



REPUBLIC OF SLOVENIA  
MINISTRY OF INFRASTRUCTURE

Langusova ulica 4, 1535 LJUBLJANA

**BULLETIN**

# **MINERAL RESOURCES**

**in Slovenia 2013**

## CONTENTS

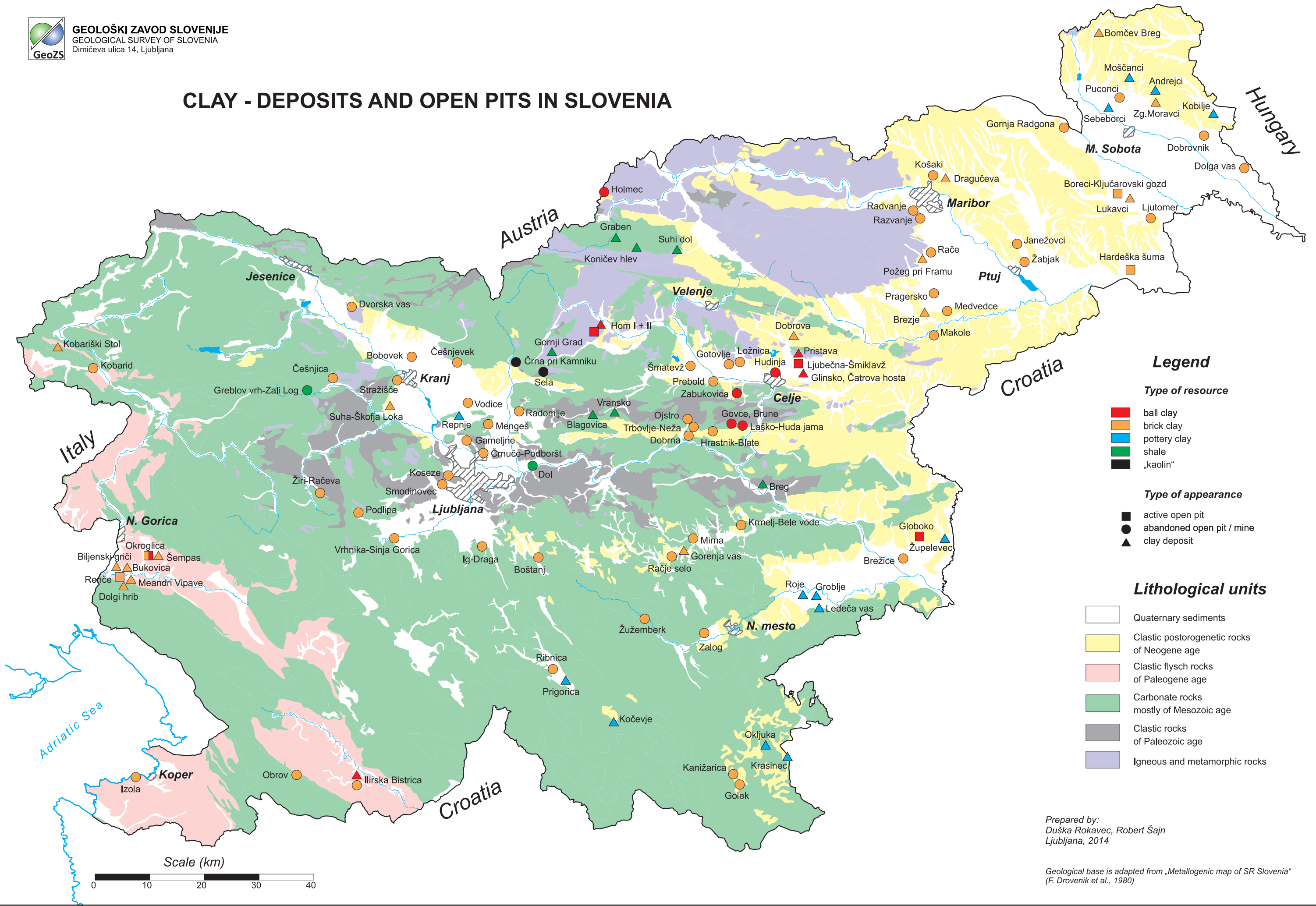
- FOREWORD
- INTRODUCTION
- THE WORK OF THE DEPARTMENT FOR MINING
- STATE OF AFFAIRS IN THE FIELD OF MINERAL RESOURCES IN SLOVENIA IN 2013
- OVERVIEW OF DATA ON PRODUCTION, RESERVES AND RESOURCES OF NON-METALS
- OVERVIEW OF EU FUNDED RESEARCH PROJECTS
- SUSTAINABLE AGGREGATES PLANNING IN SOUTH EAST EUROPE – SNAP-SEE



