

URBES Project – Procedures adopted for the identification of extractive waste facilities from closed or abandoned mines and quarries

INTRODUCTION

The objective of the URBES project is to identify, map and characterise, from a mining and environmental standpoint, extractive waste facilities with potential for the recovery of Critical Raw Materials (CRMs) and Strategic Raw Materials (SRMs), as defined in Regulation (EU) 2024/1232, currently located at closed or abandoned mines and quarries. The identification and characterisation process is inherently lengthy and complex and, for the reasons set out in the following sections, has necessarily entailed a degree of approximation, particularly during the current preliminary implementation phase.

QUARRIES

With regard to quarries, the situation is more complex and multifaceted than for mines, due to two main categories of issues of an administrative and geological nature.

- a) Under the Italian regulatory framework (Royal Decree No 1443/1927), quarries are classified as sites for the extraction of second-category materials, namely materials not considered of strategic importance for the national industry. Unlike mines, which form part of the inalienable property of the State or the Region, quarries belong to the landowner and are subject to an authorisation procedure rather than a concession regime. The authorisation is granted by the authorities designated under the relevant Regional Laws governing extractive activities, which may include the Region, the Province or the Municipality. The Region is responsible for the collection and management of information relating to quarrying activities.
- b) As second-category extractive activities within the meaning of Royal Decree No 1443/1927, quarries supply materials primarily used in public and private construction (aggregates, dimension stone and binders), in the manufacturing industry and in environmental restoration works. Given the geological formations concerned, the potential occurrence of CRMs is limited to specific lithological types. Although not considered a priority layer of information, this dataset was nonetheless included in view of the established presence of CRMs, in some cases in significant quantities, within processing residues derived from quarries exploiting igneous and metamorphic rocks. Among these, only quarries dedicated

to the extraction of ornamental stone generate substantial volumes of waste, which are often still deposited on site and may, in certain cases, contain recoverable quantities of CRMs. Typical examples include the granite quarries of Gallura and the gneiss quarries of the Ossola Valley, where the presence of veins containing rare earth minerals has been documented, as well as serpentinite quarries in Alpine areas, where nickel occurrences may also be present in significant concentrations.

Among the most significant challenges encountered were the level of detail of the available information, including the type of activity and materials extracted, and the frequency of data updates, which varies from Region to Region. Nevertheless, a selection of quarries potentially containing residues suitable for the recovery of CRMs was carried out on a geo-lithological basis. The following procedure was therefore applied:

- 1) Selection of lithological units potentially relevant for the occurrence of CRMs, based on the Geological Map of Italy at a scale of 1:100 000, harmonised under the INSPIRE Directive.
- 2) Overlay of the OpenStreetMap¹ (OSM) polygon layer with the layer of potentially relevant lithologies selected and aggregated under point 1. Regional layers were not considered sufficiently suitable at this stage, as they are currently only partially harmonised, with quarries represented in some cases as points and in others as cadastral parcels. The OSM dataset was therefore considered, at present, to provide the most homogeneous information, as it consistently follows quarry boundaries derived directly from aerial imagery.
- 3) Refinement of the dataset obtained under point 2 through intersection of OSM quarry polygons with additional point-based datasets from the Geological Survey of Italy, following the application of a 250 metre buffer in order to mitigate potential topographical and boundary inaccuracies. This step was also necessary because several polygons classified as quarries in the OSM dataset were, in fact, open-pit mines.
- 4) Further validation of the dataset through the simultaneous consultation of multiple sources, including Regional databases and ISTAT. Where available, additional information was incorporated regarding the operational status of the quarry, verified through aerial imagery, the materials extracted, the holder of the quarry authorisation, the date of commencement of operations and the expiry date of the authorisation.

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