REPUBLIC OF SLOVENIA
MINISTRY OF INFRASTRUCTURE

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BULLETIN
MINERAL RESOURCES
in Slovenia 2015

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EXPLANATION KEY

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

Minerals for construction materials
- Brick clay
- Brick marl
- Natural stone - limestone
- Natural stone - tonalite
- Natural stone - other
- Limestone for lime and cement
- Cement marl

Construction minerals - aggregates
- Crushed stone - limestone
- Crushed stone - dolomite
- Crushed stone - metamorphic and magmatic rocks
- Gravel and sand

Mineral resources - other
- # Sea salt

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W E
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0 10 20 30 40 km

Author: Andreja SENEGAČNIK
Co-authors: Ana BURGER, Duška ROKAVEC
Digital cartography: Jože ŠTIH
Ljubljana, 2016

Podlaga: Digitalni model reliefa 90m, Void-filled seamless SRTM data V1, 2004,
International Centre for Tropical Agricultura (CIAT),
CGIAR-CSI SRTM 90m Database: http://srtm. csi.cgiar.org

In 1946 our former state showed its understanding of the strategic importance of mineral resources, or as we say today, the sustainable management of minerals. The geological profession was recognized for its research, use and management of mineral resources. It is no coincidence then, that the then Government of the People's Republic of Slovenia founded Geological Survey for Slovenia, the precursor of Geological Survey of Slovenia (GeoZS), under the Ministry of Industry and Mining.

Fortunately, the awareness of the importance of natural resources and their direct connection to the geological profession has remained at a relatively high level in our society. Also for this reason we are able to celebrate the seventieth anniversary of GeoZS this very year. Our activities are still closely connected to the field of mineral resources, despite the (certainly only temporary) reduction in exploitation. We operate the Public mining service, take part in numerous international projects in the mineral resources field and in 2015 we became a member of the "Knowledge and Innovation Community (KIC) EIT RawMaterials". Above all, we did not give up on the field of scientific research, despite the not exactly enviable times and circumstances. Sooner or later, Slovenia will have to enter into a new era of research and the usage of mineral resources: join the joint efforts of the EU to expand their own supply of mineral resources and reduce dependence on foreign markets. The geological profession shall be ready for this.

GOOD LUCK!

Ljubljana, April 2016

dr. Miloš Bavec
Director
Geological Survey of Slovenia

MINERAL RESOURCES IN SLOVENIA

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Shaping the future with the past
70 YEARS
GeoZS
Geološki zavod Slovenije

Cover: 70th anniversary of Geological Survey of Slovenia - Stone sculpture on Dimičeva ulica 14 Street, Photo by: Simon Mozetič
Other photos by: Simon Mozetič, Duška Rokavec, Vida Pavlica, Snježana Miletić, Tina Benda

INTRODUCTION

70 years of Geological Survey of Slovenia (GeoZS)

This year marks the 70th anniversary of the founding, by the Government of the People's Republic of Slovenia, of the Geological Survey for Slovenia, under the Ministry of Industry and Mining. Through the decades it has grown into a modern public research institution whose fundamental mission is the research of geological structures and natural resources in earth's crust and the study of past and present processes occurring there. Clearly, the most important result of years of systematic research by numerous geologists is the basic geological map of Slovenia that is, and will continue to be for decades to come, one of the most globally comparable significant works of the Geological Survey of Slovenia and Slovenian geology in general. With the passing of years a new generation of geologists, with enviable scientific and research potential, are gradually arriving to build on the solid foundations built by the previous seventy years of Slovenian geology.

A number of Educational Institutions and Stoneworkers have joined our celebration of the 70th anniversary and contributed to the design and installation of a stone sculpture on the lawn in front of the building of Geological Survey of Slovenia on Dimičeva Street in Ljubljana. Seven slabs of different natural Slovenian stone, mark 70 years of the work of GeoZS.

In addition to aesthetic and economic value; the exhibited stones were also chosen for their representation of the geological history of Slovenia. The oldest two are colourful limestone examples from the quarries of Hotavlje and Lesno Brdo. They were deposited in shallow marine environments of the Triassic period some 225 million years ago. Numerous monuments and various architectural decorations are made from both types of stone, and they also show their colourful beauty when they stand polished inside many representative buildings in Slovenia and abroad. Younger are, approximately 93 million years old, the examples of Repen limestone taken from the quarries Doline and Debela griža pri Povirju. The fossilized clam shells trapped inside make them one of the most beautiful natural stones in south-western Slovenia while their dense micritic matrix makes them more resistant to atmospheric effects in comparison to other karst natural stones. From the Lipica I quarry comes the flowery limestone, named after the flower-like intersections of fossilized rudist shells. Such clams were common 80 million years ago in the warm, shallow parts of the Tethys Ocean during the Cretaceous. The sixth example represents the flysch beds of the sea basin of 50 million years ago; out of which most of our coastal region is composed. The flysch sandstone comes from the Elerji pri Škofijah quarry. The last piece is the youngest at only 19 million years of age, but is also the hardest and thus the most resistant. Dug out from the southern parts of Pohorje at the Cezlak I quarry near Oplotnica, it's an igneous rock formed during the rifting of the Pannonian Basin. It consists mainly of granodiorite with some transitions to tonalite with frequent and bright aplite and pegmatite veins and it's commonly referred to as the Pohorje granite.

As we can see, history is written in the rocks and we just have to read it. The goal of geologists is to tell the history to everyone else too. Based on sedimentological characteristics, fossil remains, mineralogical composition and many other details it's possible to reconstruct the region and date of a rock's formation, learn about the size of its deposit and even find new ones. Most importantly, it also allows us to better understand all the processes in the earth's crust, for to look into the future we must first understand the past. This is our main task and ultimately it contributes to a more rational management of our planet.

There is enough space on the lawn in front of GeoZS for many new stone slabs and we hope that they will be added to for a long time. For each decade a new slab, up to the end of Anthropocene - the new geological era barely in its infancy. It's being created right now and humanity is shaping it with its sometimes unwise environmental management. The dominant fossil of the Anthropocene will surely be human. In the struggle for water and mineral resources, this is where our knowledge will be immensely necessary.

