U.S. House of Representatives
Committee on Natural Resources

Field Hearing
"The Northwest at risk: the environmentalist's effort to destroy navigation, transportation, and access to reliable power"

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Hydroelectric Dams are the Foundation of Northwest Public Power

Benton PUD (BPUD) is an electric distribution utility located in Kennewick, Washington with over 56,000 service connections and is one of 134 current customers of the Bonneville Power Administration (BPA) with statutory preference and priority rights to the electricity generated by the Federal Columbia River Power System (FCRPS). The 31 hydroelectric dams included in the FCRPS typically generate about 8,500 average megawatts (aMW) of annual energy which is more than 50% of the Northwest hydropower total and a big reason why our region's electric grid is powered by more than 60% renewable generating sources; see *Attachment Slide 1*.

Like many utilities across the Northwest, BPUD will soon rely on BPA to provide 100% of our wholesale electricity. And as a Washington based utility, our 94% carbon-free hydro and nuclear portfolio puts us in a great position to meet our state's 100% clean electricity mandate.

The other good news is the majority of BPA's low cost, clean and reliable electricity continues to provide the foundation of consumer-owned public power in our region with prices holding steady and bucking the current inflationary trend. The bad news is *BPA's portfolio is tapped out and they currently have no more 'firm energy' available to meet growing electricity demand* being experienced by many of their customers.

In utility vernacular, firm energy is the electricity that can be essentially guaranteed to be delivered. And at this point BPA's FCRPS resources can produce about 7,000 aMW of firm energy on an annual basis with limits set by generating capability expected during low water (drought) years. And while it is not widely understood by the general public and some policy makers, *the 2025 forecast of total utility customer annual demand eligible to be served by BPA is already 466 aMW above the firm energy contract rights utilities have to the FCRPS*; referred to as a Contract High Water Mark (CHWM). In addition, the combined New Large Single Load (NLSL) electricity intensive businesses served by BPA customers will reach 1,110 aMW in 2025 with data centers representing most of this demand.

It is important to understand NLSL is a designation given to BPA utility customer loads *not eligible to be served at BPA's lowest rates.* Utilities can either serve an NLSL with non-federal generating resources or can ask BPA to serve the NLSL at what is referred to as the "New Resource Firm Power (NR)" rate. The *NR rate* is based on the forecast and actual price to acquire the additional power requested and for FY 2024/2025 is set at an average across the year of $90 per megawatt-hour (MWh) for *Heavy Load Hours* (HLH) and *$80 for Light Load Hours* (LLH). This is much higher than BPA's coveted *'Tier-1' rate* which is currently averaging about *$36 per MWh*.

Disallowing BPA to serve NLSL customers with 10 aMW or more of electricity demand annually at the cost of firm FCRPS capability (Tier-1) is a policy based in a statutory restriction put in place decades ago to keep low-cost hydropower from attracting too much of the nation's heavy industry to Northwest states. To put this in context, Benton PUD acquires about 210 aMW of wholesale electricity annually. So, while 10 aMW is a large number for any one customer, it is not uncommon for heavy industry, manufacturing facilities, and data centers to require many multiples of that.

While hydropower is a very flexible, low cost and clean generating technology, it is also variable from year-to-year and month-to-month. So, BPA can only contractually commit to providing firm energy to their preference customers based on the worst water years and then sells surplus hydropower generated during better than bad water years in wholesale electricity markets. To put things in perspective, compared to firm water years, *average and high-water years can deliver between 2,200 and 4,500 aMW of additional annual energy* which is as much as 4.5 times the Columbia Generating Station nuclear plant's 1,000 aMW annual production; see *Attachment Slide 2*.

Revenues derived from BPA's surplus sales are used to buy down the rates they charge for their Tier-1 product which equivalent to 3.6 cents per kilowatt-hour (kWh) and translates to BPUD effective retail rates for large commercial and industrial customers of between 5 and 6 cents and 8.5 cents for residential customers.

Thanks to affordable BPA hydropower which represents 50% of BPUD's costs to our customers, our 7.2 cents per kWh average for all rate classes is 33% lower than the national average of 10.7 cents. Compared to states like California with average retail rates reaching 20 cents per kWh and residential rates expected to increase to as high as 40 cents per kWh in some cases, Washington state's 8.5 cents average represents a significant economic benefit to residential customers and an economic development advantage when trying to attract business and industry.