**GEOLOGICAL SURVEY OF SLOVENIA**  
Dimičeva ulica 14, 1000 Ljubljana



# CLAY - DEPOSITS AND OPEN PITS IN SLOVENIA



### Legend

#### Type of resource

- ball clay
- brick clay
- pottery clay
- shale
- „kaolin“

#### Type of appearance

- active open pit
- abandoned open pit / mine
- ▲ clay deposit

#### Lithological units

- Quaternary sediments
- Clastic postorogenic rocks of Neogene age
- Clastic flysch rocks of Paleogene age
- Carbonate rocks mostly of Mesozoic age
- Clastic rocks of Paleozoic age
- Igneous and metamorphic rocks

Prepared by:  
 Duška Rokavec, Robert Šajn  
 Ljubljana, 2014

Geological base is adapted from „Metallogenic map of SR Slovenia“  
 (F. Drovenik et al., 1980)

Scale (km)



## FOREWORD

We are proud to present the fourth edition of Bulletin of Mineral Resources in Slovenia. As the bulletin is biannual, this actually means that 6 years have passed since the first edition of the English version of Mineral Resources bulletin was issued. This year, the tenth edition of the Slovenian version was printed.

It is a time of reflection on the Slovenian and also English version of Mineral Resources bulletin. Both bulletins are accessible free of charge in printed and electronic versions and both are successfully reaching targeted audience. The structure and content of the English version is pretty straight forward from the start, serving its main purpose: giving the base line information on the mineral resources in Slovenia. A reader can find all additional information either at the team of Public Mining Service (of Slovenia) or elsewhere. The simple structure and biannually updated information on up to 14 pages with thematic maps give the reader sufficient information.

The bulletin has maintained its basic character (content, extent, format, enclosed map). As has always been the case, this year again you will find some rather intriguing reading: production data and other information. It is also worthwhile to search for information via the internet application of the Public Mining Service. Maps have become a regular feature of the bulletin. We are glad that each time we have wider and more diverse circle of readers, which is both a pleasure and encouragement.

Each year we report on the happenings in the field of mineral resources in Slovenia in the past year. Recently, although there is more optimism in the European Union and elsewhere around the world, Slovenia has still been experiencing a crisis. The production of mineral resources for construction is still falling. Luckily the most countries surrounding Slovenia are already in more optimistic post-crisis era, also with regard to mineral resources.

We strongly believe that the next issue of Bulletin of Mineral Resources in Slovenia in two years' time will be filled with post-crisis optimism that would be supported by the recovery of the raw materials sector, in particular the construction minerals one, and justified with a raise of production numbers.

This year's as well as all the past bulletins are available because of the efforts of our colleagues, the bulletin designers, and, of course, the authors. Sincere thanks to you all!

And finally, one important, and many times repeated statement: the editors, as well as all external co-workers, would like to ask you to pass on only your positive comments, while your critical comments should be reserved first for us.

Ljubljana, October 2014

Editor and associates

### MINERAL RESOURCES IN SLOVENIA

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## INTRODUCTION

It is my pleasure to introduce the fourth issue of the English version of Bulletin of Mineral Resources in Slovenia. The bulletin has become a recognised source of information on mineral resources in Slovenia. It is published biannually in the context of activities of the Public Mining Service, which has its legal foundation in the Mining Act and is conducted by the Geological Survey of Slovenia under the auspices of the Energy Directorate at the Ministry of Infrastructure.

The Geological Survey of Slovenia has given a priority to research and innovation in the area of sustainable mineral resource management some years ago. This decision has proven to be correct as the mineral exploration of the Earth's crust and sustainable use of mineral resources are again in the focus of public and industrial interest.

The significance of minerals has also been recognised by the European Union, which makes every effort to avoid import dependency, supports the supply from EU sources and boosts resource efficiency and recycling. This has been confirmed recently by the announcement of the outcomes of the first Horizon 2020 programme's call. The European Commission supports a wide range of sustainable mineral resources management projects, such as preparation of strategies for accessing raw materials from external markets under undisturbed conditions, the use of secondary raw materials etc. The Geological Survey of Slovenia acts as a partner in some of those projects and thus continues to strengthen its role in this area in spite of relatively modest extraction of mineral resources in Slovenia.

