



2022 – a tale of two halves

Cobalt Institute Market Report

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Benchmark Mineral Intelligence

Cobalt Congress | Istanbul, Turkey

10th May 2023



HQ: London, UK

Offices: Beijing, Brisbane, Fort Lauderdale, Melbourne, New Delhi, Porto, San Francisco, Tokyo

Benchmark Mineral Intelligence: Products & Services

<p>PRICE ASSESSMENTS & MARKET DATA</p>	<p>Lithium (8 Carbonate, 6 Hydroxide, 1 Spodumene) Cobalt (Sulphate, Metal, Hydroxide) Natural Graphite (8 Flake, 3 Spherical Graphite) Synthetic Graphite (4 Needle Coke, 2 Pet Coke)</p>	<p>Nickel (2 Sulphate, MHP) Anode and Cathode prices (6 Anode, 7 Cathode) Lithium Ion Battery Cells Gigafactory Assessment Anode & Cathode Market Assessments</p>	<p>WEEKLY / MONTHLY</p>
<p>FORECASTING, CONSULTANCY & ESG</p>	<p>Lithium Cobalt Nickel Natural & Synthetic Graphite Anode and Cathode</p>	<p>Lithium Ion Battery Database Solid State Batteries Recycling ESG Life Cycle Assessments</p>	<p>QUARTERLY</p>
<p>NEWS ANALYSIS, WEBINARS & EVENTS</p>	<p>News & analysis Supply chain commentary Presentation archive</p>	<p>Quarterly Review Magazine Video Archive In-person events in all regions</p>	<p>REGULAR</p>

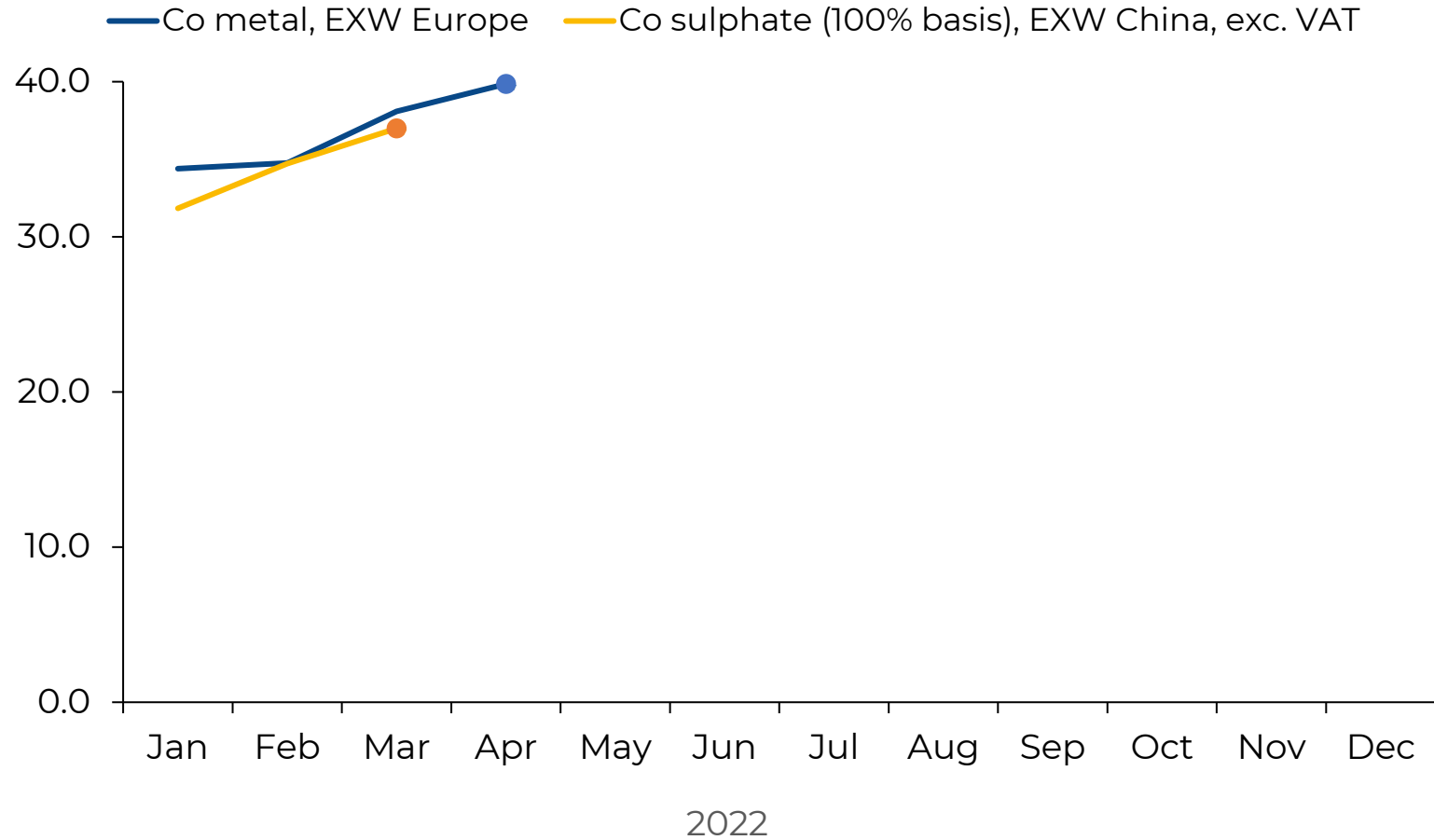


Outline

- **A tale of two halves**
- **A key year for geopolitics**
- **Critical cobalt**
- **Looking ahead**

