Columbia Gorge Climate Action Network

August 9, 2022

RE: Goldendale Energy Storage Project, Project 101, LLC, Draft Environmental Impact Statement

Dear Washington Department of Ecology,

Thank you for this opportunity to opine on this proposed project. The Columbia Gorge Climate Action Network (CGCAN) educates, organizes and motivates Columbia Gorge activists to reduce and eliminate fossil fuel usage and climate change, at all levels from individual to global. We encourage clean local renewable energy, conservation, community sustainability and resilience throughout our National Scenic Area.

CGCAN opposes Rye Development's proposed Goldendale Energy Storage Hydroelectric Development as proposed in the current Draft EIS. The impact of this proposed project is more harmful than it is good. The greatest impact would be on the tribal, cultural and religious resources as submitted by the Yakama Nation, the Confederated Tribes of the Umatilla Indian Reservation, and the Kah-Milt-Pah (Rock Creek Band of the Yakama Nation). Historically Tribal Nations have been ignored along with the violation of Treaty Rights. This is true today in regards to Rye Development's Project 101.

We believe that the application should be denied in its current state. If this project is pursued further, it must include the following:

- A robust mitigation plan available to Tribal Nations. Currently as it stands the mitigation plan has not been accepted or supported by the Tribes. The impact would be significant and unavoidable in its current state.
- Consideration for the fish and wildlife that will be significantly impacted. Biologists have raised concern about the increase in wind turbine bird kill. The U.S. Fish and Wildlife have discussed at great length the concern over the Golden Eagle population being significantly impacted while the developer has not offered a viable mitigation plan for this potentially significant loss. Questions remain about how the project will mitigate the loss of stream and riparian habitat in wetlands and other ephemeral streams.
- In 2016, a pump storage project was denied due to the toxic pollution at the Aluminum smelter site. We request a full analysis of all the mediation impacts on the site.
- The project must show through market analyses that it will be economically competitive. Why will utilities commit to long-term contracts for all the generation of this project at $85

to $95 per MWh? Meanwhile the cost trajectories of competing battery, distributed EV storage and other technologies for grid balancing are getting cheaper while pumped storage is mature and costs are fixed.

- In its current state ~100,000 MTCO2e will be consumed during construction, a large amount of gasoline and diesel. In addition, a substantial amount of electricity will also be consumed. It is said that it would not impact the environment, this is false. We request an analysis of the impacts on the environment during construction of the project along with how long such an operation of this size would need to function in order to make up for the energy used.

Currently, financial viability is unknown for this project. We are concerned that the environmental and cultural impacts for a failing project is more important than the detrimental impacts it will have on land, water, and wildlife. Above all else the Tribal Nations concerns should be considered at the forefront of this project. Tribal Nations have suffered from the industrialization of their land and further are the most impacted by climate change. We urge you to put the Tribal Nations concerns at the forefront of this project before moving any further.

Sincerely,

Eric Strid
Co-convener, Columbia Gorge Climate Action Network

Appendix: Detailed comments

I. Community impacts are a net negative

A. The tribal communities have not accepted that any development could incorporate acceptable mitigations

After years of engagements, the tribes affected continue to reject all proposals for mitigations. Unless the project can constructively collaborate with tribes over their needs, the no action option is indicated.

B. 3000 construction jobs would create a boom-and-bust cycle for Goldendale and The Dalles

Goldendale's population is 3600 people, or about 1400 households; Goldendale is about a 20 minute commute to the proposed project. The Dalles' population is 15,500 people, or about 6200 households; The Dalles is about a 32 minute commute to the project. Together the cities total about 7600 households.

Adding 3000 construction workers would cause a 40% increase in demand for affordable housing, local traffic, school capacity, associated infrastructure, social services, etc. at both cities. As soon as some of these are in place, the collapse of housing prices and tax base create more problems in the opposite direction after the 5 year construction period.

The EIS has no mention of a plan for temporary housing or mitigations for the boom and bust at local communities.

The 40 direct jobs projected would be welcome, although that isn't much different from the employment from an additional gorge brewery.