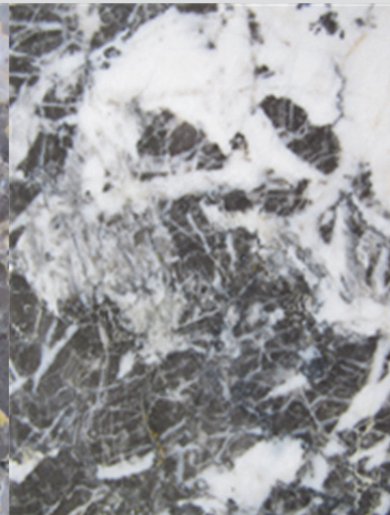
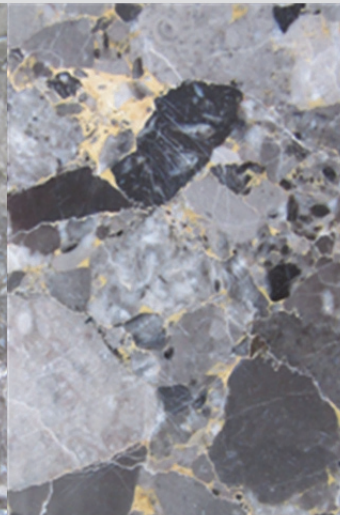
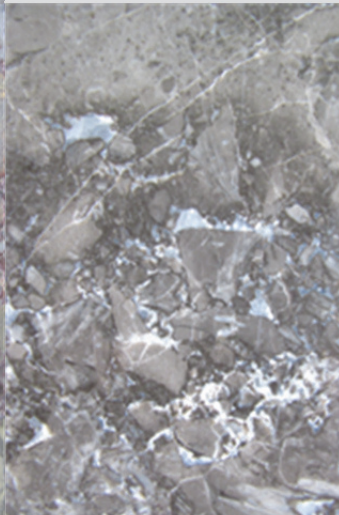
I hope and expect that increased international activity of Slovenian research and innovation oriented stakeholders in the area of mineral resources will soon be recognised on the national level. Slovenia has some mineral resource potential, mostly in still unknown deep geological structures, which should be explored in the near future. Following the European Union recommendations I believe Slovenia needs to review its national minerals strategy.

I would like to thank all the contributing authors, congratulate the editorial board and wish you pleasant reading.

Miloš Bavec, Ph.D.  
Director

Geological Survey of Slovenia

Ljubljana, October 2014





## 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.

The screenshot displays the official website of the Ministry of Infrastructure of the Republic of Slovenia. The header includes the national coat of arms and the text 'REPUBLIC OF SLOVENIA MINISTRY OF INFRASTRUCTURE'. A language selector is set to 'Slovensko', and there are links for 'Government sites', 'RSS', and 'Print'. A search bar is present on the right.

The main navigation menu includes: 'AREAS OF WORK', 'MEDIA ROOM', 'LEGISLATION AND DOCUMENTS', 'ABOUT THE MINISTRY', and a partially visible 'CONTACT' link. The 'ABOUT THE MINISTRY' page is active, showing the following content:

- Identity Card**
- Leadership**
- Organization**
- Freedom of Public Information**

The main content area is titled 'ABOUT THE MINISTRY' and 'MINISTRY OF INFRASTRUCTURE'. It provides the following details:

- Address:** Langusova ulica 4, SI-1000 Ljubljana, Slovenia
- Phone:** +386 1 478 80 00
- Fax:** +386 1 478 81 39
- E-mail:** [op.mzjp\(at\)qov.si](mailto:op.mzjp(at)qov.si)
- Minister:** Dr. Peter Gašperšič
- State Secretary:** mag. Klemen Grebenšek
- State Secretary:** (blank)
- Organizational chart for the Ministry of Infrastructure and Spatial Planning** (link)

The footer contains a grid of useful information:

- Location:** Ministry of Infrastructure, Langusova ulica 4, SI-1000 Ljubljana, Slovenia. Phone: +386 1 478 80 00, Fax: +386 1 478 81 39, E-mail: [op.mzjp\(at\)qov.si](mailto:op.mzjp(at)qov.si)
- Bodies affiliated to the Ministry:** [Slovenian Maritime Administration](#), [Slovenian Roads Agency](#), [Transport Inspectorate of the Republic of Slovenia](#)
- Useful connections:** [Traffic information](#), **Timetables:** [Bus](#), [Railway](#), [Aircraft](#), **Public Agencies:** [Public Agency for Safety of Traffic of the Republic of Slovenia](#), [Public Agency of the Republic of Slovenia for Railway Transport](#)
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## STATE OF AFFAIRS IN THE FIELD OF MINERAL RESOURCES IN SLOVENIA IN 2013

### Overview of Slovenia's mineral resources

In Slovenia, situated in the area between the Alps, Pannonian Basin, Dinarides, and the Adriatic Plate, 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 occurs 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-Novno 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 occurrences. 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.



Coal mining in Slovenia begun in the second half of the 18<sup>th</sup> century. Almost all coal mining sites known today were found in the 19<sup>th</sup> century, and then thoroughly explored and increasingly exploited in the 20<sup>th</sup> 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 (prevalingly 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 was 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 closing down since 1987 and 1988 respectively. The Mežica Mine is closed since 2005.

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 2014. 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 2013 there was a total of 214 areas with mining rights, of those, 210 exploitation and 4 exploration areas, with 26 different mineral resources. These areas were administered by 158 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 2013. In that year, according to data from the Ministry of Infrastructure (by the Reporting Form), the following types of mineral resources were exploited and explored:

#### – ENERGY

- brown coal, lignite, oil and natural gas, geothermal energy

#### – METALS

-----

#### – NON-METALS

- lake chalk (production until 2003), bentonite, chert, quartz sand, calcite, tuff, industrial dolomite, ceramic 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-diorite, 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

- mineral resources for the manufacturing industry and other uses (industrial minerals and industrial rocks)

- mineral resources for the industry of construction materials

- aggregates

#### – MINERAL RESOURCES - OTHER

### Explanation of the tables

The source of the data on production, reserves and resources for the years 2004 - 2013 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<sub>1</sub>; among *resources*, into conditionally economically viable and economically unviable reserves types A, B and C<sub>1</sub> and resources, type C<sub>2</sub>. *Reserves* and *resources* have been measured only in exploitation and exploration areas. Regarding the recorded resources D<sub>1</sub> and D<sub>2</sub>, it is our opinion that they were not evaluated within legally approved exploitation and exploration areas and we have not included them among *resources*.