Ljubljana, April 2016

dr. Bogdan Jurkovšek,
dr. Duška Rokavec
Geological Survey of Slovenia

THE WORK OF THE DEPARTMENT FOR MINING

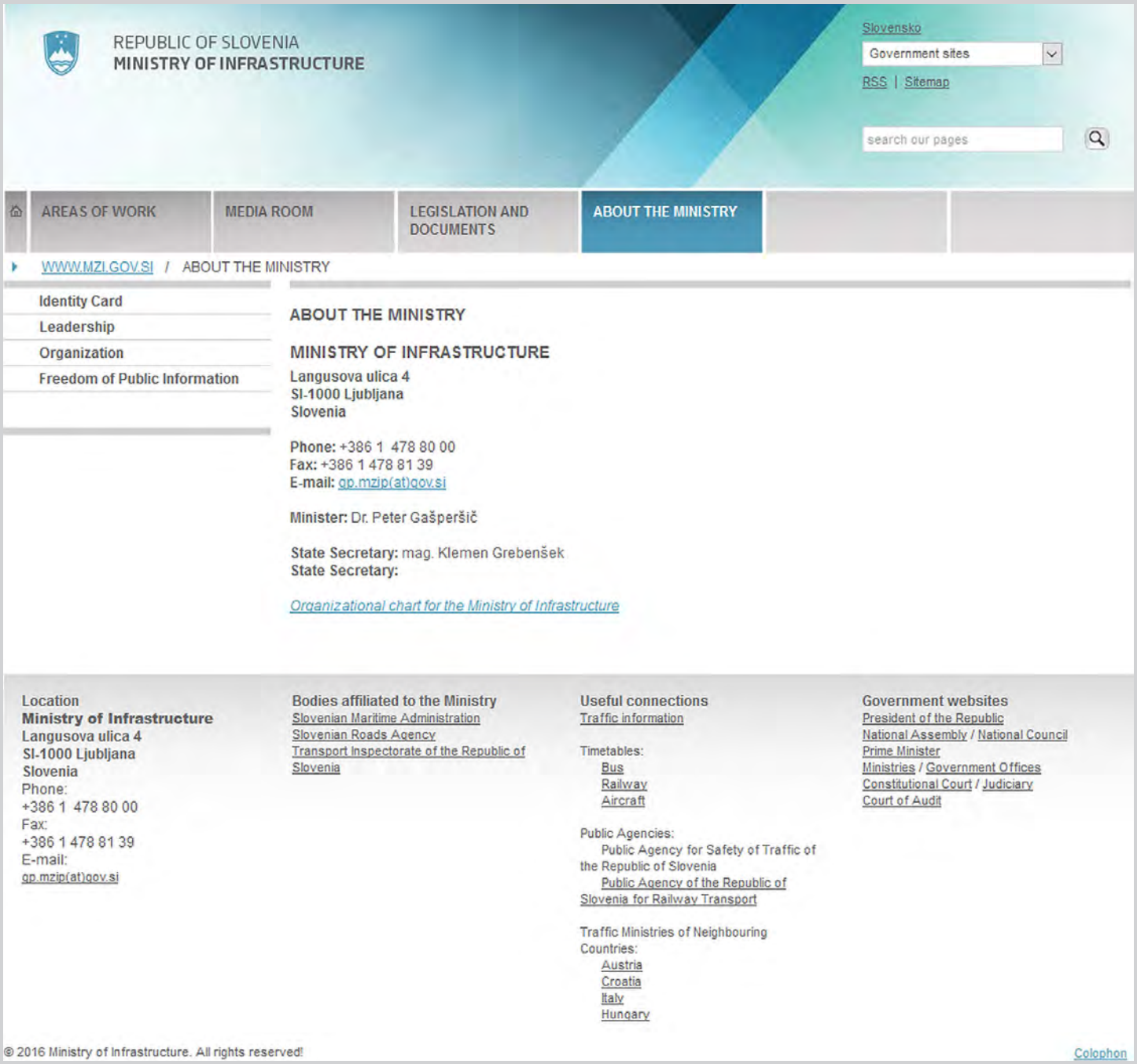
Mining activities in Slovenia fall under the jurisdiction of the **Ministry of Infrastructure, Energy Directorate.** (http://www.mzi.gov.si)

The Energy Directorate performs tasks relating to the efficient use of energy and to the provision of renewable sources of energy, energy supply, sources of energy and mining. Its key activities include:

- preparation and implementation of national energy policy (energy generation and processing, production, distribution and supply, efficient use and renewable sources of energy for heating and transport);
- ensuring rational economic management of raw mineral resources and conferring mining rights for exploration and exploitation of raw mineral resources;
- implementing measures to achieve energy and climate objectives while ensuring a reliable energy supply at competitive prices, in particular through encouraging the use of renewable energy sources and measures for higher energy efficiency;
- cooperation within bilateral and multilateral regional energy frameworks aimed at providing a stimulating environment for cooperation at national, regional and entrepreneurial levels;
- management of the energy sector database information system for the needs of the sectoral ministry and elaboration of economic analyses for the energy sector; and
- drawing up legislative and other acts for the energy and mining sectors.

The Energy Directorate framework of operation includes the pursuit of key national energy policy goals, as follows:

- a secure, sustainable and competitive energy supply;
- increasing energy efficiency; and
- energy supply from renewable energy sources.



