Council Meeting
October 11 – 12, 2016

Tuesday, October 11

Council Chair Henry Lorenzen called the meeting to order at 1:30 p.m. All members were in attendance, with Council Member Jim Yost joining by phone.

NORTHWEST POWER AND CONSERVATION COUNCIL MOTION TO MEET IN EXECUTIVE SESSION

Council Member Bill Booth moved that the Council meet in Executive Session at the close of business on Tuesday, October 11, 2016, to discuss personnel matters.
Bradbury second. Motion passed without objection.

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

Fish and Wildlife Committee

Fish and Wildlife Committee Chair and Council Member Jennifer Anders reported that they had a full, four-hour meeting. They began by discussing different program monitoring, research and evaluation methods, including which actions are needed, where they're needed and to what extent. The question arose if they are learning and adapting.

There was an update on unusual ocean conditions and stellar sea lion predation. It included a discussion of the Blob, El Niño and the movement of species to the north. NOAA fisheries talked about the migration of sea lions. There was a conversation over the research plan: Patty O'Toole, staff program implementation manager, talked about the revision of the plan and review of other programs around the country. She highlighted research themes. They discussed the process of identifying cost savings, and how $500,000 could be allocated. A targeted approach would be the best method, so RFPs will be put out on emerging priorities, which are listed on page 116 of their program.

They heard an update on emerging priorities, including long-term O&M planning on screens

and hatcheries, mapping of toxic hot spots, development of an invasive mussels forum charter, and a staff white paper on passage at high-head dams. Member Anders wrapped up by sharing that she was in Canada at the Columbia Basin Trust's annual meeting, sharing what the Council does, as well as providing an overview of the Fish and Wildlife Program and the Power Plan.

Power Committee

Power Committee Chair and Council Member Tom Karier reported that the meeting started with a report on what staff is doing to extend the benefits of energy efficiency to hard-to-reach markets. The Conservation Resources Advisory Committee (CRAC) will report to the Council on these efforts by November 2017, and its first meeting on the topic is November 7, 2016.

The committee also heard a presentation from Paul Didsayabutra, ColumbiaGrid's manager of grid planning. Didsayabutra described what ColumbiaGrid does, such as looking at transmission needs five and 10 years out. ColumbiaGrid is one of two transmission-planning agencies in the Northwest. It's important to continue the Council's close collaboration, Karier said.

There was a presentation on GENESYS by John Fazio, staff senior power systems analyst, which covered the inputs and outputs of the modeling system.

Gillian Charles, staff energy policy analyst, discussed energy storage in the Northwest. It's complicated because it provides many different values, including load following and deferring the need for transmission. Massoud Jourabchi, staff economic analysis manager, related storage to the *Internet of Things* and how it will affect the Council's planning. The cost of monitoring equipment and sensors has declined so much, the storage units can be put anywhere in the house and be connected connect to the Internet. Using storage, energy can be collected cheaply and it's going to change the demand for electricity. Patrick Balducci, with PNNL, said that economists are working to value storage batteries in a utility-scale system. If a utility is going to purchase it, it needs to know the value streams.

Public Affairs

Public Affairs Committee Chair and Council Member Jim Yost reported that no meeting was held in Spokane.

1. Presentation by the Cowlitz Indian Tribe: Rudy Salakory, Cowlitz Indian Tribe, reviewed the Cowlitz Tribe's background. Its members established a Tribe Natural Resources Department and hired a forestry person to look at how they can work from "the headwaters to the ocean." The goals for the habitat program are to protect intact or functioning habitat and to restore habitat-forming processes.

Salakory said his group has implemented 27 projects in the region, and secured $20 million in funding to restore access to hundreds of miles of stream. Many projects are associated with the Fish and Wildlife Program, he said, and they are looking to kick-start processes. They sometimes work with large-scale impacters and recently worked with Burlington Northern to build a side creek. They also work with Bonneville on its Columbia Estuary Ecosystem Restoration Program to remove a mile of levy.

Some of the tribe's challenges include:

- Funding – Salakory said it's unlikely that we'll get a very left-leaning, pro-environmental-leaning administration or Congress over the next 100 years, he said, so funding will continue diminish at the state and federal level. Washington State Governor's salmon recovery office estimated that in 2012, "it would take $1.2 billion to restore the tier-one reaches in Southwest Washington."
- Monitoring – It's something they would like to see, but it would require over a million dollars and take over a decade.
- Toxics – They're trying to get Congressional funding to look at this.
- Climate change – With sea levels rising, you'll see greater saline content in the river.
- Invasive species – They don't know how they'll get to this.
- Paradigm shifts – Where do we go from here? Looking at the notion of fish recovery from an econological standpoint rather than just numbers.

