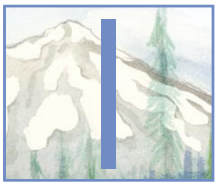
Council QUARTERLY
Northwest Power and Conservation Council
Spring 2008

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

Scientists Study Changing Ocean Conditions for Clues About Future Salmon Abundance



It is no secret that the abundance of fish in the North Pacific Ocean varies with changes in climate. Scientists at NOAA Fisheries, the University of Washington, Oregon State University, and other institutions have documented that shifts in climate cause shifts in sea surface temperatures and the direction and strength of seasonal winds, which in turn affect the production of food organisms for fish. As these organisms become more or less abundant in response to climate shifts, the fish that feed on them do, too.

The question for the future is: If current theories about climate change prove accurate, how will the usual patterns of sea surface temperatures, winds, food production, and therefore, salmon and steelhead abundance, be affected? Past changes in the ocean environment may hold the key.

The North Pacific ocean environment shifts in a periodic pattern that scientists at the University of Washington first observed and named the Pacific Decadal Oscillation or PDO. By linking known patterns of wind and sea-surface temperatures with records of fish abundance, primarily harvest records, the scientists observed a periodic shift, or oscillation, of warm water and cold water between the Gulf of Alaska and the ocean off the coast of Oregon and Washington. When the Gulf of Alaska was warmer than usual, the Oregon and Washington coastal ocean was colder, and vice versa.

Columbia River salmon and steelhead do best when the Gulf of Alaska is warm and the Oregon and Washington coastal ocean is cool. Under these conditions, which the scientists call a cool or negative PDO sequence, sea-surface winds from the north cause an ocean-wave

(continued on page 2)

Here Comes the Sun: Innovations in Solar Technology

As fuel costs rise and concerns about climate change dominate the news, interest in renewable energy has never been higher, and some of the most intriguing developments have been in the area of solar power. Photovoltaic and solar thermal are the two dominant technologies used to harness the sun's energy. Photovoltaic systems convert sunlight directly into electricity and solar thermal technologies concentrate the sun's heat to create steam, which is then used to power turbines, generating electricity. Concentration systems can also be used for space and water heating.

Although both technologies are much more costly than conventional generation, even with high oil and natural gas prices, many people are taking

another look at solar energy's potential. In a recent interview with Newsweek, Fred Krupp, president of the Environmental Defense Fund, noted that "Every hour, the sun provides the earth with as much energy as all of human civilization uses in an entire year…if you could capture just 10 percent of it on a piece of 100-mile square piece of land, you

(continued on page 4)

What's Inside

Scientists Study Changing Ocean Conditions (continued from page one)

phenomenon known as upwelling. During upwelling, water is pulled up to the surface, and surface water is pushed to the depths. Rather like turning over a compost pile, upwelling brings nutrients up to feed the organisms that fish eat near the surface of the ocean — phytoplankton and zooplankton — and this in turn provides food for fish. When upwelling is delayed or doesn't occur, the food web collapses. Without sufficient food, fish die, and without fish, other animals die, as well. When the PDO reverses and Alaskan waters cool, winds shift and Alaskan salmon thrive.

By comparing known conditions in the ocean against records of salmon harvests dating back to the early 1900s, scientists demonstrated corresponding periods of abundance and scarcity of salmon returning to Alaskan rivers and to the Columbia River Basin. When Alaskan waters were cold and the ocean off the Oregon and Washington coast was warm, Columbia River salmon and steelhead runs declined and runs in Alaskan rivers boomed. When Alaskan waters were warm and Oregon/Washington coastal waters were cool, Columbia River runs boomed and Alaskan runs declined.

> When upwelling is delayed or doesn't occur, the food web collapses.

For most of the 20th century, the PDO occurred in approximately 20-year cycles, but more recently the shifts have occurred as close as four years apart. It is not clear why. During the past 10 years, conditions in the North Pacific Ocean were highly variable, with a warm-water period off the coasts of Oregon and Washington in 1997 and 1998 followed by four years of cooler and more productive waters. During the warm period, the number of Pacific Northwest salmon returning to spawn declined, and during the cool period they rebounded. In late 2002, conditions reversed again, and warm water prevailed through 2006. Salmon returns declined again.