II. The market for grid balancing

A. We agree that there are increasing needs for much more grid balancing

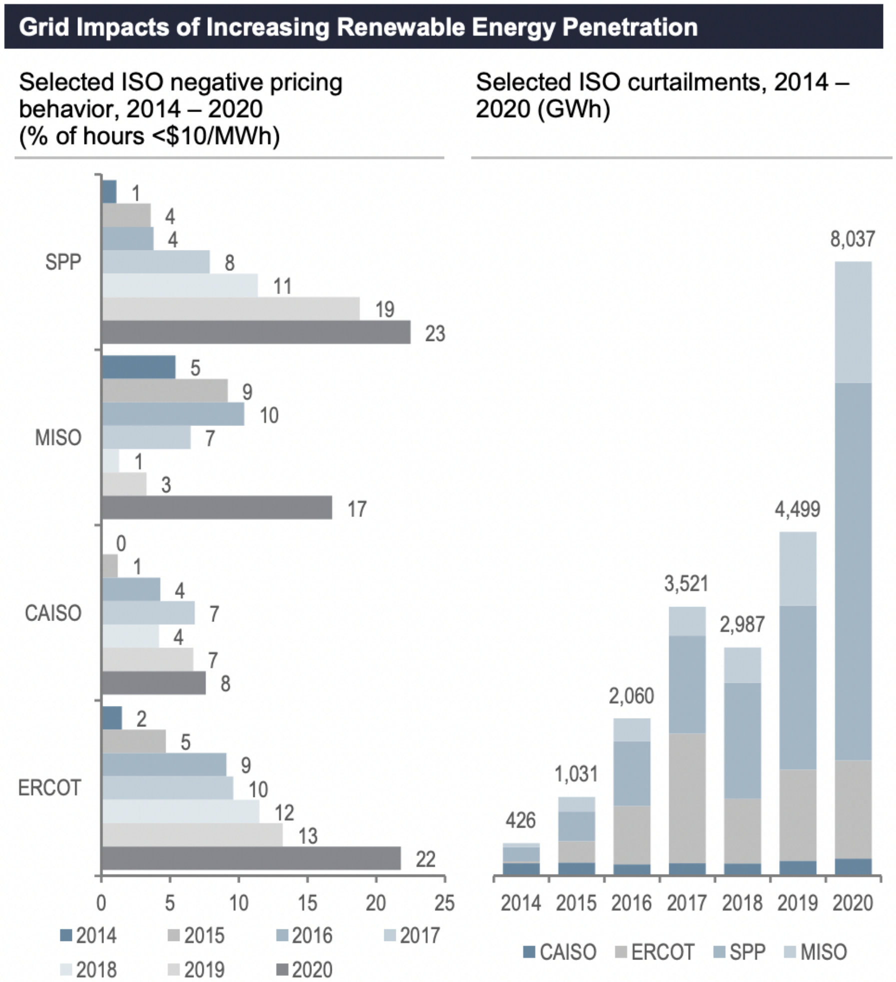


Figure 1. Grid impacts of more renewables from [Lazard LCOS 2021](#).

Figure 1 shows that the instances of negative pricing are generally increasing, although CAISO was the lowest in 2020; this could be due to relatively more storage buildouts in California. Also note that the cheaper the generation from solar and wind, the less the economic impacts of curtailments or zero pricing, in other words, when solar is half the capital cost, then curtailment has half the economic impact.

We note that utilities in the Northwest willingly signed up for 100% renewable electricity by 2045 in Washington state and 2040 in Oregon, without any caveats about the costs or availability of grid-balancing resources. There was no call for a storage mandate or policies that accelerate pumped hydro or any type of storage. The main utilities have studied the future grid options and are willing to sign up for 100% renewables with business-as-usual policies and market forces. Thus, any grid-balancing technology like pumped hydro must compete in the free market with other options.

B. Comparing pumped hydro to Li ion batteries

1. Cost per kWh already cheaper with Li-ion

The proposer asserts that “Pumped hydro storage is the only asset that provides large-scale, cost-effective renewable energy storage capacity and a range of essential grid reliability services, the value of which will increase as penetration of intermittent renewable resources rises. Pumped storage is increasingly compared and contrasted with Lithium Ion (Li-ion) batteries. In general, Li-ion batteries have excellent energy and power densities and round-trip efficiency. However, the average duration of Li-ion batteries is 4 hours, which limits their ability to support the integration of high percentages of renewable energy.”

