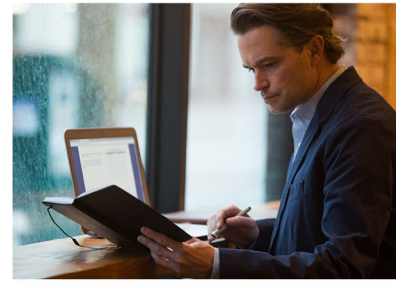


# Renewable Resources: Pumped Storage Hydroelectric Generation Feasibility at the Cutler Project



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Welcome and Introductions



PacifiCorp Integrated Resource Plan (IRP) and Energy Transition



What is Pumped Storage? Feasibility of Pumped Storage Hydroelectric Generation at the Cutler Project



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License Amendment Process and Potential Studies



Review of Distinction of Relicensing and License Amendment processes



Next Steps and Study Suggestions Workshop [*Breakout*]

# Cutler Project Team



Pacific Power  
Rocky Mountain Power



River Science  
Institute  
(John Gangemi)



Miriam  
Hugentobler

# Integrated Resource Plan

## OUR COMMITMENTS:

- **PRIORITIZING SAVINGS AND VALUE FOR OUR CUSTOMERS**
  - We've captured over \$620 million in savings for our customers by leading the way in establishing more innovative markets, enabling us to deliver reliable service at rates 27% below the national average. Soon, we'll evolve how we buy and sell electricity even further to secure greater economic and reliability benefits for customers.
- **EXPANDING CLEAN POWER**
  - Through smart investments that keep costs low, we're on track to deliver over 20,000 megawatts of wind and solar energy by 2032.
- **BUILDING STORAGE CAPACITY**
  - We're working toward an energy storage capacity of nearly 7,400 megawatts by 2029.
- **INVESTING IN TRANSMISSION**
  - Making progress on our ambitious Energy Gateway plan to add 2,500 miles of new transmission lines, we're substantially expanding the connectivity between the Pacific Northwest and the Rocky Mountains to meet rising customer demand, while connecting clean energy across our system for a more resilient grid.



# Integrated Resource Plan

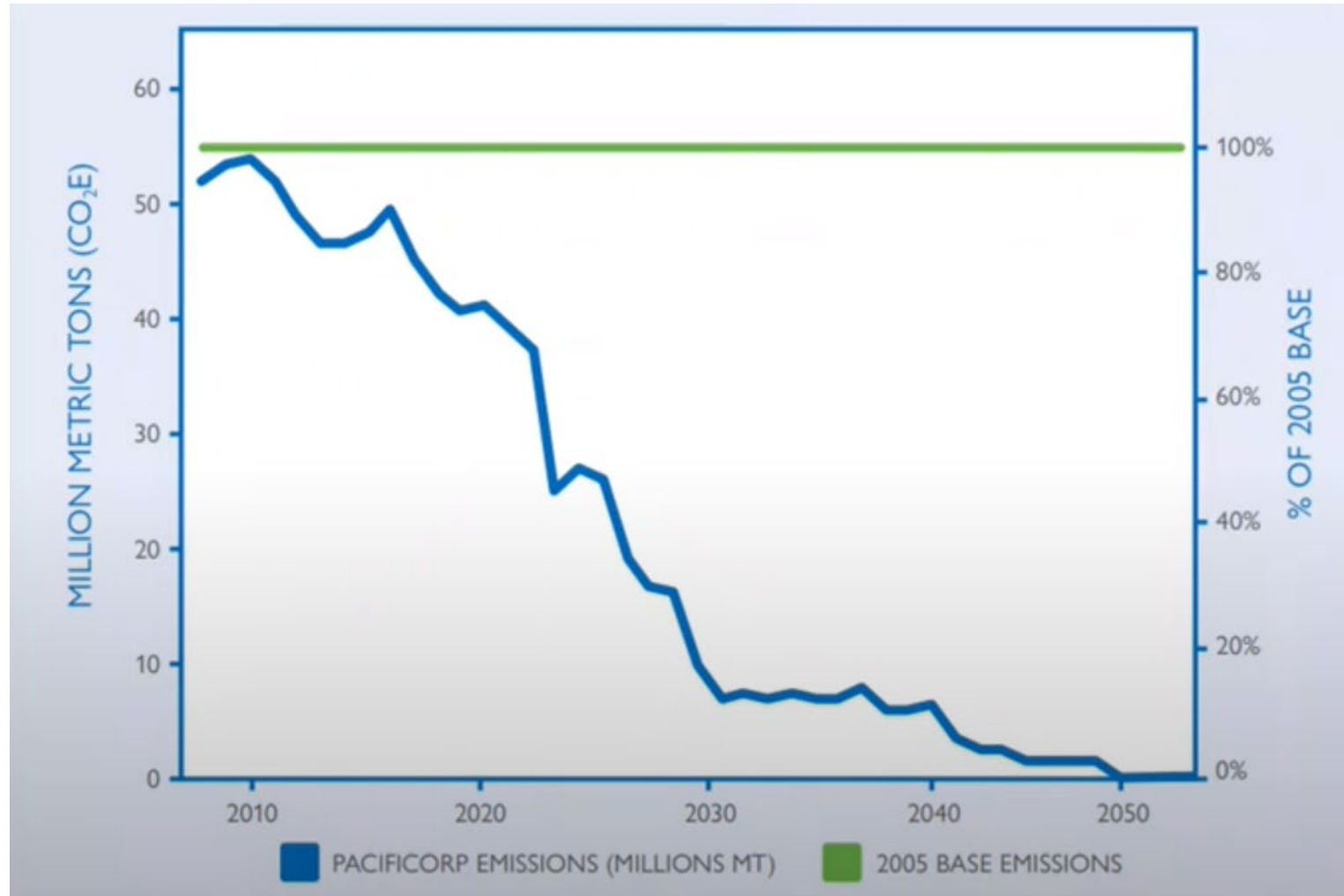
**The 2023 Integrated Resource Plan (IRP) outlines PacifiCorp's vision for the West between now and 2042 and sets us on the path to:**

- Continue our growth toward a grid powered by clean energy:
  - 9,111 megawatts (MW) of new wind resources.
  - 8,095 MW of storage resources, including pumped hydro storage resources.
  - 7,855 MW of new solar resources (most paired with battery storage).
  - 1,240 MW of non-emitting peaking resources that meet high-demand energy needs.
  - 5,882 MW of capacity saved through energy efficiency and load control programs
  - 500 MW of advanced nuclear generation (Natrium™ reactor demonstration project) in 2030, with an additional 1,000 MW over the long term.
- Connect and optimize these diverse, clean resources across the West with a strengthened and modernized transmission network that provides resilient service, reduces costs and creates greater opportunities for our communities to thrive:
  - Over 1,100 miles of new transmission lines, and upgrades to existing system to enable renewable resource requests to connect to the transmission system in Wyoming, southeast Idaho, central Utah, central Oregon, the Willamette Valley in Oregon, and in Yakima and Walla Walla, Washington.