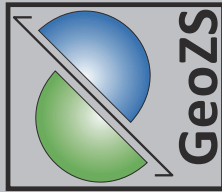
**Jože Štih, Andreja Senegačnik**



## Overview of EU funded research projects dealing with mineral resources in which Geological Survey of Slovenia participates

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	on-going	Limestone as the common denominator of natural and cultural heritage along the karstified part of the Adriatic coast	Oct '12	Sep '15	36	Lead partner	Geological Survey of Slovenia (GeoZS)	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.
FP7 - Coordination and support actions (FP7-NMP-2013-CSA-7)	Minerals4EU	on-going	Minerals Intelligence Network for Europe	Sep.'13	Avg.'15	24	Project partner	Geological Survey of Finland (GTK)	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 geosource 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.
EC procurement - Enterprise and Industry no 179/PP/ENT/CIP /12/C/N04c012	Minventory	on-going	Statistical Information on EU Raw Materials Deposits	Jan '13	Dec '14	24	Project partner	Oakdene Hollins Ltd., UK	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.
Horizon 2020-WASTE-4c-2014	ProSUM	approved	Prospecting Secondary raw materials in the Urban mine and Mining waste	Jan '15	Dec '17	36	Project partner	Waste of Electrical and Electronical Equipment Forum	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 (EUIIN), 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	IVAMOS!	approved	Viable and Alternative Mine Operating System	Jan '15	Jul '17	42	Project partner	BMT Group Limited	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 open-cut 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	MINATURA	approved	Developing a concept for a European minerals deposit framework	Jan '15	Dec '17	36	Project partner	Montanuniversität Leoben, 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 MINATURA.
Horizon 2020-SC5-13b	INTRAW	approved	International cooperation on Raw materials	Jan '15	Dec '17	36	Project partner	Federation Europeenne des Geologues (EFG)	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.
The South East Europe Transnational Cooperation Programme 2007-2013	SARMa	finished	Sustainable Aggregates Resource Management	May '09	Dec '11	32	Lead partner	Geological Survey of Slovenia (GeoZS)	Aggregates (crushed stone, sand and gravel) are crucial for infrastructure and construction. South East Europe countries are rich in aggregates, but supply is not coordinated within or across the area. The project challenges were illegal and damaging quarries, unreclaimed sites, limited recycling and community opposition. Fulfilling demand requires efficient and sustainable supply chain (planning, extraction, transport, use and recycling), and socio-eco friendly quarrying, to preclude opposition to extraction, supply bottlenecks, and restricted growth. Main objectives of the project were to develop common approach to sustainable aggregate resource management (SARM) and sustainable supply mix (SSM) planning, at three scales, to ensure efficient and secure supply in SEE. Specific objectives included capacity building, information infrastructure creation, and planning for a Regional Centre on SARM and SSM.
ICT Policy Support Programme	EuroGeoSource	finished	EU information and policy support system for sustainable supply of Europe with energy and mineral resources	Apr '10	Mar '13	36	Project partner	Geological Survey of the Netherlands (TNO)	EuroGeoSource is a data portal, which allows access by Internet to the aggregated geographical information on geo-energy (oil, gas, coal etc.) and mineral resources (metallic and non-metallic minerals, industrial minerals and construction materials: gravel, sand, ornamental stone etc.), coming from a wide range of sources in a significant coverage area of Europe (ten countries). The project was co-funded by the Competitiveness and Innovation Framework Programme (CIP), under the Policy Support Programme (PSP), Geographic Information Theme. The aim of the project is to provide information on oil and gas fields, including prospects and mineral deposits, in order to stimulate investment in new prospects for geo-energy resources, as well as in renewing production at mines undergoing economic decline or closure, contributing this way to the independence of the EU having to import valuable minerals from outside resources.
FP7-ENV-2009-1	EO-MINERS	finished	Earth Observation for Monitoring and Observing Environmental and Societal Impacts of Mineral Resources Exploration and Exploitation	Feb '10	Oct '13	45	Project partner	Bureau de Recherches Géologiques et Minières (BRGM)	The scope of EO-MINERS project was to address the sustainable development of the extractive industry and the reduction of its environmental footprint. The extractive industry is facing increasing environmental and societal pressures, being regulatory or not, during all phases of a project, from exploration to exploitation and closure. Therefore, the EO-MINERS scientific and technical objectives were three-fold. First it was needed to assess policy requirements at macro (public) and micro (mining companies) levels and define environmental, socio-economic, societal and sustainable development criteria and indicators to be possibly dealt using earth observation. Then, by using existing EO knowledge carrying out new developments on demonstration sites to further demonstrate the capabilities of integrated EO-based methods and tools in monitoring, managing and contributing reducing the environmental and societal footprints of the extractive industry. And finally, to contribute available, reliable and objective information about affected ecosystems, populations and societies to serve as a basis for a sound "dialogue" between industrialists, governmental organisations and stakeholders.
The South East Europe Transnational Cooperation Programme 2007-2013	SNAP-SEE	finished	Sustainable Aggregates Planning in South East Europe	Oct '12	Nov '14	26	Project partner	Montanuniversität Leoben, Austria	Assuring sustainable supply of aggregates resource is an important challenge due to their limited availability when aiming at sustainable regional development. Due to the regional differences and historical development, there are diverse approaches to aggregates policies, planning and management in South East Europe, which is hindering resource efficiency and economic development in the region. There are differences among mineral policies and plans at various political scales within and across the region. Aggregates policies and plans do not reside within a single document; they are distributed among many different legal documents, making coordination and a comprehensive understanding difficult. There is also almost complete lack of coordination on planning supply from primary and secondary aggregates. Aggregates demand should be fulfilled with a mix of primary (sand, gravel, crushed stone) and secondary aggregates (recycled construction and demolition waste, manufactured aggregates, excavated materials from civil works etc.) if the SEE region is to be an eco-efficient society.