This statement is misleading and questionable when compared to the cost/performance trajectories of competing technologies in the 2030 timeframe, the year the proposed project is expected to be complete. Pumped hydro is now the largest installed base of energy storage but certainly not the fastest growing. Most of the pumped hydro systems are associated with large nuclear or coal generation to provide load stabilization. Asserting that pumped hydro will be the best technology in 2030 is highly questionable, given the $500 billion the auto industry is investing in electrifying transportation.

Claiming that Li ion batteries are limited to four hours of energy is nonsense–pumped hydro is just as limited to the discharge times and neither have the long-term storage capacity necessary for weeks or months of energy storage.

For a simple cost comparison, the proposed project’s estimated cost of $2.836 billion in 2019 for 14,400,000 kWh of capacity (1200 MW X 12 hours) implies a basic capital cost of $197 per kWh.

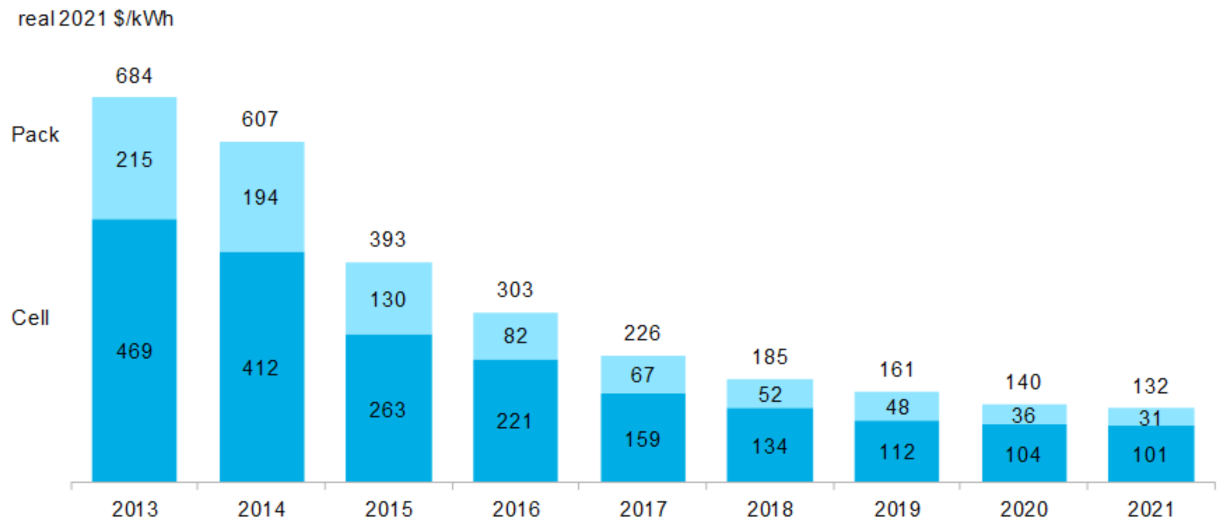
Li-ion battery packs for electric vehicles now cost about $135 per kWh. We note that battery systems for utility storage cost more than EV batteries, such differences depending on multiple project details.

(For utility storage, the currently pending Inflation Reduction Act would enable a 30% investment tax credit of 30% for both off-stream pumped hydro and batteries of all types.)

2. Cost trajectory of Li-ion batteries

The costs of pumped hydro are mature and well known; by contrast, the costs of Li-ion batteries are decreasing due to a production learning rate of about 20% (cost reduction for a doubling of cumulative production volumes), as well as aggressively funded R&D on new battery chemistries.

In November 2021 Bloomberg NEF reported that the average cost of EV battery packs had reached $132/kWh (Figure 2), although rising raw materials prices were likely to pause the downward trend in the near term until supply chains caught up with the rising demand.



Source: BloombergNEF.

Figure 2: Volume-weighted average battery pack and cell price history.

In [May 2022 Bloomberg NEF](#) reported on battery demand for grid storage. Figure 3 shows the Li-ion battery demand history and forecast.