2. Council decision to approve Regional Technical Forum 2017 Workplan

Jennifer Light, manager of the Regional Technical Forum, reported that the RTF is looking at savings estimates for conservation. The RTF is primarily funded by contributions from Bonneville and the region's utilities. In 2014, these entities signed on to a five-year funding agreement for continued support of the RTF. The 2017 work plan reflects the third year of that funding agreement.

The overarching themes include understanding the energy savings for measure development, and then to look at the Council's Action Plan items. There will be a continued emphasis on research coordination with a focus on market analysis research.

Light said that the $1.79 million budget is adequate to support RTF's expected work for the upcoming year. The RTF has been operating on a $1.66 million budget for 2016 and, as of September, it has allocated over 97 percent of its budget for contracts and deliverables. Light sees a slight increase in funds over the five years, with a primary focus on technical analysis. It also uses some money for tool development, such as ProCost, which is a tool that helps determine measure cost effectiveness.

RTF is shifting away from just looking at unit energy-savings measures. About 40 percent of their work has been to determine ways to measure energy-efficiency savings on more-

complex, new technologies. Also, they're hoping to use the budget to come up with associated capacity benefits of energy efficiency.

Council Member Bill Booth asked if the budget increase projected is driven by staff. Light replied that it's an increase for inflation, not additional staff.

Member Booth asked how the RTF trues up its modeling with the estimates of what's happening in the real world. Light replied that the RTF has guidelines. On the energy-efficiency side, they have proven and nonproven savings. Over the year, they'll monitor savings and use that data to true up their numbers. "Right now, we take energy-efficiency savings and use the load shape savings," she said. "We know some are more reliable than others."

Member Booth followed that if Costco sells fluorescent light bulbs, you assume they're going somewhere. He recalled that he once received a box of gadgets. "I tried one or two of them, but they weren't an adequate replacement because the quality was subpar," he said. "Do you have a way to assess achievements so we can be more sure we have an accurate estimate?"

Light replied that was a good example. Looking at low-flow showerheads, they try to look at what might reduce the certainty of savings and try to factor in how many won't be installed. The Energy Trust will go back to see how many were installed or removed.

Council Member Pat Smith said he's been honored to serve on the committee, and that the Council has a tremendous amount of oversight on it. The RTF goes deep into the details and the committee looks at the larger picture. He said that Jim West, RTF Policy Advisory Committee co-chair, does more heavy lifting.

West, sharing by phone, said they have representation from the four-state regulatory commissions.

Member Karier asked if they have capacity value for every energy measure.

Light replied that they hope that their work will inform future capacity value research. Hopefully it can go into where we need to put those dollars.

Member Karier asked if the RTF has looked at the proposal from the Energy Efficiency Alliance.

Charlie Grist, staff manager of conservation resources, said it's a first step, but as Jennifer pointed out they look at energy savings measures. They deal with the end use loads. We can help infer the shape of the savings.

Council Member Bill Bradbury remarked that it's been impressive to have the RTF here. It is a unique entity with utilities, government and stakeholders developing energy efficiency, and

doing it with those who have to implement it.

Northwest Power and Conservation Council Motion to Approve the 2017 Regional Technical Forum Workplan, Budget in the Amount of $1.79 Million, and Business Plan

Member Booth moved that the Council approve the Regional Technical Forum's 2017 workplan, business plan, and budget in the amount of $1.79 million, as recommended by the Regional Technical Forum Advisory Committee.

Member Smith second.
Motion carries without objection.

3. Panel on customer- and utility-scale energy storage

An informational panel reviewed the risks and opportunities in customer and utility-scale energy storage. Utility-scale storage technology and siting is being evaluated in the context of looking at system adequacy constraints, and the need for flexible resources to deal with load imbalance.

Panelists reviewed how storage works: its components, definitions, system types and services. They shared the siting and sizing systems, value stacking and optimized dispatch in the Northwest. In addition, there was a review of battery chemistries, their cost, performance, and where research is still needed.

The cost of monitoring equipment and sensors has declined so much, the storage units can be put anywhere in the house and be connected connect to the internet. Using storage, energy can be collected cheaply and it's going to change the demand for electricity, according to Patrick Balducci, chief economist with Pacific Northwest National Lab (PNNL). He said that that economists are working to value storage batteries in a utility-scale system, but if a utility is going to purchase it, it needs to know the value streams.

One of the panelists, Rebecca O'Neil, PNNL's program manager, shared some of the state regulatory challenges and mandates associated with storage. She said that the value proposition of grid storage depends on reducing institutional and regulatory hurdles. Last year, PNNL hosted state commissioners at Richland to discuss storage, what battery chemistries are involved and what costs are anticipated. O'Neil said they learned that storage is not well characterized in existing commission processes, and that addressing storage would be on a state-by-state basis.

