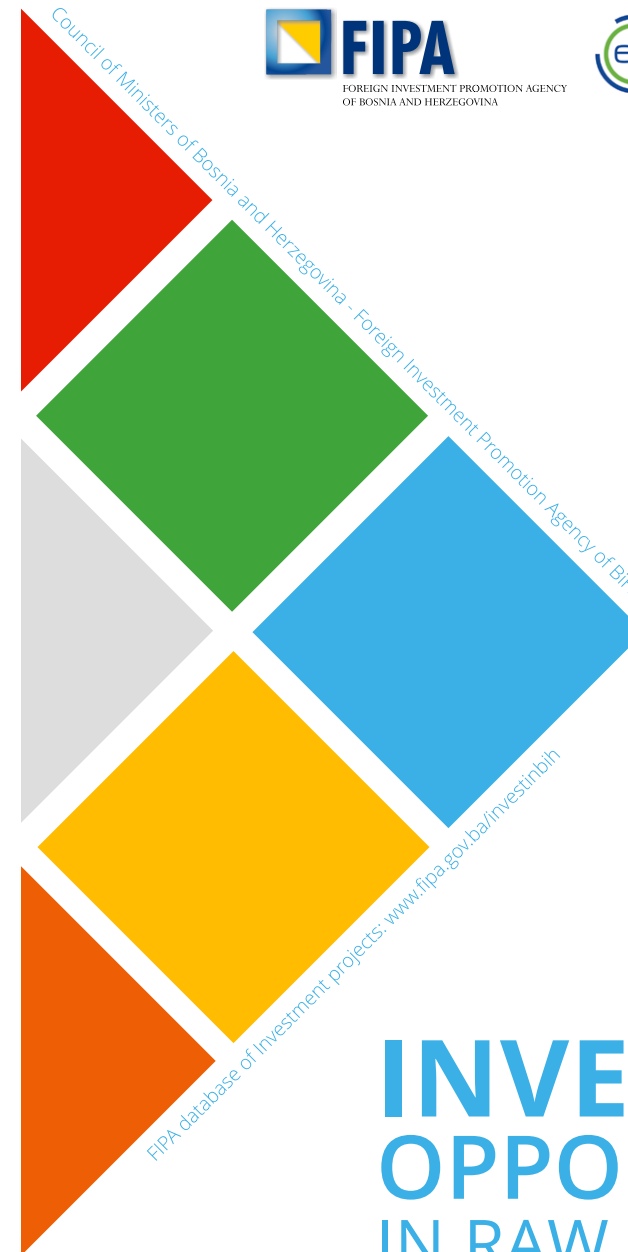


INVEST IN Bosnia and Herzegovina

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INVESTMENT OPPORTUNITIES IN RAW MATERIALS IN BOSNIA AND HERZEGOVINA

Results of the project Invest RawMaterials
- Multifactor model for investments in the raw
material sector, case study Bosnia and Herzegovina



This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation



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INTRODUCTION TO FIPA BROCHURE

This brochure has been created in the framework of the project Invest RawMaterials - Multifactor model for investments in the raw material sector, case study Bosnia and Herzegovina, funded by European Institute of Innovation and Technology (EIT) under the KIC Raw Materials program.

The aim of the project was to create a unique decision-making tool for raw materials companies and investors, mining institutes, technical universities, geological surveys, non-governmental association, B&H government and state institutions in order to facilitate investment in the raw material sector. Project is focused on Bosnia and Herzegovina due to its critical raw materials potential. The main output of the project was the development of online tool entity containing relevant and validated geo-information on **120 critical raw materials deposits and occurrences within B&H: antimony, bauxite (as potential source of rare earth elements – REE), fluorite and magnesite**, as well as relevant, updated legal, social and economic data aiming to clarify the country's complex structure. During 2019 and 2020, the online tool is presented and tested with the target groups and wider audience via four Info days (2019 – Banja Luka and Zenica, 2020 – Prijedor and Tuzla). Tool is accessible on the link: <https://test.investrm.eu/>.

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JOINT PROJECT OF:



INVESTMENT OPPORTUNITIES
IN RAW MATERIALS IN
BOSNIA AND HERZEGOVINA

WITH SUPPORT OF:



FOREIGN INVESTMENT PROMOTION AGENCY
OF BOSNIA AND HERZEGOVINA



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INVESTMENT OPPORTUNITIES
IN RAW MATERIALS IN
BOSNIA AND HERZEGOVINA

In this brochure, we present you the outcome of the devoted work of the entire project consortium from 2017 to 2019. Here you will be able to find the summary of the most relevant economic and legal data pertaining to Bosnia and Herzegovina, as well as geological data on 14 carefully selected antimony, bauxite, fluorite and magnesite deposits. We hope this brochure will find its way to interested parties and fulfill its purpose as a guide to the investors in this prospective, but insufficiently investigated area.

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PROJECT INFORMATION

Duration of the project: 2018 – 2020

Project leader: University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering (UNIZG-RGNF)

Project funded by: European Institute of Innovation and Technology, under Horizon 2020

As project coordinator, University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering (UNIZG-RGNF) would like to thank the entire InvestRM project consortium and colleagues from FIPA for their contribution in the creation of this brochure.

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INVESTMENT OPPORTUNITIES
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1. ECONOMIC DATA

Statistical consolidated data on the State level (Bosnia and Herzegovina) are published by the Statistical Agency of Bosnia and Herzegovina. In case of monetary statistics, balance of payments and other financial statistics of Bosnia and Herzegovina we refer to the official publisher, a Central Bank of B&H.