In 2005, when the PDO shift left the Alaskan ocean cold and the Oregon/Washington coastal ocean warm, dying or dead seabirds washed up on beaches in Oregon and Washington. Apparently they had starved or were starving. Sea surface temperatures were 5 to 7 degrees warmer than usual; the cold-water upwelling had not occurred. As a result, the amount of phytoplankton was only about 25 percent of normal and the food web declined. In 2006 and 2007, upwelling improved, but not substantially. The ocean environment

(continued on next page)

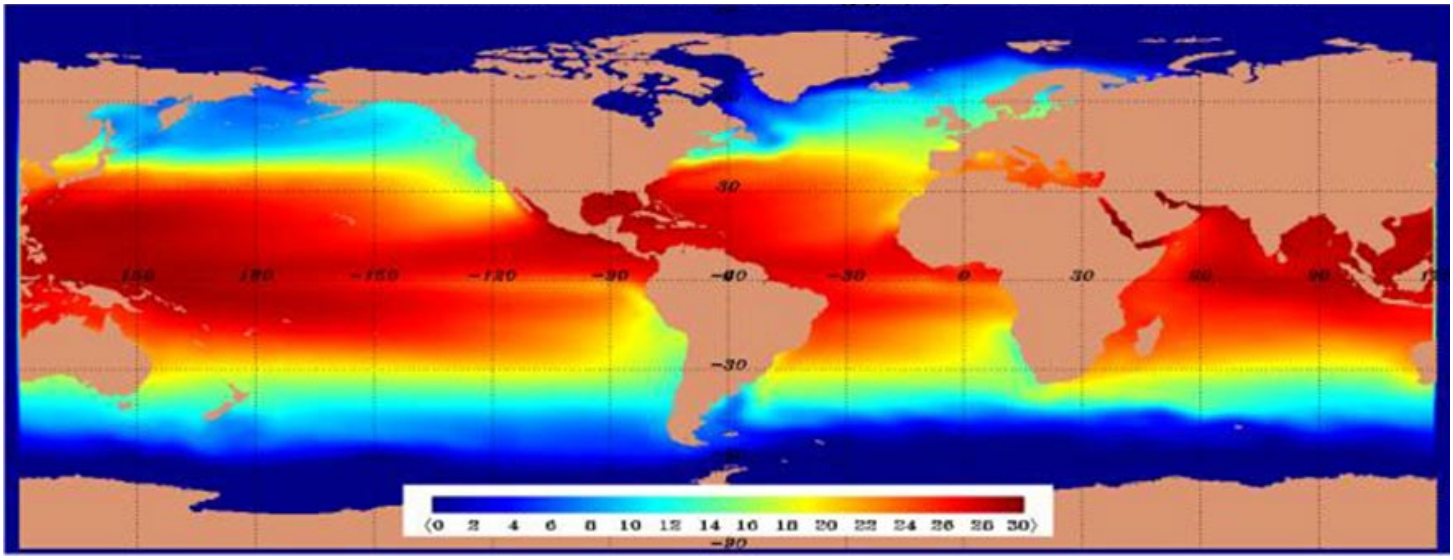
Notes From the Chair

Albert Einstein once observed that "Imagination is more important than knowledge." And while we rarely think of the work we do here at the Council in such terms, perhaps it's just another way of suggesting that the challenge, like so much of life, is not in having the right answers, but in asking the right questions. With this in mind, the stories in this edition of the Council Quarterly touch on topics where the unknowns are as important, and intriguing, as what we know.

The ocean, a critical environment for salmon and steelhead, has been influenced by myriad climatic patterns and trends since time immemorial. How these fish could be affected, if current theories on climate change prove accurate, is examined in a story about the ongoing research. At the other end of the spectrum, an interview with Dr. Michael McCoy on efforts to advance a "smart grid" envisions the kind of technological transformation of the power grid that we've seen in the business, education, and media sectors. A recent study by the Electric Power Research Institute and Edison Electric Institute found that tools like smart meters and appliances, which give consumers cost information, could help cut energy use and help the U.S. meet its projected energy needs.

Managing the hydrosystem to meet all the uses we place on it for human needs while preserving the health of the river for fish and wildlife has always been a delicate balance. Climate change and the intensified connection between energy and the environment have forced us to re-examine, and imagine, what might be possible as the limits of this critical resource are tested.

Scientists Study Changing Ocean Conditions *(continued from previous page)*



In this map of the world's oceans, warmer sea-surface temperatures are shown in red and yellow, and cooler temperatures in green and blue. The green color along the Pacific Ocean coast from northern California to Alaska shows the result of upwelling, which brings cold water from the depths to the surface. Without upwelling, the coast would be warmer during summer because warmer water would move shoreward. As a result, coastal waters would be too warm for salmon and steelhead to survive.

Illustration: NOAA Fisheries

off the Oregon and Washington coasts improved slightly.

In 2008, the improvement continued as the northerly winds and cold-water upwelling appeared to have returned. In fact, ocean conditions appear to be the best in 2008 since 2000, and that bodes well for salmon and steelhead in the coming years, even though some species, particularly those returning to rivers in southern Oregon and Northern California, are at very low levels. The scarcity this year reflects the poor feeding conditions of the last several years in the areas of the ocean where those fish go.

What does all of this mean for the future?

That is a key question scientists now are confronting: How might accelerated or more dramatic shifts in climate in the future affect the ocean environment and, as a result, ocean-going fish like salmon and steelhead from the Columbia River Basin?