As for the Lower Snake River Dams (LSRD), their combined annual generation in an average water year is 940 aMW which represents about 11% of the FCRPS; see *Attachment Slide 3*. BPA data indicates the *LSRD generate electricity at a cost of $14 per MWh (1.4 cents per kWh) which is far below the cost* of developing new renewable resources or what is available through market purchases which have dramatically increased in price over the past few years and are reflected in the BPA NR rate previously described.

Additionally, the LSRD are four of ten federal dams equipped with automatic generation control which makes them an important part of the minute-by-minute demand and supply balancing required for stable and reliable Northwest power grid operations throughout the year; see *Attachment Slide 4*. The LSRD flexible capabilities also allows them to be used to meet a significant portion of BPA's operating reserve requirements as a Balancing Area Authority (BAA) which can be thought of as backup capabilities needed for power grid emergencies.

And as more intermittent and variable wind and solar are added to the grid, flexible and controllable technologies like hydroelectric dams will be even more critical for maintaining grid reliability across a wide range of weather and temperature conditions. Keep in mind, the next best technology available today for balancing the grid is natural gas which is being phased out by aggressive clean energy policies in Washington and Oregon aimed at financially crippling existing natural gas plants and eliminating the possibility of constructing new ones.

And when you add the recent closure of coal-fired power plants (and plans for more retirements) to the mix, *the dependence on hydropower for maintaining Northwest grid reliability has already begun and will deepen significantly in the future*. This is why it is so concerning to utilities that hydropower continues to be undermined by anti-dam special interest groups and some political leaders both in terms of public support and actual amounts of generated electricity.

Under relentless threats of legal action, BPA and its federal dam operating partners have agreed to divert more and more water through spillways at the LSRD and four lower Columbia River dams rather than through turbine generators. It is fair to say 'spill' has been increased to levels beyond sound scientific reason in what is being characterized as a 'last ditch' attempt to improve young salmon (smolt) survival on their migration to the Pacific Ocean.

We must not forget; it was not long ago when fish biologists expressed *deep concerns* over raising spill-caused total-dissolved-gas (TDG) levels to more than 115% as it would be detrimental to salmon and other aquatic species. And while it is not widely reported, early indications are *increased spill to 125% TDG is not delivering the increased survival* theorized by some. In fact, these unprecedented levels of spill are making it more difficult to accurately determine smolt survival and there are questions as to whether existing in-river instrumentation and field assessments of smolt are adequate to the task of determining whether high levels of spill are helping or hurting salmon.

In a November 2022 report from NOAA Fisheries, their data indicates *despite spilling 65% of the daily flow at the LSRD, there has not been an appreciable increase in survival* for spring Chinook and Steelhead. While more time and resources are needed to make an adequate assessment of the impacts of spill, there is no doubt increased spill and reduction of hydro generation is working against utilities trying to balance affordability and reliability with demands for eliminating greenhouse gas emissions.

Additionally, the 2020 Columbia River System Operations Environmental Impact Statement (EIS) studied the impacts of LSRD breaching concluding "If Bonneville had to *replace the four lower Snake River projects' full capability* with zero-carbon resources, the *rate pressure could be up to 50%* on wholesale power rates." And has been demonstrated, a 50% increase in BPUD's wholesale power costs would translate to a 25% increase in our retail rates.

So, *any claims the LSRD are "outdated, surplus or high cost" are not based on facts.* The *LSRD are part of the foundation of the firm-energy wholesale portfolios of 134 utilities located in every Northwest state*, many of which have significant demand for electricity above what they can get from BPA. And as has been mentioned, surplus sales derived from the LSRD are not a reflection of generating capability that is not needed, they are a result of the timing of river flows and having more water available to generate electricity than is represented by a firm water year. And for Washington and Oregon utilities, *no amount of affordable, firm, and carbon-free hydropower is "surplus" when you are required to meet 100% carbon-free electricity mandates*.

Increasing Electricity Demands and Costs

So, what are BPA customer utilities including BPUD doing when their need for electricity exceeds their CHWM which is adjusted each two-year rate period and referred to as a Rate Period High Water Mark (RHWM)? Many are still counting on BPA's statutory obligation to meet their eligible electricity demand (not including NLSL) by serving loads above their RHWM at BPA's Tier-2 rate. While BPA's Tier-2 rates started higher than Tier-1, they dropped to $33 per MWh in FY 2023 ($3 less than the average Tier-1 rate of $36 per MWh). But the *decreasing Tier-2 cost trend* driven by what were low regional power market prices *is over*, with BPA Tier-2 rates set to rise to an average of *$62 per MWh* in FY 2024/2025.