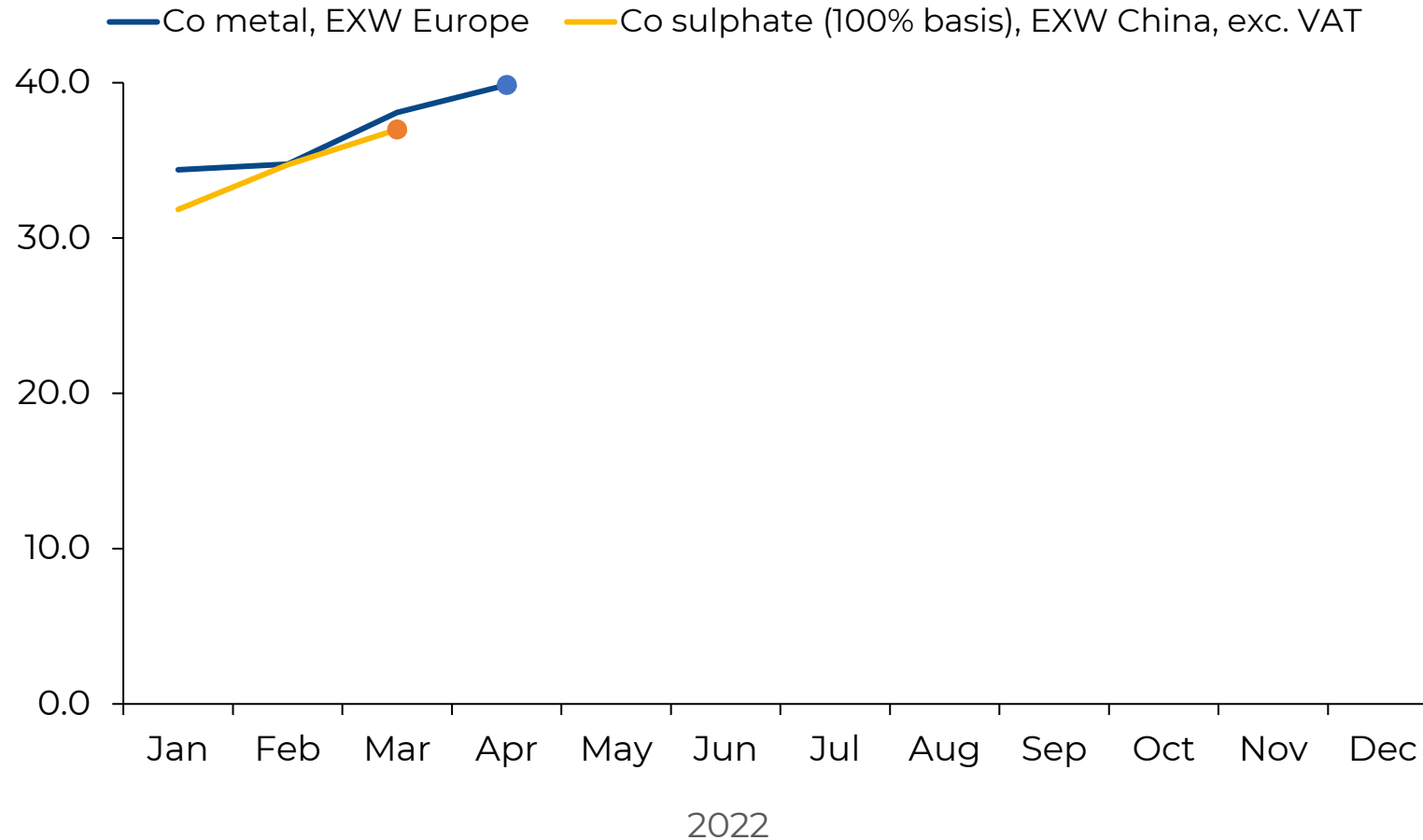
2022 – a tale of two halves

Cobalt metal & sulphate prices, \$/lb



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Cobalt metal & sulphate prices, \$/lb



