Northwest **Power** and **Conservation** Council

Council Meeting
Portland, Oregon
Tuesday, December 15, 2015

Council Chair Phil Rockefeller brought the meeting to order at 1:29 p.m. Council Members Rockefeller, Tom Karier, Henry Lorenzen, Bill Bradbury, Jennifer Anders and Pat Smith were in attendance. Council Members Bill Booth and Jim Yost attended by phone.

Reports from Fish and Wildlife, Power and Public Affairs committee chairs Fish and Wildlife Committee

Fish and Wildlife Committee

Member Bill Bradbury, Chair of the Fish and Wildlife Committee, reported that Nancy Leonard demonstrated how to use a new mapping tool to track natural origin salmon and steelhead in the various sub basins of the Columbia, which are accessible to anadromous fish. Staff will continue to refine the tool with input from the region, by rearranging things in tabular format or linking the database to the assessments database. Bradbury said that it's pretty clear it will lead to the development of Council's biological objectives and it will contribute to the NMFS Columbia biological partnership.

Several attended the opening meeting of the Sovereigns Group. The first, full partnership meeting will take place in February. The Council appears to be making steady progress in implement emerging priorities that were adopted in the 2014 Fish and Wildlife program. They will have a project in next few months on Northern Pike suppression.

The committee has received one proposal for habitat assessment on the reintroduction of salmon above Grand Coulee. It's a joint proposal from the UCUT tribes and Oregon Department of Fish and Wildlife.

The committee will work with CRITFC and the region on flood plain habitat restoration in connection with CRITFIC's salmon conference.

The committee reviewed an ISAB letter reviewed for predator science review. The committee had some questions, and staff will revise the letter and resubmit in January. In February, the Council will review it.

Power Committee

Member Pat Smith, Chair of the Power Committee, said they discussed updated inputs to the Regional Portfolio Model (RPM) and staff recommendations. They are responding to comments received on the Draft Seventh Northwest Power Plan. The first item discussed was natural gas and the wholesale electricity price range. Since natural gas prices have dropped since the price was fixed in 2014, the natural gas advisory committee was polled and the consensus was that natural gas prices should be adjusted downward. The median price forecast has dropped $1 per MBTU. The jaws of the forecast dropped to reflect a lower median price. Because wholesale electric prices are so linked to natural gas, the same adjustment occurred. For example, the Mid C price is now $21 compared to $31 in 2014. The effect is that the median forecast is reduced $3 or $4 per MWh. It slightly lowers the levelized cost of natural gas plants as well.

The committee discussed the load forecast and load changes in the direct service industry. The Columbia Falls aluminum plant closed in Montana. Two other aluminum plants, totaling 770 MW, will go idle for a couple of years in Washington. Whether the plants continue to operate is unknown, but it is assumed that they will come back online when conditions are more favorable. Counterbalancing that loss is the announcement of three potential, new methanol plants, which would be phased in 2021-22. It would be a possible addition of 800 MW of load. The power committee decided to lower the medium forecast in the short term. There's more uncertainty now because methanol plants have increased the range of long-term uncertainty.

The committee discussed the adequacy reserve margin (ARM) and the associated system capacity contribution. ARM is how the loss of load probability is incorporated into the RPM. The adequacy standard and associated system capacity contribution is that if you bring new resources online, they may allow the hydro system to have more storage for peaking power. There's a capacity benefit when new resources come online. Through public comments, there was a request to use more seasonal data, instead of yearly, mostly winter peak in the case of the ARM. Comments received expressed a hope that the RPM could look at that on a quarterly basis. This would be significant in terms of looking at solar and wind, which have a different load and shape in the seasons. And we have the ability to do that.

The committee discussed staff's recommendation to add two, renewable energy options to the RPM. One is to add an industrial-scale, reference plant west of the Cascades. It would be similar to the Southern Idaho plant. The economics are more difficult on the west side, so the costs will be higher. But because it would be located closer to transmission, it could be more economical.

The second is to add a conventional geothermal plant into the RPM. It's now treated as an emerging technology. It was looked at it in Sixth Plan, so we can use that same analysis. Now economics are better, but the sites and potential are limited. A maximum build-out on geothermal would be about 400 MW.

Last, they tweaked the logic of the RPS. It was pointed out that based on state statutes, they should base their computations on retail sales. The RPS is tied to the load of those

states. However, the staff based their computations on utility load, which included transmission and distribution losses. The statutes are based on retail sales, so transmission and distribution losses are backed out. There's a minor modification of about 7 percent, so the renewable energy outputs will be a little lower.

