



REPUBLIC OF SLOVENIA
MINISTRY OF INFRASTRUCTURE

Langusova ulica 4, 1535 Ljubljana

BULLETIN

YEAR 2021

MINERAL RESOURCES

in Slovenia



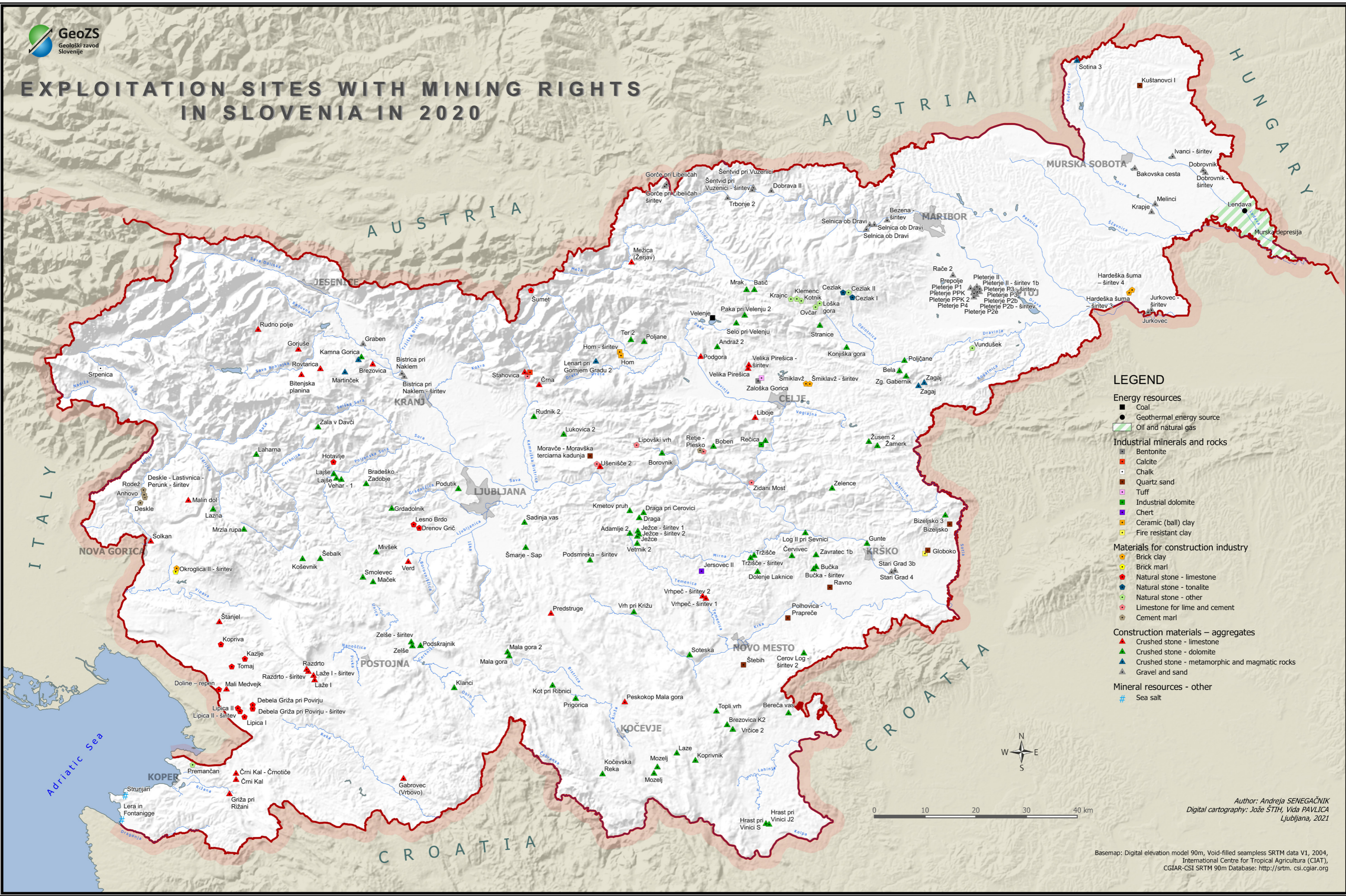
CONTENTS

- FOREWORD
- WORK of the UNIT for MINING
- WORK PLAN of the GEOLOGICAL SURVEY of SLOVENIA for the MINISTRY of INFRASTRUCTURE
- PUBLIC MINING SERVICE in SLOVENIA
- MINERAL DATA COLLECTION in SLOVENIA
- MINERAL and ENERGY RESOURCES in SLOVENIA in 2020
- LEARNING PATHWAY for a MODERN APPROACH to TEACHING and LEARNING ABOUT RAW MATERIALS
- WEST BALKAN MINERAL DATA as PART of the EUROPEAN MINERALS INTELLIGENCE NETWORK
- OVERVIEW of EXPLOITATION SITES and MINERAL PRODUCTION
- PARTIAL LIST of EU-FUNDED MINERAL RESOURCES PROJECTS
- SLOVENIAN NATURAL STONE in the EUROPEAN STONE INVENTORY
- EC SUPPORT to EGS – GeoZS ENGAGEMENT in MINERAL RESOURCES MANAGEMENT
- EDUCATIONAL INSTITUTION and NGOs ACTIVE in MINERAL RESOURCES



GeoZS
Geološki zavod
Slovenije

EXPLOITATION SITES WITH MINING RIGHTS IN SLOVENIA IN 2020



LEGEND

- Energy resources**
 - Coal
 - Geothermal energy source
 - ▭ Oil and natural gas
- Industrial minerals and rocks**
 - ▭ Bentonite
 - ▭ Calcite
 - ▭ Chalk
 - ▭ Quartz sand
 - ▭ Tuff
 - ▭ Industrial dolomite
 - ▭ Chert
 - ▭ Ceramic (ball) clay
 - ▭ Fire resistant clay
- Materials for construction industry**
 - Brick clay
 - Brick marl
 - Natural stone - limestone
 - Natural stone - tonalite
 - Natural stone - other
 - Limestone for lime and cement
 - Cement marl
- Construction materials – aggregates**
 - ▲ Crushed stone - limestone
 - ▲ Crushed stone - dolomite
 - ▲ Crushed stone - metamorphic and magmatic rocks
 - ▲ Gravel and sand
- Mineral resources - other**
 - # Sea salt



Author: Andreja SENEGAČNIK
Digital cartography: Jože ŠTIH, Vida PAVLICA
Ljubljana, 2021

Basemap: Digital elevation model 90m, Void-filled seamless SRTM data V1, 2004, International Centre for Tropical Agriculture (CIAT), CGIAR-CSI SRTM 90m Database: <http://srtm.csi.cgiar.org>

FOREWORD

Dear Reader,

The EU recognized the importance of raw material supply already in the early years of the new millennium with the publication of the Raw Materials Initiative (2008). Slovenia has been a part of this effort from the very beginning, and its involvement in the process has been increasing ever since.

The Slovenian Ministry of Infrastructure (MZI), together with the Geological Survey of Slovenia (GeoZS), has been consistently active in the Raw Materials Supply Group (RMSG) representing the position of the Republic of Slovenia with respect to the securing of reliable, unhindered access to raw materials for EU Member States. The work of the RMSG follows the Raw Materials Initiative to ensure:

- a) a fair and sustainable supply of raw materials from global markets,
- b) the sustainable supply of raw materials within the EU and,
- c) the efficient use of resources and the supply of secondary raw materials through recycling.

Over the years, many concrete activities and programs have emerged from the Initiative (including the Framework Programme Horizon2020), many of which are presented through the results published in this and previous Mineral Bulletins.

One of the latest and most important achievements of the Initiative is the Critical Raw Materials Action Plan adopted by the European Commission (September 2020). The Action Plan consists of ten concrete actions designed to tackle various vulnerability issues in raw materials supply chains. The Action Plan advocates specific EU engagement in strategic partnerships with resource-rich non-EU countries by enabling EU external policy instruments and delivering on its international obligations. The Strategic Partnership on Raw Materials, for instance, between the European Union and Canada was established and endorsed on the political level in June, and with Ukraine in July of 2021.

Throughout the 75 years of its existence, the thriving international collaboration of GeoZS in the area of mineral resources / raw materials has been growing continuously, not only within the EU institutions involved but also as a proactive member of the EuroGeoSurveys and other international associations. Associations like the International Raw Materials Observatory, which was created as a follow up to INTRAW, a successful project that initiated support for global cooperation related to all aspects of mineral raw materials (research, innovation, education, industry, trade, and recycling).

In 2020, GeoZS joined the European Raw Materials Alliance (ERMA), a network established under the umbrella of KIC EIT Raw Materials that aims to secure access to critical and strategic raw materials, advanced materials, and the processing of know-how for EU Industrial Ecosystems. The Alliance brings together a host of relevant stakeholders: industrial actors throughout the entire value chain, Member States and regions, trade unions, civil society, research and technology organizations, investors, and NGOs.

Slovenia's involvement in joint European efforts extends further still. Next to MZI and GeoZS, other Slovenian partners and stakeholders have been making greater contributions to joint European activities related to raw materials. Many important and tangible results have come out of the various collaborative efforts of the recent past.

It is a pleasure to report that in recent years the activities of KIC EIT Raw Materials has fostered productive collaborations among relevant raw materials related organizations in the East and Southeastern Europe regions. KIC EIT Raw Materials really represents an added value component in this region, for just as elsewhere in Europe it well illustrates the common notion that investment in knowledge always pays off.

One such example is the EIT RM project RESEERVE, one of most influential projects related to mineral resource management in East and Southeastern Europe. The project established registers for primary and secondary mineral resources in Croatia, Bosnia and Herzegovina, Serbia, Montenegro, North Macedonia, and Albania, which inventories are linked with relevant European data platforms. Such development established a firm foundation for the integration of the region into the pan-European Minerals Intelligence instrument. The incorporation of available INSPIRE compliant information secures the constant flow of mineral resource information for all interested stakeholders, including European industry, which is better able to expand its business and/or investments in the East and Southeastern Europe / West Balkan region. Equally important is the fact that the mineral resource sector of the region has become stronger through multilateral knowledge transfer, joint undertakings, and shared results and achievements.

Ljubljana, September 2021

Miloš Bavec
Director

Geological Survey of Slovenia (GeoZS)

MINERAL RESOURCES IN SLOVENIA

©2021, Mineral Resources in Slovenia

ISSN 1855-4733

Published by: Geological Survey of Slovenia, Dimičeva ulica 14,
Ljubljana, Slovenia

Funded by: Ministry of Infrastructure of the Republic of Slovenia,
Langusova ulica 4, Ljubljana, Slovenia

Editorial team: Marko Mehle and Duška Rokavec

Technical Editor: Marko Mehle

Design: Vida Pavlica

Printed by: Grafika GRACER

Edition: 400 copies

Cover photo by Martin Gaberšek: *The iron sculpture of the Miner Prometheus is placed in gratitude and memory of generations of miners*
Other photos from GeoZS archive
Mineral data Up-dated to 2020

WORK OF THE UNIT FOR MINING (WITHIN THE MINISTRY OF INFRASTRUCTURE)

The Unit for Mining (relevant for mining and mineral resources), organized within the Energy Directorate at the Ministry of Infrastructure, carries out various administrative, expert, coordinative, supervisory and other tasks in the field of mineral management related to exploration and exploitation, including the remediation of degraded areas and in procedures involved in closing mines.

The main activities are:

- development of mining legislation and administrative procedures in line with the Mining Act and National Mining / Mineral Strategy,
- the issuing of mineral exploration licenses and granting of mining rights (concessions),
- preparing expert material for spatial documents and issuing approvals for local spatial plans,
- maintaining a register of persons authorized in mining,
- monitoring of coal mine operations and supervising closing works,
- monitoring the work of the Energy and Mining Inspection,
- performing tasks for “Commission for professional certification in mining”,
- coordination of administrative procedures and projects.

REPUBLIC OF SLOVENIA
GOV.SI

Policies
State Authorities
Registries
Events
News

About the website

Search

About the Ministry of Infrastructure

Coronavirus disease COVID-19
Current information, instructions and entry restrictions are available on the [Coronavirus disease COVID-19 website](#)

Slovenian Presidency of the Council of the EU
Slovenia will strive to actively contribute to strengthening the EU's resilience to health, economic, energy, climate and cyber crises, which is incorporated in the slogan "Together. Resilient. Europe." Visit the official website of the Slovenian Presidency of the Council of the European Union [www.si2021.eu](#)

The Ministry of Infrastructure ensures continuous improvements to Slovenian transport and energy infrastructure. We maintain, plan, regulate, and improve the field of rail, road, air, cableway, and maritime transport as well as inland waterway transport.

We are also responsible for transport policies and infrastructure. We strive to achieve sustainable mobility and transport, which should be safer, more economical, and green. We ensure that energy supply is reliable and set the foundations for transitioning into a society which uses energy products more effectively and generates energy mainly from renewable sources.

Leadership

Jernej Vrtovec
Minister
Ministry of Infrastructure
+386 1 478 80 00
gp.mzi@gov.si

Blaž Košorok
State Secretary
Ministry of Infrastructure
+386 1 478 80 00
gp.mzi@gov.si

Aleš Mihetič
State Secretary
Ministry of Infrastructure
+386 1 478 80 00
gp.mzi@gov.si

Ministry of Infrastructure
Langusova ulica 4
1535 Ljubljana
Show on map
+386 1 478 80 00
gp.mzi@gov.si

Official Ministry of Infrastructure website

WORK PLAN OF THE GEOLOGICAL SURVEY OF SLOVENIA FOR THE MINISTRY OF INFRASTRUCTURE

The basic starting points for the annual GeoZS work program are defined in line with Slovenian legislation, EU directives and the needs of the ministry responsible for mining (Ministry of Infrastructure - Energy Directorate - Unit for Mining).

