OECD Critical Minerals Forum
Background Paper

Regional Note on Critical Minerals in Central Asia

Draft

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April 2026

Executive summary

Critical Raw Materials (CRMs) underpin the infrastructure of the green and digital transitions and play an increasingly important role in sectors ranging from defence and aerospace to healthcare and advanced manufacturing. Depending on the scenario, global demand for many critical raw materials is projected to be roughly 2-4 times today's levels by 2030 and around 4-6 times higher by 2040-2050. **As this demand intensifies, the formation of reliable, diversified supply chains has emerged as a core strategic imperative for industrialised and emerging economies alike.** Through policy dialogue, analysis and standards, the OECD supports its Member countries' efforts to secure and diversify CRM supply chains and reduce strategic dependencies, while working with non-Member countries to support the creation of localised value addition and enhance development outcomes in producer countries.

Central Asia's substantial yet untapped resource base, combined with its location between major markets in Europe and Asia, raises the region's relevance in CRM geopolitics and efforts to diversify global supply chains. Kazakhstan, already the world's largest producer of uranium, produces and processes around twenty of the 34 CRMs included on the European Union's official list and holds substantial reserves of base metals such as chromium, zinc and lead, several of which are associated with, or co-produced alongside, critical raw materials such as zinc, indium and germanium. The Kyrgyz Republic and Tajikistan both host some of the world's largest antimony reserves. Uzbekistan possesses the eleventh-largest copper reserves globally and is advancing lithium and molybdenum production. Turkmenistan's non-hydrocarbon mining remains underdeveloped, though untapped potential exists in lithium, copper and iron ore. Central Asia's established production of base metals offers significant potential to recover valuable CRMs such as germanium, indium, gallium and rare earth elements as co- or by-products from existing polymetallic deposits. Legacy waste deposits and tailings in particular represent untapped secondary sources of CRMs that can also enhance the circularity of the mining sector.

Governments across Central Asia are seeking to position themselves as reliable partners in global CRM supply chains. On-going reforms to attract investment reflect the growing recognition of the strategic importance of CRMs. Countries of the region are also advancing the adoption of ESG standards such as economy-wide strategies to reduce greenhouse gas (GHG) emissions, the establishment of legal frameworks for environmental assessments, and international standards to strengthen due diligence, labour safety and community engagement.

The development of the CRM sector also entails important challenges. Mining in the region is still dominated by state-owned enterprises (SOEs) with overlapping regulatory and commercial roles, while weak oversight of occupational health and safety and inconsistently applied community consultations undermine social outcomes. Environmental policies and GHG strategies are often not tailored to mining, with limited sector-specific targets, uneven enforcement and significant legacy waste and tailings risks. On the fiscal side, CRM activities are exposed to Base Erosion and Profit Shifting (BEPS) risks, uncommercial intra-group financing and offshore indirect transfers of mining licences.

Realising the region's CRM potential will require **scaling up and channelling public and private investment into projects that meet international requirements on sustainable practices**. It will also depend on **strengthening the policy and governance frameworks that shape the mining sector development**, including responsible business conduct (RBC), environmental risk management and fiscal frameworks designed to mobilise fair public revenues from mineral extraction.

Central Asia's CRM landscape

A resource-rich region with untapped potential

Central Asia's mineral wealth has historically been an important factor in the evolution of the region's economic structure and strategic relevance. During the Soviet period, the region's mineral resource base became a key component of the USSR's pursuit of mineral self-sufficiency and broader industrialisation objectives. Soviet economic policy prioritised domestic extraction and extensive geological exploration, as a result of which much of the existing geological data on Central Asian mineral reserves was mapped during this period. The region was identified as possessing substantial deposits of gold, silver, tungsten, molybdenum, lithium and uranium, particularly in Kazakhstan and Uzbekistan, as well as cobalt in Kazakhstan. The strategic and scientific exploitation of these resources also supported the development of new industrial centres, mining towns and infrastructure in previously remote areas, embedding mining activities into the region's economic geography. The historical importance of the mining sector continues to shape the region's economies today, with the mining sector remaining a key economic driver, generating significant revenue through mineral extraction and value-added processing while also supporting activity in related industries such as logistics, engineering, equipment manufacturing, finance and industrial sciences (P. Kalra et al., 2026) (V. Norov, 2025).

Resource endowment and production profile

Reserves country by country

Central Asia possesses large reserves of CRMs. The region holds 39% of global manganese ore reserves, 31% of chromium, 20% of lead, 13% of zinc, 9% of titanium, 6% of aluminium, 5% of copper, 5% of cobalt and 5% of molybdenum (Vakulchuk, 2021). This endowment positions the region as a potentially crucial supplier, but it remains largely untapped. Extractives exports from the region continue to be dominated by hydrocarbons (oil, gas, coal) and gold, the latter having historically played a significant role in the development of Central Asian economies (see **Error! Reference source not found.**). Other mineral i ndustries, while being fairly developed for metals like copper, aluminium, uranium and zinc, remain rather secondary in the region's export profile.

Kazakhstan holds more than 200 mineral production sites (Vakulchuk, 2021), **and 38 new mineral deposits were discovered in 2025 alone** (Kazinform, 2025). Kazakhstan can currently export 21 out of the 34 CRMs outlined in the official EU list. The country possesses the world's largest reserves of chromium, the seventh largest zinc reserves, and the eighth largest lead reserves. It stands among the first 20 countries for copper, cadmium and bauxite, while also holding significant rare earth elements reserves (Vakulchuk, 2021) (AIFC, 2025). The government expects to produce 15% of the world's graphite market through the development of the Sarytogan graphite mining site in Central Kazakhstan, for which a definitive feasibility study is due by mid-2026.

The Kyrgyz Republic possesses substantial reserves of antimony, copper, iron and uranium, among other minerals. People's Republic of China (hereafter "China") current ban on antimony exports has opened opportunities for the Kyrgyz Republic, which holds 13% of the world's antimony reserves (Carnegie Endowment, 2025).

Tajikistan possesses the world's second largest antimony reserves[1] (Central Asian Light, 2023) and ranks among the top 20 countries with proven reserves of zinc, and hosts substantial reserves of aluminium, copper, lead and silver (Vakulchuk, 2021). As for the Kyrgyz Republic, the Chinese ban on antimony exports provides a window of opportunity for Tajikistan.

In Turkmenistan, limited data availability and geological exploration make it challenging to estimate the exact amount of CRM reserves. In 2023, Turkmenistan exported small amounts of copper, aluminium, iron and lead (Observatory of Economic Complexity, 2025), but non-hydrocarbon mining remains relatively undeveloped. The country may hold substantial lithium, copper ore and iron ore reserves, but more exploratory drilling activity is needed (Progres.online, 2024).

Uzbekistan is endowed with the world's 11th largest copper reserves, as well as substantial reserves of silver, molybdenum, selenium and lithium (Vakulchuk, 2021), which are key to Uzbekistan's affirmation as a top investment destination. The country is also one of the main gold exporters and the fifth largest uranium supplier in the world (World Nuclear Association, 2025).

Production and industrial capabilities

Although Central Asia has historically had a well-developed mining industry, its production share for most metals remains relatively modest. Except uranium, for which Kazakhstan and Uzbekistan are respectively the first and fifth global producers, Central Asia is not a major global producer of strategic metals. For instance, the region's combined share of global gold production remains below 10%. Nevertheless, Central Asian countries sometimes dominate niche markets (for example, antimony production for Tajikistan and titanium production for Kazakhstan).

In Kazakhstan, the metals mining sector contributed 12.1% of GDP in 2024 (AIFC, 2025)**; the main mining products include uranium (of which Kazakhstan is the world's largest producer), aluminium, iron, gold, copper, lead and zinc** (Grata International, 2025) (World Nuclear Association, 2025). In 2022, Kazakhstan produced more than 21,000 tonnes of uranium, approximately 40% of the world total (CSIS, 2025). Kazakhstan possesses substantial titanium processing capabilities that supply the EU aerospace industry, notably through its Ust-Kamenogorsk Titanium and Magnesium Plant (UKTMP JSC), which operates a complete production chain and also processes tantalum, beryllium, niobium and base metals such as zinc and lead. However, it exports nickel and cobalt primarily as concentrates to Russia and China for final refining (Atlantic Council, 2025). China plays a key role in the establishment of facilities in Kazakhstan for copper, gold, silver and tungsten processing and refining (Trends Research, 2025).

