Main Barriers and Perceived Risks for Investment in the Ukrainian Raw Materials Resources Sector

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1 EXECUTIVE SUMMARY

Launched in 2008, the European Union's (EU) Raw Materials Initiative points out that the availability of minerals is crucial to the functioning of the EU's economy. Thus, ensuring reliable and unbiased access to minerals is becoming an increasingly important factor in the EU's competitiveness. Critical raw materials (CRMs) are essential to address today's societal challenges and needs, such as the transition to green economy and development of digital potential, boosting sectors with respect to renewable energy, electric mobility, better communications, etc.

Ukraine is extremely rich in mineral resources and is part of the European family with ever-growing ties to the EU economy and transportation systems. Analysing economic, geological, and policy data provided by the government of Ukraine and industry stakeholders and comparing it with the EU's list of CRMs, we can say that Ukraine has great potential in meeting the EU's demand for resources, allowing it to extract and supply the vast majority of critical elements. Combined with the fact that many resource deposits in Ukraine are not working to their full potential, this creates an opportunity for EU investors to bring in funds and new technologies, to build up Ukraine's raw materials base and to increase exports of nearly the full spectrum of the EU's list of CRMs.

Ukraine is well-known for its **titanium** and **coal** industries which are both raw materials on the EU's list of CRMs. However, it is less known that the country possesses other critical raw materials suited for the development of energy, automotive and semiconductor industries. Deposits of **lithium** and **cobalt** are ready to be developed and supply EU battery production companies for energy storing, automotive production, boosting the European Green Deal[1] and, particularly, the REPowerEU initiative[2]. Ukraine's over 200 deposits of **germanium** are of great interest to the semiconductor industry. The demand of germanium may rise with further EU policy changes to boost domestic production of microprocessors in the EU due to the European Chips Act. **Vanadium**, also available in Ukraine, may find its use in EU aerospace and nuclear energy industries. Finally, Ukraine's rich deposits of **fluorspar**, **natural graphite**, **phosphate rock,** and **phosphorus** are also available for extraction.

Improving the country's investment attractiveness in the mining sector has been high on the agenda of Ukraine's government over recent years. Key improvements were made, for example by introducing an **electronic bidding mechanism for issuance of special subsoil use permits**, enabling the mining industry to become more transparent and investor friendly, introducing the **Investment Atlas of the Subsoil User**, highlighting objects available for submission to the next regular electronic bidding, launching **the single window for accrual and payment of fees for special permits** with concurrent development of **a new methodology for determining their initial cost**, and many smaller initiatives.

Looking forward, Ukraine is on the path to having a **new Subsoil Code of Ukraine**, which aims to regulate issues of ensuring the transparent provision of subsoil use, establish assessment mechanisms of reserves and processing of minerals into finished industrial products in line with international standards, codify the regulations governing this industry in one document, repeal regulations that contain outdated provisions, establish clear and transparent requirements in the field of subsoil use, reduce regulatory pressure on business, and ensure equal access to natural resources.

[1] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
[2] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en

Other crucial reforms for investment attractiveness, which are underway, are **the formation of a single mineral resource base** to clarify data on mineral reserves, land plot boundaries and other relevant information on reserves, and the launch of the **Electronic Cabinet of a Subsoil User**, which will enable the gradual digitalisation of administrative services for the issuance of subsoil use permits, e.g. obtaining special permits electronically, a transparent application process for its applicants and remote access of conciliation bodies to the application.

Nevertheless, investors operating in Ukraine believe that Ukraine's subsoil sector still has significant room for improvement when it comes to its investment attractiveness. The key barriers and obstacles, as demonstrated by investors, include inefficiency, complexity or absence of certain regulatory procedures, namely the procedures for accessing geological data, agreeing on the terms of the Production Sharing Agreement (PSA), obtaining land plots, carrying out an Environmental Impact Assessment (EIA), and connecting to grids. Investors are also de facto prevented from implementing projects related to CRMs due to the absence of the required legislative procedure.

Another challenge for investors in the sector would be the number of state authorities granted with authority to either regulate, apply rules or provide public services in the industry. Such public bodies as the State Geologic and Subsoil Survey of Ukraine (Ukrainian Geological Survey) and the PSA Commission were mentioned most often as institutions that should make operational improvements.

Investors also raise concerns about the inability to dispose of the special subsoil use permit, including its sale as one of the most important investment barriers in the sector, as well as the need to address the issue of "sleeping" subsoil permits.

Finally, concerns over Ukraine's general investment framework and climate were raised as well. The key barriers and risks include the dispersion of legal acts and instability of legislation, unpredictability of the fiscal regime, and general lack of investment incentives compared to competing countries.

To address the key investment barriers and risks and increase the investment attractiveness of Ukraine's subsoil sectors, the following steps ahead are recommended to be implemented:

- Ensure the availability of geological data by expanding and developing mineral and raw material base via creating the State Fund for the Development of the Mineral and Raw Materials Base as part of a special fund of the state budget;
- Ensure the accessibility of geological data by providing easy and transparent access to it as well as grouping, cataloguing, and digitising data for future subsoil users;
- Improve and simplify procedures for concluding Product Sharing Agreements, Environmental Impact Assessments, obtaining land plots (via introduction of the "reservation of land plots" mechanism);
- Define legal procedures for accessing critical raw materials and classifying minerals of strategic importance;
- Introduce electronic services to the operations of the Ukrainian Geological Survey and Product Sharing Agreement Commission, put the e-cabinet of a subsoil user into operation;
- Permit the assessment of the reserves in accordance with international standards;
- Allow a subsoil user to alienate the right to use the subsoil at the legislative level;

- Address the "sleeping" subsoil permits issue via introduction of a subsoil use fee for subsoil users who have not started mining and do not pay rent;
- Ensure the predictability of fiscal policy, stability and unification of legislation in the subsoil use sector (via implementation of new Subsoil Code of Ukraine).

2 INTRODUCTION

For this assessment, the team of authors was contracted by the Delegation of the European Union to Ukraine to define main investment barriers and perceived risks by European investors in the Ukrainian Critical Raw Materials sector. In order to achieve the goal, the team outlined the list of steps required to deliver an appropriate report. These steps included the analysis of Ukraine's geological potential as well as the industry-specific legal and regulatory framework for Ukraine's mining sector. The next steps were to interview major current and potential stakeholders, particularly by asking for the investor sentiment of companies operating in Ukraine's mining sector. From this analysis, concrete recommendations for the transformation of the legal framework have been derived.

The geological analysis with an appropriate market overview was concluded based on known information about reserves derived from official government data and industry stakeholders' knowledge banks, e.g., reports by industry associations. It was shown that Ukraine's mineral resource base is able to meet the needs of national industry and promote the development of its export potential. The analysis was limited to the EU's 2020 list of CRMs, being the following:

Antimony	Cobalt	HREEs	Natural Rubber	Silicon Metal
Baryte	Coking Coal	Indium	Niobium	Strontium
Bauxite	Fluorspar	Lithium	PGMs	Tantalum
Beryllium	Gallium	LREEs	Phosphate rock	Titanium
Bismuth	Germanium	Magnesium	Phosphorus	Tungsten
Borates	Hafnium	Natural Graphite	Scandium	Vanadium

The geological analysis was accompanied by a brief overview of the economic policy, studying the fiscal regime, monetary policy, currency regulations and financial monitoring. A brief assessment of access to finance was also conducted.

The analysis of industry-specific regulations and the legal framework was done to identify shortcomings in regulatory policy, i.e., gaps in the legislation, institutional complexity regarding regulatory bodies and government agencies, technical problems with subsoil use rights, allocation of land plots, getting electricity, access to geological data etc. With the commencement of the Russian full-scale invasion in February 2022, an overview of martial law regulations was also analysed and added to the study.

In order to approach stakeholders, a questionnaire was developed to interview Ukrainian government agencies, industry associations and major market players. The interviews were concluded in December 2021, and results were included to build up concrete conclusions to be amended to future recommendations. Remote interviews with prospective European investors and an online survey of them were planned but were not carried out because of the Russian full-scale invasion starting in February 2022.

Finally, the sentiment analysis of investors operating in Ukraine's mining sector was carried out based on previous steps. This analysis concluded with concrete recommendations for legislation, targeting the resolution of issues in the regulatory and technical domains. The team of authors believes that the

application of the recommendations will transform the legal framework and the market climate in a way to enable a better approach to reach potential domestic and European investors.

Most developed countries have already drafted an action plan that addresses current and future challenges and propose measures to reduce their dependence on third countries, diversify supplies from both primary and secondary sources, and increase resource efficiency and the cycle while promoting good governance and worldwide delivery.

Today, it is important to increase the production of so-called critical materials and create capacity for their enrichment and primary processing, as demand is expected to proliferate on the world market. It is also essential at the state level to form and legitimise a national strategy for subsoil use and to develop a methodology for isolating critical mineral resources based on the best world practices.

Disclaimer: it is important to note that this is the draft version of the final report which will be amended with respect to results and recommendations from the Raw Material Week (14-18 November 2022) and the EU-UA Strategic Partnership on Raw Materials 1st Review Meeting (17 November 2022).

3 CRITICAL RAW MATERIALS MARKET IN UKRAINE

3.1 Background

Ukraine obtains 24 out of 30 elements from the European Union's list of Critical Raw Materials, of which official and unofficial information is available about the following (grouped according to the Study on the EU's list of Critical Raw Materials[3]):

- **industrial and construction materials**: baryte, borates, fluorspar, natural graphite, phosphate rock and phosphorus;
- **ferroalloy metals**: cobalt, niobium, tantalum, titanium, tungsten and vanadium;
- **precious metals**: none;
- **rare-earths**: scandium and yttrium;
- **other non-ferrous metals**: antimony, bauxite, beryllium, germanium, hafnium, lithium, magnesium, silicon metal and strontium;
- and **bio and other materials**: coking coal.

It is important to note that information about balance reserves of gallium, hafnium, indium, iridium, lithium, niobium, palladium, platinum, scandium, tantalum and titanium (of the EU's list of CRMs) in Ukraine is classified[4]. Nevertheless, information about hafnium is openly available from official sources[5], while information about lithium, niobium, scandium, tantalum and titanium, as well as scarce data on platinum-group metals can also be found in open sources.

The information provided is dated January 1st, 2020, the date it was last released by the Government of Ukraine. Official data on balance reserves for a selection of materials is available from the State Balance of Mineral Reserves of Ukraine. Information about the resources and reserves classification system of Ukraine is available in Annex 1.

From the **industrial and construction materials** group of the CRM list consisting of **baryte, borates, fluorspar, natural graphite, phosphate rock and phosphorus**, Ukraine possesses reserves from the whole spectrum of materials.

The **ferroalloy metals** group of the CRM list consist of **cobalt, niobium, tantalum, titanium, tungsten and vanadium**, all of which are present in Ukraine. Information about balance reserves of niobium, tantalum and titanium in Ukraine is classified. Nevertheless, some information is found in open sources.

Of the **precious metals** group of the CRM list, there are **iridium, palladium, platinum, rhodium and ruthenium**, which are depicted as grouped materials – PGMs (platinum-group metals). Information

[3] Study on the EU's list of Critical Raw Materials (2020) Final Report, ISBN 978-92-76-21049-8 – https://rmis.jrc.ec.europa.eu/uploads/CRM_2020_Report_Final.pdf
[4] Decree by the State Security Service of Ukraine No. 383 as of 23.12.2020 – https://zakon.rada.gov.ua/laws/show/z0052-21
[5] Open Data Portal – Data from the State Balance of Mineral Reserves of Ukraine – https://data.gov.ua/en/dataset/75c401c9-a673-4cef-88f8-e5cfb1086f63

about the balance reserves of iridium, palladium and platinum in Ukraine is classified. Nevertheless, very little information is found in open sources about the presence of PGMs in Ukraine.

The **rare-earth** group of the CRM list consist of two grouped materials – HREEs (heavy rare-earth elements: **dysprosium, erbium, europium, gadolinium, holmium, lutetium, terbium, thulium, ytterbium, yttrium**) and LREEs (light rare-earth elements: **cerium, lanthanum, neodymium, praseodymium and samarium**); as well as **scandium**. Information about the balance reserves of scandium in Ukraine is classified. Nevertheless, some information can be found in open sources. There is no specific information available on reserves of cerium, dysprosium, erbium, europium, gadolinium, holmium, lanthanum, lutetium, neodymium, praseodymium, samarium, terbium, thulium nor ytterbium in Ukraine.

The **other non-ferrous metals** group of the CRM list consist of **antimony, beryllium, gallium, germanium, hafnium, indium, lithium, magnesium, silicon metal and strontium**. Information about the balance reserves of gallium, hafnium, indium and lithium in Ukraine is classified. Nevertheless, some information can be found in open sources. There is no specific information available on reserves of bismuth, gallium and indium.

Of the **bio and other materials** group of the CRM list consisting of natural rubber and coking coal, only the latest is present in Ukraine.

Detailed information about reserves and specific deposits of CRMs in Ukraine derived from official and open sources can be viewed in Annex 2.

3.2 Conclusions

Many resource deposits in Ukraine are not working at all or to their full potential for various reasons The lack of present-in-Ukraine technology, the lack of investments or weak internal market are of dominance. Thus, there is extensive investment and export potential for a wide range of materials in Ukraine.

For instance, from the **industrial and construction materials** group, out of 3 **fluorspar** deposits in Ukraine 0 are in use, despite significant reserves and strong European demand. Over 100 deposits and manifestations of **natural graphite** have been discovered in Ukraine, of which only 6 have been fully studied and 2 are in use. Also, Ukraine has a fairly strong raw material base of phosphates-containing raw materials, thus making **phosphate rock and phosphorus** a great investment goal.

For **ferroalloy metals**, **titanium** is still the main export interest due to strong position of Ukraine on the global titanium market. Also, **cobalt** is found in 11 known deposits, of which only 1 is currently operational, making the extraction of this material economically attractive given the continuous growth of global consumption in the renewables and battery industries.

Among **other non-ferrous metals** group of most interest would be **lithium** with 3 large deposits, none of which are currently being worked. Given Ukraine's location and economy, this would greatly reduce supply chain costs for EU automotives that are switching to EVs. Finally, other important material for electronics would be **germanium** found in over 220 **coal** deposits in Ukraine.

More conclusions can be found in Annex 2.

4 UKRAINE'S LEGAL AND INSTITUTIONAL FRAMEWORK FOR THE MINING SECTOR

This chapter introduces Ukraine's institutional as well as current legal and regulatory framework for governing and administering the country's mining sector. In addition, it describes recent efforts in modernising mining sector governance.

4.1 Institutional setting for governing the mining sector

Activities of businesses engaged in subsoil use are governed and administered by a number of state institutions and agencies. Their purpose is to implement Ukrainian public policy in the field of subsoil use, as well as to prevent unauthorised access to it across Ukraine. The institutional setting includes such general authorities as the Parliament (Verkhovna Rada), the President and Cabinet of Ministers of Ukraine (CMU), as well as industry-specific authorities, including the policy-forming ministry, central executive authorities, regional administrations and local authorities. Below is an overview of their functions, role and authority in this sphere.