STATE OF AFFAIRS IN THE FIELD OF MINERAL RESOURCES IN SLOVENIA IN 2015

Overview of Slovenia's mineral resources

In Slovenia, situated in the area between the Alps, Pannonian Basin, Dinarides, and the Adriatic Foreland, energy, metallic and non-metallic resources occur in different geological formations. The **energy resources** include fossil fuels, i. e. coal (lignite, subbituminous coal and bituminous coal), oil and natural gas (conventional and unconventional), radioactive mineral resources, i. e. uranium, and geothermal energy. Coal-bearing areas with the highest resources and proven reserves are the Velenje Basin (N Slovenia; Pliocene lignite), Sava Basin(s) (E Central Slovenia; Oligocene subbituminous/"hard brown" coal), and Pannonian Basin (E and NE Slovenia; Miocene lignite and "brown" coal). Uranium ore occours chiefly in the area of Žirovski vrh, W of Ljubljana (Central Slovenia - W Sava Folds – Permian Val Gardena / Gröden Formation), and with lower potential also to the east (Central Slovenia - E Sava Folds). The most promising area for oil and gas generation and accumulation is the Pannonian Basin. In other areas hydrocarbons could have been generated in different known source rocks (from Paleozoic to Early Tertiary) but were lost (not trapped) during subsequent geological processes. A potential area could be offshore in the Adriatic Sea (as in a case of Italy, Croatia and south-wards), but Slovenian part of the sea is very limited and no exploration has been carried out. Around 16 % of our country has an outstanding geothermal potential. The area with the highest potential is (again) the Pannonian Basin (NE Slovenia, Krško-Brežice-Novo mesto, Rogaška-Celje-Šoštanj, Laško-Zagorje, Ljubljana, and some other basins).

On the metallogenic map of Slovenia, around 200 sites of **metallic mineral resources** are marked, a few dozens of which were mining sites (ore deposits); the rest are occurences. Potential economic significance can be attributed primarily to sites of mercury, lead and zinc, copper, antimony, iron and bauxite.

Non-metallic mineral resources of higher market value (industrial minerals and rocks) that could be exported are only moderately represented. Non-metallic mineral resources of lesser value prevail (mineral resources for the industry of building materials and construction), which we take advantage of primarily for our own use or enrich them and use them in semi-manufacturing and manufacturing. Domestic non-metallic mineral resources are used in the construction, ceramic, brick, metallurgy and metalworking industry, for the environment and water purification, glass manufacturing, farming, food industry, etc.

Mining has a long tradition in Slovenia and its own position on a worldwide scale. In the past, this meant the exploitation of a significant quantity of mercury in Idrija, whereas today it involves the technologically perfected underground extraction of lignite in Velenje. In recent times we have been closing underground mines of energy resources and metallic mineral resources; only mines (surface operations) of non-metallic mineral resources and one underground coal mine are still active. Coal production is carried out today only at the Velenje Lignite Mine, since the production of "brown" coal in Trbovlje-Hrastnik Mine has been finished in 2012.

Coal mining in Slovenia begun in the second half of the 18th century. Almost all coal mining sites known today were found in the 19th century, and then thoroughly explored and increasingly exploited in the 20th century. Among more than 100 coal-mining sites, as known from different historical documentation and maps, a lot of them had only local significance, but numerous were full-blown collieries which produced tens to hundreds of thousands tons of coal per year. Between 1950 and 1990 annual coal production (prevailingly underground) increased from 2 to almost 7 million tons (Mt). Peak annual productions reached 6.75 Mt in the 1980s (3.35 t/cap.). The quality of coal was a little below 10 MJ/kg and coal was used almost entirely in power plants that produced ca. 37% of domestic electric energy (equally as water). In Trbovlje, maximal annual production reached 1 Mt of subbituminous ("hard brown") coal, whereas in Velenje 5 Mt of lignite. In the 1990s, coal production was finished in four coal mines (Laško, Zagorje, Senovo and Kanižarica) and recently also in Trbovlje -

Hrastnik. In the last decade around 4 Mt of lignite (10.5 MJ/kg) is produced yearly in Velenje, which is planned to rest the only active coal mine (underground) until the 2050s.

The uranium mine at Žirovski Vrh, which is the only newly opened underground mine in Slovenia since the Second World War, has been in the process of closing since 1991. The production of mercury ore in Idrija ended in 1991. In Mežica the last tons of lead and zinc ore were mined in 1994. Otherwise, the mines in Idrija and Mežica have been in the process of mine closure since 1987 and 1988 respectively. The Mežica Mine is closed since 2005, and Idrija Mine since 2014.

From the brief preceding description of the situation in Slovenia, the potential of mineral resources and the overall economic state, a pronounced dynamics of change can clearly be seen: the closing of centuries-old metal mines, smaller underground coal mines and uranium mine, the preservation of one coal mine and the marked emphasis on mineral resources for building and construction industry. In view of current trends and programmes for economic development, primarily in the area of infrastructure construction (roads, railways, apartment buildings), we can predict future needs for individual non-metallic mineral resources, first of all in construction, with others also coming into play in the long term after 2016. Mineral resources for construction, which will be extracted by surface mining, will remain an important factor in the national economy and development in the future as well.

We conclude that in the year 2015, there was a total of 200 areas with mining rights in Slovenia, all of them are exploitation areas, with 26 different mineral resources. These areas were administered by 153 mining right holders.

Andreja Senegačnik, Miloš Markič

OVERVIEW OF DATA ON PRODUCTION, RESERVES AND RESOURCES OF NON-METALS

Types and distribution of mineral resources in Slovenia

There are many more types of mineral resources in Slovenia than have been exploited in the past or in 2015. In that year, according to data from the Ministry of Infrastructure (by the Reporting Form), the following types of mineral resources were exploited:

– ENERGY
  - brown coal (production until 2012), lignite, oil and natural gas, geothermal energy

– METALS

– NON-METALS
  - lake chalk (production until 2003), bentonite, chert, quartz sand, calcite, tuff, industrial dolomite, ceramic (ball) clay, brick clay, natural stone (limestone, tonalite, other natural stones), raw materials for the lime and cement industry (limestone and marl for industrial purposes), crushed limestone, dolomite, magmatic and metamorphic rocks (meta-diabase, keratophyre, andesite and andesite tuff), gravel and sand

– MINERAL RESOURCES - OTHER
  - sea salt

We can classify mineral resources in a number of ways. In Slovenia we divide mineral resources into:

– ENERGY
– METALS
– NON-METALS
  - industrial minerals and rocks
  - minerals for construction materials
  - construction minerals - aggregates
– MINERAL RESOURCES - OTHER

Explanation of the tables

The source of the data on production, reserves and resources for the years 2004 - 2015 is the data from the Geological Survey of Slovenia's »Database of Reporting Forms of Mineral Resources«. The database is compiled on the basis of the Reporting Forms for declaring the base of produced mineral resources, the size of the exploitation and exploration areas and the measures for removal of the consequences resulting from mining, and the forms regarding the state of reserves and resources of mineral resources. The holders of mining rights submit the completed forms for their areas once a year to the ministry presiding over mining. Prior to 2004 we used data from the »Statement of Reserves and Resources of Mineral Resources in the Republic of Slovenia« from the Republic Commission for Determining Mining Reserves and Groundwater (henceforward, the Commission).

