

## FERC Guidance Aims To Foster Hydropower At Mines, Dams

By **Daniel Skees** and **Robert Goldfin**

(December 11, 2019, 5:57 PM EST) -- After the first hydroelectric facilities were built in the United States in the late 1800s, hydroelectric power quickly became one of the preeminent sources of electric power across the country, aided by government initiatives such as the Newlands Reclamation Act of 1902,[1] and peaking at approximately 40% of U.S. electric production around 1920.

However, growth flattened, and today only around 6% of U.S. electricity comes from hydroelectric facilities — significantly below the worldwide average of 16%. Nevertheless, with a growing focus on decarbonization and increasing reliance on renewable generation, policy attention has turned back to hydroelectric power, due to the many benefits it can provide.

From an environmental perspective, hydropower is carbon-free renewable energy. But while much renewable energy is intermittent — creating reliability issues due to greater penetration of such resources, such as a reduction in inertia due to fewer heavy and synchronized generators on the grid — many forms of hydro are controllable to some degree.

This allows hydroelectric generators to provide a wide variety of energy products, including frequency response, voltage control, spinning reserve, standing reserve and black start capabilities. Congressional policymakers, recognizing the renewable and reliability benefits of hydroelectric facilities, have pushed for greater development of this resource.

Most recently, as part of the America's Water Infrastructure Act, or AWIA,[2] signed by President Donald Trump on Oct. 23, 2018, Congress added new sections to the Federal Power Act to streamline the processes for developing hydroelectric generation at qualifying nonpowered dams and for closed loop pumped storage projects. The AWIA also directed FERC to develop guidance in both areas.

The Federal Energy Regulatory Commission issued guidance on Oct. 17 of this year that may significantly aid hydroelectric developers in planning and siting potential projects.[3] The first guidance document is a list, jointly developed with the secretary of the U.S. Army, the secretary of the U.S. Department of the Interior and the secretary of the U.S. Department of Agriculture, of 230 existing nonpowered federal dams that FERC and the secretaries agree have the greatest potential for nonfederal hydropower development.



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The second guidance document is intended to guide applicants for licenses or preliminary permits for closed-loop pumped storage projects at abandoned mine sites. Development of hydroelectric capabilities at existing nonpowered dams and abandoned mines would aid the progress of renewable energy resources, while focusing that development on areas where adding hydroelectric capabilities would not have a significant additional environmental impact. Effectively, most of the environmental impacts have long since occurred, so the environmental impact delta is small.

### **Guidance on Development at Nonpowered Dams**

Nonpowered federal dams can be ideal choices for hydropower projects, because much of the significant and costly construction and regulatory processes have already been accomplished. In addition, the age of a nonpowered federal dam generally does not prohibit the installation of generation turbines. Similarly, abandoned mines (e.g., surface mine pits or underground mines) are particularly well suited to function as reservoirs in a closed-loop project because of the reduced construction costs and lower potential for new environmental harm.

Moreover, by focusing on existing nonpowered federal dams and abandoned mines, FERC can also enhance the environmental conditions at the sites through various licensing conditions. Many of these locations were originally developed under regulations with less stringent environmental requirements than exist today, and if a developer constructs a hydropower project at one of these sites, FERC can ensure that the site is brought up to modern standards.

Pursuant to Section 3003 of the AWIA, FERC established Docket No. AD19-7-000 to develop the list of existing nonpowered federal dams. FERC developed an initial draft list of nonpowered federal dams through cooperation with the secretaries and reports by those agencies, as well as with information from the U.S. Department of Energy.

The draft list was expanded by Oak Ridge National Laboratory, then filtered by FERC staff to include only federally owned dams, and cross-checked to remove redundancies and to exclude dams with development authorities reserved to the federal owners. Finally, FERC staff filtered the list by potential capacity.

The final list of nonpowered federal dams excludes the following:

- Dams that are or will be used by a nonfederal hydropower project under an existing FERC-issued hydropower license;
- Dams identified by the U.S. Forest Service as incompatible with the purposes of existing forest management plans or reservation authority;
- Dams identified by the U.S. Army Corps of Engineers as incompatible with hydropower generation due to certain circumstances that would hinder hydropower development (e.g., pending dam removal, extenuating construction activities); and
- Dams identified by the National Park Service as having the potential to affect the national park system or the national wild and scenic river system.

Adding power to nonpowered dams has long been a focus of the federal government. In 2012, the Department of Energy issued a report outlining the potential for such development. According to the DOE at the time, the U.S. has approximately 80,000 nonpowered dams.

In comparison, the country has roughly 2,500 dams that are powered, which produce about 78 gigawatts of conventional and 22 GW of pumped storage hydropower. The DOE concluded that by developing hydropower at the 100 nonpowered dams with the greatest potential, 8 GW of clean and reliable hydropower could be added to the nation's generation fleet.

### **Closed-Loop Pumped Storage Projects at Abandoned Mine Sites**

Pursuant to Section 3004 of the AWIA, FERC developed guidance for the development of closed-loop pumped storage projects at abandoned mine sites. The guidance includes an overview of the application process for licenses and preliminary permits for closed-loop pump storage projects at abandoned mine sites. It also provides best practices, and considerations including typical environmental issues, issues to consider during site selection and consultations with local stakeholders.

The advantage of pumped storage projects is that they move water between reservoirs located at different elevations (i.e., upper and lower reservoirs) to store and generate electricity, generally pumping water to the upper reservoir using excess generation capacity when demand is low, and releasing water to the lower reservoir through a turbine to generate electricity when demand is high.

This makes closed-loop pumped storage highly dispatchable — and, in a time where pockets of the country can produce significant amounts of excess power during periods of high renewable production, closed-loop pumped storage provides a way to use that excess energy by storing it for later. A closed-loop pumped storage project is generally defined as a pumped storage project that uses reservoirs situated at locations other than natural waterways, lakes, wetlands and other natural surface water features.

The Department of the Interior's Bureau of Land Management estimates there may be as many as 500,000 abandoned mines in the United States. Unlike DOE's prior report on nonpowered dams that identified the dams with the greatest potential for hydroelectric development, FERC's guidance document provides no such ranking of possible abandoned mine development as pumped storage.

However, the guidance document concludes with a list of resources for identifying potential abandoned mines, including both federal resources and the key agencies tracking such mines in each of the fifty states. An industrious developer could certainly use these resources to kick-start the exploration for a promising pumped storage facility.

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[1] Pub. L. 57-161, 32 Stat. 388.

[2] Pub. L. 115–270, 132 Stat. 3765.

[3] Nonpowered Federal Dams With Potential for Non-Federal Hydropower Development, Docket No. AD19-7-000 (Oct. 17, 2019); Guidance for Applicants Seeking Licenses or Preliminary Permits for Closed-Loop Pumped Storage Projects at Abandoned Mine Sites, Docket No. AD19-8-000 (Oct. 17, 2019).