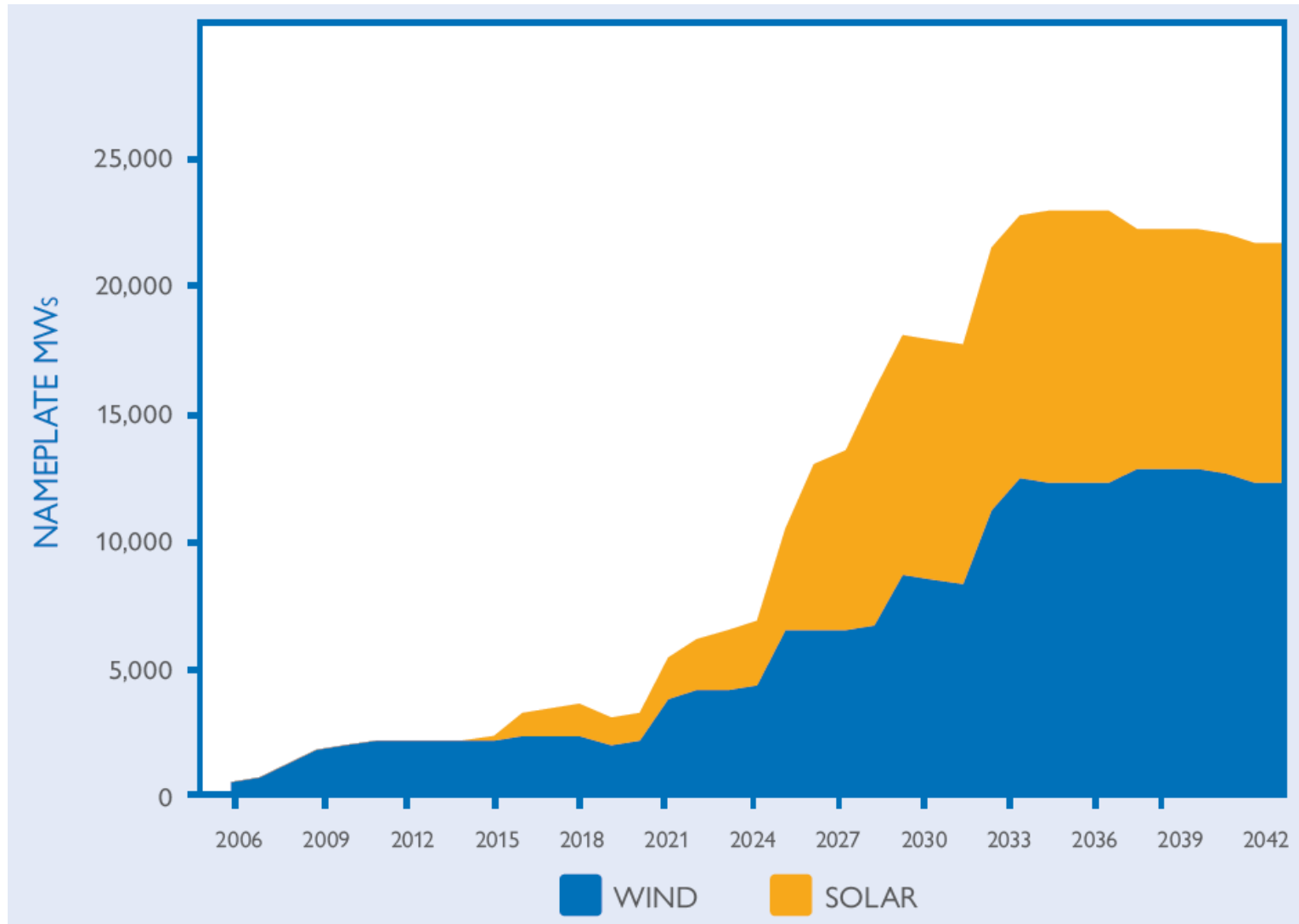


*Nearly 34,000 MW of new, renewable power generation and saved capacity, paired with new transmission and grid resilience by 2042*

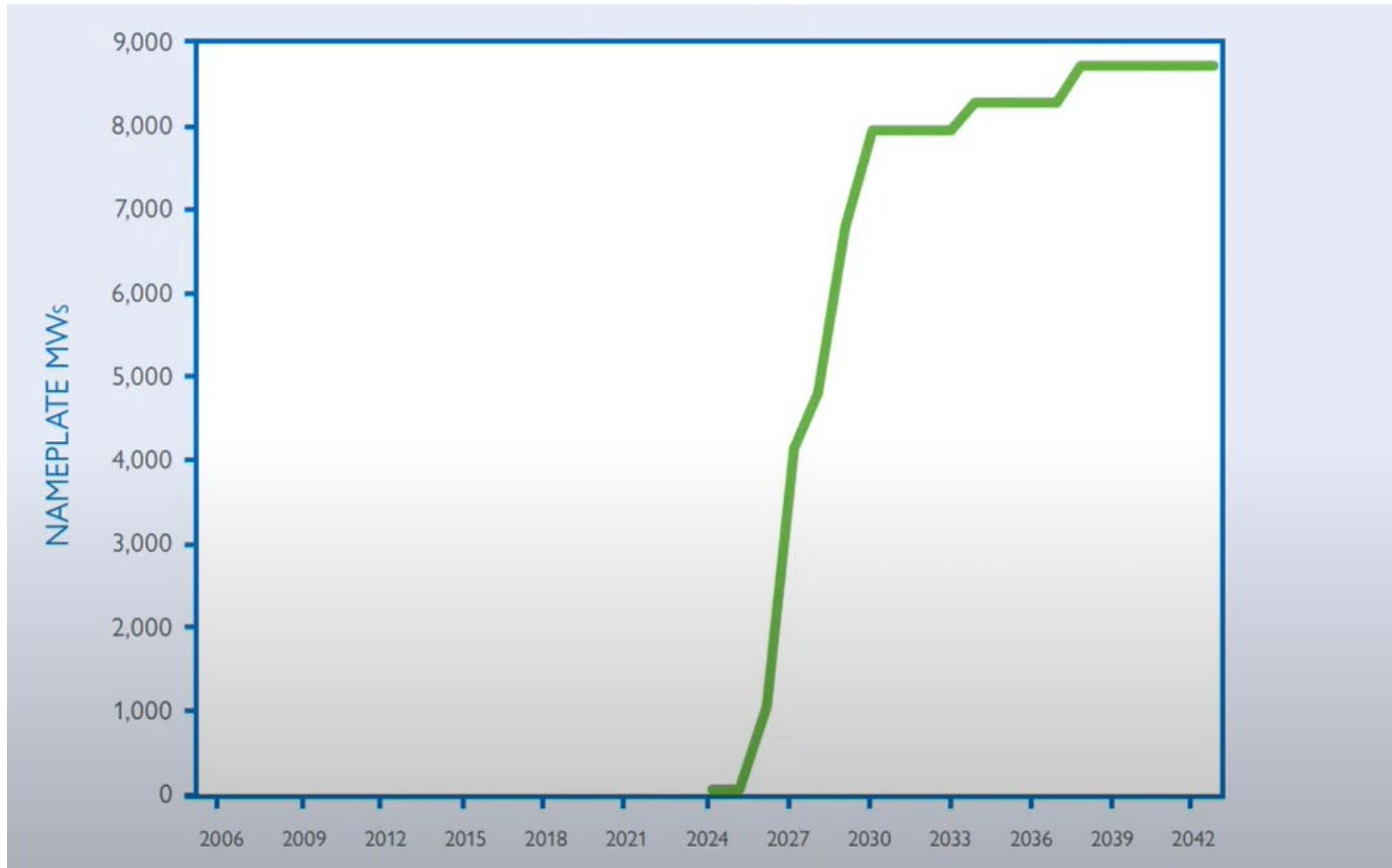
# Tracking Our Progress – Emissions



# Tracking Our Progress – Wind and Solar Capacity



# Tracking Our Progress – New Storage Capacity





# Evolving Our Portfolio

**Our resource strategy in the 2023 IRP continues that progress, and in the coming years we will:**

- Continue the process of coal-to-gas conversion of multiple units in Wyoming between 2024 and 2030
- Exit the Colstrip (coal) project in Montana by 2030
- Retire older units in both Utah and Wyoming that provide our current capacity (including Units 1, 2, and 3 at both Dave Johnston and Huntington, and Units 1 and 2 at Hunter)