Portable electronics

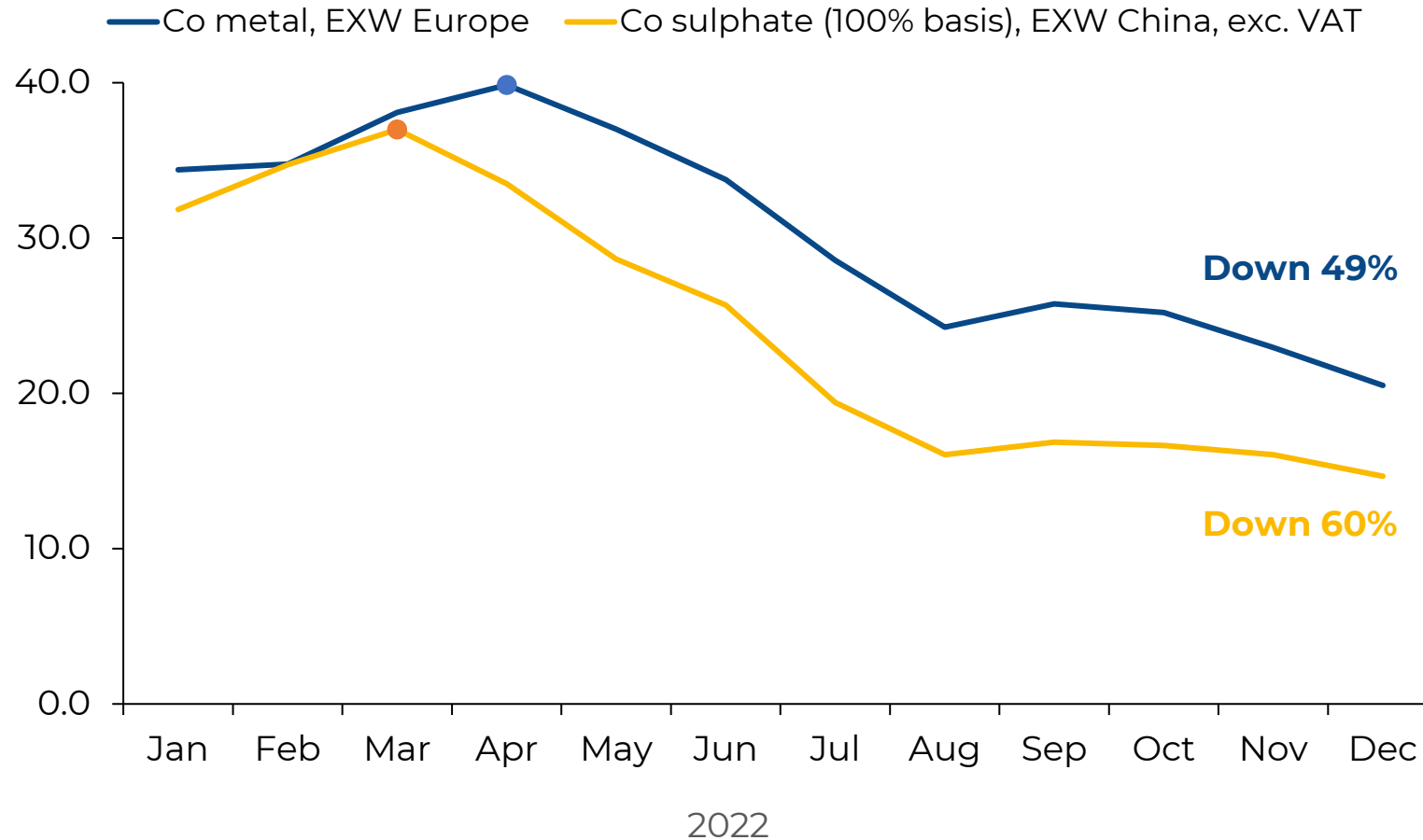
Covid-19 lockdowns in China

Logistical constraints ease

Supply from DRC & Indonesia

2022 – a tale of two halves

Cobalt metal & sulphate prices, \$/lb



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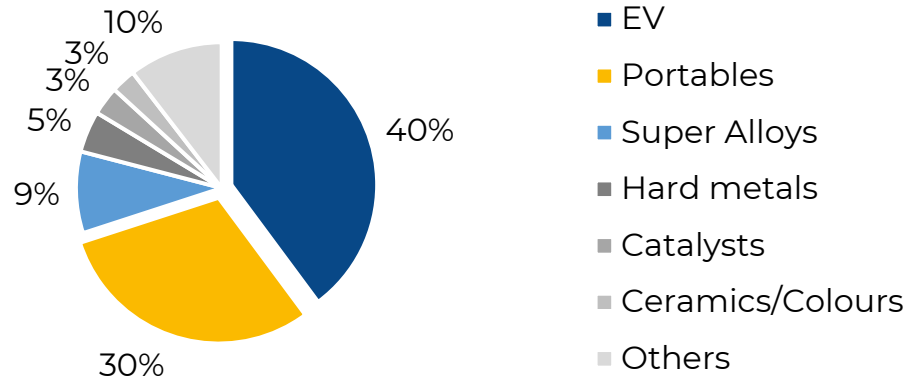
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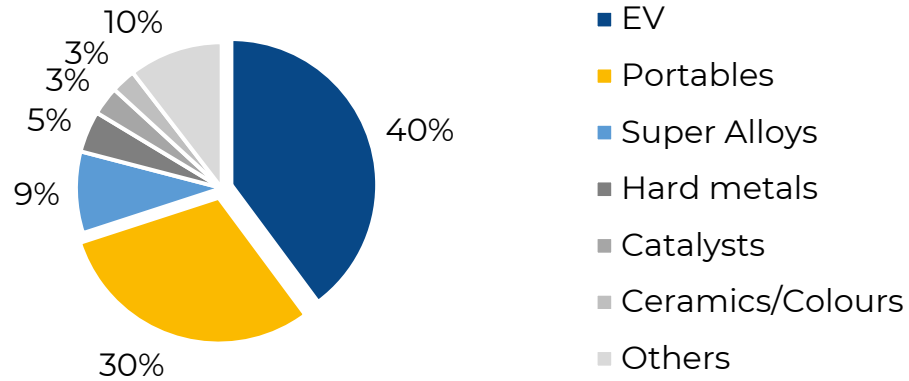
EV demand growth offsets sluggish portable electronics market

