

MIB Capstone

A Cleaner Great Game? Russia and China's Challenges with Electric Vehicle Battery Materials in
Central Asian Countries of the Former Soviet Union.

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I. Intro

For over a century, the oil and gas needed to fuel internal combustion (IC) engines have been linked to geopolitical tensions. Still, the global transition towards electric vehicles (EVs) creates new challenges. As the demand for electric vehicles increases and more global climate policy initiatives go into effect, obtaining a larger supply of the critical materials required for their battery systems is vital. The People's Republic of China (hereafter "China") views the growing demand for EVs and their battery systems as a geostrategic opportunity, hoping to increase its dominance in the upstream EV supply chain. Their Belt and Road Initiative (BRI) has facilitated large-scale expansions into international mining markets in developing countries but is often viewed as predatory in its statecraft practices. The governments of Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan have varied amounts of critical EV battery elements, proving to be a lucrative opportunity for China – right in their backyard. However, with Russia's waning post-Soviet influence, Moscow is likely to feel threatened by China's growing influence and exploitation in the mining industries of Central Asia. This growing tension between Russia and China regarding Central Asia spurred by critical EV material mining will likely strain their eastern partnership.

The production of more EVs to reach climate goals requires more materials essential to construct Lithium-ion batteries, and aluminum, copper, cobalt, lithium, manganese, nickel, and titanium are considered critical materials by the International Institute for Sustainable Development¹. These eight materials are critical because they have no viable substitutes with current technologies, one or few producers dominate their supply, most consumer countries depend on importing them, and they are neither rare-earth nor precious metals². Lithium-ion EV batteries are composed of two or more cells connected in a series circuit, and the cells contain a positive electrode (cathode) and a negative electrode (anode). Lithium ions stored in

the cathode material flow from the anode to the cathode during charging and from the cathode to the anode when discharging. Cobalt acts as an active material within its respective electrodes, providing electrochemical stability to the battery. Nickel is typically used as part of the active material within its electrodes; it helps provide high-capacity power density. Manganese helps enhance conductivity in some battery chemistries to help improve efficiency and cost. Due to its low electrical and corrosion-resistant properties, titanium is often used as a current collector for both electrodes, and it has improved battery performance.³ Ultimately, for the international community to reach the ambitious goals of transitioning away from IC engine cars and towards EVs, the supply of these materials will need to expand exponentially. Central Asia is an area that presents opportunities.

II. Critical Material Opportunities.

Although Central Asia was one of the Soviet Union's primary sources of metals and industrial minerals, it has not received adequate attention from Western global critical materials analyses. Despite their past as crucial mining areas, the Central Asian countries suffer from inadequate technical infrastructure, weak legal systems, lack of capital and expertise, corruption, and geopolitical instability. Central Asian governments have not implemented consistent legislation or regulations that would encourage investment into mining activities, thus making it difficult for companies to secure financing or obtain permits needed to begin operations in this sector.⁴

Table 1 shows four Central Asian countries with different concentrations of these critical EV battery materials. While Kazakhstan has most of these resources, the other three countries still carry noteworthy amounts of these critical materials. Kazakhstan has significant deposits of copper, nickel, aluminum, and manganese. The country also has one of the world's largest lithium deposits, located in the central Kazakh region of Karaganda. Kyrgyzstan is known to have deposits of copper and aluminum (as well as gold) but no known significant deposits of other minerals. Meanwhile, Tajikistan has deposits of aluminum and manganese, and Uzbekistan has titanium with some promises of lithium and copper. Turkmenistan may also

have potential deposits, but it is not included in this analysis due to its lack of transparency and information.