In March, NOAA Fisheries scientists reported to the Northwest Power and Conservation Council on the recent results of their ongoing research. Based on that research, and also on the current scientific consensus that the global climate is gradually warming, the scientists made some observations and recommendations about the future of the ocean environment and salmon in the North Pacific:

> Food chain effects are likely as the ocean warms.

Food chain effects are likely as the ocean warms — both the cool phase and the warm phase of the PDO will be warmer.

- As the ocean warms, cold-water species like salmon and steelhead will be affected. Populations are likely to shift northward from their current spawning and rearing areas.
- Because it is possible that global climate change will exacerbate the already observable impacts of shifts in the North Pacific, salmon harvest managers should lower their catch quotas.
- If global changes cause shifts to less snow and more rain in the higher elevations of the Columbia River Basin, river flow patterns will change, and this could affect spring-run salmon, which spawn in the higher elevations.
- Warming might favor fall-run Chinook salmon, which spawn in the mainstems of rivers at lower elevations where flows could increase during spawning times.

CQ

Here Comes the Sun: Innovations in Solar Technology

(continued from page 1)

could power the entire United States." It's a sweeping claim, but is it realistic? Here's a rundown of some of the latest advances in solar technology hoping to make it possible.

Solar Thermal Plants

Two of the largest plants use curved or parabola-shaped mirrors to focus the sun's radiation to boil synthetic oil inside pipes. The super-heated piping is used to boil water, creating steam that runs a power turbine. Solar thermal is more efficient at 20-40 percent than photovoltaics, which in practice convert sunlight to electricity at about 15-22 percent. The world's largest solar thermal plant, the Kramer Junction, is located three hours from Los Angeles in the Mojave Desert. Built in the mid-1980s, it generates about 350 megawatts of peak electricity to the L.A. grid, enough to power more than 150,000 homes. Solar One, the newest major plant, was built by Acciona, a Spanish company. Located outside of Las Vegas, it can produce 64 megawatts. A recent New York Times article on the plant noted, "[its production] is small compared with a plant running on coal or natural gas, but far bigger than a typical installation involving solar photovoltaic panels, the type of solar most people are familiar with. That technology, while good for some uses, is far more expensive than solar thermal power."

Worldwide, according to the Times article, there are eight plants under construction in Spain, Algeria, and Morocco. Another nine projects are in various stages of planning in those countries, as well as in Israel, Mexico, China, South Africa, and Egypt.

The latest variation of this technology is to focus a field of mirrors on a "power tower" to heat fluid. The advantage of this system is that these towers are able to store heat, much like "a giant Thermos," helping to integrate the plants into the electrical grid.

Coney Island's Stillwell Avenue Terminal is a 76,000 square foot glass and steel structure using an innovative, panelized construction system of semi-transparent photovoltaic modules. These solar modules function both as enclosure and a source of approximately 250,000 kilowatt hours per year in renewable energy, the equivalent of the usage of approximately 40 single family houses.

Photovoltaics

In the quest to lower the costs of solar generation, some companies are betting on thin film or nano solar technology to advance photovoltaic cells. While conventional solar panels are large and costly to install and maintain, this latest development uses different materials to bring down manufacturing costs and increase efficiency. One company, Nanosolar, has devised a way to make solar panels that are as thin as paint. The "power sheet" is made from a layer of solar-absorbing nano-ink that is printed onto a foil-thin metal sheet, much like a printing press.

Coney Island's Stillwell Avenue Terminal, the largest above-ground station in New York City's subway system, boasts a state-of-the-art PV installation that uses low-cost, thin-film panels to form its solar roof. It's the one of the world's largest thin-film installations for a building. Sixty-thousand square feet of panels generate 210 kilowatts of power, enough to meet two-thirds of the station's energy needs.

As with all renewables, cost is the determining factor in whether or not projects are built, and mass production and economies of scale will be critical to lowering costs. Solar-generated power is still relatively expensive, but tax subsidies and state-imposed mandates for renewable energy are helping to spur investment.

The race to solve the energy conundrum is on. How can we ensure that we have the energy we need without harming the environment? Steven Strong, founder and president of Solar Design Associates, Inc., is a firm believer in the importance of renewable energy as one avenue toward this goal; but only one. "Solar energy alone will not solve all of our energy requirements," he asserts. "If you are looking for the least costly investment to help reduce your energy consumption, it is not solar but rather energy efficiency that you should invest in. A dollar invested in energy efficiency will displace more units of conventional energy and return more dollar per dollar invested than a dollar invested in solar." CQ

Fish and Wildlife Program Amendment Proposals Are Available for Public Review

In November 2007, the Northwest Power and Conservation Council invited recommendations to amend its Columbia River Basin Fish and Wildlife Program. Proposals received by the April 4, 2008 deadline have been posted on a special page of the Council's website for public review and comment: **www.nwcouncil.org/amend**.

The 60-day public comment period on the amendment proposals ends on June 12. After that, the Council will develop a draft amended program and release it for public comment on August 13. That comment period will continue through October 15. The Council plans to adopt the new program on December 10.