2022 cobalt demand

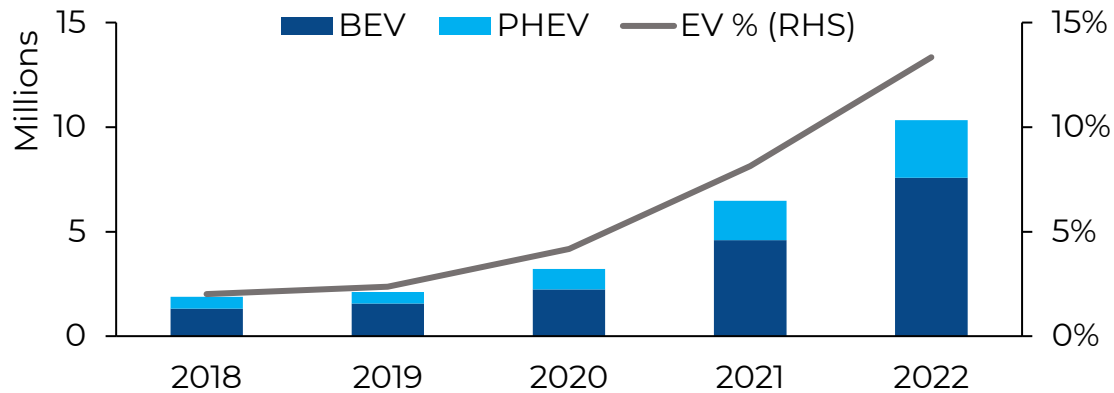


EV demand growth offsets sluggish portable electronics market

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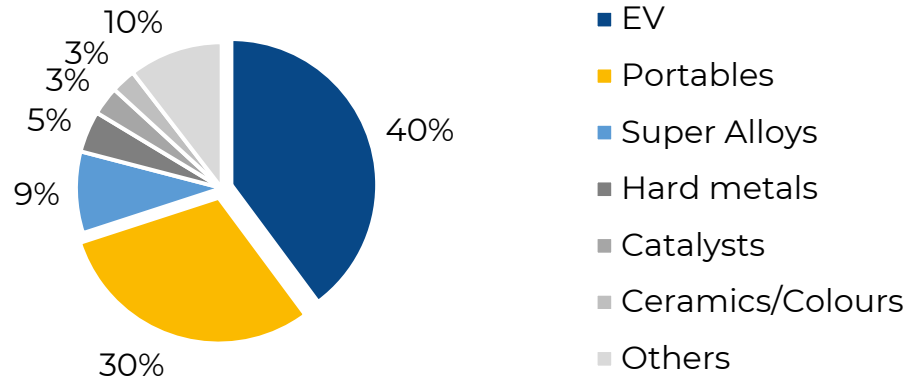


Global EV sales, millions of units

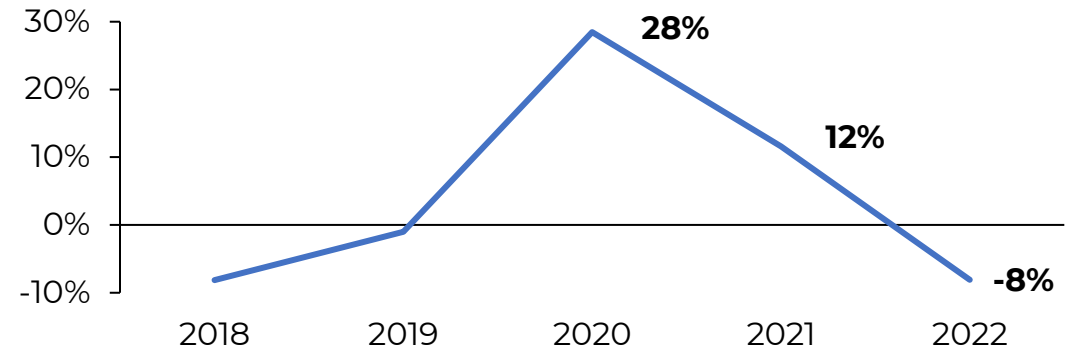


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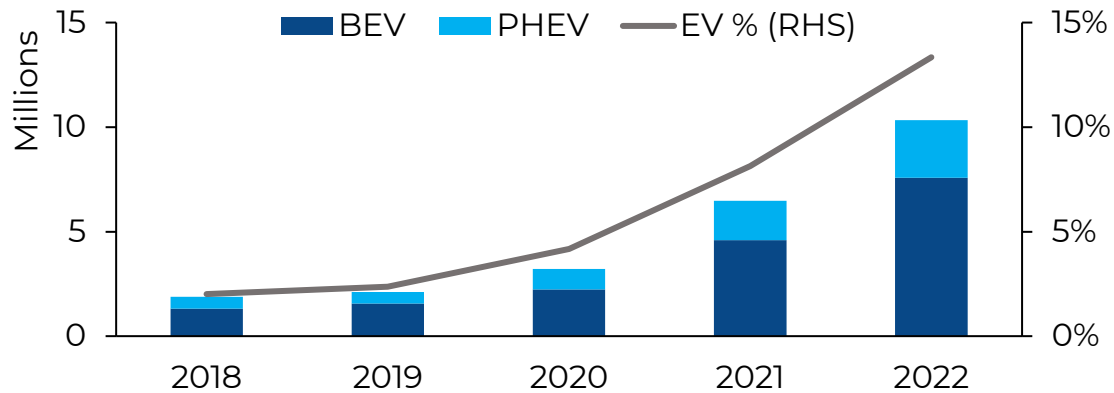
2022 cobalt demand



