SNOHOMISH COUNTY PUBLIC UTILITY DISTRICT
BOARD OF COMMISSIONERS SPECIAL MEETING
Zoom Online Meeting Platform

Special Meeting
April 26, 2022

The Board of Commissioners Special Meeting will be held virtually via Zoom Online Meeting platform. Due to the COVID-19 pandemic and Proclamation 20-28.15 issued by Governor Jay Inslee, in-person attendance is not permitted at this time.

CONVENE SPECIAL MEETING – 9:00 a.m. – Virtual Meeting Information
Join Zoom Meeting via Computer:

- Click link: https://us06web.zoom.us/j/87577445299?pwd=ZEZBR3FHRlNrT1RzNjRrYWRoOHlOdz09

Join Zoom Meeting via Telephone:

- Dial: (253) 215-8782
- Meeting ID: 875 7744 5299
- Password: 616611

The Board of Commissioners of Public Utility District No. 1 of Snohomish County, Washington, will hold a **SPECIAL MEETING** on **TUESDAY, April 26, 2022**, via Zoom Online Meeting Platform. The SPECIAL MEETING will convene at 9:00 a.m. for a Lower Snake River Dam (LSRD) Workshop.

ADJOURNMENT

Agendas can be found in their entirety on the Snohomish County Public Utility District No. 1 web page at www.snopud.com. For additional information contact the Commission office at (425) 783.8611.

AT PLACES
AGENDA ITEM NO. 00.01

LOWER SNAKE RIVER DAMS
Briefing Workshop

April 26, 2022
Commission Workshop

Previous Briefing: February 15, 2022

Purpose and Commission Asks

- The purpose of this workshop is to brief the Commission on this regional issue
- There is no upcoming decision point or action needed to be taken by the Board
- Approaching this issue objectively from a data-driven perspective allows PUD staff to engage meaningfully on this topic on a regional basis
- While regional analysis is available, the purpose of this presentation is to provide a Snohomish PUD context for Commission and customer/owners

Agenda

- Overview of Projects and Regional Discussion
- Review of Engagement Principles
- Analytical Discussion across Engagement Principles

OVERVIEW OF PROJECTS AND REGIONAL DISCUSSION

Lower Snake River Dams

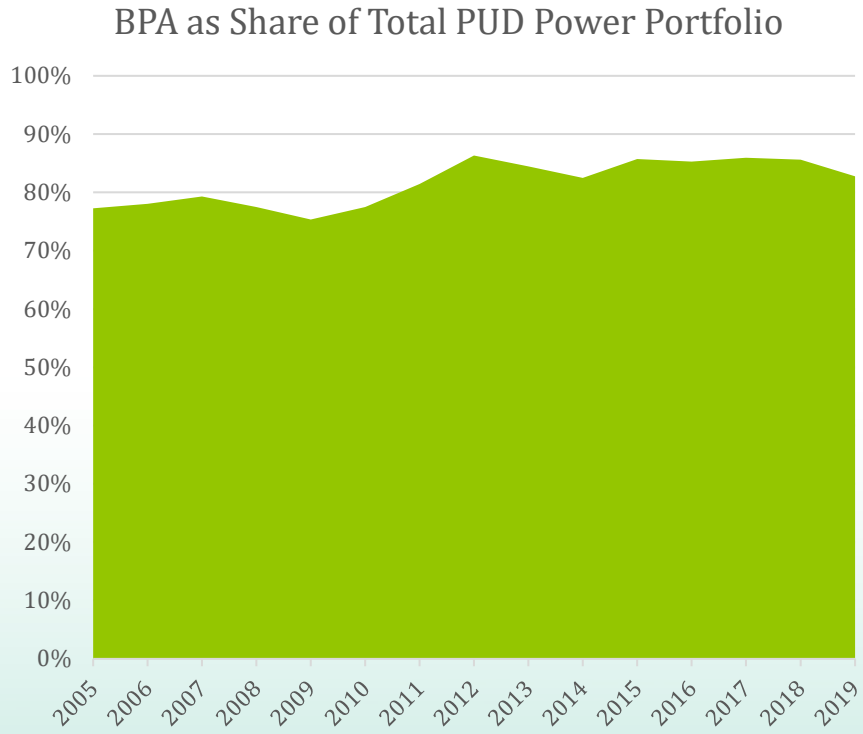
- Congressionally authorized for multiple purposes
- Part of the larger Columbia River Power System
- Designed to generate up to 3,033 MW
- Can operate at a greater level for several hours to meet peak demand
- Provide voltage stability for reliable transmission grid performance

Agencies Involved with the Projects

- The Lower Snake River Dams (LSRDs) were constructed, and are operated, by the U.S. Army Corps of Engineers
- The electric power generated by the LSRDs is marketed by the Bonneville Power Administration
- Both agencies have a number of legal obligations they must comply with, including operational requirements and environmental laws

Snohomish PUD, BPA, and LSRD

- The PUD's power portfolio is made up of 75-85% BPA
- The PUD contracts for 10.65% of BPA's firm critical system
- The LSRD provide about 12% of BPA's annual generation .



