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## Geopolitik im Rohstoffmarkt – wie balanciert Europa Chinas Zentralität?

Kiel Institute China Initiative, Global China Conversations #21

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**Contact:**

Markus Herrmann Chen | 陈瑞华  
Co-Founder and Managing Director  
[mherrmann@chinamacro.ch](mailto:mherrmann@chinamacro.ch)

[China Macro Group \(CMG\)](#)



## Profile

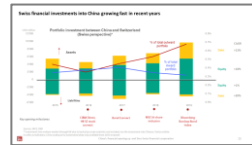
- CMG is an agile, diverse and partnership-led **European boutique consultancy** with specialization in applied China research and analysis
- CMG serves European **SMEs, MNCs, the public sector** as well as **investors**
- It focuses on China's **policy, market and China-related international affairs**
- CMG operates with offices in **Zurich, Munich and Beijing**

## Key expertise areas



### Economic policies and market reforms

- SOE reform, market access, SSSR, tax system



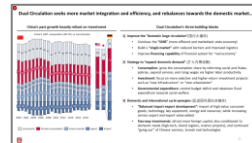
### Financial system, market and policies

- Financial opening-up, Green Finance, FinTech,



### Industrial, S&T and talent policies

- Guidance funds, MIC25, int. S&T cooperation



### Trade and foreign (economic) policies

- RCEP/CPTPP, trade promotion, Belt-and-Road



### Social and environmental policies

- Pension reform, Hukou reform, carbon trading

## Our approach

**Fact-based, rigorous and in-depth research and analysis**

**Interdisciplinary and cross-cultural team**

**On-the-ground presence and engagement with Chinese experts**

**China competency at the core: language, economic/political system, historic context**



# Introduction

- **Focus on five “priority critical minerals” and resp. “key countries”**
  - Criteria for “priority critical minerals”: crucial for green transformation and highest future demand projection
    - 4 of which explicitly mentioned by Jake Sullivan in recent remarks at Brookings (lithium, cobalt, nickel, graphite)
    - 3 of which explicitly mentioned by von der Leyen in recent China speech (Lithium, cobalt, REEs)
  - Criteria for “key countries”: extraction, processing and future reserves
  - To zoom-in on the minerals and markets expected to be most contested geopolitically
- **Approach**
  - Mapping and analytical framework
  - CMG lens and client work: behavior of countries (geopolitics, public policy) and companies (strategy, business model)
  - Closer look at China
- **This is just a start**

# Agenda

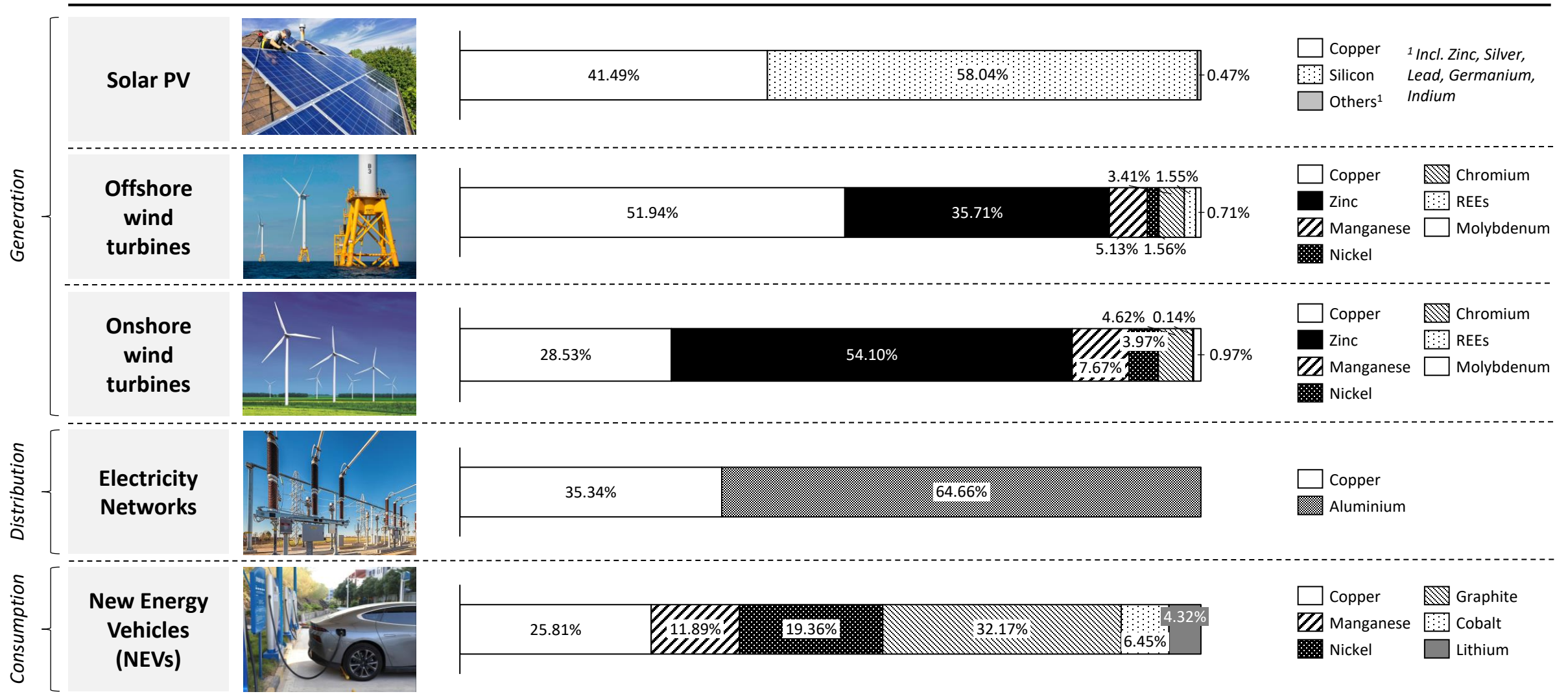
- 1** **Critical minerals for the green energy transition** **5'**
  - Identifying “priority critical minerals”
  - Identifying key countries and global supply chain concentration
- 2** **Minerals policymaking: snapshot of key countries and China deep-dive** **10'**
- 3** **Global supply framework and conclusions** **5'**

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- 1 Critical minerals for the green energy transition 5'**
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# The green energy transition relies at least on 16 different minerals...

Relative use of minerals across selected renewable energy generation, distribution and consumption types



... 11 out of 16 listed as “critical minerals” by at least one trade bloc, with 5 commonly seen as “critical”...