General authorities:

- The **Parliament** (Verkhovna Rada) establishes the main directions of the national policy in the extractive industries and regulates the relations in the sector by adopting laws.
- The **President of Ukraine** participates in the legislative process (has the right of legislative initiative and veto) and is involved in the appointment procedures of the heads of certain executive bodies in the sector. Also, the President issues Presidential Decrees, which are binding on other public authorities and determine the development vectors, among other things, in the field of subsoil use.
- The **CMU** is a collegial, supreme executive body of Ukraine that coordinates the state policy on environmental management, carries out public administration in the field of protection and rational use of subsoil, restricts activities of enterprises in case of their violation of environmental legislation, and coordinates activities of other state institutions related to environmental protection.[6]

Industry-focused authorities:

- The **Ministry of Ecology and Natural Resources of Ukraine** forms and implements the state policy in the field of environmental protection, geological analysis and efficient use of mineral resources. Within its powers, the Ministry, among other things, proposes to grant or extend the validity of special subsoil use permits and to determine the list of subsoil areas, determines permits for bidding procedure, as well as approves members of the bidding committee for the issue of special subsoil use permits.[7]

[6] Law on the Cabinet of Ministers No. 794 – https://zakon.rada.gov.ua/laws/show/794-18#Text
[7] Resolution of the Cabinet of Ministers of Ukraine on "Some issues of the Ministry of Ecology and Natural Resources" as of June 25, 2020, No. 614 – https://zakon.rada.gov.ua/laws/show/614-2020-%D0%BF#n13

- The **Ministry of Energy of Ukraine** provides preparation and conducting of online meetings of the PSA Commission. The latter is a permanent body established to address the organisation and conclusion of PSAs.[8]
- The **Ukrainian Geological Survey** implements the state policy in the field of geological analysis and rational use of subsoil. To accomplish that, *The Ukrainian Geological Survey*, among others, issues, suspends, revokes and reissues special subsoil use permits, draws up protocols and examines cases on administrative offences, conducts subsoil user inspections, and resolves subsoil use disputes.[9]
- The **State Ecological Inspectorate** initiates the suspension of special subsoil use permits in case of violation of legislation on environmental protection, takes measures to stop the unauthorized use of subsoil and unauthorized construction of mineral deposits areas, and, in general, exercises state supervision over compliance with the legislation on subsoil protection by other governmental authorities and legal entities.[10]
- The **State Labour Service of Ukraine** is a body established by reorganizing the State Labour Inspectorate and the State Service for Mining Supervision and Industrial Safety through a merger. Thenceforth, the State Labour Service, on top of its functions of labour protection supervision, performs such functions as organization and implementation of state supervision (control) over compliance with special subsoil use permits in terms of state mining supervision, mining relations at coal, mining and non-metal industries and control over compliance with the proper development of deposits of mineral resources.[11]
- The **State Commission on Mineral Resources** is an institution operating under *The Ukrainian Geological Survey* that conducts scientific and technical activities related to carrying out a state examination of geological materials for the study and use of subsoil and assessment of mineral reserves at the request of subsoil users or by order of the relevant central executive authorities. It also decides on the feasibility of granting a license for the extraction of one type of mineral from different resources located closely. It also approves and performs revaluation of mineral reserves.[12]
- The **State Scientific and Manufacturing Enterprise "State Information Geological Fund of Ukraine"** is a research and production institution of *The Ukrainian Geological Survey* that collects, stores, analyses and provides information generated during the geological exploration of the subsoil use.

In addition to the above-mentioned authorities, there are several other government bodies involved in the mining sector management that are not directly responsible but might be engaged in certain

[8] Resolution of the CMU "On the formation of the Interdepartmental Commission for the organization of concluding and implementing agreements on the distribution of products" as of August 1, 2013, No. 644 – https://zakon.rada.gov.ua/laws/show/644-2013-%D0%BF#Text

[9] Resolution of the CMU "On the approval of the Regulation on the State Geology and Subsoil Service of Ukraine" as of December 30, 2015, No. 1174 –https://zakon.rada.gov.ua/laws/show/1174-2015-%D0%BF#Text

[10] Resolution of the CMU "On the approval of the Regulation on the State Environmental Inspection of Ukraine" as of April 19, 2017, No.275 – https://zakon.rada.gov.ua/laws/show/275-2017-%D0%BF#Text

[11] Resolution of the CMU "On the approval of the Regulation on the State Labour Service of Ukraine" as of February 11, 2015, No. 96 – https://zakon.rada.gov.ua/laws/show/96-2015-%D0%BF#Text

[12] Resolution of the CMU "On the approval of the Regulation on State Commission of Ukraine on mineral reserves" as of November 10, 2000, No.1687 – https://zakon.rada.gov.ua/laws/show/1689-2000-%D0%BF#Text

situations. These bodies are the Ministry of Finance, the Ministry of Economy, the State Architectural and Construction Inspection, and regional and Kyiv administrations.

- **Local authorities** (village, rural settlement, city, district councils, and councils of united territorial communities) coordinate the provision of the subsoil of local significance for use.

4.2 General legal framework for investments

Investment activities in Ukraine are governed by general legislation as well as several special legislative acts, such as the Law of Ukraine "On Investment Activity"[13], the Law of Ukraine "On the Regime of Foreign Investments"[14] and the Law of Ukraine "On State Support for Investment Projects with Significant Investments in Ukraine".[15]

As a rule, foreign investors on the territory of Ukraine shall receive national treatment as to investment and other economic activity. All subjects of investment activity, regardless of their ownership, have equal rights to carry out investment activities. Foreign investment can be made in various forms, including:

- foreign currency and the currency of Ukraine – Hryvnia (UAH),
- any movable property or real estate and related ownership rights,
- stocks, bonds, other securities and also corporate rights,
- any kind of intellectual property and related rights, including copyright, patents, trademarks, industrial samples, know-how, etc.,
- rights to engage in economic activity including the right to exploration and exploitation of natural resources granted according to the legislation or contracts.

Entities with foreign investments on the territory of Ukraine may be established and operate within the forms stipulated by the legislation of Ukraine. Foreign investors also have the right to conclude contracts on joint investment activity (production cooperation, joint production, etc.) which is not connected with the establishment of a legal entity.

Nationalization of foreign investments is prohibited in Ukraine. State bodies may not seize foreign assets except for emergency measures in the event of natural disasters, accidents, epidemics, or epizootic.

In the past, Ukraine's investment incentives framework for the subsoil sector seriously lacked competitiveness. To change this situation, Ukraine worked on improving the legal framework for attracting investment. In December 2020, an investment incentives programme was introduced with the adoption of **the Law of Ukraine "On State Support for Investment Projects with Significant**

[13] The Law of Ukraine "On Investment Activity" as of September 18, 1991, No. 1560-XII – https://zakon.rada.gov.ua/laws/show/1560-12#Text
[14] The Law of Ukraine "On the Regime of Foreign Investments" as of March 19, 1996, No. 93/96-BP – https://zakon.rada.gov.ua/laws/show/93/96-%D0%B2%D1%80#Text
[15] The Law of Ukraine "On State Support for Investment Projects with Significant Investments in Ukraine" as of December 17, 2020, No. 1116-IX – https://zakon.rada.gov.ua/laws/card/1116-20

Investments in Ukraine".[16] The programme provides state support to private investment projects in the following forms:

- exemption from payment of certain taxes,
- exemption from import duty on new equipment and its components imported exclusively for the implementation of such a project,
- the pre-emptive right to use a state or community-owned land plot for the implementation of an investment project,
- construction of related infrastructure (roads, communication lines, heat, gas, water and electricity supply facilities, etc.) required for the implementation of an investment project.

According to the programme, the total amount of state support for the implementation of an investment project may not exceed 30% of the planned investments. An investment project shall meet the following requirements in order to qualify for the above-mentioned state support:

- be implemented in the fields of processing industry, extraction for further processing and/or enrichment of natural resources (except for bituminous coal, lignite, crude oil and natural gas), waste management, transportation, warehousing, postal and courier activities, logistics, education, research and development, healthcare, arts culture, sports, tourism, and resort and recreational sphere,
- provide for the construction, modernisation, technical and/or technological re-equipment of investment objects, purchase of necessary machinery (equipment) and components,
- create at least 80 new jobs with an average salary of employees, the amount of which is not less than 15% higher than the average salary for the relevant activity in the region where the project is implemented,
- amount of investments in investment objects exceeds the amount equivalent to EUR 20 million,
- duration of implementation of the investment project shall not exceed five years.

An investor will be required to register a special-purpose vehicle for the project's performance and comply with other legal, administrative, and technical requirements stipulated by the law.

Despite investors' positive perception of the proposed incentives by investors, the first project under the newly established programme is yet to be launched. At the time of the study, the Government was reviewing the first applications with the results expected to be announced during the first half of 2022.

4.2.1 Legal framework of the mining sector

Ukraine's legal framework for carrying out activities in the mining sector provides for a number of general obligations related to the rational use of natural resources and prevention of negative environmental impacts as well as industry-specific regulations.

[16] The Law of Ukraine "On State Support for Investment Projects with Significant Investments in Ukraine" as of December 17, 2020, No. 1116-IX – https://zakon.rada.gov.ua/laws/card/1116-20

The key provision determining the legal status of the subsoil is Article 13 of the Constitution of Ukraine, which provides that land, its subsoil and all natural resources located within the territory of Ukraine are the objects of property of the Ukrainian people.

The key regulatory act in the sector is **the Subsoil Code**,[17] which was adopted on July 27, 1994, and entered into force on August 31, 1994, and which, among other things, defines the competencies and functions of public authorities in the area of subsoil use, establishes the procedure for subsoil use, lists the rights and duties of subsoil users, outlines the royalty payments for subsoil use, regulates state accounting of mineral reserves, the construction of mining facilities, and governs the state control over the conduct of geological exploration of the subsoil, etc.

Other important regulatory acts in the area are the **CMU resolutions No. 993** "On Approval of the Procedure for Conducting Auctions for the Sale of Special Permits for Subsoil Use", which defines the procedure of sale at auction by conducting electronic bidding for a special permit for subsoil use within the territory of Ukraine, and **No. 615** "On Approval of the Procedure for Issuing Special Permits for Subsoil Use", which governs the matters of issuing special permits for subsoil use within the territory of Ukraine and determines the procedure for extension, renewal, renewal, suspension or revocation and revocation of a permit changes.

Matters related to obtaining an environmental impact assessment in the form of an official permit are governed by **the Law of Ukraine "On Environmental Impact Assessment"**.[18] Besides, all businesses in the sector are to comply with environmental legislation and rational use of natural resources that require mining companies to use natural resources rationally and economically, to implement measures for preventing damage and pollution of natural resources, negative impacts on the environment as well as measures for the reproduction of renewable natural resources, and to rehabilitate the disturbed lands as a result of their activities. Also, mining companies must obtain a permit for emissions of pollutants into the atmosphere[19] and a permit for special water use[20] if necessary.

Another crucial regulation is **the Law of Ukraine "On Production Sharing Agreements"**.[21] The law regulates the relations in the process of concluding, implementing and terminating PSAs, determines the basic legal requirements for such agreements as well as the peculiarities of legal relations regarding the use of subsoil on the terms of production sharing.

[17] Subsoil Code of Ukraine as of July 27, 1994, No. 132/94-BP – https://zakon.rada.gov.ua/laws/show/132/94-%D0%B2%D1%80#Text
[18] The Law of Ukraine "On Environmental Impact Assessment" as of May 23, 2017, № 2059-VIII – https://zakon.rada.gov.ua/laws/show/2059-19#Text
[19] Resolution of the CMU "On Approval of the Procedure for Carrying Out and Paying for Works Related to Issuance of Permits for Emissions of Pollutants into the Atmospheric Air by Stationary Sources, Accounting of Enterprises, Institutions, Organizations and Citizens - Entrepreneurs Who Received Such Permits" as of March 13, 2002, No. 302 Kyiv – https://zakon.rada.gov.ua/laws/show/302-2002-%D0%BF#Text
[20] Resolution of the CMU "On the Procedure for Issuing Permits for Special Water Use as of March 13, 2002, No. 321 – https://zakon.rada.gov.ua/laws/show/321-2002-%D0%BF#Text
[21] The Law of Ukraine "On Production Sharing Agreements" as of September 14. 1999, No.1039-XIV – https://zakon.rada.gov.ua/laws/show/1039-14#Text

The matters related to obtaining land plots for mining are governed by **the Land Code**.[22] The tax issues and regulations are codified in **the Tax Code**,[23] while the requirements towards the relationship between an employer and employees are provided by **the Labour Code**.[24]

Industry-specific regulations and other key regulatory requirements, including their application in practice, for doing business in Ukraine's mining sector are described and analysed below in more detail. In this context, an initial identification of existing and/or potential investment barriers and risks for investors is carried out. The framework for financial monitoring and access to finance in Ukraine is described in Annexes 3-5.

4.2.2 Geological data

The first step for a company willing to enter Ukraine's mining sector would be obtaining access to and analysing geological data applicable to planned investment(s). In 2019, the Government of Ukraine initiated an open-door policy in the subsoil use area by launching an online instrument for investors – the "Investment Atlas of a Subsoil User".[25] The instrument contains a list of subsoil areas offered to investors for acquisition via electronic bidding and their description, including subsoil use, location, site area, geological characteristics, information on available geological data, stock assessment and minimum requirements for the work programme.

Yet, access to geological data is not easy for investors due to complications regarding its availability and accessibility:

Availability: The vast majority of geological data available was created in the 1960-80s when the state performed active exploration. However, during Ukraine's independence, the volume of exploration efforts was reduced by 3-4 times because of lacking funding required for such purposes. In 2011, the "National Programme for the Development of the Mineral Resources Base of Ukraine for the period up to 2030" was adopted, which provided for an increase in the volume of exploration work by the state.[26] However, the analysis of the implementation of the Programme for the period 2011-2019 showed that despite the expected volume of the budgetary expenditures to finance the activities of the Programme being UAH 9.65 billion only UAH 1.88 billion (20%) was spent in reality. The majority of tasks are performed in an amount not exceeding 20% of the planned indicators.

Another problem is that out of 175 000 books containing geological data, as of the date of this report, only 15 000 were digitised, which is less than 10%.

Thus, in Ukraine, mostly outdated geological information from the Soviet era is provided in a paper book format. As a result, the investor cannot make informed decisions about the feasibility of investing in Ukraine's subsoil sector.

Accessibility: Another key problem is that the procedure for accessing geological data is complicated and time-consuming, especially for foreigners.

[22] The Land Code of Ukraine as of October 25, 2001, No.2768-III – https://zakon.rada.gov.ua/laws/show/2768-14#Text
[23] The Tax Code of Ukraine as of December 2, 2010, No.2755-VI – https://zakon.rada.gov.ua/laws/show/2755-17
[24] The Labour Code of Ukraine as of December 10, 1971, No.322-VIII – https://zakon.rada.gov.ua/laws/show/322-08#Text
[25] https://www.geo.gov.ua/
[26] The Law of Ukraine "On the approval of the State-wide program for the development of the mineral and raw material base of Ukraine for the period until 2030" as of April 21, 2011, No. 3268-VI – https://zakon.rada.gov.ua/laws/show/3268-17#Text

First, **the information on Ukraine's balance reserves of certain minerals constitutes a state secret**. Under the resolution of the Security Service of Ukraine "On Approving the Code of Information Constituting a State Secret", information on balance reserves of, among others, gold, lithium, niobium, tantalum, titanium, zirconium, scandium, platinum, iridium, osmium, palladium, gallium, indium and others is considered a state secret.[27] Therefore, disclosure of geological data may harm the national security of Ukraine.

Second, **to get access to such information, a Ukrainian national should** apply to the Security Service of Ukraine, **undergo verification and undertake a non-disclosure obligation**.[28] **The procedure is even more complicated for foreigners**, who are granted access to state secrets only in exceptional cases, such based on international treaties of Ukraine approved by the Parliament or written order of the President of Ukraine (taking into account the need to ensure the national security of Ukraine based on proposals of the National Security and Defence Council of Ukraine).

Apart from that, **geological data on certain deposits is marked with a "for official use" status**. To access such data, investors need to apply to *The Ukrainian Geological Survey* with a letter and, subject to approval and subsequent signing of a non-disclosure agreement, get access to the requested data at *The Ukrainian Geological Survey*'s premises.[29]

Regarding **the geological data that is not considered state secret or marked "for official use", an interested person willing to access the primary geological data can do it for free**.[30] However, this can be done **only in the physical place where such data is held**. Also, such access will be given only to the data in the format it was created in. In the case of Ukraine, this would primarily be documents dating from the 1960-1980s. Moreover, such information cannot be copied, e.g., photographed.

If an interested person is willing to obtain secondary (processed) geological data, the procedure for accessing it can take up to 65 days as it requires a letter to be sent to *The Ukrainian Geological Survey*, signing of an agreement with *The Ukrainian Geological Survey* and payment of fees, which is only then followed by the receipt of the data. The fees are to be paid only in case of receipt of a special subsoil use permit to compensate the state for geological exploration expenditures.

The issue of access to geological data, namely that considered a state secret, is being addressed by the Presidential Decree No. 122/2021 of March 25, 2021 "On the Decision of the National Security and Defence Council of Ukraine as of March 19, 2021 "On the State of Affairs in the Subsoil Use Field".[31] Under paragraph 4 of the above Decree, governmental agencies are tasked with the abolition of the state secret status of geological data. However, the Presidential Decree only instructs other authorities on which political course to follow. For now, the measures specified in the Decree have not been implemented (and still, information on Ukraine's balance reserves of certain minerals constitutes a state secret).