The committee agreed with staff's recommendation to run three scenarios: existing policy (1b), social cost of carbon (2b), and coal retirements and efficient natural gas retirements (3a).

Next, they discussed three new scenario options. They went along with staff recommendations to run the following scenarios:

1. Coal plant retirement without inefficient gas plant retirements.
2. Coal plant retirement without inefficient natural gas plant retirements AND without new natural gas plant development.
3. Coal plant retirements with a carbon cost rather than natural gas.

Last, there was a suggestion that the Council look at the cost and benefits of removing the Lower Snake River Dams. Staff recommends against it. The committee decided that it's an issue to take up after the Seventh Plan.

Public Affairs

Member Jennifer Anders, Chair of the Public Affairs Committee, reported that the committee didn't meet, but that there was activity in November. Member Tom Karier, and staff members Tom Eckman and Mark Walker went to Washington, D.C., to brief the region's delegation on the Seventh Northwest Power Plan. Member Karier met with nearly all of Washington State's delegation, and Eckman and Walker met with Congressional delegations from the other three states. The U.S. Senate Energy Committee hosted a briefing meeting with Walker and Eckman that was attended by a dozen people. The three Council representatives held a briefing at the U.S. Department of Energy with Claudia Andrews, BPA's chief operating officer, Sonya Baskerville, head of BPA's federal affairs, and two DOE policy and systems analysis employees. Member Karier also asked if DOE could help fund the end-use load study.

Member Karier said that there was a lot of interest in the Seventh Power Plan. Currently, DOE is spending nothing on end-use studies, which are essential for evaluating the capacity value of energy efficiency in the Northwest and across the country. He said that the whole country is investing in energy efficiency, without a clear understanding of what those capacity values are. The Council is proceeding through the NW Energy Efficiency Alliance to develop a study program. Member Karier said that he gave DOE an option to participate financially to let the rest of the country benefit from what we will learn about in the Northwest.

1. Presentation on aquatic invasive species in the Columbia River Basin

The project is funded by Bonneville Power, through its technology innovation project, not through the Fish and Wildlife Program, for fiscal years 2013-2015.

Steve Bollens, Washington State University, said that this is a broad topic. He provided an overview of anthropods, and quagga and zebra mussels.

He began with a presentation on invasive zooplankton in Washington and Oregon estuaries.
Went through a food web. The aquatic ecology lab at Washington State is concerned about all aspects of the food the web. A number of invasive species have moved globally. Most obvious are mnemiopsis and bythotrephes. Both have major impacts on food webs in the systems. There have been investigations on this for about 20 years.

Bollens discussed where copepods are in the region. When this invader gets hold, it takes over the system. Copepods migrate by salmon. Post invasion, the invasive ones live deeper and are fed upon by sculpin and mysids.

Different Asian copepods have invaded the upper reaches of Columbia and Snake Rivers. Bollens discussed the characteristics of the native and invasive copepods. Who cares? Fish in the system care. They like to consume the native copepods more than the invasive.

Invasive copepods from Asia have established themselves within the Columbia River Estuary and several hundred miles inland. Competition with native copepods, based on habitat overlap as well as similarity of diets, seems likely. The overall food web impacts (e.g. higher trophic levels such as fish) remain uncertain.

Next, Bollens discussed efforts to enhance monitoring and investigation of the spread and potential impact of aquatic invasive mussels in the Columbia River Basin. He said they have not arrived in the Pacific Northwest, but they would be coming from the east and south. Hundreds of boats have been intercepted with mussels on them. The economic impacts are enormous. The economic damage in the Great Lakes are estimated in the billions of dollars.

The colonization by aquatic invasive species in the Columbia River Basin – in particular zebra and quagga mussels – poses a critical potential challenge to effective operation of the FCRPS

The objectives of the program are to:

1) Enhance and help to further coordinate existing regional early detection efforts;
2) Compile information (GIS) describing boat ramps – first step to understand what needs to be done to create a framework for prioritizing placement of boat cleaning stations;
3) Evaluate efficacy of new FlowCam technology to process samples from ongoing WSUV-USGS veliger monitoring;
4) Conduct pilot study of the efficacy of eDNA technology for monitoring quagga/zebra mussels in the CRB – 2015 only; and
5) Provide opportunities to train young professionals in assessing the effects of AIS on food webs.

