Swan Lake North Pumped Storage Hydroelectric Project

Frequently Asked Questions

What is pumped storage and why is there demand for it?
Hydroelectric pumped storage works as an energy storage system. The system includes two reservoirs, an underground powerhouse with reversible pump-turbines, and a pipe, or penstock, connecting the system. Electricity is used to pump water from the lower reservoir to the upper reservoir. When power is needed, the water can be released back to the lower reservoir through the turbines to generate on-demand electricity. This creates a reliable way to integrate energy into the system when it is needed. Pumped storage helps stabilize the transmission grid, reduces the need for costly transmission upgrades, and supports the development of variable renewable such as wind and solar. As development of renewable resources continues to grow, a reliable method for integration and storage becomes more important.

Why was this location chosen?
The Swan Lake site was chosen due to topography, proximity to high voltage transmission line corridors, available water resources, demand for power, and ability to build a closed-loop project at the site.

Have seismic studies been conducted to ensure the safety of the dams?
Phase 1 and Phase 2 geotechnical studies have been conducted. These determined that the location was appropriate and the reservoir and dams would be able to withstand seismic events.

How were the transmission line route alternatives chosen?
Symbiotics proposed five possible routes to determine the route that would have the least amount of impact on environmental resources, private landowners, and still be a viable option for the project. Feedback from the public and agencies will determine the final route of the transmission line.

Why aren't existing transmission lines and substations being used? How will constructing a project with an interconnection in California help lower energy costs?
The existing lines are not suitable for a 1,000+ MW pumped storage project due to their capacity and current use patterns. While the existing Captain Jack and Malin substations were considered, ongoing engineering studies have shown that a connection at the Oregon-California border will maximize the benefits of the project and allow it to work at full capacity. Supporting the integration of renewable energy integration in California will also support construction of additional renewable energy projects in Oregon, ensuring that adequate supplies of energy are available for all residents in the Northwest.

Why is the line going into California when it was previously proposed to interconnect with the Captain Jack Substation?
A significant amount of renewable energy development in the Northwest has been for California electric utilities to support California's adoption of the most aggressive Renewable Portfolio Standard (RPS) in the western United States. Much of that effort has stalled due to transmission constraints in the Northwest and lack of flexible grid resources in the Northwest and California. Energy storage and flexible generation is necessary to integrate and deliver renewable generation. By directly connecting the Swan Lake project to a transmission line in California, storage and flexibility is supplied where it is most needed.

How does the Right of Way (ROW) impact the ability of land owners to use their land?
Impacts to land use within the ROW will be extremely limited. A small amount of land will be displaced by the footprint of the power poles. Some minor temporary restrictions to land use will be experienced during construction of the line. Once the transmission line is in place, landowners can use land in the ROW as they normally would as long as it does not damage or interfere with the transmission line. The routes were designed to avoid existing structures and irrigation systems. Once the line is in place, construction of new structures and irrigation systems can occur as long as it doesn't interfere with the transmission line.

What happens if the appraiser and the landowner cannot agree upon the value of the property? Will the property owner be forced to have the ROW on their land if they don't want it?
It is the appraiser's role to independently arrive at the value of a property based on the current market value. That value is then reviewed by another third party, an appraisal reviewer. The reviewer checks the appraisal to ensure that the value has been arrived at using all applicable appraisal standards. Based on the determination of current market value, just compensation is determined and that value is offered to the property owner. A ROW agent has the responsibility to work with the property owner and address any concerns regarding the specifics in the appraisal.

Comments from landowners and the agencies concerning the transmission routes will be used to determine the route that would be most optimal for landowners, state and federal agencies, and natural resources. In the event that the appraiser and landowner cannot agree upon the value of the property, it is possible that the transmission route could be rerouted to a portion of lesser value or an adjacent parcel. However, Riverbank and Symbiotics have always been successful in working with landowners to find a solution that is agreeable to both parties.

Would it be possible to use a low loss power cable and bury the lines? Has Symbiotics considered all alternatives for the transmission line? All transmission alternatives were considered. Burial of large transmission lines is technically complex and not commonly practiced. There are numerous negative impacts associated with burial of 500 kV lines:
• **Unproven:** There are no 500 kV cables installed underground in the United States. Throughout the world, the only buried 500 kV cables are either under water, on bridges, or in utility tunnels.
• **Less capacity:** Underground cables do not carry as much power as overhead lines and would require more cables to do the same job.
• **Lengthy repairs:** When there are problems with a underground line, repair could take up to a month. This could jeopardize grid stability and would require disruptive maintenance on the ROW.
• **Disruptive digging:** Underground cables require massive excavation. This would result in more acreage being disrupted and could severely impact streams, wetlands, and other sensitive areas. The amount of excavation greatly exceeds what is necessary for the tower foundations.
• **Limited use of the ROW:** Underground cables require a 30- to 50-foot ROW stripped of all woody vegetation. This would create a visible stripe along its path and limit the use of the ROW on private land. In addition, permanent access would be required along the full length of the line for maintenance and repairs.

How does EMF affect people and the environment? Where can I find independent information for transmission lines and EMF?
Please refer to these independent sources for more information on the effects of EMF:
Pacific Gas and Electric Company
http://www.pge.com/myhome/edusafety/systemworks/electric/emf/faqs/
National Institute of Environmental Health Sciences
http://www.niehs.nih.gov/health/topics/agents/emf/

Are there safety concerns associated with high voltage lines and natural gas pipelines?
High-voltage transmission lines can be safely constructed, operated, and maintained on ROWs adjacent to oil and natural gas pipeline ROWs. However, transmission lines and pipelines typically do not overlap or cross ROWs because of the safety standards and maintenance clearance requirements.

Is the Swan Lake project associated with other energy projects in the area, such as the Bryant Mountain project or a potential geothermal project?
No, development of the Swan Lake project is independent of existing and proposed energy projects in the surrounding region.

How many jobs will be created in Klamath County? Are they going to be full-time? What kind of positions are they and are they local?
The project will create approximately 60 permanent positions for individuals within Klamath County. The majority of the positions would be full time. These would vary from system engineers, to maintenance, security, and administrative staff.

How can you change designated water rights to fill up lakes and reservoirs? Will filling the reservoirs affect our water use?
For the initial fill, Symbiotics would purchase a temporary water right for the use of privately owned wells. A long-term water right would be purchased for the amount necessary to replace evaporative losses. The amount of water used would be limited to the current allocation of the well and would determine the timing and amount of withdrawal. Once the initial fill of the reservoir was completed, use of the water right would be returned to the owner. The Oregon Water Resources Department (OWRD) oversees the use and allocation of water rights. If at any time the OWRD determined that the use was causing injury to existing water rights, the temporary license would be revoked. However, Symbiotics conducted a study to evaluate the response of local well to pumping the amount of water necessary for the initial fill and found little-to-no impact on surrounding wells.

Has Symbiotics recently been acquired by Riverbank Power? Is Symbiotics webpage still active?
Symbiotics merged with Riverbank Power in December 2010. The Symbiotics website now redirects to the Riverbank website: www.riverbankpower.com.