



Geology of Uzbekistan after Covid-19: Measures and Perspectives

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Abstract. The article presents an overview of the geology of Uzbekistan after the Covid-19 pandemic, focusing on the measures and perspectives to enhance the country's mining sector. Uzbekistan possesses abundant natural resources, including precious metals, non-ferrous metals, organic fuels, and uranium. The country holds prominent positions globally in reserves and mining of various minerals. To attract foreign investment, the article emphasizes the need to adhere to international reporting standards, such as the JORC Code, and highlights efforts to train local geologists in line with these standards. The article also discusses organizational improvements, regulatory frameworks, groundwater resource management, and the potential for scientific and innovation advancements in the geological industry.

Keywords: geology, Uzbekistan, Covid-19, mining sector, natural resources, investment, foreign investors, regulatory framework, groundwater resources, scientific innovation

Introduction

The Republic of Uzbekistan is blessed with rich natural resources including precious, rare and non-ferrous metals, various organic fuels such as oil, natural and condensed gas, different types of coal, shale oil, uranium and many more. The country firmly holds fourth position in the stock of gold and seventh in gold mining, eighth in uranium reserve and eleventh in uranium mining.

There are more than 2025 mining fields around the country: construction materials - 867, groundwater - 649, hydrocarbons (oil, condensed and natural gas) - 244, precious metals - 97 (gold, silver), non-ferrous and rare metals - 12, radioactive metals - 38, raw materials mines - 37, chemicals - 32, gemstone - 30, coal and oil shale - 7, ferrous metals - 5.

Uzbekistan secures leading positions in the world in confirmed stocks of such minerals as gold, uranium, copper, natural gas, tungsten, potassium salts, phosphorite, and kaolin. Not only do the rich stocks of minerals provide the existing mining complexes with a long perspective, but they also allow for increasing facilities and re-organization of the extraction of the most important minerals such as gold, uranium, copper, lead, silver, lithium, phosphorites, potassium salts, agrochemical ores, and other. According to estimates of Boston Consulting Group, over the next ten years, the country's investment potential will amount to \$ 65 billion, of which more than 45 billion falls to the raw materials industries.

In April 2020 the country developed post-pandemic measures to mitigate the adverse effects of the pandemic. The conceptual measures tangled different aspects of the sector including investment, structural changes, regulatory framework, scientific and innovation potential as well as modernization programs. In particular, measures chase objectives such as increasing the reserves of gold, silver, copper and eight types of non-metallic minerals, and the volume of mineral extraction by at least 1.5 times in the framework of ongoing investment projects.



The country is devoted to the allocation of funds for the modernization of the industry and the digits are only growing over the years. In 2017 - 2019 in consecutive three years, 6.5, 23 and 18.2 million US dollars were allocated respectively in the framework of the modernization program. In this period, a third of the technology and equipment in the industry has been renewed. In 2020, about 53 million US dollars are expected to be allocated to modernize drilling, mining, laboratory, geophysical, energy equipment, special equipment, auxiliary and other types of equipment.

The use of modern equipment allows not only to gain access to facilities previously inaccessible due to technical capabilities but also to improve the pace and quality of well drilling at previous facilities by reducing the time previously spent on repairs. Moreover, the use of modern equipment can reduce the time of work at all stages, reduce the negative impact on the environment and drill wells of complex design. It is estimated that employing modern equipment will increase the drilling depth from 800 meters to 1200 and productivity by 1.7 times. By July over 100 units of special equipment are expected to be renewed with funds allocated from the State Budget.

Successful implementation of the program will increase exploration work by 35 percent. This exploration of 16 perspective hydrocarbon sites and confirmation of the volume of reserves at 23 new fields are expected to be completed by the end of the year. Other geographic information technologies also will be implemented into the sector that allows the processing of spatial data, such as Global Mapper (software package for a geographic information system), Erdas Imagine (software package for processing geospatial and hyperspectral images, as well as vector data) and ENVI (image analysis software used by professionals of geographic information systems, remote sensing scientists and image analysts).