Minerals	 US List (2022)	 EU List (2023)**	 Chinese List (2016)*
 Copper	✗	✓	✓
 Silicon	✗	✓	✗
 Zinc	✓	✗	✗
 Graphite	✓	✓	✓
 Nickel	✓	✓	✓
 Manganese	✓	✓	✗
 Chromium	✓	✗	✓
 Cobalt	✓	✓	✓
 Lithium	✓	✓	✓
 REE	✓	✓	✓
 Molybdenum	✗	✗	✓

Note: Aluminum not included

\*China's 13th FYP (2016-2021) list has since been expanded to cover 36 minerals, however this new list is not publicly available

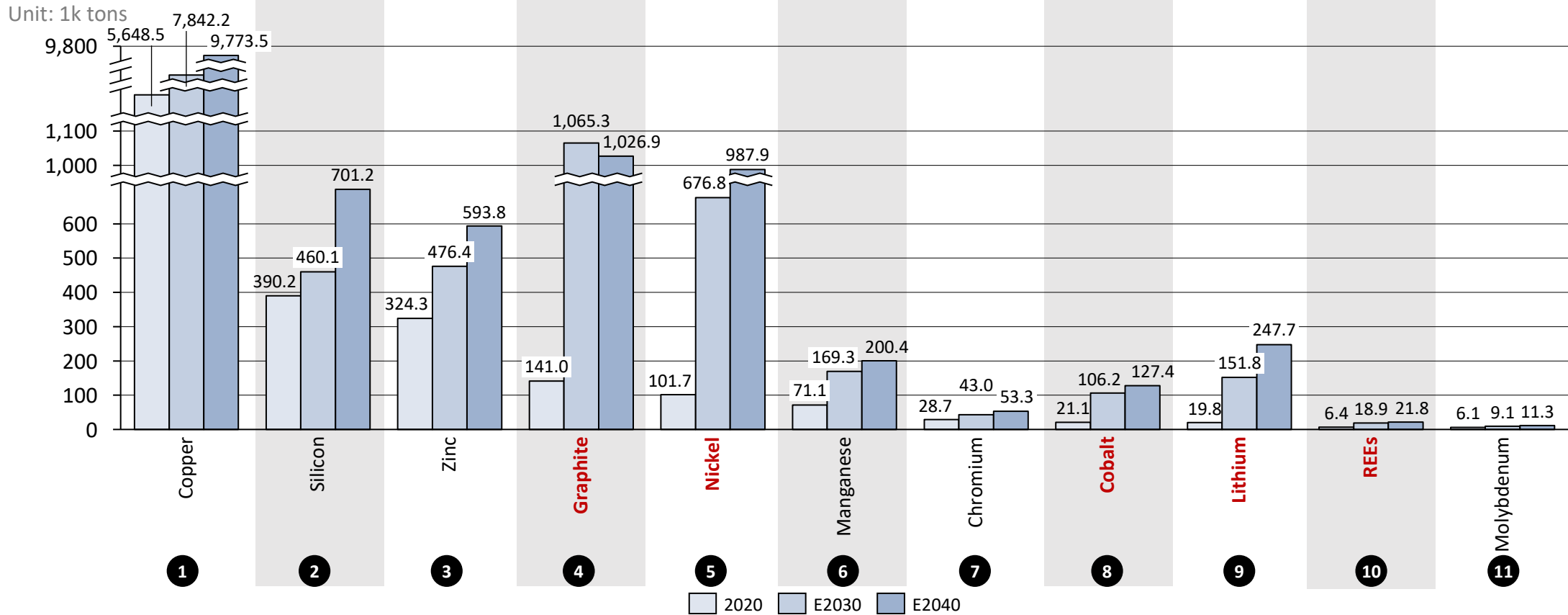
\*\* EU: “Copper and nickel do not meet the CRM thresholds but are included on the CRM list as strategic raw materials in line with the Critical Raw Materials Act”

# ... which are also the minerals for which global demand is expected to grow at CAGR >10% over next decade

Global critical mineral demand for renewable energy value chain in 2020 and growth expectations for 2030 and 2040

**Exp. CAGR:**

By 2030	3.34%	1.66%	3.92%	22.41%	20.87%	9.06%	4.11%	17.53%	22.57%	11.50%	4.1%
By 2040	2.78%	2.97%	3.07%	10.44%	12.04%	5.32%	3.14%	9.40%	13.46%	6.34%	3.15%



Note: Expected growth rates for 2030 & 2040 adapted from IEA's Stated Policies Scenario, an indication of where the energy system is heading based on a sector-by-sector analysis of today's policies and policy announcements; this is based on a more conservative estimate compared to scenarios that are consistent with the Paris Agreement goals

Source: IEA 2020



Hence, these 5 minerals identified as "priority critical minerals", which are geopolitically contested resources for minerals security



# Agenda

1

## Critical minerals for the green energy transition

5'

- Identifying “priority critical minerals”
- **Identifying key countries and global supply chain concentration**

2

Minerals policymaking: snapshot of key countries and China deep-dive

10'