Through the program, the Council and the Bonneville Power Administration direct more than $140 million per year to projects that mitigate the impacts of hydropower dams on fish and wildlife. Dams block passage by ocean-going fish, and while many dams have fish-passage facilities, many others do not. Reservoirs behind dams flooded shoreline habitat for wildlife and spawning areas for some species of fish. Dam operations cause fluctuations in the water volume and flow downstream of dams, and this also affects habitat for fish and wildlife.

Projects funded though the Council's program are designed to address these impacts by, for example, improving spawning and rearing habitat for fish, raising fish in hatcheries and releasing them in the wild, acquiring land as wildlife habitat, and funding research into key scientific uncertainties. The program also recommends dam operations to increase protection and improve the survival of ocean-going fish. Federal agencies that operate the dams are required by law to take the Council's recommendations into account when making operating decisions. The program is unique because it is funded largely by electricity ratepayers and addresses all fish and wildlife affected by hydropower in the Columbia River Basin, including threatened and endangered species.

Under the authority of the Northwest Power Act of 1980, the Council develops the program based primarily on the recommendations of state, federal, and tribal fish and wildlife managers. Bonneville implements the program and funds it with a portion of the revenue from the sale of hydroelectricity generated at 31 federal dams in the Columbia Basin. The Power Act requires that the Council review the program at least every five years. The last review and amendment occurred in 2003-2005 when the Council incorporated into the program specific recommendations for mainstem dam operations and 57 subbasin plans. Subbasin plans will guide future implementation of the program.

The proposed amendments, instructions for how to comment, and other details of the amendment process are available at www.nwcouncil.org/amend. CQ

Quarterly Quote

"We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time."

T.S. Eliot

Gauging the Northwest's Power Supply: The Regional Resource Adequacy Standard

In 2000-2001, the West experienced an energy meltdown that brought the region to the brink of blackouts and caused electricity prices to soar. One of the root causes behind the crisis was a pattern of lagging resource development and growing demand during the 1990s.

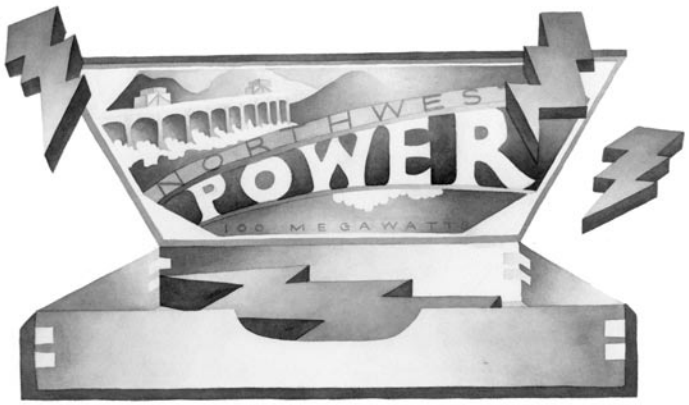
To address this imbalance, and to ensure that these conditions would not be repeated, the Northwest Power and Conservation Council and the Bonneville Power Administration initiated a forum to establish a resource adequacy framework to help know whether the region has the resources to meet its loads reliably. Representatives from utilities, utility organizations, public utility commissions, and public interest groups served on the forum.

The new standard was developed in response to a variety of changes that have occurred over the years, transforming the regional power environment into a much more complex system. These changes include the growing role of independent power producers, enhanced wholesale power trading, reduced flexibility in the hydroelectric system, the increased importance of natural gas-fired generation, the growth in wind generation, and higher summer air-conditioning loads. It will also help other entities assess resource adequacy for the entire West Coast system, a requirement stemming from 2005 federal energy legislation.

The adequacy standard is based on a sophisticated hourly assessment of loads and resources and how they could be affected by temperature, precipitation, forced outages to generating resources, and other factors. At the heart of the standard is a computer program that estimates the likelihood of a significant power curtailment under many possible future load and resource conditions.

"This standard will give us a much more accurate picture of the adequacy of the power supply," says John Fazio, senior power system analyst.

Because the new standard is different from what utilities are used to, they will inevitably want to compare its assessment of adequacy to their own perspectives. When the region's utilities add up their loads and resources through the Pacific Northwest Utilities Conference Committee's Northwest Regional Forecast, they currently show a substantial need to acquire resources, and they identify the type and quantity of resources they plan to acquire. In contrast, the regional resources adequacy assessment currently indicates that the region is above the minimum threshold for resource adequacy. Why the differences?



"The new standard is intended to be an early warning system to alert the region should resource development fall dangerously short—it is not a resource planning target," says Fazio. The current adequacy assessment indicates that sufficient resources, both firm and non-firm, are available to the region, making the likelihood of a blackout very low. But this is the minimum threshold. It may keep the likelihood of blackouts low, but it does not guarantee that prices will remain stable. This higher threshold is referred to as the economic threshold and is based on the Council's Power Plan, which acts as a blueprint for desired amounts and types of resource development. Individual utilities determine the optimal amount and types of resource development for them through their own integrated resource planning processes.