The work program performed by GeoZS is divided into the main sets of tasks according to the needs of the Unit for Mining:

- EXPERTISE
 - expertise for National Mining / Mineral Strategy and other regulations on implementation,
 - expertise in spatial planning supporting licensing procedures,
 - expertise engaging in EU activities related to minerals.
- MINERAL INFORMATION INFRASTRUCTURE
 - development and maintenance of the web application “Mining registry book”,
 - Bulletin Mineral resources,
 - “Balance of mineral reserves and resources”,
 - thematic maps,
 - archive of documentation on closed mines.
- RESEARCH WORK
 - monitoring geological research and storage of samples,
 - evaluating exploitation sites,
 - geothermal resource studies,
 - geological evaluation of hydrocarbons and coal deposits in Slovenia, their energy valuation, and feasibility of exploitation,
 - impacts of mine closures.
- OTHER
 - Participation in the Commission charged with determining mineral reserves and resources. The Commission determines the relevance of Reports of the annual classification of reserves and resources.
 - Organization of thematic workshops and congresses, the results of which are published in scientific and professional publications.

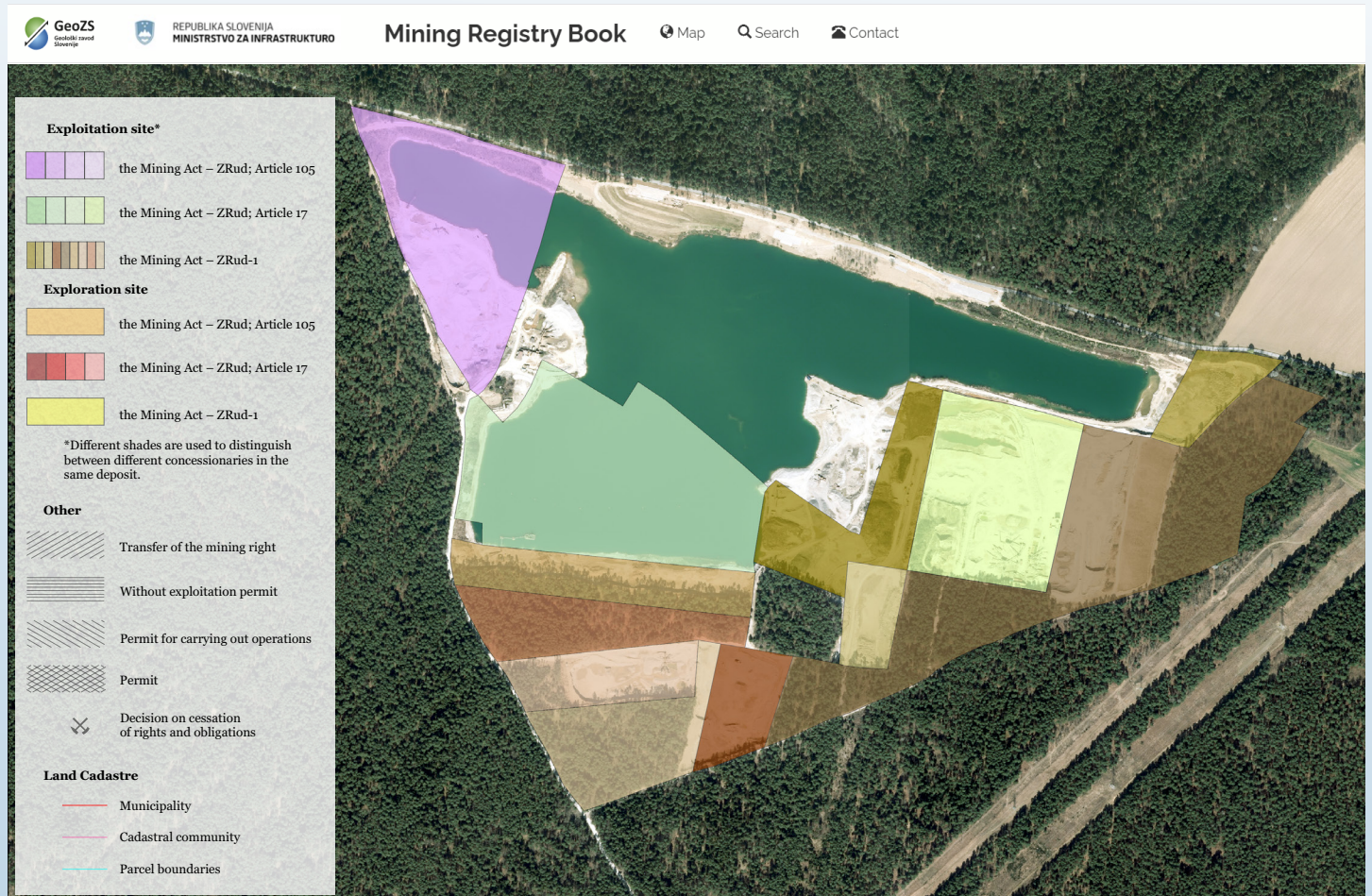
PUBLIC MINING SERVICE IN SLOVENIA

In accordance with Article 18 of the Mining Act (*Official Gazette RS, No. 14/14 – official consolidated text and 61/17-GZ*), the Geological Survey of Slovenia, in its role of Public Mining Service, supports the ministry responsible for mining (Ministry of Infrastructure) in terms of sustainable mineral management and mineral policy.

The Public Mining Service is authorized to monitor all mineral exploration works (e.g. drillings).

Tasks performed by the Public Mining Service:

- maintains a Mining Register and Mining Cadastre on the national level, including a chronology of mining rights granting (“Mining Registry Book” web application and database),
- provides professional expertise for the National Mining / Mineral Strategy,
- supervises field research work and sampling, material storage, and an archive of documentation on closed mines.



“Mining Registry Book” web application for mineral deposits with concessions.

MINERAL DATA COLLECTION IN SLOVENIA

All Slovenian concessionaires are required to report annually on production, degraded surfaces, reserves, and resources in their mining areas (Reporting forms on mineral resources). Mineral data is collected by the responsible ministry. Data collected is further processed and evaluated for purposes of mineral statistics on the national level.

Mineral resources in Slovenia are divided into:

- ENERGY
 - brown coal (production until 2012),
 - lignite,
 - oil and natural gas,
 - geothermal energy.
- METALS (no production in recent decades)

- NON-METALS
 - **industrial minerals and rocks** (chert, lake chalk (production until 2003), bentonite, quartz sand, calcite, tuff, industrial dolomite, ceramic / ball clay),
 - **materials for the construction industry** (brick clay, natural stone (limestone, tonalite, other natural stones), raw materials for the lime and cement industries),
 - **construction materials – aggregates** (crushed stone (limestone, dolomite, magmatic and metamorphic rocks), gravel and sand).
- OTHERS
 - sea salt.

In 2020, there were 2 exploration sites and 202 exploitation sites with mining rights in Slovenia, dealing with 25 different rocks and minerals and run by 131 mining rights holders.

MINERAL AND ENERGY RESOURCES IN SLOVENIA IN 2020

Overview of Slovenia's mineral resources

In Slovenia situated between the Alps, the Pannonian Basin, the Dinarides, and the Dinaric Foreland, energy, metallic, and non-metallic resources occur in different geological formations. Energy resources include coal (lignite, subbituminous coal, and bituminous coal), oil and natural (mostly tight) gas, radioactive mineral resources (uranium), and geothermal energy.

Coal-bearing areas with the greatest resources and proven reserves occur in the Velenje Basin (N Slovenia; Pliocene lignite), the Sava Basin (Eastern Central Slovenia; Oligocene subbituminous ("hard brown") coal), and the Pannonian Basin (E and NE Slovenia; Miocene lignite and "brown" coal). Uranium ore occurs mainly in the area of Žirovski Vrh, W of Ljubljana, in the Permian Val Gardena / Gröden Formation. The most promising area for oil and gas generation and accumulation is the Pannonian Basin. In other areas, hydrocarbons may have been generated in various known source rocks (from the Palaeozoic to Early Tertiary) but were lost (not trapped) during subsequent geological processes. Offshore, in the Adriatic Sea (as in the case of Italy, Croatia, and southwards), sediments and sedimentary rocks might represent a potential area, but Slovenia's claim to the sea is very limited, and no exploration has yet been carried out there. Slovenia has one oil-and-gas field in operation – the Dolina-Petišovci field, since 1942. Oil production is only symbolic (less than 500 tons/year), but gas production has been increasing in recent years after two new wells – Pg-10 and Pg-11A – from 2011 were activated.



Pg-10 and Pg-11A were drilled as the most recent wells (3545 and 3500 m deep) in the Dolina-Petišovci oil-and-gas field.

On the metallogenic map of Slovenia, more than 220 locations of metal mineral deposits and occurrences are marked, a few dozen of which were once mining sites (ore deposits), while the rest represent ore occurrences only. No metal mines are currently active. Potential economic significance can be attributed primarily to sites bearing mercury (Idrija), lead and zinc (Mežica, Litija), uranium (Žirovski vrh) and to a lesser extent copper (Sovodeni), molybdenum (Mežica), antimony (Trojane), manganese (Karavanke) and iron and bauxite.

Non-metallic mineral resources of higher market value (industrial minerals and rocks) that could be exported occur only moderately. Non-metallic mineral resources of lesser value prevail (mineral resources for building materials and

construction), which are primarily used domestically or are enriched and used in semi-manufacturing and manufacturing. Domestic non-metallic mineral resources are used in the construction, ceramic, brick, metallurgy, and metalworking industries, for the environment and water purification, and for glass manufacturing, farming, foodstuffs and similar.



Underground lignite mining in Velenje

Mining enjoys a long tradition in Slovenia. In the past this consisted in the exploitation of a significant quantity of mercury in Idrija, whereas today it involves technologically advanced underground extraction of lignite in Velenje. After 1990, several underground coal mines, as well as uranium, mercury, and lead and zinc mines, were closed. Only open pit mines of non-metallic mineral resources and one underground lignite mine were still active in 2020. Lignite is produced at the Premogovnik Velenje (Velenje Lignite Mine), while the production of "hard brown coal" in the Trbovlje-Hrastnik Mine concluded in 2012.

Coal mining in Slovenia began in the second half of the 18th century. Almost all coal mining sites known today were discovered in the 18th and 19th centuries and subsequently thoroughly explored, and were later increasingly exploited in the 20th century, especially for the railway and later for the production of electricity at coal-fired power plants. Among the more than 100 coal-mining sites many had only local significance, as can be gleaned from various historical documentation and maps; but a number operated as full-blown collieries, which produced tens to hundreds of thousands of tonnes of coal annually. Between 1950 and 1990, annual coal production (mostly underground) increased from 2 to almost 7 million tonnes (Mt). In the period 1962–1976, the run-of-mine calorific value of all excavated coals (lignites and subbituminous coals) in Slovenia from 11 mines varied at around 13 megajoules per kg (MJ/kg). Peak annual productions reached 6.75 Mt in the 1980s (3.35 t/cap.) from 7 coal mines. In the 1980s, the calorific value of total Slovenian coal production was slightly less than 10 MJ/kg, and coal was used almost exclusively in power plants that produced ca. 37% of the country's electrical energy (about the same as the country's hydro power plants). During this period, maximum annual production in Trbovlje reached 1 Mt of subbituminous ("hard brown") coal, whereas 5 Mt of lignite was produced in Velenje. In the 1990s, coal production was concluded in four coal mines (Laško, Zagorje, Senovo, and Kanižarica), and in 2012 production also wrapped up in Trbovlje-Hrastnik. Over the past two decades, some 4 Mt of lignite with a calorific value of 10.5 MJ/kg was produced annually in Velenje, which has the potential to remain the only active (underground) coal mine through the 2050s.

The uranium mine at Žirovski Vrh, which is the only underground mine in Slovenia that opened after the Second World War, has been in the process of closing since 1991. Production of mercury ore in Idrija ended in 1991, and in Mežica the last tonnes of lead and zinc ore were excavated in 1994. Otherwise, the mines in Idrija and Mežica have been in the process of closing since 1987 and 1988, respectively. The Litija Mine closed and concluded its production of lead and zinc already in the 1960s.

As can be seen from the brief description above, the situation in Slovenia has seen a pronounced change in dynamics over the past 30 years in terms of potential mineral resources and the overall related economic situation. These changes include the closure of centuries-old metal mines, almost all coal mines except for the Velenje Lignite Mine, and the uranium mine; on the other hand, the country has continued to put significant emphasis on non-metallic mineral resources for the building and construction industries. In view of current trends and economic development programmes, primarily as they relate to infrastructure construction (roads, railways, apartment buildings), we can predict future needs for individual non-metallic mineral resources, firstly in construction, with other applications also coming into play in the longer term since 2020. Mineral resources for construction, which will be extracted using surface mining, will continue to represent an important factor in the country's economy and future development. In conclusion, there were 2 exploration sites and 202 exploitation sites with mining rights in Slovenia mining 25 different mineral resources in 2020. These sites were run by 131 mining rights holders.