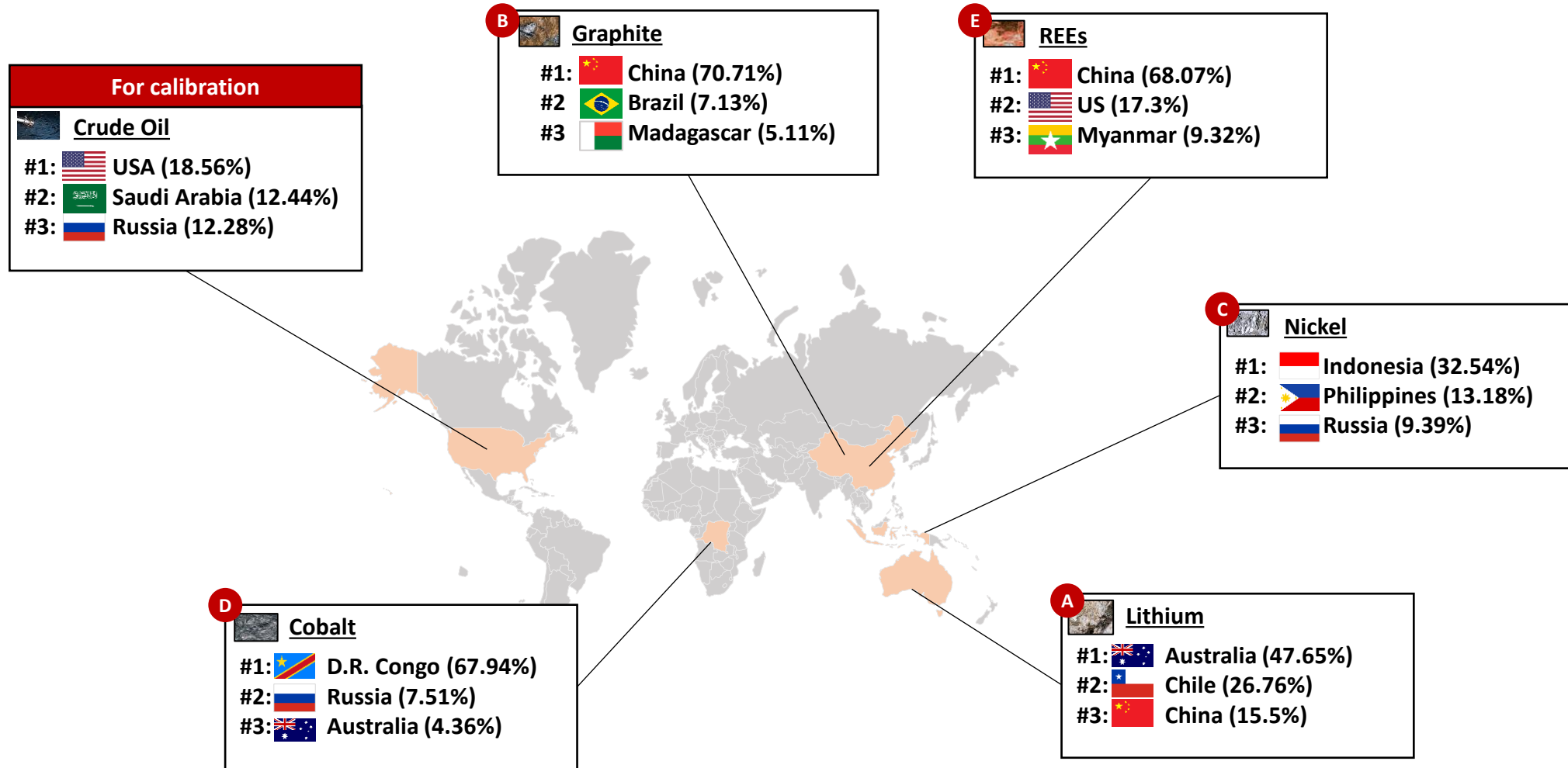
3

Global supply framework and conclusions

5'

# Extraction of these 5 “priority critical minerals” is currently very concentrated in a few countries...

Extraction: Top countries generally with very high extraction share – China by far the biggest extractor of graphite and REEs



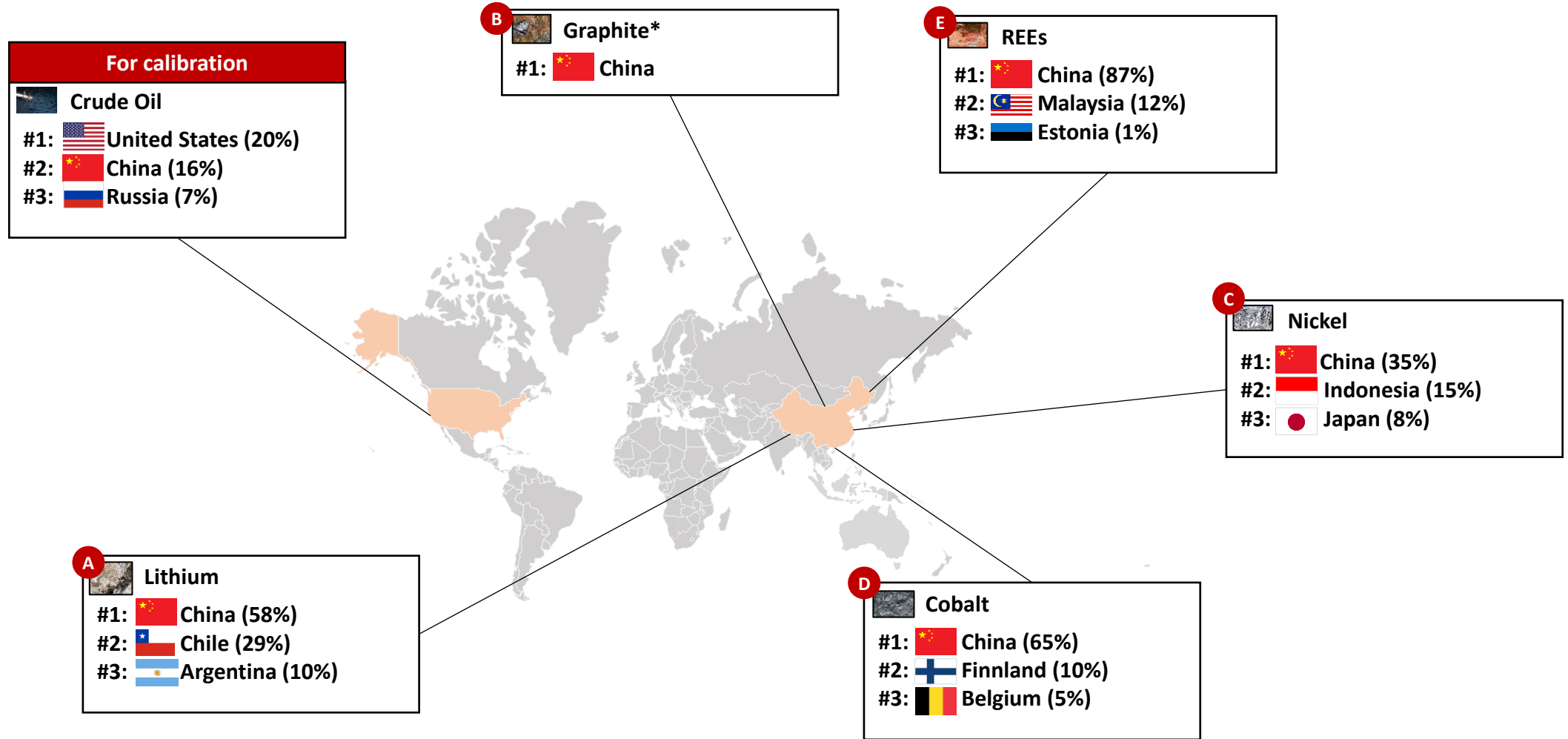
Source: BGS World Mineral Statistic 2020



China boasting two and DRC one so-called high extraction concentration for a specific critical mineral (>60% of global extraction)