Throughout this process, we are collaborating closely with affected communities and with state leadership to support a successful transition for our employees and their communities, *siting new generation infrastructure in these communities where possible.*



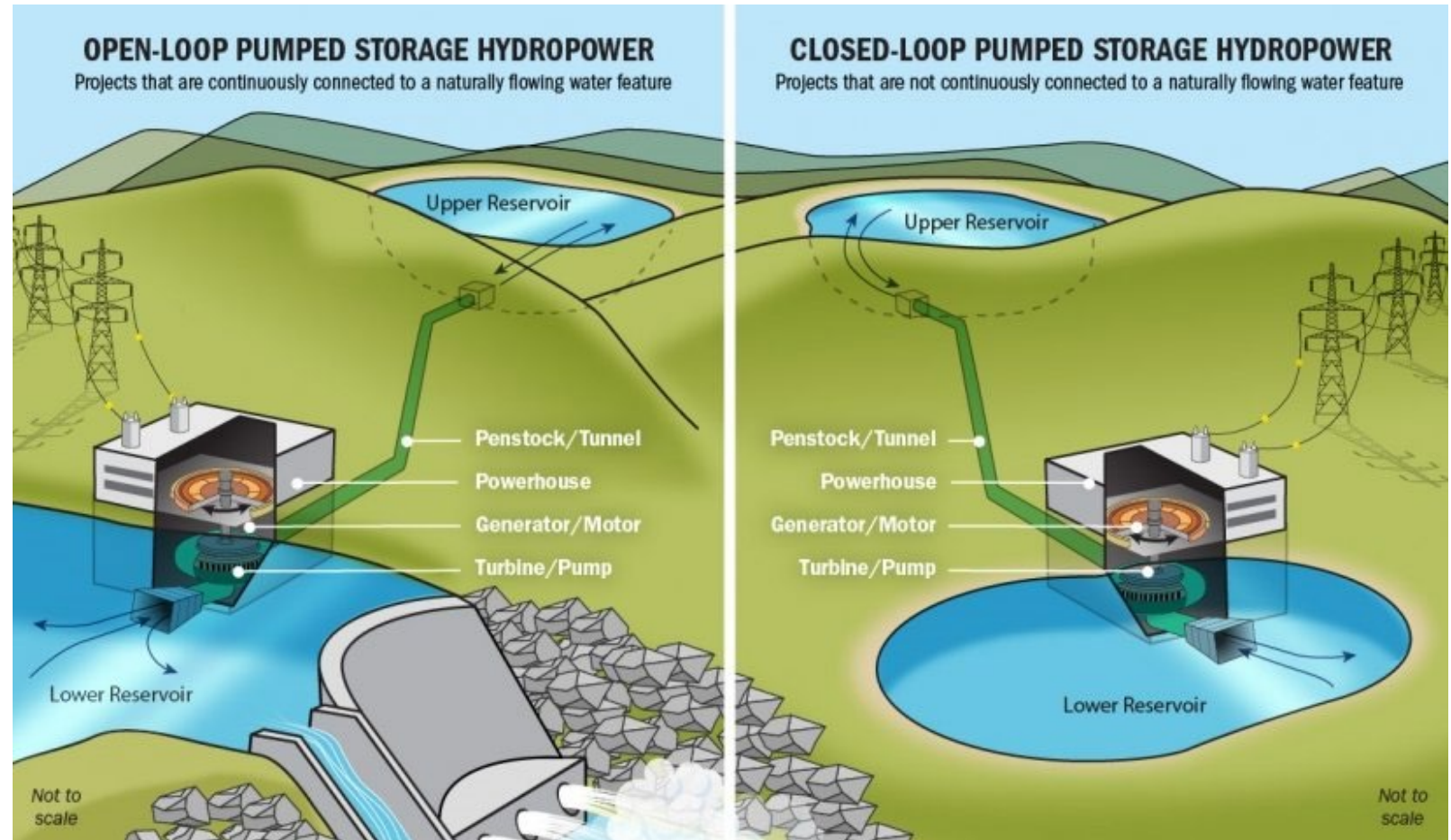


Energy.gov  
presents

Pumped-Storage Hydropower

# What Does Pumped Storage Look Like?

- A type of hydroelectric energy storage that uses two reservoirs to generate power.
- Requires two reservoirs at different elevations, connected by a conduit.
  - At times of surplus grid generation availability (when paired with intermittent generation resources)/low power prices, water is pumped from the lower reservoir to the upper reservoir.
  - At times of additional generation need/high electricity prices, water is released from the upper reservoir and passed through a turbine to generate power.
- The facility functions as a “battery” – storing power in the form of water and then releasing it when needed.

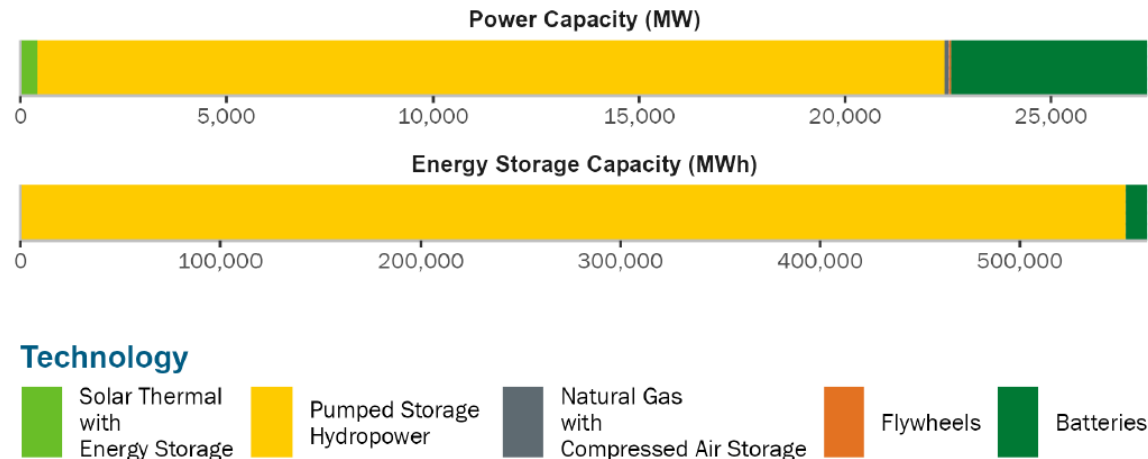


Source: DOE

# Why Utilize Pumped Storage?

- Additional baseload generation is needed to support intermittent renewable generation resources (like wind and solar).
- Wind and solar energy production is an increasing share of available energy; however, these generation sources are characterized by their variability and uncertainty, driving the need for large-scale energy storage.
- Pumped storage acts much like a battery, storing even greater volumes of potential energy and providing flexibility to the grid.
- Balancing wind and solar generation with storage capacity facilitates efficient power generation and grid stability, which is good for communities and businesses, and which can also lower costs.

