EEB European Environmental Bureau

Friends of the Earth Europe

Lithium Mining in Zinnwald, Germany

Critical Factsheets on Mining Projects

This factsheet is part of a series of case studies on contested mining projects, to shed light on the reality of local populations and the environmental impacts by extractivism.

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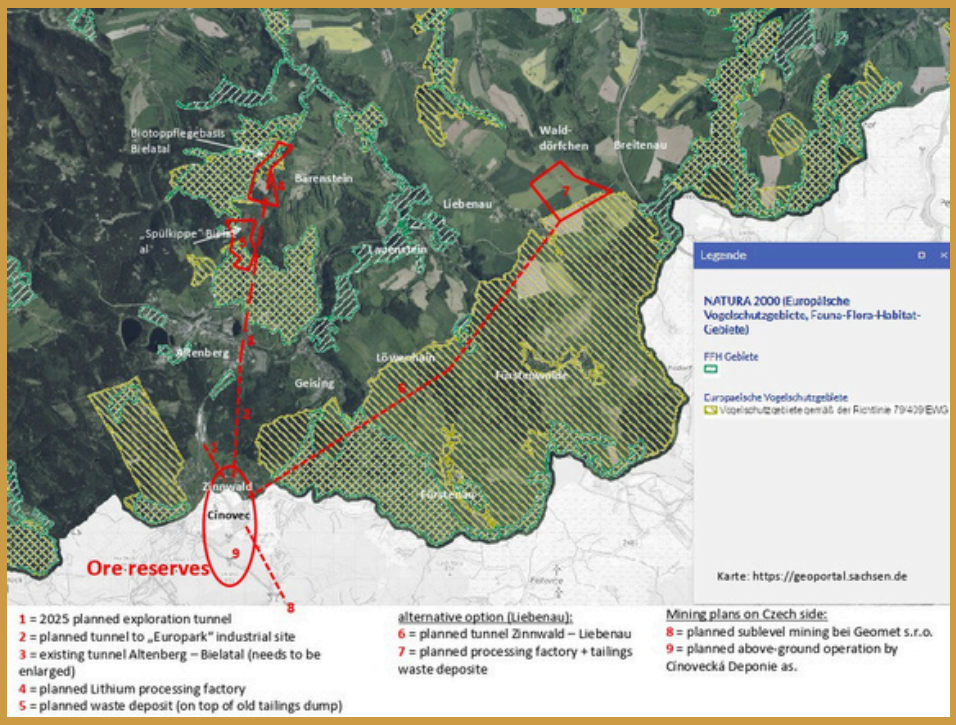
1. BASIC INFORMATION

Municipality, province:	Altenberg, Saxony, Germany
Companies:	Zinnwald Lithium Plc.
Minerals:	Lithium and by-products calcium carbonate and potassium sulphate
Status:	2028 onwards
Concession area:	256 hectares
Type of mining:	Underground



SUMMARY

British mining junior Zinnwald Lithium Plc plans to develop a large lithium mine on the Czech-German border. It is to be situated in and around of the town of Zinnwald, which is part of a UNESCO World Heritage landscape.

Zinnwald Plc's economic assessment and resource estimate foresee an annual production of up to 18kt of battery-grade lithium hydroxide (20.45 kt LCE) over a 35-year mine life. According to the company, their mine would be the "second largest hard-rock lithium project in the EU." To date there exists no feasibility study on the economics of exploiting the low-grade ore body and the definition of key elements such as the location of tailings and industrial facilities for processing etc. are still unclear. Despite this, the company applied to be designated as 'strategic' under the European Critical Raw Materials Act (CRMA).

The project has gone through bankruptcy and ownership changes and is facing growing opposition. Apart from claiming a lack of meaningful engagement, NGOs and local opposition groups point to the social, environmental, and transboundary impact; including on protected sites and habitats.