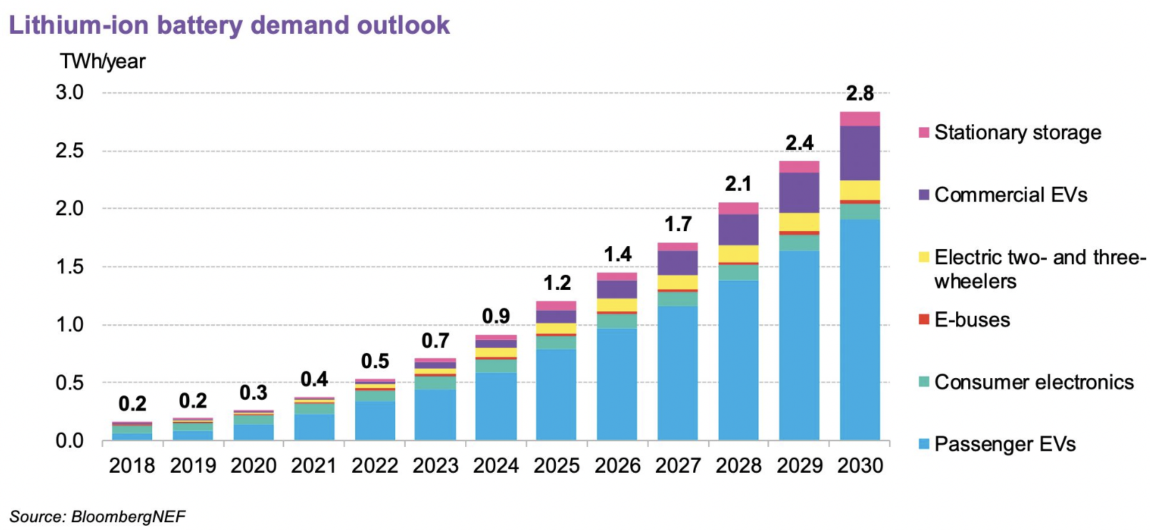


Figure 3. Global Li-ion battery demand in TWh (million MWh) per year.

Note that “Stationary storage” in Figure 3 is demand for utility-scale battery installations, which is dwarfed by the demand for EV batteries. Thus, the cost-performance of utility Li-ion battery technology will be driven by EV demand, which is of course growing exponentially and attracting the largest R&D efforts.

BloombergNEF estimates that “California will add roughly 12.4GW/48.2GWh of utility-scale batteries between 2022 and 2026.” By 2030, the proposed project’s pumped hydro sales will be competing against the cost structure of far more battery storage on the grid.

3. Versatility of distributed battery storage

The costs of transmission and distribution (T&D, the wiring and transformers of the grid) range from 3 cents to over 7 cents per kWh ($30 to >$70 per MWh). Li-ion batteries are typically deployed in substations where the load balancing needs are greatest, often to avoid the costs of increasing distribution capacity. Consumers are starting to install batteries in their garages. The ability to locate batteries closer to loads than pumped-hydro generation cuts T&D costs and line losses, and enables islanding microgrids for energy resilience.

4. Li-ion batteries are about 10% more energy-efficient

The charge-discharge cycle net energy efficiency is around 90% for Li-ion vs 80% for pumped hydro. Thus, the energy used by LI-ion storage is about half of the energy used by pumped hydro.

5. Emerging access to EV batteries for grid batteries

The huge storage capacity of the EV batteries in Figure 3 has engendered pilot projects with bidirectional EV connections to power buildings or to provide storage to the grid. The first instance was Nissan offering emergency power to Japanese homes for earthquake preparedness; recently, the vehicle-to-building capabilities of the Ford Lightning pickup are popular.

The hardware exists for vehicle-to-building (V2B) or vehicle-to-grid (V2G) applications, and these make sense from an asset deployment perspective–US vehicles are parked over 90% of the time, and bidirectional chargers at homes or businesses could be servicing other loads as well as supplying enough charge for driving needs. (The battery cycling parameters can be managed to minimize battery degradation.)