In Washington State, there is the need for an even-handed modeling approach, she said. In 2016, Washington's UTC issued a notice of Rulemaking for Integrated Resource Planning, and indicated energy storage is one of several issues to be addressed. In Oregon, the legislature passed HB 2193 in its 2015 session, directing the PUC to create procurement guidelines for storage by 2017, and for jurisdictional utilities to propose projects that meet

those guidelines within a very tight timeline.

However, traditional resource planning approaches do not address energy storage's system benefits. This includes location-specific benefits that accrue to the transmission or distribution system; and service on short-term time intervals. A report is being prepared for 2017 that provides state commissions and staff with perspective on how well traditional resource planning tools evaluate energy storage opportunities. It will describe alternative methods to revealing energy storage system benefits within existing utility regulatory frameworks that support utility decision-making and investment.

Member Anders said she's interested in the technology aspect of energy storage. "Is this battery storage?" she asked. "My understanding is that this technology is still in development and is not yet deployed on a large scale. Is this all to ensure you're ready for when it happens?"

O'Neil replied that in the regulatory proceedings, they are trying to be technology agnostic — from pump storage (500 MW plus) to batteries, flywheels and other technologies. They focus on performance, contribution and value, not on technology. She said that will be addressed in the next presentation.

Member Booth asked, "On regulatory side, is it your opinion that the regulatory regime is moving forward, requiring utilities to implement battery storage, even though the technology isn't yet available?" O'Neil replied that regulators aren't focusing on a requirement, it's examining on ways to properly value energy storage. "We look for adequacy, margins and flexibility," she said. "Regulators are focused on making sure we're looking at storage in the right way."

Member Karier asked, when you put up the Oregon target, is that statewide or utility-by-utility? O'Neil replied it's utility-by-utility, and no greater than 1 percent of peak load. She said that the way it's designed isn't a requirement; it's set up to require procurement guidelines. The idea is to set the right test and if utilities can find the right investments to those tests, then they should proceed.

Balducci said there are hundreds of battery and energy storage projects across the U.S. Ultimately there will be gigawatts of energy provided by storage in the coming years. Today it's not properly considered in resource planning processes.

Storage offers five different categories of benefits:

1. Bulk energy
2. Ancillary services
3. Distribution
4. Transmission
5. Customer

John Gibson, Avista Utilities' manager of distribution system operations and technical engineering services, provided an overview of the company's Turner energy storage project.

It's not at a substation, but is located at the end of two feeders. Gibson said it provides the opportunity to access markets. There's a resiliency, with the ability to operate independently of resources on the grid.

He discussed the transactive grid control hierarchy, and a centralized controller can optimize the assets. He said they intend to operate it for 30 years, moving from a dispatch center to a distribution operations center, and to move the traditional roles to operate these resources accordingly.

Member Booth expressed an interest in the battery backup at Schweitzer. Some type of storage is the key. Is that its sole backup or do it have diesel?

Gibson said they're still going through that. It still causes an interruption and they want to see how this exercise goes. Schweitzer is a cost-share partner. It's not typical for Schweitzer to want to partner on any type of funding like that, so they're moving the ball with them.

Member Booth said it depends how long do you want to protect yourself from the outage at this point. Most folks want something that will run two or three days. Gibson said it's probably not an either/or proposition.

Russ Weed, UniEnergy Technologies' vice president of business development and marketing, and general counsel, discussed flow battery systems and barriers for grid integration of batteries. He covered the difference between vanadium and lithium. For one, there is no degradation with a flow batter, and they warranty that for 20 years. Also the flammability is zero.

These battery systems have been installed in a variety of locations:

- Harbour Pointe Energy Storage Project (near Seattle, Washington)
- Bosch/BWP Braderup-Tinningstedt Citizens Wind Park (Braderup, Germany)
- Avista Energy Storage Project (Pullman, Washington)
- Terna Energy Storage Project (Italy)
- Snohomish PUD Energy Storage Project
- City of New York Department of Citywide Administrative Services (New York)
- Electricity Power Board (EPB) of Chattanooga (Tennessee)
- Mission Produce (Oxnard, California)

UET intends to make 100 MW of systems per year. Plus, China is building Rongke's 200 MW/800 MWh.

Member Lorenzen said you think of these quantities and compare it to hydro, such as Grand Coulee's generation — how does battery storage compare to that in terms of economics and

its use on the grid? Gibson said that inertia is an important part of the grid. Because of digital assets, it's becoming more of a problem. People like to start small, and that's happening in energy storage right now, such as at the distribution level. But transmission-scale storage is coming. But because the grid is decentralizing, it will be more a matter of distributed generation, storage, buildings and software. The grid is becoming the internet.