U.S. utility-scale electrical energy storage capacity by technology type (2021)



Source: EIA Form 860 (2021)

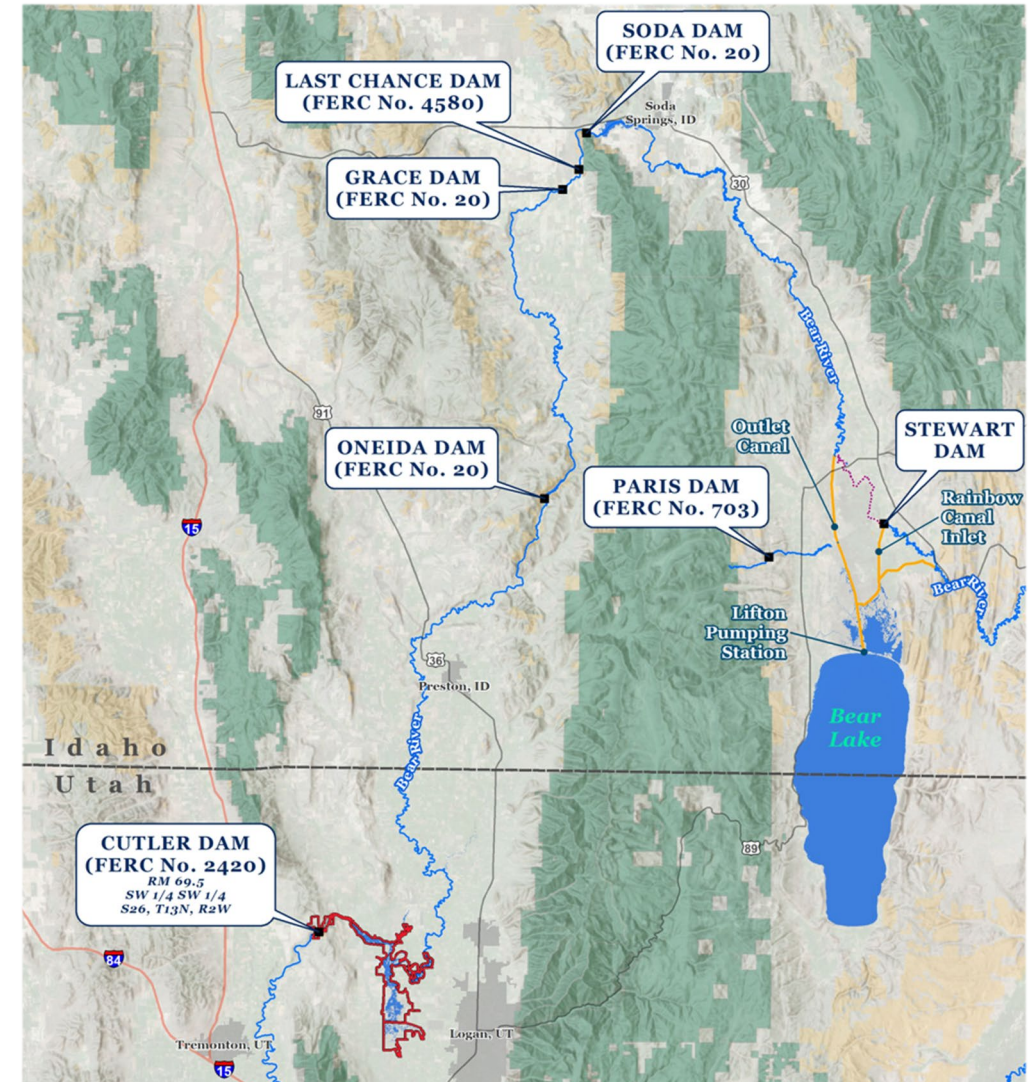


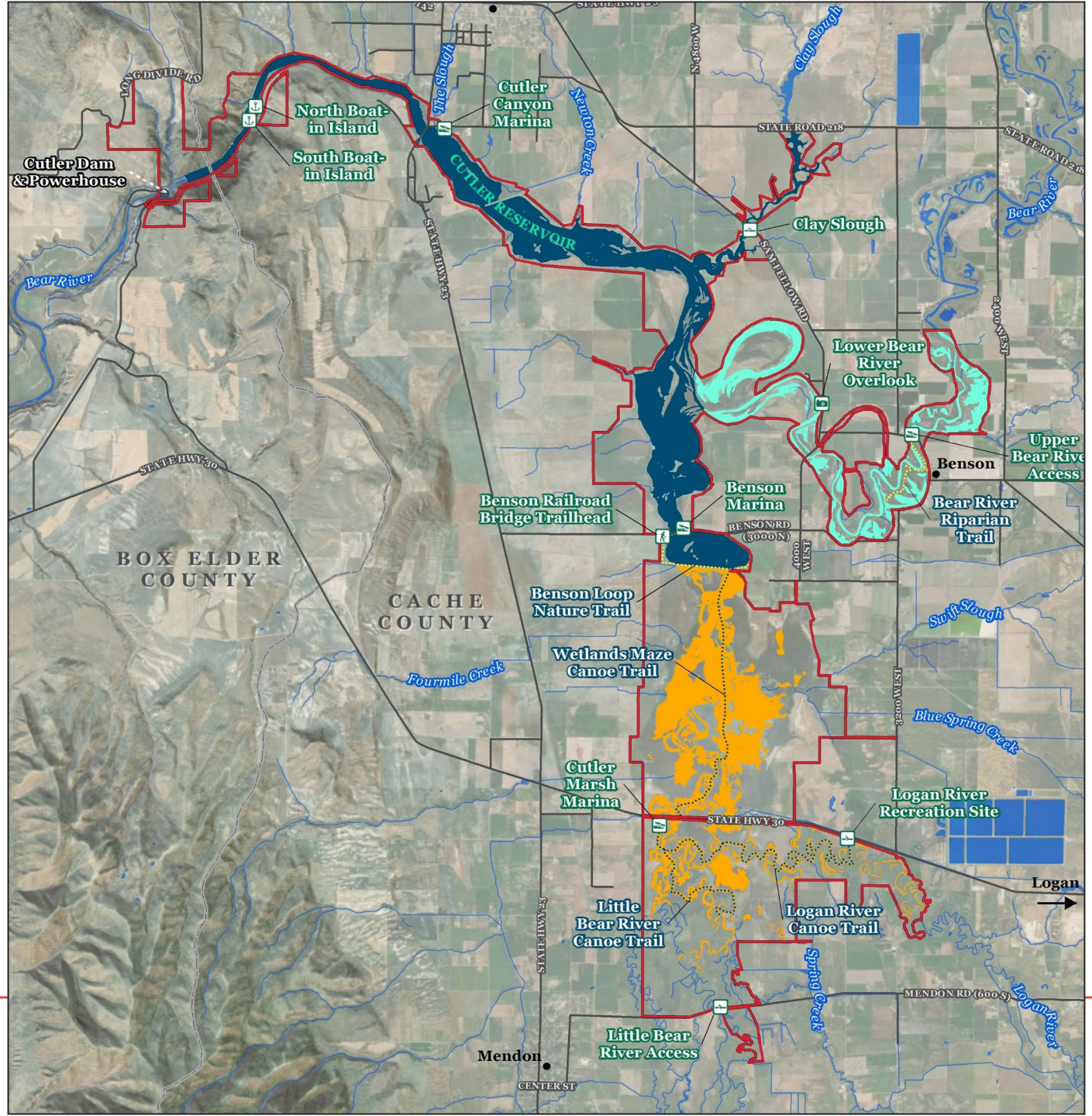
Questions about Pumped Storage Hydroelectric Generation specifically?