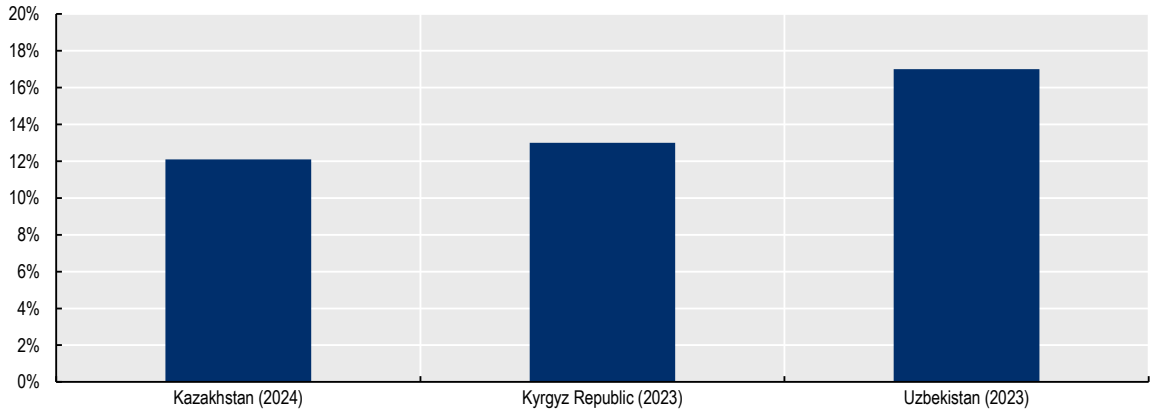
In the Kyrgyz Republic, mining accounted for 2% of GDP in 2023, the main mining industries being gold and coal (Grata International, 2025). However, the gold industry is classified as manufacturing in national statistics, which may explain this relatively low share. Estimates indicate that gold mining accounts for nearly 13% of GDP and over 60% of exports (World Bank, 2023). Mining and metals are also the sectors attracting the largest volumes of foreign direct investment (FDI) into the country (World Bank, 2025).

In Tajikistan, the main mining industries are gold, antimony and aluminium (USGS, 2025). The country ranked second largest antimony producer in 2023.

In Turkmenistan, the mining sector represents around 5-10% of GDP. Turkmenistan's mining industry is dominated by non-metal minerals such as bentonite, potash, salt and sulfur (Grata International, 2025).

In Uzbekistan, mining represented 17% of GDP in 2023, with the dominant industries being uranium, gold and copper (Grata International, 2025) (Government of the Republic of Uzbekistan, 2023), for which the country ranks respectively in the top five, top 10 and top 20 producers. Uzbekistan's major mining SOE, the Almalyk Mining and Metallurgical Combine (AMMC), produces 148,000 tonnes of copper cathode each year, and also refines by-products such as gold and silver; however, the processing of other metals is still at an early stage. China is currently establishing new facilities in the country for the processing of iron ore and copper (Trends Research, 2025).

Figure 1. Share of mining in GDP (%)



Note: For the Kyrgyz Republic, statistics only show the share of gold mining (13%) in GDP.
Note: There are not exact and official data on the mining sector share of GDP for Tajikistan and Turkmenistan.
Source: (AIFC, 2025) (World Bank, 2023) (Grata International, 2025)

Main players of the region's mining ecosystem

Foreign investment and co-operation

Foreign actors, predominantly Chinese, actively invest in Central Asia's mining industry. All Central Asian countries except Turkmenistan host mining projects with foreign involvement. Joint ventures between foreign companies and domestic SOEs are the most frequent form of foreign investment in mining. An important tendency is the expanding Chinese involvement in Central Asia's mining industry. In 2021, China was already the most important foreign investor in the mining sector of the Kyrgyz Republic and Tajikistan (Vakulchuk, 2021). China is also increasing its presence in Kazakhstan and Uzbekistan, not only by investing in extraction facilities but also by supporting the development of initial processing capabilities in these countries (Trends Research, 2025).

Box .1. De-risking instruments and initiatives for investment support in Central Asia

Several international financial initiatives contribute to reducing investment risks in Central Asia's mining sector, where limited geological information, regulatory uncertainties and the high upfront capital requirements typical of mining projects can heighten perceived risks for investors despite the region's significant resource endowments.

The European Bank for Reconstruction and Development (EBRD) plays a central role in this regard. As one of the largest institutional investors in Central Asia, the EBRD provides financing through loans, equity investments and risk-sharing facilities that help mobilise private capital in sectors perceived as high risk. In 2025 alone, the EBRD signed 31 risk-sharing transactions with 26 companies across Central Asia, sharing up to half of the risk on loans provided by partner banks. In addition, the EU-funded "GROW CRM" programme, implemented by the EBRD, supports the identification and development of CRMs projects in the region. The programme finances exploration pre-feasibility and feasibility studies and offers targeted advisory support, thereby reducing early-stage risks for CRM investments.

The European Union also contributes to reducing investment risks in Central Asia through its Global Gateway strategy, which aims to mobilise investment in the region in sectors including transport, digital connectivity, energy, water and CRMs. One of the main financial instruments supporting these efforts is the European Fund for Sustainable Development Plus (EFSD+), which provides guarantees and blending mechanisms designed to mobilise private and public investment in EU partner regions, including Central Asia. EFSD+ offers open-architecture guarantees and combines EU grants with loans from development finance institutions to improve the bankability of projects. A concrete example is the European Investment Bank's EUR 200 million loan to the Development Bank of Kazakhstan, backed by an EUR 18 million EU guarantee, aimed at mobilising investment in sustainable transport and energy infrastructure.

Source: (EBRD, 2026) (European Commission, 2025) (European Commission, 2026) (European Union, 2025)

Kazakhstan

Kazakhstan is pursuing its co-operation with the UK, the EU and China. The on-going EU-Kazakhstan co-operation on critical raw materials was reinforced following the first EU-Central Asia summit in April 2025, with a Roadmap for 2025-2026, complementing the Memorandum of Understanding signed between parties in 2022. In parallel, the EU-funded project "GROW CRM" was launched in March 2025 for the EBRD to support joint CRM project identification and development, financing pre-feasibility and feasibility studies and offering targeted technical assistance to strengthen regulatory frameworks. The Kazakh National Geological Survey (NGS) and the British Geological Survey signed a three-year partnership in 2024 to digitalise NGS's data management system and develop a comprehensive, accessible geological data platform with advanced mapping and analysis tools (The Astana Times, 2025). In November 2025, Kazakhstan signed a Memorandum of Understanding with the US focusing on CRMs, with notably a plan for the construction of a tungsten mining and processing plant (US Department of State, 2025).

Major foreign investors drive Kazakhstan's mining sector. Glencore (Anglo-Swiss) operates gold silver and zinc mines (AIFC, 2025), Central Asia Metals (UK) focuses on copper (World Bank, 2023) and Rio Tinto (Australian-British) explores copper and lithium in East Kazakhstan region (kursiv.media, 2024). Sarytogan Graphite Ltd. (Australian) develops the EU-strategic Sarytogan deposit with EBRD support, while HMS Bergbau (German) holds lithium, tantalum and rare earths licences in eastern Kazakhstan (

Netherlands Enterprise Agency, 2025). Recent US/Canadian entries include Kaz Critical Minerals, Ivanhoe Mines (AIFC, 2025) and a $1.1B Cove Capital tungsten deal, marking the US's first major entry into the region's CRM sector (Eurasianet, 2026).

Chinese investment, primarily from SOEs, has been increasing in Kazakhstan's mining sector, making China the leading foreign investor in the country's CRM industry, with involvement extending from research collaboration to extraction and processing (see **Error! Reference source not found.**).

Kyrgyz Republic

The relationship between the government and foreign investors in the mining sector has been marked by frequent disagreements around social and environmental issues, resulting in repeated license suspensions, notably for Chinese companies (Nuraiym, 2025). In 2021, a new Mining Code which was approved but never adopted was set to ban all foreign companies, except those who had already been granted licenses, from participating in future large mining projects, and planned to put all mineral development under State control (Mining.com, 2021) (USGS, 2025) (USGS, 2025). In the same year, the Kyrgyz government took control of the Kumtor mine, the largest gold mine in the country, from the Canadian Centerra Gold which was operating the site. The final agreement between the two parties was reached in 2022, when the mine was effectively nationalised and put under Kyrgyzaltyn's control (Mining.com, 2022).

Chinese actors operate key gold mining sites. These include the Ishtamberdy mine (Full Gold Mining), Kichi-Chaarat (China National Gold) (Nuraiym, 2025), and Taldybulak Levoberezhny (Zijin Mining Group /Kyrgyzaltyn JV) (Trends Research, 2025). Recently, the Kyrgyz Republic and China launched a strategic partnership around lithium exploration, mining and processing (including lithium carbonate production) as well as the mining of rare earth minerals at Kutessay deposit (Trends Research, 2025) (24KG, 2025).

Russia also remains an important player in the Kyrgyz gold mining sector, notably through projects led by Russian-owned companies Alliance Altyn (Talas region) and Highland Exploration LLC (Manas region) (World Bank, 2023). Other foreign actors in Kyrgyzstan's mining sector include the Turkish Eti Bakir, which operates the Tereksay gold mine through a joint venture with Kyrgyzaltyn, the British Chaarat Gold, which operates two gold mines in the Manas region, and the Kazakh Kaz Minerals, which operates the Bozymchak gold-copper mine. Additionally, an Australian company, Vertex Gold Company, operates a gold mine in the Manas region (Alliance "For Budget Transparency", 2023).