Recent Federal Litigation

- National Marine Fisheries Service Biological Opinion for entire Columbia River system was adopted on July 24, 2020
- Several entities challenged the Opinion in Federal court
- Those challenges have been paused so settlement discussions can occur
- The pause is set to expire on July 31, 2022

Principles to Guide Engagement

- On February 15, 2022, District staff presented five principles to Commission
- The principles were developed to guide engagement in regional discussions of the future of the LSRDs

ENGAGEMENT PRINCIPLES

We will safeguard our ability to provide reliable power to our communities.

- Access to reliable power is the bedrock of safety and economic stability for our communities.
- Recent blackouts in other communities have resulted in property damage, disruption to essential services, economic losses, and health and safety impacts to residents.
- Recent resource adequacy studies have shown our region has a resource adequacy capacity issue to address, and forecasts show the issue is expected to get worse before it gets better.

We are committed to providing clean power and we value the pivotal role the hydropower system plays in meeting utility specific, regional, and national carbon emission goals.

- Washington is aggressively trying to decarbonize and is pursuing electrification of other high carbon industries. The Clean Energy Transformation Act, Climate Commitment Act, Low Carbon Fuel Standard, and similar efforts need reliable, carbon-free capacity to reach their goals.
- The Columbia River Power System plays an integral role integrating current and future renewable resources.
- Snohomish PUD is not just trying to meet state and national goals; we are trying to be a leader. Carbon-free capacity resources are critical to support this vision and the most cost-effective ones already exist. New carbon-free capacity resources are more expensive and not currently available at the required scale.

We are public power and we will preserve our ability to provide power at the lowest reasonable cost to our customers.

- Public power was founded to provide guaranteed power to communities, with rates based on costs, not profits.
- Significant changes to the Federal system are not felt equally, and regional and community equity is an important consideration. As BPA's largest customer, our community is most vulnerable to significant changes in BPA generation or costs. Public policies that affect federally-owned assets that are operated for multiple benefits should not place 100% of the new financial responsibility on a subset of the beneficiaries.

We will safeguard the important role of local governance within public power.

- We value the use of regional processes, guided by credible subject matter experts and stakeholders, to provide a stable planning environment for our elected Board of Commissioners to have the information necessary to make informed resource decisions.

We take our environmental stewardship responsibilities seriously and we follow the best available science on salmon recovery.

- Species recovery programs and projects must reflect the best available science and information and balance all impacts to fisheries, including the role of ocean conditions and climate change.
- We are open and willing to respectfully collaborate with a variety of stakeholders to arrive at solution sets that further the preservation of our communities, natural habitat, and the ecosystem.

ANALYSIS

Framework for Analytical Discussion

What the discussion is

- A review of analysis available across the principle areas to get a better understanding of potential community impacts

What the discussion isn't

- Intended to provide a single, definitive answer in any principle area

We need to retain our ability to provide reliable power to our community.

Dispatchable Carbon-Free Capacity

- **Capacity** is the capability of a resource to generate electricity, and **dispatchability** is the ability to control when that occurs.
- **Energy** is a measure of what generation has occurred
- The greatest value of the Lower Snake River Dams to Snohomish PUD is their **carbon-free dispatchable capacity**.
  - Carbon-free capacity is hard to find and difficult to develop at large scales
  - Energy resources do not necessarily significantly help with capacity needs

Large Energy Resource Nameplate is required to produce Peak Week Capacity

	Winter	Summer
Gorge Wind	3,880	1,015
Montana Wind	527	458
Yakima Solar	2,642	274

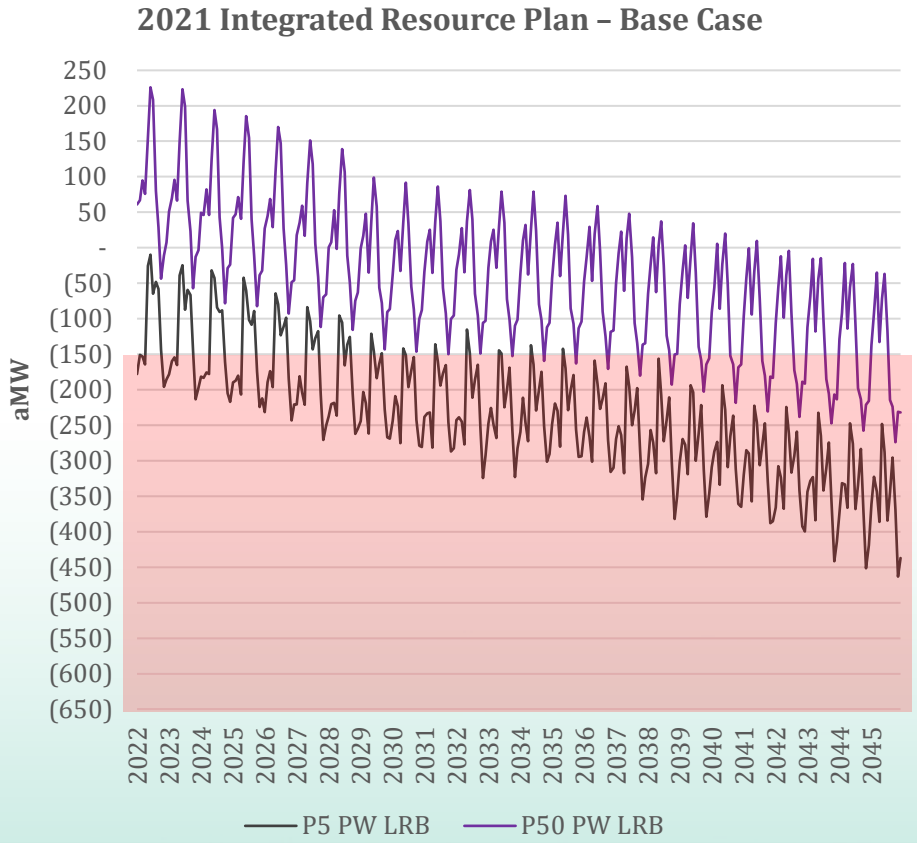
Nameplate to produce 100aMW Peak Week with 95% confidence