Annual LCO demand, y/y %

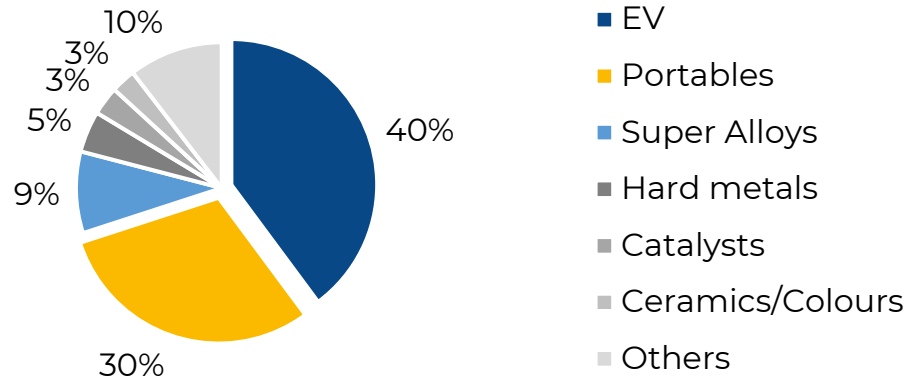


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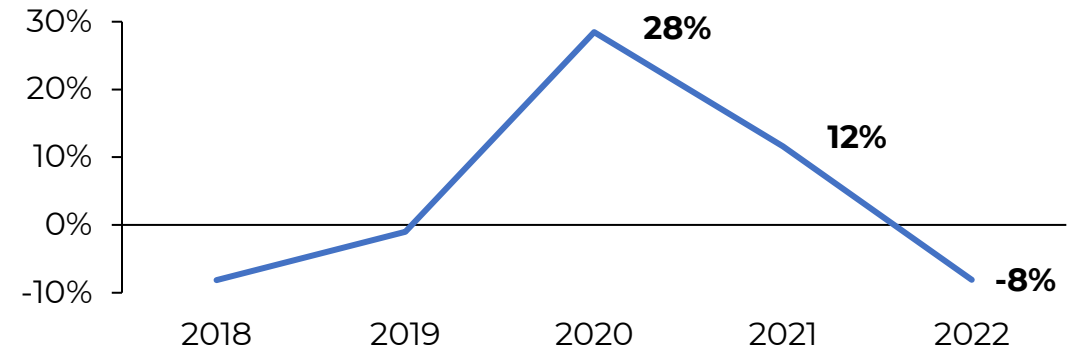


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