Balducci added that, looking a specific locational benefits and property stacking them, then battery systems can do things that Grand Coulee and combustion turbines can't do. You can capture those benefits and control it. You can generate benefits that exceed the cost of the system.

Member Lorenzen asked how you monetize the benefits of the storage.

Weed said that's why having utilities is key. We need to decentralize the grid. Weed recalled John Wellinghoff, who used to chair FERC, expressing frustration with utilities for not getting it, but then he talked with Avista and said they get it.

Member Booth asked, if once a unit is charged, does it sit there, or does it need trickle charging? Gibson replied that it's connected to the grid and is continuously recharging. "We don't want something just sitting there," he said.

Member Booth asked what occurs when there is an oversupply. Weed said the battery lingo is "self-discharge." Our max is two percent, he said. The only thing that would self-discharge is in the stacks.

Member Lorenzen asked where vanadium comes from. Weed replied that it's not a rare metal, it's the eighth most common.

Sarah Van Cleve, energy policy advisor with Tesla joined by phone. She discussed the evolution of Tesla's models from the expensive models first introduced, to the $35,000 models in 2017.

Tesla's products include autos (70-100 kWh), powerwall home battery (6.4 kWh) and powerpack commercial battery system (100 kWh+). Van Cleve talked about storage services by grid location. Batteries can provide 13 services to three stakeholder groups.

Why storage now?

Improvements in technology have made storage competitive:

1. Increase in battery cell density (i.e. the amount of energy a battery can hold)
2. Increase in scale and efficiencies due to battery use in vehicles

However, grid processes and tariffs must be updated to accommodate energy storage on the grid. Some of the barriers include:

- Planning (generation, transmission, & distribution)
- Valuation
- Procurement
- Operations
- Rate design
- Interconnection

Member Karier said that when we look at energy storage, we need to look at all sources of value, and we need to be more comprehensive in future power plans. If there ever was an elegant solution to the duck curve in California, it's storage. Is that a big impact in your analysis?

Sarah Van Cleve replied that even if you had zero renewable applications on the grid you still would have cost-effective applications for storage. That said, the more renewables on the grid, the higher price differentials you get. As we see renewables coming online, storage becomes more valuable. Weed said that ramping is a huge opportunity, particularly for the Pacific Northwest.

Member Smith said that Portland General Electric recently responded to a commission inquiry. O'Neil said PGE initiated its IRP process. By the time they finish have to do the next. It had a section of work dedicated to evaluating energy storage as part of their planning. Weed said Puget Sound Energy has storage in its IRP. They're watching how the utility is accounting for battery storage.

Member Lorenzen adjourned for the day at 4:15 p.m.

Wednesday, October 12

Chair Lorenzen called the meeting to order at 8:30 a.m.

4. Update on Bonneville's energy efficiency target and self-funding

Charlie Grist, staff manager of conservation resources, said that BPA Administrator Elliot Mainzer has had conversations with customers and stakeholders about energy-efficiency programs through its Focus 2028 initiative. BPA released some thoughts about those conversations such as how it is:

- Reassessing how BPA determines its energy-efficiency goal; and
- Increasing self-funding.

Ben Kujala, the Council's power division director, reported that BPA has not committed to a direction. BPA has been setting its energy-efficiency target based on its share of the regional load (42 percent). In response to customers, it is evaluating alternatives to how it traditionally has set its energy-efficiency goal.

Kujala said that different power plans produced by the Council have had differences in the direction they give to BPA. Earlier ones have been very directive, while later plans have been more general. In the Sixth and Seventh Plans, the Council set targets, but didn't called out particular measures.

In addition, Bonneville is considering an increase in utility self-funding from 25 percent to 30 percent. This increase in assumed self-funding is a decrease in BPA's Energy Efficiency Incentive (EEI). BPA meets its energy-efficiency targets through:

- Utility programs funded by EEI
- Utility self-funded programs
- Market transformation (NEEA)
- State codes, federal standards and market (momentum) savings

The proposal is to reduce the EEI funding to 70 percent and rely on 30 percent self-funding, which will reduce EEI by about $5 million per year. Historically, about 80 percent of BPA utilities primarily have relied on EEI to fund conservation. With less self-funding, these utilities would likely do less conservation. Staff reported that the largest five of the six public utilities plan to maintain their energy-efficiency funding amounts in the near term.

Kujala said the discussion is very nuanced. He said staff doesn't expect BPA to reduce its budget — likely it will be a decline in conservation. Currently, the numbers appear to be on-track to meet the target. BPA has agreed to use the 42 percent for its upcoming IPR.