In the tables sites are taken into account, therefore including sites without production or without reserves and resources. The site is presented for the year the valid exploitation or exploration area was declared at the Commission (until 2003) or in the Database of Reporting Forms (from 2004 onwards).

The Commission's and Database's data on reserves and resources of all mineral resources of various categories and classes has been separated into only two parts for our purposes, namely *reserves* and *resources*. Currently *reserves* can be exploited, whereas *resources*, for a variety of reasons, can not (insufficient exploration, unprofitability, technical-technological infeasibility). Therefore, in the following text *reserves* are classified into economically viable reserves types A, B and C_1; among *resources*, into conditionally economically viable and economically unviable reserves types A, B and C_1 and resources, type C_2. *Reserves* and *resources* have been measured only in exploitation and exploration areas. Regarding the recorded resources D_1 and D_2, it is our opinion that they were not evaluated within legally approved exploitation and exploration areas and we have not included them among *resources*.

Andreja Senegačnik, Jože Štih

OVERVIEW OF EU FUNDED RESEARCH PROJECTS WITH GeoZS INVOLVEMENT IN THE FIELD OF MINERAL RESOURCES

Programme	Project acronym	State	Project title	Start	End	Duration (months)	Our role in the project	Lead partner	Summary
IPA Adriatic Cross - Border Cooperation Programme 2007 - 2013	RoofOfRock	finished	Limestone as the common denominator of natural and cultural heritage along the karstified part of the Adriatic coast	Oct '12	Dec '15	39	Lead partner	Geological Survey of Slovenia (GeoZS), Slovenia	The RoofOfRock Project is being implemented under 2nd call for ordinary projects of Adriatic IPA CBC Programme 2007, joining 10 partners from 4 countries Slovenia, Italy, Croatia and Bosnia and Herzegovina. The entire Adriatic Region shares at least 200 million years of common geological history. The limestone created on this platform was used as a primary building material throughout the whole project area and takes one of the most important roles in creating common human history. The specific platy limestone as the basic construction material gives the Adriatic coastline and its interior the primary character. The problem of today is that stakeholders in spatial planning, urbanization and cultural and natural conservation lack firm guidelines for sustainable use of natural stone as building material, then for conservation of the stone as natural heritage and finally for conservation of sites and materials as cultural heritage. The RoofOfRock project therefore gathered the most relevant stakeholders around one idea with the intention to establish joint platform for platy limestone sustainable use, preservation and promotion, create the relevant guidelines and to upgrade both individual and joint capacities in preserving such common natural and cultural heritage.The overall objective of the RoofOfRock project is to demonstrate and to promote proper selection and sustainable use of building stone along the karstified part of the Adriatic coast through a joint approach and joint methodology.
EC procurement - Enterprise and Industry no 179/ PP/ENT/CIP/12/C/ N04c012	Minventory	finished	Statistical Information on EU Raw Materials Deposits	Jan '13	Dec '14	24	Project partner	Oakdene Hollins Ltd., United Kingdom	A study to document the prevalence, metadata and standards employed by EU Member States and neighbouring countries of Europe in quantifying resource and reserve information related to primary and secondary raw materials; further, to produce a roadmap outline the barriers and possible voluntary actions that might be taken to harmonise and publish the resource and reserve data at an EU level; and how this would be implemented in a European Minerals Yearbook.
FP7 - Coordination and support actions (FP7-NMP-2013-CSA-7)	Minerals4EU	finished	Minerals Intelligence Network for Europe	Sep '13	Aug '15	24	Project partner	Geological Survey of Finland (GTK), Finland	The Minerals4EU project is designed to meet the recommendations of the Raw Materials Initiative and will develop an EU Mineral intelligence network structure delivering a web portal, a European Minerals Yearbook and foresight studies. The network will provide data, information and knowledge on mineral resources around Europe, based on an accepted business model, making a fundamental contribution to the European Innovation Partnership on Raw Materials (EIP RM), seen by the Competitiveness Council as key for the successful implementation of the major EU2020 policies. The Minerals4EU project will firstly establish the EU minerals intelligence network structure, comprising European minerals data providers and stakeholders, and transform this into a sustainable operational service. Minerals4EU will therefore contribute to and support decision making on the policy and adaptation strategies of the Commission, as well as supporting the security of EU resource and raw materials supply, by developing a network structure with mineral information data and products, based on authoritative of information sources. The Minerals4EU project is built around an INSPIRE compatible infrastructure that enables EU geological surveys and other partners to share mineral information and knowledge, and stakeholders to find, view and acquire standardized and harmonized georesource and related data. The target of the Minerals4EU project is to integrate the best available mineral expertise and information based on the knowledge base of member geological surveys and other relevant stakeholders, in support of public policy-making, industry, society, communication and education purposes at European and international levels.
Horizon 2020-WASTE-4c-2014	ProSUM	on-going	Prospecting Secondary raw materials in the Urban mine and Mining waste	Jan '15	Dec '17	36	Project partner	Waste of Electrical and Electronic Equipment Forum (WEEE Forum), Belgium	The ProSUM project will establish a European network of expertise on secondary sources of critical raw materials (CRMs), vital to today's high-tech society. Data on primary and secondary raw materials are available in Europe, but scattered amongst a variety of institutions including government agencies, universities, NGOs and industry. By establishing a EU Information Network (EUIN), the project will coordinate efforts to collect secondary CRM data and collate maps of stocks and flows for materials and products of the "urban mine". The scope is the particularly relevant sources for secondary CRMs: Electrical and electronic equipment, vehicles, batteries and mining tailings.
Horizon 2020 - SC5-11a-2014	iVAMOS!	on-going	Viable and Alternative Mine Operating System	Feb '15	Aug '18	42	Project partner	BMT Group Ltd., United Kingdom	VAMOS will provide a new Safe, Clean and Low Visibility Mining Technique and will prove its Economic Viability for extracting currently unreachable mineral deposits in flooded open pit mines. Deriving from successful deep-sea mining techniques, the VAMOS mining solution aspires to lead to: Re-opening abandoned mines; extensions of opencut mines which are limited by stripping ratio, hydrological or geotechnical problems; and opening of new mines in the EU. VAMOS will design and manufacture innovative automated excavation equipment and environmental impact monitoring tools that will be used to perform field tests in four mine sites across Europe with a range of rock hardness and pit morphology.