Table 1: Breakdown of country and amount of critical material reserves (in metric tons):⁵

	Aluminum	Copper	Cobalt	Lithium	Manganese	Nickel	Titanium
Kazakhstan	309,885,594	38,582,964	208,121	50,000	681,342,741	118,000	45,608,070
Uzbekistan	12,700	741,200	645	8,334	173,000	3,700	350,000,000
Tajikistan	1,000,000,000	150,000	0	0	270,000,000	0	0
Kyrgyzstan	42,101,000	640,000	373	13,923	48,816	0	0

Table 2: Known amounts of critical materials in Central Asia⁶

Critical material /metal	Proven reserves in Central Asia (metric tons)	Central Asia's share of global resources (%)
Manganese	951,564,557	38.6
Zinc	46,009,736	12.6
Titanium	395,608,070	8.7
Aluminum	1,351,999,294	5.8
Copper	40,114,164	5.3
Cobalt	209,139	5.3
Nickel	121,700	1.2
Lithium	72,257	0.4

These reserves might demonstrate even more potential, as the exact resources in a particular deposit or each geographical area are never known until the entire deposit or area has been mined. New mineral deposits are often discovered where active exploration is carried out. For Example, the Viscaria copper mine in northern Sweden, located next to Europe's largest iron ore mine, had been in operation for more than seventy years when the copper

deposit was discovered in an area that had been intensively explored.⁷ Second, considering the known historical production, reserves, resources, and mineral occurrences, the geological formations of Kyrgyzstan and Uzbekistan are conducive to hosting more significant mineral deposits.

With the challenges of these former Soviet countries, Foreign direct investment (FDI) is vital to utilizing their critical material potential. By attracting FDI, these Central Asian countries can leverage international mining companies' expertise, resources, and technology to develop their mining industries and extract critical materials efficiently. These deposits are in remote areas with limited and aging Soviet-era infrastructure, making it challenging and costly to transport extracted minerals to processing and export facilities. Requirements for such a program include roads, rail links, and processing facilities to ensure that critical materials can be removed and transported efficiently. Political and regulatory instability has meant that major Western mining companies have hesitated to invest despite showing some interest in the early 2000s.⁸ Despite ongoing efforts by national governments to increase production levels, many obstacles still need to be addressed if countries in this region hope to capitalize on their natural assets.

Central Asia's current geography, economic structure, infrastructure, and political-security situation allow China to lead the race for influence and resources. Chinese investment is attractive to Central Asian states because it offers economic growth and, unlike Russia, has a diversified and robust economy to fund foreign direct investment—even if most of the economic benefits of those projects often go back to China. China's FDI in the region reached \$70 billion in 2022, while Russia, whose economy was throttled by war and sanctions, managed just \$3.6 billion in FDI in 2022. Curiously, US foreign direct investment (FDI) in Central Asia topped \$40 billion in 2021, even though it went almost entirely to hydrocarbon development in Kazakhstan.⁹ Furthermore, the global outlook encourages further extraction from these former Soviet countries for these critical materials. Concerns over any potential blockade by the US over potential Chinese aggression in Taiwan and the South China Sea make material supplies independent of Australia and South American supplies appealing. Additionally, China has been experiencing shortages of copper in the mainland¹⁰.

Russia and China's influence in Central Asia's mining.

Russia recognizes that these critical Central Asian resources are a significant economic asset for geopolitical statecraft. While Russia's investment power in this region is not as strong as China's, they are still economically intertwined due to decades of Soviet hegemony. This means that the Central Asian governments are influenced by Moscow via diplomatic means to allow for more lucrative deals for Russian companies and their investments, allowing for a strategic edge over Western-based companies. Russia's approach focuses on diplomatic talks with regional governments to secure contracts that offer discounted prices of minerals and commodities in exchange for preferential trade treatment. Russia also views Central Asia as a privileged sphere of influence, serving as the primary security guarantor with military bases in Kazakhstan, Tajikistan, and Kyrgyzstan¹¹.

Russia has boosted imports of aluminum, copper, and cobalt from Central Asia for lithium-ion batteries - a key component of electric vehicles.¹² Russia and Kazakhstan have cooperated on agreements worth \$4 billion for uranium exploration that could lead to cobalt discovery¹³. Russia has also developed agreements with Kyrgyzstan focused on geology, mineral resources development, and extraction¹⁴. Both contracts have opened possibilities for economic growth in Central Asia while also providing Russia access to critical materials needed for EVs. A noteworthy example of the Russian government being involved in the extractive industry of a Central Asian nation is through the mining company Vostok-Geoldobycha. With the Russian government's help, Vostok-Geoldobycha secured the production rights to the Jerooy gold mine in 2021 with a \$600 million investment. This politically ensured that Kyrgyzstan President Sadyr Jarapov and his regime would have the stability and income needed to stay in power, with even President Vladimir Putin attending the opening of the mine¹⁵. Russia also operates a lithium mine in Uzbekistan, which is advantageous, as there had not been any significant foreign investment in Uzbekistan's mining industry until 2016 when President Shavat Mirziyoyev came into power¹⁶. Nonetheless, despite its lingering Soviet influence and diplomatic power, Russia is not as investment-intensive as China in the region because its economy is undiversified and skewed towards oil and natural gas.