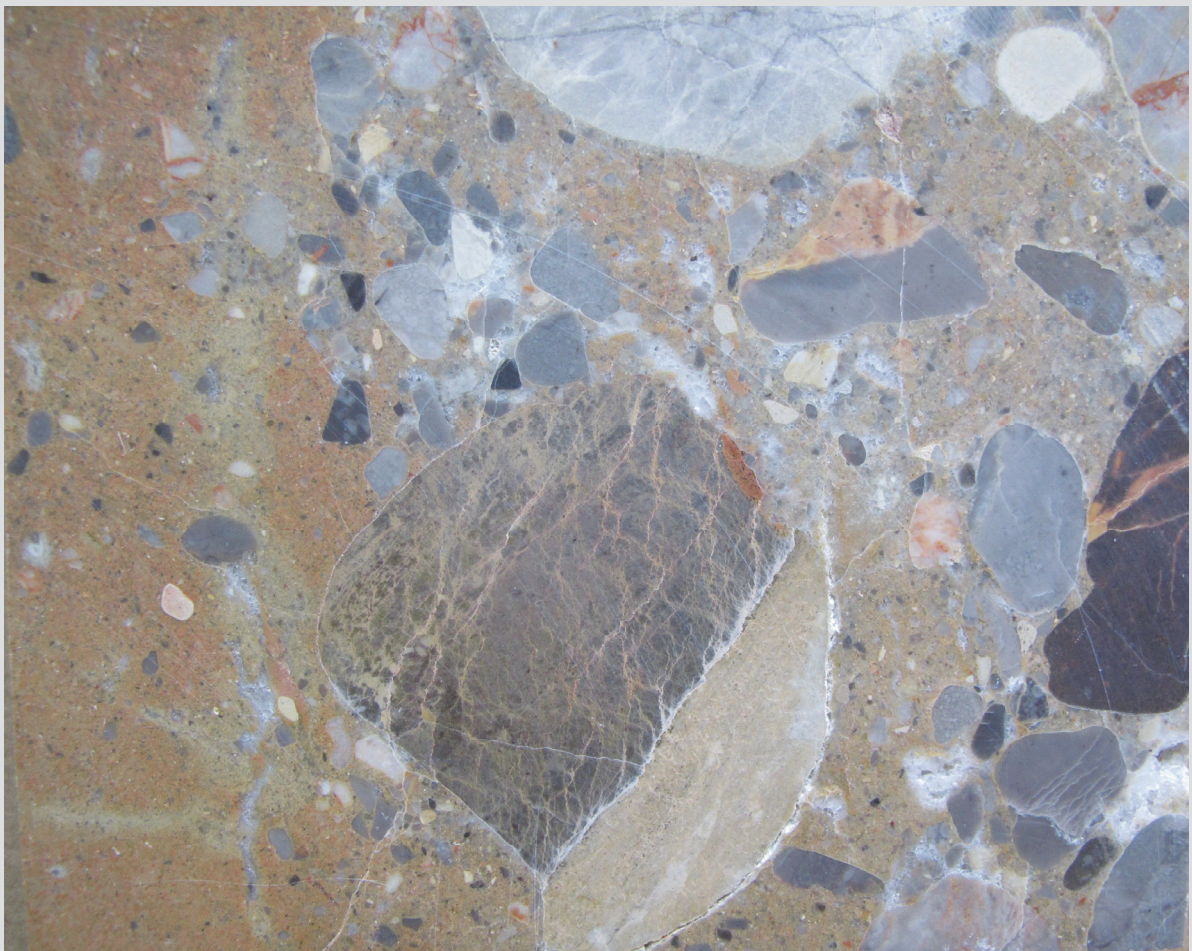
Geological Survey of Slovenia  
Dimičeva ulica 14  
Ljubljana, SLOVENIA