The official currency of Bosnia and Herzegovina is the Convertible Mark (KM). Its official abbreviation is BAM. The currency is pegged to the Euro. Each Convertible Mark issued has a cover in euros at a fixed rate:

$$1 \text{ KM} = 0,51129 \text{ € and } 1 \text{ €} = 1,95583 \text{ KM}$$

Table 1. Gross added value per activities after Thematic Bulletin TB01 (2017 data), First Release, No 2, July 2019 (2018 data). Source: Agency for Statistics of B&H

Gross added value (GVA) per activities	Structure, %		
	2017 Percentage within all areas/industry sectors	2017 Percentage within specific area/industry	2018 Percentage within all areas/industry sectors - unofficial data
Mining and quarrying	4,16	100,00	3,87
Mining of coal and lignite	2,91	70,00	No data
Mining of metal ores	0,76	18,30	
Other mining and quarrying	0,43	10,30	
Mining support service activities	0,05	1,40	
Manufacturing	25,41	100,00	25,28
Electricity, gas, steam and air conditioning supply	6,58	100,00	7,78

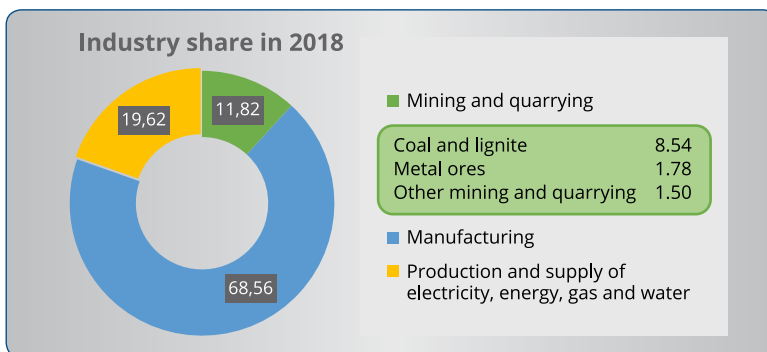


Figure 1. Mining sector position within total industry in year 2018
(Source: FIPA Agency Bulletin year 2018)



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Table 2. Trends of industrial production (volume growth) with focus on mining in Bosnia and Herzegovina. Source: KD BiH 2010 (EU NACE Rev.2) by sectors. Growth in volume; 2015=100. Gross yearly volume index of industrial production shows the yearly change in industrial production in Bosnia and Herzegovina using 2015 as base year. The monthly volume index also exists for each presented year.

	2012	2013	2014	2015	2016	2017	2018	2019	Structure 2015=100
Total Industry	-7,95	-3,18	-3,00	0,00	4,40	7,70	9,39	4,00	100,00
Mining and quarrying	3,53	-0,78	-2,83	0,00	3,77	8,93	9,91	5,63	11,82
Manufacturing	-13,22	-8,20	-4,59	0,00	3,01	8,49	7,29	3,06	68,56
Electricity, gas, steam and air conditioning supply	1,97	11,98	1,22	0,00	9,03	4,55	16,43	6,00	19,62
Mining and quarrying									
Mining of coal and lignite	4,72	-0,05	-0,64	0,00	8,69	15,43	15,68	7,03	8,54
Mining of metal ores	-11,72	-6,76	-10,42	0,00	-14,34	-14,92	-16,53	-10,84	1,78
Other mining and quarrying	12,28	2,12	-5,92	0,00	-3,47	0,37	8,42	11,38	1,50

INVESTMENT OPPORTUNITIES IN RAW MATERIALS IN BOSNIA AND HERZEGOVINA

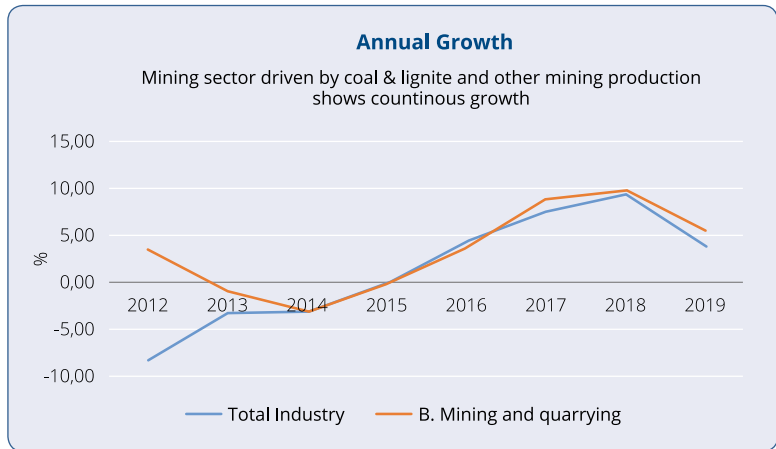


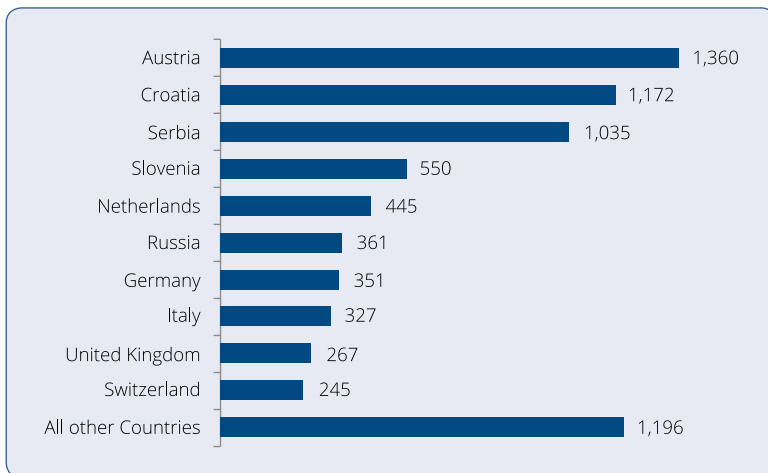
Figure 2. Trends of industrial production (volume growth) with focus on mining in Bosnia and Herzegovina. Source: KD BiH 2010 (EU NACE Rev.2) by sectors. Growth in volume; 2015=100.

Table 3. Overview of labor cost with focus in Mining industry. Source: Agency for statistics BiH: First release, Demography and social statistics - Average monthly gross earnings of employees 2012-2017 by the accounting period II semester, for I-XII 2012-2017 (in BAM).

