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Roadmap for future actions toward full sustainability

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GENERAL INTRODUCTION

The European Union has identified security of supply, improvement in environmental management and resource efficiency as key challenges for the raw materials sector. Data regarding the location and spatial distribution of primary and secondary raw materials, with respect to exploration, exploitation, production and trade activities, underpin decision making in government and industry. Given the dynamic character of such data, regular updates of comprehensive, reliable and harmonized information across borders are required. The overall aim of MINTELL4EU is to improve the European Knowledge Base on raw materials as there are several sources of non-harmonized data with different coverages developed for different purposes during national and international projects over recent decades. All data are shared at the European Geological Data Infrastructure, EGDI.

Tasks include updating the electronic Minerals Yearbook produced in the Minerals4EU project as well as extending the spatial coverage and quality of data currently in the Minerals Inventory. Furthermore, MINTELL4EU aims to increase the degree of harmonization, communication and interaction between existing data platforms, with the ambition of reaching a fully operational and reliable data knowledge management system, fulfilling the European needs and taking into account the Raw Materials Information System (RMIS) of the European Union. Finally, the applicability of the UNFC classification system for obtaining more accurate Pan-European mineral inventories are tested through a large number of case studies on different commodities across Europe.

MINTELL4EU has 27 partners each representing a national or regional geological survey organisation from 25 European countries.

EXECUTIVE REPORT SUMMARY

This report describes how the efforts achieved in MINTELL4EU can be secured for the future and how the tasks in collecting and maintaining data can be continued.



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1 MINTELL4EU IN BRIEF

MINTELL4EU builds on efforts achieved in previous projects.

When it comes to the storage of data, the database established under the past Minerals4EU project has been developed further to what is now known as the MIN4EU database. The name has changed as the database has been restructured and the code lists updated. More data providers were added, e.g., the West Balkan countries as a result of the data collected in the RESEERVE project as well as Luxembourg and the German state Baden-Württemberg. As part of MINTELL4EU, the Minerals Yearbook data have also been integrated in the MIN4EU database, thus establishing the electronic Minerals Yearbook – e-MYB.

The types of data collected or updated within the scope of MINTELL4EU are:

- Minerals Yearbook:
 - Production per country per commodity (2014-2019), now covering the period 2004-2019,
 - Trade (import and export) per country per commodity (2014-2018), now covering the period 2004-2018,
 - Resources per country per commodity as of 2019,
 - Reserves per country per commodity as of 2019,
 - Exploration data per country with 2019 as the reference year.

- Minerals Inventory
 - Mineral Occurrences (location, commodities, etc.),
 - Mines (location, commodities, etc.).

- UNFC¹ pilots
 - 19 case studies from 9 countries have been performed.

As mentioned, code lists have been updated and harmonized to ensure a higher level of transparency and interoperability, e.g., between the Minerals Yearbook and the Inventory, and UNFC codes have been added to allow reporting using this classification method.

¹ United Nations Framework Classification for Resources



2 DATA COLLECTION

2.1 The electronic Minerals Yearbook

The e-MYB contains data about primary minerals production, imports, exports, resources, reserves and exploration on a country-by-country basis. Regarding secondary materials, it contains data for mineral-based waste generation, treatment and trade. It also contains case studies relating to the recovery of 10 commodities from key waste streams, collected during the Minerals4EU project. All data are stored in the MIN4EU database.

The following mineral statistical data for six data types related to primary raw materials have been collected (2004 – 2013 in Minerals4EU; 2014 – 2018/19 in MINTELL4EU):

- Production data for 2004 to 2019,
- Trade (import and export) data for 2004 to 2018,
- Resource and reserve data as of 2013 and of 2019,
- Exploration data with reference years of 2013 and of 2019.

Data collection covers a total of 40 European countries and more than 60 mineral commodities. Data are collected, assessed and processed to ensure quality and consistency. This is mainly done by the British Geological Survey (BGS) that has been compiling and publishing minerals production and trade data for more than 100 years. Their 'World Minerals Statistics' dataset is one of the largest and most comprehensive available globally and these data continue to be made freely available to all international governments, industry and researchers.

2.2 The Minerals Inventory

The Minerals Inventory covers the collection of national or regional data on mines and minerals occurrences at commodity level.

Data collected includes geographical position (point or polygon), local name of mine or occurrence, commodity, deposit group, occurrence type, importance, mining activities etc. Descriptions of all information collected are available as comments in the M4EU DB schemas (https://db.geo-zs.si/M4EU_v2020.8.01/public/index.html).

The data are currently collected from 36 data providers covering 31 countries. 21 of these countries have created an online data service that enables harvesting of data directly from these partners. The remaining 11 countries collected their data using Excel/ Access forms developed specifically for this purpose, upon which data services were created. They are hosted by GeoZS or GEUS who ensure the harvesting of these data sets. In case of data services prepared by the data providers, updates are harvested automatically when there is a change performed at the data provider side, while updates from others require a clear communication and more effort from both, the data providers and GeoZS or GEUS.