Horizon 2020-SC5-13a-2014	MINATURA2020	on-going	Developing a concept for a European minerals deposit framework	Feb '15	Jan '18	36	Project partner	Agency for International Minerals Policy (MinPol), Austria	The exploitation of minerals in Europe is an indispensable activity to ensure that the present and future needs of the European society can be met. This means that sufficient access is required to explore and exploit minerals. At the same time the mineral needs of our society must be met without compromising the ability of future generations to meet their own needs. Accordingly exploitable mineral deposits (known deposits, abandoned mines and historical mining sites) need to be assessed against other land uses, taking into account criteria such as habitats, other environmental concerns, priorities for settlements, etc. Access to mineral deposits, on the other hand, also meets public interests such as raw materials security (compared with many international access options). The deliberation between these diverse land uses requires adequate consideration of the exclusiveness, reversibility, and consequences on the surrounding. The overall objective of MINATURA 2020 is to develop a concept and methodology (i.e. a harmonised European regulatory/guidance /policy framework) for the definition and subsequent protection of "mineral deposits of public importance" in order to ensure their "best use" in the future. Providing a policy planning framework that comprises the "sustainability principle" for mining is the key driving force behind MINATURA2020.
Horizon 2020-SC5-13b-2014	INTRAW	on-going	International cooperation on Raw materials	Feb '15	Jan '18	36	Project partner	European Federation of Geologists (EFG), Belgium	INTRAW will map and develop new cooperation opportunities related to raw materials in Australia, Canada, Japan, South Africa and the United States, addressing: Research and innovation, Raw materials policies and strategies, Joint educational and skills programmes, Licensing and permitting procedures, Data reporting systems, Exploration, extraction, processing and recycling practices and Management and substitution of Critical Raw Materials. The outcome of the mapping and knowledge transfer activities will be used as a baseline to set and launch the European Union's International Observatory for Raw Materials as a definitive raw materials intelligence infrastructure, operating internationally.
EIT RawMaterials KIC	aRAWness	on-going	Enhancing European Society Awareness of Raw Materials	Jan '16	Dec '16	12	Project partner	RWTH Aachen University, Germany	The society awareness of raw materials and circular economy varies across Europe, due to di-verse framework conditions in the member states and regions of the European Union. A continuous European exchange and transfer of information and knowledge with regard to good practice and future challenges in enhancing European society awareness for raw materials is necessary and intended by this project. Moreover, fostering an European alignment by orchestrated measures, e.g. from regional, political as well as further public and private actors, is aspired to allow the initiation of a European network of regions on the medium-term, addressing actors of the circular economy. As an overall output, project will execute a series of workshops in three different European regions (CLC West, East and South) as well as on a European level to discuss regional challenges and to derive solutions for enhancing European society awareness of raw materials.
Horizon 2020-SC5-2014-2015	UNEXMIN	on-going	Autonomous Underwater Explorer for Flooded Mines	Feb '16	Oct '19	45	Project partner	University of Miskolc, Hungary	The project will develop a novel robotic system for the autonomous exploration and mapping of Europe's flooded mines. The Robotic Explorer (UX-1) will use non-invasive methods for autonomous 3D mine mapping for gathering valuable geological and mineralogical information. This will open new exploration scenarios so that strategic decisions on the re-opening of Europe's abandoned mines could be supported by actualised data that cannot be obtained by any other ways. The Multirobot Platform will represent a new technology line that is made possible by recent developments in autonomy research that allows the development of a completely new class of mine explorer service robots, capable of operating without remote control. Such robots do not exist nowadays; UX-1 will be the first of its kind. Research challenges are related to miniaturisation and adaptation of deep sea robotic technology to this new application environment and to the interpretation of geoscientific data.
COST action - Open Call Collection OC-2015-1	MINEA	on-going	Mining the European Anthroposphere	Mar '16	Mar '20	48	Project partner	Institute for Water Quality, Resource and Waste Management (TU Vienna), Austria	Currently, acquiring an adequate overview of the future availability of secondary resources in Europe is not possible due to a lack of consolidated knowledge regarding the resource potential in the anthroposphere. To overcome this gap, this COST Action strives for a breakthrough in the field of waste and resource management and pursues the establishment of a universally acceptable and internationally applicable scheme for the classification and reporting of resource potentials. To this end, the COST Action works to form a pan-European network of high-quality researchers, engineers and scholars to coordinate nationally funded research activities.
EIT RawMaterials KIC	MineService	on-going	Mining/Mineral Support Services	Apr '16	Mar '19	36	Lead partner	Geological Survey of Slovenia (GeoZS), Slovenia	The main objectives of the MineService project are to create a network and a compendium of good practices of Mining/ Mineral Support Services (MSS), to improve technical tools for raw materials (RM) management and transfer the methodology of mineral resources (MR) management to the test site country (FYRO Macedonia). MSS is a public mineral intelligence system intended to support authorities (on national, regional or local level) at the decision-making process and to facilitate industry to enter into new markets. The network of partners in this project would increase the institutional capacity in executing technical and administrative tasks for mining and spatial planning in all involved partner countries. The good practices and knowledge of the methodology will be transferred and supplied to FYRO Macedonia during the projects life-time, but could be transferred to other EU candidate countries in a follow-up project in order to improve the relationship between the EU and the candidate countries and potentially widen the European RM supply area. This should effect and reduce the MR supply shortage and consequently diminish vulnerability of EU MR sectors. Effective MSS is therefore needed for EU to remain competitive in minerals and products market and to provide MR to meet its society needs.
Horizon 2020, B.2.9.: Energy Policy support on unconventional gas and oil-2014-2015	EUOGA	on-going	Geological Evaluation of Potential Unconventional Oil and Gas Resources In Europe	Feb '16	Jun '16	4	Subcontractor	Geological Survey of Denmark and Greenland (GEUS), Denmark	Project is dealing with Geological Evaluation of Potential Unconventional Oil and Gas Resources in Europe. It was initiated by the European Commission JRC-IET (Joint Research Centre – Institute for Energy and Transport). The project includes all EU Countries (with very few exceptions) and is led by Geological Survey of Denmark and Greenland (GEUS). This is the first attempt to evaluate geological resources of unconventional oil and gas on the pan-European scale and to present both technological and political situations in different states and regions, respectively. The most promising area for unconventional hydrocarbons in Slovenia is its NE part that belongs to the SW margin of the Pannonian Basin. It is filled with more than 4–5 km of Neogene sediments containing coal, oil and gas from great depths to the surface, and having an increased heat flow, which enables the use of geothermal energy in numerous places of favourable tectonic structures. The project is planned to be continued within the frame of the Gea-ERA – Geoenergy programme and is led to produce an atlas of unconventional hydrocarbons resources of Europe.
Horizon 2020, No° 473/PP/GRO/ IMA/15/118318	MINLEX	on-going	Legal framework for mineral extraction and permitting procedures for exploration and exploitation in the EU	Mar '16	Nov '16	9	Subcontractor	Agency for International Minerals Policy (MinPol), Austria	The main objective is to identify and describe the legal framework governing the mineral extraction (non-energy extractive industries) in the EU 28 Member States (legislation at national, regional and local levels and EU legislation impacting the permitting procedures).