[27] Resolution of the State Security Service of Ukraine "On Approving the Code of Information Constituting a State Secret" as of December 23, 2020, No. 383 – https://zakon.rada.gov.ua/laws/show/z0052-21#Text
[28] The Law of Ukraine "On State Secret" as of January 1, 1994, No. 3855-XII – https://zakon.rada.gov.ua/laws/show/3855-12#n286
[29] Investment Atlas of a Subsoil User – https://www.geo.gov.ua/wp-content/uploads/presentations/ukr/investicijnij-atlas-nadrokoristuvacha-strategichni-ta-kritichni-minerali.pdf
[30] Resolution of the CMU "On the Issue of Geological Data Management" as of November 7, 2018, No. 939 – https://zakon.rada.gov.ua/laws/show/939-2018-п#n93
[31] Presidential Decree No. 122/2021 as of March 25, 2021 "On the Decision of the National Security and Defence Council of Ukraine as of March 19, 2021 "On the State of Affairs in the Subsoil Use Field" – https://www.president.gov.ua/documents/1222021-37669

Electronic services at *The Ukrainian Geological Survey:* Despite the launch of the "Electronic Cabinet of a Subsoil User" **in test version mode**, all the communication between business, *The Ukrainian Geological Survey,* and other agencies in the sector is carried out through paper documents, lacking transparency and predictability. In order to ensure investor-friendly approach, to provide electronic services in subsoil use sector through "Electronic Cabinet of a Subsoil User" platform, **legislative changes are necessary.** This state of affairs causes delays in the internal-business processes of the authorities and frustration for business, resulting in domination of bureaucratic issues in relations with business.

Mineral reserves assessment standards: The export orientation of the Ukrainian extractive industry requires market players to comply with international business rules. Attracting foreign investment and listing on the stock exchange (IPO) involves a multi-stage audit. While Ukraine has already adopted the UNFC-2009 international classification standard[32], in order to enable better interaction with potential investors it would be complimentary for the government to accompany the data on reserves with at least an estimate in terms of international business-oriented standards for the assessment of mineral reserves, which are used in countries that import Ukraine's raw materials and in countries where companies are showing significant investment interest in new markets.

While the adopted[33] methodology used is gaining more use worldwide, foreign investors are more reliant on the use of more widespread international classification systems, such as the Committee for Mineral Reserves International Reporting Standards (CRIRSCO), and the Petroleum Resource Management System (PRMS). Therefore, investment-oriented subsoil users are forced, along with the assessment of mineral reserves, which is conducted by the State Commission of Ukraine on Mineral Reserves and costs approx. UAH 2.0-2.5 million, to procure additional alternative international expertise, which in turn increases business costs that could have been directed, for example, to improve the safety and environmental friendliness of mining operations (for information on current categories of mineral reserves, please see Annex 1).

4.2.3 Subsoil use rights

Mining activities in Ukraine require the receipt of the special subsoil use permit. The categories of special subsoil permits, among others, include the following:

- Geological study of subsoil areas;
- Geological study, including research and industrial development of mineral deposits of national importance;
- Extraction of minerals.

Access to subsoil in Ukraine is generally provided via open electronic auctions, which are issued by *The Ukrainian Geological Survey* to winners of electronic bidding following the procedure prescribed by the Regulation No. 993 "On the Procedure for Conducting Auctions for the Sale of Special Permits

[32] https://www.dkz.gov.ua/ua/209-ekspertna-grupa-z-upravlinnya-resursami-rk-oon-ta-crirsco-pidtrimue-initsiativi-dkz-ukrajini-shchodo-zastosuvannya-kriterijiv-mizhnarodnikh-standartiv-zvitnosti-pid-chas-provedennya-derzhavnoji-ekspertizi-materialiv-geologo-ekonomich-noji-otsinki-zapasiv-i-resursiv-korisnikh-kopalin

[33] Resolution of the CMU "On approval of the Classification of reserves and resources of minerals of the state subsoil fund" as of May 5, 1997, No. 432 – https://zakon.rada.gov.ua/laws/show/432-97-%D0%BF#Text

for Subsoil Use".[34] **However, in certain cases such permits might be granted without electronic biddings under the procedure enshrined in the Regulation No. 615** "On the Procedure for Granting Special Permits for Subsoil Use".[35] **Another instrument to access the subsoil is to conclude a PSA with the CMU.**

Option A – Grant of subsoil use permits based on the electronic bidding: Vacant plots for which subsoil use permits can be obtained are placed on the "Investment Atlas of Subsoil Users". Also, the subsoil areas can be nominated by business entities so that *The Ukrainian Geological Survey* sets special subsoil use permits for the auction. In 2020, *The Ukrainian Geological Survey* received 297 such applications from business (26 were previously listed in the Investment Atlas), while in 2021, 281 applications were received (29 of them were previously listed in the Investment Atlas).

To initiate electronic bidding, interested persons must send an application to *The Ukrainian Geological Survey* along with additional materials. *The Ukrainian Geological Survey* places the announcement of electronic biddings in the system of electronic bidding and on its official website.

In such a case, an examination and assessment of explored mineral reserves must be conducted prior to bidding and approved by the State Commission of Ukraine for Mineral Resources. Then, based on the signed protocol of the auction, the winner concludes a permit sale and purchase agreement with *The Ukrainian Geological Survey* within 20 days from the date indicated in the protocol. Also, the winner must pay a difference between the lot price and the guarantee fee paid to the state. Notably, if a foreign entity without a representative office in Ukraine wins the electronic bidding, it is then obliged to register within 4 months from the date of signing the agreement. Overall, the license shall be granted within 30 days from the moment of application to the signing of the agreement. Overall, licenses may be granted only for each type of subsoil use within a specific area and with a validity period of up to 10 years (a renewal procedure is available).

The number of received licenses via the auctions is growing, reaching 56% in 2021. In 2018, such percentage amounted to 7%, in 2019 to 22%, and in 2020 to 40%.[36]

Option B – Grant of subsoil use permits without electronic bidding: Alternatively, subsoil use permits may be granted without electronic bidding for the purpose of, among others:

- Geological analysis and mining of local minerals,
- Geological analysis of subsoil at the state expense,
- Construction and operation of underground facilities not related to the extraction of minerals (e.g., facilities for underground storage of oil, disposal of harmful substances and industrial waste, wastewater discharge),
- Extraction of minerals if geological analysis and calculation of mineral reserves were conducted at own expense based on a special subsoil use permit, if the documents for obtaining the permit were filed within 3 years after approval of the reserves,

[34] Resolution of the CMU On the Procedure for Conducting Auctions for the Sale of Special Permits for Subsoil Use" as of September 23, 2020, No. 993 "– https://zakon.rada.gov.ua/laws/show/993-2020-%D0%BF#Text
[35] Resolution of the CMU On the Procedure for Granting Special Permits for Subsoil Use" as of May 30, 2011, No. 615 "– https://zakon.rada.gov.ua/laws/show/615-2011-%D0%BF#Text
[36] https://www.geo.gov.ua/wp-content/uploads/presentations/ukr/statistika-elektronnix-torgiv.pdf

- One-time extension of the boundaries of not more than 50% of the previously provided area of the subsoil area for its geological study, including research and development, provided that the spatial boundaries of promising deposits identified in the geological study go beyond the subsoil area provided for the use and confirmed by the relevant protocols, placement of underground storage facilities, and also an increase in the extraction of minerals by expanding the boundaries of the site, but not more than 50% of the reserves determined by the previously issued permit, provided that the adjacent site is not provided for use or is not put up for auction,
- executing a PSA.[37]

To obtain the special permit without bidding, applicants shall submit a specific package of documents, including the following:

- Application form,
- Explanatory notes with the characteristics of an object,
- Overview map,
- Plan for calculating mineral reserves on a topographic basis with the boundaries of the category of reserves,
- Catalogue of geographical coordinates of corner points,
- Work program, etc.

More importantly, it is necessary to prepare an agreement on the terms of subsoil use. Samples of the agreements on various types of subsoil use are given on the official website of *The Ukrainian Geological Survey*.

The decision to grant a permit without bidding will be made within 30 days after obtaining all approvals and proposals from the Ministry of Energy of Ukraine. The permit itself will be issued within 20 working days after payment of the respective fee for the special subsoil use permit, on a special form together with the agreement on the conditions of use of the subsoil area and the work programme. The records of the permits and applications granted are maintained by the State Research and Development Enterprise "State Informational Geological Fund of Ukraine".

Option C – PSA: Regarding the PSAs, these can serve not only as one of the grounds to receive the license without bidding, but also as an effective way of interaction between the state and an investor.

In particular, under such agreement, Ukraine instructs an investor to conduct prospecting, exploration and production of minerals in certain subsoil areas for a designated period of time. In turn, an investor undertakes to perform the assigned work at his own expense and risk with subsequent compensation of costs and receipt of remuneration in the form of profitable products. Another important benefit of such interaction is the ability to enter into an agreement between several investors, provided that they are jointly and severally liable for the obligations prescribed by this agreement.

In addition to obtaining a special subsoil use permit, investors must also obtain these permits and follow these procedures:

[37] Para. 8 of the Resolution of the CMU "On the Approval of the Procedure for Granting Special Permits for Subsoil Use" as of May 30, 2011, No. 615 – https://zakon.rada.gov.ua/laws/show/615-2011-%D0%BF#Text

Act of mining allotment: The right to use subsoil (after obtaining a special subsoil use permit) is certified by an act of mining allotment. This act might be granted only if the mineral reserves and their components have been examined and evaluated by the State Commission on Mineral Reserves. Mining allotments for the development of mineral deposits of national importance, construction and operation of underground structures and other purposes not related to the extraction of minerals are provided by the State Labour Service. Mining allotments for the development of local mineral deposits are provided by regional councils.

Compliance with relevant quotas: It should additionally be noted that to prevent the negative demographic, social, and environmental consequences of intensive mining, quotas are set for the extraction of certain types of minerals[38] within specific deposits or their separate areas for a specified period with the determination of the maximum amount of extraction.[39]

Reporting: The license holder is obliged to submit a number of reports during their mining activity, in particular, on the accounting of mineral reserves[40] as well as on the status of implementation of the Work Programme.[41]

Despite these options for investors to engage in Ukraine's subsoil sector, there are several problematic issues related to regulatory aspects of accessing the subsoil and conducting activities in the field of subsoil use:

Minerals of strategic importance: Regarding metallic ores and non-metallic minerals that are of strategic importance for sustainable economic development and defence capabilities of the state (yttrium, lithium, magnesium, manganese, arsenic, copper, nickel, niobium, tin, scandium, silver, strontium, antimony, tantalum, tellurium, titanium, baryte, graphite, potassium salt, fluorite),[42] **the procedure for accessing them is currently not defined**.

However, according to Presidential Decree No. 306/2021 "On the Decision of the National Security and Defence Council of Ukraine of July 16, 2021 "On Stimulating the Search, Extraction and Enrichment of Minerals of Strategic Importance for Sustainable Economic Development and Defence" of July 23, 2021,[43] the CMU is obliged within two months to:

- Approve the list of subsoil areas (mineral deposits) that are of strategic importance for the sustainable development of the economy and the state's defence capabilities, which will be provided for use under the terms of PSAs,

[38] Art. 52 of the Subsoil Code of Ukraine as of June 27, 1994, No.132/94-VR – https://zakon.rada.gov.ua/laws/show/132/94-%D0%B2%D1%80#Text
[39] Para.2 of the Resolution of the CMU "On the Approval of the Regulation on the Procedure for Establishing Quotas for the Extraction of Certain Types of Minerals" as of December 22, 1994, No.862 – https://zakon.rada.gov.ua/laws/show/862-94-%D0%BF#Text
[40] Decree of the Ministry of Ecology and Natural Resources of Ukraine "On the approval of the reporting forms for accounting for mineral reserves and instructions for filling them out" as of March 14, 2016, No. 97 – https://zakon.rada.gov.ua/laws/show/z0789-16#Text
[41] Decree of the State Service of Geology and Subsoil of Ukraine "On approval of the reporting form" as of August 22, 2013, No. 433 – https://zakon.rada.gov.ua/rada/show/v0433771-13#Text
[42] Decree of the President of Ukraine #306/2021 "On the decision of the National Security and Defence Council of Ukraine as of July 16, 2021 "On Stimulating the Search for, Extraction and Beneficiation of Minerals that are of Strategic Importance for the Sustainable Development of the Economy and Defense Capability of the State"– https://www.president.gov.ua/documents/3062021-39457
[43] Decree of the President of Ukraine #306/2021.

- Approve the list of subsoil areas (mineral deposits) that are of strategic importance for sustainable economic development and defence capabilities of the state, which will be provided for use through auctions for the sale of special subsoil use permits,
- Ensure annual updating of the lists of subsoil areas (mineral deposits) that are of strategic importance for sustainable economic development and defence capabilities of the state, which will be provided for use in the following year under terms of PSAs and through auctions for special subsoil use permits,
- Annually by January 1 to submit to the National Security and Defence Council of Ukraine an updated list of metal ores and non-metallic minerals that are of strategic importance for sustainable economic development and defence capabilities of the state,
- Provide support for amendments to the Subsoil Code of Ukraine, establishing, in particular, criteria and procedure for classifying minerals as those of strategic importance for sustainable economic development and defence capabilities of the state and the priority of their development.

Still, as of the date of this study, the list of subsoil areas (mineral deposits) that are of strategic importance for sustainable economic development and defence capabilities of the state has not been approved. Therefore, the procedure for access to critical raw materials remains undefined. In addition, **the criteria and procedure for classifying minerals of strategic importance have not been developed yet**.

PSA procedure: As mentioned before, PSAs can be employed as an instrument for attracting investors to the subsoil use sector. The key benefits for an investor accessing the subsoil use market via PSAs include the simplified procedure for obtaining land plots and the guarantee of the stability of the applicable legislation.

Yet, the procedure for concluding PSAs is complicated, and the practice of its application is time-consuming and unpredictable. It was evidenced by 12 tenders for the conclusion of PSAs announced by the CMU on December 18, 2018.[44] On July 5, 2019, 9 out 12 successful bidders for PSA tenders were approved by the CMU based on the proposals of the Interdepartmental Commission for the Organization of the Conclusion and Implementation of PSA (PSA Commission).[45] The above-mentioned PSAs were signed only in late December 2020 and early 2021, which is more than 16 months after the announcement of successful bidders. As for the remaining 3 PSA tenders, PSA Commission announced the successful bidders on April 1, 2020,[46] and approved by the CMU on April 29, 2020.[47] These PSAs are yet to be signed.

Transfer of granted subsoil rights: The owners of the special subsoil permits may request to amend, reissue, revoke, suspend, and renew as well as extend the validity period of special subsoil use permits. However, they cannot transfer the granted rights to other legal entities or individuals. Therefore, the

[44] CMU Resolutions №1178-1189 as of December 18, 2018 – http://mpe.kmu.gov.ua/minugol/control/uk/publish/article?art_id=245439716&cat_id=245070661
[45] Resolution of the CMU "On Determining the Winners of Tenders for the Conclusion of Agreements on the Distribution of Hydrocarbons" as of July 5, 2019, No. 507-p– https://www.kmu.gov.ua/npas/pro-viznachennya-peremozhciv-konkursiv-na-ukladennya-ugod-pro-rozpodil-vuglevodni-m-050719
[46] https://mepr.gov.ua/news/34991.html
[47] http://mpe.kmu.gov.ua/minugol/control/uk/publish/article?art_id=245439751&cat_id=245070661

only option for transferring subsoil rights in practice is to sell the entity given such rights to another entity. As a result, companies are strongly limited in exercising their rights and are prevented mainly from transferring such rights to another entity or using them as a security when raising financing for investment projects.

"Sleeping" subsoil permits: Currently, 1 out of 3 special subsoil use permits in Ukraine is "sleeping", meaning that extraction has not been taking place for more than 2 years. As a result, investors experience complications: attractive subsoil areas are unavailable, although no exploration is being performed. Essentially, it is a legacy from the times when the permits were often obtained without electronic bidding.

