

# Critical Raw Materials in the CAREC Region: Need for a Regional Framework for Sustainable Extraction

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# Demand growth for critical materials for clean energy technologies

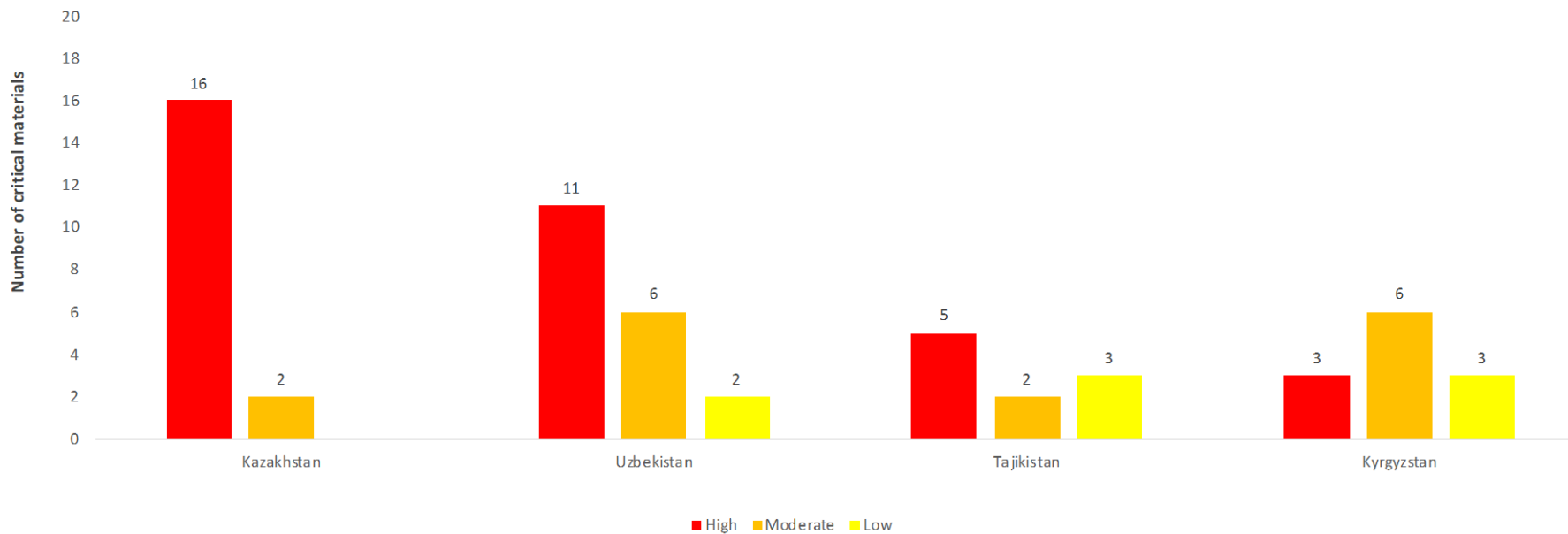
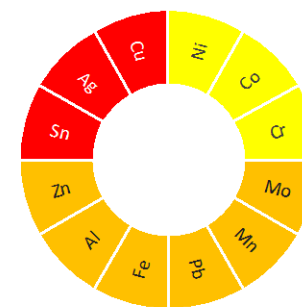
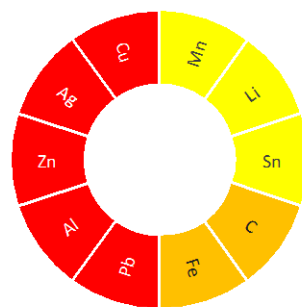
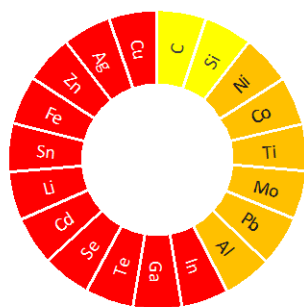
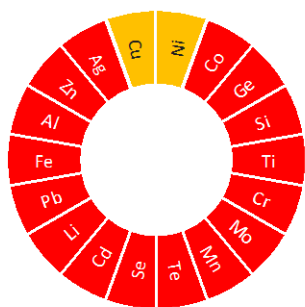
	Solar power	Electric vehicles/ storage	Wind power	Projected demand growth	Target year
<b>Germanium</b>	x			8600%	2050
<b>Bauxite &amp; aluminium</b>	x	x	x	1200%	2030
<b>Copper</b>	x	x	x	1000%	2025
<b>Iron</b>	x	x	x	1000%	2030
<b>Lead</b>	x	x	x	1000%	2030
<b>Manganese</b>		x	x	1000%	2030
<b>Nickel</b>	x	x		1000%	2030
<b>Cobalt</b>			x	1000%	2030
<b>Lithium</b>		x		1000%	2030