The 93% year-over-year BPA Tier-2 rate increase between fiscal year 2023 and 2024 is part of a disturbing trend reflecting the destabilization of the Northwest power grid precipitated primarily by rapid retirement of coal plants without specific plans for replacing their dependable capacity.

With some of the most aggressive clean energy laws and regulations in the nation, Washington, and Oregon's restrictions on the use of fossil-fueled technologies in electric utility portfolios are already beginning to put a significant premium on the cost of incremental electricity needed to meet 'organic' utility customer growth in residential and commercial sectors and on the critical electricity supply needed to maintain power grid reliability, particularly on the days and during the hours when customer demand is the highest.

To put it simply, in the next two-year period (and beyond), BPA utility customers with demand for wholesale electricity above their RHWM, who do not have other generating resources, *will pay 72% more to add new customers* ($62 per MWh for Tier-2 versus $36 per MWh for Tier-1). Including new customers that may come from economic

development opportunities. And with the NLSL restrictions previously discussed, any economic development opportunities involving electricity intensive loads above 10 aMW, the only near-term option is the NR wholesale rate which was previously identified *as $90 per MWh for HLH* which *would likely be unworkable* compared to BPUD's current large commercial and industrial retail rate which is equivalent to *$50 to $60 per MWh; i.e. the NR rate does not include charges for transmission, capacity and delivery*. So, it's not out of line to say, current pricing on the Northwest power grid has *effectively de-industrialized our region*. And for many utility managers, it is apparent the increase in BPA Tier-2 and NR rates can be *directly correlated with the rapidly increasing 'cost of reliability'* on the Northwest power grid.

Northwest Power Grid Reliability Concerns

Over the years BPUD has been actively engaged in trying to help shape clean energy policies. We have invested significant time and money to help policy makers better understand electric utility perspectives when it comes to balancing environmental costs and benefits associated with different types of generating technologies with financial costs and power grid reliability.

Through our membership in the Public Generating Pool (PGP) BPUD along with other consumer-owned utilities with generation assets helped fund and produce a study released in 2019 by E3 (Energy+Environmental Economics) titled "*2019 Resource Adequacy in the Pacific Northwest*". This study was also funded by investor-owned utility partners Avista Corp., Puget Sound Energy and NorthWestern Energy.

When it comes to Northwest power grid reliability in the near to mid-term, it's all about the impacts of coal plant retirements which will top 4,000 megawatts by 2025. While this is consequential by itself, Washington and Oregon clean energy policies have taken 60% cleaner burning natural gas off the table as a logical replacement of coal, which means keeping the grid reliable becomes far more difficult and that *hydropower will be relied upon more than ever to 'keep the lights on'*.

While coal and natural gas have historically represented about *one-third of the nameplate generating capacity* in the expanded Northwest power grid footprint, they have provided about *50% of the effective capacity*; see *Attachment Slide 5*. Effective capacity is how much electricity generation can be counted on when demand is at its highest levels which of course happens during early morning and late evening hours on the coldest days of the year, and in the early evening hours on the hottest days.

So, while the Northwest is best known for abundant hydropower when it comes to annual energy, the *importance of coal and natural gas to grid reliability should not be underestimated*. And the intermittency and variability of wind and solar power which are being strongly promoted by federal and state policies as replacements for coal and natural gas is not just an inconvenience, it can be the difference between a reliable power grid and black outs.

The E3 Resource Adequacy study refers to a metric called Effective Load Carrying Capability (ELCC) which is used in the electricity industry to quantify the additional load (electricity demand) that can be met by an incremental generator while maintaining the same level of system reliability. Equivalently, ELCC is a measure of 'perfect capacity' that could be replaced or avoided with dispatch-limited resources such as wind, solar, energy storage, or demand response.

For the Northwest power grid in place in 2018, the E3 Resource Adequacy study determined the effective capacity of thermal plants like natural gas, coal and nuclear to be 100%; see *Attachment Slide 5*. As a variable generating technology, hydropower with over 35,000 megawatts (MW) of nameplate capacity delivers an effective capacity of 53% due to limits on water storage and flows as well as generating unit availability. And the *ELCC of the 7,100 and 1,600 MW of wind and solar power was calculated to be 7% and 12% respectively*.