1. Attractiveness of the industry for investment

Given the big potential of the sector, for the successful implementation of the investment attractiveness of the industry (namely, foreign investment), it is necessary to switch to international standards of reporting. Among the widely recognized international standards is the JORC Code, which sets standards, recommendations and principles for applying public reporting on mineral exploration results and ore reserves. The main principles of the code are transparency, materiality and competence.

Despite the fact that transparency and materiality are the guiding principles of the code, the key component of providing a high-quality report at an international level remains qualified personnel, that is, competent specialists. Hence, the Uzbek government developed a crisis management program to eliminate the pandemic crises in the sector where among first measures is to train local geologists in accordance with international JORC standards by attracting foreign specialists. The measure is aimed to ensure the preparation of the necessary reports in accordance with the expectations of potential foreign investors.

Further measures include reaching an agreement with the World Bank on attracting investors to the Kyzylturuk (gold) and Sangruntov (oil shale) mines, as well as with the European Bank for Reconstruction and Development to the Oktepa (silver) and Jetimtov (phosphorite) mines. It is planned to negotiate with international financial institutions on attracting investors to the remaining 16 fields until November 1, 2020. Attracting foreign investors will directly serve to transfer new technologies, accelerate enriching stocks, and



ultimately stimulate regional economic activity, increase employment and tax revenues.

2. Organizational improvement: State Committee on Geology and Mineral Resources

As was mentioned earlier, conceptual measures tangled structural changes. A number of regulatory acts have been adopted to strengthen the functional potential and expand the activities of the State Committee on Geology and Mineral Resources. This is especially important given the need for rational and efficient use of the country's natural resources. In particular, the President's Decree "On measures to radically improve the activities of the State Committee of the Republic of Uzbekistan on geology and mineral resources" assigned the following main tasks and directions to the State Committee on Geology and Mineral Resources:

- to carry unified state policy in the field of geological study, use and protection of mineral resources;
- to improve the efficiency and effectiveness of exploration;
- to maintain an active investment policy in the field of geological exploration and industrial development of mineral deposits and create a favorable investment climate;
- to monitor the implementation of state programs for the development and reproduction of the mineral resource base;
- to implement state supervision in the field of use and protection of mineral resources during their geological study, mining, and processing of mineral raw materials;
- to implement effective measures of modernizing the geological industry by employing modern high-performance exploration equipment, providing advanced and innovative technologies;
- to implement systemic measures of training qualified personnel for the geological industry.

Additionally, another Presidential decree has been adopted "On measures to improve the organization and conduct of geological exploration for oil and gas" according to which the function of conducting research and regional geological surveys, geophysical and drilling activities as well as development and reproduction of hydrocarbon reserves of the republic were transferred to the State Committee on Geology and Mineral Resources.

3. Regulatory framework

Regarding the regulatory framework of the after-pandemic development program revised version of the Law "On mineral wealth" is to be adopted. The current law was adopted in 2002 and the government believes it should be revised based on industry development trends and best foreign practices in the field.

The working group at the State Committee on Geology and Mineral Resources is to develop a new version of the law based on the study of the legislation of Türkiye, Chile, China, Canada, Germany, the Russian Federation, Kazakhstan and Australia.

One of the recommendations for the upcoming revision of the current law is that the



rules and requirements in the new draft law will be direct in nature and will regulate the rights of foreign investors in more detail.

At the same time, it is expected that the principles of competition for the transfer of subsoil use rights directly in the norms of the draft law will be reflected. At the same time, the rights of mineral users will be strengthened, and the conditions for government and local authorities to intervene in the activities of subsoil users will be determined in detail.

4. Groundwater resources

The study of groundwater is among the most important areas in geological science. It aims to solve land reclamation problems and to create an optimal water regime on agricultural lands, as well as for hydrogeological substantiation of construction works.