Meanwhile, China's investment is altering the geostrategic balance in the region. Using large-scale BRI investments to access foreign markets or resources, China ensures a secure and abundant supply of raw materials such as aluminum, copper, and cobalt by directly funding production or purchase agreements with local businesses and governments. In addition to supporting increased resource extraction activities, China helps build the related transportation infrastructure to replace the aging Soviet ones, allowing for more efficient export logistics from Central Asia¹⁷. China's investments have been concentrated on all avenues vital to the electric vehicle battery industry; this includes their companies buying up mines across Kazakhstan and Kyrgyzstan that contain significant cobalt deposits and other EV-essential elements like copper and nickel. Kazakhstan has attracted the most significant Chinese investment in its mining sector, with Chinese companies investing in lithium, cobalt, and other critical minerals¹⁸.

Risks are associated with China's heavy investment in another country's resources, and the aid is often seen as detrimental. There are three Central Asian countries in the top 50 most indebted recipients of Chinese direct loans – Kyrgyzstan ranks 5th with 30.5% of GDP, Tajikistan ranks 19th with 16.1%, and Uzbekistan ranks 39th with 7.5% of GDP¹⁹. In addition to mining and quarrying, China's Belt and Road Initiative (BRI) investment can take the form of roads, railways, energy pipelines, and telecommunication networks. Due to the difficulty of paying back the loans and grants, Tajikistan and Kyrgyzstan are applying a scheme of 'investments in exchange for access to the mineral resources,' or "loans for resources." This can be seen as "predatory" or "colonialist" because it is locking the country into the role of raw material exporter for other larger countries. This region has also become excessively dependent on its raw materials for exports, which has resulted in limited economic diversification and an underdeveloped manufacturing base. Chinese investment will also reinforce the established resource economics of the region and threaten sustainable production in Central Asia. For instance, in mineral-rich Kyrgyzstan, mining contributes to taxes and the development of rent-seeking corruption, the entrenchment of elites, and political conflict.

These investments should provide much-needed economic growth for Central Asian nations through royalties and employment from mining operations, but that has not always been the case. Without a better understanding of local context and rational business planning,

development in Central Asia risks becoming, at best, an opaque story or infrastructure folly and, at worst, igniting regional tensions. These grand investments through BRI are presented with limited scrutiny and uncertain economic justification. The in-country decision-making process is not transparent, and whether projects are requested by or aligned with local interests is not ascertained²⁰. Chinese companies also often prefer sending over their workers, providing minimal community benefits or employment opportunities to the region.

The scale of China's capacity to refine these critical EV materials in the mainland also presents few opportunities for Central Asian benefit. China's imports of these minerals have more than tripled over the past five years amid rising EV battery material demand. Chinese firms dominate the value chains for these and other critical minerals by owning foreign mines and dominating domestic refining capacity, controlling 72% of lithium refining capacity and 71% of cobalt refining. China is also dominant in refining manganese, containing 99% of its capacity. This demonstrates that China has little interest in any potential refinement of these critical materials in the countries where they were mined.²¹ Therefore, these BRI mining investments read less like a partnership of friendly nations and more as cogs in the Chinese mega-development supply chain plan.

IV. Threats

The biggest threat to the "special relationship" between Beijing and Moscow is their current competition in influencing the four Central Asian countries in this region, with the increase in mining for EV battery materials becoming a flashpoint. This could lead to tensions and conflict if they do not seek a way to compete peacefully and responsibly. "The Great Game" was a pet name for the political, economic, and diplomatic confrontation that existed for most of the 19th century between the British Empire and the Russian Empire territories in Central Asia. Now, this moniker appears to be playing out between China and Russia. Central Asian states must maneuver a changing global economy and balance their two giant geographic neighbors in this new game.