BiH Labor cost (gross in BAM)	2012	2013	2014	2015	2016	2017
BiH Total	1.290	1.291	1.289	1.289	1.301	1.321
Mining and quarrying	1.466	1.481	1.500	1.509	1.523	1.565
BiH Employment level**	XII 2012	XII 2013	XII 2014	XII 2015	XII 2016	XII 2017
BiH employment	685.117	689.270	770.725	715.425	737.954	753.202
Mining and quarrying employment	19.773	18.662	18.702	18.530	18.482	18.420
BiH unemployment	550.255	553.762	547.134	537.568	510.022	475.084
Mobility (work permission)	2012	2013	2014	2015	2016	2017
Bosnia and Herzegovina	2.573	2.563	2.197	2.465	2.628	2.593
Federation of Bosnia and Herzegovina	1.233	1.326	1.370	1.497	1.605	1.682
Mining and quarrying	36	46	36	56	52	47

Note: BiH unemployment data is available for the complete year (2012-2017); BiH employment data exists for I, II and III quarter 2017 and all four quarters 2012-2016, but the mining sector is registered only on monthly basis (data is taken on December 2012-2017) so all three indicators are adjusted according to data from December.

Table 4. Top investors in B&H, December 2018, millions of EUR. Source: Central bank of BiH, situation DSU, August 2019.





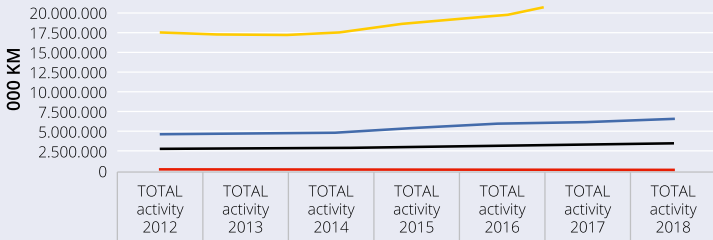
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INVESTMENT OPPORTUNITIES
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BOSNIA AND HERZEGOVINA

3a) total industrial business activities with six indicators

BiH business KPIs

total industrial business activities with 6 indicators



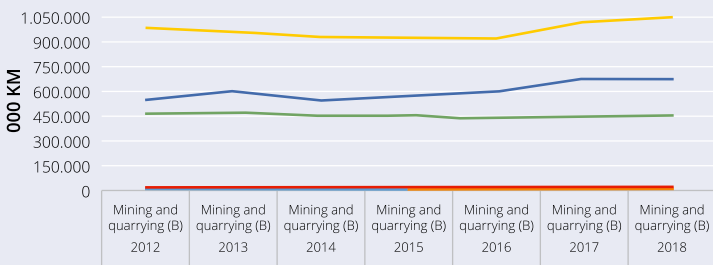
Activities throughout years

- Number of enterprises
- Number of entrepreneurs
- Number of persons employed
- Turnover (000 BAM)
- Value added at factor cost (000 BAM)
- Personnel costs (000 BAM)

3b) mining and quarrying business activities with six indicators

BiH business KPIs

Mining and quarrying business activities with 6 indicators



Activities throughout years

- Number of enterprises
- Number of entrepreneurs
- Number of persons employed
- Turnover (000 BAM)
- Value added at factor cost (000 BAM)
- Personnel costs (000 BAM)

Figure 3. Key performance indicators for B&H business. Source: Agency for Statistics of Bosnia and Herzegovina, *Structural Business Statistics – preliminary results for 2018, November 2019*

2. LEGAL DATA

2.1. Introduction

2.1.1. Management of mineral raw materials in Federation of Bosnia and Herzegovina

According to law, mineral raw materials include all organic and inorganic mineral raw materials found in solid, liquid and gaseous state, in their primary form (deposit) or in drifts, tailings, smelting slags and natural solutions, as follows:

1. energy mineral raw materials-all types of fossil fuels, hydrocarbons in solid, liquid and gaseous state, all types of bituminous sand oil rocks, other gases found in soil and radioactive mineral raw materials;
2. mineral raw materials which can be used to produce metals and their compounds;
3. all types of salt and saltwater, and gases occurring with them;
4. non-metallic mineral raw materials: abrasives, asbestos, barite, bentonite, white bauxite, cement marls, diatomite, dolomite, feldspar, fluorite, gypsum, graphite, chalk, limestone, quartz, quartz sand, quartzite, ceramic and refractory clay, keramzite, shale, mica, magnesite, brick clay, pyrophyllite, sulphur, tuff, talk, talk shale, technical-construction stone, architectural-building stone, ornamental and semi-precious stone, gravel and sand for construction outside of water-courses;
5. all secondary mineral raw materials occurring as unused residue from the process of obtaining, enriching and processing of primary mineral raw materials; and
6. any other unlisted mineral raw materials of natural origin.

The management of mineral raw materials under points 1, 2 and 3 is performed by the Federal Ministry of Energy, Mining and Industry. The management of mineral raw materials under 4, 5 and 6 is performed by the Cantonal Ministries responsible for the mining industry.

The Government of the Federation of Bosnia and Herzegovina has the right to issue the decision for the exploitation of mineral raw materials that are of special interest for the Federation.



2.1.2. Management of mineral raw materials in Republic of Srpska

According to law, the following materials are considered as mineral resources:

1. all types of coal, hydrocarbons (oil and natural gas) and other natural gas, asphalt, oil shale and radioactive ores,
2. metallic mineral raw materials and their usable compounds,
3. non-metallic mineral raw materials, raw materials for industrial processing and for obtaining building materials,
4. all types of salt and salt water,
5. subsoil waters: mineral, technical and thermal mineral waters, geothermal sources, thermal waters and gases that occur with them (hereinafter: groundwater),
6. technogenic mineral resources resulting from the exploitation and processing of mineral resources,
7. all other mineral raw materials of natural origin.

The management of all mineral all raw materials is performed by the Ministry of Industry, Energy and Mining of Republic Srpska.

Exceptionally, without a concession contract, the Government may by decision authorize the exploitation of stone in amount of up to 5,000 m³ for the construction or reconstruction of religious buildings and cultural and historical monuments, as well as for the rehabilitation of the consequences of natural disasters.