Accordingly, monitoring and maintenance of the groundwater cadaster of the country has been greatly improved. As part of the program State Committee on Geology and Mineral Resources plans to accelerate the completion of drilling 70 wells. This will secure enough water supply for irrigation for 3000 ha of land. It is worth noting that recently 250 observation wells were equipped with automatic remote measurement devices.

Organizational structuring has also been tackled in the program. To ensure efficient management of groundwater resources in the country State Unitary Enterprise “Uzbekhydrogeology” as a separate authorized body is now assigned to carry unified policy in this area.

Moreover, by the end of the year, the country will introduce a system for online monitoring of water consumption in 200 new wells (also at 400 groundwater-level wells). The extension of this measure will include the development of interactive groundwater maps.

5. Potential for scientific and innovation

In recent years, Earth Remote Sensing (ERS) has become an indispensable tool for the study and management of mineral resources. The observation is carried out by aircraft and spacecraft equipped with special multichannel tools that record electromagnetic radiation in different ranges. There are different methods for studying the earth using remote sensing technology - a surface survey using satellite imagery, as well as processing Airborne geophysical surveys data that reflect the properties of the rock at depth.

In order to increase the efficiency of exploration and extraction of natural resources, measures have been developed to organize geological research using satellite imagery by the airborne geophysical method by the end of the year. Both methods are relevant depending on the scope. In particular, airborne geophysical methods and technologies are used at all stages of geological exploration, starting with the early stages of the search and ending with the transportation of extracted minerals.

Important features of airborne geophysical technologies are high productivity (up to 30,000 linear kilometers per month with one aircraft) and the absence of anthropogenic load on the studied territories. As a rule of thumb, the use of traditional methods (seismic exploration and drilling) has difficulties associated with logistics, which leads to a significant increase in the cost of project. Application of airborne geophysics methods in these



conditions allows obtaining huge data about the geological structure of the study area in a short time by optimizing the planning and implementation of heavy geological and geophysical work due to the reasonable positioning of prospecting wells.

Given the relevance of the application of these methods, in 2019 the first modern airborne geophysical complex in Central Asia was launched in Uzbekistan by which innovative methods for the study of mineral resources were introduced. At the initial stage of geological work, widely used programs in the world based on modern geographic information technologies are actively employed. High-resolution satellite images from satellites are also actively used, which makes it possible to conduct research on vast areas and with great accuracy to obtain information about the layers of deep occurrence of minerals.

Also, in order to support research activities in the field of geology, as part of comprehensive measures, the Ministry of Innovative Development has announced a call for application for applied and innovative projects. The purpose of the competition is the generating high-tech products and innovative technologies aimed at solving urgent problems, real needs and regional problems of geology development.

In addition, to further improve the system of training qualified personnel for the geological industry,

On May 13 of this year, the Resolution of the President of the Republic of Uzbekistan "On measures to organize the activities of the University of Geological Sciences in the system of the State Committee for Geology and Mineral Resources" was adopted.

According to the resolution, the University of Geological Sciences was established, specializing in the integration of education, research and practice in the field of geology.

The University is a specialized higher education and research institute of the republic for the training of qualified personnel in the field of geology and the implementation of research work for the State Committee on Geology and Mineral Resources, mining companies and other sectors of the economy.

The university is expected to consolidate the potential of advanced theoretical knowledge of geological science and enterprises in the field of mining metallurgy, to implement projects such as the Digital Geology and the National Electronic Base of Rocks and Minerals, as well as to train students on remote sensing methods of the Earth based on high-resolution space photographs.

Students are trained on the basis of the state educational standards of Uzbekistan in accordance with the programs of leading foreign universities in the field of geology and mining.

The adoption of this decision will serve to implement the results of research in geology, the widespread use of modern teaching methods, radically improve the system of training highly qualified personnel in geology, as well as strengthen the material and technical base of education on the basis of advanced foreign technologies.