## PRODUCTION OF MINERAL RESOURCES IN SLOVENIA

(in metric tons) \*

	1988	1993	1998	2003	2008	2010	2011	2012	2013
Bentonite		20	447	187	160	135	168	98	143
Calcite	142.208	105.402	103.000	119.606	348.152	459.926	458.800	474.152	555.663
Kaolin	35.514	20.171							
Chalk	4.740	2.090	945	607					
Quartz sand	861.579	374.164	518.755	449.733	289.529	253.866	230.908	219.481	224.387
Tuff	109.000		84.101	84.333	109.949	39.401	24.639	23.732	19.171
Industrial dolomite					177.715	156.179	154.721	119.317	136.516
Chert	30.744	17.477	18.200	20.824	21.648	16.114	18.907	9.960	11.530
Ceramic clay	172.740	152.268	98.588	79.900	32.200	12.279	10.103	5.295	3.479
<b>Industrial minerals and rocks</b>	<b>1.356.525</b>	<b>671.592</b>	<b>824.036</b>	<b>755.190</b>	<b>979.353</b>	<b>937.900</b>	<b>898.246</b>	<b>852.035</b>	<b>950.889</b>
Brick clay	1.034.168	883.420	632.696	573.584	420.360	296.118	374.020	159.746	180.748
Building stone	34.830	54.321	31.474	38.942	71.260	55.045	25.109	21.006	21.158
tonalite (granodiorite)	29.344	21.600	54.478	30.850	67.400	36.855	45.930	23.374	41.016
other	9.318	2.465	1.139	5.713	21.959	19.724	11.896	11.526	8.332
Building stone	73.492	78.386	87.091	75.505	160.619	111.624	82.935	55.906	70.506
Raw materials for lime					1.631.391	1.260.446	1.103.163	896.241	860.890
Raw materials for cement	1.249.387	1.520.954	1.479.644	1.400.423	1.684.258	982.653	883.573	952.758	1.138.560
<b>Construction materials</b>	<b>2.357.047</b>	<b>2.482.760</b>	<b>2.199.431</b>	<b>2.049.512</b>	<b>3.896.628</b>	<b>2.650.841</b>	<b>2.443.691</b>	<b>2.064.651</b>	<b>2.250.704</b>
Crushed stone	4.714.443	4.620.273	6.748.784	6.623.054	7.541.043	5.773.480	4.034.597	3.264.404	2.813.266
dolomite	3.402.742	3.068.666	4.502.498	8.391.079	7.291.259	6.143.336	5.440.918	4.223.692	4.127.357
other			99.963	26.207	150.258	155.716	151.276	69.335	127.272
Crushed stone	8.117.185	7.688.939	11.351.245	15.040.340	14.982.560	12.072.532	9.626.791	7.557.431	7.067.895
Sand and gravel	3.455.355	2.668.860	2.440.115	3.437.911	4.506.076	2.422.771	1.899.770	1.707.455	2.143.013
<b>Construction materials – aggregates</b>	<b>11.572.540</b>	<b>10.357.799</b>	<b>13.791.360</b>	<b>18.478.251</b>	<b>19.488.636</b>	<b>14.495.303</b>	<b>11.526.561</b>	<b>9.264.886</b>	<b>9.210.908</b>
<b>NON-METALS</b>	<b>15.286.112</b>	<b>13.512.151</b>	<b>16.814.827</b>	<b>21.282.953</b>	<b>24.364.617</b>	<b>18.084.044</b>	<b>14.868.498</b>	<b>12.181.572</b>	<b>12.412.501</b>
brown coal					488.828	419.466	435.800	314.262	
lignite					4.008.442	4.010.930	4.066.278	3.967.064	3.721.188
oil					174	233	263	279	298
gas condensate					104	207	131	60	114
gas					2.348	6.006	2.095	1.454	2.698
<b>oil and gas</b>						<b>6.446</b>	<b>2.489</b>	<b>1.793</b>	<b>3.110</b>
sea salt					535	59	4.291	5.684	3.360

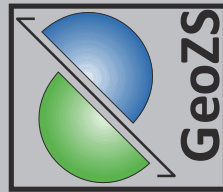
\* Coal, oil, gas and sea salt are recorded in this table since 2004.