# Existing Cutler Hydroelectric Project (P-2420)

- The Cutler Hydroelectric Project, FERC Project No. 2420, is a 30 megawatt (MW) generating hydropower facility located on the Bear River in Box Elder and Cache counties, Utah.
- The Project has been in operation since 1927.
- Annually, the Cutler Project produces on average 72.5-gigawatt hours (GWh) of electric energy.
- The Project Boundary covers approximately 9,191 acres, including open water and associated wetlands and uplands (there are no federal lands within the Project Boundary).
- Project operations managed in collaboration with other hydroelectric projects in the Bear River system.
- Required to operate the Bear River to meet needs of 1) flood control, 2) irrigation, 3) hydropower generation.
- Typically, no generation during later irrigation season, after natural flows decline (July through September).

*Currently in final stages of relicensing (FLA filed in March 2022)*







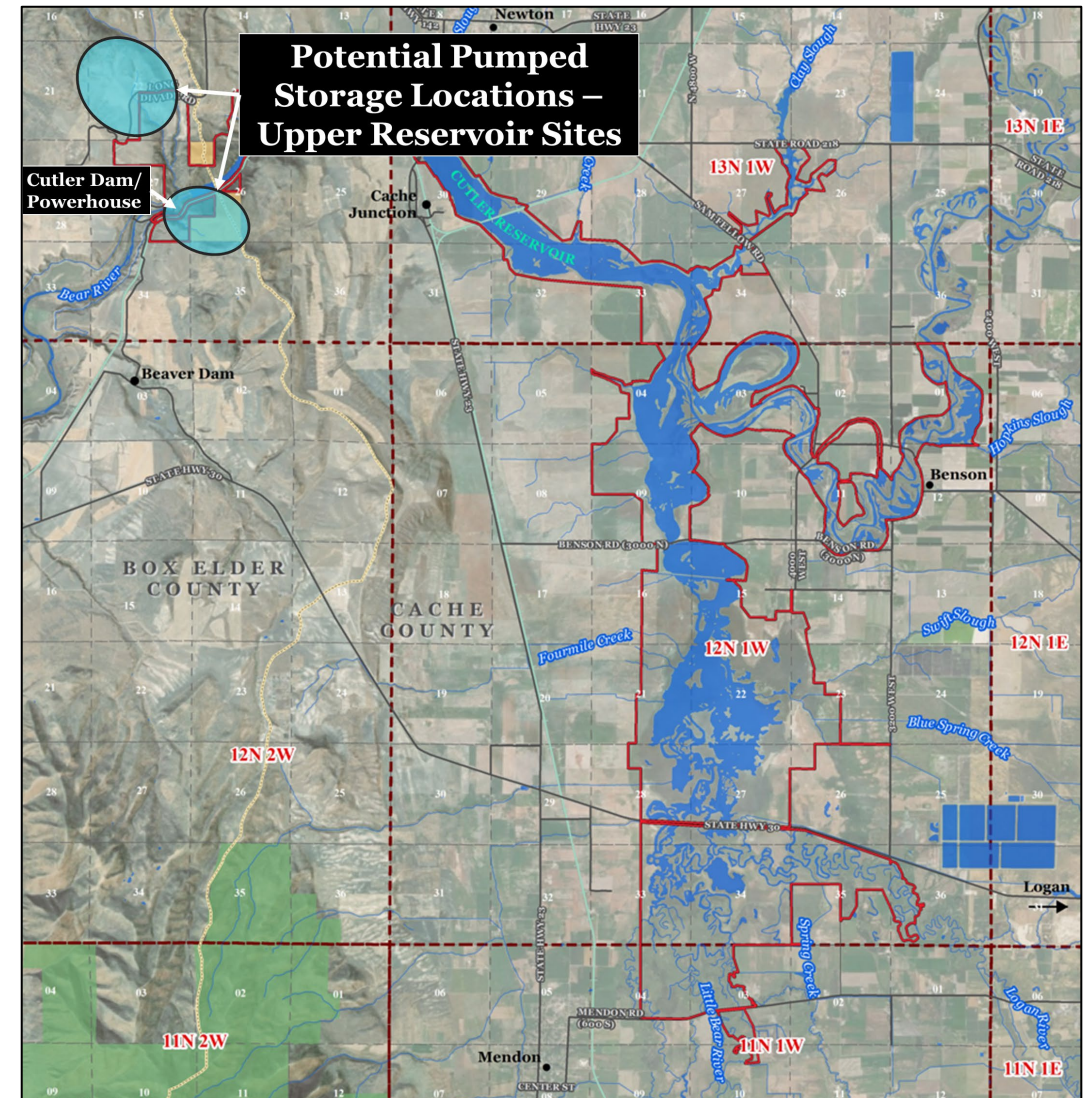
# Cutler Project Relicensing Process Update

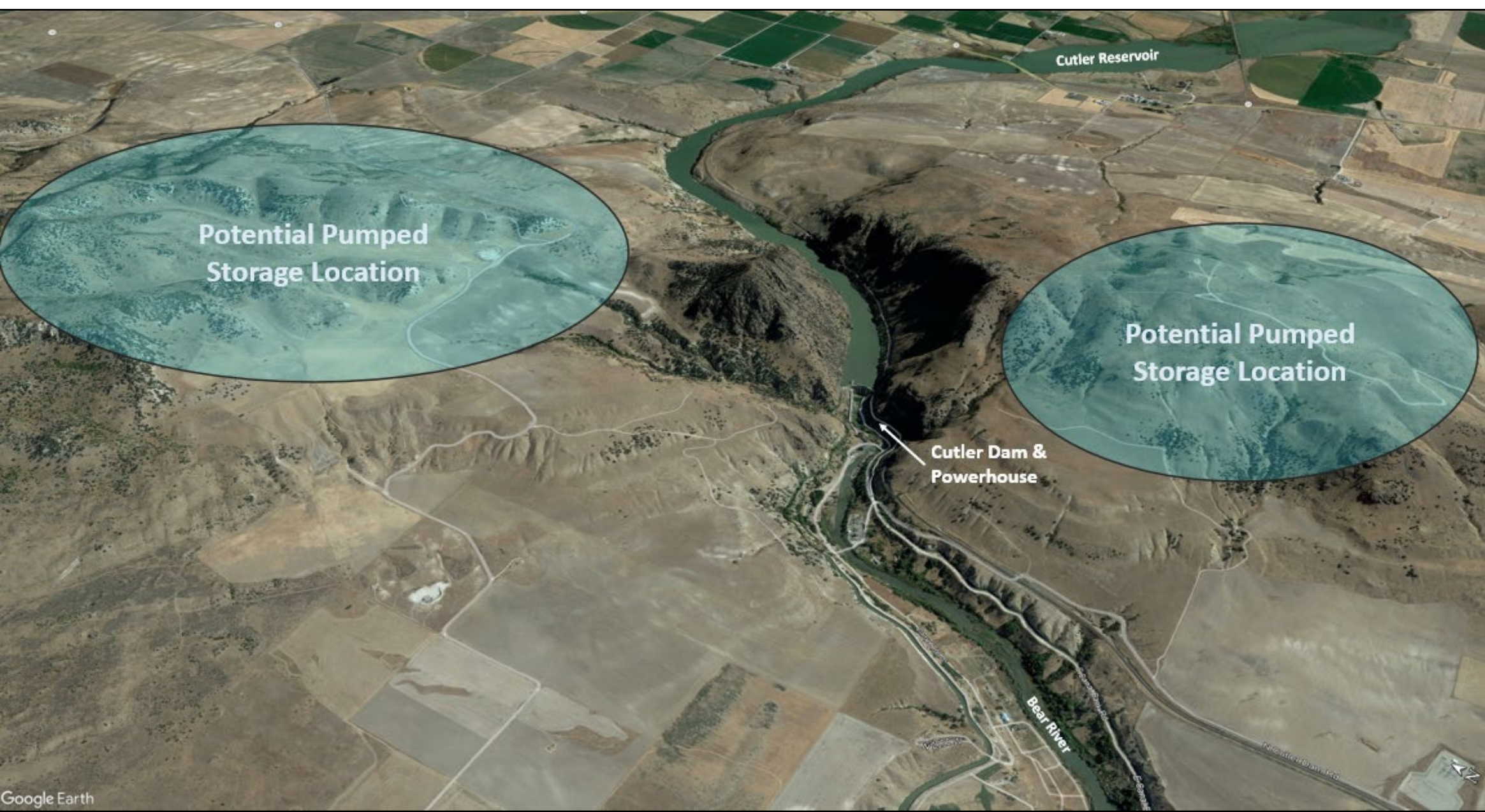
- On March 28, 2022, PacifiCorp submitted its Final License Application (FLA) to FERC to relicense the Project.
- FERC issued notice for agencies to submit mandatory conditions, and for stakeholders to submit comments or motions for intervention on the FLA.
- PacifiCorp is waiting on FERC's independent environmental analysis.
- **Two more comment periods are upcoming on relicensing that are unrelated to the pumped storage effort.**
- A license will be issued no earlier than March 2024; an exact license issuance date is unknown.