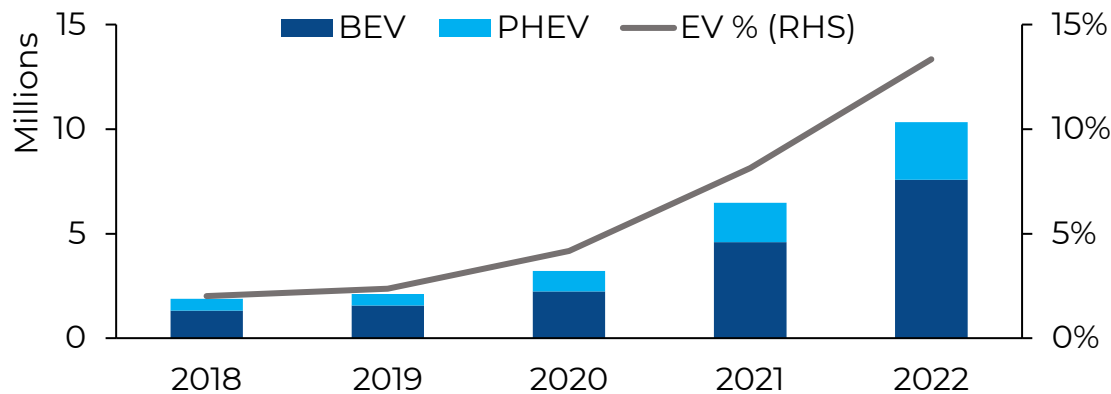
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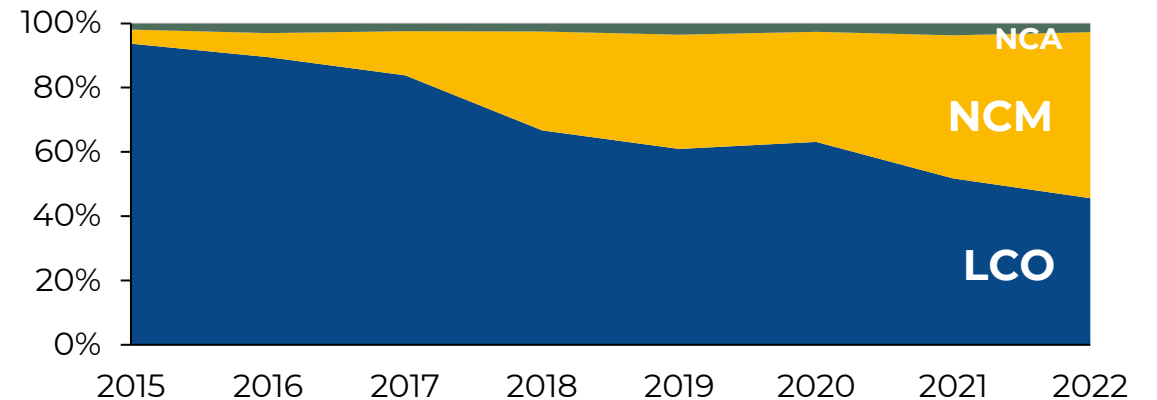
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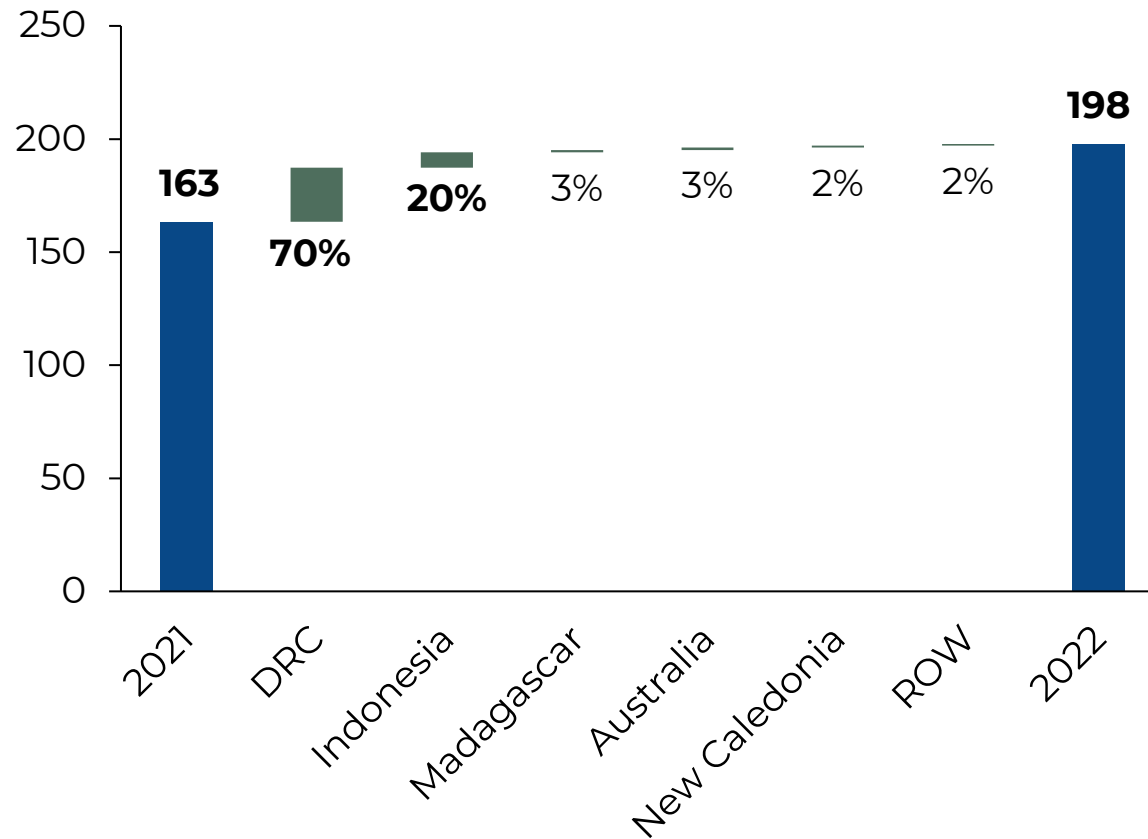