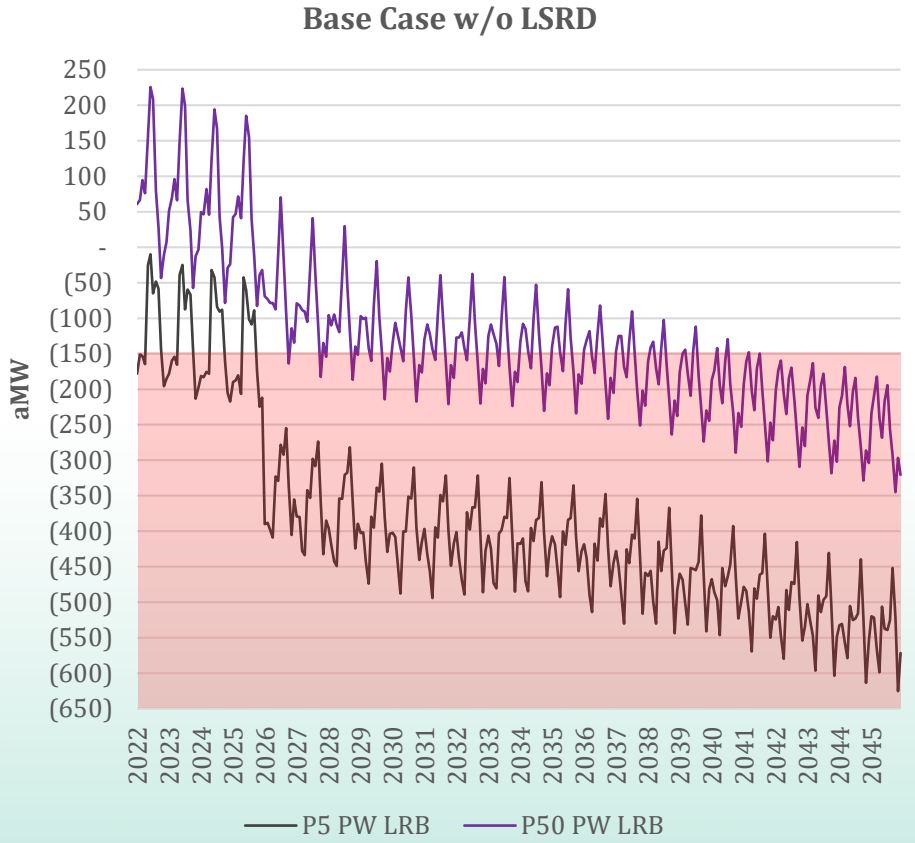
Capacity, Reliability, and Resource Adequacy

- **Reliability speaks to the probability of a blackout. The LSRDs play a significant role in preventing blackouts.**
  - If the LSRD's were removed without replacement, BPA's blackout likelihood would be 16 in 20 years.[1]
  - This is due to the combination of energy and capacity they provide the regional grid.
  - There is not certainty that the total carbon-free capacity needed for replacement is commercially available.
- **Resource adequacy in the Northwest measures the adequacy of available capacity resources to meet regional needs. The LSRDs are a significant portion of the region's capacity.**
  - The Western United States is developing a program to address the looming decline in resource adequacy resources.[2]
  - Snohomish PUD is already expecting to be deficit resource adequacy portfolio resources in the winter, and must rely on the short-term market to bridge longer-term resource development.