June 2016

Overview prepared by: Duška Rokavec, Kim Mezga

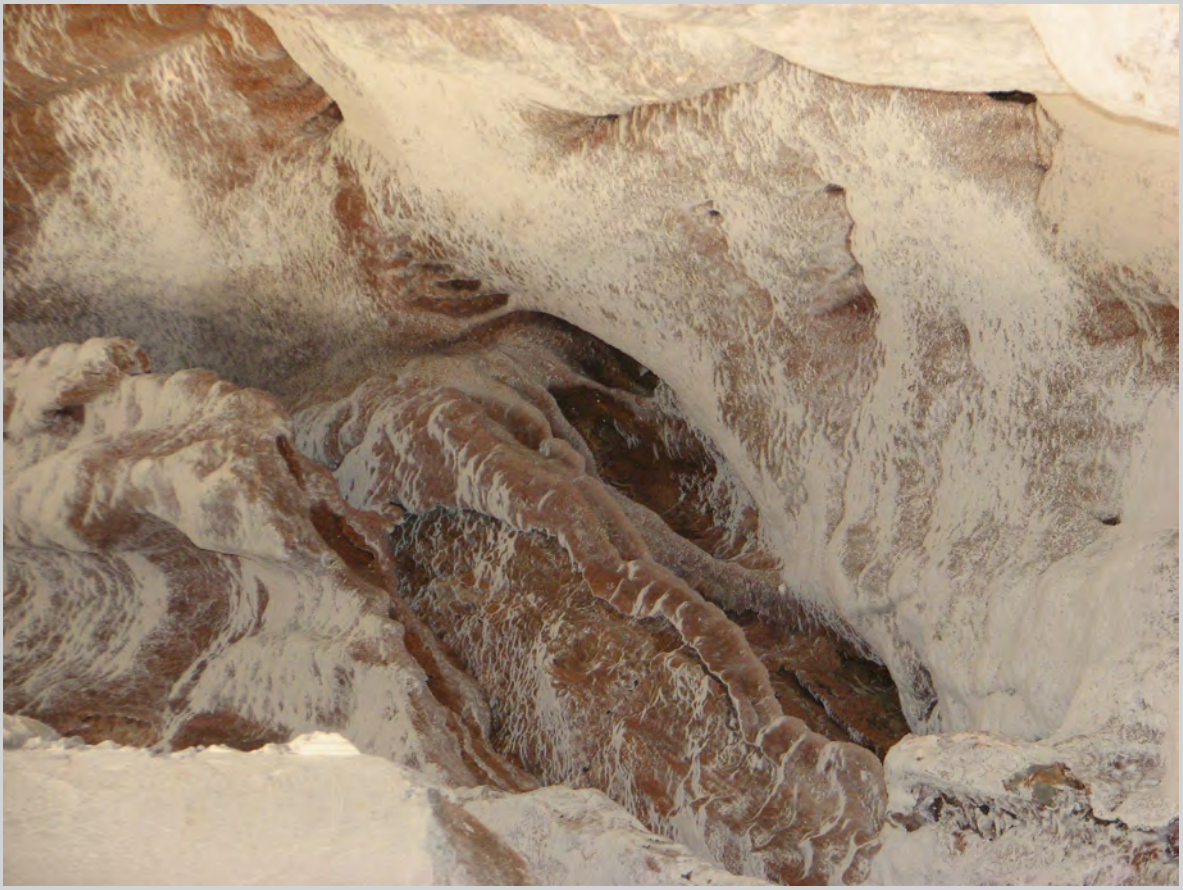
GeoZS
Geološki zavod Slovenije

PRODUCTION OF MINERAL RESOURCES IN SLOVENIA

(in metric tons)