# ...a phenomenon which is even more pronounced in the China-dominated processing of these minerals...

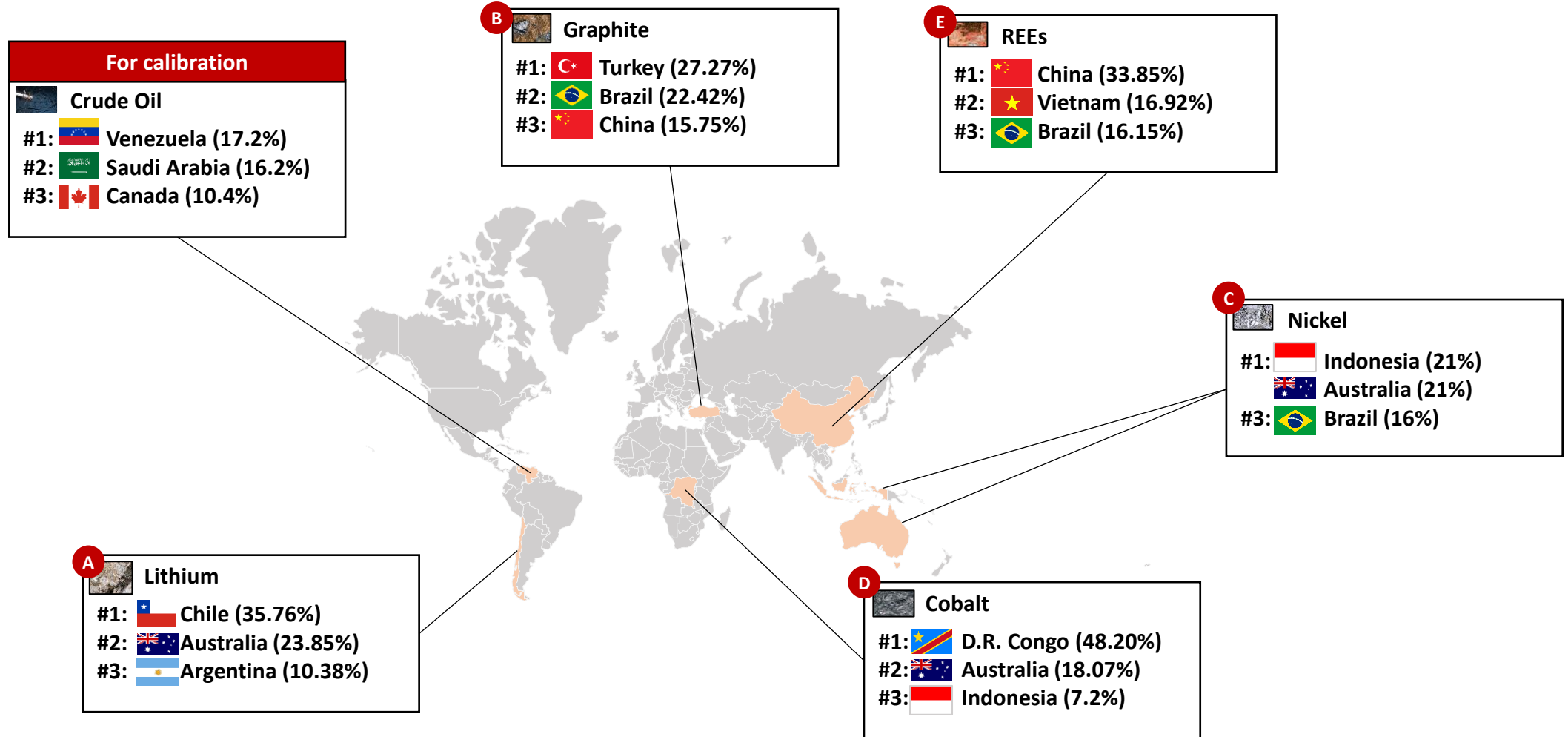
## Processing: China dominating the processing of all the five priority critical minerals



Source: IEA 2019; \*no IEA data available for graphite processing; USGS graphite factsheet 2023 states that «China processed most of the world's spherical graphite»

... while mineral reserves are geographically quite evenly distributed, which lays foundation for diversification

Estimated reserves: Critical mineral reserves overall less concentrated than current global extraction



Source: USGS Statistic 2022



Most mineral-rich countries above plus important powers (US and EU) identified as “key countries”

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**10'**

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# Overview: policy trends for key countries for “priority critical minerals”

 **US**

- Industrial policy offensive with **numerous policies to reduce dependence on China** for critical minerals
- Investments in **domestic critical mineral infrastructure and research** as well as increasing **cooperation with US allies** to diversify critical mineral sources

 **EU**

- **Build resilient supply chain** by setting up industrial alliances and providing support in knowledge, intelligence and financing
- **Reinforce domestic sourcing** by expanding local mining and processing, circular use of resources
- **Build partnerships and remove trade distortions**

 **Turkey**


- **Lack of specific industrial plan** to utilize its graphite resources, which is not yet well utilized
- Its graphite resources **take more costly and difficult technology** for utilization, greatly limiting its potential to supply minerals

 **China**

- **Ensure stable domestic supply in the long term** as China’s top priority and treated as part of its **national security**
- **Policy tools to limit both domestic mining activities and minerals export**, though only activated for a few minerals
- **Explore overseas mineral resources** to diversify supply (e.g., in BRI countries)

 **Brazil**


- With limited security concerns and overall rather neutral stance, policy focus lies on **attracting more FDI** for more sustainable and diversified development of the local mining industry

 **Australia**


- Thrive to be “**a global critical minerals powerhouse**”
- **Support** (e.g., loans) for **private companies** and public R&D to **improve sector-wide settings**
- Focused on building partnerships with **like-minded countries**

 **Chile**

- Pursuing a **progressive mining policy** that balances development of mining industry with **ESG concerns**
- **Restrictive regulations for lithium mining**, making it difficult for private lithium miners to access lithium reserves
- Chilean mining policy aiming to **develop the domestic production of diversified critical minerals**

 **Congo**

- **Impose high royalties and local ownership requirements on international Cobalt miners** to increase domestic revenues and value creation
- Build “**mutually profitable public-private partnerships**” with international companies to tap into the DRC’s vast (critical) mineral reserves

 **Indonesia**

- **Ban raw mineral export** of nickel, more minerals to be banned soon (despite a WTO lawsuit by EU)
- Incentivize **FDI into local processing**
- Likely more export to **non-US-FTA countries** before IND and US can agree on limited FTA, due to discrimination by US’ IRA



# China's overall mineral policy: China increasingly emphasizing mineral security as part of its national security\*

## Critical minerals seen as security topic



*“Increase **economic resilience**, ..., ensure food security, **energy and mineral security** (能源矿产安全), critical infrastructure security, enhance protection of overseas interests and security”*

— Xi Jinping in the Central Political Bureau meeting in November 2021 on **economic security** (经济安全), **one of the five key national security concepts**

## High-level policy priorities to secure China's critical minerals supply

### 1 Expand mineral resources



#### Enhance domestic mineral exploration to increase mineral resources reserves

- New round of “National Mineral Exploration Strategic Campaign (新一轮找矿突破战略行动)”, a government program, with focus on **clean energy** and strategic minerals
  - Led by Chinese government, with the key target of increasing China's domestic resources to supply minerals
- **Strategic minerals list** (战略性矿产目录) includes lithium, rare earth, graphite, etc. firstly introduced in National Mineral Resources Planning in 2016, for which monitoring and early warning system were set up
- **Establish national reserves** of graphite, Lithium, REEs, etc., including both products and mineral resources