The issue of "sleeping" subsoil permits was addressed by Presidential Decree No 122/2021 of March 25, 2021 "On the decision of the National Security and Defence Council of Ukraine of March 19, 2021 "On the state of affairs in the subsoil use field".[48] According to paragraph 1 of the above Decree, the Prime-Minister of Ukraine has been recommended to instruct *The Ukrainian Geological Survey* to ensure that in 2021 unscheduled inspections of the activities of economic entities in the field of geological study and rational use of subsoil are carried out, including among others those that:

- Received special permits for subsoil use based on the results of approbation of mineral reserves without a special subsoil use permit for geological study, including research and development,
- Have not started extraction of minerals within two years after obtaining special subsoil use permits for extraction.[49]

4.2.4 Allocation of land plots

All land matters are regulated by the Land Code of Ukraine. Unless otherwise provided by legislation, land plots for needs related to subsoil use are allocated after the granting of a mining allotment. Executive bodies or local self-government bodies provide land plots of state or communal ownership for subsoil use. A company should take the following steps to obtain a land plot:

1. Obtain permission to develop a land management project from the relevant executive body or local self-government government,
2. Enter into an agreement with the contractor for the development of a land management project for land allocation,
3. Develop and coordinate the land management project with the State Land Cadastre of Ukraine. Before submission of a land management project for approval, the land plot is also subject to state registration by this authority,
4. Participate in a land auction, e.g., public tender to purchase the right to lease the land plot,
5. Enter into a land lease agreement and register the right to lease the land.

[48] Decree of President of Ukraine #122/2021 "On the Decision of the National Security and Defence Council of Ukraine as of March 19, 2021 "Regarding the State of affairs in the Field of Subsoil Use" – https://www.president.gov.ua/documents/1222021-37669

[49] Under paragraph 2 of the Decree of the President of Ukraine #122/2021, *The Ukrainian Geological Survey* is also instructed to report quarterly to the Office of the National Security and Defence Council of Ukraine with the generalized reports on the results of unscheduled inspections – https://www.president.gov.ua/documents/1222021-37669

However, it has to be noted that, in practice, obtaining land plots is a complex and time-consuming process that can take up to 2 years. This timeframe can be extended even further in case the land plots required for the project belong to different owners.

4.2.5 Getting electricity

Getting electricity has long been one of the most pressing issues for investors in Ukraine due to the complexity of the procedure, its duration and high costs.

As regards the price of electricity for enterprises, with the introduction of a new electricity market in July 2019, electricity producers are trading in it as a regular commodity. The price of electricity for legal entities is formed on the free market.

The duration of connection to the grid often exceeds the statutory deadline due to the time-consuming resolution of land allocation for the linear part of the network.

As regards determining the cost of connection to electricity networks, there are two kinds of connection: standard and non-standard. The standard connection rate usually does not cover the services costs, while the non-standard one allows distribution system operators to receive higher revenues for their services. It results in cross-subsidisation between non-standard connection customers and standard customers in favour of the latter. Additionally, this creates the preconditions for various violations by the distribution system operators, such as illegal refusals to make economically unprofitable standard connections.

4.2.6 Environmental Impact Assessment

Companies must also obtain an Environmental Impact Assessment (EIA) for their mining projects under the procedure prescribed by the Law of Ukraine "On Environmental Impact Assessment". This assessment is an official permit for the implementation of planned economic activities and contains a list of environmental and ecological conditions recommended for implementation by a legal entity.[50]

The EIA is mandatory before deciding on certain activities, in particular in the case of quarries and open-pit mining,[51] processing or enrichment on-site on an area of more than 25 hectares or peat extraction on an area of more than 150 hectares, extraction of minerals, except for minerals of local significance, which are extracted by landowners or land users within the land plots provided to them with the appropriate intended use, etc.

The activities of enterprises carried out in violation of the legislation on the EIA may be temporarily prohibited or completely suspended.[52]

At the same time, the EIA legislation currently does not regulate the specifics of the EIA for the extraction of various types of minerals.

[50] The Law of Ukraine "On Environmental Impact Assessment" as of May 23, 2017, No. 2059-VIII – https://zakon.rada.gov.ua/laws/show/2059-19#Text
[51] The Law of Ukraine "On Environmental Impact Assessment"
[52] Art. 16 of the Law of Ukraine "On Environmental Impact Assessment"

Also, the public discussion of the EIA report stage can be a tool to block the activities of future subsoil users,[53] as the procedure for holding public hearings in the EIA process does not provide an online format for holding public hearings, which is further complicated by restrictive quarantine measures. In addition, no qualification requirements have been established for members of the public who submit comments and suggestions to the EIA report. Although the assessment of the actual impact of mining activities on the environment requires narrow professional specialization, any individual may challenge the conclusion on the ground that its remark had not been taken into account.

4.2.7 Fiscal regime

Mining companies in Ukraine are subject to general and specific industry taxes and payments. General taxes and payments are the following:

Corporate Income Tax – 18% on taxable profit,

VAT – 20%, 0%, and some transactions are not subject to VAT (e.g., the supply of coal and/or coal refining products is temporarily VAT exempt until 2022),

Personal Income Tax – 18% on the total (monthly) income of individuals,[54]

Military Levy – 1,5% on the total (monthly) income of individuals,

Unified Social Contribution – 22% of the tax base, except for the special rates for disabled persons.

Industry-specific taxes and payments include the following tax obligations. Mining companies and owners of the special subsoil use permit shall pay **production royalty**.

For the production royalty, the object of taxation is the volume of commodity products of businesses — the extracted minerals (mineral raw materials) in the respected tax period, recognised by the standards adopted by the sector regulations.[55] The Tax Code provides a detailed table of royalty rates in Article 252. In order to calculate the tax liability, the taxpayer has to determine the amount of minerals extracted, their value, the tax rate and the adjusting factor and calculate it under the following formula:

*Amount of minerals extracted **X** value of minerals extracted **X** tax rate **X** adjusting factor = tax liability*

Another payment to keep in mind is the special water use levy charged on the actual amount of water that is used by the water users and the volume of water losses in their water supply systems. The rates depend on several factors.[56] Also, businesses engaged in the emission of pollutants into the air and water, waste disposal and generation or storage of radioactive waste should pay the **environmental tax.** The environmental tax rates depend on the type of the source and object of pollution, level of danger, etc.[57] The **land fee** for land plots provided to mining enterprises for mining and development of mineral deposits is collected in the amount of 25% of the tax.[58] There is no payment classified as

[53] Resolution of the CMU "On Approval of the Procedure for Holding Public Hearings in the Process of Environmental Impact Assessment" as of December 13, 2017, No. 989 – https://zakon.rada.gov.ua/laws/show/989-2017-%D0%BF#Text
[54] Para. 161.1 of the Tax Code of Ukraine – https://zakon.rada.gov.ua/laws/show/2755-17#Text
[55] Para 252.3. of the Tax Code of Ukraine.
[56] Para 255 of the Tax Code of Ukraine.
[57] Section VIII of the Tax Code of Ukraine.
[58] Para 1.4. of the Law of Ukraine "On Collection and Accounting of the Unified Contribution for Compulsory State Social Insurance" (Edition as of 01.01.2019) as of 08.07.2010 No. 2464-VI – https://zakon.rada.gov.ua/laws/show/2464-17#Text

"bonus" among the mandatory payments required by the Ukrainian legislation. A **fee** is charged **for granting a license**.

As for custom duties, it is charged for exports of certain goods from the territory of Ukraine. For example, there are certain **rates of export duty** on scrap of ferrous metals, scrap of non-ferrous metals and semi-finished products with their use,[59] as well as export duty on waste and scrap of ferrous metals.[60]

4.2.8 Martial law regulations

On 24 February 2022, Russia launched a full-scale invasion of Ukraine in a major escalation of the Russian-Ukrainian War, which began in 2014. As a result, Ukraine's President introduced martial law in Ukraine[61].

In response, the CMU introduced the rule that economic activities in Ukraine may be conducted under the submission of declaration to licensing authorities, permitting authorities and entities without the need to obtain specific approvals or licences[62]. However, activities related to the mining sector were not included in such a list of economic activities.

Finally, in light of the martial law, the CMU also made minor amendments to subsoil regulation, in particular aimed at specifying the requirements for ultimate beneficial owners of investment vehicles operating in Ukraine's subsoil sector (to prevent Russians from participating in economic activities in Ukraine) and extending the validity of regulatory approvals in the sector throughout the period of martial law[63].

4.3 Recent/planned legal developments in mining sector reform

In recent years, the improvement of Ukraine's investment attractiveness, particularly in the mining sector, has been high on the Government's agenda. A brief overview of the several important initiatives is provided below.

The most notable one is the introduction of **an electronic bidding mechanism for the issuance of special subsoil use permits**. **The given critical initiative was first introduced on a legislative level via** the Law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine Concerning the Regulation of Legislation on Amber Mining and Other Minerals",[64] which provided for the introduction of electronic bidding mechanism as such. Following that, on September 23, 2020, the CMU adopted

[59] The Law of Ukraine "On the Rates of Export Duties on Scrap of Alloyed Ferrous Metals, Scrap Non-Ferrous Metals and Semi-Finished Products with Their Use" as of December 13, 2006, No. 441-V – http://zakon.rada.gov.ua/laws/show/441-16
[60] The Law of Ukraine "On Export (Export) Duty on Waste and Scrap of Ferrous Metals" as of October 24, 2002, No. 216-IV – https://zakon.rada.gov.ua/laws/show/216-15#Text
[61] Decree of the President of Ukraine No. 64/2022 "On the introduction of martial law in Ukraine" – https://zakon.rada.gov.ua/laws/show/64/2022#Text
[62] Resolution of the CMU "On Some issues of ensuring the conduct of economic activity in the conditions of martial law" as of March 18, 2022, No. 314 – https://zakon.rada.gov.ua/laws/show/314-2022-%D0%BF#Text
[63] Resolution of the CMU No. 836 "On Making Changes to Some Resolutions of the Cabinet of Ministers of Ukraine Regarding the Use of Subsoil".
[64] The Law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine Concerning the Regulation of Legislation on Amber Mining and Other Minerals" as of December 29, 2019, No. 402-IX – https://zakon.rada.gov.ua/laws/show/402-20#Text

Resolution No. 993 that introduced the rules for the application of the mechanism for the issuance of special permits (licenses) for subsoil use through transparent electronic biddings.[65] According to the new rules, special subsoil use permits (though there are exceptions) are supposed to be issued based on the results of open electronic bidding. Despite a number of shortcomings presented in this procedure, the overall situation with obtaining special permits has been significantly improved. The new rules bring a new level of transparency and predictability for investors. Also, in case of intentional or accidental disruption of bidding by a winner (refusal to pay for a special permit), the second-largest bidder becomes a new winner. Such an option mitigates the risk of cancelling electronic biddings and ensures they continue until the end. As a result, in 2020, 58 out of 70 proposed subsoil areas were allocated via electronic bidding procedure.[66] In the first 3 quarters of 2021, the same applies for 127 out of 180 subsoil areas.[67] Thus, the initiative allowed the mining industry to become more transparent and investor friendly.

Also, **the permanent service "Investment Atlas of a Subsoil User" has started to operate**. On December 6, 2019, *The Ukrainian Geological Survey* launched the mentioned service under the following link on its official website.[68]

The Investment Atlas contains current investment 585 objects available for submission to the next regular electronic bidding at the request of an investor (initiation of plots), including a foreign one.[69]

Another notable initiative is a **launch of a single window for accrual and payment of fees for special permits[70] and the development of a new methodology for determining their initial cost.[71]** Subsoil users no longer need to contact three different agencies to calculate the amount of the special subsoil use permit fee, find geological information, and determine its value. Optimising the procedure and reducing the administrative burden saves time for potential investors and reduces the total cost of calculation. In turn, the method of determining the initial sale price of a special subsoil use permit introduced a transparent and clear mechanism for determining the initial selling price at biddings, as well as the state's fee in cases of obtaining special subsoil use permits without such biddings.

However, Ukrainian mining sector is still in a reform process. Therefore, other notable initiatives are expected to be implemented soon.

For example, Ukraine is looking forward to having a **new Subsoil Code of Ukraine**.[72] Current laws and regulations in the mining sector are outdated, contradict each other, and do not meet the European standards and Ukrainian realities. Thus, the Ministry of Ecology and Natural Resources of Ukraine published a draft of the Subsoil Code of Ukraine, designed to be a driving force for reforming the

[65] The Resolution of the CMU "On the Approval of the Procedure for Holding Auctions for the Sale of Special Permits for Subsoil Use" as of September 23, 2020, No.993 – https://ips.ligazakon.net/document/kp200993?an=1
[66] https://www.geo.gov.ua/wp-content/uploads/presentations/ukr/nova-derzhgeosluzhba-suchasnij-pidxid-do-nadrokoristuvannya-richnij-zvit-2020.pdf
[67] https://www.geo.gov.ua/wp-content/uploads/presentations/ukr/shhokvartalnij-dajdzhest-derzhgeonadr-3-kvartal-2021-roku.pdf
[68] http://www.geo.gov.ua/investicijnij-atlas-nadrokoristuvacha/
[69] https://www.geo.gov.ua/wp-content/uploads/presentations/ukr/statistika-elektronnix-torgiv.pdf
[70] https://enadra.menr.gov.ua/accounts/login/
[71] Resolution of the CMU "On Approval of the Methodology for Determining the Initial Sale Price at Auction of a Special Subsoil Use Permit" as of October 15, 2004, No. 1374 – https://zakon.rada.gov.ua/laws/show/1374-2004-%D0%BF#Text
[72] Draft Subsoil Code – https://mepr.gov.ua/files/%D0%9F%D1%80%D0%BE%D1%94%D0%BA%D1%82%20%D0%9A%D0%BE%D0%B4%D0%B5%D0%BA%D1%81%D1%83%20%D0%A3%D0%BA%D1%80%D0%B0%D1%97%D0%BD%D0%B8%20%D0%BF%D1%80%D0%BE%20%D0%9D%D0%B0%D0%B4%D1%80%D0%B0.pdf

mining sector, for public discussion. The new draft Code aims to regulate issues of ensuring the transparent provision of subsoil use and to establish assessment mechanisms of reserves and processing of minerals into finished industrial products in line with international standards. The draft Code also aims to codify the regulations governing this industry in one document and thus make it possible to repeal regulations that contain outdated provisions and establish clear and transparent requirements in the field of subsoil use. All this, as a result, will reduce regulatory pressure on business and ensure equal access to natural resources. Currently, the draft Subsoil Code is pending approval by other governmental agencies.

Another crucial reform for investment attractiveness is **the formation of a single mineral resource base**. The Government already approved and registered a draft law "On Amendments to the National Program for the Development of the Mineral Resources Base of Ukraine until 2030",[73] which is yet to be approved by the Parliament. This draft law introduces the creation of the state web portal "Interactive map of subsoil use and geology of Ukraine". It will be the only information system of subsoil use that displays information about the State Fund of Mineral Reserves of Ukraine and data about the boundaries of land plots based on the State Land Cadastre. This portal will clarify and expand relevant information on reserves and the number of deposits of various minerals, as well as identify inviolable resources, which will altogether help better understand the availability of investment-attractive objects in Ukraine.

Also, **the launch of the pilot project "Electronic Cabinet of a Subsoil User"[74]** will allow for the gradual digitalisation of administrative services for issuing subsoil use permits. Currently, the platform operates in test version mode. The Cabinet's final launch will introduce the mechanism of obtaining special permits electronically, a transparent application process for its applicants, and remote access of conciliation bodies to the application. Consequently, it is expected to minimize bureaucracy issues and create conditions for transparent business conduct.

The draft law on Amendments to Certain Legislative Acts of Ukraine to Support the Development of Domestic Subsoil Use Industries No. 4187[75] is another important initiative in the field of subsoil use. This draft introduces the option of granting the owner of a special subsoil use permit (except for state enterprises) to sell rights, use as collateral or otherwise transfer the rights granted. It also abolishes mining for facilities not developed underground and reduces the list of documents required for license issuance without electronic bidding. On top of that, cases where a special subsoil use permit is issued without electronic bidding will be directly stipulated in the law.