Tajikistan

Foreign investment in Tajikistan's mining sector comes mainly from China. Zijin Mining Group holds a 75% stake in Zarafshon, the country's largest gold producer which accounts for 70% of Tajikistan's gold output, through a joint venture called the Tajik-Chinese Mining Company, which is also involved in other gold mining projects as well as ore processing (Vakulchuk, 2021) (Global Voices, 2024). In 2023, the Chinese Tibet Huayu Mining launched a major antimony extraction project which will also extract gold, while a Chinese-funded lithium mining project in Ishkashim was opened in 2024 (Trends Research, 2025). China has also been investing in initial processing capabilities (see **Error! Reference source not found.**). A mong other foreign investors, the Anzob Group, which operates at several of the country's antimony deposits, is owned by the American Comsup Commodities Inc. (Asia-Plus, 2023).

Uzbekistan

In February 2026, Uzbekistan and the US signed a Memorandum of Understanding for Securing of Supply in the Mining and Processing of Critical Minerals and Rare Earths (Tashkent Times, 2026). The government has also recently launched an ambitious USD 2.6 billion initiative to bolster its critical minerals sector, notably counting on US investment and support (Mining.com, 2025). Some projects have

already been announced with the multinational company Traxys on the exploration and extraction of tungsten, molybdenum and copper (Frank.uz, 2025). Uzbekistan also signed a Memorandum of Understanding with the EU in 2024 focusing on CRMs, with the perspective of further EU investment in the country's mining sector (The Brussels Times, 2025). Foreign involvement in Uzbekistan's mining sector includes the French company Orano, which established a joint venture with the uranium mining SOE NavoiUran, and partnerships with Japanese JOGMEC and Turkish MTA and Calik Holding (Grata International, 2025). AMMC has recently concluded a partnership with the Finnish Metso for the construction and equipment of a new copper smelting facility (Metso, 2024).

However, most foreign investment in mining comes from China, which has notably been supporting several projects of initial processing facilities (see below).

The predominant role of SOEs

In all five Central Asian countries, the mining sector is dominated by SOEs, and joint ventures requiring minority stakes for the state are frequent in the region. Domestic private participation remains limited, as most local companies are smaller firms engaged primarily in mining support activities such as geological studies, drilling and blasting.

Kazakhstan

The state-owned Tau-Ken Samruk leads mining alongside a few major corporations with mixed ownership. Key players include Eurasian Resources Group (ERG; 40% state-owned) for high carbon ferrochrome, bauxite and iron ore and Kazzinc which produces zinc, copper, lead and gold (Vakulchuk, 2021). Other private firms with minority state stakes, such as Kazakhmys and Kaz Minerals (both major copper producers) and Solidcore Eurasia (gold), also play significant roles. The main uranium mining SOE, Kazatomprom, also holds significant processing capabilities and has produced for decades (since the 1950s) tantalum, beryllium and niobium at its Ulba plant in Öskemen, making it one of the world's leading producers of these three minerals (Ulba.kz, 2026).

Kyrgyz Republic

The mining sector is dominated by an SOE, Kyrgyzaltyn, which controls most of the mining sites, including the Kumtor gold mine, the largest in the country. Kyrgyzaltyn is the only company to produce pure gold in the Kyrgyz Republic, while doré, a semi-pure alloy of gold and silver, is banned from export, which means that smaller gold mining companies must refine their gold at the Kyrgyzaltyn-owned Kara-Balta refinery. The Precious Metals and Stones Law stipulates that gold produced in the country must be sold to the National Bank and can only be sold to third parties if the National Bank declines to purchase it. Finally, the state holds at least a minority stake of 30% in every major gold or silver mining project in the country (World Bank, 2023).

Tajikistan

The Tajik Aluminium Company (TALCO), the largest enterprise in the country, is one of the world's top aluminium producers and is poised to become the main antimony mining entity in Tajikistan with the near completion of a new antimony metallurgical plant.

Turkmenistan

The main SOEs in the mining sector include Turkmendovletgeologiya and Turkmenhimiya Holding.

Uzbekistan

Three SOEs, the Almalyk Mining and Metallurgical Combine (AMMC), the Navoi Mining and Metallurgical Combine (NMMC), and NavoiUran, dominate the country's mineral extraction, including gold, silver, copper and uranium: NMMC alone is estimated to have accounted for more than 20% of Uzbekistan's budget revenues in 2024 (Mining.com, 2025). The Uzbekistan Technological Metals Complex (UzTMK), created in 2024 as a subsidiary of AMMC, is set to become a major actor in Uzbekistan's CRM industry: with an asset portfolio of over 100 development and R&D projects, UzTMK is expected to become a dominant enterprise in Central Asia for metals like tungsten, molybdenum, rhenium, tellurium, selenium, graphite, tantalum and others. UzTMK's activities involve upstream mining operations, midstream metal production and end-product manufacturing, thus considerably reinforcing Uzbekistan's metal processing capabilities.

From primary extraction to downstream processing and refining

With the development of CRM mining, Central Asian countries are presented with an opportunity to go beyond mere mineral extraction and develop their own processing and refining capabilities for CRMs. At the time of writing, Kazakhstan can already boast significant processing capabilities for its historically dominant industries such as lead, zinc (both through Kazzinc facilities in Eastern Kazakhstan) and copper (through Kazzinc and Kazakhmys facilities). Kazakhstan also possesses processing capabilities for other CRM industries, notably titanium (Eastern Kazakhstan), but also tantalum, beryllium and niobium through the Ulba plant in Öskemen. The Kyrgyz Republic holds gold purifying capacities through its Kyrgyzaltyn-owned Kara-Balta refinery. In Tajikistan, gold is refined at the Zijin Mining-operated Zarafshon site, while TALCO started processing antimony in 2022 (USGS, 2025). In Uzbekistan, AMMC and NMMC possess significant copper and gold processing capabilities.

China is actively investing in metal processing and refining facilities in Central Asia:

- **In Kazakhstan, China is currently supporting a new USD 1.1 billion copper smelting project** led by KAZ Minerals in the Abai region, which would simultaneously yield by-products from copper mining such as gold, silver and industrial sulfuric acid. Chinese companies are also active in Kazakhstan's tungsten sector: Jiaxin International Resources Investment runs an ore-processing joint venture at the Boguty deposit in Almaty region, and East Hope Group is supporting the country's first tungsten processing plant and a new vertically integrated non-ferrous complex (Trends Research, 2025).
- **In Tajikistan, China carried out the construction of a metallurgical plant at the Zarafshon site** producing metallic copper and is currently building a second-stage processing facility for lead, silver and copper; in the Sughd region, Chinese actors built the country's first iron ore enrichment plant (Trends Research, 2025).
- **China is also investing in midstream and downstream capabilities in Uzbekistan**. In the Tashkent region, the Limaomaoli Metal Company is building a new mining complex in Syurenata which is set to extract 2.4 million tons of ore each year and to process it into 850,000 tons of ore concentrate. In the Namangan region, the China Mining Energy Group invested USD 200 million in a project in the Chust district combining mining and processing facilities set to produce an annual amount of 30,000 tons of refined copper (Trends Research, 2025).

Recent changes to legal frameworks

Central Asian countries have reformed mining laws to attract CRM investment, with Kazakhstan and Uzbekistan leading liberalisation. Kazakhstan's amended Subsoil Code and CRM plan for 2024-2028 introduce streamlined licencing, electronic auctions and technologies for complex extraction, positioning it as the region's most investor-friendly jurisdiction. Uzbekistan's new 2025 Subsoil Law, with EBRD support, replaces a fragmented system with a one-stop shop, transferable rights and better

geological data access, though regulatory risks persist in labour and environmental areas. These changes signal proactive efforts to attract FDI into high-value CRMs such as lithium and rare earths.

The Kyrgyz Republic, Tajikistan and Turkmenistan show more cautious progress. The Kyrgyz Republic amended its Subsoil Law and designed a new CRM strategy (designed with BCG support), which target 700M USD annual FDI and 1 Bn USD CRM exports via digital licencing and economic zones, but retain mandatory state shares in gold and silver projects. Tajikistan's 2013 Law saw only minor 2025 updates, preserving full state ownership and non-competitive processes, while Turkmenistan's 2014 framework remains opaque with mandatory state-majority JVs despite some streamlining. Regionally, growing transparency and partnerships coexist with state dominance, limited processing capabilities and uneven risk mitigation.

Overview of key critical mineral trends in the region

Aluminium

Kazakhstan and Tajikistan have long-standing aluminium industries. Kazakhstan ranks 11th globally for bauxite reserves, and 10th for bauxite mine production, with around 4.3 million tonnes in 2023 (AIFC, 2024). Bauxite mining, alumina (oxide precursor of aluminium) refining and aluminium smelting are vertically dominated in one major cluster dominated by ERG, which is also the country's only alumina producer, (Eurasian Resources Group, 2026). Kazakhstan's aluminium is mainly exported to the EU and Türkiye (Observatory of Economic Complexity, 2026). In Tajikistan, the aluminium industry revolves around the Tursunzade aluminium smelter owned by TALCO, the largest SOE in the country: the smelter produced 82,200 tonnes or primary aluminium in 2024 (Central Asian Light, 2025). Tajikistan has no domestic bauxite mining or alumina refining and relies on imported alumina for smelting. A little under 60% of Tajikistan's raw aluminium was exported to Türkiye in 2024 (Observatory of Economic Complexity, 2026).