Share of cobalt demand from batteries by chemistry, %

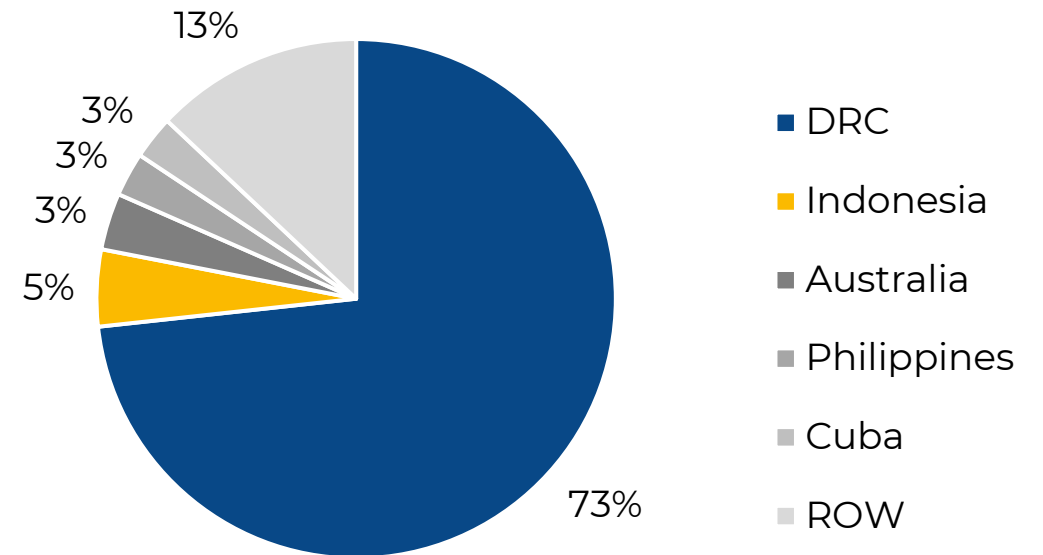


Market still dependent on the DRC, but that is starting to shift

Growth in mined supply by major country in 2022, kt



Share of mined cobalt supply in 2022, %





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- **Looking ahead**

2022 – a key year for geopolitics

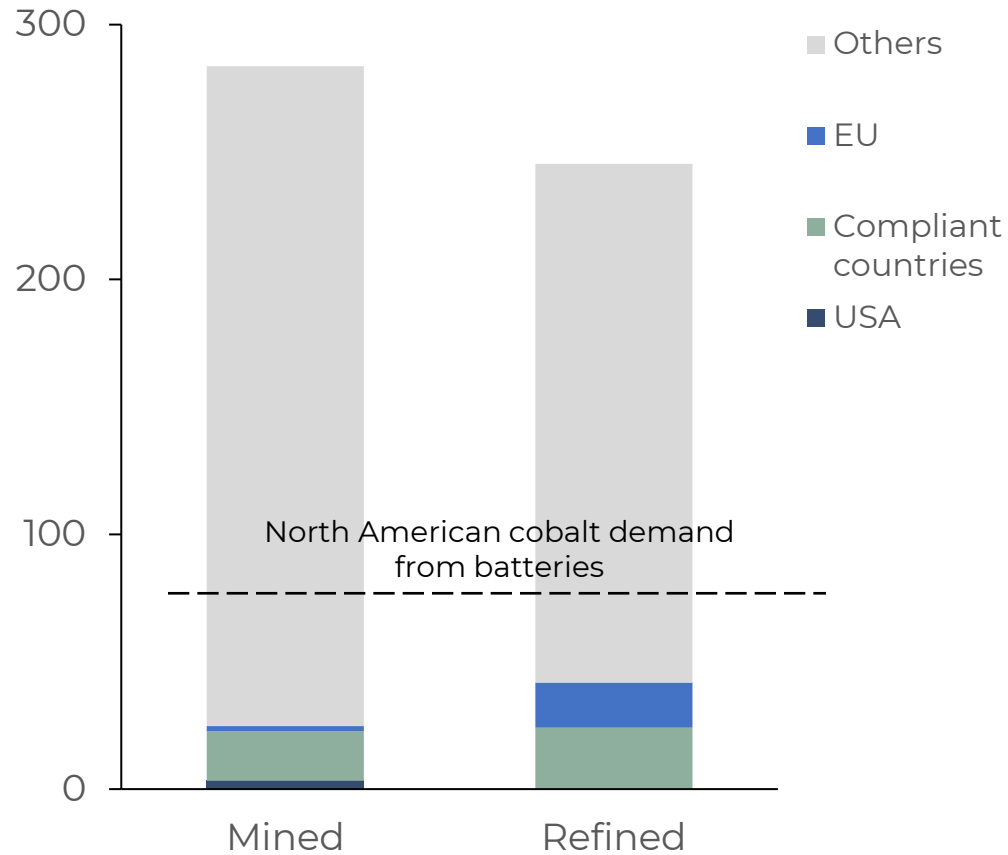
- War in Ukraine
- CMOG-DRC-Gécamines dispute
- Indonesian-Chinese supply
- Inflation Reduction Act (IRA)
- Critical Raw Materials Act (CRMA)

More details discussed in the annual report [released today](#)

