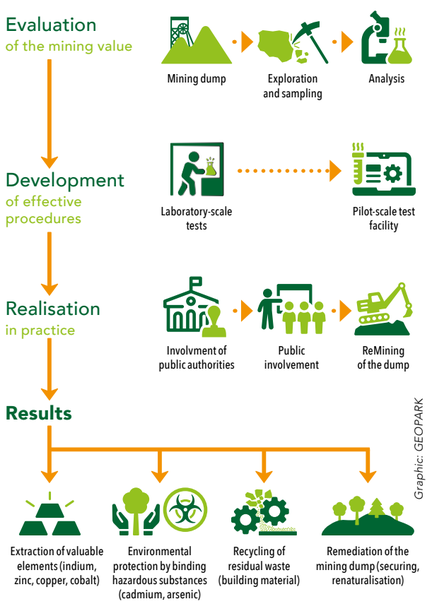
ReMining - Process flow

Dealing with old mining residues and spoil heaps is a complex process that has to take a wide range of issues into account. In addition to the technical challenges, the public authorities must be consulted and affected specialist plans must be included. A process that involves the public at an early stage can make a significant contribution to broader public acceptance of raw materials projects.

Extracting valuable elements - binding hazardous materials - recycling residual waste



ReMining - Raw materials from mining dumps

Mining and ore processing are always associated with the accumulation of residual materials, which in the past were often dumped on mine dumps. From today's technological point of view, these often still contain considerable quantities of valuable elements. Against the backdrop of a constantly growing global hunger for raw materials, mining dumps are therefore becoming increasingly interesting for the world market.

Specifically, we are talking about metals such as indium, germanium or other strategically important accompanying elements of the once historically mined main compounds from lead, tin and zinc ores. These modern-day valuable elements, which were not yet of interest to the industry at the time, are now often found in mining dumps at levels above the limits of economic extraction. In addition, most of the accompanying minerals in waste rock piles can be utilised for building materials - entirely in the sense of the circular economy.

All activities that deal with the reprocessing of minings dumps and the goal of resource recovery in this context, are generally referred to 'remining'.

Drill cores from the Davidschacht tailing dump, Freiberg (HIF)

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ReMining^{Plus} research project
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Project partners:

The research project is part of the regional recomine alliance for dealing with old mining sites in the Ore Mountains.

Associated recomine projects:
MindMontan (Hammerberg)
ReKuMat (Hammerberg)
VeharstGlas (Davidschacht)
ZauBer (Roter Graben)

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geopark SACHSENS MITTE

The GEOPARK Sachsens Mitte is a certified National Geopark in Germany. It comprises an area with special geological features, a diverse mining history and an interesting raw material potential. The new Saxon raw materials strategy (2022) describes raw materials awareness and acceptance as the 'key to the future raw materials economy'. The GEOPARK Sachsens Mitte is already tying in with this social interface in the form of educational offers relevant to raw materials and public events such as the 'Day of the open quarry' and will continue to expand these in Saxony as a land of raw materials in the future.

Promoting raw materials awareness, conserving resources and supporting the region - great!

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ReMining

Extraction of raw materials from mining dumps

Davidschacht tailing dump Freiberg (1944 - 1964)

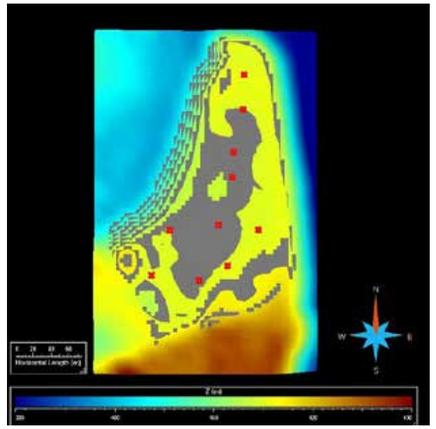
At 736 metres, the Davidschacht was the deepest shaft of the former 'Himmelfahrt Fundgrube' ore mine, which has been mentioned in documents since 1715 and was the largest mine in Saxony in the middle of the 19th century. Alongside the Reiche Zeche, the Davidschacht was the mine's main production shaft during the last phase of Freiberg ore mining (1937 - 1969). Mainly lead, zinc, arsenic and sulphur ores were mined here.

Davidschacht in 1903 (Brück & Sohn Kunstverlag, Meissen)

The dimensions of the historic mining operations at Davidschacht can still be surmised today from the three mining dumps belonging to the Davidschacht complex: the Grobberge dump, the Davidschacht tailing dump (1944 - 1964), the Hammerberg tailing dump (1964 - 1969).

The tailing dump Davidschacht alone has a surface area of 6,3 ha and a volume of approx. 760.000 m³. Due to the processing of ore from the entire Freiberg mining district, mainly residual materials from wet-chemical flotation precesses and fine components of the Freiberg gneiss - the main rock of the Ore Mountains - were washed into the tailing dump.

Davidschacht tailing dump in 1967 (SAXONIA archive)



The 3D-modelled Davidschacht tailing dump shows the concentration of the most important zinc ore, the mineral sphalerite, with proportions of indium and gallium in the body of the dump in percent by weight. (HIF)

BMBF - ReMining^{Plus} research project

As part of the BMBF programme „WIR! - Change through innovation in the region", modular pilot plants are being developed to biotechnologically extraction of valuable elements and subsequent separation of hazardous substances and to test them in practical use at the Davidschacht complex site.

The Davidschacht tailing dump contains the following mineralogical composition: quartz (approx. 70%), feldspar, mica, fluorspar, barite, calcite, lead sulphide, iron sulphide, zinc, manganese, arsenic, cadmium and copper. The tailing also contain residues of flotation reagents.

As part of ReMiningPlus, the extraction of valuable elements (In, Zn, Pb, Cu, Co) from the tailing and the utilisation of other inert components (e.g. as a building material) is carried out in a pilot-scale test facility. The removal and immobilisation of existing hazardous substances is realised in environmental module 3.

Davidschacht tailing dump today (SAXONIA archive)

ReMining^{Plus} - Pilot plant