Council Chair Henry Lorenzen said the conversation raises issues: "How does BPA's need for new resources play into it? To determine BPA's share, we need to know the goal for the entire region. Our staff and Council are committed to work with BPA to come to grips with these important issues. It calls into question to what degree should we be more specific in calling out BPA's obligations? I think it has significant implications on how to proceed."

Council Member Tom Karier said it's good to remember why the Council has a target. "Energy efficiency is the lowest-cost, lowest-risk resource," he said. "We don't know what the future will be. Without it, we'd consume a lot more thermal energy and create more carbon. That's why I'm always nervous when BPA cuts its budget."

Member Karier said they have seen rural customers use more electricity per household. "I was around when the council adopted the 42 percent for the Fifth Power Plan," he said. Before that, we used to weigh in about how things should be spent. But then we decided to stop micromanaging. Ideally, it would be what the percentage would be for BPA's service area. We needed a proxy for Bonneville's share. It was 13 years ago. It's fine to take another look at it.

Another way to go is to find out what the potential is in BPA's service area, but those surveys are expensive. If we can get that information, we can do better.

Member Karier added that he is concerned about a discrepancy in energy savings depending on where one lives. There are better incentives in Seattle for bulbs, showerheads and appliances, and the equity issue is one that needs consideration.

Member Smith had a question on the timeframe on the pilot program of reducing self-funding in 2018-19. When would we have the data to evaluate how that's going and how that plays into the Seventh Plan and approaching the Eighth Plan? He agrees that we don't need to get into the weeds of implementation.

Christ replied that there's an uncomfortable lag between reported savings and when we find them out. It would put you into 2020, when BPA is making its IRP for 2022. If there were a big shortfall, then BPA would need to know before that, otherwise, you're skipping an IRP. They don't have to report it by quarter. They have to report savings, not spending.

Kujala said the IRP sets guidance, but BPA can deviate from what is in the rate case. It can adjust midstream and put more money into energy efficiency. But it certainly adds an extra barrier.

Grist said that the reason for reexamining BPA's goal is to look at if that amount of efficiency makes sense. Some doubt that's the case. They see BPA's risk profile as different from the region as a whole.

Member Lorenzen asked about the timeframe. There are lots of issues floating below the surface. Member Karier added there's a need to look at it comprehensively. If you only look at where you can measure, you only look at a piece of the information. The 42 percent proxy is because we didn't have all of the information in every area. If you have partial info, we still might need a proxy for BPA's share.

Kujala said that a lot of work for this has already started. We're working together, sharing information and are trying to collect as much as possible.

Member Lorenzen said under the Act, we need to look at cost effectiveness on transmission, distribution, consumers, or from BPA's point of view.

5. Update on Bonneville Power Administration Integrated Demand-Side Management:

Allegra Hodges, BPA research analyst, briefed Council Members on the agency's Integrated Demand Side Management (IDSM) initiative to integrate energy efficiency, demand response and distributed energy resources into its overall power and transmission planning, systems and operations.

IDSM started as a key agency initiative in October 2014. Since then, BPA has:

- Developed a strategic roadmap to guide the overall initiative;
- Mapped and coordinated the activities of DSM-related efforts; and
- Developed objectives to refine its direction for FY 2017–2020.

BPA's demand response program is currently focused on non-wires alternatives, and the agency is pursuing a multiyear plan to build capability to support the commercialization of demand response/distributed energy resources. Later this year, BPA will assess demand response potential within its territory.

This includes:

- Evaluating BPA's current DSM-related efforts, estimating the impacts of DSM activities and recommend a coordinated path forward;
- Advancing the analytical capabilities to evaluate supply-side and demand-side options equitably;
- Determining internal practices and policies for IDSM – such as considering transmission and power needs; and
- Exploring DSM relationships with customers and stakeholders.

In 2016, BPA reported it made significant strides in building demand response capability and moving towards commercialization. This includes testing how to work with aggregators in the PNW wholesale/retail model, working with 20+ utilities, and releasing BPA's first demand-side Request for Offers for non-wires, which would replace the need for additional transmission. It also is building models to value demand response and testing new technologies, such as battery storage, smart thermostats, and interactive water heaters. BPA will release a public report this year on its findings.

Member Karier inquired, how much DSN resources does BPA have now? Hodges replied that energy efficiency makes up the largest portion of what they have.

Member Karier said that with aluminum companies, BPA did have a DSM element to the contract. Is that part of the program? Robert Petty, BPA's power forecasting and planning manager said that BPA has a higher-level plan to move the agency to where they think it needs to go.

Member Karier said, "I've heard from different entities that they're interested in providing demand response, but BPA may not want to buy it. Other utilities might need it. How can BPA help facilitate those transactions?" Petty replied that it's an interesting question and it's on our "to-do list" they will have an answer at some point.

