



## Northwest Power and Conservation Council Meeting Notes – March 10 & 11, 2015

The Council kicked it into high gear in Eugene, packing its two-day agenda with enough studies and statistics to keep power partners and fish followers buried for weeks. Most significant, the Council has its ducks in row (pun intended) on the data it will use to feed the Regional Portfolio Model, the analytic engine of the Seventh Northwest Power Plan. Next meeting: April 7 & 8, in Helena, Montana.

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### The Agenda

#### **EWEB and Emerald ask for situational-based plan**



Roger Gray, general manager of the Eugene Water and Electric Board (EWEB); and Scott Coe, general manager of the Emerald People’s Utility District, welcomed the Northwest Power and Conservation Council to Eugene. They shared their views on the need to build flexibility into the Seventh Northwest Power Plan (Seventh Plan).

Gray pointed out that EWEB is 90 percent-plus renewable, with hydro, biomass, wind and solar. “Some consider us an anomaly,” Gray said. “But we’re a harbinger for what the region is going to experience as renewable power becomes more emphasized.” He said that capacity is EWEB’s number-one issue, not conservation. EWEB’s conservation programs go back 30 years, so its cheap conservation is gone. The cost of acquiring conservation is the number-two reason for its rate increases. “I’m concerned when we take the regional average [conservation cost] and apply

it to everyone across the board,” Gray said. “Utilities have vastly different business situation in terms of how we’ve been doing conservation.”

Coe agreed with Gray that the Council’s planning has to have flexibility for changing circumstances. For example, he observed that irrigation and conservation needs are different for different utilities. He said that reliability is a critical issue in his rural service territory. He cautioned the Council not to go out with energy efficiency requirements.

*“We don’t need traditional kilowatt-hour savings. You can have a conservation program but it doesn’t help the peak.”*  
– Scott Coe, Emerald PUD



Coe said Emerald is in surplus energy for the next 10 years. “We don’t need traditional kilowatt-hour savings,” he said. “You can have a conservation program, but it doesn’t help the peak. Our situation is unique. We’re putting our eggs into the demand response and demand management baskets. We want to see if customers will help us by changing their peak. Our hope is that it will work as the least cost, least-carbon and least-risk approach. If it works, great. If not, you’ll have a new general manager speaking to you.”

### Direct use of natural gas pops up again



Like a prairie dog, the direct use of natural gas keeps popping up for discussion. The ongoing debate is over whether the Council should promote the direct use of natural gas for water heating, or if it should continue to allow the market to guide consumers in their decisions over which fuel to use. Tom Eckman, director of the Council’s Power Division, said that the Council’s policy is that the direct use of natural gas for some uses is both thermodynamically and economically more efficient, and that those uses would be advantageous. Second, current market forces seem to prompt customers to select the lower-cost fuel, without any involvement. “Because of that, we’re not intervening in that marketplace because it seems to be working,” he said.

Since 1986, the market share of electricity water heating has been declining, while natural gas water heating has been growing over time, but less so in the recent past.

Staff sought guidance from the Council on whether to change their assumptions, get more analysis, or maintain the current approach and embed it into the Draft Plan.

Council Member Tom Karier said that he doesn’t object to the major theme and that the Council shouldn’t intervene. He was interested in whether electric water heaters might be more valuable down the road for renewable integration. He wondered what potential there is for converting them to demand response units. Eckman replied that a certain fraction of them could be used and that their value would come out in subsequent analysis.

In addition, Karier was interested in putting more direct language into the Plan. “One comment that seemed reasonable was a suggestion to encourage consumers to make the optimum choice,”

he said. “If they did, they would save money, the region consumes less fossil fuel, and there are less carbon emissions ... a lot of good things happen when consumers make the optimum decision. So why would we object to encouraging efforts to inform individuals that they should make the optimum choice?”

Council Member Henry Lorenzen said, “NW Natural would love that, but I can imagine the utilities of Bonneville would wonder what in the world you’re doing, going out to spend our ratepayer money to get people to use more natural gas.”

Eckman said in the Action Plan, there would be language that lays out the results of this study and the advantages of the direct use of natural gas. He said that staff will leave the load forecast embedded with the business-as-usual conversions, and compare the system benefits with the demand response of capacity benefits and consumer benefits. Then the Council can decide if it wants to promote more conversions or not.

