Quest for renewable energy leads to increase in Utah hydroelectric projects

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By Amy Joi O'Donoghue

SALT LAKE CITY — What some have called a "Renaissance of Renewables," — the quest for renewable energy — is also generating interest in certain types of hydroelectric projects that have not been constructed in this country for 30 years.

Since then, the technology has advanced and the urge to develop pumped-storage hydroelectric projects is being seen as a way to bridge the "intermittent" nature of energy sources such as the sun and the wind.

The development of more than 15 new pumped storage hydroelectric projects is being actively pursued by both private and public organizations throughout the country, with five such proposals under recent consideration in Utah.

While two of those — the Bull Canyon and Long Canyon projects in Grand County — are on hold — three others from in the extreme north, central and southern portions of the state are winding their way through the federal permitting process.

It is that process — which is daunting and discouraging because of its incredible duration — that often deters such projects, coupled with finding appropriate sites that enable the physical process to work while not butting up against local and state government concerns.

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"It's not a cheap way of doing the job, but it is one of the best and most efficient ways to do the job," said Frank Mazzone, president of Utah Independent Power out of Sonoma, Calif.

"It takes a lot of dollars to develop these processes. You have to build dams and they are not easily done or cheaply done. It takes patient money and patient investment, but ultimately it pays for itself and also produces revenues for utilities."

Pumped storage hydroelectric projects require the construction of two reservoirs — an upper and a lower — that facilitate the daily exchange of stored water.

At night, when energy demand is low and power rates are cheap, the water from the lower reservoir is pumped to the upper reservoir. When energy demand peaks during the day, the water is released at a sufficient flow rate to generate electrical power, conveyed through transmission lines.

According to the Federal Energy Regulatory Commission, pumped storage projects are "uniquely suited" for generating power when demand for electricity is high. Advantages also include a nearly "immediate" start-up to meet peak demands, in contrast to fossil-fueled plants that require significantly longer start-up times.

"It comes down to one thing — we are at the limit of our water. We cannot afford to lose any through evaporation or seepage. ... I don't care if it even needs one gallon, there is not enough left." -John Weisheit

Such projects are also touted as way to shore up gaps in renewable energy such as wind and solar and provide a "firm" generation of power to meet demands.

"With that switch on the wall, when you turn on the light, you expect that light to come on," said Mazzone. "With wind or solar, you cannot guarantee that power. There is not always sun, and wind is intermittent."

Mazzone's company had proposed a pair of facilities in Grand County that met with opposition because of their location not far out of Moab and because of their draw down on the Colorado River.

That necessary appropriation of water for the initial fill of the reservoir — plus loss of water due to evaporation — has created concerns over these types of projects.

Despite being touted as "environmentally benign," Moab-based Living Rivers' John Weisheit was adamantly opposed to the Bull Canyon and Long Canyon projects because of their proposed location in popular recreation areas, plus their use of water from the Colorado River.

"It comes down to one thing — we are at the limit of our water," Weisheit said. "We cannot afford to lose any through evaporation or seepage. ... I don't care if it even needs one gallon, there is not enough left."

Similar concerns prompted Symbiotics, a company with offices in Logan, to shelve the Hook Canyon Pumped Storage Project in Rich County in 2008 — after two years of heated controversy that included opposition by state agencies and then-Gov. Jon Huntsman Jr.

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They're back now, with another project proposed for Rich County, called North Eden, which proposes to take water from North Eden Creek. The proposal is early in that permitting process, explained Justin Barker, director of project development for Symbiotics, and a variety of stakeholder meetings will be held.

"We have been hammered for these proposed projects in the past but people now see that with more and more renewables coming online, there is a need to integrate those intermittent sources."

Barker contends that a lot of the opposition stems from "unfounded fears of people not obtaining all the information. We want our energy, and I think people take for granted they can just go in and flip on a switch. As long as they do not see where it is coming from, it is out of sight and out of mind."

"Its ability to firm intermittent resources is astronomical. It becomes a regional asset, a local asset to Utah. You have the economics of large scale storage, instead of having hundreds of smaller facilities. You are basically, centrally locating one big battery — that's what it is." -Justin Barker

He points out that while many people say they "favor" wind energy, they easily become opposed to having towering turbines located in their "viewshed."

"In eastern Wyoming, you have the same opposition by residents there to wind farms; it is classic NIMBY-ism," Barker said, referring to the common "not in my back yard" opinion.

Barker said it is possible to mitigate concerns over water use and actually improve conservation of water, such as in the company's Parker Knoll project proposed for Piute County.

In that instance, Barker said the company has negotiated with irrigation districts and agricultural water users to make improvements to the Sevier River Basin through the installation of pressurized sprinkler systems for irrigation.

"They get more efficient delivery, get more agricultural products with less water in turn for water to fill (our) reservoir and water to offset the evaporation. It is a win-win because they do not have the capital to do it, and here is a funding source and opportunity."

The nature of such projects allows the drawdown from the water source – Otter Creek Reservoir in this case — to happen in the winter when it is not needed by farmers and ranchers.

Barker envisions the projects — if they come to fruition — will have wind developers as customers who are building wind farms in Utah.

The Parker Knoll project — which could go online by 2017 after 10 years in planning and permitting stages — would be a powerhouse of storage capacity for renewable energy, on a grand scale of offering installed capacity of 1,330 megawatts.

Its annual generation of power is enough for 300,000 homes.

"Its ability to firm intermittent resources is astronomical," Barker said. "It becomes a regional asset, a local asset to Utah. You have the economics of large scale storage, instead of having hundreds of smaller facilities. You are basically, centrally locating one big battery — that's what it is."

Proposed pumped storage hydroelectric projects in Utah

North Eden, Rich County

Installed capacity: 700 megawatts

Annual generation of 2,027 gigawatt hours, enough to power 170,000 homes

5 miles of 230 kilvolt transmission line

Upper reservoir: 10,510 acre feet of usable storage

Lower reservoir: 11,932 acre feet of usable storage

Operational mode: 10 hours a day

Water Source: North Eden Creek, Bear Lake tributary

Project status: Undergoing federal permitting process

Parker Knoll, Piute County

Installed capacity: 1, 330 megawatts

Annual generation of 3,850 gigawatt hours, enough to power over 300,000 homes

Upper reservoir: usable storage of 6,700 acre feet

Lower reservoir, usable storage of 6,700 acre feet

Operational mode: 10 hours a day

Water Source: Otter Creek Reservoir

Project status: Undergoing federal permitting process

Hurricane Cliffs, Washington County

Installed capacity: 300 megawatts, alongside a single 35 megawatt peaking generating unit

Upper reservoir storage capacity, 20,000 acre feet

Lower reservoir storage capacity, 6,000 acre feet

Operational mode: 10 hours a day

Water source: Colorado River

Project status: Undergoing federal permitting process

Bull Canyon, Grand County

Installed capacity: 800 megawatts

Annual generation of 1,077 gigawatt hours

40-mile 205 kilovolt transmission lines

Water source: Colorado River

Project status: on hold

Long Canyon, Grand County

Installed capacity, 800 megawatts

Annual generation of 1,077 gigawatt hours

40-mile 250 kilovolt transmission line

Water source: Colorado River

Project status: on hold

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