2.2. Overview

2.2.1. Bosnia and Herzegovina

I. Strategies and policies

- The environmental strategy in BiH
- The development of industrial policy in BiH

II. Guidelines for investors

- Investment Climate Statement BiH
- BiH Country Report December 2017
- Framework transport policy for BiH for the period 2015-2030
- Economic and Fiscal Policy Guidelines 2018-2020
- Economic Reform Program of BiH 2018 – 2020
- Overseas Business Risk in Bosnia and Herzegovina

- Geology of Bosnia and Herzegovina
- Mining of Bosnia and Herzegovina

III. Sector related laws

- The Law on protection and rescue of people and material goods from natural and other disasters in BiH
- Rulebook on the procedure for concession applications and conducting the concession procedure (Official Gazette 65/2006)

IV. Mining related legal acts

- The Law on the Policy of Foreign Direct Investment in Bosnia and Herzegovina
- The Law on Public Procurement
- The Law on Concessions of Bosnia and Herzegovina

V. Environmental permits

VI. Support programs

- EU Programmes available to BiH
- EBRD support programmes to development of small and medium-sized enterprises in BiH

2.2.2. Republic of Srpska

I. Mining related legal acts

- The Law on Mining
- Laws and regulations in the field of mining and exploitation of mineral resources
- The Law on Spatial Planning and Land Utilization
- Law on Environmental Protection
- The Law on Waste Management
- Rulebook on the procedure for concession applications and conducting the concession procedure
- Amendments to Spatial Plan of Republic of Srpska by the year 2025
- Legal and administrative framework
- Law on Air Protection
- Law on protection against non-ionizing radiation
- Law on Administrative Procedure
- The Law on Protection and Rescue in Emergency Situations
- Concession law



II. Concession procedure

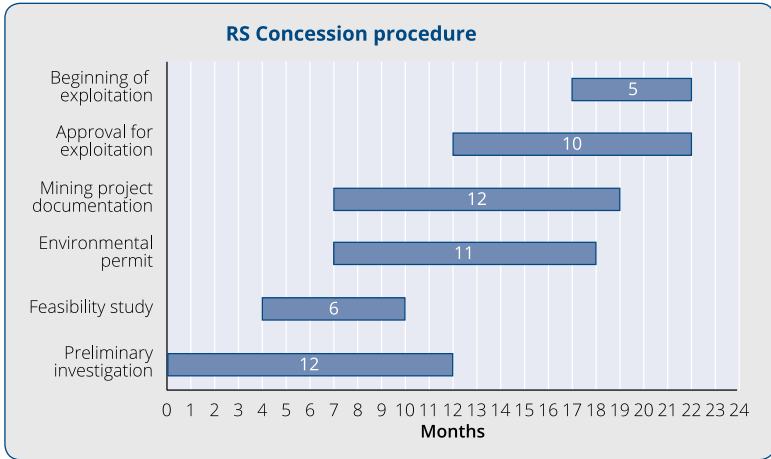


Figure 4.

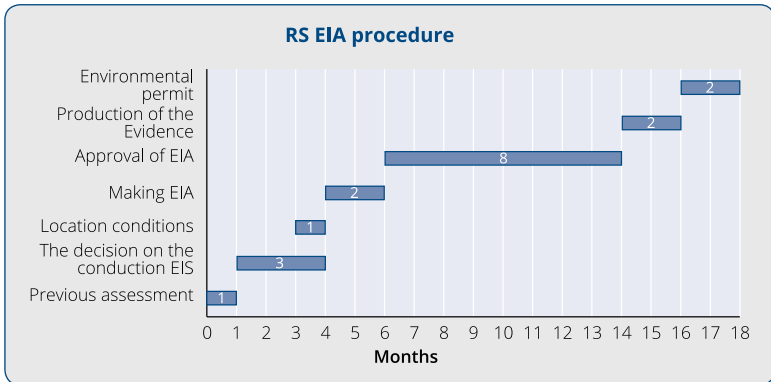


Figure 5.

2.2.3. Federation of Bosnia and Herzegovina

I. Mining related legal acts

- Law on Geological Explorations
- Law on Mining in FBiH

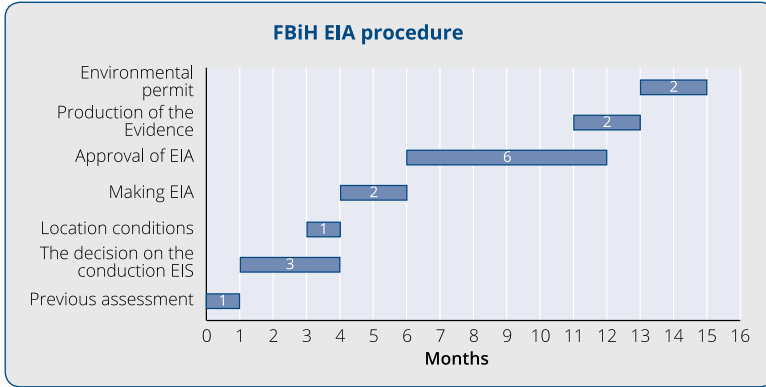


Figure 6.

2.2.3.1. Canton level

I. Mining related legal acts

- Law on Geological Explorations
- Cantonal Laws on Concessions
- Law on Mining in FBIH
- Law on Spatial Planning
- Law of Water
- Law on Forests

II. Concession procedure

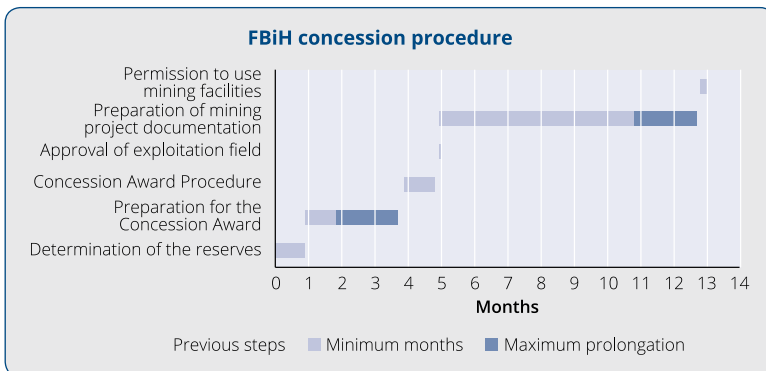


Figure 7.



3. GEOLOGICAL DATA

3.1. Introduction

Four raw materials from the EU critical raw materials list were overviewed in details in order to update reserves and resources estimations for all deposits and occurrences (>120) on B&H territory and to define potential of targeted deposits for investors.