Antimony

Tajikistan and the Kyrgyz Republic are the world's second and third countries for antimony reserves. Despite this potential, especially for Tajikistan, antimony mining remains underveloped in both countries and largely a by-product of gold mining rather than standalone primary extraction. Tajikistan's TALCO is set to step up antimony production with the near completion of a new antimony metallurgical plant (Trend.az, 2026). China is the world's dominant antimony producer, but its effective ban on antimony exports to the US and the EU provides significant opportunities for the Kyrgyz Republic and Tajikistan in this sector. Together, France and Belgium accounted for 77% of Tajikistan's antimony exports in 2024 (Observatory of Economic Complexity, 2026). Chinese and American actors are already involved in antimony mining in Tajikistan (Asia-Plus, 2023) (Trends Research, 2025), while the Kyrgyz Republic listed antimony as a strategic mineral in its latest CRM strategy.

Copper

Central Asia holds 5% of the world's copper reserves (Vakulchuk, 2021) and hosts a large copper sector. Kazakhstan dominates the copper industry in the region, with 471,000 tonnes of refined copper produced in 2025 (The Astana Times, 2026), mainly by Kazakhmys and the British-owned Central Asia Metals. Almost all of Kazakhstan's refined copper was exported to China or Türkiye in 2024 (Observatory of Economic Complexity, 2026). Uzbekistan holds significant copper reserves and current production is dominated by AMMC and NMMC. AMMC produced 148,000 tonnes of copper cathodes in 2023 (Tashkent Times, 2024). Almost all of Uzbekistan's refined copper was exported to China in 2024 (Observatory of

Economic Complexity, 2026). Some copper is also produced in the Kyrgyz Republic, often in gold-copper mines.

Graphite

Graphite is a high-potential sector for the region, especially for Kazakhstan. Graphite is an essential element in lithium-ion batteries and semiconductors. With the exploitation of its Sarytogan deposit, added to the EU's list of strategic raw material projects and reported to contain 30% of the world's graphite reserves (Minex Forum, 2025), Kazakhstan is expecting to become a crucial player on the world graphite market.

Lithium

Lithium is an essential metal for the clean energy transition, particularly in electric vehicle (EV) batteries. With surging EV adoption worldwide, demand for lithium is projected to increase up to twelvefold by 2030, and shortages could emerge as early as 2028 without major new supply investments (Trends Research & Advisory, 2025) (Wood Mackenzie, 2026). Central Asia's lithium potential remains largely unexplored, with possible deposits identified in areas such as the salt marshes of the Aral Sea. Lithium exploration projects have recently accelerated in the region. Two new lithium mining and processing facilities are expected to be established in East Kazakhstan by 2029, supported by a USD 500 million investment from a German company (The Times of Central Asia, 2025). In 2025, Tajikistan also announced its ambition to become the first country in the Commonwealth of Independent States (CIS) to launch lithium production, following 2024 discoveries of 15 new rare-metal deposits including lithium (dprom.kz, 2025).

Molybdenum

Central Asia holds about 5.2% of global molybdenum reserves. Kazakhstan accounts for around 83% of these proven reserves, although much of its production potential remains untapped. Uzbekistan is currently the largest producer in Central Asia and ranked the 11th globally (Vakulchuk, 2021). In 2024, Uzbekistan exported USD 25.2 million worth of molybdenum, which made it the 9th largest exporter worldwide. Germany, France and the United States were among its main and fastest-growing export destinations (OEC, 2026).

Titanium

Central Asia holds 8.7% of proven global titanium reserves, primarily in Kazakhstan and Uzbekistan. Yet the region's global production share was only 0.14% in 2019, nearly all from Kazakhstan, as Uzbekistan's titanium processing capacity remains very limited (Vakulchuk, 2021). In 2024, Kazakhstan was the 8th largest exporter of titanium, with France and Belgium being its main and fastest-growing markets (OEC, 2026). The country accounts for about 36% of EU titanium imports, which reflects its importance for Europe's industrial policy (European Commission, 2025). In 2024, the Kyrgyz Republic also began developing its largest titanomagnetite deposit, Kyzyl-Ompol, which is estimated to contain millions of tons of titanomagnetite (The Times of Central Asia, 2024).

Tungsten

Tungsten is known for its exceptional hardness and the highest melting point of any metal, making it indispensable for advanced manufacturing, defence, aerospace and other high-technology applications. Despite its strategic importance, particularly in the context of rising defence expenditure, the global tungsten supply chain is highly concentrated; China holds an estimated 52% of global reserves and accounts for around 83% of world production (The Diplomat, 2026) (Mining Visuals , 2025). In 2025,

Chinese tungsten product prices rose by more than 200% after the country's stricter export controls reduced availability (Fastmarkets, 2026). As a result, importing industries face heightened exposure to supply disruptions and policy-driven volatility, which elevates the diversification of tungsten supplies to a priority within the CRM agenda.

Kazakhstan holds significant untapped tungsten reserves that are becoming increasingly relevant in the context of evolving global supply dynamics. It is estimated that Kazakhstan holds roughly 2 million tons of tungsten resources, out of approximately 3.6 million tons of global reserves as of 2026 (The Diplomat, 2026) (World Population Review, 2026) (Ism.kz, 2026). After more than three decades of limited activity following the Soviet period, much of Kazakhstan's tungsten base remained largely untapped; however, production has recently resumed, including the launch in November 2024 of a modern processing plant in the Almaty region developed with Chinese partners, capable of processing 3.3 million tons of ore annually and producing 65% tungsten concentrate (The Times of Central Asia, 2024). At the same time, Kazakhstan's Tau-Ken Samruk (30%) and US-based Cove Kaz Capital Group (70%) formed a joint venture to develop the Severniy Katpar tungsten project, one of the world's largest untapped deposits and estimated to contain more than 10% of global tungsten reserves. The US has issued Letters of Interest for up to $700 million in potential financing through the US International Development Finance Corporation (DFC), advancing Washington's broader effort to diversify CRM supply chains under the November 2025 US-Kazakhstan Memorandum on critical minerals co-operation (The Astana Times, 2026) (U.S Embassy & Consulate in Kazakhstan, 2026) (Reuters, 2025).

Zinc

Central Asia holds 12.6% of global zinc reserves (Vakulchuk, 2021). Zinc is mainly used for galvanising steel to prevent corrosion, and demand is supported by growing use in wind turbines, solar power systems and EVs. Kazakhstan is the main producer in the region, accounting for almost 5% of the global zinc market and ranking seventh worldwide in reserves (6.7 million tons) in 2023 (The Times of Central Asia, 2025). In 2024, about 85% of Kazakhstan's raw zinc exports went to China, Russia and Vietnam (OEC, 2025). Tajikistan also holds significant zinc resources, with confirmed reserves estimated at about 10 million tons (Vakulchuk, 2021). In 2025, the country exported almost all of its zinc ore to neighbouring countries, Kazakhstan and Uzbekistan (OEC, 2025). The region's established zinc industry also offers by-product germanium potential amid China's export restrictions, leveraging existing polymetallic smelters that could yield commercially viable volumes with modest process upgrades. Germanium plays a key role for the defence, renewable energy and satellites sectors.

CRM co- and by-products derived from gold mining

Gold mining is increasingly relevant to the CRM agenda, as many gold deposits also contain valuable co- or by-product minerals. In addition to gold, these deposits may host recoverable elements such as antimony, tellurium, cobalt, tungsten, arsenic, manganese and in some cases zinc and silver. Historically, mining activities have focused mainly on gold extraction, leaving these associated minerals largely unexploited and often discarded in waste rock and tailings. However, with advances in tailings processing and trace-element accounting, such by-products can now be recovered economically. This enables existing gold mines to evolve into multi-mineral operations, supporting domestic CRM supply without the need to develop entirely new mines.

Box 2. Gold mining in Central Asia

Central Asia's abundant natural resources, including its substantial gold deposits, became an integral component of the Soviet Union's mineral resource base. Since independence, gold has remained a cornerstone of the economies of Kazakhstan, the Kyrgyz Republic, Tajikistan and Uzbekistan, albeit with varying degrees of macroeconomic dependence. Its importance has intensified over time, not only as a key source of export revenues, industrial output and strategic reserves, but also due to its role in modern electronic and digital technologies, where it functions as a highly efficient, corrosion-resistant conductor of electricity.

- Kazakhstan ranks 14th globally in terms of gold production. Notably, most of the deposits currently mined were either already in operation during Soviet times or discovered during that period.
- In the Kyrgyz Republic, gold has become the central focus of the mining sector since independence. In 2020 its largest mine, Kumtor, accounted for approximately 11% of GDP and 52% of total industrial output.
- In Tajikistan, gold accounted for 31.5% of total exports in 2023, with Switzerland being a major buyer and Tajikistan's main export partner in the same year.
- In Uzbekistan, gold mining began in the late 1960s with the development of the Muruntau deposit, one of the world's largest gold reserves. Gold continues to play a prominent role in the country's export basket: in 2023, gold accounted for approximately $8.1 billion or 33.4% of total exports, and this share increased to 41.7% in early 2024.