Source: Vakulchuk and Overland (2021).

# Geological potential of 22 critical materials

Critical material	Kazakhstan	Uzbekistan	Tajikistan	Kyrgyzstan
Copper (Cu)	high	high	high	high
Silver (Ag)	high	high	high	high
Zinc (Zn)	high	high	high	moderate
Aluminium/bauxite (Al)	high	moderate	high	moderate
Iron ore (Fe)	high	high	moderate	moderate
Lead (Pb)	high	moderate	high	moderate
Tin (Sn)		high	low	high
Lithium (Li)	high	high	low	
Cadmium (Cd)	high	high		
Selenium (refined) (Se)	high	high		
Tellurium (Te)	high	high		
Manganese (ore) (Mn)	high		low	moderate
Molybdenum (Mo)	high	moderate		moderate
Chromium (ore and concentrate) (Cr)	high			low
Titanium (Ti)	high	moderate		
Silicon (Si)	high	low		
Germanium (Ge)	high			
Gallium (Ga)		high		
Indium (In)		high		
Cobalt (Co)	moderate	moderate		low
Nickel (Ni)	moderate	moderate		low
Graphite (C)		low	moderate	

# Resource potential of 22 critical materials in Central Asia



# CAREC region is endowed with critical materials

38.6% of global manganese ore reserves

30.07% of chromium

20% of lead

12.6% of zinc

8.7% of titanium

5.8% of aluminum

5.3% of copper

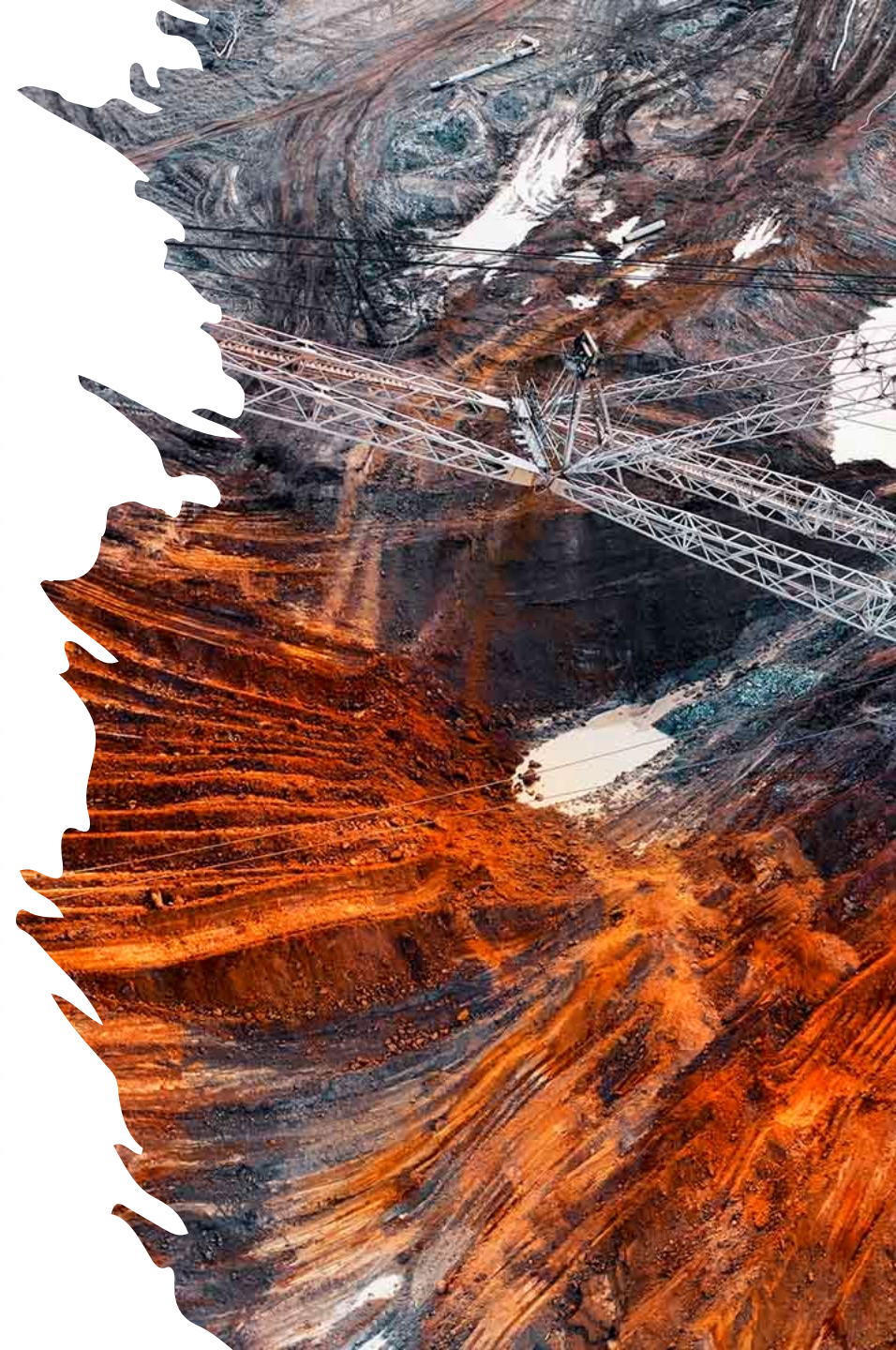
5.3% of cobalt

5.2% of molybdenum

4.8% of iron ore

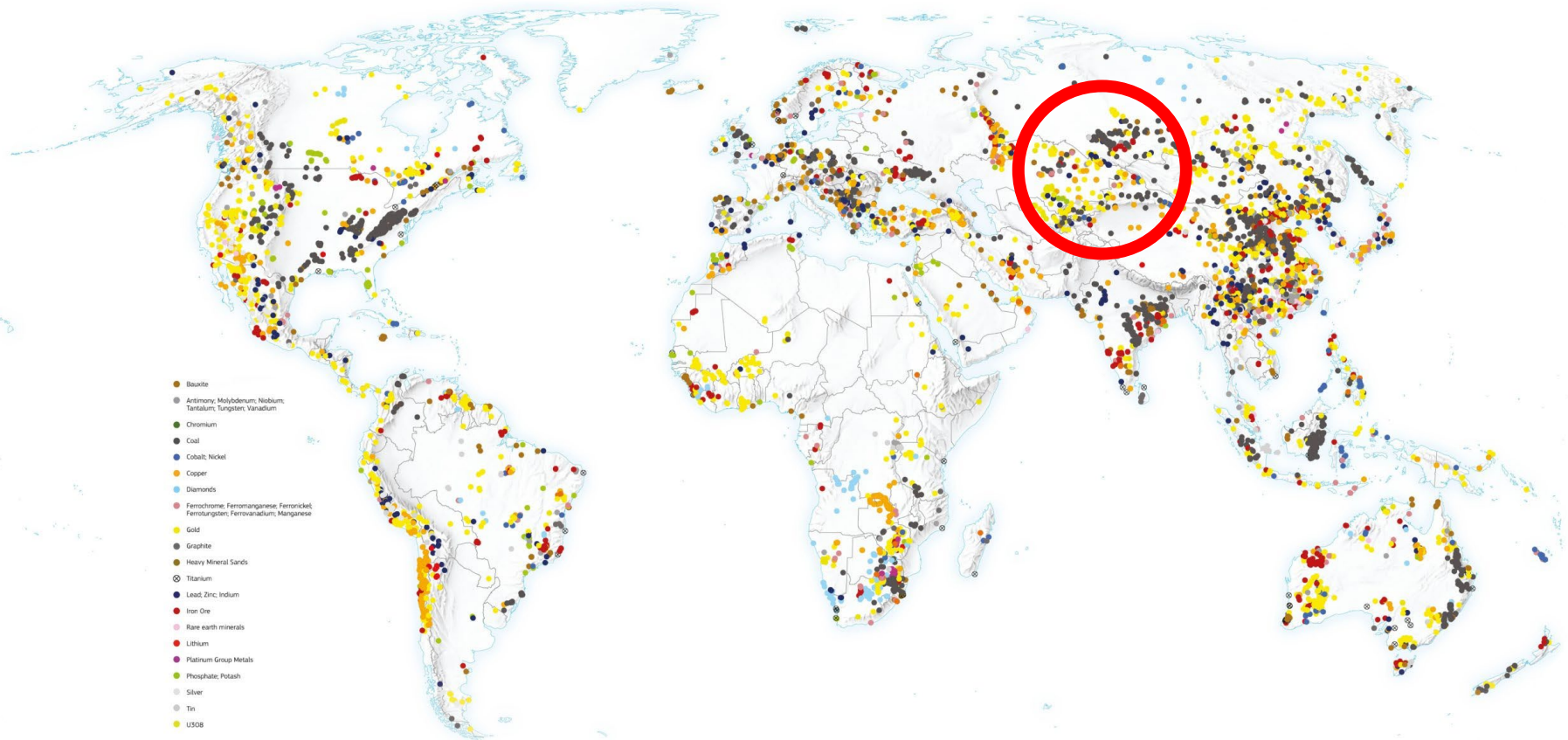
1.2% of nickel

1.2% of silver





The importance of Central Asia lies mainly in the *diversity* of its mineral base, which includes mineable reserves of most critical materials for clean energy applications



Source: SNL Metals & Mining Database (2017).

# Internal risk factors in the CAREC region

Ageing mining infrastructure



```
graph TD; A[Ageing mining infrastructure] --> B[Mining and environment]; B --> C[Critical materials as a barrier to or opportunity for economic diversification?]; C --> D[Investment climate];
```

Mining and environment

Critical materials as a barrier to or opportunity for economic diversification?