Table 5. Reserves and resources of raw materials

	No. of deposits /occurrences	Total reserves (A+B+C ₁)	Total resources (C ₂ , D ₁ , D ₂)
Fluorspar	5	-	-
Antimony	13	100.000 t	115.000 t
Magnesite	57	537.784 t	3.414.700 t
Bauxite	51	35.067.305 t	20.852.00 t

For each of the deposits, investment potential has been estimated, resulting in perspective fluorspar, antimony, magnesite and bauxite deposits. Selection process included geological criteria containing data quality level in combination with reserves and resources quantity, social criteria, environmental criteria and economic criteria (Figure 4 and 5). A+ rank stands for deposits and occurrences with favorable geological criteria, while only selected A+ ranked deposits containing all desirable criteria; geological, social, legal as well as economical feasibility, are presented in more details as investment opportunities in this brochure. For more data visit <https://investrm.eu>.

Figure 8. Selection criteria – Geological criteria for ranking deposit and occurrences with parameters:
a) Level of current geological knowledge – data quality

		RANK (defined by InvestRM consortium)		
		A	B	C
Selection criteria 1 (according to Word Risk Report)	Parameters (defined by InvestRM consortium)	Excellent geological data with defined and up to date CRM reserves and deposit characteristics. Data are based on references that describe the specific deposit (Elaborates, Technical documentation, Reports, Scientific papers, Geological maps). Moreover, the benchmark for assessing this level is at least ¾ of essential characteristics delivered in the deposit template. Exploration and sampling data available for individual deposit.	Good-sufficient geological data for CRM reserves estimation based on deposit characteristics. Data are based on references that describes the deposit's wider area (Publications, Scientific papers, Geological maps), with similar geological characteristics. The second benchmark for assessing this level is at least ½ of essential characteristics delivered in the deposit template. Only partial exploration and sampling data for targeted CRM available (e.g.: Polymetal deposits with estimation of total reserves for several RM, targeted CRM not or poorly individually described; Bauxite and Magnesite deposits with reserves estimation and deposits characteristics based on Bauxite or Magnesite region data with some exploration and sampling data for the individual deposit available.).	No or minimum geological data for individual deposit; based on regional scale geological data, CRM reserves not defined or poorly estimated. Data are based on references that describe the deposit's wider area on regional scale (Publications, Scientific papers; Geological maps). In this group less than ½ of essential characteristics are delivered in the deposit template. No data about exploration and sampling for individual deposit available. Reserves are estimated only on basic regional data.
Geological criteria	Level of current geological knowledge - data quality	Fluorite deposits: Level A or B data quality, poorly estimated mineral resources, expert judgement-short explanations based on area geological characteristics and historical data. Antimony deposits: Level A data quality, more than 10,000 t of reserves (A+B+C category) and expert judgement. Magnesite deposits: Level A data quality, more than 100,000 t of reserves (A+B+C category). Bauxite deposits: Level A data quality, more than 1,000,000 t of reserves (A+B+C1 category) or more than 500,000 t of A+B category reserves.	Fluorite deposits: Level A or B data quality, poorly estimated mineral resources or inaccessible documentation, expert judgement, historical data. Antimony deposits: Level A or B data quality, reserves are estimated only for all present raw materials in polymetallic deposit; considering expert judgement. Magnesite deposits: Level A or B data quality, more than 10,000 t and less than 100,000 t of reserves (A+B+C category). Bauxite deposits: Level A or B data quality, more than 10,000 t and less than 1,000,000 of reserves (A+B+C) category.	Fluorite deposits: Any level of data quality, inaccessible documentation, expert judgement-short explanations based on area geological characteristics and historical data. Antimony deposits: Level C of data quality with inaccessible reserves documentation considering expert judgement. Magnesite deposits: Any level of data quality, less than 10,000 t of reserves of any category. Bauxite deposits: Any level of data quality, less than 10,000 t of reserves A+B category or inaccessible reserves data.
	Level of current geological knowledge - quantity			



Figure 8. Selection criteria – Geological criteria for ranking deposit and occurrences with parameters:
b) Level of current geological knowledge - quantity

		A	B	C
Selection criteria 2 (according to Word Risk Report)	Parameters (defined by InvestRM consortium)	A	B	C
Social licencing	Acceptance by Local community	Excellent, local community is aware of need for economical prosperity that industry brings along, local mines operate without conflict, supported by local community, location of the deposit is within poor rural area in the vicinity of urban area	Sufficient, local community is aware of need for economical prosperity that industry brings along, however several incidents have been recently reported from local mines operate, local community is partly supportive but worried from the aspects of health and safety	Insufficient or problematic based on current state of mining activities, local community does not accept industry due to focus on other area (agriculture, tourism), usually urban area. Local mines experience various problems related to social acceptance.
Environmental management	Legal requirements: Master plan, EIA, Environmental permit	Excellent - Environmental permit issued	Good - EIA prepared	Insufficient - exploitation filed NOT included in the Master plan
Project permitting	Legal requirements: Preliminary investigation work, Mining project, Concession permit	Excellent - Concession permit issued	Good - mining project approved	Insufficient - no research approved and/or no reserves determined
Skills availability	Labour cost, skills, task force defined in a WP2 Social and Economics data	4 - 5 unique rank for B&H; in general 15% higher than average salaries		



Figure 9. Selection criteria 2:

Selection criterium	Parameter (defined by InvestRM consortium)
Social licencing	Acceptance by local community
Environmental management	Legal requirements: Master plan, EIA, Environmental permit
Project permitting	Legal requirements: Preliminary investigation work, Mining project, Concession permit
Skills availability	Labour cost, skills, task force defined in a WP2 Social and Economics data