# Proposed New Development (Pumped Storage)

- Currently evaluating feasibility of adding a pumped storage hydropower development to the existing Cutler Hydroelectric Project.
  - Construct a second reservoir at a higher elevation than the existing reservoir.
  - Construct penstock/tunnel; hydropower generating equipment such as turbines, pumps, motors, and transmission; associated access roads.
  - Construct an additional powerhouse either above or underground, depending on chosen configuration.
- Currently, several potential options have been identified above the Cutler Dam and Powerhouse, on both the north and south sides of the river.
- This idea is very preliminary and may not prove to be feasible – if feasible, it would require a license amendment following issuance of the new license.





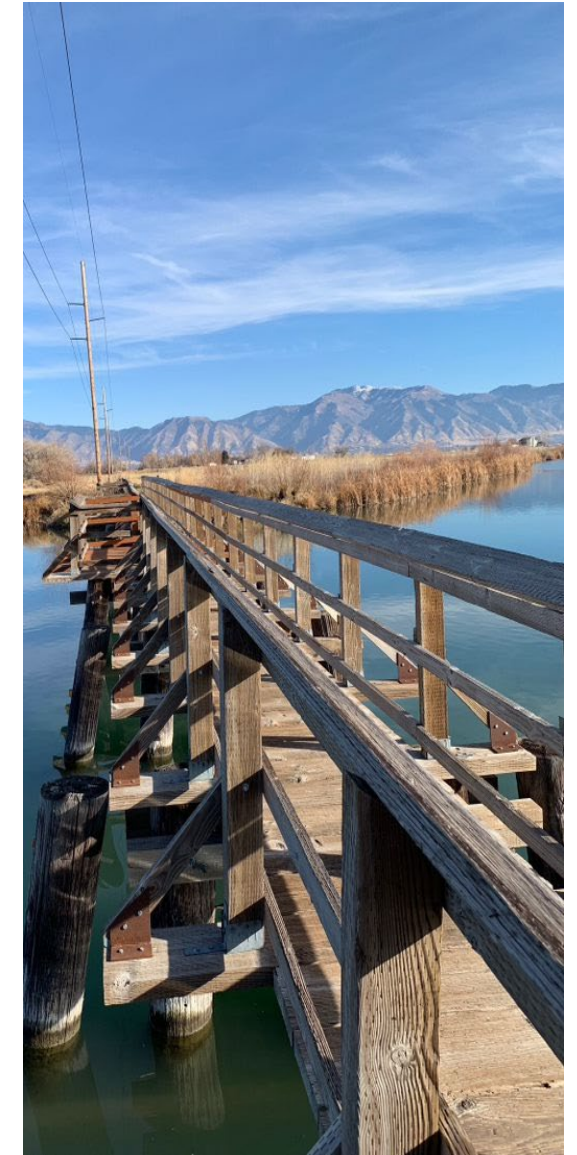
# Why Pumped Storage?

Cutler Powerhouse  
Flowline, and Dam –  
Cutler Canyon walls in the  
background



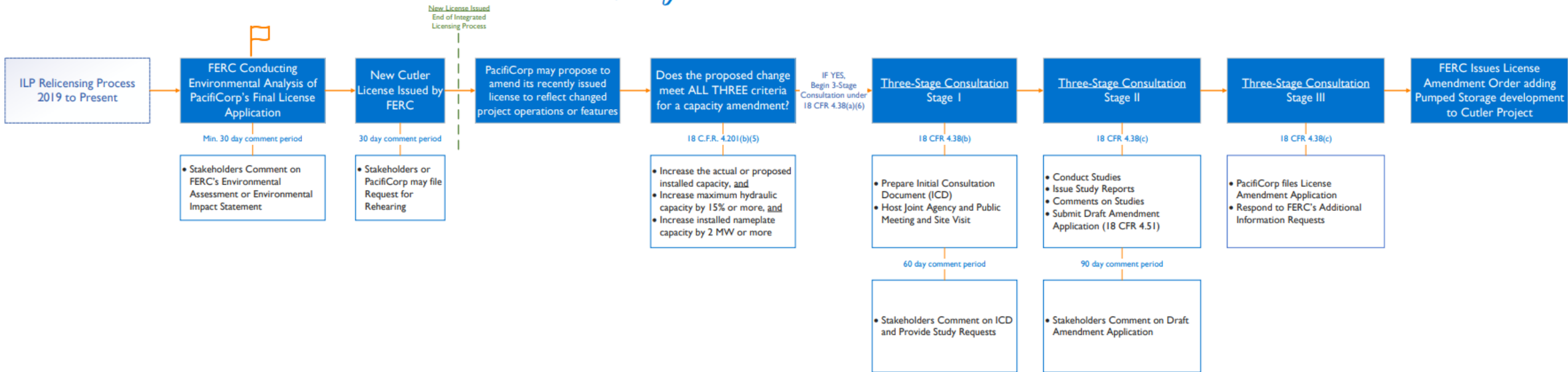
# Relicensing Integrated Licensing Process Nexus to License Amendment Process

- PacifiCorp is in the process of determining feasibility of potential pumped storage development
- If determined to be feasible, PacifiCorp would likely seek an amendment to a newly-issued Cutler license
- However, PacifiCorp must first receive the new license before proposing any potential amendment (such as changes required to incorporate pumped storage features into the Project)
- Once that has occurred, expect initial consultation document on a Cutler pumped storage project license amendment