Russia has largely tolerated the rapidly expanding Chinese investment presence in Central Asia, but the landscape is changing. Russia-China relations in the region have generally

been characterized by the phrase, “Moscow holds the gun and Beijing the wallet.”²². This means there is an informal division of labor whereby Russia presides over military and security issues, and China provides investment. However, after several attacks on Chinese personnel and facilities in Central and South Asia, Beijing realized a need to protect its BRI projects and has begun expanding its military-security presence in the region. Combined with heightened security risks after the U.S. withdrawal from Afghanistan and Russia’s diversion of resources to the war in Ukraine, China is making inroads in the security arena in Central Asia through both multilateral and bilateral channels. Meanwhile, Central Asian countries are trying to reduce their reliance on Russia, which they see as a predatory trade market and a destination for migrant labor, all while strengthening other relationships with India, Pakistan, Japan, South Korea, and Turkey. Nonetheless, China’s share of regional investment overshadows all others and continues to grow.²³

China’s increasing investment in the area is a source of anxiety for the Central Asian countries in the region who are concerned about China’s influence affecting their sovereignty. As a result of China's growing global influence, regional nations are worried China could change the border agreements signed in 1997, where the Chinese cannot deploy new military units within the limits of a 10-kilometer-wide zone along the border. China is ignoring this part of the agreement, as many well-equipped People’s Armed Police (PAP) units are deployed along Central Asian State borders, all without modification to the current border agreement. The number of PAPs deployed within the buffer zone remains unclear, however. In January 2011, Tajikistan ratified a border demarcation agreement that ceded approximately 1,100 square kilometers of the Pamir Highlands to China. Increasingly, Dushanbe and Moscow view the PRC’s construction of border posts and airports in the Pamir region and its involvement in the gold mining industry as elements of a larger Chinese plan to annex this area eventually. Such an outcome would put China in a position to dominate a weakened Tajikistan and northern Afghanistan²⁴. Furthermore, Chinese radical nationalism news outlets have called for more land to be seceded from both Kazakhstan and Kyrgyzstan.²⁵

Although not a critical material for EVs, gold mining has proved to be a heated issue in Kyrgyzstan and Tajikistan, showing souring attitudes toward foreign mining activities and

potential outcomes of increased critical material mining. Chinese companies are highly interested in developing the Solton Sary gold mine in Kyrgyzstan, carrying a controlling stake in the mine, which has an estimated reserve of 12 tons of gold. This gold mine was the site of violent protests from locals due to exploitative and environmental concerns regarding Chinese mining activities²⁶. The years of litigation between the Kyrgyz government and the Canadian company Centerra Gold over the Kumtor gold mine resulted in its eventual nationalization by Kyrgyzstan in 2022. It is a powerful example of how a mine that contributes mainly to an economy can prove to be a giant risk to foreign companies and the investments being put in them.²⁷ While Kyrgyzstan is unlikely to be foolish to nationalize any Russian or Chinese-funded project, it does provide insight into the Jarapov regime's concept of foreign investment and business practices in their country.

The Russo-Ukraine War and the sweeping Western sanctions will likely complicate the demand for Central Asian EV battery materials. Before the sanctions, Europe imported more than \$7 billion worth of metals and minerals from Russia in 2020, which include nickel, lithium, cobalt, aluminum, and copper. Price increases in raw materials and the threat of supply disruptions will come when Europe works to speed up the transition to green energy and break its heavy reliance on Russian oil and natural gas.²⁸ Therefore, Europe would be incentivized to find more supplies of these critical materials, with Chinese companies likely to be the primary supplier upstream. Chinese companies are infamous for avoiding sustainable and equitable mining practices found and promoted in Western companies. Thus, they are poised best to utilize the mining potential of their northern neighbors. Additionally, Russia is a direct competitor to Central Asia's natural resource exports to the Chinese market, which may push Central Asian elites even more toward Chinese influence.²⁹