4.4 Conclusions

Thus, Ukraine's subsoil sector is both in need of and in the process of deep transformation. Despite significant improvements in the investment climate made after 2019, the investment, legal and institutional framework is yet to become competitive and attractive for investors, including foreign ones. For example, significant changes are being implemented in terms of offering an investment

[73] The draft Law of Ukraine "On Making Changes to the National Development Program" No. 6227 as of 27.10.2021 – http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=73079
[74] https://enadra.menr.gov.ua/accounts/login/?next=/eservice/create/nadra
[75] The draft Law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine Concerning Support for the Development of Domestic Subsoil Use Industries" No. 4187 as of 05.10.2020 – http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=70117

incentives program to, among others, businesses in extractive industries, but the practice remains limited thus not providing the necessary assurance for enterprises interested in the Ukrainian market.

Also, while Ukraine's Government has initiated a significant number of regulatory improvements, the area remains highly overregulated, which can be evidenced by the dozens of regulatory acts governing different issues related to doing business in Ukraine's subsoil sector. There is a strong need for codification of the rules applicable to mining activities.

Another challenge for investors in the sector would be the number of state authorities granted with authority to either regulate, apply rules or provide public services in the industry. Such a list includes the Parliament, the President, the CMU, several ministries and central executive authorities as well as local authorities.

At the moment, the investment, legal and institutional framework of Ukraine's subsoil sector is in strong need of simplicity, transparency, predictability and investor-friendliness for Ukraine to become a truly attractive investment destination for both local and foreign businesses.

5 INVESTOR SENTIMENT

To identify key investment barriers and risks as perceived by investors, a series of interviews were held involving representatives of Ukrainian state public bodies, mining and exploration companies with past experiences and/or interest in investing, business and industry associations, and law firms in Ukraine. The interviews aimed at capturing the opinions of these stakeholders with regards to strengths and weaknesses of the Ukrainian regulatory framework for the mining sector as well as the significance of specific investment barriers and risks they perceive. As mentioned before, this analysis was supposed to be supplemented by a survey among (potential) European investors to find out their specific perceptions of investment barriers and risks of investing in Ukraine's critical raw materials. However, due to the Russian full-scale invasion of Ukraine on rFebruary 2022, no survey of European investors was carried out. It should also be noted that all the interviews were conducted before the beginning of the Russian full-scale invasion of Ukraine on 24 February 2022. Due to the ongoing military conflict, perceptions of interviewed stakeholders might have changed in the meantime. However, this study could not consider any of such changes in perceptions.

5.1 Key investment barriers and risks as perceived by companies operating in Ukraine's mining sector

Investors willing to access Ukraine's mining sector face several investment barriers and risks. Some of them are triggered when investors analyse the market while making an investment decision (lack of quality and poor accessibility of geological data), some – at the initial stages of investment (inefficiency of PSA procedure, "sleeping" subsoil permits, lack of legislative procedure for accessing CRM), while others arise in the course of implementing an investment project (legal instability and unpredictability, complex EIA procedure, unpredictable taxation rules).

The table and figure below summarise the perception of companies operating in Ukraine's mining sectors on key issues affecting mining and/or exploration investment decisions.

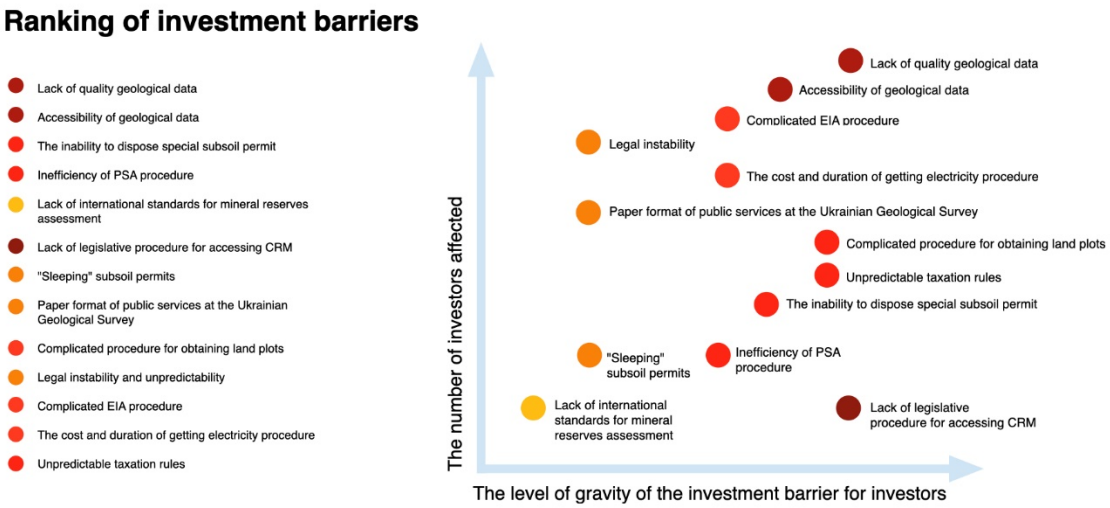
#	Topic	Views of company representatives
1	Geological data	Investors underlined that a key obstacle at the initial stage of investments into exploration and mining is the inability to access and review quality geological data. At the moment, 90% of the geological data was created during Soviet times, it is not digitised and is provided in paper book format only. Investors highlighted the difficulty of making informed decisions on the feasibility of mining investments in Ukraine's subsoil sector based on data of questionable quality.
1.1		Investors would welcome the simplification of the procedure of accessing geological data, which, in their opinion, does not correspond to international best practices. The procedure to obtain the right to review geological data on CRM status as "for official use" or "state secret" is described by investors as

		untransparent, complex and time-consuming and needs significant improvement. The publication of "Investment Atlas of a Subsoil User", although perceived positively by the investor community, still does not solve the problem.
1.2		Investors suggest that international standards should be applied to classification of reserves to enable foreign investment and assist companies in their efforts aimed at IPO listings.
2	Subsoil use rights	Investors welcome the simplification and transparency introduced to the procedure special subsoil use permits allocation via electronic auctions, as well as the possibility of nominating the subsoil areas for the biddings. Yet, from investors' point of view, the absence of a defined legislative procedure for accessing the CRM *de facto* prevents them from implementing projects related to CRM.
2.1		Investors expressed concerns over the procedure of agreeing on the terms of the PSA, its speed and transparency, as well as the predictability and investor-friendliness of the operations of the PSA Commission in general. Such inefficiency resulted in a significant delay between the announcement of the successful bidders and the signing of the PSA. During this period, the market conditions have changed, in particular, due to COVID-19 consequences, which made investors raise issues about the feasibility of their PSA projects.
2.2		Investors underlined the importance of introducing the possibility of disposing of the special subsoil use permit, including its sale. At the moment, a whole entity possessing the special subsoil permit needs to be purchased to obtain access to the subsoil, which is considered a severe barrier and reputational risk. It has already resulted in the failure of several projects' launch due to buyers concerns over the "company history" of the sellers.
2.3		Investors experience complications caused by the existence of the so-called "sleeping" subsoil permits. Attractive subsoil areas are not available, despite no exploration being performed there as a legacy from the times when the permits were often obtained without electronic bidding.
2.4		Investors remarked that there was a need to raise the quality of the public services at *The Ukrainian Geological Survey*. Despite the launch of the "Electronic Cabinet of a Subsoil User" platform in test version mode, all the communication between business, *The Ukrainian Geological Survey,* and other

		agencies in the sector is carried out through paper documents, lacking transparency and predictability. Thus, investors call for the introduction of digital services at the agency so that the status of any application could be tracked online.
2.5		Investors voiced concerns over Presidential Decree No. 306 as of July 23, 2021, which obliges central executive authorities to prepare changes to legislation, including bans on the extension of subsoil use permits & subsoil works in subsoil use permits, the out-of-court authority of The Ukrainian Geological Survey to suspend and revoke special permits for subsoil use, and introduction of requirements for the enrichment and processing of minerals in Ukraine in special permits for subsoil use related to minerals of strategic importance. In investors' view, such legislative developments could deprive them of guarantees of stability of investment activities and protection of investments by the state.
2.6	Allocation of land plots	The inefficiency of the procedures related to obtaining land plots for subsoil use is described by investors as one of the key investment barriers to the sector. As obtaining the special subsoil permit does guarantee the receipt of the land plots required for the project implementation, such a state of affairs poses a significant risk for investment. A famous precedent in Ukraine includes an investor that could not launch a USD 1 billion project in the subsoil area due to 10-year-long negotiations regarding land issues with one of Ukraine's ministries. Those investors who succeed in obtaining land plots still need to go through a long (2 years on average), complex, multi-stakeholder procedure that significantly delays the period of project implementation.
3	Environmental impact assessment	Investors are concerned with the high investment risks resulting from the procedure for carrying out EIA as a crucial step in investment project implementation. Competitors may manipulatively use the need to conduct public hearings to stop or slow down the project; thus, it needs considerable improvement.
4	Getting electricity	Investors expect solutions to the issues regarding getting electricity. The duration of connecting to the grid is often exceeding the legislatively prescribed periods. As for the prices for connecting to the grid, these are perceived as manipulative due to unjustified, illegal refusals to make economically unprofitable standard connections, unjustified attribution of connection to a non-standard type by exceeding the maximum possible distance of the linear part, etc.

5	Fiscal regime	Investors are concerned by the unpredictability of the taxation rules in the subsoil sector and constant changes to the rates for production royalties, which are changed yearly and sometimes even more often. It resulted in investors' willingness to select PSAs as the investment instrument above obtaining a special subsoil permit.
6	Legal instability	Investors are concerned by the dispersion of legal acts and the instability of legislation in the subsoil use sector in general. The sphere is regulated by dozens of laws, presidential decrees, and by-laws that are being constantly amended, thus making it hard to follow the relevant changes. Investors, therefore, call for the adoption of the planned Subsoil Code, which could serve as a key guideline for investors in mining and exploration activity and ensure the predictability of regulation.
7	Investment incentives	As a rule, investors welcome the adoption of the Law of Ukraine "On State Support for Investment Projects with Significant Investments in Ukraine", which entails strong incentives and state support for investment projects, including in the subsoil sector. However, there is a need for several pilot projects to be launched and implemented so that any doubts and uncertainties about the incentives program viability are eliminated.

Key investment barriers and risks as perceived by companies operating in Ukraine's mining sector



5.2 Conclusion

Despite positive efforts in reforming Ukraine's mining sector, investors who operate in Ukraine believe that the country's investment attractiveness is hindered by several barriers and risks arising at different stages of the implementation of mining investment projects.

Investors' biggest concerns are primarily in about the inefficiency, complexity or absence of certain regulatory procedures. In the view of Ukraine's investors, the procedures for accessing geological data, agreeing on the terms of the PSA, obtaining land plots, carrying out EIA, and connecting to grids should all be significantly improved and aligned with international best practices. In addition, investors are de facto prevented from implementing projects related to CRM due to the absence of the required legislative procedure.

Another group of barriers may be described as inefficiency of the operations and the functioning of public bodies in the sector. The Ukrainian Geological Survey and PSA Commission were mentioned most often as institutions that should make operational improvements.

Investors also point to the inability to dispose of the special subsoil use permit, including its sale as one of the most important investment barriers in the sector. Other issues, such as the so-called "sleeping" subsoil permits resulting in the unavailability of certain attractive subsoil areas, are described by investors as significantly decreasing Ukraine's investment attractiveness.

Finally, investors have concerns about Ukraine's general investment framework and climate, which are not directly related to the mining sector. The key barriers and risks in this sub-group include the dispersion of legal acts and the instability of legislation, the unpredictability of fiscal regime and the general lack of investment incentives compared to competitive countries.

6 RECOMMENDATIONS

The recommendations focus on specific actions to be taken by Ukraine's Government to overcome investment barriers and decrease investment risks in Ukraine's mining sector regarding CRMs.

To ensure the **availability of geological data**, it is necessary to **expand and develop the mineral and raw material base** and conduct further exploration of deposit areas. As one of the obstacles for SMEs preventing them from operating in the sector is a lack of budgetary funding, we suggest considering **the mechanism of creating the State Fund for the Development of the Mineral and Raw Materials Base as part of a special fund of the state budget**. Such a fund could be filled with deductions from rent payments, fees for issuing special subsoil use permits, funds from the sale of permits at auction, funds from the provision of geological data and fees for subsoil use.

To solve problems with geological data, transparent and easy **access to geological data** should be provided. **Geological data must be grouped, catalogued, digitised and accessible to future subsoil users**.

Special attention should be paid to ensuring the **cancellation of decisions on classifying information in the field of subsoil use regarding certain minerals as a state secret**, as defined by the Security Services of Ukraine. In this regard, **the criteria and procedure for classifying minerals of strategic importance should also be developed and adopted at the state level**.

In addition, **electronic services at The Ukrainian Geological Survey should be improved. The e-cabinet of a subsoil user should be put into operation** and provide an accessible and simple digital procedure for obtaining special subsoil permits, including filling out an application through the e-cabinet, electronic interaction with other systems of authorities when considering applications, electronic interaction with auction systems in the field of subsoil use, etc.

It is advised to provide the possibility for a subsoil user, at their request, to **assess the reserves according to other international standards**, not only UNFC-2009. It is important for a subsoil user in connection with the introduction of the legal institute "Alienation of the right to use subsoil" because it will allow him or her to alienate his right to the subsoil to a foreign investor. To carry out an international assessment of reserves, it is proposed for the government to complement potential foreign investors by **accompanying the data on reserves with at least an estimate using more widespread international classification systems such as CRIRSCO and PRMS**.

The procedures for special permit use should be improved, simplified, and become harmonised, more transparent, and digitised. **The procedure for access to critical raw materials should be defined. The lists of subsoil areas (mineral deposits) that are of strategic importance for sustainable economic development and defence capabilities of the state should be defined, which will be provided for under terms of PSAs and through auctions for special subsoil use permits.**

The procedure for concluding PSAs should be faster and more transparent for the investor. It can be achieved, in particular, with the help of digital solutions that will make the procedure clear for the investor as well as enable him to follow all stages of concluding the deal.

We propose to **allow a subsoil user to alienate the right to use the subsoil at the legislative level**, namely sell, transfer to another person under the property management contract, transfer to the authorised capital of business entities created with his or her participation, make a contribution to

joint activities, to pledge it or inherit. The legislation should enable the transfer (in whole or in part) of the right to use the subsoil to one or more persons.

To address "sleeping" subsoil permits, it is necessary to introduce a subsoil use fee for subsoil users who have not started mining and do not pay rent. The period from which a subsoil user, who has not started extraction, starts to pay the subsoil use fee could depend on the type of subsoil use and the mineral at hand. This tax payment corresponds to the global practice and its fee and potential time frames for the exclusivity are generally designed to make sure that companies do not sit on potential valuable properties without developing them.[76]

To guarantee a subsoil user the right to use the land, the introduction of a mechanism called **"reservation of land plots"** is necessary. With the help of this mechanism, the state must form a plot of land for the purposes of subsoil use and ensure its transfer after a subsoil user receives a subsoil use permit (at auction/without auction). A number of institutions should participate in the process of reservation of land plots, including The Ukrainian Geological Survey, regional state administrations, local self-government bodies, the State Forestry Agency, the Ministry of Environment, the State Service of Ukraine for Geodesy, Cartography and Cadastre, the Ministry of Culture, state and communal property management bodies, and privatisation bodies. Because of the involvement of these bodies in the reservation, questions regarding the owner of the land will be clarified, including the presence of real estate and property to be privatised on it, the objects of the nature reserve fund, cultural heritage and forest plantations. A plot of land with no restrictions should be reserved by its managers for a certain deposit and given to a subsoil user.

Simplification of the EIA procedure can be achieved by reducing the terms of the procedure at the legislative level, implementing legislative requirements from the EU legislation, developing industry methods of EIA procedure, and developing sample EIA reports in the field of subsoil use.

In addition to the above, to improve investment attractiveness, **the predictability of fiscal policy and stability of legislation in the subsoil use sector should be ensured, in particular, through the adoption of a new unified Subsoil Code and cancellation of excessive regulation** in the field of subsoil use.

[76] Analysis of tax regimes - Comparative analysis of tax regimes of land-based mining in 15 countries, International Seabed Authority, Para. 82, Page 28 – https://isa.org.jm/files/files/documents/20201012-RMGAnlaysis-Rev3-withLinks2.pdf

Annex 1. Categories of mineral reserves

Mineral reserves are divided into 4 categories: A, B, C1 and C2.