Karier said he wouldn’t change any language at this point. “I’d like to see the results of the demand response report and reserve the right to revisit it,” he said.

### **New to Plan, peak-hour conservation potential**

Staff asked for Council guidance on the suitability of the conservation potential assessment as draft Plan inputs. The presentation by Charlie Grist, Manager, Conservation Resources, looked at the amount of conservation, the cost of it and the pace at which it can be acquired. He said that there is a lot of conservation in this bundle, but “you can’t have it all right now. It takes time to build it.” He said that initial results show that the total 20-year achievable conservation potential is about 5,100 MWa and 11,000 MW in the peak hour.

*“You can’t have it [conservation savings] all right now. It takes time to build it.”*

*– Charlie Grist, NWPC staff*

“These are achievable conservation potential, not conservation targets,” Grist said. He said they don’t know what the cost-effective level of conservation is – as they’ll discover after they run the analysis. The numbers aren’t quite final and he said that they will be ready for the modeling effort by March 27.

The costs are levelized over 20 years in order to put conservation and generating resources on equal footing with one another. The intent is to compare them, apples to apples, in dollars.

Peak capacity is an issue: Energy efficiency measures identified may or may not contribute to reducing peak load. If they save energy at that 6 to 7 p.m. peak demand hour, they will be counted contribute to meeting the peak.

Council Member Pat Smith asked what the graph on capacity would look like in the Sixth Plan. Grist replied that the number was not a lot different. What is different is that we are now looking at a single hour. “We couldn’t produce this graph from our tools then because we weren’t

looking at single-hour peak,” he said. Eckman added that they now use a single-hour metric for capacity. In the Sixth Plan, it was a 16-hour sustained peak, high-load hour.

Grist reviewed the potential conservation breakdowns by price, sector and end use. Lighting is a big measure in the commercial and residential sectors. Heating is significant and there are many water heating measures in the residential sector. Some notable new measures include: solid-state lighting, devices to control plug loads, variable refrigerant flow HVAC systems and efficient data center equipment.

Council Member Henry Lorenzen asked what goes into the calculations to determine the cost of a conservation measure. Grist replied that they use total resource cost: capital, installation, markup, line for annual O&M cost changes and periodic O&M. “We do all costs and all benefits,” he said.

Lorenzen expressed concern over the cost of acquiring conservation. “There are some real barriers to the implementation of conservation,” he said. “One of the things we should be focusing on is how do we overcome those barriers, such as how utilities price their product, because it’s a great disincentive. There are small utilities that don’t have load growth and their boards of directors are reluctant to push conservation, when it will result in an increase in rates. These are impediments to the implementation of conservation that otherwise, from an economic and regional standpoint, would be the most efficient way to go.”

The Council’s consensus was that the conservation characteristics and assumptions are suitable.

### **Demand response valuable, but costly resource**

John Ollis, Council staff’s new power system analyst, briefed the Council on the *Demand Response Characteristics Assumptions*. He said that demand response is a hybrid between energy efficiency and a supply resource. The model sees it as a supply-side resource even though it’s a demand-reduction resource, because of its dispatchability component.

Demand response can be looked at by supply source and by dispatch method, and by whether it is firm or non-firm. The two main attributes for acquiring demand response are seasonality (summer and winter peaking capability) and cost. Eckman said that demand response didn’t fit the need because of its capacity requirement. “We had to treat it as a peak generator that could be dispatched at a given hour,” he said.



Karier observed, “I think it’s a key resource. If the Council identifies it as a great value to the region or of no value, it will have implications for utilities’ portfolios. Like any other resource; we’re not directing anyone to build it. It’s either the right or wrong resource for the region.”

Karier added that to meet capacity, there are only a few options, be it building single cycle plants or demand response. “This is a good way to test DR at a regional level — is there an economic

advantage to any one of these strategies?” he asked. “I think it’s an important finding and it will bear on future investments in the region, and it should, but maybe not individual utilities.”

Eckman said, “DR would rarely be dispatched for economic reasons, it would be for reliability reasons. It may be cheaper than building plant, however. It’s the least expensive of a very expensive group of things.”

“DR is for capacity,” said Council Member Jim Yost. “That’s what you use it for. I’ll support this, because we need to do this for five years and see what happens, and get our feet wet on how it works.”

Simmons next discussed utility-scale solar PV systems, which he said have been coming down sharply in cost in recent years. A big change from the Sixth Plan is that Solar PV is being put into the mix of potential future resources.