For the regional adequacy assessment, the new standard counts generation that is available to the region, but not owned or contracted by any utility. Most utilities only count resources they have firm rights to. Most utilities use critical water (driest year on record) to measure hydroelectric generating capacity; the new standard uses a less stringent measure to define the minimum threshold for adequacy. Many utilities don't count the availability of some resources because of their high operating costs, lack of firm fuel contracts, or other reasons. The new standard is based on the assumption that during emergencies, many of these resources would be available. Lastly, many utilities are concerned about the risk of high costs when the power supply is tight, and therefore take a more conservative approach to defining their need to acquire new resources.

While the forum believes that the new standard is a step forward in more accurately assessing the adequacy of the region's power supply, it also wanted to ensure that it did not overstep the jurisdiction of states or the prerogatives of individual utilities in planning and acquiring resources to meet load.

"The standard does not set mandatory compliance or imply enforcement mechanisms. Rather, it will serve as a gauge to assess whether the Northwest electricity supply is adequate to meet the region's needs now and in the future," notes Council Chair Bill Booth. CQ

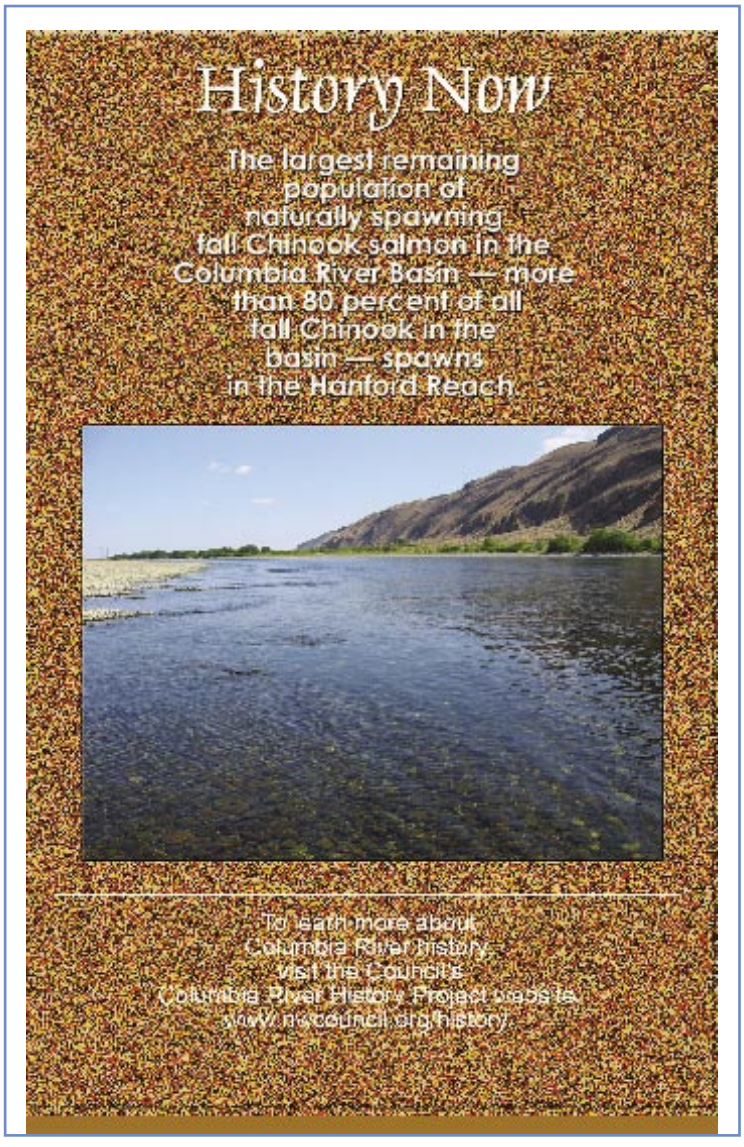
Columbia River Runoff Should Be Slightly Below Normal in 2008

Columbia River runoff in 2008 is expected to be slightly below normal, according to a report in May by the Northwest River Forecast Center in Portland, a division of the National Oceanic and Atmospheric Administration.

The January-September water supply forecast for the Columbia River measured at The Dalles Dam is 88 percent of the 1971-2000 average. Individual tributaries are expected to experience both above-normal and below-normal runoffs.

The highest runoff forecasts in the Columbia River Basin are for the Grand Ronde River in Northeastern Oregon (123 percent of normal), and the Yakima River in Washington (121 percent of normal). The lowest runoff forecasts are for the Snake River near King Hill, Idaho, at 68 percent of normal, and for the Okanogan, Methow, and Similkameen rivers in northern Washington (87-88 percent of normal). In addition, below average runoff — in the 86 percent of normal range — is forecasted for the Snake River in the Brownlee Dam-Hells Canyon area.