### 2 Extraction control



#### Coordinating extraction activity and conservation of mineral resources to ensure long-term supply, different mineral extraction policies apply

- Orderly extract rare earth, with quotas limit; **reasonably enlarge mining of nickel but encourage mining of lithium**
- **To enhance conservation of graphite resources**, only reasonable extraction of graphite shall be permitted
- Optimize **industry structure and market concentration** to increase efficiency

### 3 Import and export control



#### Build a diversified supply system, utilizing domestic and overseas resources

- Build internationally competitive mining companies
- Encourage investment along BRI countries for mineral exploration
  - Private companies' outbound FDI encouraged, assisted by bilateral MOUs in some cases
- Encourage foreign investment into China with advanced technology
- Moreover, China is imposing export control on Sn, Sb, W, Ag, etc.
  - Currently not subjecting the 5 priority critical minerals to export controls

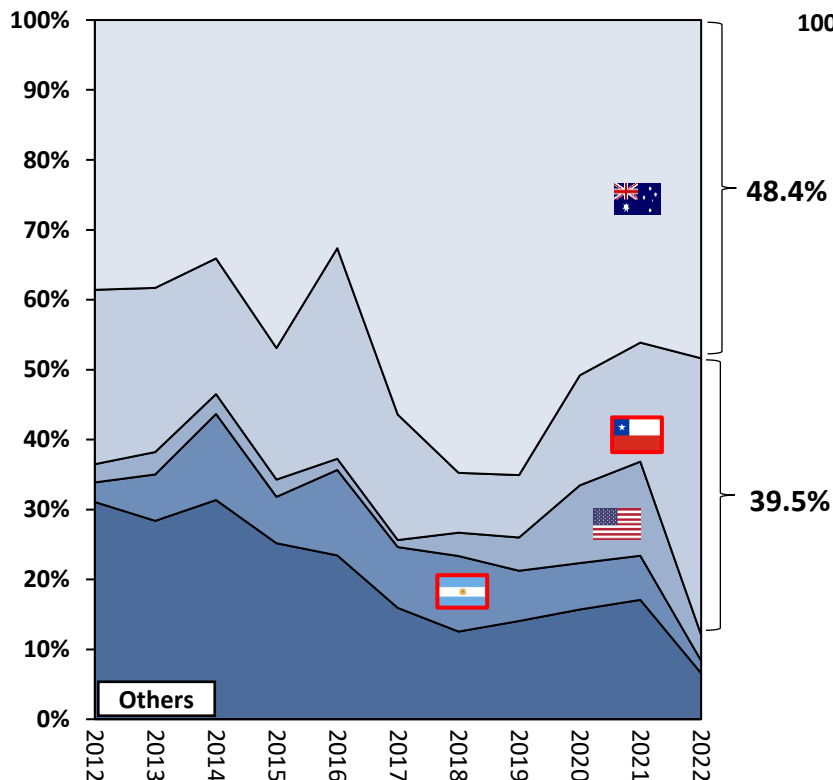
\* Analysis based on public speeches, concepts from the 13<sup>th</sup> FYP, ministerial meetings etc. as China stops publicly publishing all 14<sup>th</sup> FYPs regarding mineral resources, probably due to security concerns



# Minerals import: China's import dependencies for "priority critical minerals" focus on lithium, cobalt and nickel

## More lithium import from Chile since 2019...

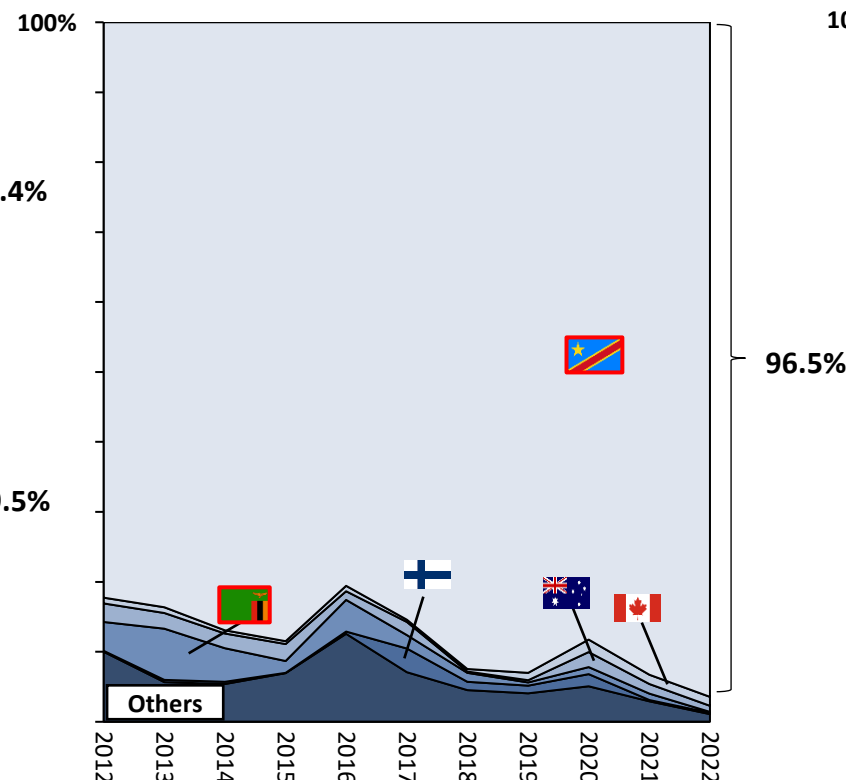
Chinese imports of unrefined and refined lithium (by share of total import value)



Notes: HS 2530.90 (basket category does not exclusively cover lithium minerals), HS 2825.20 ("Lithium oxide and hydroxide"), 2836.91 ("Lithium carbonites") and HS 2805.19, HS 2826.90 and HS 2827.39 (refined lithium compounds)