The reference plant for solar technology is in Southern Idaho, and its capital cost is less than half of what it was in the Sixth Plan. The plant can serve local load and regional load via a potential new transmission line, specifically the Boardman to Hemingway Project.

There are two wind reference plants – one in the Columbia Basin and one in Central Montana serving Northwest load. Both are 100 MW projects. They extended the life of the projects from 20 to 25 years and lowered the development time to four years. And capital costs are higher. Capacity factors in the Columbia Basin are 32 percent, which is the same as Sixth Power Plan. For Central Montana it’s a 40 percent capacity factor.

Also discussed was the inclusion of the Renewable Portfolio Standards (RPS) in the plan, which are regulatory mandates by individual states to increase the development and generation of renewable resources. There are a lot of details and nuances in each state that can’t all be captured in the modeling. There is legislation in Washington and Oregon that could have an impact going forward. Idaho doesn’t have a standard, but it encourages renewable generation and development in their energy plan.

The Council agreed that staff is on the right track.

## **Future Scenarios Heart of Plan**

The use of scenarios in the Seventh Plan allows the Council to stress test changes in futures to accommodate new regulations, technologies or other factors, which is at the heart of the Plan development. No matter what the future holds, there are power gaps that have to be filled.

Eckman reviewed the high and low potential load growth ranges through 2035. “We have the major inputs to the model and we have existing resources,” he said. “We see little growth of plants coming online in 2016 and 2017, and we see a gradual decline in coal with announced retirements of Centralia and Boardman. So loads are growing while the existing resource base is getting smaller.”

The difference between what we have and what we need is a gap that has to be filled. “That gap is between 1,600 and 3,000 MWa by 2025, and between 3,600 and 6,700 MWa by 2035,” he said. “That’s what the modeling effort will try to solve.”

“What should we build/buy?” he asked. “The statute says we have to buy the cheapest thing first. The model will buy the cheapest thing first; so don’t be surprised when energy efficiency shows up as a big component in each analysis. When we look at the capacity side, demand response is cheaper than buying engines. It doesn’t have much energy contribution, but demand response will be first because it’s cheaper.”

Staff is proposing to run 15 scenarios that were crafted to examine potential future stresses and constraints on the system. They will look at existing policies with and without uncertainty to test the model, examine different green-house gas reductions policies (certain and uncertain), explore ways of lowering carbon emissions with existing and emerging technology, understand the impacts of existing resource and out-of-region market uncertainty as well as look at the impacts of the influence of climate change on loads and the hydropower system.

In remarks before the Power Committee earlier that day, PNUCC Executive Director Dick Adams praised Council staff’s work. “These scenarios are the greatest value of the Seventh Plan, because they’re going to help the industry understand the impacts of ‘what if,’” he said. “This is incredibly important work.”

*“These scenarios are the greatest value of the Seventh Plan.”*

*– Dick Adams, PNUCC*

Adams did suggest a different approach to the carbon scenarios by urging the Council to see how far it can go. “If the region reduced carbon 10 percent, what are the consequences?” he asked. “What would it take for the region to reduce its carbon irrespective of what it’s tied to? What is the maximum reduction under current technologies, instead of guessing what the EPA will do in coming years? We might see some limits that will surprise us.”

## **Solar is a new player**

Gillian Charles, energy policy analyst, presented a high-level summary of the proposed draft Seventh Plan generating resources and their characteristics that will be used in their analysis for developing the plan. While this topic has been covered at previous Power Committee meetings, the full Council had the opportunity to get an overview of the technologies, reference plants and cost assumptions. In addition, Charles provided a first look at folding Renewable Portfolio Standard assumptions into the analytics.

The primary resources being considered for use in the future are natural gas combined-cycle combustion turbines, natural gas simple-cycle turbines, reciprocating engines, wind, and with this plan solar will be included. Steve Simmons, staff senior economic analyst, described natural gas combined-cycle combustion turbines as the most efficient of the gas technologies. They developed two reference plants – a combined-cycle 1, which is wet-cooled and requires a water

source; and a combined-cycle 2, which is dry-cooled, easier to permit, but it comes with a higher capital cost.

Karier asked that since the plants seem so similar, why do we need two plants? Simmons said a limit on the number of permits for wet-cooled plants. We figured we'd better have a dry cooled one as well. They will be distinctly defined in the modeling input and can be pulled out.