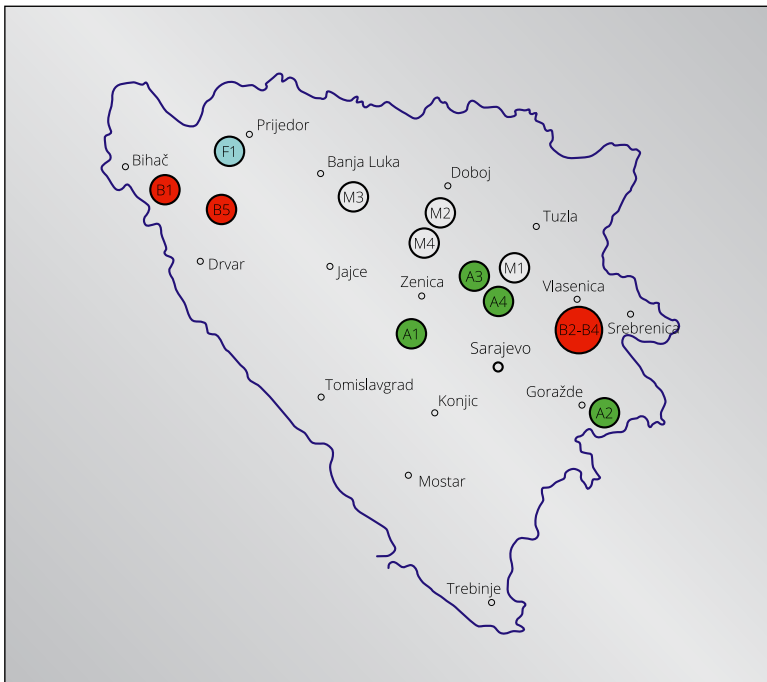


Figure 10. Location of selected perspective deposits, occurrences and mineral fields.

F1-Fluorspar occurrence Žune, A1-Antimony occurrence Čemernica, A2-Antimony occurrence Podhrušan, A3-Antimony field Rupice, A4-Antimony occurrence Veovača, M1-Magnesite field Kladanj, M2-Magnesite deposit Ošve, M3-Magnesite field Snjegotina (Banja Luka), M4-Magnesite field Teslić, B1-Bauxite field Pritoka-Tihotina-Trovrh, B2-Bauxite deposit Podbraćan, B3-Bauxite deposit Crvene stijene, B4-Bauxite deposit Kosturi, B5-Bauxite field Krnjeuša-Bravski vrh-Crni vrh.

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INVESTMENT OPPORTUNITIES IN RAW MATERIALS IN BOSNIA AND HERZEGOVINA



3.2. Fluorspar

Table 6. Ranked list of fluorspar occurrences on the BH territory.

Fluorspar	Data level-quality	Data-Quantity	Social licencing	Environmental management	Project permitting
Meovršje	A/B	A+	B	C	C
Hrmza	A/B	A+	B	C	C
Pećine	B	B	B	C	C
Žune-Ljubija	A	A+	B	C	C
Vidrenjak-Ljubija	B	B	B	C	C

Mining region Ljubija presents polymetallic, predominant Pb-Zn-Fe deposit in some areas with high grade of fluorspar. *Žune* and *Vidrenjak* were identified as economically interesting occurrences of fluorite. According to available data, **occurrence Žune** (F1-Figure 1) in mining region Ljubija is the only occurrence on BH territory with separately defined reserves of Fluorspar.

- *Reserves&resources: reserves and resources of Fluorspar are 1.500 t, considering other commodities appearing in same deposit, predominantly barite, geological potential could be much higher.*
- *Location: Republic of Srpska*
- *Status: abandoned, exploration license*

3.3. Antimony

Antimony occurrences are related to rift deposits in Inner Dinarides, formed mostly in late Paleozoic and lower-middle Mesozoic period with intracontinental rifting and supporting volcanic activities resulting in intrusive plutonic bodies and formation of polymetallic veins. Economical most valuable deposits are related to iron-sulphide-siderite-barite veins. Deposits *Podhrusanj*, *Čemernica*, *Veovača* and *Field Rupice* with several occurrences were identified as perspective sites.

Table 7. Ranked list of antimony occurrences in BH.

Antimony	Data level-Quality	Data-Quantity	Social licencing	Environmental management	Project permitting
Čemernica	A	A+	B	B	B
Totinovac-Viduša	B	C	B	C	C
Field Ljubija	B	B			
Podhrusanj	A	A+	B	C	C
Field Rupice	A				
Rupice	A	A+	A	A	A
Rid	A	B	A	B	B
Veliki do	A	B	A	B	B
Križ	A	B	A	B	B
Veovača	A	A	A	A	A
Podkozara	B	B	A	A	A
Field Srebrenica	A/B				
Lisac	A/B	B	A	A	A
Vitlovac	A/B	B	A	A	A
Čumavić	A/B	B	A	A	A

Occurrence Čemernica (A1 - Figure 1) holds 12 % of total Antimony reserves in BH. It was highly ranked due to the estimated reserves and potential related with favorable geological characteristics of wider area. Historical data from middle age mining are describing well known deposits of gold, silver and mercury in surrounding area. Polymetallic ore bearing vein is located in the middle of Čemernica deposit area and can be clearly traced according to previous investigations. Moreover, several smaller polymetallic veins in this area are reported, with prevailing antimony concentration in the main vein with length more than 4 km and thickness up to 120 m. Reported reserves of all raw materials in deposit Čemernica are 299.234 t (A+B+C₁)

- Reserves: 11.935 t of Sb (A+B+C₁)
- Location: Central Bosnia Canton
- Status: abandoned, exploration license



Antimony **occurrence Podhrusanj** (A2 - Figure 1) is an abandoned mining site with 75 % of total BH reserves and only occurrence with recorded resources. Geological potential was defined on behalf of reported reserves and resources, while another important factor is favorable antimony environment controlled by geological structure. Beside antimony there are occurrences of aluminum, iron, manganese, chromium formed with contact metamorphism process. Moreover it is necessary to consider that the reserves estimation is dating from late 1970s. The quantity of extracted commodity to present day has not been reported.

- Reserves&resources: 74.651 t (A+B+C₁), C₂=115.000 t (C₂)
- Location: Republic of Srpska
- Status: abandoned, exploration license

Polymetallic **field Rupice** (A3 - Figure 1) is part of the larger mineralized zone Vareš-Borovica. Antimony **occurrence Rupice** as part of wider area with additional registered antimony occurrences **Rid, Veliki do** and **Križ**, represent 10 % of total reported antimony reserves. Antimony occurrence Rupice represents polymetallic barite-sulphide veins with several commodities: barite, zinc, lead and antimony.