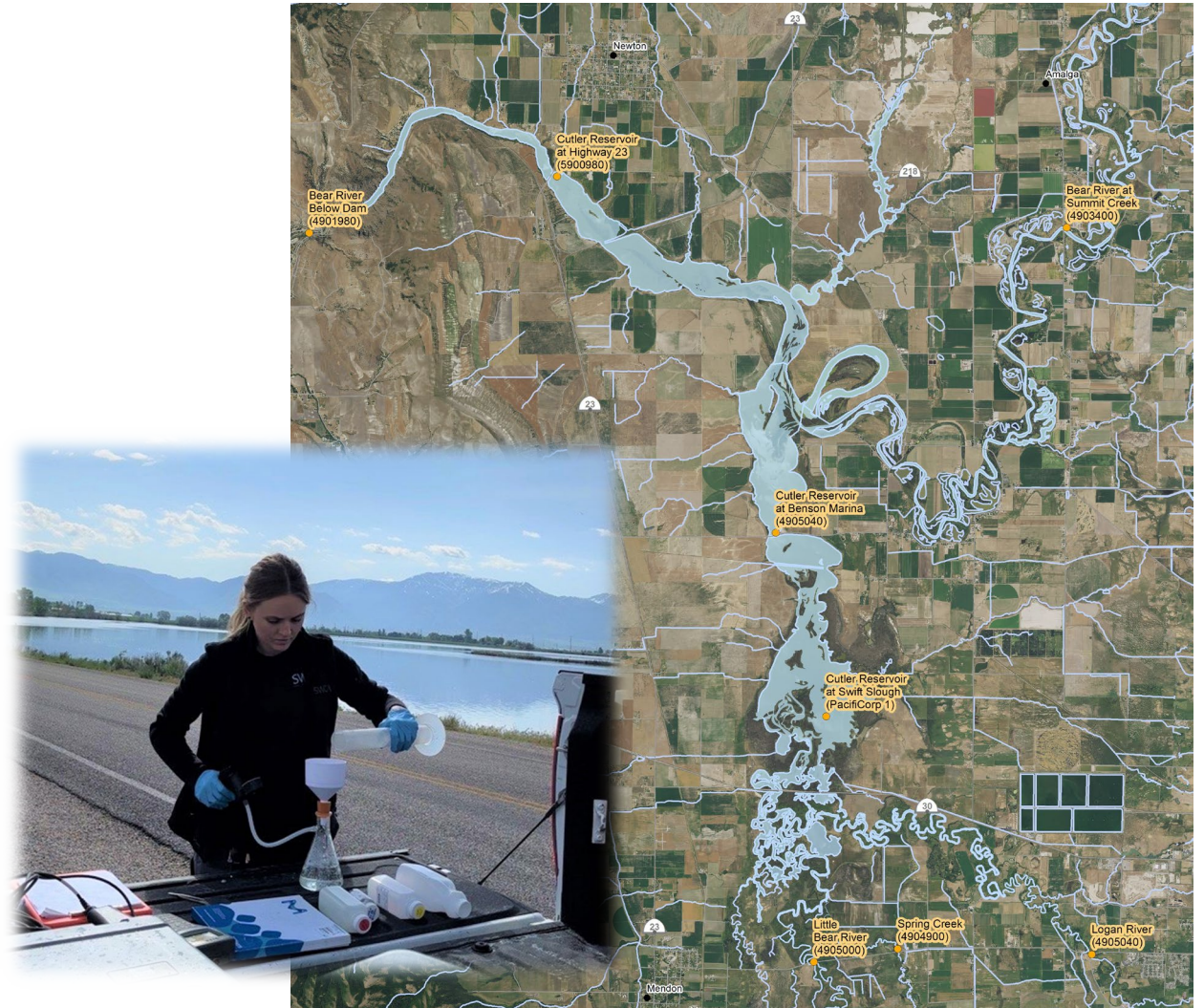
# Capacity-related License Amendment Process (18 CFR 4.38)

## Capacity-related License Amendment Process under 18 CFR 4.38



# Potential Preliminary Pumped Storage Studies

- All resource disciplines will be evaluated utilizing existing information from the recent 2022 Final License Application's environmental analysis and the studies that informed that analysis – 'desktop analysis' (e.g., water quality, recreation) – see posters for a more detailed list by resource.
- Some disciplines will also require new information (e.g., specific geotechnical and wildlife and cultural surveys in the areas proposed for new potential upper reservoir, conduit, access roads, and powerhouse sites) to fill study gap needs.
- Some previous studies may be enhanced (e.g., hydraulic modeling, sediment study, Desert mountain snail surveys).



# Potential Preliminary Pumped Storage Studies

- Examples of New Information Needed for Pumped Storage Feasibility and Environmental Analysis:
  - Aesthetic/visual simulations of upper reservoir and powerhouse sites.
  - Columbian sharp-tailed grouse lek, Desert mountain snail, bats, and raptor nest surveys in areas where new disturbance would potentially occur; quantify habitat for species of greatest conservation need (e.g., milkweed for Monarch butterflies).
  - Database and pedestrian surveys of cultural resources in areas where new disturbance would potentially occur.
  - Potential for 3D hydraulic model to incorporate effects of upper reservoir sites on flows and ensure irrigation infrastructure needs are met.
  - Soil stability and geotechnical surveys in potential sites for upper reservoirs, access roads, conduits, tunnels, powerhouse.
  - Information collection to ensure no effects to irrigation water delivery infrastructure and associated water rights, or to transportation infrastructure.
  - Cutler Canyon recreation survey.



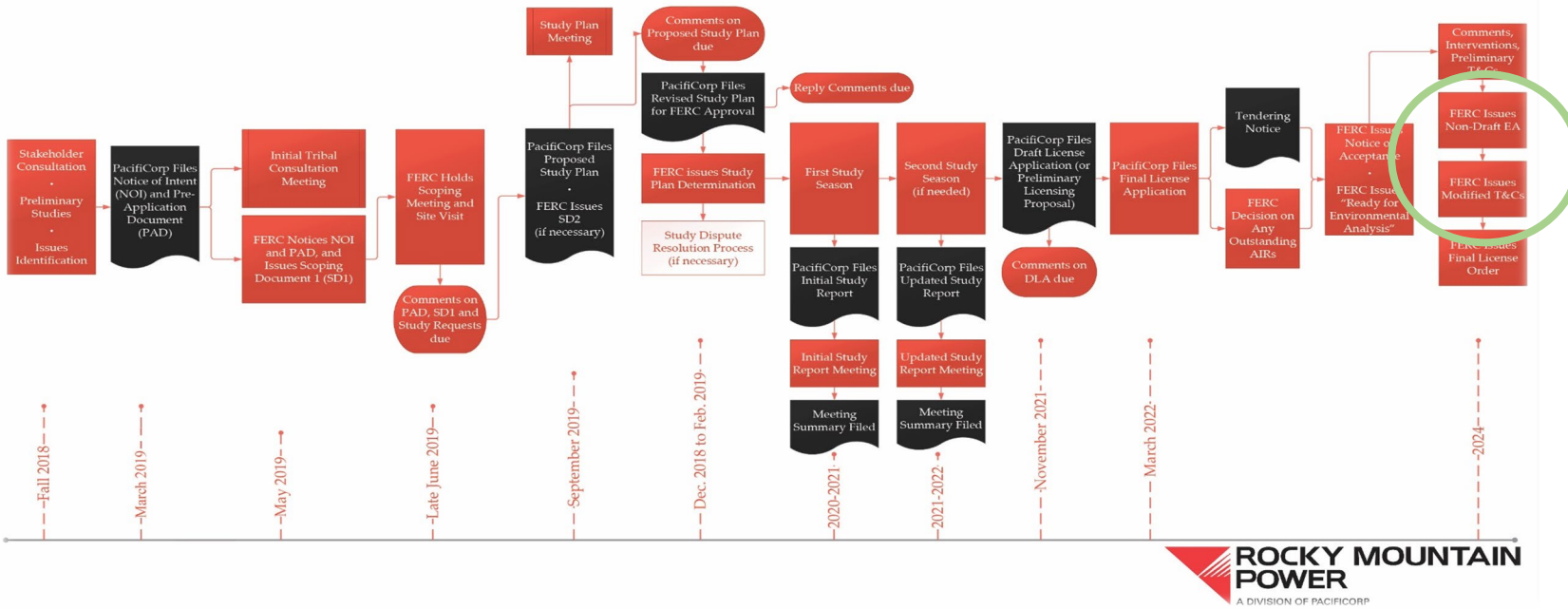


# Estimated Pumped Storage Process Milestones

- **2018:** PacifiCorp initiated the Cutler licensing process
- **March 2022:** Following study process, PacifiCorp filed Final License Application with FERC
- **May 2023:** PacifiCorp hosts early-inquiry public meeting for potential pumped storage
- **2023:** PacifiCorp continues to analyze feasibility of pumped storage addition to Cutler Project, and begins potential preliminary studies
- **March 2024 (estimated):** FERC issues new license for Cutler Project
- **2<sup>nd</sup> quarter 2024:** PacifiCorp begins consultation process by filing the Initial Consultation Document (includes public comment period), and hosts joint agency and public meeting
- **3<sup>rd</sup> quarter 2024:** PacifiCorp begins any remaining studies (including public comment period on study process)
- PacifiCorp submits draft license amendment application (including public comment period)

