Berlin is keen to source more critical raw materials at home — but is meeting with opposition from locals.

Werner Müller can vividly remember the day a tremor caused by drilling cracked the walls of his house. Now, more than a decade later, he fears that new plans to extract lithium — a key raw material in car batteries — will once again put residents at risk.

The Upper Rhine Valley in Germany's southwest is thought to be home to one of the largest lithium reserves in Europe. That's potentially a huge boon for the country's green transition, as it looks to diversify its supply of the materials needed to build green technologies like electric cars and wind turbines.

Several research groups and companies are looking to extract lithium using geothermal drilling, a process that involves drilling wells into a thermal reservoir up to several thousand meters below ground and pumping hot lithium-rich brine to the surface. The water is used to generate electricity and lithium is extracted and refined to a grade suited for battery use.

Those plans fit into Berlin's goal, announced in January, to expand mining of raw materials at home to help the country meet its green goals: By 2030, it wants to get 15 million battery-installed vehicles on the roads and supply 80 percent of its electricity from renewable energy.

"Domestic mining is preferable to raw material imports if it leads to better environmental and social standards and strengthens the resilience of supply chains," the climate and economy ministry, helmed by the Greens' Robert Habeck, said in a position paper on the country's raw materials strategy.

The Greens' embrace of domestic extraction marks another major policy shift for the party, which in the past year has adapted its stance on a number of key ideological issues — including on extending the lifecycle of the country's nuclear power plants — amid an energy crisis and the war in Ukraine.

The question of how to secure these key green resources is also an existential question for Europe. The European Commission is expected to present a Critical Raw Materials Act in March aimed at lessening the bloc's dependence on China and Russia, including by designating projects of strategic interest within the EU that would benefit from faster permitting.

But tensions in Germany's Upper Rhine Valley, one of two main lithium deposits in the country, suggests that ramping up domestic mining won't be an easy feat.

Residents like Müller are reluctant to see major extraction projects pop up in their backyard, fearing that the drilling could cause new tremors in the area and cause expensive damage.

"There's such a hype around lithium and geothermal energy — what is to happen here in the Upper Rhine Valley is sheer madness," said Müller, who heads a local citizens' initiative against the plans.

'White gold' rush

Companies and researchers agree that the **Upper Rhine Valley** could become an important source of lithium but don't agree on how quickly industrial-scale extraction can begin and how economically viable it will be.

Vulcan Energy Resources, a company founded by Australian and German geologists, is among the companies hoping to exploit the resource, with plans to kick off extraction in 2025 and supply 40,000 tons of battery-grade lithium hydroxide every year. It aims to increase this production capacity over time and is currently testing extraction at a pilot plant.

Co-founder Horst Kreuter said he is "very positive" that the company can "meet a substantial portion of the demand for batteries for the electric cars produced in Germany." Its plans were met with enthusiasm from a car industry under pressure to make the switch to electric, ahead of an EU-wide ban on the sale of new fossil-fuel-powered cars by 2035. Automakers Stellantis, Renault and Volkswagen have all signed supply agreements with Vulcan. Belgian materials firm Umicore has also sealed a deal with the company. Still, some scientists and companies caution it's too soon to cry victory.

"Technologically, it is already possible to drill that deep for geothermal purposes and we also have the means to extract lithium," said Michael Schmidt, a research associate at the German Mineral Resources Agency. "But it remains to be seen whether it makes sense economically and ecologically."

The extraction method "hasn't been established at an industrial scale anywhere else yet," Schmidt added. "Currently, there is no company in the world that extracts lithium coupled to geothermal energy. There is still basic geological research to be done."

Some researchers also say that Vulcan's projections for how much lithium it can extract in the region are overblown.

According to two recent studies published by the **Karlsruhe Institute of Technology** (KIT), domestic resources could only cover about 5 percent to 19 percent of the annual demand for planned German battery cell production — in the "most optimistic scenario." Responding to those findings, Kreuter from Vulcan argued that KIT's geologists "only looked at existing projects … and didn't describe the future with the latest technology, and that's what we've done."

Fabian Nitschke, one of the authors of the KIT studies, said exploring lithium in the region

would be "fantastic" for Germany's supply of critical raw materials, but added that "key questions" still need to answered before it can go ahead and be scaled up.

Winning over the public

One key issue is how to win over a wary local population.

Geothermal drilling has a bad reputation in the region: In 2006, a deep geothermal project in Basel triggered a magnitude 3 earthquake; in 2019, an earthquake occurred in Vendenheim near Strasbourg.

Locals are mobilizing with a number of citizens' initiatives across the region.

Hans Roser, the head of one such initiative in the southern Upper Rhine Valley, said he expects earthquakes to "certainly occur more frequently" if lithium is extracted.

The states of Rhineland-Palatinate and Baden-Württemberg, where most extraction is currently being studied, are acutely aware they will need to reassure residents that extraction is safe.

Baden-Württemberg's environment ministry, which is run by the Greens, said: "every project is seismically monitored from the very beginning" and that lithium can only be extracted from the groundwater — rather than through a so-called hard rock system, which has been linked to earthquakes in the past.

Rhineland-Palatinate is currently pushing for a revision of Germany's mining code with the aim of making processes more transparent and involving the public to a greater extent.

A common argument made by supporters of lithium extraction in the region is that it will be more environmentally friendly than mining abroad. Lithium recovery from brine, as is currently practiced in the salt deserts of the Chilean, Bolivian and Argentine Andes, is associated with water shortages, while hard-rock mining on average emits **15 tons of CO2 per mined ton of the mineral.**

Extracting lithium through geothermal processes is "preferable" because it doesn't emit any carbon, consume water or generate waste, said Thomas Kölbel, a geothermal energy expert at EnBW, a company currently testing lithium extraction in Germany.

So far, such promises have done little to convince the skeptics: Rather than sourcing at home, Germany should "go to Chile and implement other standards there," said Roser.

Source: Politico