The May 2008 runoff forecasts for the remainder of the Columbia Basin fall in the 90-120 percent range, which continues to be good news for this year's water supply conditions. Because of cool weather in April, the snowmelt slowed and more water saturated the soil than would have occurred in warmer weather. This had the effect of reducing normal April streamflows, but also improving soil moisture content.



CQ

Northwest Q&A: Dr. Michael McCoy on the Smart Grid

Dr. Michael McCoy is a council member on GridWise Architecture, an organization formed by the U.S. Department of Energy to promote the development of information technologies to enhance the planning and operation of the power grid. GridWise believes that by improving the way these many electrical systems communicate with one another—creating a "smart grid," as it were—a faster, more efficient, and more flexible power system would result.

Currently, Dr. McCoy is the vice president for quantitative analysis for Becker Capital Management, an investment advisory firm in the United States, and he is also a technical director for Power Systems Research Inc., a power sector consulting company located in Brazil. He holds a bachelor of science degree in engineering physics from the University of Portland and a doctorate of philosophy in mathematics from Oregon State University. He has also done post doctoral work in operations research at Cornell and Stanford universities.

What is the smart grid?

The smart grid has a lot of different definitions, depending on who you are. From my point of view, it is trying to get the consumer of electricity to play a bigger role in making electricity cheaper and more reliable. From a distribution or engineering point of view, a smart grid tells you when it's having problems, and it helps people locate where the problems are. It's that type of thing. So there's a smart grid where the grid is intelligent, and then there's a smart grid in the concept of, let's get the consumer to play a bigger role in trying to help us manage this whole system better. My main emphasis at the GridWise Architecture Council, so far, has been mainly trying to get the consumer more involved.

What is GridWise's role?

The GridWise Architecture Council is sponsored by the Department of Energy; 13 people are selected nationally, and we're all volunteers. Our mission is to promote what we call interoperability, which is the idea that you can't have a system be real smart unless all the pieces talk a common language, use common definitions, etc. So, we're kind of the nails, the screws, and the bolts that you have to develop before you can put the wood together to build your house. That's our primary focus, but in doing that, we also have to have a view of where all this might be able to go. We call it the 30,000-foot view. Our view is very, very high in the sky. There are huge numbers of activities going on that are from a 20,000 and 10,000 foot view, and on the ground. But our view is a much broader perspective.

What kinds of things are happening now to create a smart grid?

The big player is still the utility, so there are a lot of smart grid initiatives where you see millions of smart meters being deployed in California and other states like Pennsylvania and Maryland. You see other initiatives like that where they're putting meters in homes that in the simplest way, the meter gives the utility the ability to control some aspect of the home's energy system. Normally, you get direct control of the home's air conditioning unit in California, for instance. And if the utility starts to get into trouble, it sends a blanket signal to all of these homes and it says, turn off your air conditioning because my load is getting too high, or if you have a transmission line that's overloaded, it could send a message just to those at the end of the transmission line, or if the whole system is overloaded, you can send it to everybody.

So the homeowner actually gets a message, but it's up to the homeowner to respond to the message?

Actually, his meter gets the message, and this has become a very delicate issue. The understanding was that the homeowner would have the ability to say whether he wanted his meter to respond or not. Recently, the California utilities went to the regulators and said, we want to be able to turn power off, no matter what the homeowner said. There are situations, in cases where they would have to resort to rolling blackouts, for instance, where we would want to override the customer's decision. That's created a kerfuffle, according to one member of the council. She said a lot of people were upset, saying that, maybe what you're doing is good for me, but it feels like more control than what I'm willing to cede. How that will all play out, I have no idea.

Then there are people who are starting to work from the bottom up. There is a company that used to put home entertainment centers in houses, but it was a pretty limited market. Then they found that there were people who had,

(continued on next page)

for example, an invalid grandmother, and wanted something in the home that would monitor her, make sure that her room temperature was okay, that you could sense that she was moving around, etc. That became a selling point, having a home entertainment center, and also being able to monitor an invalid in your house. And then they started to find that there were people who were willing to pay for the ability to preheat their vacation home. And there are people who are starting to provide small and medium-sized enterprises like Starbucks and Nordstrom with programs that enable them to make economic decisions about electricity usage. If you save $5 a month on your electricity bill, it's a good reduction, but not very exciting. But these people are amalgamating, aggregating a lot of these clients together, and so when they go to the utility they represent a significant load. While individually, their savings are modest, together they make a difference. Places like Starbucks are actually interested in those types of programs because it's green in a lot of instances, and just being able to brand their business as green is as important to them as the $5 they might save on their electricity bill.

The Northwest is at a disadvantage, because to get consumers to respond the way you want, they need signals. But in the Northwest, other than special programs, time-of-day rates are flat-rate prices; you don't get any price signals. Until the Northwest gets out of this flat-rate structure, it is not going to be a hotbed for these types of activities, in my opinion.