Use of geothermal energy in Slovenia in 2020

Roughly 18% of the country has significantly greater deep geothermal potential than other parts of the country. As a result of this particular potential, this northeastern region belonging to the Pannonian basin has been intensively investigated in recent years within the frame of various European projects. Efforts have also been put into the promotion of more sustainable exploitation by applying new reinjection wells forward into the future based on materials prepared during project operations. Better insights have been gained regarding the characteristics of the geothermal field, the hydrogeological conditions of northeastern and eastern Slovenia, and the potential for direct heat utilization. The northeastern part of the country is characterized by a thin crust and thick Cenozoic sedimentary layers (up to 5.5 km) with elevated surface heat-flow density (HFD) above 100 mW/m² and expected temperatures above 80 °C at a depth of 2 km east of the Maribor - Ptuj line. All production wells situated in that area exploit thermal water from Neogene aquifers, with the exception of those in Maribor. This most geothermally utilized area is filled with Neogene marine and freshwater sediments, and at depths of more than 2500 m thermal fluids reach temperatures of 100 to 200 °C. Here, clays and marls predominate, with intercalations of porous sands and sandstones of the Upper Pannonian-Pontian Mura Fm, where mineral, thermal and thermo-mineral waters are found. These hydraulically connected sandy lenses are widely utilized in Slovenia (and Hungary to the east) and are composed of sand-prone units 50 to 300 m thick found at depth intervals of roughly 0.7 to 1.45 km in the interior parts of the Pannonian basin, with temperatures from 50 to 72 °C.

In recent years, particular attention has been paid to efforts to estimate shallow geothermal potential, particularly in urban and some suburban areas.

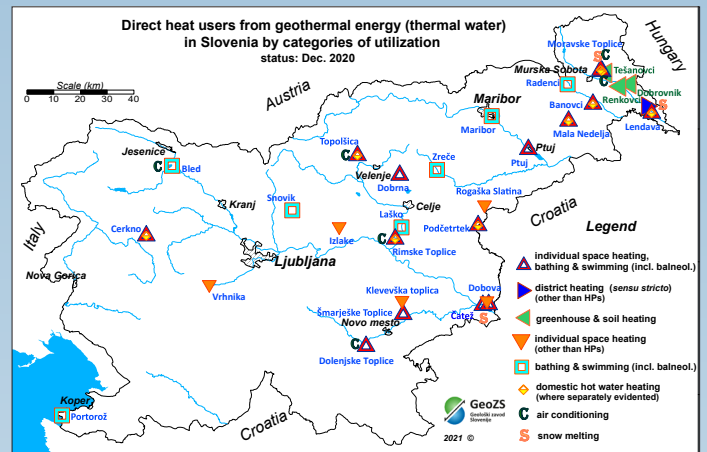


Figure 1: The main categories of direct heat use of geothermal energy from thermal water in Slovenia in 2020 at 31 locations (if the Tešanovci greenhouse is considered as a separate user).

Everywhere, geothermal energy is effectively used in numerous spas and recreation centres, in agriculture, and for individual space and district heating. Compared to 2019, we recorded another rather small user of thermal water from a natural spring, namely the Klevevška toplica spa. On the other hand, 2020 saw no further exploitation of thermal water by the Hotel Diana in Murska Sobota, having closed the well there in autumn 2019. The use of deep geothermal energy is currently based only on the direct use of thermal water, which suffered the effects of the Covid-19 pandemic in 2020 and which considerably slowed – and in some places stopped – the operation of spas and thermal baths. Thermal water was utilized from 50 geothermal wells and 4 thermal springs. Due to the onset of the pandemic, there was a significant reduction in the use of thermal water by some users; as a result it is unrealistic to compare geothermal energy use in 2020 with that in 2019. Nevertheless, total consumption of geothermal energy as of 2020 was 1546.50 TJ, with a corresponding installed capacity of 275.11 MW. Geothermal energy from thermal water is used directly at 31 locations (Figure 1), where installed capacity and geothermal energy consumed amounted to 56.94 MW_t and 456.92 TJ, respectively. Shallow geothermal energy (heat in the shallow subsurface), which is exploited by approximately 13,654 units of ground-source heat pumps, contributed 1089.58 TJ of geothermal energy consumed of the installed capacity of 218.17 MW_t. Of these, the bigger GSHP units (with >20 kW of rated power), of which there are roughly 800, contributed some 304.36 TJ of shallow geothermal energy.

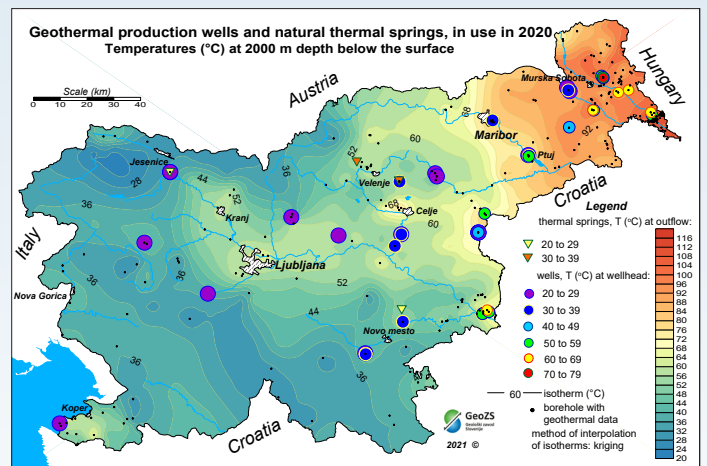


Figure 2: Geothermal production wells and natural thermal springs in use in 2019 in Slovenia (status: Jun. 2020); expected temperatures at a depth of 2000 m beneath the surface.

Miloš Markič, Andreja Senegačnik and Dušan Rajver
(GeoZS)

LEARNING PATHWAY FOR A MODERN APPROACH TO TEACHING AND LEARNING ABOUT RAW MATERIALS

We unconsciously encounter raw materials at every turn. Society and our way of life are based on their use, and they will also be crucial in our successful transition to a carbon-neutral future. In primary and secondary education, raw materials are neglected in Slovenian curricula and the presentation of such in textbooks is largely outdated. In response, we have developed a learning pathway that simplifies teaching for teachers and encourages students to become actively involved in society. The learning pathway for raw materials in school (Figure 1) increases students' interest in science and technology, particularly disciplines related to raw materials and the circular economy. This approach encourages students to collaborate, interact, and explore the challenges associated with raw materials for the circular society of the future. Students become researchers and present their products to the professional and lay public alike.

The main objective of the learning pathway is to increase awareness and knowledge of raw materials in formal education systems throughout the European Union. The learning pathway for raw materials in school begins with a **lesson** in which the relevant content is explained to the students. The lesson actively involves students in creating and discussing their own experiences of the topic. This process can be facilitated using triggers, such as a smartphone. Students are then engaged in **an activity** to support or extend their knowledge and skills. This can include lab experiments, learning games, or situational role-playing. Following the activity, students **visit an industry** that deals with raw materials. This allows them to experience how the topic they have learned about works in the private sector. After the visit, they build on their knowledge with **research** on the topic, culminating in a public presentation of their findings. Once students have completed the research, they **create** a communication product (e.g., video, comic, poster, lab activity, etc.) to present to others. The learning pathway for raw materials in school leads them from **communication** within the school (between peers) to

communication with broader society (the professional and lay public). The knowledge acquired is directly transferable to real life, as they acquire skills related to sustainable and circular thinking and action through the proposed approach to learning. With the proposed learning pathway, we also encourage and develop 21st-century learning skills in young people, such as research in science, creativity, independence, critical thinking, awareness and responsibility, entrepreneurship, communication, and teamwork.

Good cooperation between the three strands of the knowledge triangle – research, education, and entrepreneurship – is essential in achieving the goals of the long-term EU2050 strategy. Awareness of the importance of raw materials and the challenges associated with their extraction, processing, use, replacement, collection, and recycling is essential for a successful transition to the green society of the future. Well and properly educated young people is the only guarantee of progress. To achieve an appropriately high taxonomic level of knowledge and to increase the sustainability of knowledge after primary and secondary education, it is necessary to change current teaching and learning strategies. In the future, the learning pathway for raw materials in school can serve as an effective teaching method that enables young people, through experiential learning, to critically evaluate the importance of raw materials in society.

The learning pathway was created as part of the European project Raw Matters Ambassadors at Schools, where CNR is the lead partner. The project is funded by the H2020 program and the European Institute of Innovation and Technology – Raw Materials Community.

Rok Brajkovič
(GeoZS)

Armida Torreggiani
National Research Council of Italy (CNR)

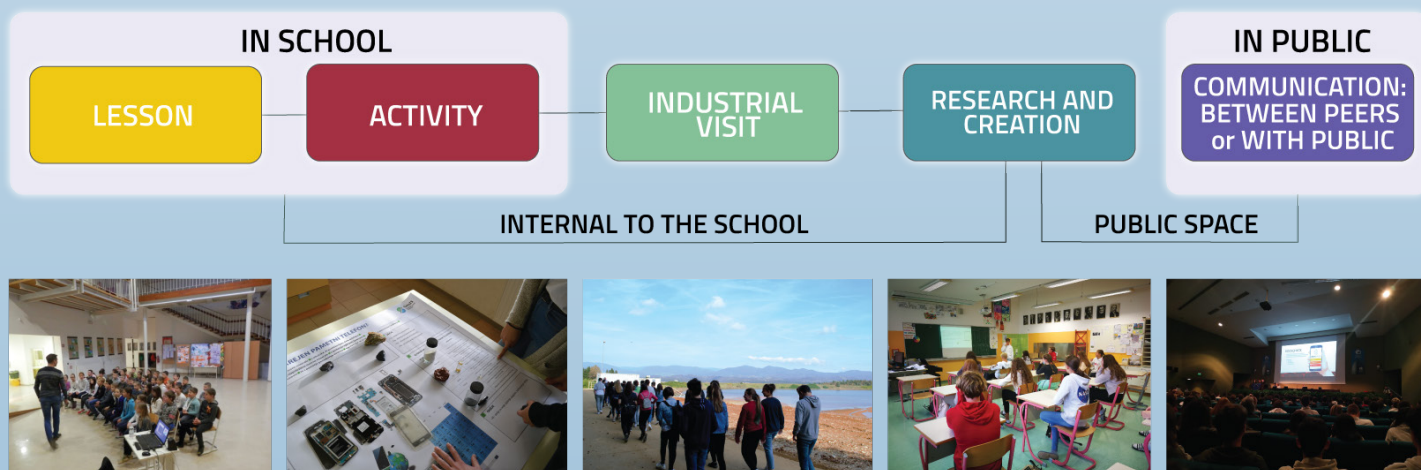


Figure 1: Schematic representation of the learning pathway for raw materials in school, here with various student activities.

The reliable and sustainable supply of raw materials to the European economy is strategically important.

The European Commission has recognised the mineral potential of the Western Balkans as one of the most promising sources of mineral supply, and which region is abundant with mineral resources, including CRMs.

Most EU countries are already part of the Pan-European Minerals Intelligence Network, which provides consistent and organised information on mineral resources. Prior to the launch of the project, the West Balkan region represented a gap in this network. The RESEERVE EIT RawMaterials KAVA project, financed by the European Institute of Innovation and Technology, is addressing this challenge by creating the West Balkan Primary Mineral Register and integrating the region into the Pan-European Minerals Intelligence Network. The raw materials of the West Balkan countries – Serbia, Albania, Bosnia and Herzegovina, Croatia, North Macedonia, and Montenegro – until recently largely absent from the existing European data platforms, were mapped and the West Balkan Mineral Register was created.

The RESEERVE project consortium consists of 14 partners from 12 countries, which belong to research, education, and business sectors. Most of them (10) are from the RIS region (West Balkan). The research partners involved, and represented by national geological surveys, have the task of capturing, evaluating, storing, and providing national geo-data, and also manage the most relevant mineral datasets. Education and business partners contributed their respective experience and knowledge related to potential investments in mineral resource exploitation.

Based on the defined quality, quantity, and format of mineral data, publicly accessible data was extracted and gaps in the mineral information from the West Balkan region were identified. A comparison of datasets from those West Balkan countries involved was performed, and information on mineral raw materials were validated. A common set of attributes was created for the whole region, and the West Balkan Mineral Register is being generated by the Geological Survey of Slovenia



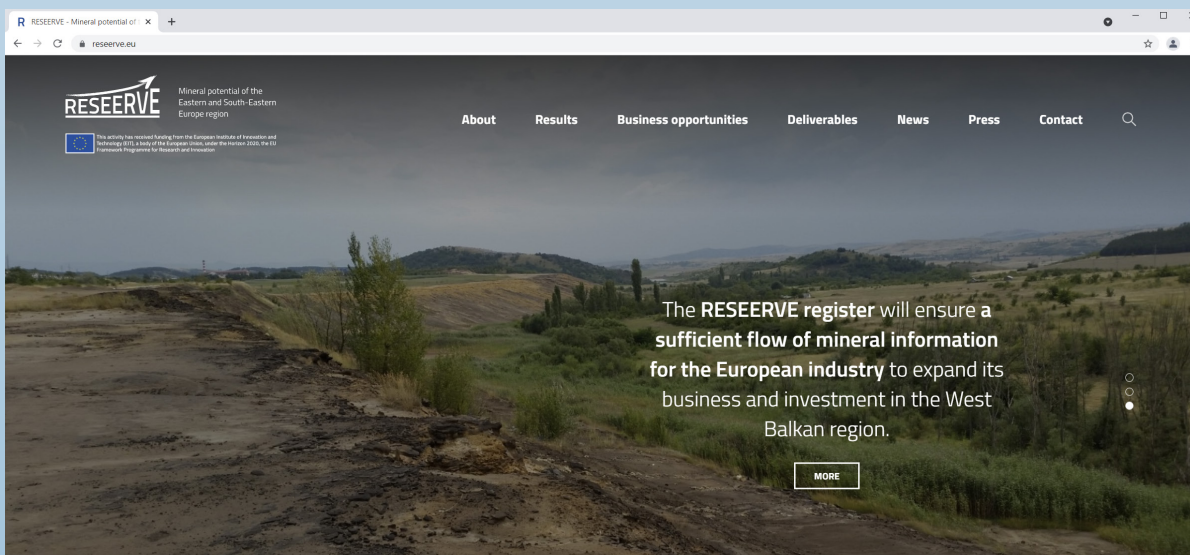
Final RESEERVE meeting in Ljubljana (hybride)

Existing primary raw material data was transformed into INSPIRE-compliant data. Most West Balkan partner countries were connected into the Pan-European Minerals Intelligence Network.

