality. Its use to warm bathtubs 30 degrees, to heat homes, and to keep sleeping TVs and computers powered up is a sad commentary on the thoughtless waste of resources of our culture.

Providing space for divergent viewpoints is commendable. But it is also a responsibility of a publication to do critical, constructive, and caring editing. Not deleting or censoring, but challenging the writer or speaker to be clear, to support what they're saying, and be competent. Presentation and discussion of new options is important, but so is ensuring that what is presented is competent. I felt that missing in this piece.

Sincerely,

Tom Bender
Nehalem, Oregon

Jack Robertson's response:

I agree the net energy economics of hydrogen are a problem if you do simple calculations. It does not make economic sense, as Mr. Bender points out, if you simply electrolyze water into hydrogen, store it, and then burn the hydrogen to create electricity at all hours of the day and night and during all seasons of the year.

But as I tried to make clear in my interview, this simple analysis is too limited. It assumes the fundamental source of electricity generation—the Columbia River and increasingly wind energy—is a constant. They are not. The power of hydrogen in the Northwest is in its ability to take advantage of this important fact.

We are all familiar with the enormous amount of energy the Columbia River produces every spring that is well in excess of the needs of the region. During the spring runoff the price of electricity typically drops well below the average price during the year. Similarly, the price of electricity typically drops at night, when regional usage plunges.

The key to making hydrogen hubs economically successful, as I pointed out in the article, is to generate hydrogen during these lower cost periods, and store the hydrogen cost-effectively in hydrogen-rich liquids, such as ammonia. Renewable ammonia created in this way can also be supplemented by the outright purchase of ammonia from other sources. Millions of tons of ammonia are transported throughout the world each year, mostly to serve farming needs. The hydrogen hubs would then burn this stored hydrogen in new, highly efficient engines designed to operate on these hydrogen-rich fuels. These new engines are being designed to burn hydrogen and ammonia and generate electricity

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without pollution. Hydrogen generation would meet the high-cost peak needs of the power generation, transmission, and distribution system.

Since hundreds of millions of dollars are spent by utilities throughout the Northwest to meet these critical, peak conditions, the value of dispatchable, non-polluting, highly efficient generation placed squarely in the centers of the region's growth, is extremely high. This is the key to the economics of hydrogen power. Add all generation, transmission and distribution, carbon tax exposure, and renewable portfolio demands to this peak power, and it can approach and surpass 10 cents a kilowatt hour. Moreover, many assume utilities can continue to expand transmission corridors across the Cascades, and distribution systems inside growing urban areas to meet electric growth. Based on my experience, these assumptions face strong opposition.

The objective of the hydrogen hubs is, then, to "store" significant amounts of low-cost hydropower in the form of hydrogen-rich fuel in the spring and at night when the cost of electricity can be well below 3 cents a kilowatt hour. The hubs will be designed to then generate power at daily and season peaks, when the value of electricity increases many fold. Moreover, hydrogen can generate power on a predictable basis inside urban areas, next to substations, with no pollution—a huge added advantage.

We need to test hydrogen hubs in pilot projects. But I believe on-peak hydrogen generation can be more cost-effective than other renewable alternatives, provide predictable, non-polluting energy on demand, and play a key role in firming the increasing wind resource in the region which poses a growing system capacity challenge. The key to this is by better shaping the enormous, wind and water power of the region.

Meeting our rapidly growing peak-energy demands with scalable, dispatchable, non-polluting resources at the exact center of electric load growth is at the core of the Council's most compelling energy and environmental challenges. I believe a hydrogen infrastructure designed to increase the value of the region's enormous natural resources can plan a breakthrough role in a new energy future.

Thanks for the opportunity to respond to Mr. Bender's concerns.

Jack Robertson, chairman
Northwest Hydrogen Alliance

Coming soon...



“The Best Dam Simulation Ever” game will teach you about the multiple uses of the Columbia River and the complexities of operating the region’s hydrosystem. You’ll be able to test your operator’s skill and “run the river”!

A joint project of the Northwest Power and Conservation Council and the Oregon Museum of Science and Industry, “The Best Dam Simulation Ever” game will be available soon at www.nwcouncil.org and www.oms.edu.

Council Decisions

Fish and Wildlife Manager Coordination Funding

November

The Council voted to provide a total of \$2,481,044 to coordinate the work of Columbia River Basin Indian tribes and state and federal fish and wildlife managers in 2007. This work involves data collection and management and reviewing technical and policy issues for the purpose of providing collective advice and recommendations regarding the Council's Columbia River Basin Fish and Wildlife Program. Entities that will receive coordination funding include the Columbia Basin Fish and Wildlife Authority, \$2,071,450; the Upper Columbia United Tribes, \$69,594; the Columbia River Inter-Tribal Fish Commission, \$210,000; the Kalispel Tribe, \$65,000; and the Spokane Tribe, \$65,000.

Comparative Survival Study 10-year Report and Annual Report

November

The Council authorized the sponsors of the Comparative Survival Study (CSS), a research project to insert PIT tags in spring/summer Chinook salmon, to continue the tagging in 2007 and to prepare a 10-year retrospective report of the CSS work that will include an in-depth description of the project's methods, analytical approaches, and interpretation of all the project's past data. The budget approved by the Council is \$915,444. The Council also asked that the Independent Scientific Advisory Board review the retrospective report when it is completed.

Model Conservation Standards for New Commercial Buildings

November

The Council adopted energy conservation standards for new commercial buildings. The energy-efficiency specifications adopted by the Council are stronger than any existing commercial building codes currently in force in the Northwest. The new standards will be helpful in ongoing local code-adoption processes and in the design of energy conservation programs offered by utilities.

Electricity Adequacy Capacity Standard

December

The Council adopted a capacity standard for assessing the adequacy of the region's electricity supply. The capacity standard, combined with an energy standard adopted by the Council earlier in 2006, will provide a consistent context to utilities, regulatory commissions, and public utility boards in their assessments of individual utility resource plans. Federal energy legislation adopted in 2006 gives the Federal Energy Regulatory Commission (FERC) authority to assess the adequacy of the nation's power supplies. The Council expects that the Western Electricity Coordinating Council (WECC) will be designated to assess the adequacy of the power supply in the western United States. The Council intends the capacity and energy standards to be integrated into the WECC's efforts. Additionally, the Bonneville Power Administration, which participated in designing the standards, intends to incorporate them in decisions regarding power sales.

Competitive Solicitation for Innovative Fish and Wildlife Projects

January

The Council approved a solicitation for innovative fish and wildlife projects, which would be funded from a \$3 million placeholder amount set aside by the Council in its project-funding recommendations to the Bonneville Power Administration last October. Innovative projects are intended to improve scientific knowledge, encourage creative thinking, and directly benefit fish and wildlife. The tentative schedule is to request proposals in March and make a decision in August following independent scientific review of the proposals. Implementation would be in 2008.

Biennial Power Plan Monitoring Report

January

The Council approved the Biennial Power Plan Monitoring Report, which is a review of the conclusions and recommendations in the Council's Fifth Northwest Power Plan. The Council adopted the plan in December 2004. The plan calls for an assessment two years after approval to determine whether revisions are necessary. The Monitoring Report concludes that the plan does not need substantive revision at this time. The report documents that Northwest utilities are making good progress implementing the actions in the Fifth Power Plan. The region's utilities, in total, are close to achieving the energy conservation targets in the plan. Not all utilities are meeting their share of the regional targets, but there is evidence of a growing interest in, and commitment to, energy conservation, according to the report.

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