Tom Still: New uses for old mines? It's worth pursuing in Wisconsin

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Glance at the coat of arms for Wisconsin's flag and you'll see a miner holding a pick, a symbolic reminder of early 19th century lead and zinc mines clustered in the southwest corner of the state. As home-grown elementary school students can likely tell you, miners often lived in dugout caves near those mines – which is why Wisconsin's nickname is "the Badger state."

Wisconsin's lead and zinc mines played out long ago as sources of lead and zinc, but what if some took on a second life as a source of so-called "rare earth" minerals with properties that underlie many modern technologies?

It's entirely possible, according to two professors who view abandoned mines as helping to solve two modern problems: Recovering rare earth minerals in one case; using those mines as "mechanical batteries" to store energy in another.

Let's start with rare earth minerals, which are 17 naturally occurring elements among 118 in the periodic table. They are not "rare" in the typical sense of the word, but once refined they have magnetic, conductive or optical properties used in cars, airplanes, medical devices, smartphones, some cancer treatments and more.

Minerals such as gallium, germanium and indium are found in many places around the world, but today's "rare" tag hangs mostly on how they are refined and where. That "where" is 90% China. By mobilizing government resources and sometimes ignoring environmental standards, China's rare earth refining industry has cornered

the global market.

Julie Michelle Klinger, an associate professor at UW-Madison, doesn't think it's necessary to burrow into Greenland or fly to the moon to extract rare earth minerals. She believes it's cheaper and better to derive such minerals from existing sources, including abandoned mines.

"The United States has plentiful reserves of its own, both in the ground and hiding in plain sight in mine waste, industrial scrap and discarded electronics," Klinger wrote in a guest column for the New York Times. "… America could go a long way toward meeting its growing demand for such minerals by harvesting those readily available sources."

Tapping Wisconsin's old mines is less about the availability of rare earth minerals than the economics of recovering them. Largely because holes were dug nearly 200 years ago and granular waste tailings are still a problem for water and wildlife, people should look at abandoned mines with "fresh eyes," she said in a recent interview.

"We have two big problems that can be solved, side by side … recovering rare earth minerals and cleaning up waste," Klinger said. (Her Feb. 6 guest column was headlined, "America's Rare-Earth Solution Is Hiding in Plain Sight.")

Tim Scarlett, a professor at Michigan Technological University in Houghton, Mich., agrees certain mines in southwest Wisconsin and Michigan's Upper Peninsula may be sources of rare earths. Could it be a new "mother lode" that sparks economic rebirth for nearby communities?

"It's often about creating the right carrots and sticks." said Scarlett, who has spoken to people in Platteville about "connecting the past to the future" through re-imagined uses for abandoned mines.

Reclaiming rare earth minerals from old shafts as well as their tailings is one such use. Depending on the depth of such mines, they may also serve as mechanical batteries to store energy produced by solar and wind generation to release at peak use times.

Scarlett and others believe some abandoned mines could host large-scale, closed-loop systems called Pumped Underground Storage Hydropower facilities. Water is

pumped from a lower, underground reservoir to an upper reservoir during low demand cycles, then released to turn turbines during times of peak demand. It's a way of putting gravity to work.

That may not be feasible in southwest Wisconsin because most old mines are too shallow. Former iron mines in the Upper Peninsula are likely stronger candidates. The Mather "B" Mine in Negaunee, Mich., is in the early stages of a pilot project.

Breaking China's stronghold on rare earth minerals and finding new ways to store energy are vital goals. Perhaps that miner on Wisconsin's state flag can find new work in the 21st century.

Still is the past president of the Wisconsin Technology Council. He is an adviser to Competitive Wisconsin Inc., a non-profit policy group.