A SWOT/Gap analysis was performed and business opportunities in the region were mapped. The potential to turn the identified primary resources into marketable products is being examined and a roadmap outlining these findings will be created. A SWOT analysis was performed for the region. In addition, a Gap analysis was performed for each of the West Balkan countries in terms of barriers and obstacles (legislative, environmental, technological etc.) to the development of the raw materials sector.

The RESEERVE project represents an excellent case study in the creation of methodologies related to securing and organising mineral data from different sources and countries and preparing data for harvesting into the INSPIRE-aligned network. The mineral data is available for potential investors in the region and can be accessed at <https://reserve.eu>.

Duška Rokavec, Matej Draksler and Katarina Hribernik (GeoZS)



West Balkan Mineral Register

OVERVIEW OF EXPLOITATION SITES AND MINERAL PRODUCTION

LIST OF EXPLOITATION SITES WITH MINING RIGHTS IN SLOVENIA IN 2020

	Mineral commodity	Exploitation sites	Concessionaire		Mineral commodity	Exploitation sites	Concessionaire
1	Coal	Velenje	PREMOGOVNIK VELENJE, d.o.o.	70	Crushed stone - limestone	Mali Medvejk	P.G.M. INŽENIRING proizvodnja gradbenih in drugih materialov d.o.o.
2	Oil and natural gas	Murska depresija	GEOENERGO, raziskave in pridobivanje surove nafte in zemeljskega plina d.o.o.	71	Crushed stone - limestone	Malin dol	KRAJEVNA SKUPNOST LOKOVEC
3	Geothermal energy source	Lendava	PETROL, Slovenska energetska družba, d.d., Ljubljana	72	Crushed stone - limestone	Mežica (Žerjav)	GRADBENI MATERIALI, podjetje za proizvodnjo gradbenih materialov d.o.o.
4	Bentonite	Zaloška Gorica	MONTANA, pridobivanje in predelava nekovinskih rudnin, d.o.o.	73	Crushed stone - limestone	Peskopok Mala gora	O-PROJEKT, Gradbeno projektiranje in inženiring d.o.o., Kočevje
5	Calcite	Stahovica	CALCIT, proizvodnja kalcitnih polnil d.o.o.	74	Crushed stone - limestone	Podgora	KAMTEH GmbH, Predstavninstvo Šmartno ob Paki
6	Chalk	Srpenica	TKK Proizvodnja kemičnih izdelkov d.o.o.	75	Crushed stone - limestone	Predstruge	KPL, družba za gradnjo in vzdrževanje cest, zelenih površin ter inženiring d.o.o.
7	Quartz sand	Bizeljsko	IGM ZAGORJE Industrija gradbenega materiala, d.o.o.	76	Crushed stone - limestone	Razdrto	CPK, d.d., družba za vzdrževanje cest, gradbeništvo in druge poslovne storitve
8	Quartz sand	Globoko	IGM ZAGORJE Industrija gradbenega materiala, d.o.o.	77		Razdrto – širitev	
9	Quartz sand	Kušanovci I	Murexin, gradbeni materiali, d.o.o.	78	Crushed stone - limestone	Rovtarica	GOZDNO GOSPODARSTVO BLEĐ d.o.o.
10	Quartz sand	Moravče - Moravska terciarna kadunja	TERMIT, rudarsko podjetje za pridobivanje kremenovih peskov d.d.	79	Crushed stone - limestone	Rudno polje	GOZDNO GOSPODARSTVO BLEĐ d.o.o.
11	Quartz sand	Polhovica - Prapreče	KREMEN d.o.o., industrija in rudniki nekovin	80	Crushed stone - limestone	Solkan	SALONIT ANHOVO, Kamnolomi, d.o.o.
12	Quartz sand	Ravno	KREMEN d.o.o., industrija in rudniki nekovin	81	Crushed stone - limestone	Stahovica	CALCIT, proizvodnja kalcitnih polnil d.o.o.
13	Quartz sand	Štebih	KREMEN d.o.o., industrija in rudniki nekovin	82	Crushed stone - limestone	Štanjel	KAMNOLOM ŠTANJEL DUŠAN ŽERJAL s.p.
14	Tuff	Zaloška Gorica	MONTANA, pridobivanje in predelava nekovinskih rudnin, d.o.o.	83	Crushed stone - limestone	Ušenišče 2	IAK, INDUSTRIJA APNA KRESNICE, d.o.o.
15	Industrial dolomite	Rečica	GRATEX, Pridobivanje in predelava dolomitnega agregata in kurivoprodaja d.o.o., Laško	84	Crushed stone - limestone	Velika Pirešica	CM CELJE, d.d. - Ceste mostovi Celje, družba za nizke in visoke gradnje - v stečaju
16	Chert	Jersovec II	P-D KREMEN, Pridobivanje drugih rudnin in kamnin, d.o.o.	85		Velika Pirešica - širitev	
17	Ceramic (ball) clay	Hom	Gorenje Keramika, d.o.o.	86	Crushed stone - limestone	Verd	KAMNOLOM VERD Podjetje za proizvodnjo kamnitih agregatov, d.o.o.
18		Hom - širitev		87	Crushed stone - limestone	Vrhpeč - širitev 1	CGP, družba za gradbeništvo, inženiring, proizvodnjo in vzdrževanje cest, d.d.
19	Fire resistant clay	Globoko	IGM ZAGORJE Industrija gradbenega materiala, d.o.o.	88		Vrhpeč - širitev 2	
20	Brick clay	Hardeška šuma - širitev 3	Wienerberger, proizvodnja in prodaja gradbenega materiala, d.o.o.	89	Crushed stone - dolomite	Adamlje 2	KAMNOLOM JEŽCE, JOŽE ADAMLJE, S.P.
21		Hardeška šuma - širitev 4		90	Crushed stone - dolomite	Andraž 2	EKOMINERAL, svetovanje, storitve, proizvodnja, d.o.o.
22	Brick clay	Oroglica II – širitev	GORIŠKE OPEKARNE d.o.o.	91	Crushed stone - dolomite	Batič	GRADBENIŠTVO PERŠE UROŠ PERŠE s.p.
23	Brick clay	Šmiklavž	VOC Ekologija, urejanje okolja d.o.o..	92	Crushed stone - dolomite	Bela	KLAS PRODAJALNA NOVE IN RABLJENE KMETIJSKE TER GRADBENE MEHANIZACIJE, STARO ZA NOVO STANISLAV HACE S.P.
24		Šmiklavž - širitev		93	Crushed stone - dolomite	Bereča vas	AVTOPREVOZNIŠTVO IN PRIDOBIVANJE PESKA IN GRAMOZA - JANEZ AMBROŽIČ S.P.
25	Brick marl	Oroglica II – širitev	GORIŠKE OPEKARNE d.o.o.	94	Crushed stone - dolomite	Bizeljsko 3	AGRAD podjetje za trgovino, gradbeništvo in gostinstvo d.o.o.
26	Natural stone – limestone	Debela Griža pri Povirju	KAMNOSEŠTVO TAVČAR pridobivanje in obdelava kamna d.o.o.	95	Crushed stone - dolomite	Boben	AGM NEMEC, podjetje za proizvodnjo, trgovino in storitve d.o.o.
27		Debela Griža pri Povirju - širitev		96	Crushed stone - dolomite	Borovnik	AGM NEMEC, podjetje za proizvodnjo, trgovino in storitve d.o.o.
28	Natural stone - limestone	Doline – repen	MARMOR, Podjetje za pridobivanje in obdelavo naravnega kamna Sežana, d.d.	97	Crushed stone - dolomite	Bradeško – Zadobje	IZKOPI IN PREVOZI JANEZ BRADŠKO S.P.
29	Natural stone - limestone	Drenov Grič	MINERAL, obdelava naravnega kamna, d.o.o.	98	Crushed stone - dolomite	Brezovica K2	KOGRAD gradbeništvo d.o.o.
30	Natural stone - limestone	Hotavlj	MARMOR HOTAVLJE, družba za obdelavo kamna, d.o.o.	99	Crushed stone - dolomite	Bučka	AVTOPREVOZNIŠTVO - TGM - MKI JOŽEF TOMAŽIN S.P.
31	Natural stone - limestone	Kazlje	MARMOR, Podjetje za pridobivanje in obdelavo naravnega kamna Sežana, d.d.	100		Bučka - širitev	
32	Natural stone - limestone	Kopriva	MARMOR, Podjetje za pridobivanje in obdelavo naravnega kamna Sežana, d.d.	101	Crushed stone - dolomite	Cerov Log - širitev 2	CGP, družba za gradbeništvo, inženiring, proizvodnjo in vzdrževanje cest, d.d.
33	Natural stone - limestone	Lesno Brdo	MINERAL, obdelava naravnega kamna, d.o.o.	102	Crushed stone - dolomite	Červivec	GMP LUZAR Škojčan, nizke gradnje d.o.o.
34	Natural stone - limestone	Lipica I	MARMOR, Podjetje za pridobivanje in obdelavo naravnega kamna Sežana, d.d.	103	Crushed stone - dolomite	Dolenje Lahnice	CGP, družba za gradbeništvo, inženiring, proizvodnjo in vzdrževanje cest, d.d.
35	Natural stone - limestone	Lipica II	MARMOR, Podjetje za pridobivanje in obdelavo naravnega kamna Sežana, d.d.	104	Crushed stone - dolomite	Draga	TRGOGRAD trgovina in gradbeništvo, d.o.o., Litija
36		Lipica II - širitev		105	Crushed stone - dolomite	Draga pri Cerovici	DRAGA Separacija peska, d.o.o., Litija
37	Natural stone - limestone	Šumet	MEDARD ŠUMET	106	Crushed stone - dolomite	Grdadolnik	TGM IN PRIDOBIVANJE PESKA FRANC GRDAD-OLNIK S.P.
38	Natural stone - limestone	Tomaj	MARMOR, Podjetje za pridobivanje in obdelavo naravnega kamna Sežana, d.d.	107	Crushed stone - dolomite	Gunte	CGP, družba za gradbeništvo, inženiring, proizvodnjo in vzdrževanje cest, d.d.
39	Natural stone - tonalite	Cezlak	EKOREN, podjetje za zbiranje in ravnanje z odpadki, d.o.o.	108	Crushed stone - dolomite	Hrast pri Vinici J2	PRIDOBIVANJE IN PRODAJA PESKA ZDRAVKO JURŠINIČ S.P.
40	Natural stone - tonalite	Cezlak I	MINERAL, obdelava naravnega kamna, d.o.o.	109	Crushed stone - dolomite	Hrast pri Vinici S	AGM Starešnič, avtoprevozi, gradbeništvo in mehanizacija, d.o.o.
41	Natural stone - other	Cezlak II	MINERAL, obdelava naravnega kamna, d.o.o.	110		Ježce	
42	Natural stone - other	Klemenc	KAMNOLOM KLEMENC SILVESTER KLEMENC s.p	111	Crushed stone - dolomite	Ježce - širitev 1	PESKOKOP KEPA SUZANA KEPA s.p.
43	Natural stone - other	Kotnik	KAMNOLOM KLEMENC MILAN KLEMENC S.P.	112		Ježce - širitev 2	
44	Natural stone - other	Krajnc	PREDELAVA OKRASNEGA KAMNA SIMON KRAJNC S.P.	113	Crushed stone - dolomite	Kamna Gorica	GORENJSKA GRADBENA DRUŽBA, projektiranje, inženiring, gradnja in vzdrževanje objektov visoke in nizke gradnje d.d.
45	Natural stone - other	Loška gora	ČREŠNAR ANTON	114	Crushed stone - dolomite	Klanci	GREĐIN gradbeno in transportno podjetje Markovec d.o.o.
46	Natural stone - other	Ovčar	OVČAR ALOJZ - DOPOLNILNA DEJAVNOST NA KMETIJI	115	Crushed stone - dolomite	Kmetov pruh	TRGOGRAD trgovina in gradbeništvo, d.o.o., Litija
47	Natural stone - other	Premičan	INGEN - Gradbeni inženiring, d.o.o.	116	Crushed stone - dolomite	Kočevska Reka	SNEŽNIK podjetje za proizvodnjo in storitve, d.o.o.
48	Natural stone - other	Vundušek	ŽOLGER JOŽEF S.P. - GRADBENE STORITVE AVTOPREVOZNIŠTVO ŽOLGER	117	Crushed stone - dolomite	Konjiška gora	KONGRAD gradbeno, obrtno, instalcijsko in proizvodno podjetje d.d.
49	Limestone for lime and cement	Lipovški vrh	IGM ZAGORJE Industrija gradbenega materiala, d.o.o.	118	Crushed stone - dolomite	Koprivnik	TRGOGRAD KAMNOLOMI, Proizvodnja in storitve v gradbeništvo, d.o.o.
50	Limestone for lime and cement	Retje - Plesko	Lafarge Cement, d.o.o., Trbovlje	119	Crushed stone - dolomite	Koševnik	DOLOMIT GRADBENA MEHANIZACIJA-SEPARACIJA PESKA JANKO KOSMAC S.P.
51	Limestone for lime and cement	Stahovica	CALCIT, proizvodnja kalcitnih polnil d.o.o.	120	Crushed stone - dolomite	Kot pri Ribnici	KLUN - PESKOKOP, TRANSPORT IN USLUGE TGM KLUN JOŽE S.P.
52	Limestone for lime and cement	Ušenišče 2	IAK, INDUSTRIJA APNA KRESNICE, d.o.o.	121	Crushed stone - dolomite	Laharna	RASPET, Podjetje za proizvodnjo materialov in gradbene storitve d.o.o.
53	Limestone for lime and cement	Zidani Most	APNENEC d.o.o., Proizvodnja apnenčeve moke	122	Crushed stone - dolomite	Lajše	STORITVE S TEŽKO GRADBENO MEHANIZACIJO MARJAN VEHAR S.P.
54	Cement marl	Ānhovo	SALONIT ANHOVO Gradbeni materiali, d.d.	123	Crushed stone - dolomite	Lajše	TOPOS HOTAVLJE, gradbeništvo, proizvodnja, trgovina in storitve, d.o.o.
55	Cement marl	Deskle	SALONIT ANHOVO Gradbeni materiali, d.d.	124	Crushed stone - dolomite	Laze	RIGLER, peskokop, prevozištvo in storitve gradbene mehanizacije, d.o.o.
56	Cement marl	Deskle - Lastivnica - Perunk - širitev	SALONIT ANHOVO Gradbeni materiali, d.d.	125	Crushed stone - dolomite	Lazna	SOŠKO GOZDNO GOSPODARSTVO TOLMIN d.o.o.
57	Cement marl	Retje - Plesko	Lafarge Cement, d.o.o., Trbovlje	126	Crushed stone - dolomite	Log II pri Sevnici	CGP, družba za gradbeništvo, inženiring, proizvodnjo in vzdrževanje cest, d.d.
58	Cement marl	Rodež	SALONIT ANHOVO Gradbeni materiali, d.d.	127	Crushed stone - dolomite	Lukovica 2	STRABAG gradbene storitve d.o.o.
59	Crushed stone - limestone	Bitenjska planina	GOZDNO GOSPODARSTVO BLEĐ d.o.o.	128	Crushed stone - dolomite	Maček	STORITVE Z GRADBENO MEHANIZACIJO MARJAN MAČEK S.P.
60	Crushed stone - limestone	Brezovica	VODNOGOSPODARSKO PODJETJE d.d.	129	Crushed stone - dolomite	Mala gora	TANKO podjetje za nizke gradnje in hidrogradnje in trgovino na debelo, d.o.o.
61	Crushed stone - limestone	Črna	CALCIT, proizvodnja kalcitnih polnil d.o.o.	130		Mala gora 2	
62	Crushed stone - limestone	Črni Kal	CPK, d.d., družba za vzdrževanje cest, gradbeništvo in druge poslovne storitve	131	Crushed stone - dolomite	Mivšek	MIVŠEK, OPRAVLJANJE STORITVE Z GRADBENO MEHANIZACIJO, AVTOPREVOZNIŠTVO, DRUGA GRADBENA DELA, RAČUNOVODSKE STORITVE RAJKO MIVŠEK S.P.
63	Crushed stone - limestone	Črni Kal - Črnotiče	SALONIT ANHOVO, Kamnolomi, d.o.o.				
64	Crushed stone - limestone	Gabrovce (Vrbovo)	SALONIT ANHOVO, Kamnolomi, d.o.o.				
65	Crushed stone - limestone	Gorjuše	GOZDNO GOSPODARSTVO BLEĐ d.o.o.				
66	Crushed stone - limestone	Griža pri Rižani	PRIMORJE d.d. družba za gradbeništvo, inženiring in druge poslovne storitve - v stečaju				
67	Crushed stone - limestone	Laže I	KOLEKTOR CESTNO PODJETJE NOVA GORICA, Družba za vzdrževanje in gradnjo cest, d.o.o.				
68		Laže I - širitev					
69	Crushed stone - limestone	Liboje	VOC Ekologija, urejanje okolja d.o.o.				