That's the challenge.

That's right. I mean, if you just go 400 or 500 miles south, then all of a sudden you've got people that have day-ahead markets and they're paying people who say they will help them out if they're in trouble. There are markets that do that and you can bid into markets, and none of those structures are available. Those concepts are not even really well defined in the Pacific Northwest.

> "The smart grid . . .is trying to get the consumer of electricity to play a bigger role in making electricity cheaper and more reliable."
>
> *Michael McCoy*
> *Gridwise Architecture*

Do you see that changing?

Yes, it will change as the hydrosystem becomes less and less dominant, and PGE has programs, Seattle City Light has programs. They're introducing the concepts because it does make a difference to them. They see the California market when they make purchases, so they recognize that they can sell down there at times when prices are better, and not when prices are worse. So there's a fair amount of that information that is seen by utilities. But the regulators in the Northwest have not seen the necessity, and maybe it isn't a necessity, to pass that type of structure on to the consumer. We'll see. But they will get there; it will get there as soon as those price swings start to cause us problems. Right now in the Pacific Northwest, the council is very active trying to figure out whether we are capacity sufficient which has never been an issue before. And it's capacity that causes the prices to go up and down.

It sounds like it depends on the hydrosystem, and as that system is tapped out then you start to see more price fluctuation.

The prices will fluctuate more as the capability of the hydrosystem, which levels everything out, dissipates. This will happen because, a.) demand grows; and b.) fish regulations will take away the flexing capability of the hydrosystem. And if we're going to have wind farms, and if they are going to have the hydrosystem try to absorb the fluctuations in the wind farm, it's going to lessen its ability to meet the other fluctuations that come from the generators. All of these things are going to make the Northwest much more sensitive to hourly prices than they are now. And they are sensitive now; it's just that they're not sensitive enough that we see the need to put a mechanism in place that will allow the consumer to see that sensitivity.

Are there parts of the country that are leading the way?

California has a huge program. The state of Maryland is going to put all of the state buildings into a management program. They're going to aggregate the state buildings as a load and they're going to try and manage them. There are some pilot projects like that that are being developed by utilities here. A lot of this falls under demand response. Demand response programs are already being developed by utilities and some of the PUDs in the Pacific Northwest. But the big activities, I think, are happening where they have the most pressing problems right now. And that's not the Pacific Northwest. It's California and lots of different places on the East Coast—Texas is pretty active, New Mexico is active, not necessarily because they're up against any kind of problem, but because their governor and their senators are thinking that this is where somebody has to get ahead in this pro-

(continued on next page)

cess. So they're very, very active in initiating programs in those areas, probably ahead of where the public would be if it weren't for those guys being so active.

The goal of the smart grid is not really to lower energy consumption but to manage the timing of electricity use?

On an economic basis, the smart grid is just trying to reduce the price that it takes to meet the load. But if it turns out that one of the ways to reduce the price is to become more efficient, which is clearly the case, then not only will it reduce the price, it will reduce the load. If they ever got to where they put green charges on the price of electricity, so that emissions were rolled into the price of the generation, then all of a sudden this technology, which is mainly aimed at reducing the price, would automatically be the one that also tries to reduce emissions, because emissions would be a significant part of the price. So that would be the dream at the end. If the price really represented the social costs, the fuel costs plus the emissions cost.

One part of the challenge is the technological question of sending price signals to the consumer; is the other challenge also getting the consumer educated about why they should buy into it? Do they need to understand what the benefits are?

If you are driven just by dollars, the individual consumer is probably not going to feel that it's worth his time. That doesn't mean that the consumer won't be part of this program, because somebody else may come into his house and do all the work, the electricity bill will go down by $5 dollars, and the consumer won't even notice that anything has been done. And in aggregate, by having so many people participate, it makes a difference. But I don't think the consumer will do much until you make it very convenient.

> "But if it turns out that one of the ways to reduce the price is to become more efficient, which is clearly the case, then not only will it reduce the price, it will reduce the load."
>
> *Michael McCoy*
> *Gridwise Architecture*

And obviously, there's the issue of not wanting to give up control.

Yes, absolutely. Site control, which looks at each individual customer, and knows that there are certain customers who are not able to tolerate having their air conditioning turned off during extremely hot weather—an office building, for example, that would just get too hot. So the decision to curtail air conditioning is individually tailored. They might turn off your compressor and your savings might be half what it would be with no air conditioning, but you're not going to notice it in the building. On average, the load goes down very fast, but then you see about 5 or 6 companies where the load just keeps going up, and that is what I think you need to provide. They are tailoring these services so that people don't notice it, and that would be what I think the homeowner needs.

There is something attractive about having that level of—not monitoring—but just knowing that everything is running as efficiently as possible. In that sense, it's an energy-efficiency issue.

Yes.

Is there a timeline for when you think the Pacific Northwest will see more of this happening?