		1988	1993	1998	2003	2008	2012	2013	2014	2015
Bentonite			20	447	187	160	98	143	199	232
Calcite		142.208	105.402	103.000	119.606	348.152	474.152	555.663	646.542	268.677
Kaolin		35.514	20.171							
Chalk		4.740	2.090	945	607					
Quartz sand		861.579	374.164	518.755	449.733	289.529	219.481	224.387	207.381	343.455
Tuff		109.000		84.101	84.333	109.949	23.732	19.171	8.872	9.116
Industrial dolomite						177.715	119.317	136.516	177.338	172.697
Chert		30.744	17.477	18.200	20.824	21.648	9.960	11.530	15.340	21.041
Ceramic (ball) clay		172.740	152.268	98.588	79.900	32.200	5.295	3.479	7.461	7.574
Industrial minerals and rocks		**1.356.525**	**671.592**	**824.036**	**755.190**	**979.353**	**852.035**	**950.889**	**1.063.133**	**822.792**
Brick clay		1.034.168	883.420	632.696	573.584	420.360	159.746	180.748	154.944	194.852
Building stone	limestone	34.830	54.321	31.474	38.942	71.260	21.006	21.158	79.005	99.541
	tonalite (granodiorite)	29.344	21.600	54.478	30.850	67.400	23.374	41.016	23.749	26.995
	other	9.318	2.465	1.139	5.713	21.959	11.526	8.332	9.917	9.790
Building stone		73.492	78.386	87.091	75.505	160.619	55.906	70.506	112.671	136.326
Raw materials for lime						1.631.391	896.241	860.890	919.528	1.103.283
Raw materials for cement		1.249.387	1.520.954	1.479.644	1.400.423	1.684.258	952.758	1.138.560	1.325.907	1.190.807
Minerals for construction materials		**2.357.047**	**2.482.760**	**2.199.431**	**2.049.512**	**3.896.628**	**2.064.651**	**2.250.704**	**2.513.050**	**2.625.268**
Crushed stone	limestone	4.714.443	4.620.273	6.748.784	6.623.054	7.541.043	3.264.404	2.813.266	3.060.104	3.486.409
	dolomite	3.402.742	3.068.666	4.502.498	8.391.079	7.291.259	4.223.692	4.127.357	4.901.721	4.427.094
	other			99.963	26.207	150.258	69.335	127.272	161.762	194.610
Crushed stone		8.117.185	7.688.939	11.351.245	15.040.340	14.982.560	7.557.431	7.067.895	8.123.587	8.108.113
Sand and gravel		3.455.355	2.668.860	2.440.115	3.437.911	4.506.076	1.707.455	2.143.013	2.799.006	2.943.870
Construction minerals – aggregates		**11.572.540**	**10.357.799**	**13.791.360**	**18.478.251**	**19.488.636**	**9.264.886**	**9.210.908**	**10.922.593**	**11.051.983**
NON-METALS		**15.286.112**	**13.512.151**	**16.814.827**	**21.282.953**	**24.364.617**	**12.181.572**	**12.412.501**	**14.498.776**	**14.500.043**
brown coal						488.828	314.262			
lignite						4.008.442	3.967.064	3.721.188	3.108.203	3.168.001
coal*							**4.281.326**	**3.721.188**	**3.108.203**	**3.168.001**
oil						174	279	298	366	261
gas condensate						104	60	114	95	98
gas						2.348	1.454	2.698	2.463	3.109
oil and gas*							**1.793**	**3.110**	**2.924**	**3.468**
sea salt*						535	5.684	3.360		2.191

* Coal, oil, gas and sea salt are recorded in this table since 2004.



Number of sites of non-metals (including aggregates) in Slovenia in exploitation areas

		1988	1993	1998	2003	2008	2012	2013	2014	2015
Bentonite		1	1	1	1	1	1	1	1	1
Calcite		1	1	1	1	1	1	1	1	1
Kaolin		3	3	3						
Chalk		1	1	1	1	1	1	1	1	1
Quartz sand		7	10	9	7	7	7	7	7	7
Tuff		2	2	2	1	1	1	1	1	1
Industrial dolomite						1	1	1	1	1
Chert		1	1	1	1	1	1	1	1	1
Ceramic (ball) clay		6	7	6	6	5	3	3	3	3
Industrial minerals and rocks		**22**	**26**	**24**	**18**	**18**	**16**	**16**	**16**	**16**
Brick clay		11	10	7	7	8	5	5	5	5
Building stone	limestone	2	3	4	6	12	12	12	11	12
	tonalite (granodiorite)	2	2	1	2	3	3	3	3	3
	other	3	5	4	9	15	14	14	13	13
Building stone		7	10	9	17	30	29	29	27	28
Raw materials for lime						6	6	6	6	5
Raw materials for cement		6	7	6	4	5	5	4	4	4
Minerals for construction materials		**24**	**27**	**22**	**28**	**49**	**45**	**44**	**42**	**42**
Crushed stone	limestone	20	24	22	25	27	29	29	29	30
	dolomite	31	36	30	88	95	91	88	88	82
	other			2	4	6	6	6	6	6
Crushed stone		51	60	54	117	128	126	123	123	118
Sand and gravel		28	30	22	32	33	30	32	31	29
Construction minerals - aggregates		**79**	**90**	**76**	**149**	**161**	**156**	**155**	**154**	**147**
NON-METALS		**125**	**143**	**122**	**195**	**228**	**217**	**215**	**212**	**205**

GeoZS
Geološki zavod
Slovenije

RESERVES OF NON-METALS (including aggregates) IN SLOVENIA*

(in metric tons)