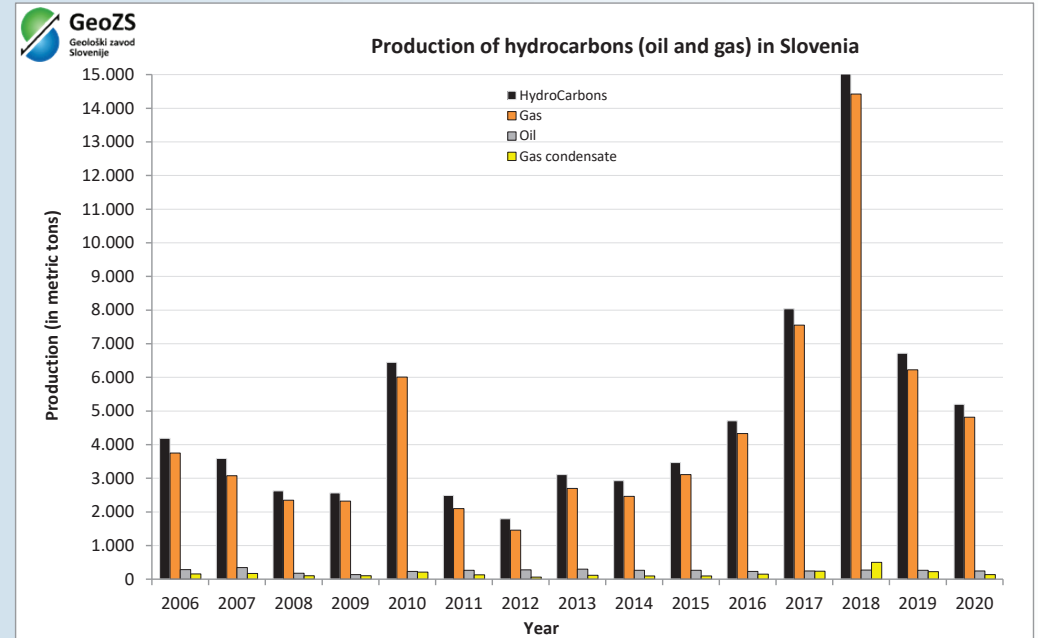
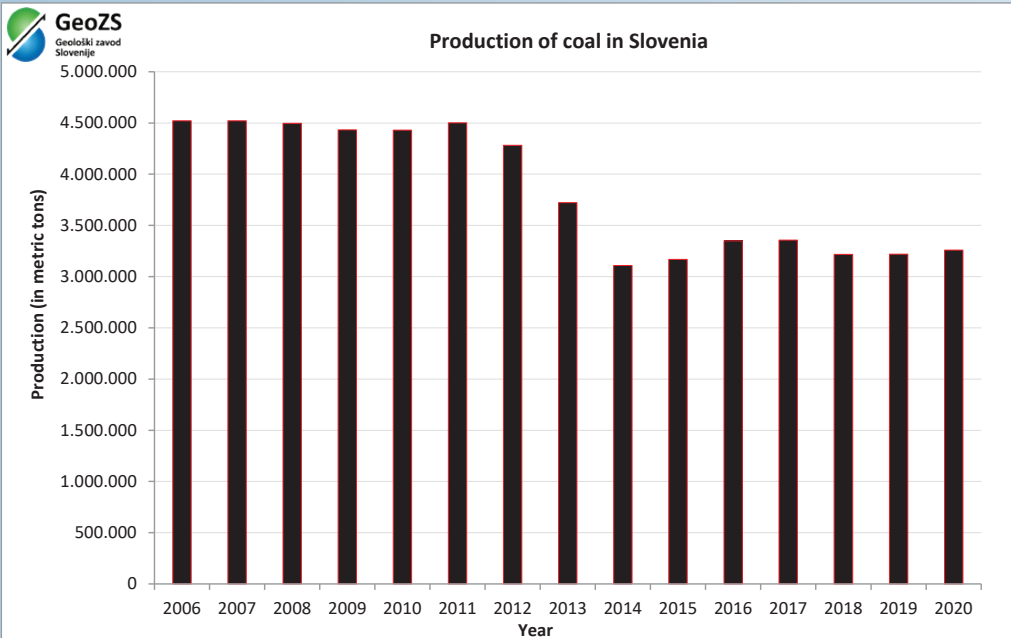
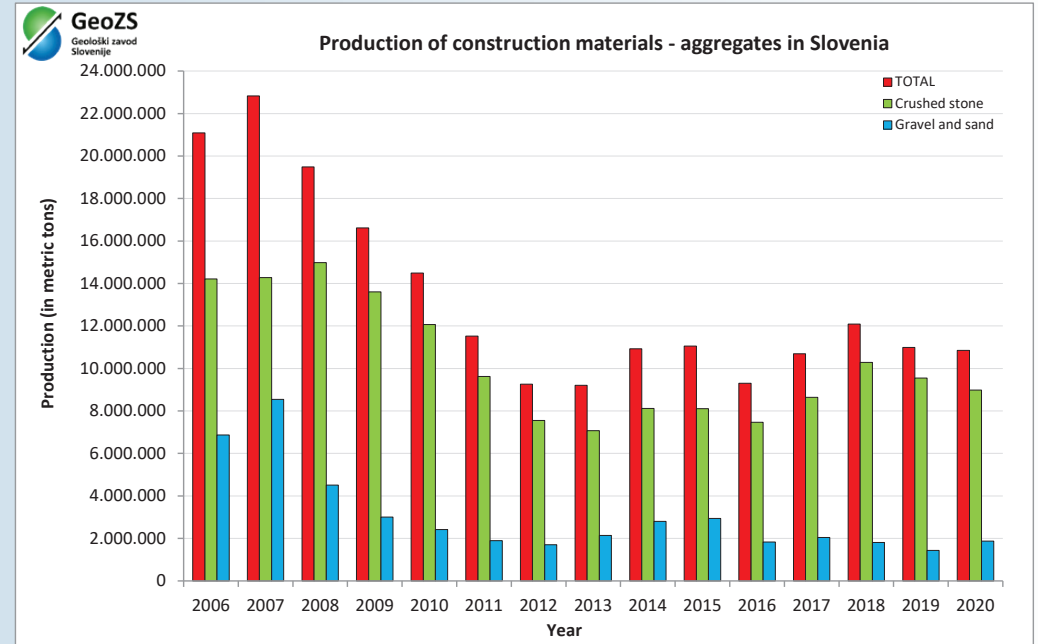
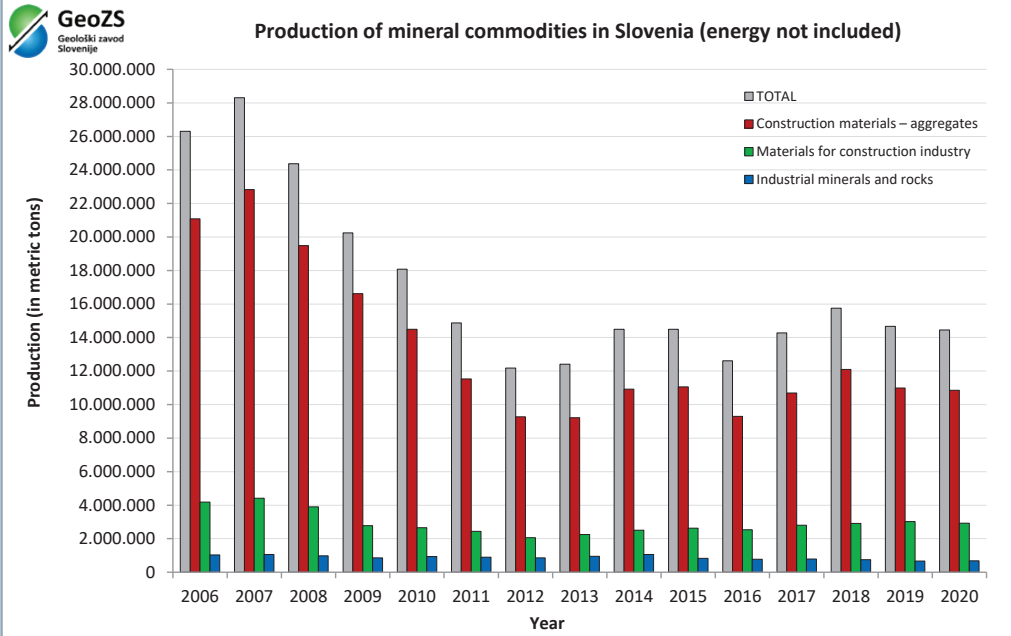
	Mineral commodity	Exploitation sites	Concessionaire		Mineral commodity	Exploitation sites	Concessionaire
132	Crushed stone - dolomite	Mozelj	TRGOGRAD KAMNOLOMI, Proizvodnja in storitve v gradbeništvu, d.o.o.	171	Crushed stone – meta-morphic and magmatic rocks	Sotina 3	POMGRAD - CESTNO PODJETJE, družba za vzdrževanje in gradnjo cest d.d.
133	Crushed stone - dolomite	Mozelj	JAVNO KOMUNALNO PODJETJE KOMUNALA KOČEVJE d.o.o.	172	Crushed stone – meta-morphic and magmatic rocks	Zagaj	TRIK kamenine d.o.o.
134	Crushed stone - dolomite	Mrak	MRAK LEOPOLD	173	Crushed stone – meta-morphic and magmatic rocks	Zagaj	POSREDNIŠTVO IVAN MIJOŠEK S.P.
135	Crushed stone - dolomite	Mrzla rupa	"GRAMEH" GRADBENA MEHANIZACIJA BOJAN JEREB S.P.	174	Gravel and sand	Bakovska cesta	POMGRAD, gradbeno podjetje d.d.
136	Crushed stone - dolomite	Paka pri Velenju 2	RGP d.o.o. rekonstrukcije, gradnje, proizvodnja	175	Gravel and sand	Bezena - širitev	PREVOZNIŠTVO, GRADBENA MEHANIZACIJA, POSREDNIŠTVO, GRAMOZNICA BEZENA SILVA BRACKO S.P.
137	Crushed stone - dolomite	Podskrajnik	JAVNO PODJETJE KOMUNALA CERKNICA d.o.o. Cerknica	176	Gravel and sand	Bistrica pri Naklem	GORENJSKA GRADBENA DRUŽBA, projektiranje, inženiring, gradnja in vzdrževanje objektov visoke in nizke gradnje d.d.
138	Crushed stone - dolomite	Podsmreka – širitev	PESKOKOP UNIVERSAL proizvodnja gradbenega materiala d.o.o. Ivančna Gorica	177	Gravel and sand	Bistrica pri Naklem - širitev	MARALD-MARSEL gradbena mehanizacija-gramoz d.o.o.
139	Crushed stone - dolomite	Podutik	KPL, družba za gradnjo in vzdrževanje cest, zelenih površin ter inženiring d.o.o.	178	Gravel and sand	Dobrava II	NOGRAD, gradbeno in trgovsko podjetje d.o.o.
140	Crushed stone - dolomite	Poljane	PREVOZNIŠTVO - PESKOKOP, KRIVEC JANEZ S.P.	179	Gravel and sand	Dobrovnik	GRAMOZNICA PAČNIK, separacija, prodaja in storitve, d.o.o.
141	Crushed stone - dolomite	Poljčane	TRIK kamenine d.o.o.	180	Gravel and sand	Dobrovnik - širitev	GRAMOZNICA PAČNIK, separacija, prodaja in storitve, d.o.o.
142	Crushed stone - dolomite	Prigorica	RIGLER, peskokop, prevozištvu in storitve gradbene mehanizacije, d.o.o.	181	Gravel and sand	Graben	GORENJC, družba za inženirske dejavnosti, d.o.o.
143	Crushed stone - dolomite	Rečica	GRATEX, Pridobivanje in predelava dolomitskega agregata in kurivprodaja d.o.o., Laško	182	Gravel and sand	Ivanci - širitev	POMGRAD, gradbeno podjetje d.d.
144	Crushed stone - dolomite	Rudnik 2	Avtoprevozištvu in gradbena mehanizacija Klemen Uršič s.p.	183	Gravel and sand	Jurkovec	ŽIHER podjetje za trgovino, proizvodnjo, prevozištvu in storitve d.o.o.
145	Crushed stone - dolomite	Sadinja vas	KPL, družba za gradnjo in vzdrževanje cest, zelenih površin ter inženiring d.o.o.	184	Gravel and sand	Jurkovec - širitev	ECOENERGETIKA družba za varstvo okolja, rudarstvo in gradbeništvo d.o.o. - v stečaju
146	Crushed stone - dolomite	Selo pri Velenju	VEGRAD d.d. Gradbeno industrijsko podjetje - v stečaju	185	Gravel and sand	Krapje	SEGAP rudarstvo, proizvodnja in gradbeništvo d.o.o.
147	Crushed stone - dolomite	Smolevec	STORITVE S TEŽKO GRADBENO MEHANIZACIJO PRIDOBIVANJE PESKA IN GRAMOZA RAJKO ČERIN S.P.	186	Gravel and sand	Melinci	T G P OZMEC - trgovsko, gradbeno in prevozištvu podjetje d.o.o.
148	Crushed stone - dolomite	Soteska	GOZDNO GOSPODARSTVO NOVO MESTO d.d.	187	Gravel and sand	Pleterje II	CESTNO PODJETJE PTUJ D.D.
149	Crushed stone - dolomite	Stranice	VOC Ekologija, urejanje okolja d.o.o.	188	Gravel and sand	Pleterje II - širitev 1b	EPSON, trgovina, gostinstvo in storitve, d. o. o.
150	Crushed stone - dolomite	Šebalk	SOŠKO GOZDNO GOSPODARSTVO TOLMIN d.o.o.	189	Gravel and sand	Pleterje P1	CESTNO PODJETJE PTUJ D.D.
151	Crushed stone - dolomite	Šmarje – Sap	KG-EKO, Proizvodnja in predelava agregatov, d.o.o.	190	Gravel and sand	Pleterje P2b	CESTNO PODJETJE PTUJ D.D.
152	Crushed stone - dolomite	Ter 2	PRIDOBIVANJE PESKA IN GRAMOZA TEREZIJA BURJA S.P.	191	Gravel and sand	Pleterje P2e	CESTNO PODJETJE PTUJ D.D.
153	Crushed stone - dolomite	Topli vrh	GMP PESKOKOP ALEN MUJAKIČ S.P.	192	Gravel and sand	Pleterje P3	TLAKOVEC podjetje za proizvodnjo in trgovino d.o.o.
154	Crushed stone - dolomite	Tržišče	AGM PUNGERČAR, d.o.o., avtoprevozištvu, gradbena mehanizacija, peskokop	193	Gravel and sand	Pleterje P3 - širitev	EPSON, trgovina, gostinstvo in storitve, d. o. o.
155	Crushed stone - dolomite	Tržišče – širitev	STORITVE S TEŽKO GRADBENO MEHANIZACIJO MARJAN VEHAR S.P.	194	Gravel and sand	Pleterje P4	DUIJARDIN gradbeno, transportno, špeditsko, trgovsko, gostinstvo in proizvodno podjetje d.o.o.
156	Crushed stone - dolomite	Vehar – I	REKON gradbeništvo, inženiring, trgovina, d.o.o.	195	Gravel and sand	Pleterje PPK	DUIJARDIN gradbeno, transportno, špeditsko, trgovsko, gostinstvo in proizvodno podjetje d.o.o.
157	Crushed stone - dolomite	Vetrnik 2	CGP, družba za gradbeništvo, inženiring, proizvodnjo in vzdrževanje cest, d.d.	196	Gravel and sand	Pleterje PPK 2	BETON - BETONSKI IZDELKI DUŠAN KUHAH S.P.
158	Crushed stone - dolomite	Vrčice 2	GOSTGRAD, Gostinstvo, gradnje in storitve d.o.o. Žužemberk	197	Gravel and sand	Prepolje	GOKOP gradbeno, gostinstvo in trgovsko podjetje d.o.o.
159	Crushed stone - dolomite	Vrh pri Križu	GORENJSKA GRADBENA DRUŽBA, projektiranje, inženiring, gradnja in vzdrževanje objektov visoke in nizke gradnje d.d.	198	Gravel and sand	Rače 2	PANEL avtoprevozištvu, storitve z gradbeno mehanizacijo, trgovina, gradbeništvo in svetovanje d.o.o.
160	Crushed stone - dolomite	Zala v Davči	GRADNJE gradbeništvo in prevozištvu d.o.o. Boštanj	199	Gravel and sand	Selnica ob Dravi	KONSTRUKTOR VGR gradbeništvo, proizvodnja, trgovina in storitve, d.o.o. - v stečaju
161	Crushed stone - dolomite	Zavratec 1b	STEDO proizvodnja, trgovina in storitve d.o.o.	200	Gravel and sand	Selnica ob Dravi	MAGDA GODEC družba za proizvodnjo, trgovino in storitve d.o.o.
162	Crushed stone - dolomite	Zelence	KAMNOLOM ZELŠE, d.o.o.	201	Gravel and sand	Stari Grad 3b	Kostak, komunalno in gradbeno podjetje, d.d.
163	Crushed stone - dolomite	Zelše	PREVOZNE STORITVE, ZEMELJSKA DELA, PRIDOBIVANJE KAMNA ANDREJ JAGODIČ S.P.	202	Gravel and sand	Stari Grad 4	Kostak, komunalno in gradbeno podjetje, d.d.
164	Crushed stone - dolomite	Zelše - širitev	KRAJEVNA SKUPNOST LOKA PRI ŽUSMU	203	Gravel and sand	Šentvid pri Vuženic	GRADBENIŠTVO KUSTER, nizke in visoke gradnje, d.o.o.
165	Crushed stone - dolomite	Zg. Gabernik	PREVOZNE STORITVE, ZEMELJSKA DELA, PRIDOBIVANJE KAMNA ANDREJ JAGODIČ S.P.	204	Gravel and sand	Šentvid pri Vuženic - širitev	JAVNO KOMUNALNO PODJETJE DRAVOGRAD d.o.o.
166	Crushed stone - dolomite	Žamerk	KRAJEVNA SKUPNOST LOKA PRI ŽUSMU	205	Gravel and sand	Trbonje 2	SOLINE Pridelava soli, d.o.o.
167	Crushed stone - dolomite	Žusem 2	KRAJEVNA SKUPNOST LOKA PRI ŽUSMU	206	Gravel and sand		SOLINE Pridelava soli, d.o.o.
168	Crushed stone – meta-morphic and magmatic rocks	Kamna Gorica	GORENJSKA GRADBENA DRUŽBA, projektiranje, inženiring, gradnja in vzdrževanje objektov visoke in nizke gradnje d.d.	207	Sea salt	Lera in Fontanigge	
169	Crushed stone – meta-morphic and magmatic rocks	Lenart pri Gornjem Gradu 2	"TUJKA" PESKOKOP TUFA KANOLŠČICA PETER BEZOVŠEK S.P.	208	Sea salt	Strunjan	
170	Crushed stone – meta-morphic and magmatic rocks	Martinček	GOZDNO GOSPODARSTVO BLED d.o.o.	209			
				210			
				211			