What is missing is interconnection standards for V2B and far more standardization for V2G applications. V2B requires more standardization with building codes, chargers, and vehicles. For V2G, there are 3000 electric utilities in the US with 7,000 different rate structures, so the standardization is a complex task. To address this gap, vehicle-grid integration (VGI) standards are being urgently developed at the US DOT, DOE, and EPA. While the schedule for V2G deployment is highly uncertain, the opportunities for automakers, homes, businesses, and utilities are so large that eventual standardization and deployments are inevitable. For electric utilities, the costs of V2G could be very low because it would use EV batteries that are otherwise idle. For consumers, signing up for V2G would offset their monthly bill with minimal disruption of their transportation needs. Automakers like Ford see opportunities to add new features to vehicles.

In summary, the economic competitiveness of new pumped hydro is questionable and gets weaker as other storage options become cheaper.

C. Other technologies for grid-balancing technologies also getting cheaper

Besides Li-ion batteries, there are many other grid-balancing technologies in various stages of R&D or deployment. Demand response, the control of loads, has been used forever in some form–such as calling up industrial customers to have them shut down large loads. PNNL did a pilot project that controlled the hours that hundreds of water heaters were powered up. Today many utilities are installing smart meters (advanced metering infrastructure or AMI) to enable time of use (TOU) pricing. TOU is ideal for helping consumers choose when to charge their EVs; thus, the increasing load from EVs is also an increasing load that can be shifted to balance the grid.

Distributed energy resources such as rooftop solar are increasingly paired with batteries, to provide resilience as well as shift the building's energy flows to optimize electricity rates. Smart load centers can island homes or businesses, reconfigure which circuits are powered by home batteries or vehicles, and manage charging and discharging of the microgrid's resources, etc.

From 2017 to 2021 CAISO's annual peak loads fell by more than 10% (slide 7). This is not enough data points, but it may be indicating the macro impacts of more grid balancing through various techniques.

D. Pumped hydro doesn't address the big problem, which is seasonal storage.

Few of the storage technologies being pursued address the largest unmet need, which is seasonal storage. The main alternative strategy is increased transmission, such that different regions can share more wind or solar power over long distances.

Two of the promising seasonal storage technologies are flow batteries and generation of green hydrogen with low- or negative-cost electricity and storing the hydrogen for later electricity generation by fuel cells. The 2018 report by Flink Energy compared the cost of batteries, pumped hydro, and hydrogen storage at the scale of BPA's needs. Figure 6 in that report shows estimated costs of providing 8.7 billion kWh of storage using batteries at $100/kWh, pumped hydro at $500/kWh, and green hydrogen at 70% efficiency and $500/kW. The capital costs were vastly different, with hydrogen at $3.5 billion, batteries at $870 billion, and pumped hydro at $4,350 billion.

If Rye Development could invest in a seasonal storage facility, the returns might be much higher than pumped hydro.

III. Revenue generation of the proposed project is uncertain and potentially weak

A. How will the proposed project generate revenue?

The above discussion of grid-balancing needs and technologies is relevant to the basic question of how the proposed project will derive operating revenue. If other balancing resources–whether demand response to modulate loads or transmission options or batteries–are cheaper than pumped hydro, then where will the project's revenue come from? BPA currently markets load-balancing from the Columbia dams for about $40 per MWh.

The proposer discloses some operating cost and revenue numbers in the FLA Exhibit D. The annual operating costs (section 4.0) are expected to average $278,796,000, including $115,620,000 in income and property taxes, indicating an expectation of high profitability, and thus strong revenue.

Section 5.0 begins with, "The Pacific Northwest region's energy market is expected to have a strong demand for peak capacity by 2028." Then, "...the Applicant is expecting to sell capacity on long-term contracts to utilities in the region…" The expected annual revenue of $300 million to $330 million implies the full-capacity output of 1200 MW for 8 hours a day, 365 days a year, (the quoted 3,561,000 MWh per year) and selling it for $85 to $93/MWh.

But running the pumped hydro at maximum capacity every day of the year doesn't sound like it would be addressing peak capacity needs. Why would utilities sign up for long-term contracts for so much power at such high prices? The costs of wind and solar farms keep dropping; California is installing many GWh of battery storage that would compete with any pumped hydro.