Data are regularly harvested (at least once a month) and eventually stored in the central MIN4EU database. However, it is important to note that the content of the database depends on the input from data providers. The quality and content of national



data sets transferred to MIN4EU are the sole responsibility of each individual data provider.

In MINTELL4EU, harmonisation of data and spatial coverage have been improved. However, there are still harmonisation challenges to be solved, and the spatial coverage could be extended, e.g., the Baltic countries, most German states, Bulgaria and Malta which are not yet covered. Adding these countries requires first of all that they are willing to enter into cooperation. Technically, there is no major difficulty as the technical infrastructure and documentation (software, guidelines, code lists, etc.) are already established and available in MINTELL4EU via the repository and other related projects such as RESEERVE, ORAMA, etc.

2.3 UNFC Pilot

In the UNFC pilot, 19 case studies from 9 countries have been performed, covering a panel of commodities ranging from metals, industrial minerals, dimension stones and aggregates. The cases were performed with different granularity and study scope from case to case.

The case studies prepared during MINTELL4EU reflect the current status of UNFC implementation across Europe. They have been used to map different approaches for applying UNFC, to identify and analyse key challenges relating to the technical UNFC classification workflow, and to build a common understanding of how to address UNFC classification across Europe.



3 SUSTAINING THE DATABASE AND THE NETWORK BEHIND

All actions carried out in MINTELL4EU contribute to consolidate the European knowledge on raw material. The close coordination and cooperation with the GeoERA Information Platform project (GIP-P) and with EGD I ensured that new or updated data are added to the European database and related maps displayed at the platform.

Crucial issues in relation to the maintenance are identified, and solutions are described here after.

Maintaining services and the database

The maintenance of the services keeping the harvesting process operational will be taken over by the CSA GSE² in 2022 (if the project is granted). GeoZS and GEUS will ensure sustained operation of these tasks during the period from the end of MINTELL4EU until the expected initiation of the CSA GSE. During this period, (limited) staff will also be available for solving simple issues that might arise on the data provider side.

Consolidating the network of data providers

The communication with as well as networking among data providers and the minerals experts from each data provider are identified as extremely important tasks. Even within individual organisations, the interaction between those that organise data in local databases (IT staff) and the mineral experts (scientists) has been improved as a result of the work.

Maintenance of national datasets for harvesting

The maintenance and quality assurance of national datasets is the responsibility of each data provider, but the efforts to continuously ensure that data are available from all over Europe in a harmonised way are expected to continue under the CSA GSE. Besides, the community behind MIN4EU will strongly support and encourage that raw materials data collected by other related projects are made available for harvesting into MIN4EU.

Further harmonisation of data

Despite intensive work for updating code lists and the introduction of new ones in the process towards ensuring harmonisation of data, there are still tasks to be carried out. These could include a possible extension due to different national requirements, collection of data on secondary raw materials, introduction of UNFC classification, etc. Maintaining the network of data providers as described here above will solve some of these challenges, but dedicated resources for further communication among minerals experts are required. A specific task is to transfer the updated and new code list into the INSPIRE knowledge base. Besides, visualization towards targeted audience and smarter download facilities need to be addressed more closely. Code lists including UNFC codes have been added enabling the database to host this information. Only a few data providers use this classification for now. More elaboration regarding the methodology and visualisation of UNFC is needed to have data in an interoperable format.

² Coordination and Support Action: Geological Service for Europe: a project proposal is being prepared under the leadership of EuroGeoSurveys, the Geological Surveys of Europe; call HORIZON-CL5-2021-D3-02-14: Support to the activities of the European Geological Services.



Maintaining data collection to update the e-MYB

As mentioned here above, the data collection for the e-MYB was mainly done by BGS in both Minerals4EU as well as in MINTELL4EU. Although BGS will continue the collection of data for their 'World Minerals Statistics', it is at this stage unclear whether these data will be made available for updating of the e-MYB. UKRI has expressed the willingness to continue the cooperation in future research and supporting actions, but it has not been finally agreed if e-MYB will be a part of this cooperation.

Hopefully, where not already in place, there will be room for continuation of these issues in the CSA GSE, supported by the Raw Materials Expert Group (MREG) under EuroGeoSurveys.



4 SHOWING AND SHARING DATA

As already mentioned, the data sets collected in the framework of MINTELL4EU and in the other GeoERA projects are shared through EGDI at www.europe-geology.eu. A [MINTELL4EU viewer](#) has been developed and the maps shown at this viewer will also be incorporated into EGDI which will also serve as the information platform in the future CSA GSE.

MIN4EU and EGDI interacts with other European information platforms such as the European Plate Observing System [EPOS](#) and the Raw Materials Information System RMIS run by Joint Research Centre (JRC), the common research centre of the European Commission, for whom MINTELL4EU has developed a [dedicated viewer](#).

MIN4EU and EGDI will be open for sharing data in the future with other relevant platforms.