

# Hydroelectric engineers find potential in centuries-old mine

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In this Dec. 8, 2016 photo, Steve Burke and Jim Besha of Albany Engineering Corp. stand at the site of an abandoned iron mine in the Adirondacks, in Mineville, N.Y., where they're seeking a federal permit to build an underground hydroelectric pumped storage project. The hills behind them are "tailings" leftover from crushing ore to extract iron from the mine that closed in 1971. (AP Photo/Mary Esch)

Some look at an abandoned, centuries-old iron mine in New York's Adirondacks and see a relic.

An ambitious group of engineers sees the shafts in Mineville as a new way to provide a steady flow of electricity in a growing market for renewable energy.

They are pitching a plan to circulate some of the millions of gallons of groundwater that have flooded the mine shafts over the years to power an array of 100 hydroelectric turbines a half-mile underground.

They envision the operation as a solution for solar and wind power producers, who need ways to ensure an uninterrupted flow of energy when the sun isn't shining and winds are still.

"Today, everyone's recognizing that a critical part of our energy infrastructure is going to be storage," said Jim Besha, head of Albany Engineering Corp., as he gave officials a tour of the mine site about 100 miles north of Albany. "You can think of it as a bank. If someone has excess solar energy, they would pay a fee to store it overnight."

While logistically complex, the plan is at the same time incredibly simple: Engineers would drain roughly half of the water from the shafts and pump the remainder into an upper chamber. The water would then be released into a lower chamber, powering turbines and creating electricity. The turbines would be reversed to pump the water back up to repeat the process.

Technically, the pumped water is considered stored energy, to be released strategically when power is needed.

The Mineville Pumped Storage Project still faces federal approvals and up to three years of construction, but it could become one of the first

projects of its kind in the nation.

It also would mark a 21st century re-use of a mine that famously contributed iron for the first naval battle of the Revolutionary War on nearby Lake Champlain and was mined for the last time in 1971.



In this Dec. 8, 2016 photo, Jim Besha, head of Albany Engineering Corp., stands with his application to the Federal Energy Regulatory Commission for an underground hydroelectric pumped storage project in an abandoned iron mine in the Adirondacks, in Mineville, N.Y. The plan is to circulate some of the millions of gallons of groundwater that have flooded the mine shafts over the years to

power an array of about 100 hydroelectric turbines a half-mile underground. (AP Photo/Mary Esch)

For the locals, the pumped storage project would breathe new life into a depressed former mining town, doubling the local tax base, generating hundreds of construction jobs and a dozen permanent ones, and providing extras like a new highway garage and water lines, said Tom Scozzafava, supervisor of the surrounding town of Moriah.

"It's a once-in-a-lifetime opportunity for a community that has never fully recovered from the closing of the mine," Scozzafava said. "And environmentally, it's very clean. It's all underground and utilizes the same water source continuously. You can't find a cleaner way to produce and store power than pumped storage."

Besha first envisioned his plans in 1990 after Scozzafava came to him looking for a way to make the defunct mine profitable again. The project languished until 2005 as interest in renewable energy projects grew.

"Now it looks like it could be online just when it's needed," Besha said, noting Democratic Gov. Andrew Cuomo's call for 50 percent of the state's electricity to come from renewable sources like wind and solar by 2030.

The project is basically an underground version of big outdoor projects that rely on the same principle. The New York Power Authority's Blenheim-Gilboa Pumped Storage Project in the Catskills and the proposed Eagle Mountain project in southern California, for example, use outdoor, hilltop lakes as the upper reservoirs.

The large-scale pumped storage projects, which have been used for decades to meet peak demand for electricity produced by fossil fuel and nuclear plants, represent 97 percent of the nation's energy storage today.

Now the Department of Energy is calling for a big increase in pumped storage capacity by 2050 to meet the needs of renewable energy sources that are growing so fast the Energy Information Administration predicts they'll overtake nuclear energy by 2021 and coal by 2030.

"Pumped storage enables greater integration of variable renewables, like wind and solar, into the grid by utilizing excess generation, and being ready to produce power during low wind and solar generation periods," said LeRoy Coleman, of the National Hydropower Association.

Underground projects using mines, caverns and excavated spaces have become attractive because of reduced environmental effects. In addition to Mineville, projects have been proposed for an abandoned mine and quarry in Elmhurst, Illinois, and underground caverns in Wiscasset, Maine.

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