Pacificorp's 2021 IRP calls for 4781 MW of batteries co-located with solar farms, 1400 MW of stand-alone batteries and 500 MW of pumped hydro by 2040; Goldendale pumped hydro is not indicated. Thus, Pacificorp's strategy has pumped hydro at less than 10% of the planned storage.

Portland General Electric plans a mix of large and small storage resources, not mentioning pumped hydro.

Puget Sound Energy's 2021 IRP included a comparison of capital costs for various generation and storage options (Figure 4). Note the much higher cost of Wind+pumped hydro (dashed orange) vs Wind+batteries (dashed purple).

Figure D-25: Capital Cost Curve for Renewable Resources

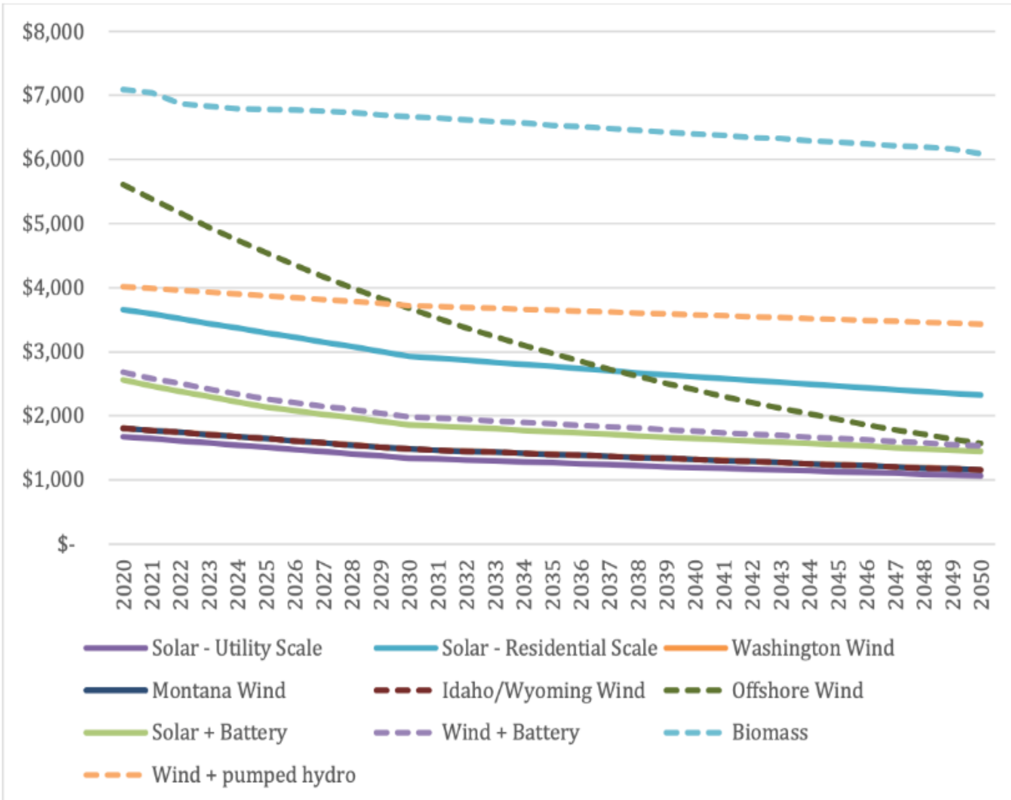


Figure 4. PSE's capital cost data for various renewable sources and renewables + storage.

This proposal is incomplete without a believable, fundamental revenue plan. The cost trajectories of competing technologies, especially batteries, indicate lower cost solutions even in the first year of operation. The storage plans of regional utilities include pumped hydro as an asterisk at best.

B. Such incomplete financials become an environmental concern

With less than roughly half the expected revenues, this project cannot make money and would likely be shut down.

The worst case could be abandoning the project before construction is complete, thus creating even more environmental impacts and no path for mitigations.

Project profitability apparently was not considered in the scoping, but it should have been.

The financial viability of this project is potentially weak enough that risks of shutdown or abandonment should be considered. What is the recourse and environmental impacts of decommissioning the project? Are there any useful options for operating it differently, so that it could break even? Etc.