Lee Hall, BPA's manager of distributed energy resources, reviewed highlights in 2016 and what it plans to accomplish in 2017.

In 2016, BPA made significant strides in building DR capability and moving towards

commercialization:

- Tested how to work with aggregators in the Pacific Northwest wholesale/retail model.
- Worked with more than 20 utilities.
- Called over 100 events at MW scale with 90%+ performance.
- Built internal capabilities — contracts, operations, and measurement and verification.
- Release of BPA's first demand-side Request for Offers for non-wires, a significant milestone.

BPA is building models to value demand response and is testing new technologies, including battery storage, smart thermostats, interactive water heaters with standard communication ports. Hall said they performed a benchmarking effort with 13 different entities. They obtained information from East and Midwest utilities, and from PacifiCorp and Idaho Power. They key lessons were:

- Distributed energy resources must be reliable, available and cost competitive to be a viable alternative.
- Multiyear contracts are needed.
- A market needs to be "seeded."
- Residential should not be underestimated as a viable source. Seventy percent of BPA's load is residential. Thirty percent are turning out to be our most valuable initial forays.
- Simple devices are often more cost effective than complicated technologies.
- Trend is to integrate demand-side as a standard part of resource planning.
- Demand response is used widely for economic benefit, not just reliability.
- There are large quantities of distributed energy resources growing in some states.

Hall next discussed the Energy Northwest and BPA Demonstration: Public Aggregation for Public Power. The 2.5-year demonstration included Cowlitz PUD: NORPAC, Pend Oreille PUD: Ponderay Newsprint, City of Richland: Demand Voltage Reduction, and Powin Battery.

The Energy Northwest Model was successful in terms of performance (94 percent with 64 successful events and four failures) and asset diversity. He said the performance was impressive given the operating parameters of "fast DR," with 10-minutes notice.

The project, was recognized with a Peak Load Management Association national award as a "Pacesetter."

In a private aggregation demonstration, the winter period was successful, but not the summer.

Hall discussed the 2016 Fall River Irrigation Demand Response Pilot and the South of Alstom project.

Member Bradbury asked what is meant by moving towards demand-side commercialization

with non-wires opportunities. Hall said it's replacing the need for additional transmission construction, or deferring it. Demand response is a strong answer to large, transmission investment. He referred to BPA's Interstate 5 initiative as an example.

Member Lorenzen asked, "Isn't energy efficiency also a non-wires response?" Hall replied it's a different magnitude unless it's permanent.

Hall shared his observations on the DER non-wires opportunity: He said it's a new discipline for traditional transmission planning and operations. The business case for non-wires can be compelling and is best when the incremental capacity need is low and wires solutions are costly.

Demand response can be competitive with traditional generation resources and, at a minimum, it can increase the non-wires bidder pool. Battery storage technology is advancing and costs are dropping sharply and quickly. There are opportunities in finding multiple value streams and/or longer-term contracts. Last, there is a consistent need, which is likely to grow regional availability and supply.

Looking ahead to 2017, BPA will continue to lay the groundwork for future commercial use of DER at BPA, working with the agency's Integrated Demand Side Management (IDSM) efforts. This includes demonstrations and pilots of new concepts and products that meet anticipated needs.

Member Karier said that the work at the South of Alstom is cutting edge. He said he served on the non-wires committee. He asked about the pilot with Energy NW and Idaho River. "Are you using those resources now?" he asked. "If not, can others use them? There's an RFP now by Puget Sound Energy on demand response. Can BPA facilitate that? Are there institutional barriers?"

Hall replied, I wouldn't call them institutional barriers — more like WECC rules. Can BPA go outside its balancing authority to get that demand response or that DAR resource? In terms of capacity to support transmission, it's about location. However, that doesn't take away from looking at the region and see how we can connect a resource in one location, say in Seattle City Light's balancing authority. If one organization contracts for a resource, then that resource can't necessarily be available to another balancing authority.

Member Smith observed that 70 percent of BPA's customers are residential. "What comes to mind with the work you've done so far with residential, demand-side management opportunities?"

Hall said BPA has concentrated on the commercial and industrial space in the demonstrations. "We have to evaluate the reliability," he said. "In the benchmarking study, many retail utilities do that. It might require a third-party aggregator. It won't be BPA contracting with a residential customer. It would be through an aggregator."

Petty said that residential takes a lot longer to build, and you're only getting 1k per hit. You need a year commitment to build a program like that.

Member Karier asked how deep BPA was going to go. Hall replied that they're not sure about contacting individuals, but it will be comprehensive.

Member Booth said that it's interesting to see that BPA is focusing on the July/September timeframe. A residence can do without air conditioning if it has to. But if demand response is going to be relied upon to fulfill the adequacy shortfall, are you going to look at winter? Adequacy is 12 months of the year, not four. Is this just a solution for that timeframe?