- Reserves: over 10.000 t (A+B+C₁)
- Location: Zenica-Doboj Canton
- Status: under development, exploration license
- Concessionaire: Eastern mining d.o.o. Sarajevo, Društvo za istraživanje i eksploataciju rude; ulica Maršala Tita 3/2, 71000 Centar, Sarajevo

Antimony **occurrence Veovača** (A4 - Figure 1) is polymetallic deposit, part of larger Vareš-Borovica area, with over 6.000.000 t of reserves and resources, where barite, lead-zinc and iron ore prevail. Polymetallic veins contain antimony in varying percent.

- Reserves: over 3.000 t (A+B+C₁) of Sb, 6.000.000 t (A+B+C₂) of all summarized raw materials reserves.
- Location: Zenica-Doboj Canton
- Status: under development, exploration license
- Concessionaire: Eastern mining d.o.o. Sarajevo, Društvo za istraživanje i eksploataciju rude; ulica Maršala Tita 3/2, 71000 Centar, Sarajevo

3.4. Magnesite

Table 8. Ranked list of magnesite deposits in BH

Magnesite	Data level	Quantity-perspectivity	Social licencing	Environmental management	Project permitting
Magnesite Field Kladanj	A				
Miljeвица	A	A+	A	A	A
Zeničica	A	B	A	B	B
Drinjača	A	C	A	B	B
Magnesite Field Moševac	A/B				
Borik	B	A	B	C	C
Moševac	B	A	B	C	C
Paklenica	B	C	B	C	C
Šahmanska Bašča	B	B	B	C	C
Divan 1	B	B	B	C	C
Divan 2	B	B	B	C	C
Daska	B	B/C	B	C	C
Beša Potok	B	B/C	B	C	C
Drum	B	B	B	C	C
Magnesite Field Novi Šeher	A				
Ošve	A	A+	B	C	C
Bijeli Klanci	A	B	B	C	C
Samar	A	C	B	C	C
Veliki Križ	A	B	B	C	C
Sač	A	C	B	C	C
Muratovac	A	C	B	C	C
Magnesite Field Žepče	A				
Loznikovac	A	B	B	C	C
Selište	A	B	B	C	C
Čubrinovo brdo	A	A	B	C	C
Magnesite Field Bajvat	A/B				
Poliča njive	B	A	B	C	C
Velike ravni	B	B	B	C	C
Krčevina	B	B	B	C	C
Magnesite region Dištica	B				
Maoča	B	C	B	C	C
Dištica	B	B	B	C	C



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Table 8. Continued

Magnesite	Data level	Quantity-perspectivity	Social licencing	Environmental management	Project permitting
Magnesite Field Olovo	B				
Donje Lanište	B	C	B	C	C
Mladoševac	B	C	B	C	C
Tovarnica	B	C	B	C	C
Berina	B	C	B	C	C
Magnesite Field Banja Luka-Snjegotina	A				
Jelovac	A	A+	A	C	C
Mednjak	A	A	A	C	C
Pločni	A	A+	A	C	C
Snjegotina	A	B	A	C	C
Četnja	A	A	A	C	C
Stanikova 2	A	B	A	C	C
Čađavica 2	A	B	A	C	C
Magnesite Field Banja Luka-Vrbanja	A				
Jazavići 1	A	C	A	C	C
Repište	A	B	A	C	C
Magnesite Field Prnjavor	A				
Raulića potok	A	B	A	C	C
Sigovac	A	C	A	C	C
Tanašića potok	A	C	A	C	C
Brezna	A	B	A	C	C
Stražbenica	A	B	A	C	C
Ravno brdo	A	B	A	C	C
Domaćevac	A	B	A	C	C
Dugovac	A	C	A	C	C
Mala Ukrina	C	C	A	C	C
Magnesite Field Teslić	A				
Blatnica	A	A+	A	C	C
Bukovički jarak	A	A	A	C	C
Milošev jarak	A	A+	A	C	C
Proleterov do	A	B	A	C	C
Skok	A	B	A	C	C
Vranilovići	A	C	A	C	C
Maksimova kosa	A	B	A	C	C
Paradnjak	C	C	A	C	C
Goveđa luka	A	B	A	C	C

Magnesite deposits are situated in Middle Bosnian Ophiolite zone. Magnesite deposits occur as result of metamorphism and alteration of ocean crust origin rocks. Field Kladanj with deposit *Miljevica*, Deposit Ošve, Magnesite field Teslić with deposits *Blatnica*, *Bukovički jarak* and *Milošev jarak* and Magnesite field Snjegotina with deposits *Jelovac* and *Pločni* were identified as potential investments sites.

Magnesite field Kladanj with identified deposit *Zeničica* and occurrences *Drinjača* and *Miljevica* is the most perspective site, presenting 5% of magnesite reserves in BH. Deposit *Miljevica* is an operating site with more than 30.000 t of annual capacity and currently the only operating magnesite deposit in BH.

- *Reserves&resources: 193.484 t (A+B+C1)-deposit Miljevica, 7.300 t (C1), 55.000 t (C2) - occurrence Zeničica, 4.800 t (C2) - occurrence Drinjača*
- *Location: Tuzla Canton*
- *Status: operating, exploration license*
- *Concessionare: Rudar d.o.o, Mitra Trifunovića Uče broj 9, 75000 Tuzla*

Magnesite deposit Ošve is part of Magnesite field Novi Šeher with large potential. The site was abandoned in the past and no later exploration or excavation activities were reported. Deposit Ošve represent 5,5 % of Magnesite reserves and resources in BH, together with several smaller magnesite occurrences with more than 40.000 t of resources the area was identified as Magnesite Field Novi Šeher.

- *Reserves&resources: 150.000 t (C1), 65.000 t (C2)*
- *Location: Zenica-Doboj Canton*
- *Status: abandoned, storage license*



Magnesite field Teslić covers 3 deposits with more than 15% of total BH Magnesite reserves. Deposits **Blatnica** (260.000 t C1+C2), **Bukovički jarak** (120.000 t C1+C2) and **Milošev jarak** (377.000 t C1+C2) were recognized as perspective sites. Furthermore, there are 6 occurrences with over 100.000 t of resources in the same area.