This means despite investments in thousands of megawatts of wind and solar 'nameplate' capacity, they are only expected to contribute 500 MW and 200 MW of effective capacity respectively which is what counts most when planning for power grid reliability. The extremely low ELCC of wind is a function of the simple observed reality that high electricity demand events in the Northwest tend to occur during the wintertime when historically there is little wind blowing. Further, the E3 study states "existing NW wind is almost entirely located within the Columbia River Gorge which tends to have very low wind output during the high-pressure weather systems associated with the Greater Northwest cold snaps that drive peak load events". Wind ELCC in the Northwest can be improved by building more wind farms across a larger geographical area, particularly in Montana and Wyoming. But even the Southwest Power Pool regional transmission operator (RTO) covering states from Canada to northern Texas with the *best wind resources in the United States only has average Summer and Winter Wind ELCC of 15% and 16% respectively.*

In addition to effective capacity, it is critical to understand the scale of energy supply and demand, and how much we rely on each type of generating technology for both capacity and energy. *Electricity is a just-in-time service* where the *unforgiving laws of power grid physics requires the supply of electricity to precisely match demand on a minute-by-minute basis*. And controllable technologies like hydropower and natural gas are best suited for the balancing act.

To help better understand the distinction between energy and capacity, consider the expanded Northwest power grid which extends into Eastern Montana, Utah, Wyoming, and Colorado; see *Attachment Slide 6*. Each circle on the map represents a Balancing Area Authority (BAA) which are entities responsible for maintaining the precise balance of supply (generation) and demand (electrical load) for a collection of generating plants and a load service region. And each line on the map represents transmission lines connecting the various BAA's together which allows scheduled generation imports and exports and a high level of operational coordination. Coordinated operations over a large geographical area allows BAA's to share generating plant surpluses, cover

unplanned outages of power plants and transmission lines, and take advantage of time and weather based load diversity.

To really appreciate the importance of hydropower and thermal generation resources to power grid reliability in the Northwest it's helpful to review data and graphs from actual grid operations like what is shown on *Attachment Slides 7 and 8*. *Slide 7* illustrates the magnitude and shape of electricity demand in the expanded Northwest power grid during a cold and snowy week in February 2021. In synch with the 'rhythm of life', electricity demand rises and falls as people wake up and go to sleep and try to stay warm as they go about their daily lives. It can be seen the total electricity demand reaches a level of just over 50,000 MW with two daily peaks coinciding with early morning and late evening heating demand.

Slide 8 shows the controlled output of *hydropower doing the bulk of 'load following'* and supplying as much as 23,000 MW to meet demand. Natural gas is also doing a bit of load following as indicated by the shape of its production curve. Coal power which is running mostly steady combines with natural gas to supply as much as 25,000 MW to meet *50% of demand* on the coldest days. And of course, the Columbia Generating Station nuclear plant is providing an around the clock and constant 1,150 MW.

Slide 8 also illustrates how wind and solar power's inability to produce electricity in a controllable pattern matching customer demand makes these generating resources look like 'negative demand' in a get-what-you-get pattern not correlated to the demand curve shape. Referring to Slide 7 it's important to recognize the shape of the 'power curve' must be matched precisely and that the area under the curve is power over time which represents energy. So, wind and solar can be overbuilt to provide large amounts of energy and increase the probability they will fill in more area under the curve. But the question is how extensive will and should the overbuild be to achieve an adequate level of effective capacity? Particularly when you consider land-use impacts, and that overbuilding can lead to the need to curtail wind and solar during times of low electricity demand. And *replacing a large share of controllable technologies like natural gas or hydropower with wind and solar requires many multiplies of up-front capital costs* which translates to *increases in prices utilities will have to charge their customers for reliability*.

Now with a better understanding of power grid operations and the dynamics of supply and demand balancing, the graph in the lower right corner of *Attachment Slide 4* highlighting the benefits of the LSRD can be appreciated even more. This graph *illustrates the flexibility of LSRD operations and how their wide range of possible hourly generation can be used to help precisely follow demand*. The graph also shows the LSRD can produce as much as 2,500 MW of capacity and why BPA assigns as much as 25% of their operating reserve requirements to these dams. This is also why *'blackout insurance' is an apt description of the operating capability provided by the LSRD*.

The Waning Northwest Economic Development Advantage

In recent years and months, the Tri-Cities area of Washington like many cities in the Northwest is increasingly on the radar of companies looking for communities to bring new industries and jobs. The kind of jobs that include good wages and benefits and that offer stable, multi-generational employment opportunities. There are a lot of reasons to love the diverse communities in the Northwest but when it comes to electricity intensive industry and manufacturing, they are being attracted here in large part based on the reputation the Northwest has for abundant and inexpensive hydropower. And while *low-cost electricity has been the economic engine of the northwest for decades, times are changing, and not for the better* when it comes to the possibility of electricity-intensive development in many communities.