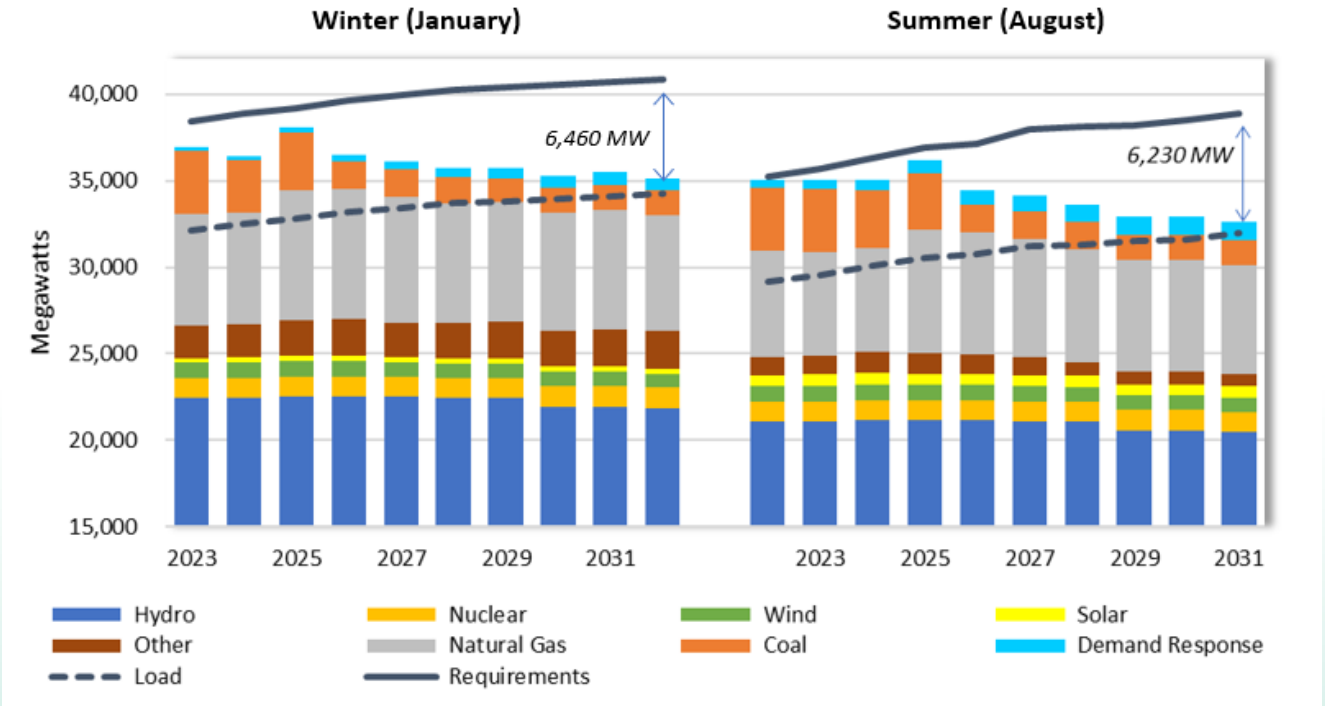
1. CRSO EIS. Pg 3-883. Assumes no Pac NW coal. https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll7/id/14959
2. Western Power Pool. https://www.westernpowerpool.org/about/workgroups/12

Peak Week Portfolio Deficits increase by ~100-200aMW without LSRD





The region forecasts a growing capacity gap[1]



1. PNUCC 2021 Northwest Regional Forecast

Analysis Highlights

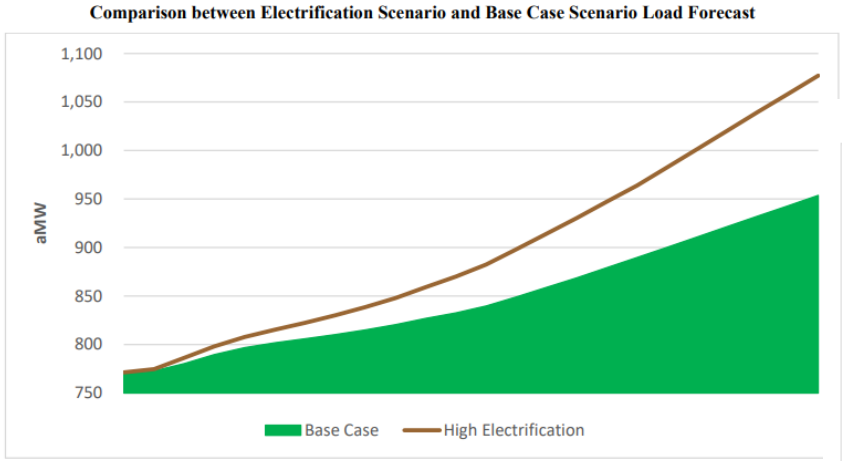
- The carbon-free capacity of the LSRDs is unique and significant
- Capacity can’t be easily replaced with energy resources
- Dispatchable capacity resources help maintain regional reliability
- Replacement resources are needed to mitigate significant loss-of-load risk