Source: (The Astana Times, 2025), (World Bank, 2023), (World Bank, 2023), (The Times of Central Asia, 2025), (Energy Research & Social Science, 2026), (The Times of Central Asia, 2024), (Resource World Magazine, 2020), (U.S. Geological Survey, 2025) (Observatory of Economic Complexity, 2026)

Challenges facing Central Asia's CRM sector

Gaps in exploration and reserves reporting

Lack of exploration and reserves data

Central Asia inherited significant mining infrastructure and geological data from the Soviet Union. However, limited exploration since the 1990s has led to a lack of a reliable, transparent and easily accessible data about mineral reserves in Central Asian countries (Carnegie Endowment, 2025). Most of the currently available data comes from pre-independence geological mapping projects. For example, Soviet Kazakhstan's exploration spending in 1990 alone matched independent Kazakhstan's total expenses from 2003 to 2023 (Carnegie Endowment, 2025). In the Kyrgyz Republic, the Kumtor mine, accounting for 90% of the Kyrgyz gold exports, is set to close in 2031 due to reserves depletion: the lack of exploration since independence will make it harder to offset this decline quickly with the development of new industries or deposits, putting at risk the Kyrgyz Republic's growth prospects (World Bank, 2023).

Central Asian countries lack both accessible and up-to-date databases of mineral reserves, and all countries except the Kyrgyz Republic lack an official list of CRMs considered strategic for their economies. During the Third EU-Central Asia Economic Forum the parties signed the Data4CRM agreement which aims to address this problem through the modernisation of geodata systems and the

improvement of the access to geological information, for a total budget of EUR 7.5 million and with the support of the Geological Survey of Finland (EEAS, 2025).

Lack of harmonisation and standardisation of reserves reporting systems

Central Asian countries inherited the Soviet GKZ mineral reserves classification system, which differs from CRIRSCO-aligned international standards (JORC, CIM, PERC) by not distinguishing resources from reserves and using "balance reserves" instead. Kazakhstan joined CRIRSCO in 2016 (CRIRSCO, 2025) to transition towards international standards and developed the JORC-inspired KAZRC system (now used alongside GKZ, while progressively replacing the latter); Kyrgyzstan transitioned to CRIRSCO standards in 2017, launching its UN-backed KyrRC system (approved in 2024, with dual GKZ use on major projects like Kumtor and full integration planned by 2030); and Uzbekistan adopted JORC in 2019-2020 while phasing out GKZ internally. Tajikistan and Turkmenistan remain fully reliant on GKZ with no transition underway (KAZRC, 2021) (Grata International, 2025) (CRIRSCO, 2022) (Grata International, 2025) (Grata International, 2025).

Obsolete mining and metal infrastructure

Most countries in Central Asia have legacy mining operations served by outdated infrastructure. Although Kazakhstan (Minex Forum, 2025) and Uzbekistan (Mining Technology Insights, 2025) are planning to modernise their mining infrastructure, there are still substantial efforts to be made to converge with world mining leaders such as Australia, Canada. The regional energy grids are also not well equipped to provide electricity for mass mineral mining. Mining and metallurgical production necessitates considerable amounts of energy: as an example, mining currently accounts for 69% of Kazakhstan's industrial energy use. Central Asian power systems cannot currently meet energy demand, which has led to frequent blackouts, gas rationings and residential heating shortages. To be able to substantially increase its mineral production, the region will need new and modern power plants as well as upgraded high-voltage transmission lines (Atlantic Council, 2025) (Center of Global Energy Policy at Columbia, 2023).

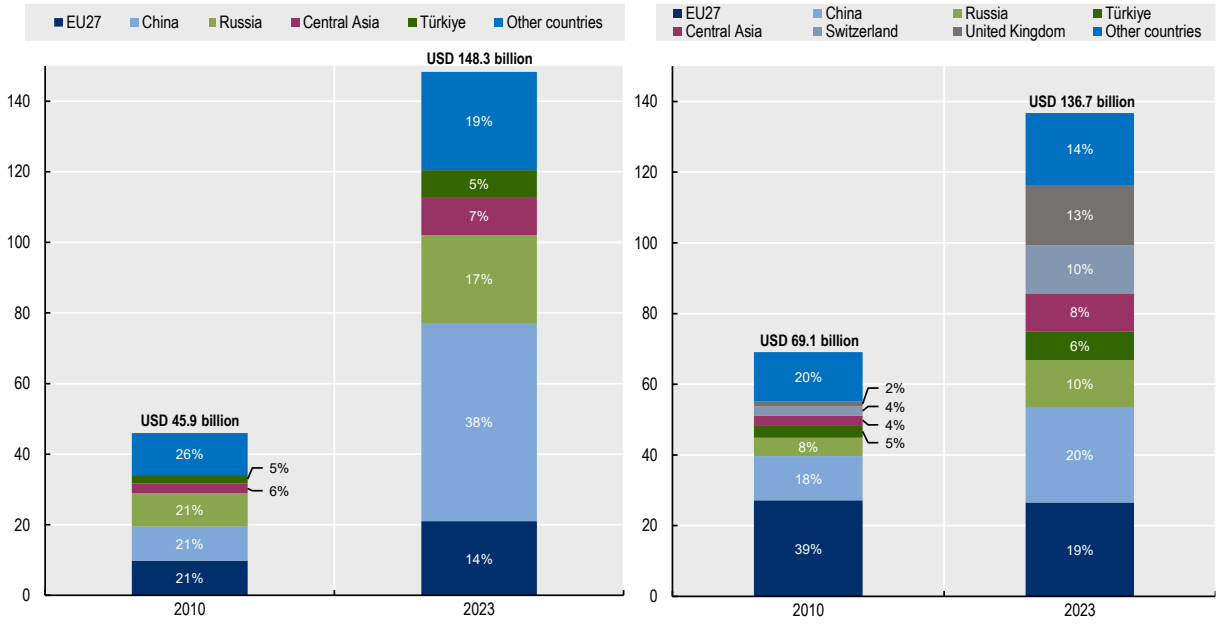
Trade and connectivity bottlenecks

Reliance on a few commodities for exports exacerbates vulnerabilities to price fluctuations

Central Asia's concentrated export baskets reinforce the need for trade-partner diversification. Central Asian countries currently present a rather undiversified export profile, each country being dependent on the export of one or two commodities (oil and gold for Kazakhstan; gas for Turkmenistan; gold for the Kyrgyz Republic, Tajikistan and Uzbekistan). They also export a range of metals and CRMs, including copper, aluminium, ferroalloys, and various metallic ores. Current export patterns indicate that trade in metals and CRMs remains largely oriented towards China, Russia and Türkiye, while the EU also serves as a destination for some of these materials, notably uranium and aluminium from Kazakhstan and Uzbekistan (OEC, 2025) (Euratom Supply Agency, 2025). Diversifying export profiles and strengthening participation in global value chains will depend on the development of efficient and secure transport links connecting Central Asia with a wider range of global markets.

Figure 2. Central Asia's main trade partners

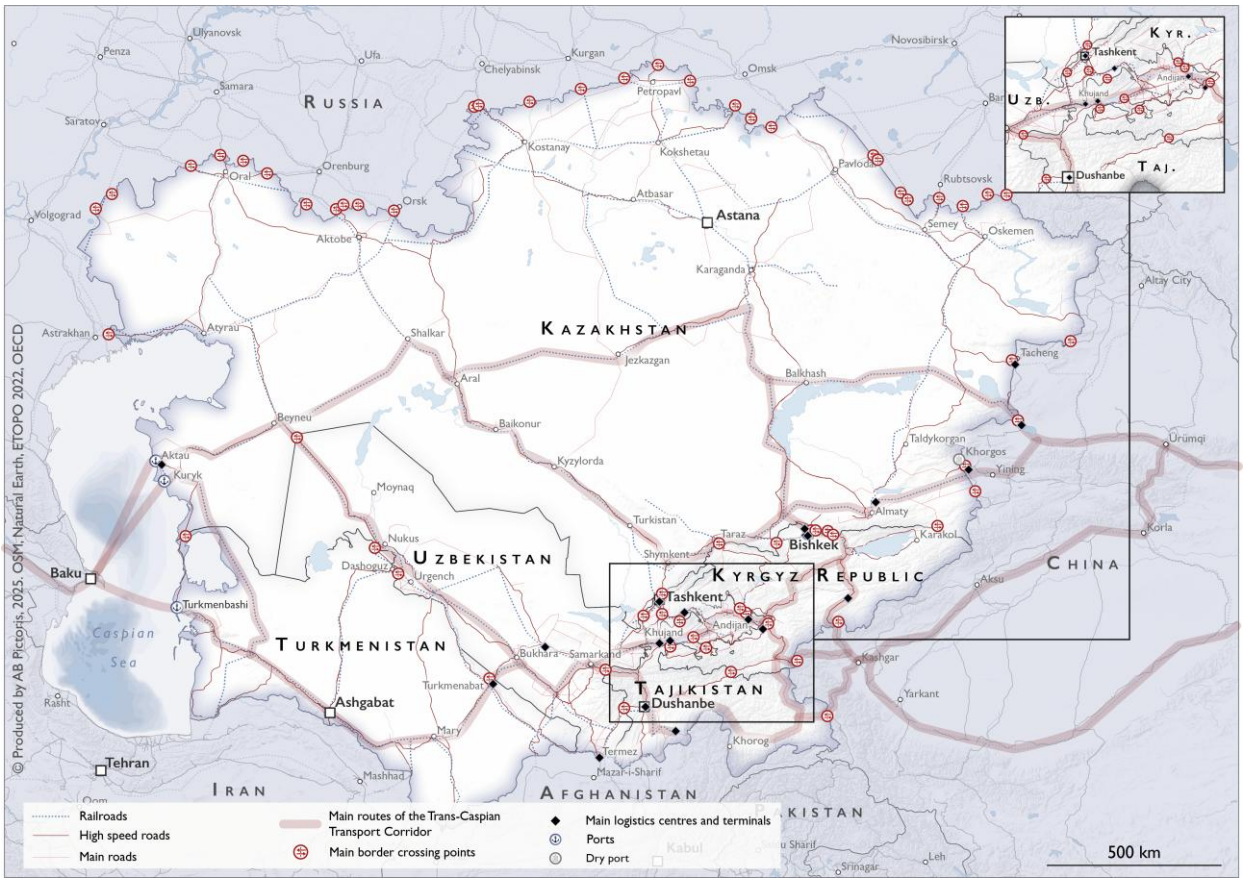
Percent, import sources (left), export destinations (right)