- *Reserves&resources (total): 881.000 t (C1+C2)*
- *Location: Republic of Srpska*
- *Status: abandoned, storage license*

Magnesite field Snjegotina covers 3 perspective deposits; **Jelovac** (420.000 t C1+C2), **Mednjak** (113.100 t C1+C2) and **Pločni** (437.757 t C1+C2). In the same area as part of magnesite field Snjegotina there are several occurrences; **Snjegotina**, **Četnja**, **Stanikova 2** and **Čadavica 2** with more than 250.000 t of magnesite resources.

- *Reserves&resources (total-9 deposits): 1.231.900 t (C1+C2)*
- *Location: Republic of Srpska*
- *Status: closed, storage license*

3.5. Bauxite

Table 9. Ranked list of bauxite occurrences in BH

Bauxite	Data level	Quantity-perspectivity	Social licencing	Environmental management	Project permitting
Bešpelj-Crvene stijene	A	A	A	A	A
Poljana	A	A	A	A	A
Studena Vrela	A	A+	A	B	B
Podzavelin-Vinica	A	B	B	C	C
Volujak-Kadim	A	A	B	C	C
Zagorje	A	A+	B	C	C
Vinjani	A	A	B	C	C
Vučipolje	A	B	B	C	C
Trebistovo-Sobač	A	A	B	C	C
Mratnjača-Medine stanine	A	A+	B	C	C
Krstače-Cerovi doci	A	A+	B	C	C
Varda planina	A	A	B	C	C
Crne lokve-Kidačke njive	A	A+	B	C	C
Resnica-Grabova draga	A	B	B	C	C
Uzarici-Knežpolje	A	B	B	C	C
Trn-Sliškovića lokve	A	B	B	C	C
Mamići-Rasno-Hamzići	A	C	B	C	C
Blatnica-Lokvice	A	A+	B	C	C
Krehin gradac-Blizanci	A	B	B	C	C
Ošljari-Krivodol	A	B	B	C	C
Jasenjani	A	B	B	C	C
Žovnica	C	C	B	C	C
Vitina-Lipno	A	B	B	C	C
Bivolje brdo-Domanovići	A	B	B	C	C

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Table 9. Continued

Bauxite	Data level	Quantity-perspective	Social licencing	Environmental management	Project permitting
Poplat	A	B	B	C	C
Gornji Brštanik	A	B	B	C	C
Dabrica	A	A+	B	C	C
Hodovo	A	B	B	C	C
Hrgud	A	B	B	C	C
Služanj	C	C	B	C	C
Udrežnje	A	B	A	A	A
Viduša	A	B	A	A	A
Bjelaj	A	B	B	C	C
Suvaja-Šolaja	A	B	B	C	C
Pritoka -Tihotina-Trovrh	A	A	B	C	C
Veliki Skočaj	B	C	B	C	C
Palež	B	C	A	A	A
Podbraćan	A	A+	A	A	A
Šumarnica	A	A+	A	A	A
Palež II-Braćan	A	A+	A	A	A
Štedra	B	C	A	C	A
Crvene stijene	A	A+	A	A	A
Kosturi	A	A+	A	A	A
Gerovi	C	C	A	C	A
Dragošnica	B	B	A	C	A
Žedanjsko	B	B	A	C	A
Pribojevići	B	B	A	C	A
Kutuzero	C	C	A	C	A
Krnjeuša-Bravski vrh-Crni vrh	A	A*	B	C	A*

Bauxite deposits are mostly related to Paleogen-Neogen carbonatic rocks distribution and are spread on large area of BH territory. Bauxite forms are related to transgressive-regressive cycles of sea level and formation of Al rich sediments with varying concentration of critical raw materials and REE traces. Bauxite is mostly related to erosional unconformities. Several operating open pits and underground mines with exploration licenses and recent activities were registered together with several perspective not operating large bauxite fields.

Bauxite field Vlasenica-Srebrenica was recognized as large area with several perspective deposits; Podbračan, Kosturi and Crvene stijene as deposits with the largest reserves, together with several smaller deposits. Most of the deposits in this area are under concession and operating. Bauxite reserves in this area are estimated over 20.000.000 t.

As not operating but perspective deposits with over 10.000.000 t of reserves, Pritoka-Tihotina-Trovrh and Krnjeuša-Bravski vrh-Crni vrh were identified as investors opportunities.

Bauxit deposit Podbračan (B1-Figure1) is part of Bauxite field Vlasenica-Srebrenica, continuously operating with annual capacity of 600.000 t with more than 5 % of total bauxite reserves on BH territory.

- *Reserves: 2.300.000 t (A+B+C₁), C₂=500.000 t (C₂)*
- *Location: Republic of Srpska*
- *Status: operating*
- *Concessionare: "BOKSIT" a.d. Milići, Trg rudara 1, 75446 Milići*

Bauxite deposit Crvene stijene is an operating open pit in Vlasenica-Srebrenica bauxite field with 10% of total BH bauxite reserves.

- *Reserves: 4.827.809 t (A+B)*
- *Location: Republic of Srpska*
- *Status: operating, production license*
- *Concessionare: BOKSIT" a.d. Milići, Trg rudara 1, 75446 Milići*



Bauxite deposit Kosturi is an operating open pit in Vlasenica-Srebrenica bauxite field with more than 10% of total BH bauxite reserves.

- *Reserves: 5.815.000 t (A+B)*
- *Location: Republic of Srpska*
- *Status: operating, production license*
- *Concessionaire: BOKSIT" a.d. Milići, Trg rudara 1, 75446 Milići*

Bauxite field Pritoka-Tihotina-Trovrvh holds more than 15 % of total BH bauxite reserves and resources. The area stretches over 50 km², and according to data Al₂O₃ content is the highest among BH bauxite deposits and varies from 62-75% with very low SiO₂ content between 1-5%.

- *Reserves&resources: 10.000.000 t (C₂)*
- *Location: Una-Sana Canton*
- *Status: not operating, exploration license*

Bauxite field Krnjeuša-Bravski vrh-Crni vrh was recognized as perspective site, due to the very large field area (80 km²) containing several bauxite deposits and occurrences with slightly varying SiO₂ and Al₂O₃ content. In general, low SiO₂ content and high grade of Al₂O₃ content (varies between 58-69%) as well as large amount of estimated reserves and resources set this deposit on the top of the perspective sites.

- *Reserves&resources: 10.500.000 t (C₂)*
- *Location: Una-Sana Canton*
- *Status: not operating, exploration license*