Investment climate

## China- Central Asia

Mining of critical materials as important element of the BRI

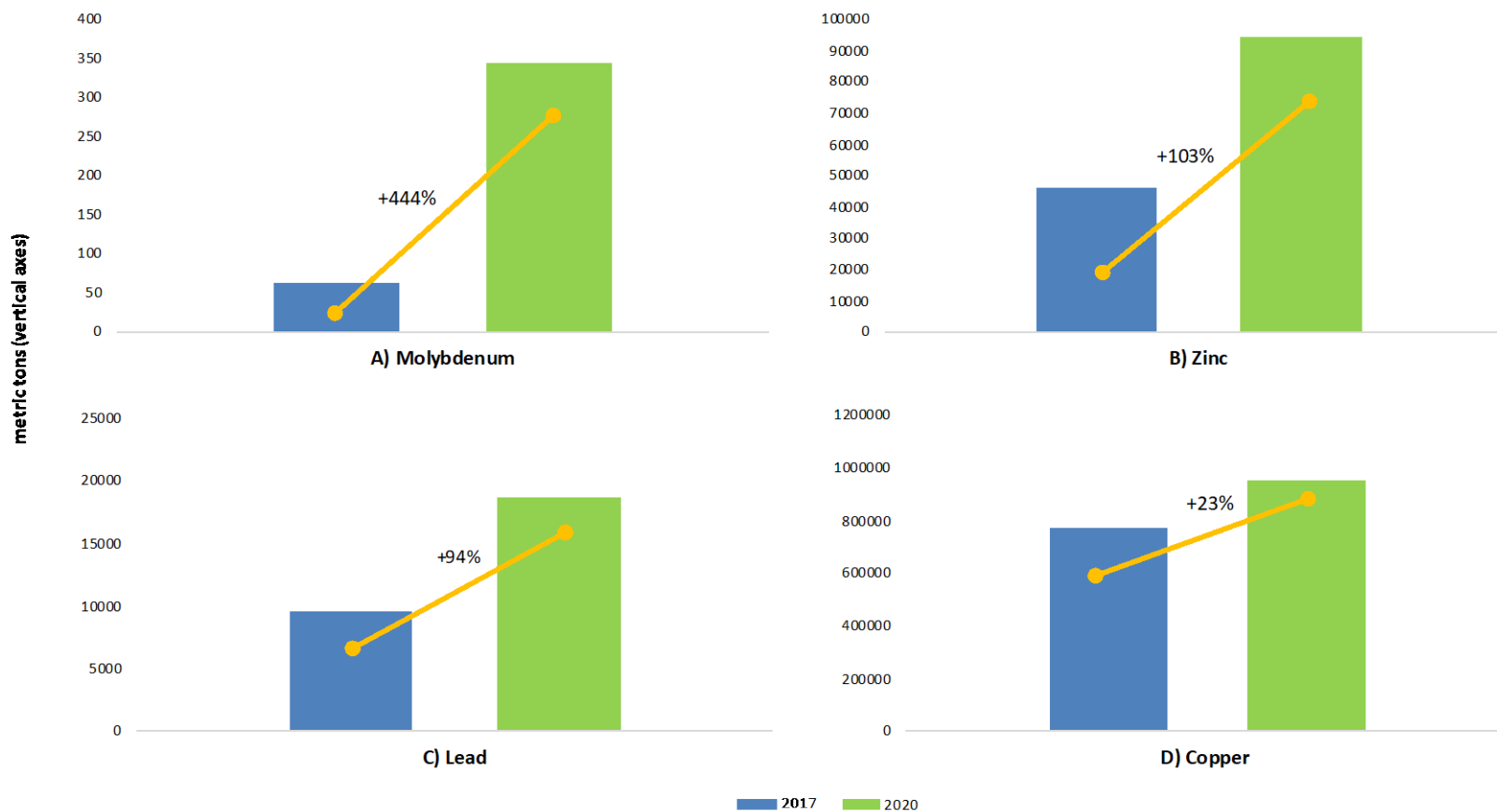
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graph TD; A[Mining of critical materials as important element of the BRI] --> B[China is the largest investor and importer of region's critical materials]; B --> C[Chinese companies own a large share of CRM extraction licences in Kyrgyzstan (9 companies) and Tajikistan (8 companies)];
```

China is the largest investor and importer of region's critical materials

Chinese companies own a large share of CRM extraction licences in Kyrgyzstan (9 companies) and Tajikistan (8 companies)



# Growth of Chinese imports from Kazakhstan 2017–2020



# EU-Central Asia

## The EU signed a strategic agreement with Kazakhstan in 2022



English 

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Press release | 19 May 2023 | Brussels