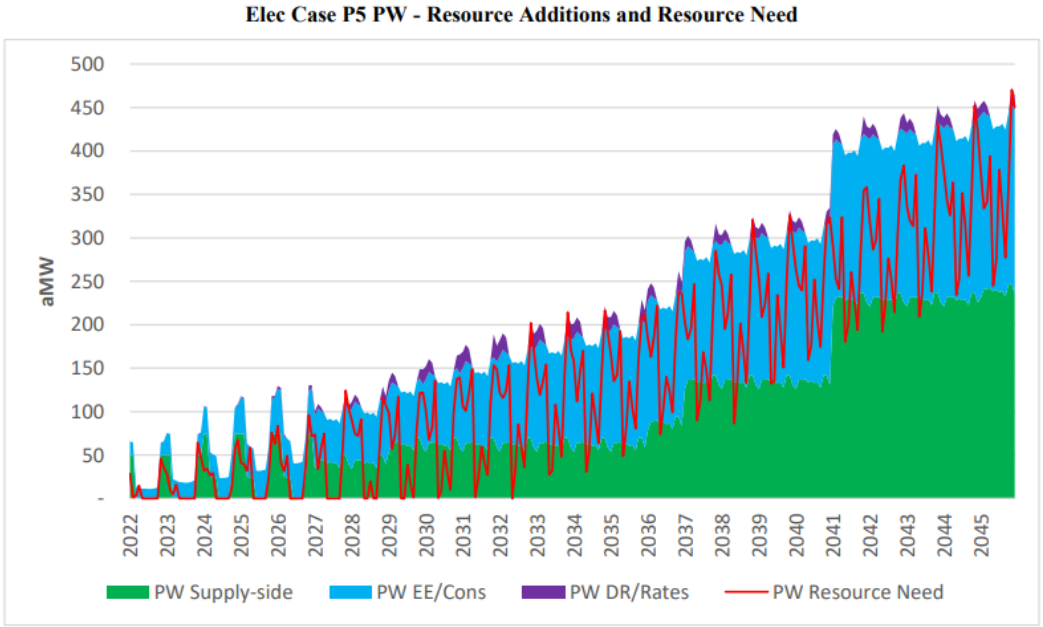
We are committed to providing clean power and leading on local and regional clean energy and carbon emission goals.

Highlights

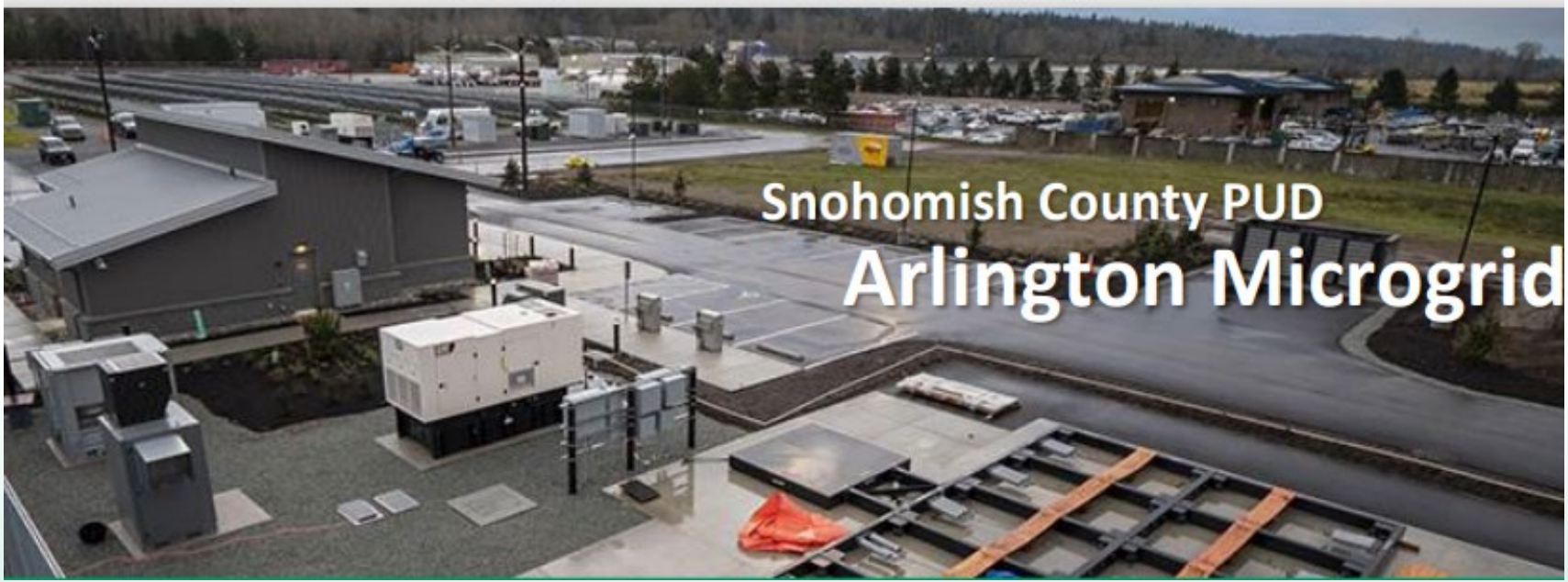
- Snohomish PUD has one of the most ambitious clean energy plans in the Pacific Northwest, aiming to meet CETA's 100% clean goal by 2030
- Roughly 9.6% of the PUD's clean energy comes from the LSRD's indirectly from BPA
- Consideration of LSRD replacement must include clean energy resources in order to keep local and regional plans on track

Electrification is coming…and a clean energy portfolio brings highest greenhouse gas benefits





The PUD is leading on clean energy technology, but technology maturity still has room to grow



We need to preserve our ability to provide power at the lowest reasonable cost to our customers.