Charles said that gas peakers offer two major technologies: Single-cycle combustion turbines and reciprocating engines. She described their operation, and said that historically, they were used to shape hydropower. There is a reference plant for each technology. They tried to structure the reference plant around Port Westward II, PGE's most recent peaking plant, which has a capacity of 220 MW. Also, gas units have a big fuel component, which is an uncertainty in the future.

### **Columbia Basin fish returns stay strong**

Paul Kline, Idaho Department of Fish and Game, and Bill Tweit, Washington Department of Fish and Wildlife, were the bearers of good news when they briefed the Council on 2014 fish run data and their forecasts for 2015. Tweit said that the Columbia River is showing higher-than-average in salmon productivity, and stated that managing abundance is a lot more fun than managing scarcity.

Tweit said that we're looking at a strong return of spring Chinook to the Basin, an increase over last year. The Upper Columbia spring Chinook run is smaller than in the Snake River. The 2014 return was quite strong, and another good one is forecasted for 2015, with a 2015 wild forecast of 170 percent of the 10-year average. An increase in Upper Columbia summer Chinook is expected and Upper Columbia sockeye numbers are very rewarding. A "reasonably good return" is predicted for upriver summer steelhead.

The biggest attraction is the Fall Chinook forecast: 747,300 for 2015. "We know we won't be at these levels forever," Tweit said. They show long, cyclical variations due to ocean conditions and other conditions we don't understand."

Overall, 2014 was a very good year. Tweit said we are up two million in a total return in upriver, salmonid stocks. "You can see just how depressed they were in the 1990s, and how much of a bounce back we've seen since then," he said.

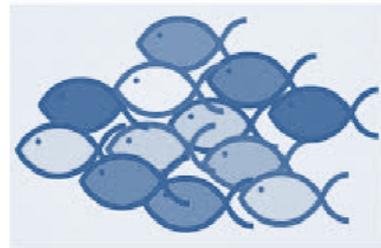
Kline provided a look at fish Lower Granite upstream. He reviewed 15 years of trend information returns back to Lower Granite Dam for fall Chinook, sockeye, summer steelhead, spring/summer Chinook and coho. Looking at fall Chinook at Lower Granite Dam, a good year is predicted for 2015 after a record year in 2014. "This year, we're forecasting a high number of natural-origin steelhead — about 56,000," Kline said. "It's a remarkable forecast." Hatchery fish forecasts are lagging as habitat conditions impact them differently.

Tweit cautioned that the science they're seeing beyond 2015 makes them nervous. There have been some changes in the food chain, and sardines seem to be declining and moving on. He said that he won't be surprised if we start to see lower numbers in 2016 and 2017. "The only way we can know if it changed is looking in the rear view mirror," he said. "We have a shot clock going in our brains that it only stays good for so long before it starts to fall off. We've had 15 years of good abundance."

### **Crowded rivers could be hindering recovery**

Some of the most significant news of the meeting came from the Independent Scientific Advisory Board (ISAB), which reported its evidence that the recovery of most of the ESA-listed populations in the Basin may be hindered by fish density.

The denser the population of a fish species in a given area causes a change a fish population's growth rate. The population's growth rate slows as the number of fish increases, and, in turn, increases as the number of fish decreases. This decrease in a population's growth is most often caused by limitations in food or habitat carrying capacity.



ISAB Member Greg Ruggerone told the Council that there is strong evidence of density dependence in 25 of 27 Columbia River spring and summer Chinook populations. Snake River fall Chinook is density dependent and all 20 interior Columbia River steelhead populations show strong density dependence, he said. This information can help inform restoration activities.

Looking at a map of the Columbia River Basin, Ruggerone said that 31 percent of previously accessible habitat is now blocked. The impact varies by species. Changes in abundance have been greater than changes in habitat. Basically, density dependence is about crowding.

Ruggerone summarized his presentation by saying, "Understanding density dependence (e.g., stock-recruitment relationships) in salmon populations is central to evaluating responses to recovery actions and for setting spawning escapement goals that will sustain fisheries and a resilient ecosystem."

Council Chair Phil Rockefeller observed that this is a watershed study that will trigger a lot of questions. He asked Ruggerone and his colleagues to bring more detail back to the Council's Fish and Wildlife Committee.