Timothy Counihan, U.S. Geological Survey, said the project started in January 2013, working with the Columbia Basin team. In the first year, they were able to get the people

doing the monitoring to get adequate information before going out into the field. Created an information loop. People can provide feedback, coordinate and collaborate. They know where monitoring took place to avoid overlap.

They placed their efforts on *relative risk of establishment*: the probability of mussels taking hold.

Member Karier said that it appears for that there is a number of monitoring going on in the low-risk categories in Oregon and Idaho. In Washington and Montana, there is less monitoring in the low-risk areas.

Counihan said it is related to the relative number numbers of water bodies in each state. In any case, it's most problematic in areas where they don't have any data.

To evaluate the risk of introduction, boater-use data was gathered from a variety of sources. They did analysis state by state and province by province.

Similar to the risk of establishment, there are seeing monitoring efforts spread across a number of categories. In the time we've been doing this, the relationships have changed significantly. People are becoming aware of these relationships. But a lack of common metrics from state to state precludes comparisons.

Estimated probability of detecting rare taxa in three Columbia River reservoirs and in one Snake River reservoir. We're seeing large gains in the taxa detected.

Counihan said that the take-home message is that what's being spent in Bonneville Reservoir is not providing for a high level of early detection.

For Priest Rapids Reservoir, which is a more typical example, the funding is not sufficient for early detection; nor is it adequate to characterize the more abundant planktonic taxa.

Currently, there isn't a high number of early detection taking place. With the cessation of funding, there will be a large gap in the effort.

Bollens then discussed the joint USGS/WSUV early-detection monitoring process. In 2014, they processed 290 samples. No detection. In the FLowCam assessment, the speed of processing samples is better. The weakness is that the accuracy of identification requires a lot of effort and operator training.

In 2015, they conducted eDNA pilot study. Zebra and quagga mussels release copies of their DNA into the environment through natural behavior. Pilot study didn't find any mussels in the samples. But did find Asian clam in abundance.

Next steps:

- BPA Technology Innovation Program funding ended 9-30-15; alternative BPA funding being discussed;
- Several scientific journal articles (plus BPA-TIP final report) describing our early detection and research findings are in preparation; and

- Additional sources of funding for early detection of AIS in the Columbia River (especially quagga and zebra mussels) are being sought.

Bollens said they are grateful for the support they received in the first three years. We made great progress on multiple fronts. But now there's a gap and the broader community needs to step up to fill that gap.

Member Rockefeller said, "Now that you have the technology in hand, you've looked in reservoirs, and didn't find anything, but you're recommendation is that this is useful monitoring, but you lack funding." Looking at the 100 meridian group, and the regional states that have a layered strategy, there is decontamination at the source, and detection in the perimeter states, and another layer of inspection and control within the states — how do you see your work in that strategy?

Counihan said that bolstering early detection is number one. They need to increase the level of effort, which is an obvious solution with an unknown cost. They need to improve detection techniques through the development of technologies such as the flowcam and eDNA.

The risk of introduction is related to traffic patterns and how people travel. If we can join those efforts and use the perimeter defense, and direct our monitoring activities, that would be a benefit. Serious choices need to be made about where the effort is expended. It's a gamble either way. If you're not monitoring in certain areas, that's an issue.

Bollens said that most, perhaps all, would agree that boat inspection and perimeter defense is essential, but that doesn't preclude monitoring our own water bodies. Research on new technologies or procedures for decontamination are three legs of a stool. We need to be doing more, not less, of these things.

Member Anders asked how this was funded by BPA. Was it a research or monitoring effort? Bollens said it was engineering associated with the power generation side. We were fairly anonymous, he said. We were invited to submit a research program, and after three years, it's up in the air.

Member Bradbury said that his first reaction looking at the map is that they're having good luck. The question arises: is there some difference in the environment or water quality that makes it more difficult for mussels to colonize?

Counihan said that there is work to be done to see if the two mussels can survive in the Columbia. It needs more investigation. Assuming that they can't is not a good strategy. There have been studies showing that these animals can thrive in different situations. The highest-calcium waters are in the headwater regions of the Columbia. Calcium helps shell growth.

Member Karier asked about the potential for eradication once it's detected. He understood that it's about zero. Counihan replied that it's dependent on how early they are detected. There are a lot of containment procedures that could be enacted.