LSRDs produce low-cost carbon-free energy

- Current BPA power costs are ~$.031/kWh, an average made lower by the ~$.012/kWh LSRD projects @11% of the BPA Portfolio.
- While LSRD energy costs are very low, their effective capacity costs are significantly lower than other regional capacity resources.

Replacement Resources could create significant new costs

- These hypothetical examples are intended to provide an insight on the scale of cost impacts, but don't reflect any expected cost obligations
- These examples rely on uncertain assumptions on resource availability
- Estimates don't include rate impacts expected from average BPA system cost changes

BPA MUST REPLACE

- $685M/yr is conservative net cost of power replacement
- SNOPUD costs would be $72M per year, a 12% cost increase for customers

UTILITIES MUST REPLACE

- Snohomish estimates a $969M Present Value cost to replace its share of lost resources.
- Costs of $67M per year, an 11.1% cost increase for customers

Community Impacts & Equity

- We are sensitive to rate impacts that would disproportionately add additional strain on all of our customers.
- Approximately 21 percent of Snohomish PUD customers currently qualify for needs-based bill assistance programs. That's about one in five households.
- Public power customers are at risk for the burden of expenses related to replacement.

There is a diversity of data points on power replacement costs

- Columbia River System Operations Environmental Impact Statement (2020): $685M/yr; $11B
- Joint Utility Analysis (2021): $940M/yr; $14-15B
- Northwest Energy Coalition (2018): $396M-1.2B/yr; $6.4B-19.7B

All Present Value cost figures are directional and reflect 30-year Present Value at 5% discount rate

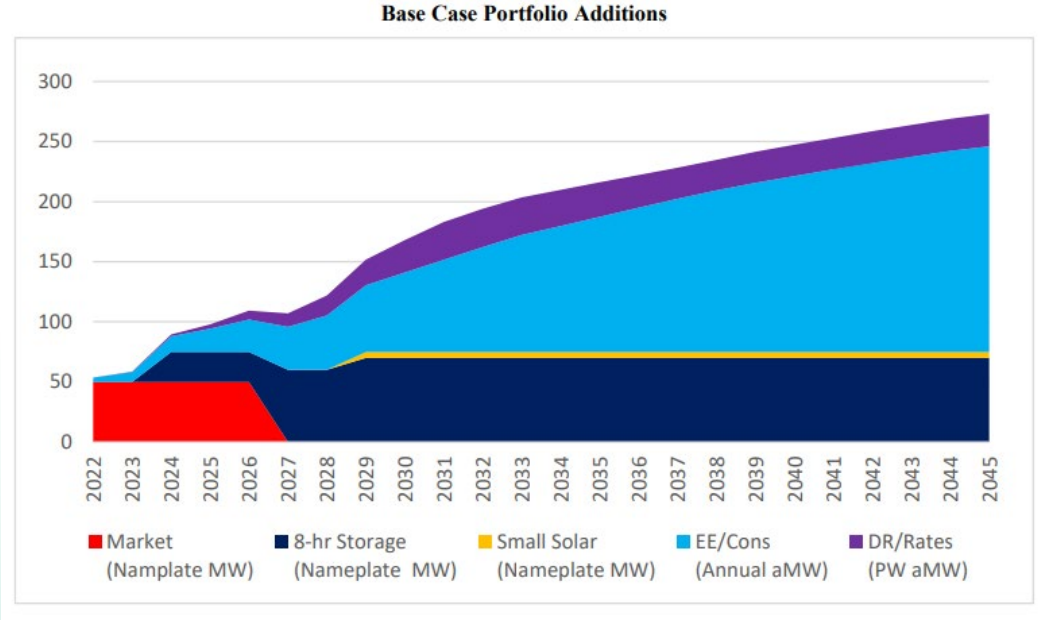
Analysis Highlights

- As one of the lowest cost resources in BPA's generation portfolio, average BPA costs would be expected to increase with the removal of the LSRDs
- There is a diversity of forecasts for what replacement costs would look like, though there is broad agreement there would be significant costs
- Staff estimate the replacement cost at the PUD's scale of LSRD consumption is $67-72 million per year
- A key question is who would plan replacement and who pays costs

We will safeguard the important role of local governance within public power.

Our ability to plan for the future is impacted by uncertainty

- Current plans would be affected by LSRD changes
- Clear, robust regional planning with stakeholder participation helps us meet our customer obligations



We take our environmental stewardship responsibilities seriously and we follow the best available science on salmon recovery.