NUMBER OF EXPLOITATION SITES (NON-ENERGETIC) IN SLOVENIA

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Bentonite	1	1	1	1	1	1	1	1	1	1	1	1
Calcite	1	1	1	1	1	1	2	1	1	1	1	1
Chalk	1	1	1	1	1	1	1	1	1	1	1	1
Quartz sand	7	7	7	7	7	7	7	7	7	7	7	7
Tuff	1	1	1	1	1	1	1	1	1	1	1	1
Industrial dolomite	2	2	2	2	2	1	1	1	1	1	1	1
Chert	1	1	1	1	1	1	1	1	1	1	1	1
Ceramic clay	5	4	4	4	4	5	4	5	5	3	3	3
Industrial minerals and rocks	19	18	18	18	18	18	18	18	18	16	16	16
Brick clay	7	9	8	7	5	6	5	6	5	5	5	6
Natural stone												
limestone	11	13	12	12	11	13	14	15	14	14	13	13
tonalite	3	3	3	3	3	3	3	2	1	1	1	2
other	15	15	14	14	13	13	13	12	10	10	9	8
Natural stone	29	31	29	29	27	29	30	29	25	25	23	23
Raw materials for lime	6	6	6	6	6	6	5	5	5	5	5	5
Raw materials for cement	6	6	6	6	5	5	5	4	4	4	4	5
Materials for construction industry	48	52	49	48	43	46	45	44	39	39	37	39
Crushed stone												
limestone	25	26	26	26	27	29	36	33	32	32	30	30
dolomite	99	101	101	94	95	94	84	86	85	84	80	79
other	3	4	4	4	4	6	6	5	5	5	5	6
Crushed stone	127	131	131	124	126	129	126	124	122	121	115	115
Gravel and sand	47	47	45	41	47	44	38	34	31	32	31	36
Construction materials – aggregates	174	178	176	165	173	173	164	158	153	153	146	151
TOTAL	241	248	243	231	234	237	227	220	210	210	199	206