A few hundred meters away in the village of Cínovec on the Czech side of the border, a Czech-Australian venture is planning Europe‘s largest lithium mine; aiming to process 3.2Mt/a. Geomet s.r.o. which is owned by the Czech group ČEZ a.s. and Australian-based European Metals Holdings Ltd. wants to exploit the same deposit as Zinnwald Lithium via underground mining from the Czech side. Geomet s.r.o. also applied to be designated as 'strategic' under the European CRMA.

The cumulative and comprehensive impact of Europe‘s largest two lithium proposals wanting to exploit the same ore desposit simultaneously is fiercly opposed on both sides of the border. Both are located in populated areas; they will be situated adjacent to each other and drain from identical resources - e.g. water etc.. Neither the Czech nor German authorities have announced transboundary assessment procedures, although an EIA proceedure for parts of the Czech proposal is ongoing.

2. PERMITTING HISTORY & EIA STATUS

Underground mining in the Erzgebirge – literally: “Ore mountains” — region of Germany and the Czech Republic dates to the late Middle Ages. From 1686 the “Tiefe-Bünau-Stolln” became the most important mine of the Zinnwald ore field. Mining, including for lithium micas, ceased in the 1990s.

In 2011 and 2012, Solarworld Solicium GmbH, one of Zinnwald Plc predecessors acquired two exploration licenses in the Zinnwald area. Subsequent drilling defined the mineral resource further. In October 2017, Saxony’s mining authority approved a mining permit for the “Zinnwald“ concession. It covers 256 hectares and is valid until 2047. It includes the “Tiefe-Bünau-Stolln”, a protected monument and a visitors’ mine. Following the bankruptcy of Solarworld in 2017, the concession was transferred to Zinnwald Plc.

The proposal is at an early-stage: The company yet needs to yet prove its economic feasibility and add key project details, not only for the underground mine and its vast waste facilities in the surroundings of the towns of Zinnwald and Liebenau, but possibly also for an industrial complex with a lithium refinery to achieve the production of battery-grade lithium as advertised by Zinnwald Plc. Despite this, Zinnwald Plc applied for ‘strategic’ status under the European CRMA in 2024. Results are expected in early 2025. If its application is successful, then Zinnwald Plc would benefit from streamlined permitting. If both mines become operational, the Erzgebirge would be turned into Europe’s largest lithium exploitation site.

Photo:Jens Weberr

3. PROJECT SUSTAINABILITY

The targeted processing and production volumes and respective sites for waste storage would have significant consequences for people and nature, thus impacting the project's sustainability in a negative manner. As vital components of the project still have to be defined and despite the current proposal being an underground mine, many locals fear that the estimated production targets and economics can only be feasible via open-cast mining.

3.1 BIODIVERSITY IMPACTS

The Zinnwald proposal is located close to important distribution and breeding grounds for over 20 animal species; some of which with special protection status under the European Habitats and Birds Directives. The area has international significance for the conservation of various endangered species such as the black grouse and horseshoe bat.

The mine could be in breach of European and national nature conservation goals under the Birds and Habitats Directive, as well as under the Nature Restoration Law, since Natura2000 areas would be impacted. Mining in the area could also affect unique mountain meadows and a clearance cairn ("Steinrücken") landscape with a exceptional cultural landscape value and a biological diversity. The project would affect up to 10 Special Areas of Conservation and Special Protection Areas bird sanctuaries on the German side, and at least three conservation areas on the Czech side.

These areas and the relatively small, unprotected corridors in between contain at least 15 different habitat types from Annex I of the Habitats Directive, of which at least 5 are priority habitat types. The conservation status of more than half of these habitat types was classified as "unfavourable" to "poor" in 2018, in particular regarding water-dominated habitat types. In November 2024, the European Court of Justice ruled against Germany for inadequate conservation of habitats, including Natura2000 hay meadows that would be put at risk by the Zinnwald proposal. The well-developed and preserved biotope network between the numerous small-scale habitats results in complex ecological interactions. The biotope network could be further threatened by mining waste sites, should the mine owner opt for this variant. The mine will require the construction of substantial roadways to accommodate heavy mining trucks. This will greatly increase traffic induced noise and pollution levels, and could add to the impact on the biotope network. This poses a significant risk to the network's biodiversity, with many endangered and threatened species. Affected by the environmental legacy of historic mining, the area's biological diversity of mountain meadows was improved by a long-term public funded conservation project initiated in 1999. Since the projects' end in 2018, all involved municipalities and counties are obliged to ensure that the project objectives are maintained.