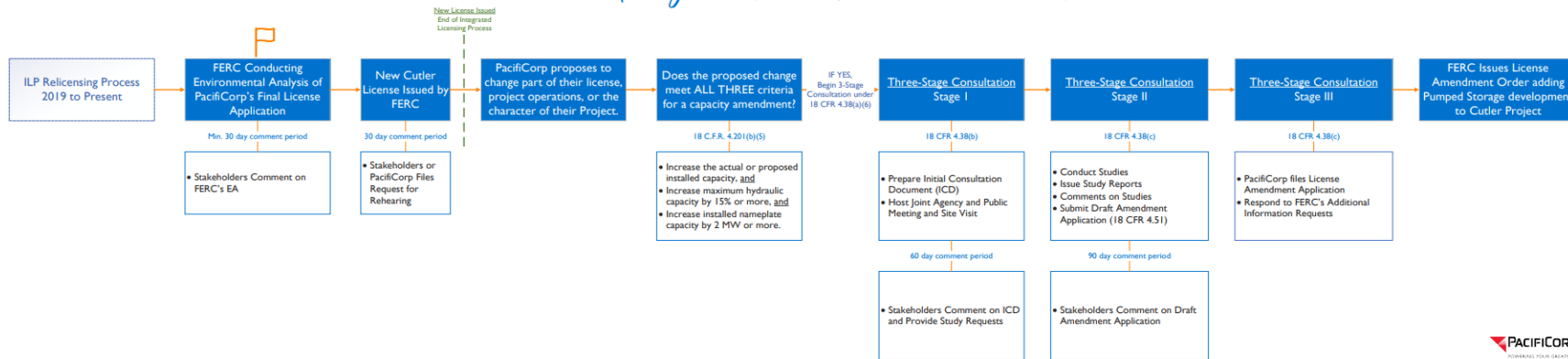


## Integrated Licensing Process Timeline for Relicensing Cutler Hydroelectric Project (FERC No. 2420)



Questions about Relicensing Process and/or Pumped Storage License Amendment Process differences specifically?

### Capacity-related License Amendment Process under 18 CFR 4.38



# Workshop Resource Station List: Breakout Sessions

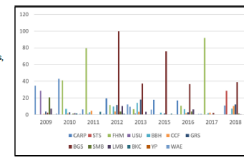
- Avian/Shoreline Habitat
- Terrestrial Wildlife
- Threatened/Endangered Species
- Fisheries and Invertebrates
- Water Resources (Hydraulic Modeling) and Water Rights
- Water Quality/Sedimentation
- Rocky Mountain Power General
- Recreation
- Geology and Soils
- Cultural
- Land Use/Socioeconomics
- Aesthetics/Visual
- Pumped Storage 101
- Regulatory (Relicensing and License Amendment Processes)
- Property/Land Management

**Cutler Hydroelectric Project (FERC Project No. 2420)**  
Feasibility of Pumped Storage

**FISHERIES AND INVERTEBRATES**

**Fisheries**

- Only one species of native fish at Cutler; no native species are extant downstream of the Project.
- Fish species present in the reservoir include:
  - common carp, channel catfish, largemouth bass, Utah sucker, fathead minnow, spottail shiner
- Fish species present downstream of Cutler Dam include:
  - Channel catfish, common carp, smallmouth bass, green sunfish, bluegill sunfish, black crappie, common logperch, walleye, brown trout, and fathead minnow
- No known federally listed, rare, threatened, or endangered or candidate fish species or other sensitive aquatic species occur at the Project.
- No essential fish habitat, as defined by the Magnuson-Stevens Fishery Conservation and Management Act, occur at the Project.
- No anadromous fish




**What to Expect with Pumped Storage**

- Larval and very small young-of-year fish may be entrained in the pump intake at Cutler Reservoir. It is likely that only a small number of entrained fish will survive to the upper reservoir.
- Given the amount of water pumped from Cutler Reservoir in relation to the reservoir volume, some of the fish population may be exposed to entrainment and potentially mortality.
- Following initial start-up, benthic macroinvertebrates and shellfish may experience relatively minimal effect from the pumped storage operation.

**What More Information?**

Scan the code to learn more about the Cutler Hydroelectric Project relicensing process and existing Pumped Storage Projects.



For more information, visit [www.pacifiCorp.com/energy/hydro/cutler.html](http://www.pacifiCorp.com/energy/hydro/cutler.html) or e-mail us at [CutlerLicense@gmail.com](mailto:CutlerLicense@gmail.com).

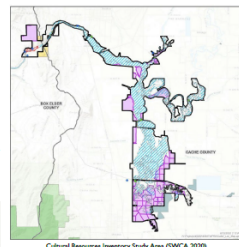
**PACIFICORP**  
POWERING YOUR GREATNESS

**Cutler Hydroelectric Project (FERC Project No. 2420)**  
Feasibility of Pumped Storage

**CULTURAL RESOURCES**

**Project Background**

- The Cutler Historic District and surrounding area are rich in historic and prehistoric resources.
- Resources within the Project Boundary include evidence of Native American Occupation, Euro-American exploration, settlement, irrigation, and transportation.
- The Cutler Project Area was inventoried in 2020 to locate archeological resources, historical architecture, and ethnographic resources that may be affected by operation of the Project, recreation, irrigation, or agricultural leasing. Resources were evaluated for eligibility into the National Register of Historic Places.
- Cultural inventories help us understand the nature of resources to inform management decisions outlined in the Historic Properties Management Plan (HPMP).




**What to Expect with Pumped Storage**

- PacificCorp may perform additional cultural surveys in the areas affected by pumped storage development if they were not previously surveyed in 2020.
- The HPMP would likely need to be amended to incorporate the footprint of the revised Project Boundary (to include the pumped storage facility).
- PacificCorp will consult with stakeholders whose existing infrastructure (that are also historic and cultural resources) may intersect the proposed pumped storage project at Cutler.

**What More Information?**

Scan the code to learn more about the Cutler Hydroelectric Project relicensing process and existing Pumped Storage Projects.



For more information, visit [www.pacifiCorp.com/energy/hydro/cutler.html](http://www.pacifiCorp.com/energy/hydro/cutler.html) or e-mail us at [CutlerLicense@gmail.com](mailto:CutlerLicense@gmail.com).

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**Thank you! Please give us feedback on study suggestions at the workshop stations...**

To access on-going relicensing materials, please go to: <https://www.pacificorp.com/energy/hydro/cutler.html>

You can email questions or comments to PacifiCorp:

[Cutlerlicense@gmail.com](mailto:Cutlerlicense@gmail.com)

[Eve.Davies@pacificorp.com](mailto:Eve.Davies@pacificorp.com)