Analysis Highlights

- Climate change is unfolding
- Freshwater and marine experiences both influence survival
- Marine experience may place bounds on what can be expected from changes in freshwater environment
- Complicated issue – no silver bullet solutions
- Science is solid in some areas and lacking in others
- Research is advancing but needs to be accelerated
- Decisions need to be science-based
- Collaboration is essential

Species Recovery / Ecosystem Preservation

- Focus tends to be on salmon and steelhead: however, it is important to think holistically and remember that there are many other species of fish and aquatic resources in the Snake River system
- For salmonids, we have:
  - Native/introduced, resident/migratory, hatchery/wild
  - Multiple life stages (egg, fry, juvenile, smolt, adult)
  - Variable life history / behavioral strategies
- In terms of the environment, there are a multitude of interrelated factors operating over space and time
- Best available science applies to enhancing our understanding all aspects of the freshwater and marine ecosystems, the interplay between factors, and what it means for a given species or suite of species.

Our understanding of the freshwater experience within the built environment

Outmigrating juveniles

- Passage Routes, Passage Efficiency
- Migration Rates / Travel Times
- Facility and Reach Specific Survival

Returning adults

- Upstream Passage / Conversion Rates / Fallback
- Access to and utilization of habitat

Water quality conditions

- Temperature
- Total Dissolved Gas

Analysis of a breached environment – juvenile rearing and outmigration

- Connectivity between habitats
- Downstream passage
- Physical Habitat
  - Transition from a run-of-river reservoir to riverine environment
  - Changes in depths, velocities, and substrates
- Water Transit Time - Migration Rates (Travel Times)
- Sediment
  - Mobilization
  - Contaminant Release
  - Deposition
- Water Quality
  - Suspended Sediment
  - Dissolved Oxygen
  - Temperature
  - Total Dissolved Gas

Our understanding of the lower river, estuary, and marine experience

Downstream of Bonneville / Estuary / Plume

- Timing of transition and conditions upon arrival
- Vulnerability due to physiological condition, size, stress, disease
- Predation, on both juvenile outmigrants and adults returning from the ocean
  - Piscivorous fish (pikeminnow)
  - Birds (Caspian Terns and Cormorants)
  - Marine mammals

Ocean

- Ocean entry (timing, size)
- Prevailing Climatic Conditions (sea surface temperatures, wind, upwelling, downwelling)
- Resources available / food webs / trophic interactions
- Species composition
- Competition
- Ocean interceptions and harvest of returning adults

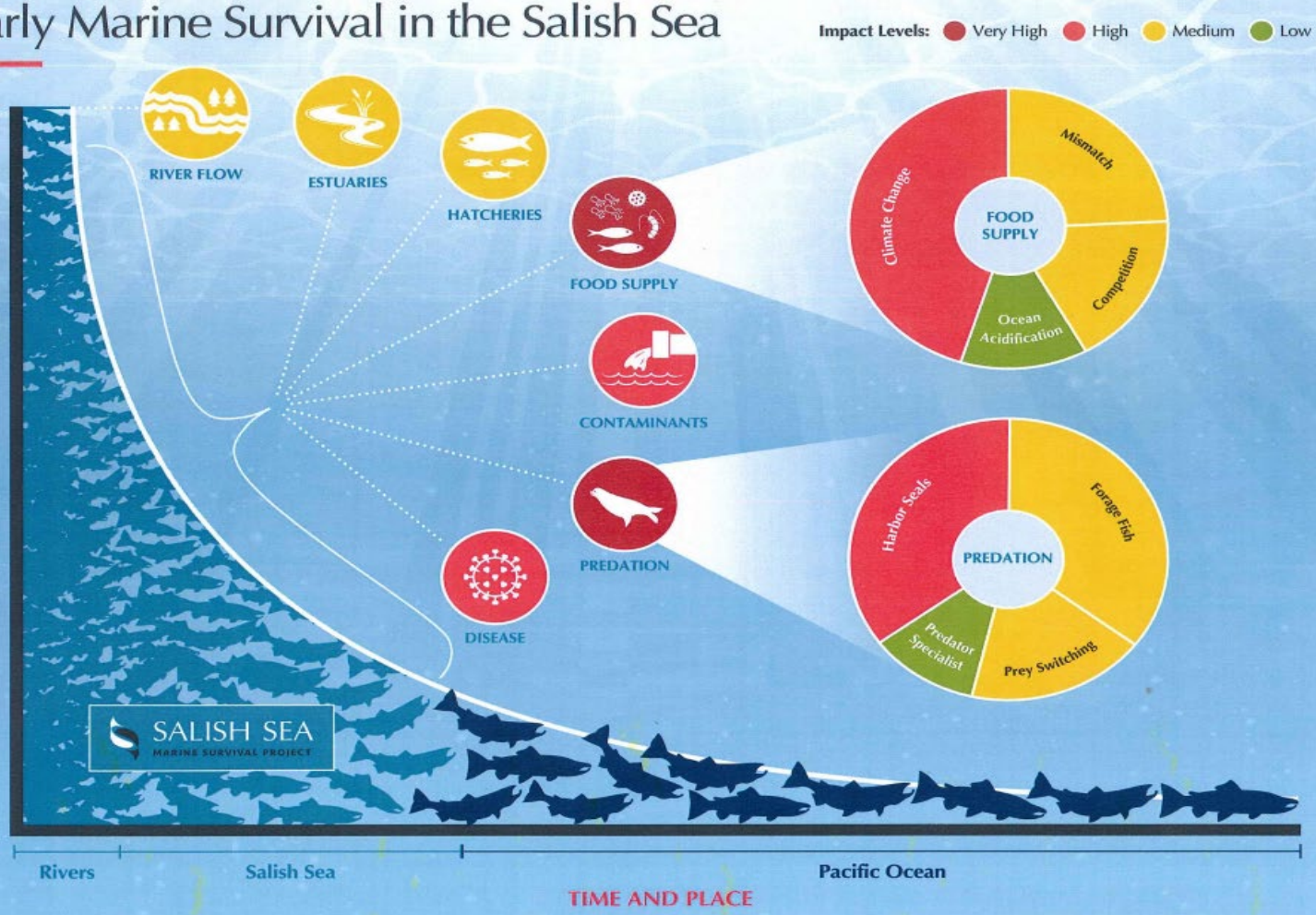
Analysis of a breached environment – migrating and spawning adults