PRODUCTION OF MINERAL COMMODITIES IN SLOVENIA (in metric tons)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Bentonite	130	130	160	104	135	168	98	143	199	232	182	147	113	99	77
Calcite	271.509	273.745	348.152	405.467	459.926	458.800	474.152	555.663	646.542	268.677	255.709	220.771	204.914	221.767	229.111
Kaolin															
Chalk															
Quartz sand	278.041	295.667	289.529	215.065	253.866	230.908	219.481	224.387	207.381	343.455	338.080	359.476	343.683	311.954	325.318
Tuff	88.013	90.319	109.949	58.062	39.401	24.639	23.732	19.171	8.872	9.116	8.840	9.144	8.633	9.133	8.257
Industrial dolomite	294.645	299.177	177.715	146.214	156.179	154.721	119.317	136.516	177.338	172.697	150.545	172.656	129.821	102.619	88.275
Chert	15.445	16.745	21.648	16.695	16.114	18.907	9.960	11.530	15.340	21.041	20.272	15.525	20.436	20.773	21.485
Ceramic clay	86.443	78.221	32.200	9.478	12.279	10.103	5.295	3.479	7.461	7.574		5.478	42.052	6.412	5.354
Industrial minerals and rocks	1.034.226	1.054.004	979.353	851.085	937.900	898.246	852.035	950.889	1.063.133	822.792	773.628	783.197	749.652	672.757	677.877
Brick clay	638.329	706.866	420.360	235.348	296.118	374.020	159.746	180.748	154.944	194.852	202.540	167.898	159.615	180.088	273.771
Natural stone															
limestone	52.459	47.983	71.260	73.156	55.045	25.109	21.006	21.158	79.005	99.541	101.991	107.630	91.231	69.155	58.109
tonalite	56.587	65.715	67.400	39.787	36.855	45.930	23.374	41.016	23.749	26.995	26.746	28.544	41.793	25.078	17.839
other	24.392	27.124	21.959	21.573	19.724	11.896	11.526	8.332	9.917	9.790	7.690	6.151	3.615	2.660	16.370
Natural stone	133.438	140.822	160.619	134.516	111.624	82.935	55.906	70.506	112.671	136.326	136.427	142.325	136.639	96.893	92.318
Raw materials for lime	2.089.495	2.082.593	1.631.391	1.221.197	1.260.446	1.103.163	896.241	860.890	919.528	1.103.283	1.046.293	1.174.038	1.212.883	1.186.037	1.025.514
Raw materials for cement	1.324.803	1.489.625	1.684.258	1.188.493	982.653	883.573	952.758	1.138.560	1.325.907	1.190.807	1.149.065	1.318.832	1.405.518	1.551.728	1.532.796
Materials for construction industry	4.186.065	4.419.906	3.896.628	2.779.554	2.650.841	2.443.691	2.064.651	2.250.704	2.513.050	2.625.268	2.534.325	2.803.093	2.914.655	3.014.746	2.924.399
Crushed stone															
limestone	7.242.777	7.134.305	7.541.043	6.284.804	5.773.480	4.034.597	3.264.404	2.813.266	3.060.104	3.486.409	3.164.109	3.824.938	4.757.905	4.557.967	4.447.674
dolomite	6.712.996	6.909.947	7.291.259	7.175.362	6.143.336	5.440.918	4.223.692	4.127.357	4.901.721	4.427.094	4.280.306	4.808.753	5.516.316	4.984.010	4.484.334
other	257.546	235.002	150.258	149.562	155.716	151.276	69.335	127.272	161.762	194.610	26.018	9.190	7.781	8.662	51.910
Crushed stone	14.213.319	14.279.254	14.982.560	13.609.728	12.072.532	9.626.791	7.557.431	7.067.895	8.123.587	8.108.113	7.470.433	8.642.881	10.282.002	9.550.639	8.983.918
Gravel and sand	6.871.519	8.549.960	4.506.076	3.001.291	2.422.771	1.899.770	1.707.455	2.143.013	2.799.006	2.943.870	1.833.732	2.047.403	1.810.666	1.437.101	1.869.851
Construction materials – aggregates	21.084.838	22.829.214	19.488.636	16.611.019	14.495.303	11.526.561	9.264.886	9.210.908	10.922.593	11.051.983	9.304.165	10.690.284	12.092.668	10.987.740	10.853.769
TOTAL	26.305.129	28.303.124	24.364.617	20.241.658	18.084.044	14.868.498	12.181.572	12.412.501	14.498.776	14.500.043	12.612.118	14.276.574	15.756.975	14.675.243	14.456.045
brown coal	587.912	483.417	488.828	510.769	419.466	435.800	314.262								
lignite	3.932.842	4.037.766	4.008.442	3.921.746	4.010.930	4.066.278	3.967.064	3.721.188	3.108.203	3.168.001	3.348.889	3.355.664	3.216.735	3.218.696	3.259.309
coal	4.520.754	4.521.183	4.497.270	4.432.515	4.430.396	4.502.078	4.281.326	3.721.188	3.108.203	3.168.001	3.348.889	3.355.664	3.216.735	3.218.696	3.259.309
oil	284	344	174	138	233	263	279	298	366	261	229	241	270	267	247
gas condensate	154	167	104	105	207	131	60	114	95	98	150	240	499	223	138
gas	3.751	3.078	2.348	2.317	6.006	2.095	1.454	2.698	2.463	3.109	4.331	7.554	14.423	6.225	4.815
oil and gas	4.189	3.589	2.626	2.560	6.446	2.489	1.793	3.110	2.924	3.468	4.710	8.035	15.192	6.715	5.200
sea salt	1.624	3.029	535	2.924	59	4.291	5.684	3.360	0	2.191	2.417	2.335	2.018	1.437	805



PARTIAL LIST OF EU-FUNDED MINERAL RESOURCES PROJECTS

Programme	Project acronym	State	Project title	Start	End	Duration (months)	Lead partner	Project summary
KIC EIT RawMaterials	RC ADRIA	ongoing	Regional center ADRIA, EIT RawMaterials Hub	Jan '18	Dec '21	48	Geological Survey of Slovenia (GeoZS), Slovenian National Building and Civil Engineering Institute (ZAG), Faculty of Mining, Geology and Petroleum Engineering at the University of Zagreb (UNIZG-RGNF), Croatia	RC Adria is a hub for mineral raw material stakeholders focused primary on Slovenia and Croatia, with outreach to South-East European countries (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Serbia). It acts as an interface between local environments (knowledge triangle) and EIT RawMaterials, enabling access to information on EIT RawMaterials projects and activities. Some of the main objectives of the RC Adria include encouraging networking, exchanging project ideas, and offering support to potential new partners of the EIT RawMaterials community. It represents an informational "one stop shop" for EIT RawMaterials knowledge transfer for all local stakeholders – businesses, educational institutions, research organisations, and local authorities. At the same time, it connects local raw materials communities with their international EIT RawMaterials counterparts.
KIC EIT RawMaterials	InvestRM	ongoing	Multifactor model for investments in the raw material sector	Jan '18	Dec '21	48	Faculty of Mining, Geology and Petroleum Engineering at the University of Zagreb (UNIZG-RGNF), Croatia	The InvestRM project will create a decision-making tool for raw materials companies and investors, mining institutes, technical universities, geological surveys, non-governmental associations, the government of Bosnia and Herzegovina, and state institutions in order to facilitate investments in the raw materials sector. The project is focused on Bosnia and Herzegovina due to its considerable raw material potential, but will also be fully transferable to other East and Southeast European (ESEE) countries.
KIC EIT RawMaterials	RM@Schools-4	ongoing	Raw Matters Ambassadors at Schools 4.0	Jan '21	Mar '24	40	Consiglio Nazionale delle Ricerche (CNR), Italy	Raw Matters Ambassadors at Schools 4 (RM @Schools-4) is a continuation of the RM@Schools 3.0 project, in which the consortium continues to develop a strategic dissemination capacity and methodology to promote science education and careers in the raw materials sector for students aged 10–19 by combining technical knowledge and soft skills such as creativity and communication. Students will have many unique opportunities to interact with relevant experts and researchers through an active learning pathway (hands-on educational toolkits, excursions to industry, and dissemination activities), and then to become in turn young RM ambassadors who share their knowledge with other students (peer-to-peer education) and the wider public. In addition, a RM@Schools handbook will be created, containing all the information on different RM topics and toolkits created within the project in order to train teachers to become RM ambassadors themselves and to promote the project methodology.
KIC EIT RawMaterials	RESEERVE	ongoing	Mineral potential of the ESEE region	Apr '18	Nov '21	44	Geological Survey of Slovenia (GeoZS)	Mineral resources are of strategic importance for the EU. Most EU countries are already part of the Mineral intelligence for Europe providing organised and consistent information on mineral resources on the European level. Most West Balkan countries represented a gap in the EU mineral platform. The RESEERVE project provides knowledge transfer of EIT RM to the West Balkan countries with the aim of facilitating the development of new markets for modern technologies, creating opportunities for start-ups and SMEs, contributing to the creation of new job opportunities, and generating economic added value in the mineral sector. Achieved project objectives: (1) determine available and missing information on primary and secondary mineral resources of the West Balkan area; (2) set up a West Balkan Mineral Register for primary and secondary mineral resources by mapping data from Croatia, Bosnia and Herzegovina, Serbia, Montenegro, North Macedonia, and Albania; (3) to increase mineral management capacity on national levels in the region; and (4) ensure sufficient flow of information on minerals to European industry, with the intention of expanding their business and investments in the region.
KIC EIT RawMaterials	RIS-CuRE	ongoing	Zero waste recovery of copper tailings in the ESEE region	Jan '19	Dec '21	36	Slovenian National Building and Civil Engineering Institute (ZAG)	The work of the RIS-CuRE project is based on an innovation model merging all relevant stakeholders within the knowledge triangle in the field of industry, research, and education to increase regional competitiveness on a regional scale, drawing on the latest know-how of the RIS-CuRE consortium. The final output of the project will be a strong sustainable regional network based on validated and fact-based data, including a study of the potential economic, technological, organisational (legislative), environmental, and social impacts of applying the innovative methodology of the zero-waste extraction of valuable materials in Serbia and the North Macedonia. Once this is developed it will be easy to transfer a validated approach to other parts of the ESEE region with similar geological, social, and economic backgrounds, as well as to other parts of Europe, which will create a ripple effect in the further development of more sustainable mining and processing of primary and secondary raw materials in Europe and around the world.
KIC EIT RawMaterials	RIS-ALiCE	ongoing	Al-rich industrial residues for low-CO2 cement clinkers	Mar '19	Feb '22	36	Slovenian National Building and Civil Engineering Institute (ZAG)	Aluminium is one of the key components in the production of Al-rich mineral binders. In order to reduce the consumption of valuable primary Al-mineral deposits (mainly bauxite), alternative materials can be used in the production of Al-rich mineral binders. Huge amounts of various Al-rich residues (steel slags, red mud, ashes, landfills of bauxite mines) with low recycling rates in RIS countries represent high secondary mineral resource potential. RIS-ALiCE plans to define possible ways of replacing bauxite with Al-rich industrial and mine residues. Moreover, this approach will represent an innovative recycling case study for the ESEE region. The main outcomes of the project are to establish a long-term active network between the producers and the end-users of Al-rich industrial residues; valorisation of Al-rich residues by producing environmentally friendly high-Al mineral binders utilising data from Slovenia, Hungary, and BIH, knowledge transfer from Slovenia, Hungary, and BIH to the whole ESEE region, and a contribution to the implementation of a circular economy and zero-waste management for Al-rich industrial waste in ESEE regions.
Horizon 2020	ROBOMINERS	ongoing	Resilient Bio-inspired Modular Robotic Miner	Jun '19	May '23	48	Universidad Politecnica de Madrid, Spain	The project aims at developing a bio-inspired, modular, and reconfigurable robot-miner for small and difficult to access deposits. The robot will be able to mine underwater, underground, or above water, and due to its unique modular design, it will be able to reach the deposit via a large diameter borehole. The use of the robot miner will be especially relevant for mineral deposits that are small or difficult to access. This covers both abandoned, flooded mines that are no longer accessible using conventional mining techniques, or places that have formerly been explored but where exploitation was considered economically unviable due to the small size of the deposits or the difficulty accessing them.
KIC EIT RawMaterials	UNEXUP	ongoing	UNEXUP, UNEXMIN Upscaling	Jan '20	Dec '22	36	University of Miskolc, Hungary	UNEXUP stands for UNEXMIN Upscaling, a project funded under EIT Raw Materials and a direct continuation of the Horizon 2020 UNEXMIN project. Efforts have been made at UNEXMIN towards the design, preparation, and testing of an innovative exploration technology for underground flooded mines. The main goal of UNEXUP is to launch the UNEXMIN technology into the market, while further improving the system's technology and capabilities. A real service-to-client approach will be demonstrated, supporting mineral exploration and mine surveying efforts in Europe using unique data from flooded underground environments that cannot be obtained without incurring high costs or risks to human lives. Improvements will be made to the UX-1 research prototype, raising technology readiness to TRL 7/8. Specific goals of the UNEXUP project include improving the system's hardware, software, and capabilities, testing the robot's performance in four different pilot tests, commercialising this innovative technology, and launching the service on the market.
KIC EIT RawMaterials	INSite	ongoing	In-situ ore grading system using LIBS in harsh environments	Jan '20	Dec '22	36	INESC TEC Instituto de Engenharia de Sistemas e Computadores do Porto, Portugal	INSite brings together a multidisciplinary research team with a renowned spectroscopy company to take a new smart LIBS (Laser Induced Breakdown Spectroscopy) technology to the market. LIBS is a powerful spectroscopy technique used for element analysis with very promising features for real time assessment of composition. Recently, however, the INESC team has developed novel methods that allow LIBS technology to perform accurate analytical operations even with complex mineral samples, thus enabling real time ore grading. INSite thus aims to bring to market a unique and integrated LIBS technology that can perform accurately in harsh mining environments with true analytical capabilities. These kinds of analytical capabilities in situ is also an asset in many other applications and potential markets, e.g. geosciences research/services, oil and gas research, and various development fields.
Horizon 2020	SCRREEN2	ongoing	Solutions for Critical Raw materials – a European Expert Network 2	Nov 20	Oct 23	36	CEA - The French Alternative Energies and Atomic Energy Commission	The aim of the SCRREEN2 project is to ensure sustainable access to primary and secondary raw materials and in particular Critical Raw Materials (CRMs) in the EU by providing expert advice to better understand the value chains of the raw materials studied and screened in the CRMs assessment. SCRREEN2 will further develop and strengthen the expert network already established in the SCRREEN project. Based on the expertise of the expert network, a CRM factsheet will be validated and improved to provide up-to-date information on CRMs available in primary and secondary resources and their material flow.
	PanAfGeo-2	ongoing	Pan-African Support to the EuroGeoSurveys-Organisation of African Geological Surveys (EGS-OAGS) Partnership	May 21	Apr 24	36	Bureau de Recherches Géologiques et Minières (BRGM), France	PanAfGeo (Pan-African Support to the EuroGeoSurveys-Organisation of African Geological Surveys (EGS-OAGS) Partnership) is a project that supports the training of geoscientific staff from African Geological Surveys through the development of an innovative training programme. The project includes a variety of geological topics, from mineral resources to geohazards. In terms of mineral resources, it aims to increase African geological knowledge and skills for sustainable mineral exploration, exploitation, and related infrastructures. PanAfGeo-2 will contribute to the more sustainable management of natural resources in tackling climate change based on science and technology.
GeoERA	Mintell4EU	ongoing	Mineral Intelligence for Europe	Jul '18	Oct '21	40	Geological Survey of Denmark and Greenland (GEUS)	The EU has identified security of supply, improvement in environmental management, and resource efficiency as key challenges for the raw materials sector. Data on locations 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. The aim of this project is: to improve harmonised data on European raw materials stored in a centralized Mintell4EU database by updating aggregated statistical data compiled in the electronic Minerals Yearbook and to extend the spatial coverage and quality of data that is part of Minerals Inventory; to increase the harmonisation, communication, and interaction between the existing data platforms, such as the EU's Raw Materials Information System; to disseminate data through the European Geological Data Infrastructure in a uniform way; and to test the applicability of the UNFC classification system for obtaining more accurate Pan-European mineral inventories.
GeoERA	FRAME	ongoing	Forecasting and Assessing Europe's Strategic Raw Materials Needs	Jul '18	Oct '21	40	Laboratório Nacional de Energia e Geologia, I. P. (LNEG), Portugal	Europe is experiencing increased consumption of mineral commodities, yet supply does not meet market demand. However, even with the important contribution from recycling of mining and industrial waste, the exploitation of primary mineral deposits will always be needed to cover the ever-growing demand for critical minerals and metals. Currently, the main focus is on applying new technologies in the field of deep exploration and mining, turning low-grade ores into exploitable resources, and reducing huge amounts of mining waste and large tailings by converting them into exploitable resources. The FRAME project is designed to research critical and strategic raw materials in Europe, in scenarios as described above, by employing sound strategies and a partner-base spread across countries that have some of these raw materials. A group of experts will provide innovative contributions towards increasing knowledge of potential primary deposits, identifying new target areas/deposits, and recognising the potential in secondary deposits. FRAME will collect, extract, and disseminate data on strategic and critical minerals in Europe.
GeoERA	EuroLithos	ongoing	European Ornamental Stone Resources	Jul '18	Oct '21	40	Geological Survey of Norway (NGU)	Although ornamental stone remains an important raw material produced all over Europe, its use is decreasing both locally and regionally in many parts of Europe, along with related knowledge, traditions, and skills. EuroLithos was founded with the intention to increase knowledge related to the quality and history of natural stone and its use in Europe, which has the potential to stimulate more sustainable use of stone resources in Europe for the benefit of SMEs, to enrich our cultural heritage, and to establish a sound land use management policy for the safeguarding of ornamental stone deposits. The project addresses several aspects, including the identification and mapping of different types and qualities of construction materials and to provide tools and protocols for the assessment and comparison of deposits. It also addresses cultural heritage and building preservation, since the maintenance of European heritage and the stone industry are mutually dependent. EuroLithos will set up an ornamental stone knowledge base under the umbrella of EGD, covering harmonised spatial data on European stone resources, an atlas of resources and use, a directory of ornamental stone properties, and guidelines on the valorisation of ornamental stone heritage. The project work runs in close collaboration with the GeoERA Information Platform.