We are winter peaking, Hall said. In other parts of country, it's a summer-peaking issue. Petty said he's seen it used effectively in winter. For example, Minnesota has a winter-peaking program.

6. Briefing on the potential conversion of Boardman to biomass

Since Portland General Electric (PGE) announced its plans to cease coal-fired operation at its Boardman plant the end of 2020, it has been researching alternative ways to keep it functioning. Converting Boardman to a biomass plant is one option that PGE has studied for several years.

Wayne Lei, PGE's project manager, provided Council members with an overview of the company's biomass pilot program. A distinct advantage is that biomass will count as a renewable resource in Oregon, but for it to work at Boardman, the fuel has to conform to the way it process coal. "Biomass" covers a variety of fuels derived from organic materials, and Lei discussed the use of waste wood that is "torrefied" into a charcoal-like, combustible substance. Torrefication is a thermally efficient process because it produces heat, not smoke. Lei discussed the aspects of Oregon Torrefaction, Inc., and torrefied fuel combustion performance. He said that 300 degrees performed better than 450 degrees. He described what material goes into the Biomass process and locally built torrefiers. However, an uncertainty is whether it can be outfitted to meet new, ambient air-quality standards.

If the plant can be converted, Lei said it would have a good capacity factor, operating five months a year, averaging out at 240 MW out of a 600 MW plant. In addition, the plant is fully depreciated by 2020, and has another 20 years of life in it. It can even burn wood damaged in forest fires, although the issue is getting it transported. Of course, the entire project is predicated on regulatory approval.

Member Lorenzen asked about source of the fuel supply and if the cost of transporting it would eat them alive — whether it's using grass or wood. Lei said what this has to compete against the marginal wind plant. Lately, because Oregon is driving so hard to renewables, it has relied on the intermittent wind. That means you have to fire the thermals. It becomes a reliability issue. You might have to factor in gas storage to that equation.

If we had to do it, we could use energy grass, Lei said, it would be nice to get some wood. What's been encouraging is forest collaboratives, such as the Blue Mountain. We'll need 1.2 million torrefied tons (3 million tons of green material) to operate Boardman at 40 percent, he said.

Member Anders said they have lots of wood in Montana, and observed that Lei didn't talk about greenhouse gas emissions. Lei said they have the studies. Four universities banded together. They did it from soup to nuts. Grass is neutral, but wood will be an interesting conversation. You can let it rot, burn in the forest or put it to better use.

Member Smith asked if it's successful, what useful life would you be looking at for the plant? What capacity factor? Lei said it has a good capacity factor, operating five months a year at 240 MW. The plant is fully depreciated.

Member Karier asked if they could use wood from forest fires. Yes, you can, Lei replied. The problem is getting permission to get it. If more forest collaboratives come to fruition, we'll get more of these.

7. Presentation on Independent Scientific Advisory Board (ISAB) Predation Metrics Report

The Council and Fish and Wildlife Committee asked the ISAB to look at the efficacy of the science behind predation. Then it was narrowed down to look at metrics. The ISAB reviewed and recommended potential alternative metrics for evaluating and comparing the effects of predation at different stages in the life cycle of anadromous salmon and steelhead in the Columbia River Basin.

Dr**.** Greg Ruggerone, ISAB chair, briefed the Council on predator control programs in the Columbia Basin. He discussed different types of predators: sea lion, bird, pikeminnow and northern pike. The key question is to what extent do they improve the survivability of salmon? Plus, they're taking them at different times in a salmon's lifecycle.

Our task is narrow, Ruggerone said. They didn't attempt to review predation in the Basin. Just looked at metrics to measure the effects of predation on salmon and steelhead. ISAB's assumptions were that:

- Predators impact salmon survival at all life stages;
- Predation-related mortality rate is often higher when salmon abundance is low; and
- Predators help maintain community structure and diversity, and that removal may have unintended effects.

Steve Schroder, ISAB vice-chair, defined the types of predation mortality:

- Additive: is pretty straightforward. If 10 percent were killed in juveniles, there would be

a 10 percent reduction in adults.
- Compensatory: when predation at one life stage is offset by decreased mortality at the same or subsequent life stages. Such as predation on the fry stage, but the survivors can grow more rapidly with less competition.

Member Karier wanted to know if it's possible that the smolts are larger and survive at a higher rate that you actually have more returns? Yes, Schroder replied, it's overcompensation because you've reduced that competition early on.

Council Member Guy Norman asked if there would be a different conclusion with the tributary habitat as opposed to the migration corridor? Very much so, said Schroder.