- Upstream Passage
  - Migration impediments
    - Dam sites (certain hydrologic conditions)
    - Perched tributaries
- Physical Habitat
  - Transition from a run-of-river reservoir to riverine environment
  - Changes in depths, velocities, and substrates
- Water Quality
  - Temperature
  - Total Dissolved Gas

Assessing impacts - measuring survival

- Smolt-to-adult return ratios
- Need to do our best to identify direct and indirect causes of mortality
- Need to recognize that there can be carryover effects between life stages (latent / delayed mortality)
- We measure cumulative effects from freshwater and marine experiences but need to be able to separate out the relative role and importance.

Early Marine Survival in the Salish Sea



INFOGRAPHIC ILLUSTRATES THE RAPID DECLINE in number of juvenile salmon as they migrate downstream and through the Salish Sea. Impacts shown are those that were assessed as part of the Salish Sea Marine Survival Project. Impact levels were established by the project's lead scientists.

Legend

RIVER FLOW – Low river flows can expose young salmon migrating downstream to higher predation.

HATCHERIES – More hatchery Chinook are released at the same time now versus spread out over the spring as they were in the past. Pulses of hatchery fish can increase predation risk, potentially increase competition for food, or reduce chances of the fish entering the saltwater when prey is plentiful.

CONTAMINANTS – Young Chinook are contaminated with PBDEs or PCBs in many urban watersheds. PCBs continue to accumulate in Chinook that stay in Puget Sound to adult age.

ESTUARIES – Degraded estuaries and nearshore reduce shelter and prey for young salmon, in particular Chinook that use these habitats for some time.

DISEASE – More infectious agents are found in young Chinook and Coho in the Strait of Georgia compared to the open coastline.

FOOD SUPPLY – Zooplankton and forage fish, especially herring, have declined when young salmon need energy-rich food to grow and survive.

CLIMATE CHANGE – More days of sun, less wind, earlier spring river flows, and increasing water temperatures all can affect when, where and how much food is available for young salmon.

MISMATCH – Alterations in climate can change the timing of spring phytoplankton blooms, cascading through the food web so that zooplankton and herring are not available to young salmon in the size and quantities they need when they enter the Salish Sea.

COMPETITION – Competition for food between young salmon or between salmon and herring may occur when food supplies or habitat is limited.

OCEAN ACIDIFICATION AND HARMFUL ALGAE – Ocean acidification and harmful algae pose concerns as climate change continues to affect our waters.

PREDATION / HARBOR SEALS – A massive increase in harbor seal abundance results in high predation rates of young salmon and steelhead.

FORAGE FISH – A primary food source for salmon predators, forage fish like herring are less abundant.

PREY SWITCHING – Prey switching may occur and hatchery fish targeted when they enter the Salish Sea en masse.

PREDATOR SPECIALISTS – At fish migration barriers and other bottlenecks, seals are specializing in eating young steelhead and salmon.

Stewardship of the environment and the path to recovery

- Best Science: Research, Data, Models, Collaboration
- Systems are complex and variable
  - Spatially: river, estuary, ocean
  - Temporally: within season, seasonal, annual
- Acknowledge areas of uncertainty, state assumptions
- Avoid unintended consequences

Conclusion

- This is a complex, multi-dimensional issue
- Regional discussion has not identified a clear plan for resource replacement if the dams were breached, including who would be responsible for replacement or who would pay.
- Resource replacement may pose cost and reliability risks, and current plans would need to be updated
- The biological science is complicated and evolving, but there aren’t known silver bullet solutions that address all risks
- Staff will continue to engage in regional discussions to ensure discussions consider all Principle items as it relates to this issue