Member Karier said you might have a different monitoring strategy. You don't want it to develop in either place. San Justo reservoir was infected with mussels years ago. It was cordoned off. Folks at Lake Mead would encourage us to do early detection. When they were detected there, they were adults.

Member Rockefeller asked, "What's your counsel?"

Bollens said that his goal was to convey the substantial progress they have made on this issue, to let them know our expertise, but I don't want that to disappear and have us close shop. We're looking for advice on how we should proceed. We're hoping that BPA's position will change and provide funding. So any input would be helpful. The project was cost shared by Washington State dollar for dollar.

Member Karier said that they aren't sure what BPA spends on fish and wildlife research and monitoring. Many of those projects don't have an end date. Hopefully we will be reviewing those projects and perhaps money will be available.

Member Rockefeller said it would be helpful for the Fish and Wildlife Committee to take this under advisement.

2. Briefing on Citizens' Utility Board (CUB) activities and recent conference.

Member Lorenzen introduced CUB's Executive Director Bob Jenks as a national expert on utility issues. Member Lorenzen said that CUB has a role in keeping utilities honest, and that it participates in almost every utility case, including rates, mergers and deregulation.

Jenks shared his conference presentation, a look at the Northwest's energy future. He said it could either appear bright or scary.

The two things that the things that keep him up at night are:

1. Accelerating climate change:
    - The polar ice sheet melt is accelerating – it serves as the battery of our region's electric system.
    - Abrupt, irreversible regional changes – it means we might have to decarbonize the energy sector much more quickly than we had planned.

2. Divergence of COU/IOU rates:
    - PGE and PacifiCorp are the two that have to reduce their carbon footprint. The others don't have to reduce it, and it's notable that the consumer-owned utility (COU) rates are almost half of the investor-owned utility (IOU) rates. In 1980, communities were trying to form publics and to reduce their rates by going to Bonneville. Now the publics don't want to dilute their federal hydropower by having more participants. He said the end result is that things freeze. Until can you work out that problem, entities stop making investments. The regional instability that can be caused by divergent rates is something that people don't talk about, but it will become an issue as climate change is addressed.

One thing Jenks is not worried about is that “Solar + Rooftops = A Utility Death Spiral.”

Some utilities have bought into this, but he doesn’t think it’s that big of a deal. Net metering looks a lot like energy efficiency. He said that as a customer, he gets paid the retail rate for the energy he’s saving. He reduced his energy usage by 40 percent. Those using solar get paid the retail rate.

Since 1990, PGE’s average household uses 15 percent less power. Nationally, the average household uses 20 percent more. Northwest utility customers use less whereas other areas of the U.S. use more.

There has been extremely significant penetration of energy efficiency in the Northwest. Loads have come down. PGE’s peak load has decreased by 12 percent since its peak in 2000. Rates have increased by 27 percent, adjusted for inflation. Bills increased 8 percent (people are using less). Still, utilities have had investment opportunities. Utility plant investments have increased 34 percent since 1990 and 57 percent since 2000.

Jenks is optimistic about the convergence of energy efficiency and demand response. He discussed the technology of ice-making air conditioners as an example of energy efficiency because it chills at night when temperatures require less energy. It also represents demand response, because it moves load to off-peak hours. There’s a whole series of load shifting innovations that could be promising.

In renewables, it’s exciting that PGE has been looking at Montana wind as a good match for Pacific Northwest load. He’s also excited about utility-scale tracking solar, where it is 6 cents/kWh in California and 4 cents/kWh on some Southwest PPAs.

Member Karier commented that he’s been seeing numbers like this in the press, but 4 cents is pretty striking. “Is that in the contracts?” he asked. Jenks replied it that was from a press report. He has a better understanding of the 6 cents figure. It has the full, capital cost of the facility, but it doesn’t include the transmission and line losses.

Jenks is optimistic about the Northwest’s institutions such as NWPCC, Energy Trust of Oregon and the Northwest Energy Efficiency Alliance (NEEA). He said the region has focused on energy efficiency before the rest of the country noticed the need. That’s why we’re doing well with the Clean Power Plan. We have a history of collaboration in the Northwest whereas the rest of the country has a history of litigation, he said.

This approach started with the Northwest Power Act, then SB1149, Oregon’s RPS, BPA residential Exchange Settlement, Klamath Restoration and Dam Removals, and utility integrated resource plans (IRPs). We still do IRPs with stakeholder participation. We take it for granted it the Northwest, but it’s unique and helpful.