The council tries to say that right now our horizon is 10 years; that's when we hope to see most of the things that we're talking about come together. Think about credit cards. There was a time when you had to write the credit card number down by hand. Now, overseas, they have places where you just hold your card to a light. So just look at that progression and how much technology had to advance to be able to make all this work.

The technology exists today to do all this stuff, the problem is that there isn't a single technology that will do it; there are a lot of technologies that will do it. A lot of money is being spent to see who will control how the communications are done.

Is there a race on to be the dominant system?

There are a lot of races, on many levels. The question is, will the decision be made through a meter in your home or is it going to be made through your cell phone? Is the internet going to be the communication medium for pricing, is pricing going to go to the internet? There are programs that are doing that. There are programs that are trying to send it down the power lines to the meter; there are programs that are trying to send it through the air to the internet, through the cable to the internet; through the internet to your cell phone or through the internet to a guy who is managing all the houses on your block with some software.

It's a culture-changing event, whatever comes out of this. CQ

Council Decisions

January

Coordination Funding for Tribes and Fish and Wildlife Agencies

The Council recommended the Bonneville Power Administration provide $2.4 million to fish and wildlife agencies and Indian tribes to participate in the Council's fish and wildlife program planning and implementation processes. The Council approved this funding, called coordination funding, in the following amounts: $1,869,650 for the Columbia Basin Fish and Wildlife Authority (CBFWA); $62,814 for the Upper Columbia United Tribes; $58,668 for the Kalispel Tribe; $58,668 for the Spokane Tribe; and $189,542 for the Columbia River Inter-Tribal Fish Commission.

New Protocols for Reporting Scientific Data

The Council approved a set of guidelines for scientific research projects regarding how to report location and time-related data within a geographic information system in a database or spreadsheet. The data-reporting protocols were developed by the Northwest Environmental Data-Network in collaboration with numerous agencies including state and federal fish and wildlife and land-management agencies, and Indian tribes. In approving the protocols, the Council recommended that Bonneville implement them through the contracting process for projects that implement the Councils' Columbia River Basin Fish and Wildlife Program.

Charter for Conservation Resouces Advisory Committee

The Council approved the charter for a committee of technical experts on energy conservation to provide expert technical review of the Council's assessment of regionally cost-effective conservation potential and help the staff and Council formulate and review policy and program alternatives to develop the region's conservation potential. The Council is beginning work on the Sixth Northwest Power Plan, which is expected to be completed in 2009.

March

Electricity Resource Adequacy Standard

The Council adopted a regional electricity resource adequacy standard to provide a consistent context to utilities, regulatory commissions, and public utility boards in their assessment of individual utility resource plans. The proposed standard consists of a metric (something that can be measured) and a target (an acceptable value for that metric) for both energy (annual) and capacity (hourly) capabilities of the power system. The energy metric is an annual load/resource balance, and the capacity metric is an electricity reserve planning margin (or surplus sustained-peaking capability). The Council will use the standard in developing its Sixth Northwest Power Plan.

Northwest Power and Conservation Council Members

Central Office
Northwest Power and
Conservation Council
851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
Telephone: 503-222-5161
Toll Free: 1-800-452-5161

Idaho
Boise
450 West State
Boise, Idaho 83720-0062
Telephone: 208-334-6970
Council Member:
James A. Yost

Hayden Lake
East 1677 Miles Ave., Suite 103
Hayden Lake, Idaho 83835-9154
(208) 772- 2447
Council Member:
W. Bill Booth, Council Chair

Montana
1301 Lockey
Helena, Montana 59620-0805
Telephone: 406-444-3952
Council Members:
Bruce Measure, Council Vice Chair
Rhonda Whiting

Oregon
Astoria:
1642 Franklin Ave.
Astoria, Oregon 97103
Telephone: 503-325-2006
Council Member:
Joan M. Dukes

Milton-Freewater:
410 N. Main
P.O. Box 645
Milton-Freewater Oregon 97862-0645
Telephone: 541-938-5333
Council Member:
Melinda S. Eden

Portland:
851 S.W. Sixth Avenue, Suite 1020
Portland, Oregon 97204-1347
Telephone: 503-229-5171

Washington
Spokane:
N. 501 Riverpoint Blvd, Suite 425
Spokane, Washington 99202
Telephone: 509-359-2438
Council Member:
Tom Karier

Lacey:
510 Desmond Drive SE Suite 271
Lacey, Washington 98503-1273
Telephone: 360-534-9347
Council Member:
Dick Wallace

Council Quarterly
is produced four times a year by
the Public Affairs Division
of the Northwest Power and
Conservation Council

Northwest Power and Conservation Council

851 S.W. Sixth Avenue
Suite 1100
Portland, Oregon 97204

Telephone: 503-222-5161
Toll free: 800-452-5161
Web site: www.nwcouncil.org

PRSRT STD
U.S. POSTAGE PAID
PERMIT NO. 11
PORTLAND, OR