## ...but growing dependency on DRC for cobalt...

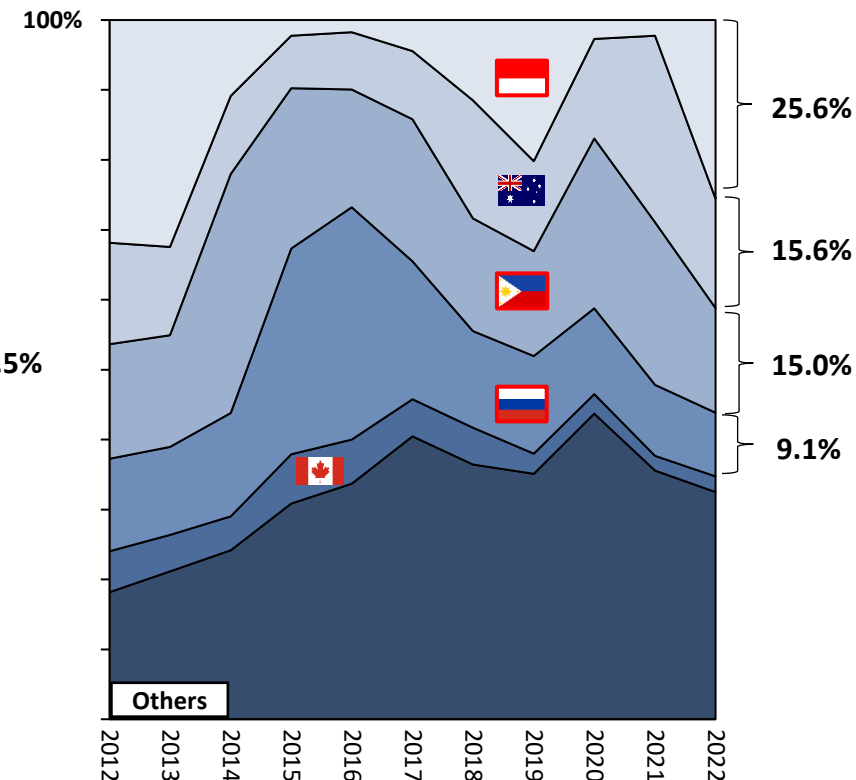
Chinese imports of unrefined and refined cobalt (by share of total import value)



Notes: HS 2605.00 ("Raw cobalt ores and concentrates"), HS 2822.00 ("cobalt oxides and hydroxides") and HS 8105.20 ("Cobalt mattes and other intermediate products of cobalt metallurgy; unwrought cobalt; powders")

## ...while nickel imports are more diversified

Chinese imports of unrefined and refined nickel (by share of total import value)



Notes: HS 2604.00 ("Nickel ores and concentrates"), HS 75 ("Nickel and articles thereof")

**BRI countries** Source: UN Comtrade



Since 2019, China has been able to diversify its imports, sourcing import-reliant critical minerals increasingly from BRI countries



## 3<sup>rd</sup> country engagement: decade-old policy framework, followed-through by ambitious Chinese firms

### China engaged in Indonesia since a decade – BRI as framework

#### 2013 Comprehensive Strategic Partnership

- **Comprehensive Strategic Partnership** signed in Jakarta in 2013, where Xi Jinping announced **Maritime Silk Road** :
  - China and Indonesia also signed a cooperation to establish IMIP in Central Sulawesi to develop local nickel mining and processing industry



#### “Extraction” wave

- **Chinese FDI in Indonesia’s mineral sector experience a boom after launch of the BRI in 2013**
  - Growing from USD ~3B between 2009-2012 to just more than USD ~15B between 2013-2016)

#### “Localization” wave

- **Indonesia’s first raw nickel ban** in 2014 prompted many Chinese firms to speed up investments into downstream activities to maintain their access to Indonesian nickel
  - Allowing it to circumvent this **export ban** via exporting locally processed nickel by Chinese companies

### CATL will build a new nickel factory with 2 Indonesian SOEs



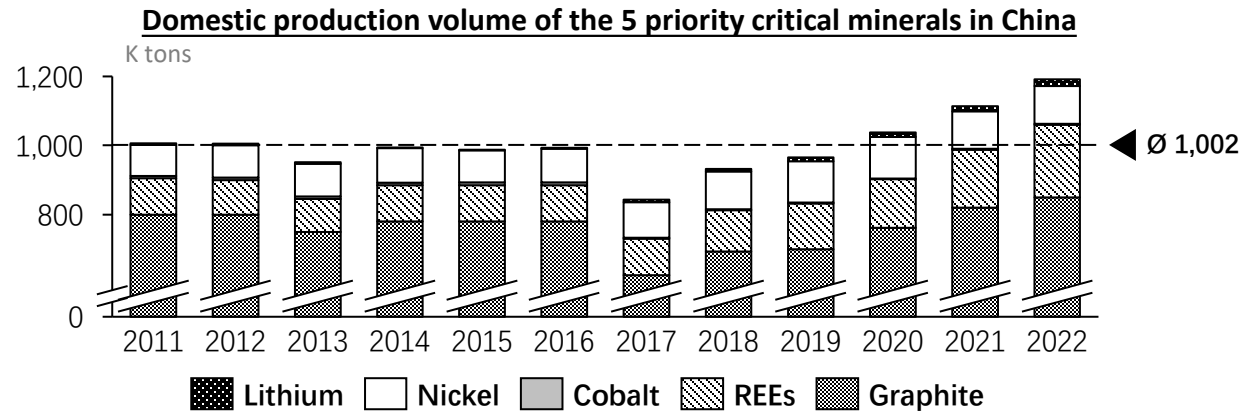
Ceng Yuqun, Chairman of CATL, announced the deal in 2022 and said “CATL is committed to helping Indonesia develop a “green” battery industry

#### CATL new Indonesian factory overview:

- Investment volume: **6 billion USD**
- Location: **FHT Industrial Park**, East Halmahera; **19.39 km<sup>2</sup>** planned area
- Production across value-chain: Mining, smelting, battery production, recycling, **> 60% nickel** will be produced into **end-product battery** locally
- Partnership: Joint Venture together with 2 Indonesian SOEs (PT Aneka Tambang and PT Industri Baterai Indonesia)
- Develop local industry: Battery **tech cooperation** to help local industry

# Domestic processing: POEs as key players in China's critical mineral processing market, located across China

## Processed critical minerals soaring since 2017 – POEs lead the market



## Number of SOEs vs POEs as market leaders in processing the 5 priority critical minerals

Critical minerals	POE as market leaders	SOE as market leaders
Lithium	3   	2  
Nickel & Cobalt	3  	1 
REEs	0	4   
Graphite	6  	0