## EU-Kazakhstan strategic partnership becomes operational

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Today, Executive Vice-President Valdis **Dombrovskis**, on behalf of the European Commission, and Alikhan Smailov, Prime Minister of Kazakhstan, announced a set of concrete actions that will implement the [Memorandum of Understanding](#) (MoU) between the EU and Kazakhstan on a strategic partnership in the field of raw materials, batteries and renewable hydrogen.

# US-Central Asia

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SEPTEMBER 21, 2023

## C5+1 Leaders' Joint Statement



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*The New York Declaration: C5+1 Resilience through Security, Economic, and Energy Partnership*

- Launching a C5+1 Critical Minerals Dialogue.
- “It will provide a forum in which the C5+1 can catalyze investment and collaborate on critical minerals supply chains”.
- Development Finance Corporation, the U.S. Export-Import Bank.

## Recent CRM partnerships

### **Kazakhstan-USA**

- ERG signed a 5-year contract with Evolution Energy (US) for the supply of cobalt hydroxide.
- Evolution Energy manufacturer of materials for electric car batteries.
- First deliveries for 2026.

### **Kazakhstan-China**

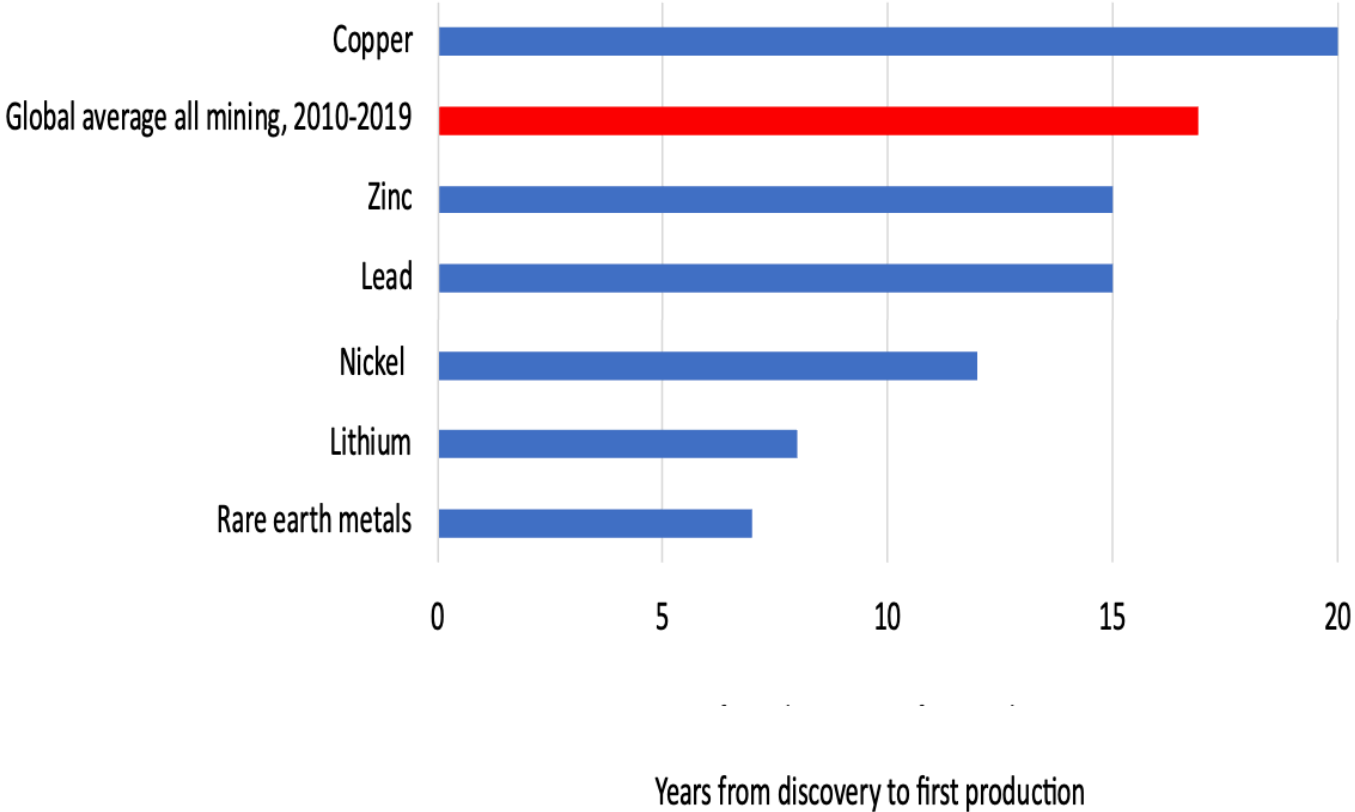
- ERG new contract with China (BGRIMM Technology Group) for cobalt mining in Congo.

# Major risks to the sustainable extraction and supply chains



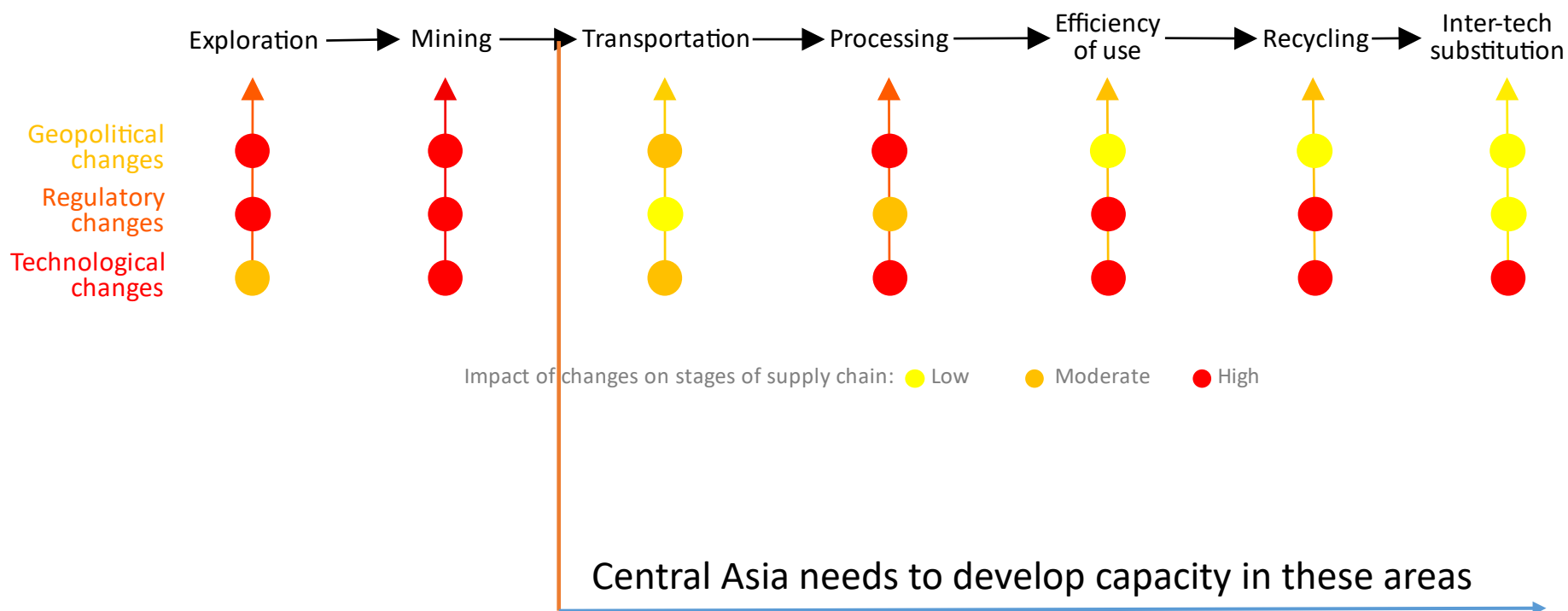
Source: IRENA (2023).

# Lead times of critical materials





# Regional Framework for Sustainable Extraction



Source: Overland et al. (2024).

## Concluding remarks

- The CAREC region as a one-stop-shop for many critical materials
  - Translating large potential into much-needed investment, job creation and economic diversification
  - Promoting sustainable CRM extraction
  - Global energy transition and its implications for the region
- 