Note: Russia has not published its trade statistics since 2022.
Source: (OEC, 2025)Connectivity bottlenecks

The diversification of export profiles and the strengthening of participation in global value chains depend on the development of efficient and secure transport links connecting Central Asia with a wider range of global markets. The Trans-Caspian Transport Corridor (TCTC), which connects Europe and China through Central Asia, the Caspian Sea, the Caucasus and Türkiye, offers Central Asia the opportunity to not only become a major transit hub but also to increase its own trade volumes (OECD, 2025). The TCTC has gained renewed importance since Russia's full-scale invasion of Ukraine; in 2024, traffic along the corridor increased by around 62% as exporters sought reliable East-West trade alternatives. Before the full-scale invasion, the corridor already served as an alternative route for exports of some CRMs and hydrocarbons to Western markets. Kazakhstan in particular has long relied on the corridor for its grain, oil, minerals and uranium exports: in 2023, about 64% of Kazakhstan's uranium exports to Western markets were transported via the TCTC. Since 2022, the country has also increased its oil exports along the TCTC, using the well-established Baku-Tbilisi-Ceyhan (BTC) pipeline connection.

Infographic 1. Trans-Caspian Transport Corridor (TCTC)



Source: OECD and Pictoris (2025)

However, the development of the TCTC still faces multiple challenges, including insufficient multimodal infrastructure and the lack of regional harmonisation of national border-crossing procedures. The European Union has prioritised the development of the corridor to strengthen East-West supply chain resilience, including for the transport of CRMs. The OECD published a comprehensive report *Enhancing the Competitiveness of the Trans-Caspian Transport Corridor in Central Asia*, which assesses recent developments along the TCTC and provides tailored policy recommendations to strengthen its efficiency, predictability and regional integration potential (OECD, 2025).

CRMs leaving Central Asia are mainly shipped by land, with rail carrying the heaviest flows where networks are strong and road freight filling gaps where they are not. At the regional level, international rail freight in all five Central Asian countries is conducted under the Agreement on International Goods Transport by Rail (SMGS) within the framework of the Organisation for Co-operation of Railways, of which all three countries are members (OSJD, 2026). National regulations operate alongside this framework. In Kazakhstan, for instance, materials such as lithium, cobalt, manganese, chrome, copper, nickel, lead, zinc and molybdenum ores are explicitly classified as bulk cargo under rail freight rules, while materials classified as dangerous or valuable (notably gold) are subject to stricter containment, packaging and documentation requirements (Ministry of Justice of the Republic of Kazakhstan, 2019). These regulations have implications on transport costs, as bulk cargo costs less than containers and specialised rolling stock required for precious and high-value goods. This makes the country competitive for supplying unprocessed concentrates and incentivises shipping larger ore volumes rather than finished products, reinforcing its primary-producer role.

Trade restrictions

Central Asian countries often resort to temporary 6-12 month bans on the exports of ferrous metal scrap, waste containing critical or precious metals, catalysts, catalytic converters and similar products to prioritise supply for domestic industries and local processing. As a result, these countries are seen as less predictable and reliable trade partners. Kazakhstan repeatedly announces bans on the export of ferrous and non-ferrous scrap metals, such as aluminium, copper and lead scrap. In the Kyrgyz Republic, the years 2022-2024 were punctuated by temporary partial bans on the export of ferrous ingots, ferrous metal scrap and waste, gold-bearing ore and concentrate, as well as coal (USGS, 2025). Tajikistan went as far as imposing a permanent ban on the export of scrap and waste of ferrous and non-ferrous metals in 2020 to encourage local processing (Global Trade Alert, 2020).

Central Asian countries also maintain export duties and licensing for strategic materials. Kazakhstan, Uzbekistan and Tajikistan apply export duties to several raw materials (The Times of Central Asia, 2025), with Tajikistan applying them to aluminium and antimony, while Uzbekistan maintains control on uranium and gold exports.

Environmental, Social and Governance (ESG) considerations in Central Asia's mining sector

Environmental considerations

Mining and processing are responsible for a range of environmental and sustainability challenges, including in Central Asia. Among them are land degradation, high greenhouse gas (GHG) emissions - some being hard-to-abate - water and air pollution, biodiversity loss and hazardous waste (Eurasianet, 2024) (East Asia Forum, 2025) (Global Voices, 2024) (OECD, forthcoming). Mining activities can also require intensive use of water resources, which is a challenge in regions already under severe water stress (The Times of Central Asia, 2025). Central Asia has already experienced major environmental disasters such as the desiccation of the Aral Sea and is currently facing numerous environmental challenges, such as the receding levels of the Caspian Sea (OECD, 2025), desertification (World Bank, 2023) (UNCCD, 2023) and glacier melt (France24, 2024) (Jouberton, 2025).

The detrimental impact of mining on sustainability creates a paradox at the core of Central Asia's CRM agenda: net-zero pathways rely on a rapid expansion of mining and processing to supply transition minerals, yet current practices are highly carbon- and resource-intensive and can aggravate climate and environmental risks in an already fragile region. Central Asia aims to expand the supply of critical minerals for global industrial value chains, including those supporting the energy transition. However, mining and processing in the region remain highly carbon-intensive with weak environmental controls. Without major upgrades in decarbonisation, resource efficiency and waste/pollution management to international standards, these efforts risk contradicting the climate and sustainability goals they are meant to advance (Mining Digital, 2024).

GHG emissions

State of play

Central Asia's mining sector is emissions-intensive due to reliance on fossil fuels, ageing infrastructure and energy-intensive extraction and processing. Operations often depend on diesel-powered equipment and electricity-intensive processes, and many mines operate in remote or weak-grid locations. These characteristics are particularly relevant for "hard-to-abate" segments such as iron, aluminium and zinc in Kazakhstan, copper in Uzbekistan, and gold across the region.

Central Asian countries have adopted increasingly ambitious economy-wide climate targets. Kazakhstan has introduced explicit GHG reduction objectives for major mining and metallurgical enterprises under its 2024-2030 Action Plan for the Green Economy; and operates an Emissions Trading System (ETS), covering about 42.9% of national emissions (Kazenergy, 2023; UNFCCC, 2025). Uzbekistan has committed to a 30% reduction in emissions by 2030 and net-zero by 2055, and some large mining SOEs, such as Almalyk MMC (AMMC), are developing internal emission-reduction strategies (UNFCCC, 2025). The Kyrgyz Republic's updated Nationally Determined Contributions (NDCs) include industrial decarbonisation initiatives and GHG reduction targets, though mining is not explicitly targeted.

Challenges

Central Asian countries have adopted increasingly ambitious climate commitments, yet mining-specific decarbonisation policies remain limited across the region. CRM development strategies tend to prioritise production expansion and value-addition, with limited integration of climate objectives. Environmental impact assessment frameworks do not systematically account for GHG emissions from mining projects, and emissions from mining activities often do not require dedicated ecological permits. While Kazakhstan's ETS is evolving and Uzbekistan is developing the legal basis for one, regulatory coverage remains incomplete, and the Kyrgyz Republic relies primarily on emission quotas rather than market-based instruments (Adilet, 2023) (Lex.uz, 2025).

Water management

State of play

Central Asia faces significant water stress driven by transboundary dependence, inefficient water use and ageing infrastructure. Kazakhstan relies on external sources for around 44% of its surface water, while river flows have already declined by 27% due to climate change and rising demand in upstream countries (FAO, 2022) (World Bank, 2024). Uzbekistan depends on upstream inflows for nearly 80% of its water resources and could face a 30-40% decline in water availability in the coming decades (World Bank, 2024) (World Bank, 2025). Although the Kyrgyz Republic possesses relatively abundant water resources and plays a key role in supplying downstream countries, access to safe drinking water remains uneven domestically (The Times of Central Asia, 2025) (World Bank, 2024).