Environmental degradation is a cause for concern regarding China's increasing mining activities, which is likely to sour Central Asian perceptions of Chinese investment. Chinese mining operations for other materials have contributed to environmental degradation, which interacts with socioeconomic vulnerabilities to aggravate tensions between Chinese companies and local communities. China's extractive activities have generated environmental consequences like soil, water, and air pollution. Chinese companies are also responsible for

destroying pastures and forests while conducting mineral exploration, and their dams have reduced river flow and caused food shortages. In 2019, farmers near Kyrgyzstan's Solton-Sary gold mine claimed that livestock were dying because a Chinese mining company had polluted their drinking water with toxic chemicals. The ensuing brawl between villagers and Chinese workers sent 20 people to the hospital.³⁰ In Uzbekistan, the Angren Coal Mine in Uzbekistan, owned and operated by a Chinese state-owned enterprise, Shenhua Group, received lots of criticism for its environmental impact, including air and water pollution and the destruction of local ecosystems³¹. Controversies regarding corruption scandals and China's persecution of Muslims in the Xinyang province have also further exacerbated local anxieties.³² The mining of some critical materials, such as lithium and cobalt, can generate copious amounts of waste and result in the production of toxic substances. Lithium mining's requirement of substantial quantities of water for its extraction can also prove detrimental to Central Asian countries as much of their terrain is arid or semi-arid, and clean water is a scarce resource.³³

Instances of social unrest in the region have generated an interventional response from Russia, but that role may be waning and not for the betterment of the region. For example, in January 2022, Kazakhstan faced mounting protests that originated around gas prices but later evolved into a more revolutionary movement targeted to overthrow the government. With President Kassym-Jomart Tokayev feeling his grip on power "slipping," the Russian-led Collective Treaty Security Organization (CSTO) was called in to assist his regime. While this was mainly a symbolic gesture, and not a single shot was fired, Russia intended to assume a commanding posture, demonstrating its strength and supporting Tokayev. With Russia's attention toward the West, it is unlikely to project as much hard power through the CSTO to promote autocratic stability as it desires. Another option to launch stabilization may be installing a limited lethal force to ensure regime change is impossible. In the meantime, Kyrgyzstan has expressed interest in having China play a more significant security role in the region and give balance to its often-antagonistic relations with Tajikistan. Kazakhstan is also seeking greater Chinese activism to counteract Russia's potential aggression. Clashes between Chinese mining activities and local communities have the real potential to trigger security responses due to criticisms of exploitative practices. If mining protests or riots were to snowball

into calls for more regime change, Russia would be left in a potentially awkward position, mainly if its Central Asian elites promoted stronger relationships with China and Chinese-funded mining projects.³⁴

Solutions

Unexploited reserves of such raw materials provide potential alternatives for diversification. However, there may be several reasons why some reserves have remained untapped, notably environmental implications, social concerns, and economic viability. International investments must flow into existing and new producing countries in line with international standards on responsible business conduct. Longer-term approaches to recycling, secondary raw materials, less critical material-intensive technologies, and the circular economy also have the potential to mitigate supply concentration.³⁵

Raw critical materials for electric vehicles are concentrated in the hands of Chinese businesses, and the global electric energy push is likely to challenge the "friendship without limits" between Russia and China. The Central Asian countries will eventually see their production peak for these critical materials, and Russia and China each want to get their cut of this economic opportunity. However, further mining investment and activities in the area by China will likely be a catalyst for the fracturing of their cooperation in the region. Russia's waning influence in the east also prevents it from being the rational counterbalance to Chinese interests in the area.

The reaction from the people of Kazakhstan, Kyrgyzstan, Uzbekistan, and Tajikistan towards this influx of foreign investment for mining is mixed. Several view it as a welcome opportunity for much-needed economic growth; however, there are some concerns about potential environmental degradation and exploitation from foreign companies/governments that come with it. The fragile structure of the security environment is also likely to change as the world seeks to phase out IC engines.

To address these pressing issues, Central Asian countries must take practical steps toward protecting their mining interests from unwanted foreign interference while balancing environmental protection and economic development objectives. The disparity between

Moscow's traditional approach and Beijing's more quid pro quo methods could lead to strained relations between the two countries if not carefully managed. This will require robust legal frameworks that provide clear guidance on how minerals should be extracted responsibly without harming local communities or ecosystems - which is not commonly the case in many parts of this region today. Additionally, focusing global capital and expertise on these green energy resources and development could play a key role in diversifying regional investment to improve existing resource extraction, physical infrastructure projects, and environmentally sound intentions.

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