Category A	Category B	Category C1	Category C2
Detailed reserves of minerals. The boundaries, shape and structure of mineral bodies must be fully defined, and known types and industrial varieties of raw materials, as well as geological factors influencing the conditions of their extraction.	Preliminarily explored mineral reserves. The contours of the bodies of minerals are approximately determined, and the exact position of natural types of raw materials is not spatially reflected.	Reserves of explored deposits of complex geological structure and poorly explored reserves of minerals. It is applied on new areas and on the areas adjoining to in detail explored sites. Estimation of category C1 reserves is performed by extrapolating geological data from detailed explored areas of deposits.	Promising, unexplored reserves. Evaluated by interpreting the geological structure, taking into account the analogy of similar and detailed exploration of mineral bodies.

Ukraine's resources and reserves classification system can be roughly aligned with the CRIRSCO system in the following way[77]:

Ukrainian category	CRIRSCO category
A	MEASURED RESOURCE
B	MEASURED / INDICATED RESOURCE
C1	INDICATED / INFERRED RESOURCE
C2	INDICATED / INFERRED RESOURCE
P1	INFERRED RESOURCE / EXPLORATION RESULTS
P2/P3	EXPLORATION RESULTS

[77] CRIRSCO Committee for Mineral Reserves International Reporting Standards – http://igi.ie/assets/files/courses/NRReporting%20Workshop/Alignment%20of%20CRIRSCO%20and%20RF%20systems-NYoung%20et%20al.pdf

Annex 2. Critical Resource Materials in Ukraine. Detailed overview

Information provided on current reserves is dated as of January 1, 2020, the date it was last released by the government of Ukraine.

Material	Type and q-ty	Deposits		Reserves as of 01.01.2020			
		All	In use	On balance, all		On balance, in use	
				A+B+C1	C2	A+B+C1	C2
INDUSTRIAL AND CONSTRUCTION MATERIALS							
Baryte	ore, Ktons	1	1	2 522	415	2 522	415
	baryte, Ktons			1 009	166	1 009	166
Borates	ore, Ktons	n/a	n/a	n/a	n/a	n/a	n/a
	B2O3, Ktons	n/a	n/a	n/a	n/a	n/a	n/a
Fluorspar	ore, Ktons	3	0	6 084.5	24 288.3		
	CaF2, Ktons			1 820.7	2 255.43		
Graphite	ore, Ktons	6	2	230 343.7	75 806.7	50 366.8	33 082
	graphite, Ktons			13 760.7	4 140.1	2 825.7	1 564.2
Phosphate rock	ore, Ktons	9	2	390 786.77	83 948.15	40.6	3 556.65
	P2O5, Ktons			11 090.04	4 018.46	3.66	245.87
Phosphorus	ore, Ktons	7	3	2 174 550.08	1 122 378.27	1 816 578.58	812 977.17
	P2O5, Ktons			71 911.72	24 276.40	66 621.72	16 179.20
FERROALLOY METALS							
Cobalt ores	ore, Ktons	11	1	22 677	2 888	1 813.8	
	cobalt (Co), Ktons			8 826.3	1 033	670	
Niobium and Tantalum	ore, Ktons	n/a	n/a	n/a	n/a	n/a	n/a
Titanium	ore, Ktons	n/a	n/a	n/a	n/a	n/a	n/a
Tungsten	ore, Ktons	n/a	n/a	n/a	n/a	n/a	n/a
	WO3, Ktons			n/a	n/a	n/a	n/a
Vanadium	ore, Ktons	13	6	5 527.3	995.2		
	ore/sand, thous.m3			217 955.2	14 407.2	217 955.2	
	V2O5, Ktons			15.5	316.26		250.82
RARE-EARTHS							
Yttrium lanthanides	ore, Ktons	3	1	860 524	106 771.22	859 627.6	95 858
	TR2O5, Ktons			1 939.74	291.66	1 938	274
Scandium	ore, Ktons	n/a	n/a	n/a	n/a	n/a	n/a
	TR2O5			n/a	n/a	n/a	n/a
Other REE	ore, Ktons	n/a	n/a	n/a	n/a	n/a	n/a

	TR2O5			n/a	n/a	n/a	n/a
OTHER NON-FERROUS METALS							
Antimony	ore, Ktons	n/a	n/a	n/a	n/a	n/a	n/a
Aluminium ores	bauxite, Ktons	1	0	6 403	12 482		
Beryllium ores	ore, Ktons	1	1	2 065.9	769.8	1 711.2	732.7
	beryllium oxide, Ktons			11 441.2	3 866.6	9 825.4	3 696.6
Germanium	coal, Mtons	222	70	8 466.8	8 139.2	3 488.8	1 254.9
	germanium, tons			33 929.17	47 738.02	9 860.66	6 085.57
Hafnium ores	sand, thous.m3	2	2	206 752.2	315 624	200 200.2	
	hafnium oxide, tons			4 413.42	11 297.04	3 982.22	11 297.04
Lithium	ore, Ktons	3	0	n/a	n/a	n/a	n/a
Magnesium salts	raw salts, Mtons	4	2	1 141.3	579 204	698 861	579 204
	MgO, Ktons			90 359.28	48 988	67 873.28	48 988
Silicon metal	sand, thous.m3	n/a	n/a	n/a	n/a	n/a	n/a
	SiO2, Ktons			n/a	n/a	n/a	n/a
Strontium	ore, Ktons	1	1	859 627	95 858	859 627	95 858
	strontium oxide, Ktons			865	87	865	87
BIO AND OTHER MATERIALS							
Brown coal	Ktons	80	3	2 593 360	299 181	9 332	
Black coal	Ktons	1052	470	41 253 228	11 199 985	8 413 939	815 630

INDUSTRIAL AND CONSTRUCTION MATERIALS

Baryte

On the territory of Ukraine, baryte ore deposits are known in the Carpathian intermountain depression and in the zone of articulation of the Donetsk folded structure with the Ukrainian Shield. In the Carpathian intermountain depression, baryte ores occur within the Berehove ore district. In 1964, the complex Biganskyi deposit of sulphide-baryte ores in the May ore zone was explored. A concentrate with baryte content of 92-98% was obtained from baryte ores with the help of gravity. Extraction of baryte ores up to +110 m is possible with the help of galleries; to develop the lower horizons, it is necessary to build a mine. Concomitant extraction of alunite, lead-zinc ores with gold and silver is possible. Baryte mineralisation is developed on the upper horizons and near Berehove gold-polymetallic deposit. Detected quartz-baryte veins with $BaSO_4$ content from 17.8 to 60% (Kukhlya, Muzhiievo). There are manifestations in other regions[78].

Borates

[78] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Pages 11-12 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf

DISCLAIMER. Information about the balance reserves of borates in Ukraine is not published officially in the State Balance of Mineral Reserves of Ukraine. Information was derived from open sources.

Approximately 60 manifestations of boron are found on the territory of Ukraine, within the north-western part of the Donetsk folded structure, the Dnipro-Donetsk depression, the Precarpathian depression, the Black Sea depression, and the Ingulo-Kuban depression. In Dnipro-Donetsk depression, boron manifestations are associated with rock salt deposits and mineral springs, where the content of B_2O_3 is insignificant and mainly ranges from traces to 0.3%. In the Black Sea basin, boron manifestations are associated with bottom sediments and brine of lakes and estuaries of the Black and Azov Seas. Usually, B_2O_3 content is non-industrial.

Within the Ingulo-Kuban regional depression, boron manifestations are confined to the mud hills of the Kerch Peninsula. On the Kerch Peninsula, promising areas for boron exploration in the waters of lakes and hilly breccias, such as Bulganatska, Tarkhankutska, Pryozerna, Mykhailivska, Malobabchytska, Yenakiieve, George, Soldatsko-Slobidska, St. Elijah, and others. The content of B_2O_3 in the rocks on individual hills varies from 0.26 to 30%. Reserves were calculated at the end of the 1950s only at the Bulganatske (53.7 kilotons of B_2O_3 in category B+C1) and Tarkhankut (8.7 kilotons of B2O3 in category B) deposits.

Due to the complexity of the technological processing of raw materials, stocks are classified as off-balance sheets and are not approved[79].

Fluorspar

In Ukraine, deposits of fluorspar are known in the zone of articulation of the Ukrainian Shield with Dnipro-Donetsk depression (Pokrovo-Kireievske deposit, Dokuchaievske, Karakubske, Novotroitske manifestations), in Podilia (Bakhtynske deposit, Novoselkivsky, Skazynetske, Posukhovske, Perekorinske, Israeli, Moslovske), in the Sushchano-Perzhanska zone (Central manifestation), in the Kirovohrad zone (Bobrynetske, Kompaniyivske, Pervozvanivske manifestations), and in the Azov region (Constantinople manifestation).

The use of fluorspar in Ukraine does not exceed 60 kilotons per year, 25 kilotons of which are used by the metallurgical industry. Ukraine's needs in fluorite are met through imports.

The Pokrovo-Kireievske deposit has been explored in the eastern part of the Azov block. CaF_2 content of fluorite ores ranges from 38 to 71% and averages 63.9%. Root ores are represented by two subtypes: carbonate-fluorite (CaF_2 content on average 65%) and carbonate-feldspar-fluorite (average CaF_2 content 45%). Ores also contain carbonates, feldspars (albite, kalishpat), quartz, sericite, chlorite, kaolinite, cinnabar, pyrite, galena, and others. Ores are distinguished by variety: rich in carbonate-fluorite, which do not require enrichment (CaF_2 73-83%); ordinary carbonate-fluorite (CaF_2 38-71%) and carbonate-feldspar-fluorite (CaF_2 54.3%). The reserves of the area are almost 1.4 megatons, but the flooding of the area and very difficult mining conditions make it impossible to extract.

The Bakhtyn deposit is composed of platform deposits of the Riphean and Mesocainoza. The main minerals are fluorite and calcite. Ores are poor, complex, and without harmful impurities, with fluorite content from 11.1 to 40.8% (average 17.1-20.6%). Fluorite, feldspar and quartz are of industrial importance, from which high-quality fluorite, ceramic feldspar, quartz feldspar and quartz

[79] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 12 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf

concentrates can be obtained. Reserves of CaF_2 amount to 2520.8 kilotons and additionally available promising resources of ore category P1 amount to 10.8 megatons. Fluorite forms nests and streaks in the quartz feldspar mass, and its content varies from the first percent to 53.8% (average 28%). It usually contains about 0.5% yttrium and rare-earths. Resources of yttrium-fluorite ores in category P2 are 4 megatons[80].

Graphite (natural graphite)

Crystalline graphite deposits form the Ukrainian province, which includes four regions. In total, about 100 deposits and manifestations of graphite have been discovered in the province. To date, approximately 500 points of increased graphite mineralisation and 100 manifestations of graphite have been identified in Ukraine, including 47 objects added in the resource base of the state balance, and the main reserves are concentrated in 6 deposits[81].

Currently, PJSC "Zavallivskyi Graphite Plant" is being developed only in the South-Eastern section of the Zavalivske deposit. The design capacity of the quarry is 800 kilotons of graphite ore (35 kilotons of graphite concentrate) per year. In 2020, 93.1 kilotons of graphite ore and, respectively, 5.2 kilotons of graphite were mined. The main marketable products of PJSC "Zavallivskyi Graphite Plant'" are graphite ore with a carbon content of not less than 2%. Ore processing as well as product sales are managed by Zavallivskyi Graphite LLC. The company's website states that the company is in the top 10 in the world among producers of natural graphite and produces more than 25 major brands of graphite with carbon content of 85% to 99.5% and size of 10 to 200 microns, as well as colloidal graphite preparations and graphite-based lubricants and coolants. The plant includes 3 quarries for ore mining, a concentrator, shops for chemical enrichment of graphite, colloidal graphite preparations, lubricants and coolants, etc[82].

In recent years, special permits have been issued for graphite extraction from Balakhivske, Burtynske, and Zavallivske deposits, but the companies that received them have not started extracting them. Mariupol Graphite Plant (PJSC "Markograf") does not have its own raw material base[83].

Phosphate rock and phosphorus

Phosphorite ores in Ukraine are represented by granular phosphorites, phosphorite-glauconite sands, oyster phosphorites, and phosphorite iron ores. In 2010, P_2O_5 reserves were increased due to two new deposits – Viazovatyi Yar (Kharkiv region) and Ratnivske (Volyn region). The total forecast resources of all types of phosphorite deposits are from 2 to 4 billion tons. Thus, Ukraine has a fairly strong raw material base of phosphate-containing raw materials. The thickness of productive deposits varies from 0.5 to 10-15 meters, sometimes up to 25 meters, and the content of P_2O_5 in the ore ranges from 4 to 26%[84].

[80] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Pages 12-13 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[81] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 11 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[82] Seventh International Scientific and Practical Conference "Subsoil Use in Ukraine. Investment Prospects." Conference materials. Volume 1. Page 264.
[83] Seventh International Scientific and Practical Conference "Subsoil Use in Ukraine. Investment Prospects." Conference materials. Volume 1. Pages 250-251.
[84] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 13 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf

Today, the raw material base of phosphorus in Ukraine is represented by five objects of ilmenite-apatite ore accounting – Kropyvnia, Stremyhorod, Torchyn, Fedoriv (Zhytomyr region) and Nosachiv (Cherkasy region), where apatite can be extracted as a co-mineral; one deposit of apatite-rare metal-containing ores – Novopoltava (Zaporizhzhia region) and Davydkivske deposit (Zhytomyr region); apatite-ilmenite ores, where apatite was studied as the main mineral. All deposits are complex, during the development of which all useful components are to be removed. The vast majority of apatite reserves are almost entirely concentrated in two deposits – Stremyhorod and Novopoltava[85].

FERROALLOY METALS

Cobalt (cobalt ores)

On the territory of Ukraine, the balance reserves of cobalt are accounted for by eleven complex silicate-nickel deposits that contain it. From 2001 to 2011, Pobuzskyi Ferronickel Plant LLC developed areas "Western" and "School" of the Lipovenkivske deposit. Cobalt was extracted from raw ore together with nickel in the form of ferronickel. However, it was not removed from ferronickel and with the available technology everything was lost – dispersed in molten steel, alloys, and also remained in man-made waste.

In the early 90's, exploration and evaluation work for nickel sulphide were carried out within the Prutov sulphide-copper-nickel ore occurrence located in Zhytomyr region. Cobalt was not considered for the feasibility of developing the deposit in preliminary economic calculations, as at that time, there was no effective technology for its extraction from the collective (sulphide-nickel) concentrate[86].

Niobium and Tantalum

DISCLAIMER. Information about the balance reserves of niobium and tantalum in Ukraine is classified and is not published officially in the State Balance of Mineral Reserves of Ukraine. Data was derived from open sources.

Tantalum and niobium on the territory of Ukraine were found in complex deposits and ore occurrences of the central, south-eastern and north-western parts of the Ukrainian Shield. Tantalum-niobium ores have been found in the northwest of the Ukrainian Shield in association with yttrium, zirconium, and tin, where they gravitate toward rare metal metasomatites and pegmatites.

A rare metal Shpola-Tashlyk district with deposits of substituted lithium pegmatites containing tantalum-niobates was discovered in the central part of the Ukrainian Shield. In the north-eastern part of the Priazovskyi block of the Ukrainian Shield, the Shevchenkivske deposit of spodumene ores has been explored. In the Azov region, the Novopoltava (ore-bearing carbonate) and Mazury deposits (rare metal nepheline syenites and metasomatites) with quite strong reserves of tantalum and niobium were discovered and explored with varying degrees of detail. Based on the Mazury deposit, a rare-metal GOK can operate with a processing capacity of up to 15 million tons of ore per year.

[85] Seventh International Scientific and Practical Conference "Subsoil Use in Ukraine. Investment Prospects." Conference materials. Volume 1. Pages 280-281.
[86] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 10 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf

The state balance of mineral reserves of Ukraine reserves of tantalum and niobium pentoxide is accounted for by two complex deposits: loose zircon-rutile-ilmenite Malyshivske (tantalum and niobium contained in ilmenite and rutile, in the conditions of available technology) and indigenous apatite-rare metal Novopoltavske. Most of the niobium in it is associated with fergusonite and gatchelite. The mass fraction in tantalum and niobium pentoxide carbonates is 0.002-0.003 and 0.06-0.3%, respectively, for the amount of REE from 0.17 to 4.6%[87].

Titanium

DISCLAIMER. Information about the balance reserves of titanium in Ukraine is classified and is not published officially in the State Balance of Mineral Reserves of Ukraine. Data was derived from open sources.