Number of sites of non-metals in Slovenia with and without production in exploitation areas

	1988	1993	1998	2003	2008	2010	2011	2012	2013
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 clay	6	7	6	6	5	3	3	3	3
<b>Industrial minerals and rocks</b>	<b>22</b>	<b>26</b>	<b>24</b>	<b>18</b>	<b>18</b>	<b>16</b>	<b>16</b>	<b>16</b>	<b>16</b>
Brick clay	11	10	7	7	8	7	6	5	5
Building stone									
limestone	2	3	4	6	12	12	12	12	12
tonalite (granodiorite)	2	2	1	2	3	3	3	3	3
other	3	5	4	9	15	14	14	14	14
Building stone	7	10	9	17	30	29	29	29	29
Raw materials for lime					6	6	6	6	6
Raw materials for cement	6	7	6	4	5	5	5	5	4
<b>Construction materials</b>	<b>24</b>	<b>27</b>	<b>22</b>	<b>28</b>	<b>49</b>	<b>47</b>	<b>46</b>	<b>45</b>	<b>44</b>
Crushed stone									
limestone	20	24	22	25	27	29	29	29	29
dolomite	31	36	30	88	95	96	96	91	88
other			2	4	6	7	6	6	6
Crushed stone	51	60	54	117	128	132	131	126	123
Sand and gravel	28	30	22	32	33	33	33	30	32
<b>Construction materials – aggregates</b>	<b>79</b>	<b>90</b>	<b>76</b>	<b>149</b>	<b>161</b>	<b>165</b>	<b>164</b>	<b>156</b>	<b>155</b>
<b>NON - METALS</b>	<b>125</b>	<b>143</b>	<b>122</b>	<b>195</b>	<b>228</b>	<b>228</b>	<b>226</b>	<b>217</b>	<b>215</b>





Geological Survey of Slovenia  
Dimičeva ulica 14  
Ljubljana, SLOVENIA

## RESERVES OF NON-METALS IN SLOVENIA

(in metric tons)

	1988	1993	1998	2003	2008	2010	2011	2012	2013
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	17.131.983	16.776.578	16.444.522	16.344.403
Tuff	X	X	X	X	X	X	X	X	X
Industrial dolomite									
Chert	X	X	X	X	X	X	X	X	X
Ceramic clay	24.140.907	24.594.991	11.992.994	3.594.473	4.410.827	4.842.142	4.831.411	4.848.411	4.844.660
<b>Industrial minerals and rocks</b>	<b>65.742.594</b>	<b>67.116.118</b>	<b>52.927.392</b>	<b>36.974.132</b>	<b>44.309.229</b>	<b>37.478.301</b>	<b>36.899.829</b>	<b>35.895.908</b>	<b>34.979.159</b>
Brick clay	33.405.130	51.530.276	11.054.904	22.533.978	10.551.336	16.264.904	15.974.434	15.222.702	12.925.646
Building stone	X	9.631.643	5.485.933	5.394.506	5.499.571	6.079.433	8.343.915	8.214.386	8.146.626
tonalite (granodiorite)	X	X	X	X	6.925.657	6.849.028	6.803.090	6.779.716	6.738.701
other	2.439.715	3.523.851	3.631.370	2.569.868	2.489.065	2.459.719	2.447.788	2.434.717	2.424.992
Building stone	18.473.030	19.095.834	15.202.277	14.921.513	14.914.293	15.388.180	17.594.793	17.428.819	17.310.319
Raw materials for lime					86.896.853	81.472.894	76.665.636	79.804.024	71.746.619
Raw materials for cement	111.011.205	126.557.151	94.028.998	66.973.262	40.963.436	38.650.565	38.094.287	38.045.010	25.295.432
<b>Construction materials</b>	<b>162.889.365</b>	<b>197.183.261</b>	<b>120.286.179</b>	<b>104.428.753</b>	<b>153.325.918</b>	<b>151.776.543</b>	<b>148.329.150</b>	<b>150.500.555</b>	<b>127.278.016</b>
Crushed stone	420.997.551	407.042.962	345.954.722	211.860.322	167.006.530	173.556.721	137.031.936	137.705.071	140.278.435
dolomite	128.054.857	123.927.918	123.149.775	153.442.411	112.442.037	122.631.137	140.139.477	130.896.386	126.420.845
other			X	2.774.079	4.179.785	5.156.142	4.651.580	4.591.875	4.473.952
Crushed stone	549.052.408	530.970.880	469.206.583	368.076.812	283.628.352	301.344.000	281.822.993	273.193.332	271.173.232
Sand and gravel	63.227.742	39.080.471	18.019.921	34.241.209	46.148.792	37.115.556	35.605.242	35.537.547	34.904.839
<b>Construction materials – aggregates</b>	<b>612.280.150</b>	<b>570.051.351</b>	<b>487.226.504</b>	<b>402.318.021</b>	<b>329.777.144</b>	<b>338.459.556</b>	<b>317.428.235</b>	<b>308.730.879</b>	<b>306.078.071</b>
<b>NON-METALS</b>	<b>840.912.109</b>	<b>834.350.730</b>	<b>660.440.075</b>	<b>543.720.906</b>	<b>527.412.291</b>	<b>527.714.400</b>	<b>502.657.214</b>	<b>495.127.342</b>	<b>468.335.246</b>

According to 83<sup>rd</sup> 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

# SUSTAINABLE AGGREGATES PLANNING IN SOUTH EAST EUROPE – SNAP-SEE (2012 – 2014)

## Introduction

Aggregates are the essential building component for modern society. The sustainable supply of aggregates is essential to economic growth, and conversely aggregates consumption can be an indicator of economic prosperity. Europe currently needs approximately 3 billion tonnes of aggregates each year (6 t/c) and consumption could reach 3.5-4 billion tonnes before 2030, driven mainly by economic growth in Central and South East Europe (SEE). Growing demand needs to be addressed by aggregates supply planning concepts.