The biodiversity-rich Bielatal valley near Bärenstein is Zinnwald Plc's preferred location for the processing plant and mining waste deposit. This would turn the valley into an industrial site with long-lasting impacts. An alternative option proposed by Zinnwald Plc near the village of Liebenau is a crucial part of internationally important bird migration corridor.

3.2 RISKS TO WATER RESOURCES AND FLOOD HAZARDS

Zinnwald Plc has not published any information on water usage and wastewater generation. Considering the increasing water scarcity, there exists a risk that the project would impact the already limited natural water supply of the region. Limited water resources and the yet to be defined water usage rates for the mine, could put at risk the restoration plans for the Georgenfelder Hochmoor Nature Reserve. Prior to 1990, Altenberg and Cínovec already faced water shortages due to the water used for mining and processing. This led, among other things, to public health risks due to the dust dispersed from tailings dump sites near Bärenstein. Since 2018, the area has been exposed to long periods of drought. Taking into account that two mining projects will compete for the same water sources, not only the moors of the Eastern Ore Mountains are at stake, but also the region's drinking water supply - impacting the metropolitan areas of Dresden and northern Bohemia.

The project proposal poses significant risks to the water quality of rivers and groundwater bodies with possible impacts on the drinking water supply. The host rock presents a significant geogenic arsenic content, which risks being released into the environment through the mining operations including waste dumps.

Photo:Jens Weberr

The large scale of the planned mining operation with associated infrastructures will lead to a high level of soil sealing and compaction. At the same time, the eastern Ore Mountains are a flood-prone area, as demonstrated by flood disasters in 2002. The tailings retention basins (TMF) from former mining operations pose a particular risk. In 1966, the Tiefenbachhalde dam above Geising collapsed, resulting in a mudslide affecting urban areas, arable lands, and water bodies. In 2002, the Bielatal basin, operative until 1991, was close to reaching its maximum capacity, resulting in the evacuation of downstream settlements. The re-commissioning of the legacy infrastructure, as considered by Zinnwald Plc in cooperation with Knight Piesold Ltd., would ignore established best practices in tailings management and pose a risk for a future dam failure and subsequent flooding. Following a Canadian lawsuit settled in 2018, Knight Piesold Ltd. had to compensate a mine operator with $108 million for the Mount Polley mine dam collapse and respective environmental disaster.

3.3 SOCIO-ECONOMIC IMPACTS

The area under the project footprint is well populated. Planned mining activities include areas underneath the town of Zinnwald. This means that the relocation or resettlement of locals might be necessary to create the space for the above-ground installations, such as processing, and waste depositing, but also due to subsidence risks posed by underground mining underneath historic mining shafts. The mere threat of renewed mining has, according to residents, already decreased property values and led to banks rejecting loans.

Although the mine is expected to create around 400 jobs over the 35 years of its expected mine life, it would also have negative impacts on the current local economy, due to the possible relocation/resettlement of property owners as well as loss of land and production means. The region is a popular holiday destination; especially for people living in the nearby cities of Dresden and Leipzig. Numerous locals make a living from tourism; both directly or indirectly. The town of Zinnwald is part of the Erzgebirge/Krušnohoří UNESCO Mining Cultural Landscape and a visitors' mine leading from Germany into the Czech Republic attracts a multitude of visitors every year.