Ukraine produces ilmenite and rutile concentrates, titanium dioxide, titanium sponge, titanium metal and articles thereof. In Ukraine, with varying levels of detail, 26 titanium ore deposits have been explored, another 48 deposits are off balance, and titanium reserves and resources have only been estimated. The main mineral bases of titanium are ilmenite and complex rutile-zircon-ilmenite placers. Root ores are associated with intrusions of olivine gabbroids, and the content of ilmenite in them reaches 25%, apatite 12%. The Stremyhorod root deposit is complex and contains 131 megatons of ilmenite. Ukraine has 20% of the world's ilmenite deposits, ranking fifth in the world, and in terms of production of ilmenite and rutile is in the top seven countries. Production, labour and environmental resources in Ukraine, necessary for the titanium industry, remain quite competitive[88].

High-quality raw materials for titanium production are extracted and processed by LLC VKF "Velta" on Vilnohirskyi, Irshanskyi, Demurinskyi mining and processing plants from placer deposits and supplied in the form of ilmenite concentrate. Placers are complex titanium-zircon with distene and staurolite. Zircon, which is the most important for the United States, produces hafnium, which is critical for many countries and is on the CRM list as well. Deposits concentrated in crystalline rocks are not currently being developed; they are also complex titanium-vanadium-apatite[89].

Up to one million tons of concentrates are produced annually in Ukraine, the main volume of which is not processed but exported as raw material. Mining assets play an insignificant role in the titanium industry; almost all value added is formed at metallurgical and chemical enterprises that produce final products. Worldwide, about 80% of concentrates are processed into titanium dioxide, which is a widely consumed product. In Ukraine, it is produced by PJSC "Sumykhimprom", in 2020 in the amount of 43.4 kilotons. Also, the production of titanium dioxide was established at PJSC "Crimean Titanium", which now operates under Russian control; its capacity was almost twice as large.

Sponge titanium in Ukraine is manufactured by the Zaporizhzhia Titanium and Magnesium Plant. Even though the annual design capacity of the plant is 12 kilotons of titanium sponge and there is a possibility of manufacturing ingots, due to the depreciation of production assets, the company

[87] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Pages 8-9 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[88] Seventh International Scientific and Practical Conference "Subsoil Use in Ukraine. Investment Prospects." Conference materials. Volume 1. Page 264.
[89] Seventh International Scientific and Practical Conference "Subsoil Use in Ukraine. Investment Prospects." Conference materials. Volume 1. Pages 251-252.

produces about 5-9 kilotons of sponge per year. In 2020, the production of titanium sponge amounted to 5.4 kilotons.

Production of titanium ingots in Ukraine is carried out by the International Company "ANTARES", Paton Institute, BM Strategy LLC. In 2020, Ukrainian companies produced 720 tons of titanium ingots. Today, titanium blades for NPP turbines are manufactured in Ukraine, and serial 3D printing of rocket engine elements is underway. Ukraine's production, labour and environmental resources needed by the titanium industry are still quite competitive. Currently, Ukraine has neither sufficient capacity for titanium production nor significant domestic consumption[90].

Tungsten

DISCLAIMER. Information about the balance reserves of tungsten in Ukraine is not published officially in the State Balance of Mineral Reserves of Ukraine. Data was derived from open sources.

No industrial tungsten deposits have been identified in Ukraine, and there are no industrial concentrations of tungsten in the ores of other mineral deposits as a concomitant component. At the same time, there are prospects, as the forecast tungsten resources have been calculated during the exploration works on the border of the Lipnyaz granite dome on the territory of the distribution of ore-bearing rocks with an area of 10 km^2. At the Novostankuvatskyi tungsten ore occurrence forecast resources for category P3 is almost 90 kilotons (WO_3 content 0.177%), in Lutkiv – 2 kilotons (WO_3 content 0.217%), in Skarnov – 4 kilotons (WO_3 content 0.185%). Mineralogical analysis revealed scheelite.

According to geochemical data, willow tungsten ore occurrence was found within the Kichiks-Novoselivske ore field, which contains three productive zones with tungsten ore bodies with an onboard WO_3 content of 0.15%. The thickness of tungsten ore bodies varies from 1 to 14 m. The depth of ore bodies is from 61 to 113 m. The weighted average content of tungsten trioxide at the willow ore manifestation is 0.245%, and the maximum content is 1.2359%. The mineral form of tungsten has not been established[91].

Vanadium

DISCLAIMER. Information about the balance reserves of vanadium in Ukraine is not published officially in the State Balance of Mineral Reserves of Ukraine. Data was derived from open sources.

Vanadium in Ukraine in industrial concentrations was found in ilmenites of apatite-ilmenite deposits (root and weathering crusts), ilmenite placers and in uranium-vanadium-scandium ore deposits in the Ukrainian Shield, as well as in brown iron ores of the Kerch group of deposits. Ukraine does not produce vanadium concentrates; the needs of the national economy are met through imports.

Of the secondary raw materials of vanadium, the waste of Ukrainian oil refineries and titanium enterprises, as well as the ashes of CHPs and TPPs, especially those operating on fuel oil, deserve maximum attention. The waste of Zaporizhzhia Titanium and Magnesium Plant contains 0.1-2.0% V_2O_5, so the plant creates equipment for the extraction of vanadium and other components, with a capacity of up to 30 tons of V_2O_5 per year. Industrial solutions and "red sludge" of the Mykolaiv alumina plant

[90] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Pages 9-10 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[91] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Pages 10-11 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf

processing bauxite and Dnipro aluminium plant also contain V_2O_5. Zaporizhzhia Aluminium Plant already has a plant for processing aluminosilicate solutions with a production of up to 100 tons of V_2O_5 per year[92].

PRECIOUS METALS

Planned exploration work for platinum mineralisation within Ukraine was almost not carried out. No deposits and promising manifestations of platinum and platinoids have been discovered in Ukraine yet. In addition, there is currently no reliable analytical basis for determining the content of platinum-group metals.

Elevated concentrations of platinum group metals, in particular from 0.5 to 2.8-4.9 g/t of platinum, were found in the Prutivskyi, Zhelezniakivskyi, and Kamianskyi massifs. The maximum content of platinum (up to 0.3 g/t) and palladium (up to 0.18 g/t) has been set for dunites and apodunite serpentinites of the North Ternuvat massif. High contents of osmium (up to 4 g/t), iridium (0.1-0.45 g/t), ruthenium (0.5-1.0 g/t), rhodium (0.13-0.25 g/t) were recorded in the mafic-ultramafic complexes of the Middle Dnieper Megablock. Studies of the Surskyi, Chortomlytskyi, and Bilozirskyi districts, where birches containing gold and molybdenum are widespread, found a predominant amount of palladium (concentration from 0.01 to 1 g/t). The content of palladium up to 2 g/t was confirmed in separate samples at the Bobrykivske deposit, but the presence of platinoids in the ores was not systematically studied[93].

RARE-EARTHS

In the geological complexes of Ukraine, several hundred objects of concentration of rare earth elements (from deposits to ore manifestations) have been identified, which are currently being studied to varying degrees. Most of them are localised on the Ukrainian Shield and adjacent structures.

Various alkaline and subalkaline igneous rocks with rare metal specialisation have been developed within the Priazovskyi block of the Ukrainian Shield[94]. Among the most important and best-studied is the Azov zirconium-rare-earth industrial deposit. Ore-bearing is a syenite massif with an area of about 20 km. Ore bodies contain TR203 = 0.02-9.92%, on average 0.088-1.822%, together with Zr0 = 0.02-27.12% contain elements of cerium group 0.017-8.299% and yttrium group 0.003-1.628%. Technologically, it is possible to obtain britolite, zircon, and feldspar concentrates.

In this area, rare earth concentrations are still associated with vein carbonate-fluorite manifestations – Petrovo-Gnutovskyi, Pishchevykskyi, and others. Rare earth ore occurrences in the alkaline granites of the Azov Sea region, as well as coastal, eluvial, and alluvial deposits of monazite, have been little studied. Manifestations of kularitis with the content of significantly deficient samarium, europium, gadolinium were found in loose sediments in the Azov region. Ores of phosphorus-rare metal

[92] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Pages 7-8 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[93] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 11 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[94] Seventh International Scientific and Practical Conference "Subsoil Use in Ukraine. Investment Prospects." Conference materials. Volume 1. Pages 282-283.

Novopoltavskyi in carbonates and complex rare-metal Mazurian deposits can also be a source of a concomitant supply of rare-earth elements. The area as a whole has unique reserves and large prospects and forecast resources of rare earth elements, but the concentrations of cerium elements over yttrium sharply prevail here, although they are present in some objects, in particular in the pegmatites of the Kruta Balka deposit.

The Yastrebetske fluorite-rare-earth deposit located in the syenite massif of high alkalinity is located in the northwest of the Ukrainian Shield. In its southwestern part, there is an isometric ore body with a diameter of 500 m with inclusions and nests of zircon, tantalum-niobates, yttrofluorite, etc. The total content of rare earth elements reaches 0.3%. The ratio of yttrium to cerium is 0.5 to 0.7. Other rare-metal and rare-earth ore manifestations in greisenised rocks with the content of rare-earth elements at the level of 1.5% have been established in this area[95].

Scandium

DISCLAIMER. Information about the balance reserves of scandium in Ukraine is classified and is not published officially in the State Balance of Mineral Reserves of Ukraine. Data was derived from open sources.

Ukraine has significant mineral and resource potential for scandium. Concentration of this element is located in ilmenite and titanomagnetite ores, ferrous bauxite, weathering crust and placers. Scandium contains pyroxene, amphibole, ilmenite, titanomagnetite. Scandium reserves have been estimated in four complex deposits: Zhovtorichanske (metasomatites), Stremyhorodske, Torchynske (apatite-titanomagnetite-ilmenite ore roots and their weathering crusts), and Zlobitske ilmenite placer deposit. Considerable scandium resources are concentrated in placer ilmenite and rutile-zircon-ilmenite deposits of Volyn and Right Bank districts. From concentrates of ilmenite, titanomagnetite, zircon and rutile, which contain scandium in the usual amounts for these minerals (0.1-0.4%), it can be extracted in one step at the working enterprises of Ukraine.

The scandium ore bodies of the Zhovtorichanske deposit are localised in the halos of sodium metasomatosis, which is genetically related to uranium mineralisation. The total thickness of tectonometasomatic zones reaches tens of meters, and the length exceeds 1 km. The deposit is unique in terms of scandium reserves. Scandium ores are polymineral and contain in industrial quantities Sc, V, Zr, TR, P and U.

Zaporizhzhia Titanium and Magnesium Plant waste contains more than 40 g/t of scandium, which can be removed by water washing with further extraction. During bauxite processing at the Mykolaiv Alumina Plant, approximately 1.4 million tons of red sludge are generated annually, containing an average of 50 g/t of scandium. The mineral resources of scandium in the bowels of Ukraine are among the largest in the world, and the available mining and processing facilities make it possible to fully meet the domestic needs of scandium and supply it for export[96].

[95] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 9 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[96] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 9 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf

OTHER NON-FERROUS METALS

Antimony

DISCLAIMER. Information about the balance reserves of antimony in Ukraine is not published officially in the State Balance of Mineral Reserves of Ukraine. Data was derived from open sources.

Manifestations of antimony on the territory of Ukraine are closely related to mercury deposits in Donbas (Mykytiv ore field), but the content of antimony in ores is low (0.4-1%), mining technology has not been developed, which did not allow to extract antimony even as a concomitant element together with mercury, the deposit of which ceased to operate in 1995 due to depletion of rich ore reserves. But it is known that 3 tons of ore from the Mykytivka deposit contained 2 tons of antimony, which fell together with the cinders of mercury production into dumps, which have not yet been studied[97].

Aluminium ores (bauxite)

The mineral base of aluminium in Ukraine is deposits of bauxite, nepheline ores and alunites. Ukraine is a country poor in bauxite: only three deposits have been discovered – Vysokopilske, Nikopol, and Smiliansk. The state balance of reserves of aluminium raw materials takes into account only the Vysokopilske deposit of ferrous bauxite with boehmite gibbit-chamosite composition, the reserves reaching 18.9 megatons.

In Ukraine, the most significant are the alkaline complexes of the October massif of the Azov region, reserves of nepheline ores Mazurivske, Kalinino-Shevchenkivske, and Vali-Taram deposits, which amount to about 2.9 billion tons; the field has not yet been developed.

In Ukraine, Transcarpathian alunite can be considered as a potential aluminium-containing raw material, provided its integrated use. Currently, there are two large deposits in Transcarpathia on the state balance: Biganske and Berehivske with explored reserves of alunite ores – 290.3 and 51.4 million tons, respectively. In addition, almost ten alunite deposits and ore occurrences have been found within the Berehove ore field, associated with secondary quartzites. Alunite ores can be mined in the open, but their disadvantage is the low content of alunite (about 30%), which leads to the need to enrich such ores. The possibility of flotation enrichment of the total sample of alunite ore of the Bigan deposit was studied, and alunite concentrate with alunite content of 51.5-55.0% was obtained by its extraction. Later, on the basis of the obtained results, the study of the flotation of different types of alunite ores of this deposit was carried out. As a result of enrichment, the content of aluminium in the concentrate, depending on the type of ore, increases from 13.34-14.98 to 27.03-27.72%.

The basis of aluminium production in Ukraine are two companies: LLC "Mykolaiv Aluminium Plant" (MGZ) and JSC "Zaporizhzhia Aluminium Production Plant" (ZALK). MGZ is the largest producer of aluminium in the CIS – in the period 2014-2018, aluminium production amounted to 1.45-1.7 million tons. ZALK has a production capacity of 110 000 tons of primary aluminium and primary alloys based on it and 265 000 tons of aluminium. Due to the lack of domestic raw materials, the plants are completely dependent on stable imports. In this regard, the aluminium industry is not Ukraine's competitive environment in the future development of the country's mining industry[98].

[97] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 10 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[98] National Extractive Industries Association of Ukraine – http://neiau.org/boksyty-syrovyna-dlya-nebesnogo-metalu/

Beryllium ores (beryllium)

The raw material base is represented by one large Perzhanske deposit of high-tech gentylvin ores, characterised by high quality in beryllium content and sound enrichment. Work is underway to bring it into operation. Also, the available beryllium mineralisation is associated with calcified alkaline rocks, granite pegmatites, complex rare-metal pegmatites of albite-spodumene type, and others. The field has large reserves with an average beryllium oxide content of 0.55%. Ores are relatively easy to enrich, and the extraction of beryllium in concentrate reaches 85-90%. The field has been thoroughly explored and prepared for operation with potentially high profitability of development – over 30%. In terms of scale, quality, and new types of mineralisation, the deposit is unique in the world[99].

According to the results of the auction for the sale of a special subsoil use permit, which took place on 22.04.2019, the right to develop the Perzhanske beryllium deposit was granted to the limited liability company "PERZHAN ORE COMPANY" in accordance with special subsoil use permit No. 6383 dated November 1, 2019.

Other areas include the Ukrainian Shield and Donbas joint zones, where beryllium mineralisation is associated with calcified alkaline rocks. In the Priazovskyi block, the Ukrainian Shield is connected with granite pegmatites of the western part of the Azov. Granite pegmatites are known in Volyn, in which beryllium crystals are leached from Miarol cavities. Total reserves of beryllium oxide in Ukraine reach about 66 kilotons[100].

Beryllium imports to Ukraine in 2017-2021 amounted to USD 124.6 thousand, while exports were zero. Actual beryllium consumption in Ukraine is extremely meagre[101].

Germanium

On the territory of Ukraine, germanium is available in the coal deposits of the Donetsk and Lviv-Volyn basins. The main source of germanium in Ukraine is Donbas coal. Extraction of germanium from coal is possible on special equipment for coke production. Coal has a germanium content of 1 g/t to 23 g/t. However, industrial extraction of germanium in Ukraine has not been carried out since 1991. It is possible to meet the needs of germanium through the use of thermal coal ash.

Hafnium ores (hafnium)

DISCLAIMER. Information about the balance reserves of hafnium in Ukraine is classified. Nevertheless, data on hafnium is openly available from the State Balance of Mineral Reserves of Ukraine. Other data was derived from open sources.