Assuring sustainable supply of aggregates is an important challenge due to their economic importance and the potential environmental and social impacts associated with their production. **The Sustainable Aggregates Planning in South East Europe (SNAP-SEE)** project, funded by the EU South East Europe Transnational Cooperation Programme, focuses on developing and disseminating tools for aggregates planning in South East Europe. It builds on the results of the Sustainable Aggregates Resource Management (SARMa) project, a preceding SEE Transnational Cooperation-funded project. Due to regional differences in historical development, there are diverse approaches to aggregates policies, planning and management in SEE, which is hindering resource efficiency and economic development in the region:

- differences among mineral policies;
- aggregates policies and plans are distributed among many different legal documents, making coordination and a comprehensive understanding difficult;
- authorities in SEE countries do not have the understanding of either sustainable aggregates resource management (SARM) or planning for sustainable supply mix (SSM) and
- there is almost a complete lack of coordination on planning supply from primary and secondary aggregates sources.

SNAP-SEE is a two year project with 27 partners from 13 SEE countries and Turkey, cooperating under the leadership of the University of Leoben (Montanuniversität Leoben – MUL) from Austria.





## Project objectives

Our objectives are focused on:

- coordinated national / regional planning for aggregates' supply that addresses cross-sectoral interactions and ensures that documents are consistent;
- integrated planning for primary and secondary aggregates that addresses resource efficiency;
- capacity and competence to address the preceding two problems;
- stakeholder engagement and consultation process to ensure that planning addresses the concerns and needs of all target groups.

The main, joint objective is to develop a Toolbox for Aggregates Planning to support national / regional primary and secondary aggregates planning in SEE countries, which includes a SNAP-SEE Vision for a transition to sustainable planning, a handbook on Capacity Building and Stakeholder Consultation, a handbook on Data and Analysis Methods and the Aggregates Planning Scheme with necessary actions towards sustainable planning.

## Results

The **Aggregates Planning Toolbox** represents the final deliverable of the SNAP-SEE project and is composed of four aforementioned handbooks, dealing with four themes that were developed in these years. All the documents are inter-related and mutually supporting and will be introduced in a project's Final publication.

- The "**A Vision of Best Practices for Aggregates Planning in South East Europe**" document as a first handbook presents a vision for a transition to integrated, comprehensive sustainable planning in SEE. It includes discussions on the issues that need to be addressed, interim steps that should be taken toward more sustainable planning and a review of the components a sustainable plan should contain.
- Within the SNAP-SEE project, there were two rounds of stakeholder consultations organized in each partners' country. Experiences from all workshops are presented in a handbook on capacity building and stakeholder consultations, titled "**Consulting Stakeholders when Applying Best Practices in Sustainable Aggregates Planning**". This document provides a step-by-step guide on how to plan and conduct stakeholder consultations to ensure that industry, government, non-governmental organizations and civil society provide their input to and participate in the planning process.
- The third handbook, "**Data and Analysis Methodologies for Aggregates Planning: In support of best practices in Sustainable Aggregates Planning**" discusses the various types of data that provide essential background information for the planning process. Data definitions, significance, availability, structure and needs are addressed. Methods for validating and analyzing data are presented, including approaches to demand forecasting.
- The last, fourth handbook titled "**How to Build a Sustainable Aggregates Plan**" represents a roadmap, a "Scheme" for planning, including discussions of the planning process itself and its various steps. The possible dictions of different planning modules are provided that embody the principles, approaches and actions necessary to achieve the goals set up by the Vision.

Therefore, the Toolbox should help governments in South East Europe to improve their aggregates planning and management processes. For this reason it will be printed in English, as well as in all national languages of the partners.

The SNAP-SEE project will end in November 2014. Before its conclusion, the conference, titled "**International Conference on Sustainable Aggregates Planning in South East Europe - contributions to the EU minerals policy framework**", will be organized by the Geological Survey of Slovenia in cooperation with the projects' lead partner MUL. The event will take place between the 22<sup>nd</sup> and 24<sup>th</sup> October 2014 in Bled, Slovenia. The purpose of this international conference is to share the results of the SNAP-SEE project and place those results in the context of the European Innovation Partnership on Raw Materials' call for an improved minerals policy framework.

All the project results will be available on the SNAP-SEE website ([www.snapsee.eu](http://www.snapsee.eu)), along with three SNAP-SEE newsletters, two promotional project videos and other public materials, produced within this project.

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