Jenks said he believes that the Seventh Plan’s orientation is right. There’s a large energy efficiency resource, and demand response to meet capacity is an area we lag in compared to the rest of the country. We need to do better in that area with the participation of NEEA and the Energy Trust.

There is little need for additional renewables other than the Renewable Portfolio Standards (RPS) at hand. There are initiatives, such as to phase out coal in Oregon and increase the RPS to 50 percent (compared to no new renewables in the Seventh Power Plan).

When we talk about the RPS, the focus is on PGE and PacifiCorp. They provide 70 percent of the power to Oregon. They have 27 of the 29 coal plants serving Oregon, many out of state. Washington doesn't treat the coal the same as Oregon, he said.

Jenks discussed how Oregon Initiative starts with how to replace the coal and outlined what IOUs will have to replace the power. Utilities are looking at baseload gas and other things. PGE spends well over 5 percent of its revenue requirement in energy efficiency — the highest in the country. PacifiCorp is 4.5 percent, a greater percentage than in its other states. Energy efficiency in Oregon is controlled by the Energy Trust, not the utilities. The more energy efficiency we do, the less renewables are needed under a 50-percent RPS because you don't have the demand. Energy efficiency is first. In order to integrate the renewables, and under the Oregon initiative, you need a lot of demand response. The discussion is being driven by the question of how Oregon could phase out coal without replacing it with gas. It's not about meeting load growth, or what resources are in the Seventh Plan or an IRP.

Member Lorenzen said one thing that concerns him is that PGE and PacifiCorp rates are higher. If Oregon's RPS goes to 50 percent, what impact would that have on those rates?

Jenks replied that it would make it worse. However, it's not about doing renewables at any cost. There is a 4 percent cost cap. Some ask, why don't we put a price on carbon? His opinion is that Oregon will never get a price on carbon statewide as long as we have PacifiCorp's coal resources. If you put a $15 per ton price on carbon, the industrial customers would see a 30 percent price increase. That would do serious damage to a lot of communities.

Member Lorenzen said he initially was taken aback by the conclusion of the Power Plan. But after drilling down, what became apparent is that the Plan looks at the best way to reduce carbon for the least cost. Going the route of a heavy investment in renewables costs more money and requires a significant amount of other resources to back it up. He said he believes that our hydrosystem is close to being tapped out, so other sources need to be examined, which right now are gas plants. He said that some might criticize that the Plan doesn't take into consideration those evolving technologies that can be used in the future to integrate. "To what extent should we be looking within the power system for the most cost effective way of getting the greatest carbon reduction — recognizing that there are economic resources that could be devoted to other sectors such as transportation, which could then reduce the carbon footprint as well."

Jenks said that the Seventh Plan takes a regional perspective. Will utilities rely on power that also can be sold out of region? PGE is looking at energy and capacity deficits into the future. Will utilities bet their reliability on demand response that isn't yet available? If prices go up, that makes surplus hydro more valuable. But for utilities with a deficit in their system that have to buy that power, they'll have to pay more. Least cost to a region is different than least cost for utilities. For IOU utilities, it's utility-by-utility least cost, not a regional least cost.

Member Karier urged Jenks to look at the issue of capacity a little more. There's a need for it, with the closure of the coal plants, he said. That's what the Council is grappling with in this plan. He said we might wish to replace it with wind or solar, but it doesn't bring capacity value. We're doing more work to assess that, but it's not a lot, even with our hydro system. He said that's what IOUs will face with the phase-out of coal — they'll be capacity short.

Jenks said he agrees and that we'll see some peaking natural gas plants. There's a lot we can do with demand response. But the idea of buying energy on the market and looking at demand response for capacity are approaches he doesn't think he can get his utility or the commission to go along with.

Jenks said that the Seventh Plan doesn't say built a baseload gas plant. But all things being equal, that's what's likely to happen, especially with current gas prices. The current IRP process isn't going to get to the Seventh Plan, and the environmentalists aren't getting to the Seventh Plan. So there's no way to get to it.

Member Lorenzen said, "So we probably hit it right."

3. Review of the schedule and process for the Seventh Power Plan

Chad Madron, staff project analyst, shared the webinar schedule, specifically asking for additional Council meeting time on February 3 and 4. They are still gathering comments on the Draft Plan. There is a possible final vote on the Seventh Power Plan in February. Staff will rerun model scenarios and hope to complete that and additional edits on the Draft by January 18.