Kazakhstan, the Kyrgyz Republic and Uzbekistan have established regulatory frameworks governing water abstraction and wastewater discharge for industrial activities, including mining. In Kazakhstan, large-scale water abstraction projects require government approval, while water discharge from industrial facilities is regulated through environmental permits. In the Kyrgyz Republic, water use requires licences or concessions, and wastewater discharge must comply with strict pollution standards. Uzbekistan also regulates water abstraction through quotas based on technological needs and requires permits for both abstraction and discharge, applying the "polluter pays" principle to compensate for pollution.

Challenges

Despite these regulatory frameworks, national water management strategies rarely define mining-specific objectives or quantitative targets for water use, recycling or pollution reduction. Policy priorities often focus on other sectors, particularly hydrocarbons in Kazakhstan and irrigation in Uzbekistan, while environmental strategies in the Kyrgyz Republic do not include specific water-management targets for mining. As mining activity expands, particularly in the CRM sector, water demand could increase in already water-stressed contexts without clearer sector-specific objectives and monitoring mechanisms.

Mining waste and tailings management

State of play

Central Asia hosts numerous active and legacy mining waste and tailings storage facilities, many of which contain hazardous or radioactive materials. These sites are particularly concentrated in major mining regions of Kazakhstan, the Kyrgyz Republic and Uzbekistan, reflecting the long history of metal and uranium extraction in the region (Business and Human Rights Centre, 2022) (The Times of Central Asia, 2024). Poorly managed tailings pose significant environmental risks, including contamination of soil and water resources. As the development of critical mineral mining expands, the volume of mining waste

is expected to increase, potentially exacerbating existing risks, particularly in areas vulnerable to heavy rainfall, landslides and seismic activity.

Central Asian governments have begun strengthening legal frameworks and policy planning related to mining waste and tailings management. Kazakhstan, the Kyrgyz Republic and Uzbekistan rely on environmental and subsoil legislation that regulates the storage, handling and disposal of mining waste, increasingly incorporating provisions for monitoring, safe storage and resource recovery. In Kazakhstan, mining residues must be stored in authorised sites and treated as potential secondary resources, and national planning documents include targets such as increasing industrial waste recycling to 50% by 2030 and reprocessing several mining-waste deposits. In the Kyrgyz Republic, legislation requires strict monitoring of tailings facilities, safe storage of hazardous and radioactive waste, and land reclamation financed through dedicated funds; national strategies also aim to secure legacy uranium tailings and conduct risk assessments of existing sites. Uzbekistan similarly requires waste-processing and recovery measures in mine closure plans and has introduced targets to rehabilitate land degraded by mineral extraction.

Challenges

Important gaps remain in the monitoring and reduction of mining waste across the region. Reliable data on hazardous mining waste treatment remain scarce, with Kazakhstan being the only country providing relatively recent official statistics, while comparable data are limited or unavailable in the Kyrgyz Republic and Uzbekistan. In addition, most national strategies focus on general waste management and environmental rehabilitation without establishing clear sector-specific targets for reducing unrecycled mining waste or increasing circularity in the mining sector. While Kazakhstan has introduced recycling targets and provisions for reprocessing mining waste, policy frameworks in the Kyrgyz Republic and Uzbekistan place greater emphasis on monitoring and safe storage rather than large-scale recovery of valuable materials from legacy tailings.

Social considerations

Labour rights

State of play

Central Asian governments have made tangible strides in advancing labour rights in their mining sectors, particularly through legislative updates, strategic frameworks and international alignments. Kazakhstan has updated its labour code to strengthen occupational health and safety provisions and launched the 2024–2030 Concept of Safe Labour, which aims to reduce workplace accidents common in the mining sector (World Bank, 2023). In the Kyrgyz Republic, 2022 reforms aimed at expanding employment in the CRM sector also require employers to implement safeguards to protect workers' life and health. Uzbekistan has acceded to several ILO conventions and substantially revised its labour code in 2023, while increasing funding for labour inspections and introducing digital safety monitoring systems in mines. At the same time, SOEs such as AMMC and NMMC have begun publishing non-financial reports that include information on workplace accidents (Business and Human Rights Resource Centre, 2025).

Challenges

Yet, significant gaps remain in health and safety protection, labour rights frameworks and the effectiveness of grievance mechanisms. In Kazakhstan, industrial accidents and fatalities continue to occur, including the 2023 Kostenko methane explosion that killed 46 miners (The Diplomat, 2023). Trade

unions have raised concerns about possible under-reporting of workplace accidents, and collective bargaining and strike rights remain limited (World Bank, 2023) (Human Rights Watch, 2025). Migrant workers have also reported cases of discrimination, wage theft and coercion. In the Kyrgyz Republic, an estimated 10-15 mining fatalities annually point to ongoing safety challenges (World Bank, 2023). Chinese companies operating in the Kyrgyz Republic have also been accused of discriminatory employment practices toward Kyrgyz workers (World Bank, 2023). In Uzbekistan, labour rights concerns include restrictions on freedom of association and a gender pay gap estimated at 39% (OECD, 2025). Workplace safety in the mining sector also remains a concern; at AMMC alone, authorities recorded 728 health and safety violations in early 2024, alongside reports of worker abuse and several fatal accidents.

Meaningful engagement of local communities

State of play

Central Asian governments have established legal frameworks requiring community involvement in mining projects. In Kazakhstan, environmental and subsoil legislation mandates Environmental Impact Assessments (EIAs), public consultations and hearings, and Community Development Agreements for projects near settlements (World Bank, 2023). The Kyrgyz Republic requires mining companies to conclude social package agreements with local authorities and allows public review of EIAs (World Bank, 2023). Uzbekistan has introduced provisions for early public consultations and Public Environmental Expertise hearings, while SOEs are required to provide grievance mechanisms and citizens can submit appeals through the national Ombudsman (Lex.uz, 2025) (Uzbekistan Authorized Person of the Oliy Majlis for Human Rights, 2026).

Challenges

Despite these provisions, implementation gaps remain in transparency, enforcement and the effectiveness of community participation in mining governance. In Kazakhstan, EIAs are not always fully disclosed and consultation processes may be poorly publicised, while Community Development Agreements are sometimes negotiated without direct community involvement (World Bank, 2023) (OECD, 2025). In the Kyrgyz Republic, concerns about corruption in licensing and tighter controls on civil society have weakened dialogue with communities (PWYP Kyrgyzstan, 2024). Public EIA reviews remain advisory, and communities are often excluded from consultations after the initial approval stages, contributing to distrust toward some foreign companies (World Bank, 2023). In Uzbekistan, consultation practices still fall short of international standards. Public Environmental Expertise hearings remain consultative, grievance mechanisms are uneven among private firms, and community influence in decision-making remains limited (Lex.uz, 2025).

Governance and Responsible Business Conduct considerations

State of play

Central Asian governments have begun to introduce Responsible Business Conduct (RBC) and sustainability standards in their mining sectors through international commitments, national strategies and enterprise-level initiatives. Kazakhstan has adhered to the OECD Declaration on International Investment and Multinational Enterprises and the OECD Guidelines for Multinational Enterprises on RBC, and established a multipartite National Contact Point supporting a National Action Plan on Business and Human Rights (OECD, 2025) (OECD, 2026). The country also participates in transparency and international co-operation initiatives such as the Extractive Industries Transparency Initiative (EITI) and the Forum on Resource Geostrategic Engagement (FORGE) (OECD, 2018) (EITI,

2025) (US Dept of State, 2026). The Kyrgyz Republic has demonstrated commitment to transparency through early EITI adoption and disclosure of production and revenue data (EITI, 2024), while Uzbekistan has strengthened anti-corruption and SOE governance frameworks (Ministry of Investment, Industry and Trade of the Republic of Uzbekistan, 2026) (OECD, 2025). Across the three countries, some major mining and metallurgical companies are voluntarily undergoing international assurance processes and introducing ESG roadmaps, due diligence systems and reporting that can progressively raise expectations for responsible mineral supply chains in the wider region.

Challenges

Perceptions of opacity and corruption, as well as the predominant role of SOEs, continue to weigh on mining governance and investment attractiveness in Central Asia. In Kazakhstan, corruption risks persist in public administration, procurement and large infrastructure projects, including cases of illegal granting of mining rights, gaps in lobbying regulation and weaknesses in enforcement mechanisms. SOE dominance through Samruk-Kazyna and Tau-Ken Samruk, combined with ministries that both own and regulate companies, creates potential conflicts of interest and risks of competitive distortions (OECD, 2025; OECD, 2024) (World Bank, 2023). In the Kyrgyz Republic, anti-corruption frameworks exist but enforcement remains uneven, while increased state participation in the mining sector following the nationalisation of Kumtor has raised concerns about transparency and investor confidence (World Bank, 2022). In Uzbekistan, some large contracts are reportedly awarded to offshore-linked companies. A 2024 assessment of AMMC also identified significant gaps in RBC practices, particularly in supply-chain due diligence, including difficulties in identifying high-risk suppliers and countries of origin or transit (The CopperMark, 2026).