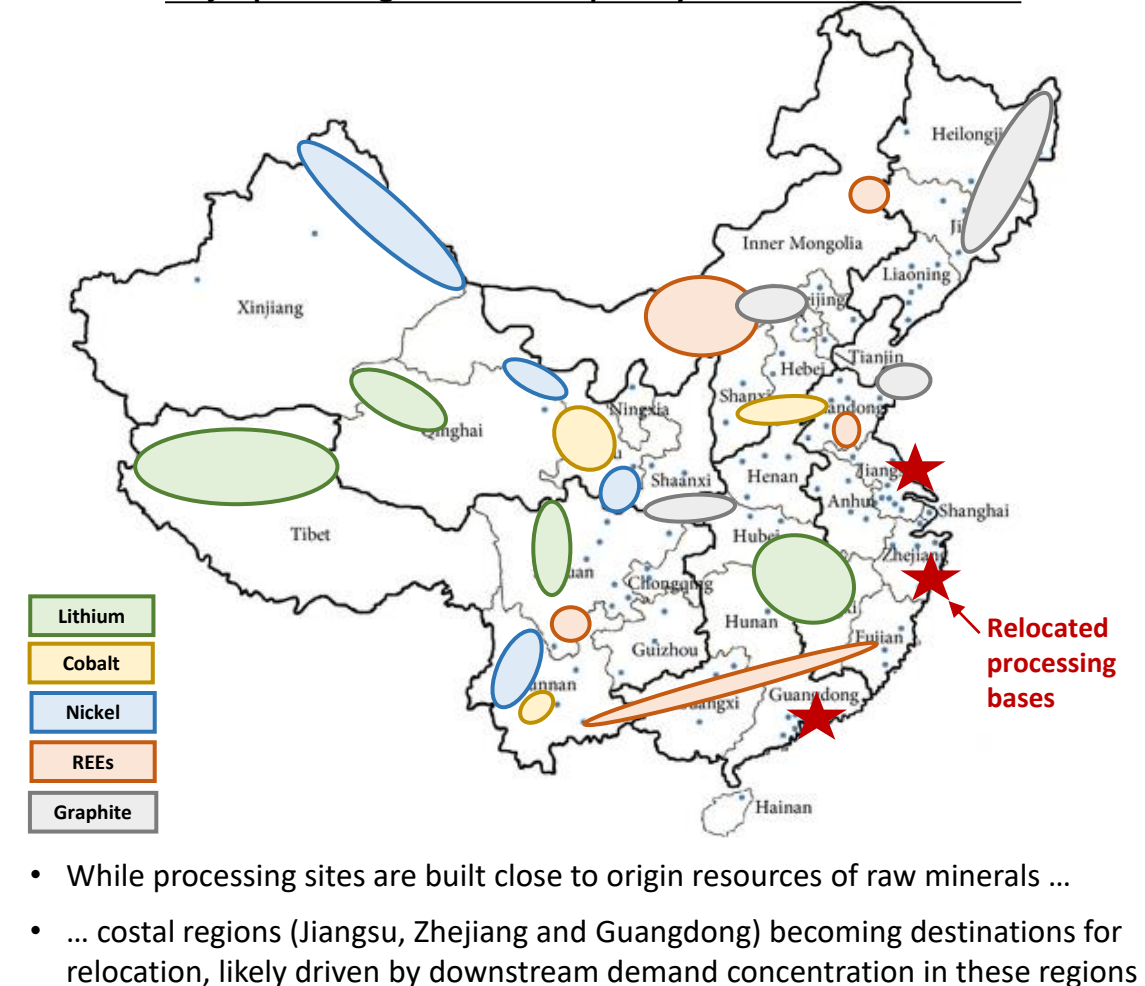
Among 19 market leaders in critical mineral processing, 12 POEs and 7 SOEs

- Subject to strict protection policy, **REE production concentrated in SOEs**
- **Graphite processing mainly in POEs**

\* 19 samples consist of 3~4 largest companies by share in production/processing of each mineral

## Processing next to sources, relocations to coastal region as new trend

### Major processing sites for the 5 priority critical minerals in China




- While processing sites are built close to origin resources of raw minerals ...
- ... coastal regions (Jiangsu, Zhejiang and Guangdong) becoming destinations for relocation, likely driven by downstream demand concentration in these regions







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# Case-studies of policy approaches adopted by leading industrial trade blocs – US and EU using similar tools

 Depth of cooperation

Case studies	 <b>China's approach</b>	 <b>US' approach</b>	 <b>EU's approach</b>
 <b>Indonesia: #1 in nickel and #3 in cobalt</b> (in global mineral reserves)	<ul style="list-style-type: none"> <li>China has FTA with Indonesia via both <b>China-ASEAN FTA (2007)</b> and <b>RCEP (2022)</b> and Indonesia as a member of <b>BRI</b></li> <li>In 2013, Xi Jinping signed multiple agreements with Indonesia <b>including cooperation on minerals</b>, part of which is the important <b>Tsingshan industrial park</b></li> <li>In 2021, 27% of its nickel exported to China</li> </ul>	<ul style="list-style-type: none"> <li>No FTA with US and not a member of <b>US-led Mineral Security Partnership (MSP)</b></li> <li>For competitiveness of its mineral industry under the US' IRA, Indonesia recently seeks to have a <b>limited FTA</b> with US focusing on certain minerals</li> <li>In 2021, 3.5% of its nickel exported to US</li> </ul>	<ul style="list-style-type: none"> <li>1st ASEAN country as EU <b>"partner"</b> (2014)</li> <li><b>EU Indo-Pacific Strategy (2021)</b>, including supply chain diversification and critical raw materials</li> <li><b>Bilateral FTA (CEPA)</b> under negotiation since 2016</li> <li>EU's case at <b>WTO</b> ruled against Indonesia's export ban and local processing requirement on nickel</li> <li>No export of nickel to EU in 2021 from Indonesia</li> </ul>
 <b>Australia: #2 in lithium, #2 in cobalt and #2 in nickel</b> (in global mineral reserves)	<ul style="list-style-type: none"> <li><b>AUS distanced itself from China</b> by cancelling Victoria's <b>BRI</b> agreement with China in 2021, but <b>Bilateral relationship</b> expected to improve</li> <li>China has FTA with Australia via both <b>China-ASEAN FTA</b> and <b>RCEP</b>, but China de facto <b>banned imports</b> of many non-essential consumer goods</li> <li>95.7% of exported lithium (2021) and 58% of nickel (2020) to China</li> </ul>	<ul style="list-style-type: none"> <li><b>FTA with US</b> and member of the <b>US-led MSP</b></li> <li>US has been <b>working closely with Australia for critical minerals security</b>, with measures such as <b>standard setting and financing</b> since 2021</li> <li>0.9% of exported lithium (2021) and 12% of nickel (2020) to US</li> </ul>	<ul style="list-style-type: none"> <li><b>EU-Australia Framework Agreement (2022)</b> to <b>deepen cooperation on areas including minerals</b></li> <li><b>EU-Australia FTA</b> under negotiation since 2018, both sides planning to conclude by summer 2023</li> <li>Wants AUS to join <b>Critical Raw Materials Club</b></li> <li>2.5% of exported lithium (2021) and 1% of nickel (2020) to EU</li> </ul>
 <b>Brazil: #1 in nickel</b> (in global mineral reserves)	<ul style="list-style-type: none"> <li>In 2023, China and Brazil signed <b>MOU for cooperation including minerals and clean energy</b></li> <li>Recently, Brazil states willingness to negotiate a <b>FTA with China via Mercosur</b></li> <li>In 2021, 56% of exported nickel to China</li> </ul>	<ul style="list-style-type: none"> <li><b>No FTA with US</b> and is <b>not a member of MSP</b></li> <li>In 2020, US set up a <b>working group with Brazil for critical minerals</b>, to deepen cooperation; nonetheless, in 2022, Brazil claims it does <b>not intend to grant privileges to such partners</b></li> <li>In 2021, 10% of exported nickel to US</li> </ul>	<ul style="list-style-type: none"> <li><b>EU-Brazil Strategic Partnership</b> in 2007 to enhance <b>overall bilateral relationship</b></li> <li><b>EU-Mercosur FTA</b>, concluded in 2019, not ratified by EU yet due to environmental concerns</li> <li>New <b>"window of opportunity"</b> (with Lula) upcoming at <b>EU-Latin America summit</b> in July</li> <li>In 2021, 25% of exported nickel to EU</li> </ul>
<b>Observed mineral supply security strategy</b>	<b>"Early mover"</b> : strategic bilateral agreements for <b>mutual economic development</b> and <b>broad cooperation</b> , CN firms follow with investments and adjust nimbly to local policy changes	<b>"Full tool-box"</b> : domestic <b>industrial policy</b> plus <b>3-layered approach</b> : bilateral agreements with US allies (e.g. Japan), broad convening as "club" (MSP) plus targeted FTA (e.g. Indonesia)	<b>"Nascent play"</b> : domestic <b>industrial policy</b> plus relying on <b>general trade policy</b> , only very recently broadening instruments to use <b>partnerships</b> , focus on "like-minded" countries