After Council members vote on the Plan in February, and if it's approved, a week later, the final Plan will be published online. John Shurts, staff general counsel, said that following the guidelines of the Federal Administrative Procedures Act, which requires the inclusion of a Statement of Basis and Purpose. It is an explanation of the main issues raised between the draft and the final, if the Plan was changed and if not, why not? The Fish and Wildlife Program piece is a little different because it has specific findings and recommendations. The Power Plan portion is a general statement. It takes a month or two to get that to the Council for its approval. Then it is published in the Federal Register. April is the tentative date to get it wrapped up.

Tom Eckman, power division director, said that the process after Friday is important. John will walk them through what we mean when we *close the record*, and what we do as a Council and staff when people try to give us comments.

Member Karier observed that all meetings are full Council. He said there might be some language refinement in the Plan that might lend itself to a first cut by the Power Committee. He said might be more expedient with four instead of eight Council Members.

Eckman said he is happy to have the Members fine tune the language.

Shurts said that by the time they go to full draft, they want to do as much with the full Council as possible. Previous Power Plans have been edited with the full Council.

Member Anders said they don't know what the Fish and Wildlife portion would include. If the Monday session is for two hours or less, she asked if it could be folded into the Tuesday session.

Shurts said the time allotted for Monday might not be enough time. They'll use every minute possible.

Madron reminded Members that he sent an email about an internal review website.

Shurts discussed the process following the end of public comment. Members can close off comment, but we don't usually do that. It's sometimes called the *ex parte period* to have continued informal conversation, but write down a note that you had that conversation. We do recommend a consultation period. It's not a specific time period, and it's at the discretion of the Council. The Power staff recommends closing that relatively quickly, at the end of December. The alternative is to go through the January meeting. The longer you keep it open, the harder it is for staff to know what they're working on. Shurts said the staff's recommendation is January 8, but Council members can choose a different date.

Staff will be running more scenarios. Expectations are that it won't look wildly different than what we already see in the Plan. If it is different, you may want to reopen comments.

The Council agreed that the deadline for formal comment is January 8, 2016. Then they will "go dark" and no longer will have conversations about the Draft Plan.

Karier wanted to clarify that they can still discuss it among Council members, and could open up discussion at the January meeting if they agree to. Shurts said that there are no exceptions. It's just what's compiled over time for fairness in reaching decisions.

4. Summary of comments received to date on the Draft Seventh Power Plan

Sandra Hirotsu, staff senior counsel, reported that they have captured 100 comments from the Council's website and informal conversations. There have been comments at five public hearings. There are two more hearings to go: one in Portland and one in Eugene.

There's been continued support for the resource strategy in the Draft Seventh Plan. The prioritization of energy efficiency and demand response has been met well. There have been calls for being more strident in that regard. There have been many calls that 4,500 MW over the planned, 20-year horizon should be a minimum, not a maximum. However, some utilities want more flexibility in terms of having a range.

The Council's approach to demand response has been well received. There have been calls for a demand response target to meet winter capacity. There also have been comments that the infrastructure needed to acquire demand response could take time to put into place and have costs.

Most comments have come in about renewable resources. Many comments have said that draft is short sighted by not building out beyond what the state RPS requires. The 35

percent RPS scenario may have undervalued renewables. Other comments have said that if renewables aren't cost competitive now, the Plan should incentivize renewables.

Other comments have been about natural gas as a resource. As discussed in the Power Committee, there is a move to change the price in the Plan to reflect a downward trend. However, the volatility of gas prices, and the possibility of methane and fracking regulations could trend natural gas prices upwards. So comments have urged caution about investments in natural gas plant so it doesn't become a stranded resource.

Another scenario receiving comments is about the four Lower Snake River dams, and people have asked the Plan to do an analysis similar to the Sixth Power Plan.

That's the gist of what the Council staff has been hearing, and they anticipate a slew of comments coming in.

Eckman said that the technical comments have been about what scenarios we should run. "We'll see what comes in under the Christmas tree on Friday, when the comment period closes," he said.

Madron said that Council Members have access to the 107 comments that have come in so far. He explained his role to make sure that comments were applicable to the Plan.

Member Karier brought up the criticism that the Council is misunderstanding the amount of climate change emissions from methane. He said that if the multiplier for methane is significantly higher than carbon dioxide, then we're not accounting for emissions that are released in methane form, compared to carbon dioxide form.