As previously mentioned, power markets have recently taken a turn in the direction of significantly higher prices which is illustrated on *Attachment Slide 9*. Dramatic forward price increases in the Mid-C power market which is the central trading hub on the Northwest grid are indications of the impact rapid coal plant retirements with no plans for replacement with dependable technologies are beginning to have. *Slide 9* illustrates what a utility should expect to pay to secure a year's worth of firm electricity on a calendar-year basis (calendar strip) compared to BPA rates. "Peak" includes the hours between 6 am to 10 pm (Heavy Load Hours) on weekdays and Saturdays and "Off Peak" are all other hours including Sundays and holidays (Light Load Hours).

While Northwest electric utility retail rates are currently some of the lowest in the nation, the *near-term prospects for adding large amounts of incremental electricity demand at 'reasonable rates' using market purchases are bleak*.

And for utilities with existing or emerging electricity deficits on a seasonal basis, *Attachment Slide 10* provides an additional indication of the 'cost of reliability' with 2024 forward Q3 (summer) and Q1/Q4 (fall/winter) reaching Peak prices of more than $150 per MWh and $90 per MWh respectively. As important as the magnitude of these prices, is the slope of the curves and high rate of change of prices that began in the spring of 2021. Using January 2021 when a Q3 forward was priced at $45 per MWh as a basis, *there has been a more than 330% increase in 2024 Peak Quarterly prices over a two-and-a-half-year period*.

As alarming as current forward price curves are, market-based electricity does not represent the only way for Northwest utilities to meet growing demand. Of course, utilities can elect to build their own generation (which is no small thing) or purchase power from new wind and solar farms proposed for development in the Northwest. *The challenge is how do you 'firm' the intermittent and variable output of wind and solar into the future when natural gas is facing punitive financial penalties* and *firm hydropower is at or close to its limits* and faces the possibility of being further diminished?

Firming with energy (battery) storage is a popular idea with some politicians and wind and solar developers. But batteries cost billions of dollars at the scales that would be

needed, and current lithium-ion technology has significant operational limitations with only a four-to-six-hour discharge capability. And there is always the question of what you will charge the batteries with? Particularly as the Northwest grid deepens its dependence on wind and solar power and we experience multi-day cold spells that are also windless and cloudy.

As was addressed earlier, surplus hydro can provide large amounts of energy depending on the year but firming variable wind and solar with variable hydro that may not show up is becoming increasingly risky, both financially and physically.

While it remains to be seen where Mid-C prices will end up, the simple fact is certainty in electricity generation equates to predictable and more stable electricity rates. And *high levels of certainty are not what we are likely to get* with the construction of more wind and solar farms in the Northwest and further erosion of hydropower.

Conclusions

Reliable electricity is critical to every aspect of modern human living, including food, clothing, shelter, medical care, and education. When you think about it, electric utilities are really in the health, safety, and wellbeing business.

And while customers and policy makers rightly engage in holding utilities accountable for providing affordable and environmentally responsible electricity, *when it comes to delivering on reliability, there is nobody with more skin in the game than utilities*. Failure to 'keep the lights on' can be a matter of life and death and will always be the metric by which utilities will receive their harshest critiques and ultimate judgments.

Washington and Oregon clean energy policies have boxed many Northwest utilities into a corner by taking reliable technologies off the table before we have dependable replacements. To compound the problem, the *political leadership in both states are actively advocating for the diminishment of hydropower* through *excessive spill* and in the case of the Lower Snake River Dams, *outright removal*.

Aggressive clean energy polices with prohibitions and restrictions on fossil-fuel technologies are rapidly removing reliable generating technologies from the Northwest grid. And *in the Northwest, the perfect balancing of supply and demand required by the unforgiving laws of grid physics will fall more and more on hydropower*. At this point, many utilities have nowhere else to turn for proven, dependable, and sustainable generating capacity. The kind of capacity that can be counted on to show up on the hottest and coldest days of the year.

When it comes to grid reliability, hydropower is to the Northwest as natural gas is to California and most of the rest of the United States. Based on sound scientific analysis and common sense, many utilities are unconvinced that widespread development of energy-dilute and variable wind and solar backed up by expensive and potentially

unsustainable battery storage is a reasonable or even achievable vision for the power grid of the future.