Base Erosion and Profit Shifting tax risks in Central Asia's CRM sector

The CRM sector presents significant potential for domestic revenue mobilisation, yet this potential is vulnerable to Base Erosion and Profit-Shifting (BEPS) practices by multinational enterprises (MNEs). BEPS refers to tax planning strategies that exploit gaps and mismatches in tax rules to shift profits away from the jurisdiction where economic activity takes place, thereby reducing taxable income in source countries. While global revenue losses from BEPS are substantial, these risks are particularly acute in resource-rich emerging economies such as those in Central Asia, which rely heavily on corporate income tax and extractive sector revenues and face constraints in legislative design and administrative capacity (OECD, 2025).

In Central Asia, OECD analysis has identified three key BEPS risks in the CRM sector: i) underpricing of mineral sales, ii) abusive related-party financing structures and iii) the offshore indirect transfer (OIT) of mining licences. These risks are reinforced by gaps in domestic tax legislation and limited access to information, making them challenging for tax administration to detect and address effectively.

Under-pricing of mineral sales

Under-pricing of mineral sales is a key BEPS risk in Central Asia's CRM sector. Instead of selling minerals at arm's length prices to independent buyers, companies may sell output to related or co-ordinated entities located in low- or no-tax jurisdictions at prices below market value. These entities then resell the minerals at market prices, shifting profits out of the producing country and eroding the local tax base. This risk is heightened for critical minerals that lack transparent or widely quoted benchmark prices, making it more difficult for tax authorities to establish an appropriate arm's length price. Under-pricing directly reduces corporate income tax liabilities and, where applicable, ad valorem royalties and profit-based rent taxes. It can also reduce dividend withholding tax by lowering reported profits in the producing jurisdiction.

In the Kyrgyz Republic, existing legislation explicitly allows mineral sales prices to deviate from market prices by up to 20%, creating significant scope for profit shifting. In some cases, such deviations may eliminate the entire taxable profit margin in the producing country, with profits instead recognised by offshore entities. Evidence from the region also points to the use of intermediaries that are not formally part of an MNE group but co-ordinate transactions to avoid the application of transfer pricing rules. These opaque arrangements are particularly difficult to detect given current limitations in information exchange and audit capacity.

The use of abusive financing structures for CRM projects

Abusive related-party financing structures present a second major BEPS risk in Central Asia. Mining projects require substantial upfront capital and often operate at a loss during exploration and early development. While independent investors typically provide equity in such high-risk phases, intra-group financing within MNEs frequently takes the form of related-party debt at non-arm's length interest rates or with excessive leverage. This allows companies to generate large interest deductions that erode the tax base before production begins.

Evidence from Tax Inspectors Without Borders (TIWB) programmes in Kazakhstan and Mongolia shows that intercompany debt abuse in the mining sector is widespread. High interest rates, inflated debt levels and the misclassification of equity-like instruments as debt are common features. These practices are difficult to challenge where tax administrations lack clear legal tools, financial expertise or effective interest-limitation rules.

While Kazakhstan has begun strengthening its capacity to assess related-party financing with OECD and TIWB support, the Kyrgyz Republic remains fully exposed to this risk. It lacks interest-limitation rules and does not allow transfer pricing or market-price concepts to be applied to financial transactions, leaving tax authorities with no legal basis to challenge abusive structures.

Offshore indirect transfers of mining licences

The offshore indirect transfer of mining licences is a further significant BEPS risk in the region. Large capital gains may arise when investors sell mining licences, which can be extremely valuable assets. While direct sales of licences or shares in domestic licence-holding companies are often taxable, investors may avoid local taxation by selling shares in offshore holding companies that indirectly own the licence.

In Central Asia, legal frameworks to tax such offshore indirect transfers are uneven. Kazakhstan has made progress by implementing international standards on transparency and information exchange, including participation in the Multilateral Convention on Mutual Administrative Assistance in Tax Matters. This enhances its ability to obtain information on offshore transactions. By contrast, Uzbekistan's tax rules cover only direct sales of shares in Uzbek entities and do not capture indirect transfers through foreign holding companies, leaving a significant gap in the taxation of capital gains linked to domestic mineral assets.

Policy considerations

1. Enhance geological mapping through renewed exploration and the harmonisation of reserve reporting

Governments of Central Asian countries could consider scaling up their subsoil exploration projects to provide domestic companies and potential investors with better visibility on the types of minerals present and the scale of available reserves. Governments could also consider providing more exploration licences to foreign companies and creating joint ventures for soil exploration.

The mineral reserves reporting systems should be harmonised, not only with CRIRSCO member countries but within Central Asia as well:

- Kazakhstan, which is already a CRIRSCO member, could finalise its transition to CRIRSCO reporting standards and completely phase out the GKZ system in favour of the KAZRC system.
- The Kyrgyz Republic and Uzbekistan could finalise their transition to CRIRSCO standards; while the Kyrgyz Republic is already a CRIRSCO membership candidate, Uzbekistan could consider going in the same direction.
- Tajikistan and Turkmenistan could consider starting the transition towards CRIRSCO reporting standards.

Kazakhstan, Tajikistan, Turkmenistan and Uzbekistan could also consider publishing official lists containing minerals they consider as critical and/or strategic for their economies. The Kyrgyz Republic already has such a list.

2. Clarify legislation and rules to potential investors

Governments could consider providing investors with clear guidance on legislation and rules touching upon mining revenue taxation and environmental and social standards. This would avoid future misunderstandings and disagreements between investors and governments, leading to less litigations and fewer project terminations. Fuller, clearer and more systematic provision of information and guidance in this respect will allow governments to attract foreign investment more easily and lead to better informed co-operation between different parties involved in the mining process.

3. Promote the implementation of OECD and other international RBC standards to enhance the mining sector's transparency

Governments could continue adopting and raising awareness of relevant OECD RBC standards, such as the *OECD Guidelines for Multinational Enterprises for Responsible Business Conduct* and the *OECD Due Diligence Guidance for Responsible Mineral Supply Chains from Conflict-Affected and High-Risk Areas*. Tajikistan, Turkmenistan and Uzbekistan, who are not yet EITI members, could consider starting implementing EITI standards in their respective mining sectors. Risks related to illicit mining, under-regulated artisanal and small-scale mining, potential conflict-affected tantalum and gold flows, and the concentration of ownership and control in large SOEs mean that further advances in transparency, independent oversight and supply-chain due diligence are needed for RBC standards to translate into consistent practice on the ground.

4. Strengthen labour rights and protections in the mining sector

Governments could consider enhancing their labour protection frameworks through several measures:

- Enhancing overall safety oversight.
- Promoting transparency around incident reporting.
- Providing the inspection authorities with capacity and a mandate for unannounced inspections.
- Providing clearer minimum requirements for operational safety measures, supported by proportionate enforcement.
- Making complaint and grievance mechanisms more accessible and effective.

Uzbekistan in particular could consider easing the restrictions on trade union organisations, notably by making it easier for trade unions to operate outside of the Federation of Trade Unions of Uzbekistan.

5. Enhance local community involvement in mining projects

Governments could consider requiring mining companies to take into account the results of public hearings and ensure that companies continue the dialogue beyond the early stages of mining projects. In Kazakhstan and the Kyrgyz Republic, governments could promote and ensure the involvement of local communities during the negotiations on Community Development Agreements. In Tajikistan, Turkmenistan and Uzbekistan, governments could consider introducing mechanisms of public dialogue between mining companies, local public authorities and local communities around mining projects, which would allow for better information about the projects' risks and potential impacts and better consideration of local communities' needs.

6. Integrate mining- and CRM-specific ecological targets in strategies and development plans

Stronger integration of climate considerations into mining governance will allow to align CRM expansion with national and regional climate goals. Governments could therefore consider setting more sector-specific targets in their national strategies and plans, notably for the mining sector, which:

- Is highly GHG-emissive.
- Has a considerable negative impact on the quality of water resources.
- Poses additional risks through challenges linked to waste and tailings storage and management.

Following Kazakhstan's example, the Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan could consider setting GHG emissions reduction targets for the largest emitting mining companies.

6. Address legislative gaps to align with BEPS international tax standards

To counter BEPS practices, governments could consider:

- **Strengthening anti-BEPS provisions in their tax legislation to better align with international standards**. This includes embedding clear rules on transfer pricing, interest limitation and the taxation of indirect transfers in primary legislation, allowing tax administrations to more effectively address base-eroding arrangements.
- **Implementing reforms in a transparent and prospective manner while maintaining legal certainty for investors.** Governments should ensure that stabilisation clauses in investment agreements do not prevent the adoption of *bona fide* anti-avoidance measures aligned with recognised international standards.

- **Strengthening tax transparency and international co-operation, including the effective use of transfer pricing documentation and information-exchange mechanisms**. Continued investment in tax administration capacity, particularly in international taxation, transfer pricing and extractive industries, is essential. Participation in initiatives such as the Global Forum on Transparency and Exchange of Information for Tax Purposes can further support these efforts.

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Notes

[1] Most of Tajikistan's important antimony deposits are polymetallic and occur as mercury-antimony (-gold) ores rather than as a simple, clean primary antimony ore.