SLOVENIAN NATURAL STONE IN THE EUROPEAN STONE INVENTORY

Natural stone is a traditional building material with a long history of use. By shaping rural and urban environments it lends a particular identity to the cultural landscape of each region, which gives it great historical and cultural significance. As a valued raw material, it is produced almost everywhere in Europe, but its use has been in decline as of late, as have the knowledge, traditions, and skills associated with natural stone heritage. Expanding and improving knowledge of the historical use of natural stone, its qualities, and its potential in Europe may contribute to more sustainable use of this valuable resource, to promoting and protecting cultural heritage, and at the same time play a part in developing effective land use.

The GeoERA research project EuroLithos addresses European ornamental stone resources, which aims at raising the intrinsic value of European ornamental stones. The significance of such, both historical and cultural, is being documented for purposes of heritage protection. The cultural impact of natural stone is becoming increasingly recognized and guidelines for its further recognition are being drafted. This will encourage increased use and thus production of European stone, while contributing to the maintenance, preservation, and continuation of Europe's valuable cultural heritage.

Slovenia is relatively rich in natural stone resources, and some are particularly appreciated both at home and abroad. In order to spread knowledge of Slovenian natural stones, to promote our cultural heritage built from domestic stone resources,

and to raise awareness of the need for their sustainable use, the Geological Survey of Slovenia has joined the EuroLithos project and has prepared a list of Slovenian natural stones. Furthermore, we have collected a wide range of available data on their geological settings, application, use and heritage, petrography, mineral and chemical composition, and physical properties. The physical properties of each stone are documented in microphotographs and photographs of their polished surface, as objects, and as buildings in which the stone was used (see Figures), with the quarrying locations and geological units presented on the geological map. The data on Slovenian natural stones was taken from various publications, scientific articles, and books (such as Vesel, 1975; Mirtič et al., 1999; Ramovš, 2000; Kramar et al., 2015 etc.), while data on stone extraction and production was obtained from the Slovenian Mining Registry Book.

The so-called Slovenian unique stone list was prepared following the European standard prEN 12440:2016 (E) Natural stone - Denomination criteria, and additionally supplemented with the most recognised Slovenian natural stones. However, the list is not complete, and may be supplemented even after



Figure 1: Several types of natural stones are used for architecture elements in cultural heritage; here, the restored Roman wall in Ljubljana.



Figure 2: Different Cretaceous limestones with rudist shells in the lobby of the Montanistika building (1937) in Ljubljana. The dark Kazlje limestone and the light grey Kopriva limestone are from Slovenian Kras, while the brownish one is from the island of Brač, in Croatia.



Figure 3: Plečnik's Church of St. Michael (1940) in Črna vas, built from Podpeč limestone and reddish brick.



Figure 4: Country house in Zgornja Besnica with entrance portal, window frames, and benches made of green Peračica tuff.

the project has been concluded. Currently, 25 Slovenian natural stones have been described and their datasets uploaded into the European Geological Data Infrastructure. The locations of the stone provenances are presented in the Atlas, which indicates the geological and geographical distribution of the stone. The characteristics of these stones are now part of the European directory of ornamental stone properties, which consists of “identity cards” representing a technical characterisation of each stone.

We hope with such an inventory knowledge of our long stonecutting tradition and Slovenian stone resources, as well as their remarkable appearance and particular quality will come to be shared throughout Europe and beyond.

EuroLithos is funded by the European Union’s Horizon 2020 research and innovation programme. More information on the project is available at the EuroLithos project website.

Snježana Miletić and Matevž Novak
(GeoZS)

REFERENCES

- EuroLithos project website: <https://www.eurolithos.org/>
 KRAMAR, S., BEDJANIČ, M., MIRTIČ, B., MLADENVIČ, A., ROŽIČ, B., SKABERNE, D., GUTMAN LEVSTIK, M., ZUPANČIČ, N. & COOPER, B. 2015. Podpeč limestone: A heritage stone from Slovenia. Geological Society Special Publication 407, 219-231. 10.1144/SP407.2.
 Mining Registry Book: <https://ms.geo-zs.si/en-GB>
 MIRTIČ, B., MLADENVIČ, A., RAMOVŠ, A., SENEGAČNIK, A., VESEL, J., & VIŽINTIN, N. 1999. Slovenski naravni kamen. Ljubljana, Geological Survey of Slovenia, Slovenian National Building and Civil Engineering Institute, University of Ljubljana Geology department. 131 pg.
 RAMOVŠ, A. 2000. Podpeški in črni ter pisani lesnobrdski apnenec skozi čas. Mineral, Ljubljana. 1-115.
 VESEL, J., ŠKERLJ, J., ČEBULJ, A. & GRIMŠIČAR, A. 1975. Nahajališča okrasnega kamna v Sloveniji. / Freestone quarried in Slovenia. Geologija, 15.

EUROPEAN COMMISSION SUPPORT TO THE ESTABLISHMENT OF EUROPEAN GEOLOGICAL SERVICES – GEOZS ENGAGEMENT IN MINERAL RESOURCES MANAGEMENT

One of the first calls for proposals from the European Union’s Research and Innovation Framework Program for 2021–2027 was a tender for co-financing activities for the establishment of the European Geological Services (HORIZON-CL5-2021-D3-02-14, Support to the activities of the European Geological Services) (<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home>). The call was published within Cluster 5 (climate change, energy and mobility), Pillar 2 (research addressing societal challenges and industrial technologies) on 24 June 2021 with a deadline date of 5 January 2022.

The expected outcomes of the call are:

- An improved evidence-based decision-making and long-term sustainable management of Europe’s subsurface, including offshore, needed to build a climate neutral continent.
- Comprehensive inventory of harmonised data on primary raw materials in Europe, with a focus on applications of critical raw materials for energy storage and power generation, resulting in a higher level of independence for Europe.
- Comprehensive inventory of information on geothermal energy resources and subsurface storage capacities for sustainable energy carriers (hydrogen, heat and cold) and sequestration of CO₂, based on common and national scale assessment criteria and standardised reporting.

- Improved appraisal, protection, and sustainable use – including appraisal of capacities for temporary storage – of Europe’s groundwater resources, which are under increasing pressure because of climate change and competing uses of the subsurface. Improved adaptation of coastal zones to the effects of climate change and sea level rise.
- A strong and sustainable network of national Geological Survey organisations to provide geological knowledge and services on a Pan-European level.

The Geological Survey of Slovenia participates in the preparation of the project proposal within the network of European geological organisations (EuroGeosurveys).

In the field of mineral resources, GeoZS is engaged as the lead in the preparation of the proposal for establishing the European Centre of Excellence for Sustainable Resource Management (ICE). In its work, ICE will focus on the promotion and dissemination of knowledge, capacity building, and application of the United Nations Framework Classification for Resources (UNFC), with a focus on primary and secondary minerals, especially critical minerals. ICE will also support the United Nations Resource Management System (UNRMS) in line with the UN 2030 Agenda for Sustainable Development. ICE will operate to support policy and decision-makers on the national as well as EU level.

Meta Dobnikar
(GeoZS)

FACULTY OF NATURAL SCIENCES AND ENGINEERING



University of Ljubljana
Faculty of *Natural Sciences and Engineering*

	Department of Geology	Department of Geotechnology, Mining and Environment	Department of Materials and Metallurgy
E-mail	og@ntf.uni-lj.si	ogro@ntf.uni-lj.si	omm@ntf.uni-lj.si
Website	www.ntf.uni-lj.si/og/en/	www.ntf.uni-lj.si/ogro/en/	www.ntf.uni-lj.si/omm/en/
Head of the department	Prof. Boštjan Rožič, Ph.D.	Assoc. Prof. Željko Vukelić, Ph.D.	Prof. Goran Kugler, Ph.D.



Društvo tehničnih vodij
površinsko odkopavanje

SURFACE MINING ASSOCIATION (“DTV PO”)

The Surface Mining Association has been operating continuously for 26 years. It brings together more than 90% of all Slovenian mining companies – holders of mining rights, experts from public institutions responsible for mineral resource management and planning, researchers, and the private sector.

The Association organizes professional training courses and capacity building of expertise in the fields of geology, mining, environmental protection, sustainable exploitation of natural resources, safety practices, and other solutions. It also actively participates as a stakeholder in the implementation of national mining legislation.

President of DTV-PO: Željko Pogačnik, Ph.D.

Address: DTV-PO, Kotnikova 30, SI-1000 Ljubljana, Slovenia.

Website : <http://drustvo-dtvpo.si>

E-mail: info@drustvo-dtvpo.si; predsednikdtvpo@gmail.com

Phone: + 386 51 396293



SLOVENIAN MINING ASSOCIATION OF ENGINEERS AND TECHNICIANS (“SRDIT”)

The Slovenian Mining Society of Engineers and Technicians (SRDIT) is a non-governmental non-profit organization of miners and geotechnologists. The SRDIT’s mission is to facilitate the mining and geotechnical profession in Slovenia and beyond. SRDIT assumes the role of arbitrator in assessing the professionalism of its membership, organizes international networking, raises the level of expert knowledge of its membership, and organizes social events. At the time of its founding in 1991, the Slovenian Mining Association of Engineers and Technicians counted 53 members; at the end of 2020 it had 156 members. The SRDIT is an organizer and co-organizer of educational seminars, expert meetings, and consultations (the “Jump over the leather skin” meeting and the “St. Barbara” meeting), technical meetings, workshops for miners and expert international consultants, and conferences (Waste Management - GzO and Urban Mining).

President of SRDIT: Drago POTOČNIK, MSc. Mining

Address: SRDIT, Aškerčeva cesta 12, SI-1000 Ljubljana, Slovenia.

Website: <http://www.srdit.si>

E-mail: joze.kortnik@guest.arnes.si

Phone: + 386 1 4704626

ISSN 1855-4733