Photo:Jens Weberr

4. STAKEHOLDER ENGAGEMENT AND LOCAL OPPOSITION

Until the publication of a draft framework operating plan in 2019, Deutsche Lithium GmbH (Zinnwald Plc's predecessor) attempted to be transparent towards civil society and provided information about the project. Environmental initiatives such as the Grüne Liga Osterzgebirge and BUND Sachsen responded with critical statements and did not dismiss the proposal outright. At the time, the town of Altenberg supported the project via a municipal council resolution. Since then, environmental and civic initiatives claim a lack of information, while the company continued its exploration drilling campaign in Zinnwald.

In July 2023, Zinnwald Plc held a first community meeting. It was invitation-based only and consisted of a project presentation revealing plans for tailings sites and processing plants on the fields of the village of Bärenstein. This led to the founding of the 'Bärenstein Citizens' Initiative.' Zinnwald Plc's mining plans were generally met with fierce resistance by the locals who considered them unprofessional and badly planned. At a subsequent meeting in August 2023, the State Directorate of Saxony, being the administrative authority of the Free State of Saxony, instructed Zinnwald Plc to initiate a separate spatial planning procedure ahead of an EIA assessment. During the winter of 2023/24, Zinnwald Plc announced a new location to process the ore; including waste dumps and a chemical processing plant near Liebenau. In a public survey, an overwhelming majority of Liebenau's residents expressed their opposition to the plan. This resulted in the creation of the 'Liebenau Citizens' Initiative.' The 'Interessengemeinschaft Zinnwald' bundles the resistance on the German side. On Czech side, local residents and citizens from Cínovec founded the NGO 'Cinvald.cz' in 2017.

Since 2024, citizens' groups on both sides of the border have been coordinating their activities; including a letter to the EU Commission, arguing against a designation as 'strategic' under the European CRMA and to the Germany's Minister for the Environment requesting transboundary impact assessments for both proposals.

Photo:Jens Weberr

5. TECHNICAL FEASIBILITY & RISKS

The technical feasibility of the mine proposal has not yet been proven, as key parameters of the industrial process are still to be defined. The remediation of the old mining sites and their long-term impact has also not been addressed.

The low ore grades of the Zinnwald proposal would imply increased energy expenditures for rock grinding, as well as increased quantities of mining waste per produced unit of lithium.

The Liebenau location variant of the processing plants would require an approximately 10 km long tunnel between the deposit and the processing area. This tunnel would cross the Lauenstein flood retention basin at a shallow depth and possibly jeopardize its stability.

Based on the information available, the planned procedures, processes and technologies are unlikely to correspond to best available techniques. Technical documents published by Zinnwald Plc in July 2023 were met with criticism by experts. For example, numerous mining induced sink-holes exist in the eastern part of the Ore Mountains, severely impacting the geological stability of the mountain massif, with a high risk of accumulating impacts through the proposed lithium projects.

The Zinnwald deposit is a cross-border granite stock with an ore-bearing greisen body. Mining these lithium reserves is planned by competing companies sitting on Czech and German sides respectively. Both mining operators intend to excavate from the same limited resources needed for mining such water for processing. In mining terms this means that the impact and effects will be up to three times bigger than if the rule of "one deposit - one mine" was followed.

As the CRMA's scope is to ensure a secure and sustainable supply of critical raw materials, it is worth noting that among Zinnwald Plc's significant shareholders counts Ganfeng International Trading Ltd. a subsidiary of Chinese Ganfeng Lithium Ltd., one of the largest lithium producers in the world. There exists no guarantee that it won't increase its stake at any time in the future.

6. FINANCIAL FEASIBILITY

Lithium prices fluctuate a lot based on market conditions and other factors. Lithium hydroxide and lithium carbonate prices, for example, have fallen more than 80% throughout 2023 and into 2024. Due to the low grade of the deposit (3,500 ppm Li = 0.74% Li2O), low lithium prices might undermine the project's economic viability. The volatility of the lithium price has already resulted in the scaling down or even shutdown of operations at major mines in Australia, with spodumene rock ore grades of over 1% at the Wodgina and Bald Hill mines.

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