Eckman said they have a losses analysis for the pipeline transmission to the generator in the range of 2-3 percent. The calculation now used is just the smokestacks. When you go back to fracking wells and production fields, the number ranges between less than 2 percent to as much as 20 percent. There's a rulemaking at EPA in process but we don't have a compliance number right now. But there's been a lot of investigation.

Member Karier wants a note on what those ranges are. If there's a future EPA ruling, what difference would that make?

Member Rockefeller agreed with Member Karier and said it would be good to know.

Shurts said that currently, there's not enough certainty to fold into the modeling, so they can't quantify it at this point.

Member Karier said perhaps it could be run as a scenario, and modify it to add a multiplied effect.

Eckman said maybe they could calculate it outside the model, and suggested that Members read Appendix I, which addresses the state of the science on that topic.

Council Business

NORTHWEST POWER AND CONSERVATION COUNCIL MOTION TO APPROVE THE MINUTES OF THE NOVEMBER 17-18, 2015, COUNCIL MEETING

Member Bradbury moved that the Council approve for the signature of the Vice-Chair the minutes of the November 17-18, 2015, Council Meeting held in Portland, Oregon [with the changes made by the Members at today's meeting]. Member Anders second. Minutes unanimously approved.

NORTHWEST POWER AND CONSERVATION COUNCIL MOTION TO APPROVE THE CHARTER OF THE OCEAN AND PLUME SCIENCE AND MANAGEMENT FORUM

Member Bradbury moved that the Council approve the Charter of the Ocean and Plume Science and Management Forum for a period of two years, as presented by staff and recommended by the Fish and Wildlife Committee [with the changes made by the Members at today's meeting. Member Anders second.

Patty O'Toole, fish and wildlife program implementation manager, said that the forum provides opportunities for ocean researchers and fisheries managers (inland) to share information, collaborate and discuss the management implications of ocean research. Another objective is to develop prioritized management questions and critical research uncertainties to guide ocean research under the program. O'Toole said that the meetings have been a very popular part of this charter, especially with such dynamic ocean conditions. They are now revising their research plan.

Member Rockefeller said the charter serves a very useful purpose and is consistent with the Council mission.

The motion was unanimously approved.

NORTHWEST POWER AND CONSERVATION COUNCIL MOTION TO APPROVE THE DRAFT LETTER TO THE U.S. ARMY CORPS OF ENGINEERS AND MID-COLUMBIA PUBLIC UTILITY DISTRICTS REGARDING WATER TEMPERATURE MODELING.

Member Bradbury moved that the Council approve for the Chair's signature the letter to the U.S. Army Corps of Engineers and the mid-Columbia Public Utility Districts regarding water temperature modeling, as presented by staff and recommended by the Fish and Wildlife Committee, [with the changes made by the Members at today's meeting].

One of our high, emerging priorities is to preserve program effectiveness by taking into account the effects of climate change. We saw mortality in the mainstem due to higher temperatures. This letter addresses the effects of temperature. To get at the effects, we need a model for the mainstem. This letter is asking to collaborate and coordinate to complete the temperature modeling in the mid-Columbia reach in the mainstem of the river. This has been discussed with Corp of Engineers water quality folks and each of the three PUDs. Work is underway with Grant County PUD, Priest Rapids and Wanapum projects. The reach that needs to be modeled by Chelan County is the Rock Island Project, and Corp will work on the Hanford reach below Priest. The parties are willing to work together.

The motion was unanimously approved.

Rockefeller: We have a public comment period, but we have an executive committee meeting, and then a meeting at the EcoTrust Building.

Public Comment:

Member Karier introduced Arnold Goldman and Kim Johnson who are working to solve the problems the Council has looked at, such as trying to push carbon out of the system and preserve our low-cost system.

Their company is Modai Power. They showed a video of the technology, which demonstrates how to use an energy control technology and existing legacy assets to avoid building new plant.

Goldman said that it's an energy processing technology that integrates historic fossil fuel assets with strategic wind resources. It helps modulate the supply. It creates a diversity of product that works as dispatchable as a combined cycle plant. It's a blend of wind and coal that's distributed. It's able to dispatch the selected resources the company wishes. We think it could satisfy a lot of issues brought in by intermittent renewable power, he said.

Member Karier observed that it's all off-the-shelf technology put together in a different way.

The meeting adjourned at 4:32 p.m.

Approved January _____, 2016

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Vice-Chair