Northwest utilities are already facing tremendous uncertainty with many deeply concerned *we could be heading for a reliability cliff*. Thankfully *Hydropower is standing in the growing effective capacity gap for now*, but the Northwest grid cannot afford to see a further erosion of its capabilities. Particularly if the levels of electrification of transportation and natural gas end uses envisioned by some state and federal policy makers happens, either in part or to a large degree.

One frustrating irony is that *some of the same entities who helped convince policy makers to back utilities into a corner and force a deeper dependence on wind and solar power are continuing to cavalierly call* for the erosion and outright removal of carbon free hydroelectric generating capacity. The very hydropower on which Washington and Oregon's 100% clean aspirational visions and bragging rights were established. And rather than celebrating our existing nation leading clean energy capabilities, anti-hydropower interests are attempting to capitalize on a shift in political power together with emotionally charged arguments and opinions to weaken support for hydropower while falsely promoting wind and solar technologies as environmentally benign replacements.

The industrialization of natural landscapes, ecological disruption and volumetric waste challenges that would be the result of replacing diminished hydro generation with wind and solar power never seem to be a part of the anti-dam conversation and they should be. Clearly dams have significant environmental and ecological impacts and it is right to continuously scrutinize and scientifically evaluate their operations. What is not right is to proclaim an unwavering commitment to science when it suits narrow ideological interests while being willfully blind to the fact all energy conversion technologies have limitations and lifecycle impacts that should be considered in a balanced costs versus benefits analysis.

Policy makers and utilities also need to face the emerging reality that clean energy policies with strong preferences for wind and solar power are likely to face land use conflicts and supply chain constraints as significant limiting factors. And that this *project development 'friction' and uncertainty could contribute to a growing fragility of the Northwest power grid* as the scheduled rapid retirement of coal-fired power plants proceeds as planned and the strategy to overbuild wind and solar projects faces the prospect of project development gridlock in some areas.

This same uncertainty will likely be amplified further when you consider the potential pushback by citizens and agencies representing Idaho, Montana, and Wyoming; states that continue to be identified by Washington and Oregon policy makers as essential to the wind, solar and transmission line development necessary for achieving their aggressive clean energy goals. To reinforce this point, in a January 2023 work session with the Senate Environment, Energy & Technology Committee, Washington state energy officials confirmed they expect 43% of electricity will be imported into the state by 2050 and that 36% will come from Wyoming and Montana wind farms.

To gain additional perspective, the Washington state energy strategy (SES) indicates a near *doubling of electricity consumption will be required by 2050* to significantly decarbonize the transportation sector and natural gas end uses. Given Washington's annual electrical energy consumption was recently 10,700 aMW, the SES vision would require more than 35,000 megawatts of wind power or more than 42,000 megawatts of Washington based solar power to generate an equivalent amount of annual energy.

Of course, no single technology is being proposed as a solution but when you consider wind farms on average require about 140 square miles of land for every 1,000 megawatts of installed capacity, a land area equivalent to sixty Seattle's would have to be covered with industrial wind turbines to achieve just the incremental energy envisioned by Washington's SES. And when you consider the overbuild required to make up for the deficient ELCC of wind, the build out is clearly infeasible.

As philosopher and energy expert Alex Epstein has stated "energy is the industry that powers every other industry. The lower cost energy is, the lower cost everything is." Energy costs in Washington state are trending upward with some of the highest priced gasoline in the nation and carbon policies which will increase the cost of natural gas as well. As Washington state attempts to transition away from fossil fuels, the cost of transportation, groceries and other essentials are likely to increase making less money available for other expenses. Washington's goals to electrify transportation and natural gas end uses will increase demand for electricity, requiring unprecedented capital investments resulting in significant upward pressure on electricity rates. *Keeping electricity affordable in Washington will be more critical than ever and more difficult than ever*.

The *availability of affordable and reliable electricity provided by BPA hydropower has been treated as a certainty for decades*. BPUD customers (particularly those in lower income categories) have adapted their lives and budgets consistent with these expectations to be sure their lights stay on, and they are protected from extreme heat and cold. While we don't think about it much in the U.S., it is clear from a global perspective that energy poverty is human poverty. And I fear low income and vulnerable populations in the Northwest may be in for a very difficult time in the years to come if we continue down the path we are on. Every dollar counts for many of BPUD's customers. And as a consumer-owned utility *our customers expect us to hold the line on electricity rates and they always hold us responsible when the lights go out*.