Hafnium reserves are determined according to zirconium reserves in a ratio of 1:50. Almost all hafnium is now produced as a product of reactor zirconium purification. In Ukraine, reserves of hafnium oxide in zircon are taken into account only for the Malyshiv complex placer zircon-rutile-ilmenite deposit located in the Dnipropetrovsk region. The reserves of the deposit are calculated and approved for such minerals as titanium and zirconium dioxide, hafnium dioxide, tantalum pentoxide, niobium, vanadium,

[99] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 8 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[100] Seventh International Scientific and Practical Conference "Subsoil Use in Ukraine. Investment Prospects." Conference materials. Volume 1. Page 264.
[101] Seventh International Scientific and Practical Conference "Subsoil Use in Ukraine. Investment Prospects." Conference materials. Volume 1. Pages 302-309.

scandium trioxide, disten and sillimanite, staurolite, moulding sands. Given the reserves of titanium dioxide and zirconium dioxide, this is the largest placer deposit not only in Ukraine but also within the former Soviet Union and is unique in the presence of valuable components. The productive stratum is represented by fine-grained Neogene sands. The field has been exploited since 1961 in an open way. The plant includes quarries, a concentrator, three metallurgical plants and a whole complex of shops and factory services. In 2017, the deposit produced 4 164.7 thousand m^3 of sand, with 349.7 tons of hafnium oxide in them. As of January 1, 2018, the reserves of hafnium oxide are 13.6 thousand tons, and the prospects for their increase are estimated at 100 kilotons.

Ukraine produces 30 kilotons per year of zircon concentrate as a concomitant component during the extraction and processing of complex zirconium-titanium placer deposits, as well as complex zircon-rare-metal, zirconium-rare-earth root deposits and zirconium weathering crusts. The volume of these deposits provides all the needs of Ukraine in zirconium and hafnium, as well as allows to supply raw materials for export. Hafnium extraction and processing in Ukraine is completed at the stage of obtaining pure metallic hafnium, but there is no technology for the production of hafnium products in Ukraine. In March 2018, the Dniprodzerzhynsk Chemical Plant started processing hafnium-containing raw materials, which is hafnium hydroxide with a high (up to 10%) sulphate content. The new technology has been introduced in the production of hafnium-nickel ligature[102].

Lithium

DISCLAIMER. Information about the balance reserves of lithium in Ukraine is classified and is not published officially in the State Balance of Mineral Reserves of Ukraine. Data was derived from open sources.

In terms of proven reserves and promising and forecast resources of lithium, Ukraine is perhaps the richest in Europe, because it can not only fully meet the needs of domestic production, but also the demand of the European raw materials market. These are pegmatite deposits of various degrees of study: Shevchenkivske (spodumene ores), Polokhivske (petalite ores), Stankuvatske (spodumene-pelitic ores), Kruta Balka (complex rare metal ores), as well as numerous ore occurrences of this type. In addition, lithium in mica minerals with lithium oxide content in the range of 0.2-0.6% forms large accumulations in the Donbas[103].

Shevchenkivske deposit is a series of rapidly declining pegmatite veins of the spodumene-albite type. Ore bodies are 600–700 meters long and have an average thickness of 40 meters. According to the estimated reserves of lithium oxide, the deposit is large. Lithium oxide content is in the range of 1.1-1.5%. Most of the lithium is associated with spodumene and to a lesser extent (3.7% of the total) with petalite. An enrichment scheme has been developed, according to which the extraction of spodumene occurs in the range of 88–92%. The average total yield of concentrate is 22.8%. The average content of lithium oxide in the concentrate is 4.9%.

The Polokhivske deposit of petalite ores is located in an area with developed infrastructure in the territorial proximity to the mining enterprises "Vostok GOK", and during the development of the deposit it is possible to use the entire infrastructure of the Smolin mine. Productive ore zones are

[102] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 8 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[103] Seventh International Scientific and Practical Conference "Subsoil Use in Ukraine. Investment Prospects." Conference materials. Volume 1. Page 264.

sodium-lithium pegmatites, which occur in granites, and are covered with loose terrigenous deposits of the Meso-Cenozoic cover and weathering crust.

Within the north-western flank of the Lipnya dome structure, a powerful Stankuvatske ore field was discovered, where the main ore mineral is spodumene, total lithium oxide resources exceed 1.5 megatons and available opportunities for concomitant extraction of tantalum, niobium, rubidium, caesium, beryllium and beryllium[104].

Magnesium salts (magnesium)

On the territory of Ukraine, Neogene chloride-sulphate magnesium ores are in the Kalush and Stebnykiv deposits. High-magnesium hyperbasites (Rodion area) have been found in the Western Azov Sea (Sorokin Tectonic Zone). The estimated resources of magnesium raw materials (category P2) to a depth of 200 meters are 250 megatons. A promising source of magnesium raw materials is the brine of the Sivaske deposit. Ukraine has significant reserves of bischofite (Chernihiv region, Poltava region). Its total resources are about 50 km^3[105].

Silicon metal

DISCLAIMER. Information about the balance reserves of silicon metal in Ukraine is not published officially in the State Balance of Mineral Reserves of Ukraine. Data was derived from open sources.

Despite the large reserves of quartz raw materials in Ukraine, it is suitable mainly for glass and refractories, and relatively few deposits are suitable for the production of silicon metal. According to studies of quartz raw materials in Ukraine (Banytske, Bila Skelia, Vasylkivske, and Matskivske deposits), the most promising raw material for pure silicon should be considered quartz from the Matskivske deposit, which has a granular structure and was formed in fundamentally different conditions than quartz from the above deposits[106].

Silicon metal – quartzites, quartzite sandstones and quartz sand are used in Ukraine for the production of refractories, ferroalloys, and crystalline silicon. As of January 1, 2018, the state balance of mineral reserves of Ukraine incorporates nine deposits, including five quartzite deposits, two – quartzite sandstone, and two – quartz sand. The balance reserves of this raw material in Ukraine amount to almost 170 million tons. Four deposits are currently being developed. The content in quartzites of the Tovkachiv SiO_2 deposit is 97.28%, Fe_2O_3 – 0.57%, A12O3 – 1.3%. The sand of the Krasnohorivka deposit contains SiO_2 – 96%, Fe_2O_3 – 0.3%. The sandstone of the Banytske deposit: SiO_2 – 99.3%, Fe_2O_3 – 0.7%. Since 1968, the products have been supplied to the Dnipro Aluminium Plant as a raw material for the production of crystalline silicon[107].

Strontium

On the territory of Ukraine, strontium (derived from celestine) was first discovered in the Precarpathian regional depression in the ores of the Podorozhnianske sulphur deposit in the Lviv region. Reserves of sulphur ores of the deposit were fully worked out in 1985, and strontium was not

[104] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 8 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[105] "Non-metallic minerals of Ukraine" Textbook – http://www.geol.univ.kiev.ua/lib/RKK_nemetalichni_kk.pdf
[106] Seventh International Scientific and Practical Conference "Subsoil Use in Ukraine. Investment Prospects." Conference materials. Volume 1. Page 282.
[107] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 13 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf

extracted from sulphur ores. According to the state balance, strontium reserves are accounted for by the Novopoltava apatite rare metal deposit. Strontium is a concomitant component found as isomorphic impurities in apatite ores and rare complex metal concentrates. The field is fully prepared for operation. In the case of its development, the reserves of strontium, as well as other accompanying elements, belong to the mining. As of January 1, 2018, strontium oxide reserves amount to 950 kilotons[108].

BIO AND OTHER MATERIALS

Coking coal

Coking coal reserves make up 31% of all coal reserves in Ukraine. Ukraine's coal reserves are estimated at 60 billion tons, of which 23 billion are proven and probable, and 10 billion tons are economically extractable[109].

[108] Mineral Resources of Ukraine, 2021, No. 2, ISSN 1682-721X. Page 9 – https://www.geo.gov.ua/wp-content/uploads/2021/09/mru_2_2021.pdf
[109] Seventh International Scientific and Practical Conference "Subsoil Use in Ukraine. Investment Prospects." Conference materials. Volume 1. Page 280.

Annex 3. Access to finance

Lending by the banks and nonbank financial institutions is recovering, but their contribution to economic growth should be more significant. In the corporate sector, most recipients of new bank loans are solvent companies: hryvnia loans to honest companies that have not defaulted since the beginning of the crisis have been growing at a rate of 25% YOY. Consumer lending is increasing rapidly.

With the decline in the number of supervisory entities in the nonbank financial services markets as the National Commission for the State Regulation of Financial Services Markets improved the regulatory environment, key development indicators have increased over the past two years. These include assets (+22.7%), insurance payments (+40.4%), factoring (+184.8%), loans (+88.6%), and the value of leasing agreements (+126%). However, the role of lending in supporting economic growth remains small.

A recovery of lending by financial institutions is an important prerequisite for accelerating economic growth in Ukraine. Lending to the real sector by banks and nonbank financial institutions is constrained by inadequate creditor rights protections and the problem of NPLs.

In recent years, measures have been taken to strengthen the protection of creditor rights. In particular: at the legislative level, a mechanism has been put in place for the voluntary financial restructuring of company debt; amendments have been made to the tax legislation to provide tax exemptions for banks and retail borrowers for the restructuring and cancellation of FX loans; the institution of the bankruptcy of individuals has been established, which also provides a mechanism and conditions for restructuring the debt of individuals on FX loans; and creditor rights protections in civil relations have been strengthened.

However, it is necessary to strengthen further the institution of enforcement, including the ability to effectively enforce the foreclosure and sale of collateral. Also, at the legislative and institutional level, safeguards for creditors in their relations with debtors are not fully ensured, and foreclosure is impeded by ambiguity and ineffective enforcement. The share of NPLs in Ukraine's banking system is still about half of total loans of the banks and remains one of the highest in the world. Debt management will require the emergence of a fully functional secondary market for distressed assets and the arrival of new market players and investments.

The Government's support for lending to the real economy, especially small and medium-sized companies, remains fragmented and ineffective. Support for the development of entrepreneurship in Ukraine, especially for small and medium-sized businesses, primarily comes from the EU and international financial organizations, which also provide credit support (the EBRD, EIB, World Bank, Kreditanstalt für Wiederaufbau (KfW), etc.).

At the state level, credit support programs for priority areas are primarily concerned with the agro-industrial complex, housing for young people, and energy efficiency. The mechanism for granting credit guarantees and government-backed agribusiness insurance has not been fully implemented. In fact, government institutions for development are virtually inactive.

Annex 4. Monetary policy and currency regulations

In 2014–2016, Ukraine faced a triple crisis as the combined impact of a banking crisis, and a currency crisis exacerbated a crisis in the real sector of the economy.

Macroeconomic imbalances that had accumulated in previous years, the political crisis of early 2014, and the occupation of Crimea and some areas of Donetsk and Luhansk regions sent the economy into a deep crisis. At the same time, the drops in real GDP by 6.6% in 2014 and by 9.8% in 2015 were accompanied and exacerbated by several waves of the hryvnia's significant depreciation and a banking crisis that triggered a massive outflow of deposits from the banking system, leaving banks bankrupt.

Ukraine's financial sector reform of 2014–2019 has helped achieve macro-financial stabilisation and strengthened the ability of regulators and financial market participants to withstand the effects of crises. The reform was laid out in the Comprehensive Program of Ukrainian Financial Sector Development Until 2020 approved by financial sector regulators.

The reform was aimed at overcoming systemic problems in the financial sector and building a fully functional, market-driven competitive environment in line with EU standards. The reform pursued three main objectives: ensuring the stability of the financial sector, building the institutional capacity of regulators, and safeguarding the rights of consumers and investors in the financial sector. The Strategy is an extension of the Comprehensive Program of Ukrainian Financial Sector Development Until 2020. The reform of the NBU's monetary policy and the strengthening of its institutional capacity have been significant factors in the stabilisation of the banking system of Ukraine.

Amendments to the Law of Ukraine "On the National Bank of Ukraine" that were made in 2015 introduced into the legislation of Ukraine the globally recognised principle of central bank independence. These amendments significantly strengthened the NBU's institutional, operational, financial, and personal independence. As a result, the prerequisites were met for the central bank to pursue its mandate, to ensure that the domestic currency is stable. Macroeconomic stabilisation was facilitated by the reorientation of monetary policy towards inflation targets and by the transition to a floating exchange rate regime. Fiscal policy, which was prudent as well, consisted in a substantial reduction of the deficits of the public and quasi-public sectors, a gradual reduction in the level of public debt, and the implementation of medium-term budget planning.

New liberal currency regulation has been implemented, but certain FX restrictions are still in place. The new currency regulation system is intended to deregulate investment, ease cross-border transactions with foreign currency, and expand the list of available FX transactions. New opportunities have emerged: non-resident investment funds and asset management companies acting on behalf of the latter can now open accounts with Ukrainian banks; the international securities depository Clearstream is now connected to the infrastructure of the Ukrainian stock market. The NBU's ultimate goal in currency regulation is to remove all existing restrictions and to gradually transition to the free movement of capital.

The achievement of this goal will be possible if appropriate macroeconomic conditions are met, legislation is implemented to counteract base erosion and profit shifting, and Ukraine becomes a member of the international system of automatic exchange of information on financial accounts. A decrease in the share of foreign currency borrowing and a decline in the dollarisation of loans and deposits in the banking system will help increase the stability of the financial and corporate segments.

Annex 5. Financial monitoring

On April 28, 2020, the Law of Ukraine "On Prevention and Counteraction to Legalisation (Money Laundering) of the Proceeds of Crime or Terrorism Financing, as well as Financing of the Proliferation of Weapons of Mass Destruction" (Law on Financial Monitoring) entered into force and replaced the previous law. Apart from the implementation of FATF recommendations, the Law on Financial Monitoring additionally aims at compliance with the recommendations of the experts of the International Monetary Fund, the European Commission and the Committee of the Council of Europe on the Evaluation of Anti-Money Laundering Measures and the Financing of Terrorism. With respect to the funds transfer requirements, the aim is to implement the provisions of Regulation (EU) 2015/847 "On information accompanying transfers of funds".

Financial monitoring is a system of detecting and counteracting money laundering and money laundering, prevention of terrorist financing and proliferation of weapons of mass destruction. The system consists of primary and state levels. The subjects of primary financial monitoring (SPFM) are banks, credit unions, stock exchanges, insurers, payment organizations, and other financial institutions. The subjects of state financial monitoring are the National Bank, the State Financial Monitoring Service (SFMS), the Ministry of Justice, the National Commission on Securities and Stock Market, and the Ministry of Finance.

The number of signs of financial transactions that SPFMs are obliged to report to the SFMS has decreased. There were 17 of them, and there were four left. Reducing the number of features of financial transactions that SPFM is obliged to report to the SFMS does not mean reducing the burden. The four-way check needs to be more thorough, which takes more time, so some customers are denied certain transactions.

The SCFM was given the right to freeze assets based not on a court decision, but only on suspicion. For the client, blocking the account means not being able to use the funds until the verification is completed.

The non-banking sector, obliged to conduct full-fledged financial monitoring, received an additional burden. Its participants had to invest in the construction of an internal compliance system, which increased the cost of their services.

An additional burden for business was the requirement of the National Bank (in compliance with the law) to establish a separate unit of the SPFM, appoint responsible employees and conduct regular internal audits.

The law requires companies to properly verify data on the ultimate beneficial owner not only based on the Unified State Register (USR). In fact, the state has put "detective" functions on business. Companies must inform about the ownership structure and update the data on their beneficiaries annually. SPFMs are obliged to inform the SFMS about the discrepancies between the data in the USR and the information obtained as a result of their verification of the client. Such detailed investigations can be costly for SPFM.

The concept of threshold financial transactions, which must be reported to the SFMS, has been introduced. Such transactions are in the amount of UAH 400,000 or more (previously UAH 150,000 or more). This does not apply to gambling and transactions with virtual assets, the threshold of which for mandatory financial monitoring is UAH 30,000.

An important innovation was the expansion of the list of those who have the right and even the obligation to identify the client. Accountants, realtors, lawyers, notaries, tax consultants, audit and law firms, postal operators, gambling representatives, and business entities advising on tax issues have been added to the SPFM. Thus, accountants providing private services should check the financial transactions of their clients and report suspicious transactions to the SCFM. If an accountant, bank, or other SPFM misses a suspicious cash withdrawal transaction that finances illegal activities, and this can then be proven, then both he and the unreliable client will be held accountable. Therefore, it is better to refuse SPFM to carry out operations if there are risks to them.