Member Booth added if you're making this argument, then you're habitat-limited somewhere. Yes, it's the doom on the surplus. They'll produce more than the environment can support. Member Booth said we operate on the assumption we could use more habitat. I was interested in the density report that shows there are effects in some tributaries. I can see how complicated this can get. Schroder said there could be density effects in the mainstem. Compensatory mortality gets complicated.

Depensatory: If predation occurs on individuals that would otherwise be more likely to survive (e.g., large smolts) then predation is Depensatory.

Schroder then discussed selectivity by fish, birds and mammals.

Fish predators generally choose:
- Smaller fish
- Less healthy
- Hatchery over wild

The conclusion is that most predation is compensatory rather than additive.

Birds:

- Caspian Terns consume larger-than-average salmonids.
- With Double Crested Cormorants, salmonid body size not as important.

General Conclusions;

- Juvenile salmonids in poor condition are consumed by birds.
- Depending on the species, they may select large, small, or be non-size selective.
- Bird predation is complex: it may be additive, compensatory or depensatory, depending upon the species.

Mammals:

Pinnipeds

- May select smaller fish
- Prey on early portions of the spring Chinook run
- Increasing numbers of Steller sea lions at Bonneville Dam in the fall

Orcas

- Prefer large salmon (Chinook, chum)

General Conclusions: More information is needed to determine if predation is additive or compensatory.

Ruggerone then discussed:

- quantifying compensatory mortality,
- equivalence metrics,
- change in growth rate metrics, and
- life-cycle models.

Member Booth asked that with the work NOAA's doing, will they insert predation into their life cycle modeling? Ruggerone answered that it's a work in progress. Member Booth said it would be good if they could condense it down to a number. Ruggerone replied you couldn't do that because there are so many factors, such as compensatory mortality. Member Booth: if you could come up with a metric and relate it to an adult return, you could insert predation from birds and see at what stage the most impact exists. Maybe we'd see we're focusing on the wrong species. Ruggerone said part of what we recommended is the adult equivalent, comparing smolts' impact on the adult return. It's good way to do it with bracketing. Bird researchers are very aware of this issue and made assumptions about the level of compensation that occurs after the birds are consuming smolts.

Ruggerone then reviewed the Grande Ronde life-cycle model.

ISAB Recommendations

- Use and refine two types of metrics used in the Basin:
  – Equivalence-factor metrics (e.g., adult equivalents)
  – Change in population growth-rate metric

- Adjust metrics to account for compensation
  – If there's no data, adjust using plausible compensation. It's important to have an idea of the amount taking place.

- Use life-cycle models to estimate compensation-adjusted values.
  - Assess predation impacts on salmon viability

Member Norman asked a question on compensation factors. I assume most of the work is concentrated in the estuary, he said. Ruggerone answered that they don't do any of the modeling, they just review things. Wherever people were looking, they found strong density dependence. In terms of density dependent effects in the estuary, there's not a lot of direct evidence, but we assume that there is.

Member Norman said, "My assumption is that density dependence would decrease as you move downstream. Is that a correct assumption?" Ruggerone replied that it's complicated. As the smolts get concentrated in the mainstem, then they all have to go through the estuary. There was a discussion on how much time smolts spend in the estuary, mixing with other fish.

Member Norman asked Schroder that as information moves into a lifecycle model, are you aware of efforts to factor in this new, increased predation versus a pre-European comparison? Schroder replied that it's complicated. Salmon biologists assume predation is a major threat throughout a salmon's life, but mostly they prey on the weaker individuals.

Member Karier said that the original impetus for asking the question was that we see these expensive studies and metrics being reported in different forms. We wanted to see if they could be reported them in the same way. They might have to lose some of their scientific elegance, and see if it's "significant," "mild" or "low" compensation.

Council Business:

Northwest Power and Conservation Council Motion to Approve the Minutes of the September 13-14, 2016 Council Meeting

Booth moved that the Council approve for the signature of the Vice-Chair the minutes of the September 13-14, 2016 Council Meeting held in Spokane, Washington.

Karier second. Passed without objection.

Public comment

Wendy Gerlitz, policy director for the NW Energy Coalition, raised concerns that the Council's Seventh Power Plan has action items for BPA to capture cost-effective conservation across the region. Gerlitz said, "We think BPA should pursue those action items before making changes in the status quo, but now we hear that BPA would make changes before pursuing them. We're disappointed in this." She said their concern is that it will result in a net decrease in conservation, even if BPA does meet a target number.

“There’s been a nickel-and-diming of conservation efforts at BPA,” Gerlitz said. “The coalition wants to be involved moving forward. We’re not as interested in squabbling over a number.”

The Council needs to take the lead, and the place to drive this is through its Conservation Resources Advisory Committee, she said.

Adjourned at 11:43 a.m.

Approved November ___, 2016.

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Vice Chair