		1988	1993	1998	2003	2008	2012	2013	2014	2015
Bentonite		X	X	X	X	X	X	X	X	X
Calcite		X	X	X	X	X	X	X	X	X
Kaolin		2.277.432	2.131.780	0						
Chalk		X	X	X	X	X	X	X	X	X
Quartz sand		26.414.361	27.349.780	25.533.023	20.049.072	18.649.704	16.444.522	16.344.403	16.125.911	15.751.263
Tuff		X	X	X	X	X	X	X	X	X
Industrial dolomite						X	X	X	X	X
Chert		X	X	X	X	X	X	X	X	X
Ceramic (ball) clay		24.140.907	24.594.991	11.992.994	3.594.473	4.410.827	4.848.411	4.844.660	4.901.638	4.804.340
Industrial minerals and rocks		**65.742.594**	**67.116.118**	**52.927.392**	**36.974.132**	**44.309.229**	**35.895.908**	**34.979.159**	**33.828.069**	**29.028.654**
Brick clay		33.405.130	51.530.276	11.054.904	22.533.978	10.551.336	15.222.702	12.925.646	12.458.558	12.310.116
Building stone	limestone	X	9.631.643	5.485.933	5.394.506	5.499.571	8.214.386	8.146.626	7.767.247	12.634.664
	tonalite (granodiorite)	X	X	X	X	6.925.657	6.779.716	6.738.701	6.717.554	6.690.560
	other	2.439.715	3.523.851	3.631.370	2.569.868	2.489.065	2.434.717	2.424.992	2.398.343	2.386.109
Building stone		18.473.030	19.095.834	15.202.277	14.921.513	14.914.293	17.428.819	17.310.319	16.883.144	21.711.333
Raw materials for lime						86.896.853	79.804.024	71.746.619	71.005.559	53.417.991
Raw materials for cement		111.011.205	126.557.151	94.028.998	66.973.262	40.963.436	38.045.010	25.295.432	25.109.468	24.845.930
Minerals for construction materials		**162.889.365**	**197.183.261**	**120.286.179**	**104.428.753**	**153.325.918**	**150.500.555**	**127.278.016**	**125.456.729**	**112.285.370**
Crushed stone	limestone	420.997.551	407.042.962	345.954.722	211.860.322	167.006.530	137.705.071	140.278.435	137.010.920	156.057.727
	dolomite	128.054.857	123.927.918	123.149.775	153.442.411	112.442.037	130.896.386	126.420.845	133.394.817	125.341.037
	other			X	2.774.079	4.179.785	4.591.875	4.473.952	4.399.390	4.351.514
Crushed stone		549.052.408	530.970.880	469.206.583	368.076.812	283.628.352	273.193.332	271.173.232	274.805.127	285.750.278
Sand and gravel		63.227.742	39.080.471	18.019.921	34.241.209	46.148.792	35.537.547	34.904.839	32.100.705	32.244.970
Construction minerals – aggregates		**612.280.150**	**570.051.351**	**487.226.504**	**402.318.021**	**329.777.144**	**308.730.879**	**306.078.071**	**306.905.832**	**317.995.248**
NON-METALS		**840.912.109**	**834.350.730**	**660.440.075**	**543.720.906**	**527.412.291**	**495.127.342**	**468.335.246**	**466.190.630**	**459.309.272**

According to 83rd article of the Mining Act (Official Gazette of the Republic of Slovenia, No 14/14 - official consolidated text) the reserves of raw materials present at only one or two sites are not listed

* (in exploitation areas)

MINATURA2020

"Developing a concept for a European minerals deposit framework"

The exploitation of minerals in Europe is an indispensable activity to ensure that the present and future needs of the European society can be met. This means that sufficient access is required to explore and exploit primary raw materials. At the same time, the mineral needs of our society must be met without compromising the ability of future generations to meet their own needs. Accordingly exploitable mineral deposits (including known geological deposits, abandoned mines and historical mining sites) need to be assessed in the face of other land uses, taking into account criteria such as agriculture, forestry, habitats for fauna and flora, other environmental concerns, priorities for settlements and infrastructure, etc. Access to mineral deposits, on the other hand, also meets public interests such as raw materials security (compared with many international access options). The deliberation between these diverse land uses requires adequate consideration of the exclusiveness, reversibility, and consequences on the surrounding.

The overall objective of MINATURA2020 is to develop a concept and methodology for the definition and subsequent protection of "mineral deposits of public importance" in order to ensure their "best use" in the future in order to be included in a harmonised European regulatory/guidance/policy framework. Providing a policy-planning framework that comprises the "sustainability principle" for mining like for other land uses is the key driving force behind MINATURA2020.

MINATURA2020 is a 3-year (2015–2018) EU funded project that relies on the strength of an international consortium of **24 partners** (coordinator **MinPol,** Austria). All project partners have a demonstrated record of accomplishment of projects at national, international and commercial level. They are active players in the international raw materials community, part of a well-established network and cover different domains (public and regulatory authorities, industry, academics, civil society, etc.). **GeoZS** is a leader of **WP4 - Demonstration and pilot-testing of developed methodology at case study level**. For Slovenia it is important to ensure the access to mineral deposits (MDoPI) which in the future should be properly safeguarded.

EXPECTED IMPACT & OUTCOMES

Support to EU-policy:

- "Europe 2020", the European Union's new growth strategy;
- "Integrated Industrial Policy for the Globalisation Era Putting Competitiveness and Sustainability at Centre Stage" Communication;
- Raw Materials Initiative.

The first Slovenian national workshop within the MINATURA2020 project

Expected long-term outcome:

- Stable and competitive supply of primary mineral raw materials from EU sources;
- Improved conditions for sustainable access and supply of primary mineral raw materials in the EU;
- Increased EU raw materials knowledge for different stakeholders, assessing and making use of existing inventories of raw materials;
- Facilitated decision-making at EU, national, regional and local levels and in the minerals industry;
- Promotion of good governance and facilitation of public acceptance in the EU;
- Increased competitiveness of the EU industry and primary minerals supply from EU sources;
- Increased transparency of EU mineral policies and legislation.

Website: http://minatura2020.eu/

This project has received funding from the **European Union's Horizon 2020** research and innovation programme under grant agreement nº 642139.

Duška Rokavec, Snježana Miletić

The MineService project

The Geological Survey of Slovenia (GeoZS) is a partner in the Knowledge and Innovation Community (KIC) for the raw materials field. The "EIT Raw Materials" KIC has the ambitious vision of turning the challenge of raw materials dependence into a strategic strength for Europe. Novel service offerings will be implemented to empower the EIT Raw Materials community and other stakeholders, including four customised tracks focusing on growth and job creation by boosting start-ups, SMEs, radical innovation and education.

Within the frame of the EIT Raw Materials the "Mining/Mineral Support Services" (MineService) project was granted funding. The project's activities started in April 2016 and will last 3 years. The consortium, that consists of two Slovenian and 5 European partners, is coordinated by Geological Survey of Slovenia. The network of partners in this project would increase the institutional capacity in executing technical and administrative tasks for mining and spatial planning in involved partner countries. The good practices and knowledge would be transferred to EU candidate countries. This should effect and reduce the mineral resources (MR) supply shortage and consequently diminish vulnerability of EU's MR sectors. Effective Mining/Mineral Support Service (MSS) is therefore needed for EU to remain competitive in minerals and products market and to provide MR to meet its society needs.

Tina Benda, Duška Rokavec

A metal mine in the ESEE region

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