With China enjoying advantages in accessing critical minerals overseas, US and EU just starting their mineral security efforts

# Conclusions

- **Topic is picking up speed!**
- **High-level policy landscape**
  - US and EU ramping up industrial policy, partnerships and clubs
  - China dominates with mature processing capabilities and as early-mover in taking overseas supply into own hands
  - Beyond key trade blocs, broader distortive effects from protectionist policies from key countries – will lead to reconfiguration of supply chains
- **KSFs (for Europe)?**
  - (Popularly) embrace importance of mining sector
  - Companies, capabilities and business models – incentivized to act in line strategic priorities
  - Substantive overseas partnerships / cooperation – narrow or broad
  - R&D investment in recycling technology
  - Environmental standard-setting/labor rights as desirable differentiator, but brings trade-offs
- **Impacts vary for miners/processors and downstream sectors**
  - Miners/processors will face a dynamic and competitive geopolitical environment, with growing segmentation and protectionism
  - Highest impact for downstream green tech manufacturers, esp. NEV manufacturers

# Appendix



# Overview of 11 Chinese deals to deepen engagement with key countries for improved minerals access to date



Weiming and Indigo invest **400 M USD** in a nickel plant with an output of **40k tons / year**, focusing on **low-grade ore** and tailings utilization



CATL invested **6 B USD** with 2 Indonesian state-owned enterprises to build a **battery factory**, will **start production in 2024**



NIO invested **87 M USD** in Greenwing Resources, to **expedite lithium mining in San Jorge, Argentina** and will be priority client



GEM invested **998 M USD** to build a new nickel plant, with capacity of **73k tons / year** nickel; phase II is under planning



Chengtun **expanded cobalt facilities** with 2 projects and can produce **3.6k tons / year** crude cobalt hydroxide



Tsingshan expanded in Indonesia by investing **5 B USD** in **Phase I of Weda Bay Park**, started operation in Q1 2020, Phase II under planning



Delong expanded in Indonesia by building a new plant with **2.7 B USD** investment, w. capacity of **180k tons / year** of nickel



Ganfeng acquired Lithea with **962 M USD**, can extract lithium from two salt lakes with capacity of **50k tons / year** of lithium carbonate



Tibet Summit invested **2.2 B USD** on 2 lithium projects, which can potentially produce up to **50k - 100k tons / year** lithium carbonate



Tianqi acquired Essential Metals with **92 M USD**, which has Pioneer Dome, with a potential total resource of **11.2 M tons of lithium**



BYD expanded with **290 M USD** to build a new lithium plant; Before that, it was granted to mine an extra of **80k tons** lithium ore in Chile



Indonesia: Low-grade ore plant (nickel)



Indonesia: Giant Shield plant (nickel)



Indonesia: Battery plant (nickel)



Argentina: mining (lithium)



Argentina: mining (lithium)



Argentina: explore and mining (lithium)



Indonesia: new plant (nickel)



Australia: explore and mining (lithium)



DRC: mining and smelting (cobalt)



Chile: new plant (lithium)

2020

2021

2022

2023 (January-April)



Chinese companies are accelerating mineral investments abroad in recent two years, esp. in Latin America and Indonesia



# Evaluation of key countries' future supply capability and domestic policies' distortion to global supply chain

X-axis: Future supply capability	US	China	EU	Australia	Indonesia	DR Congo	Chile	Turkey	Brazil
<b>Production:</b> share of production, indicating extraction capability	Low	Significant	Low	Significant	Medium	Significant	Low	Low	Low
<b>Reserves:</b> share of reserves of critical mineral production	Low	Medium	Low	Significant	Low	Significant	Medium	Medium	Significant
<b>Aggregated "Reserves and extraction capabilities"</b>	Low	Medium to Significant	Low	Significant	Low to Medium	Significant	Low to Medium	Low	Medium
Y-axis: Policies' distortion to global supply chain today**	US	China	EU	Australia	Indonesia	DR Congo	Chile	Turkey	Brazil
<b>Mineral specific partnership building:</b> with specific countries	Medium (MSP)	No	Medium (MSP)	Medium (MSP)	Potential (Nickel OPEC)	No	Potential (Nickel OPEC)	No	Potential (Nickel OPEC)
<b>Supply chain exclusion:</b> exclude certain countries' minerals from its supply chain, including FDI limits	Medium	Low	Low***	Medium	Medium	Medium	Medium	Low	Low
<b>Export controls:</b> limit to the export of certain critical minerals	Low	Medium	Low	Low	Significant	Medium	Low	Low	Low
<b>Aggregated "Distortions to global supply chain"</b>	Medium	Medium	Medium	Medium	Significant	Medium	Medium	Low	Low

Rating logic for production and reserves: **Significant** = >45% in 1; >30% in 2; >15% in 3; **Medium** = >30% in 1; >20% in 2; >10% in 3; **Low** = < 30% in 1, replaceable



\* Low for the Y-axis Including situations where there are no relevant policy measures \*\* aggregated result= highest result of all the result for the 4 factors below \*\*\* EU facilitates the general FDI screening by member states. But the rejection rate is extremely low, 1% in 2021

**Contact:**

**Markus Herrmann Chen | 陈瑞华**  
*Co-Founder and Managing Director*  
[mherrmann@chinamacro.ch](mailto:mherrmann@chinamacro.ch)