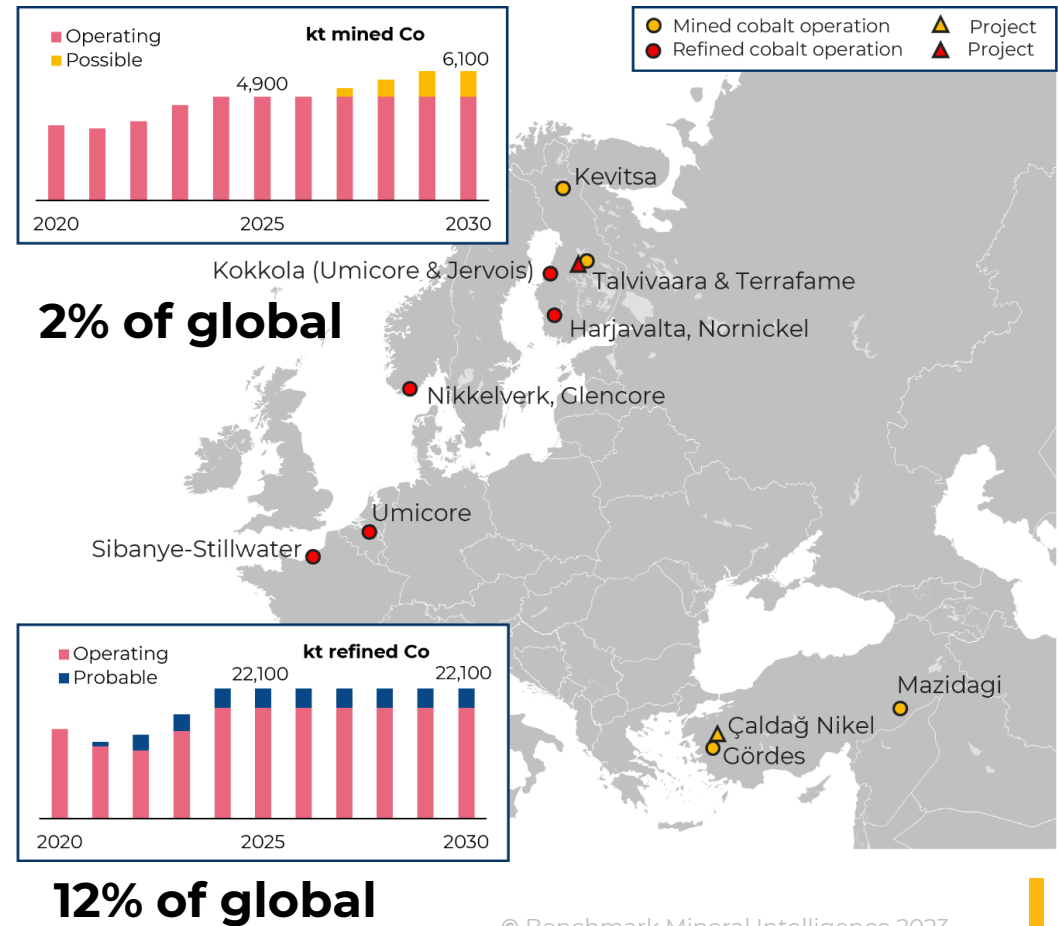


2022 – a key year for geopolitics

Mined & refined cobalt supply in 2025, compared to North American demand, kt



European mined & refined cobalt operations expected in 2030



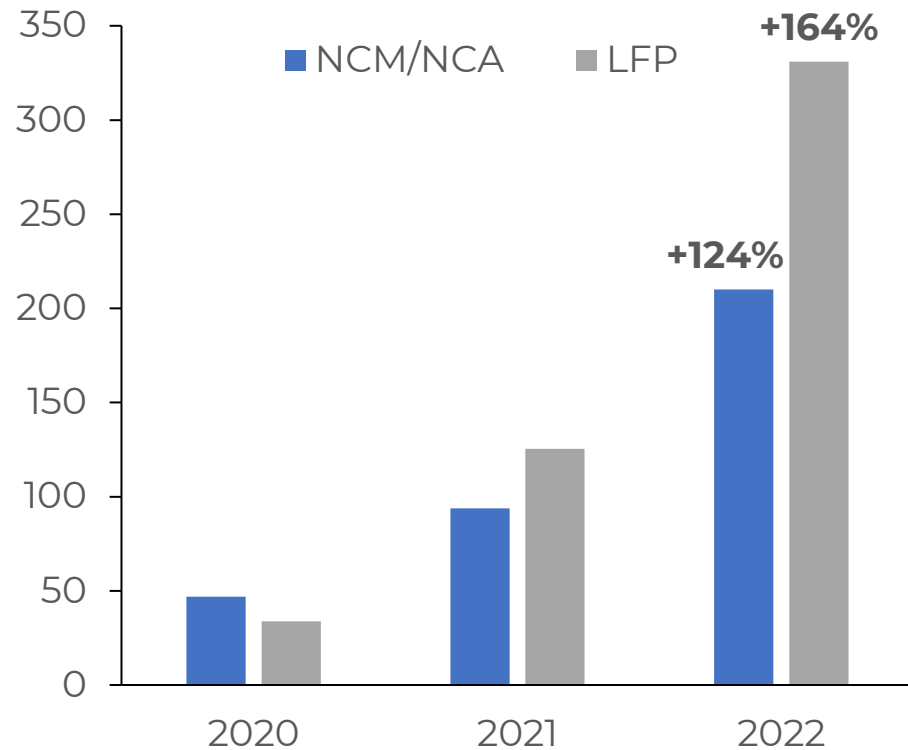


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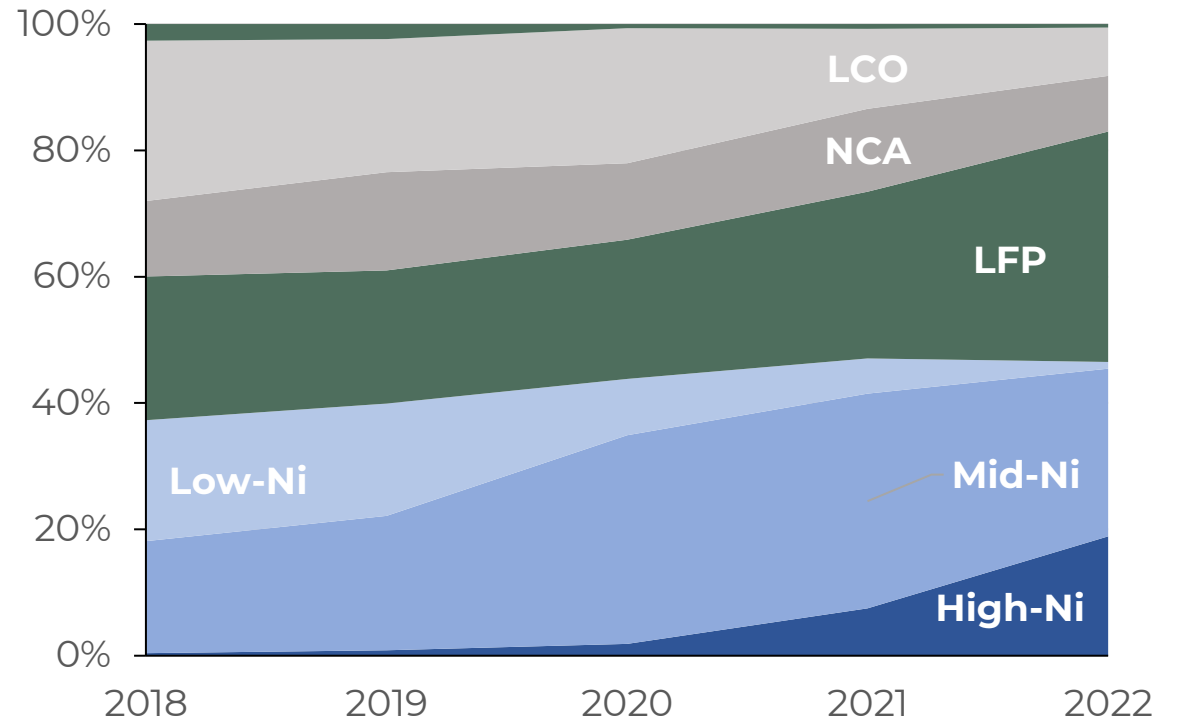
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LFP's share has risen but cobalt remains critical

Cathode capacity installations in China, GWh

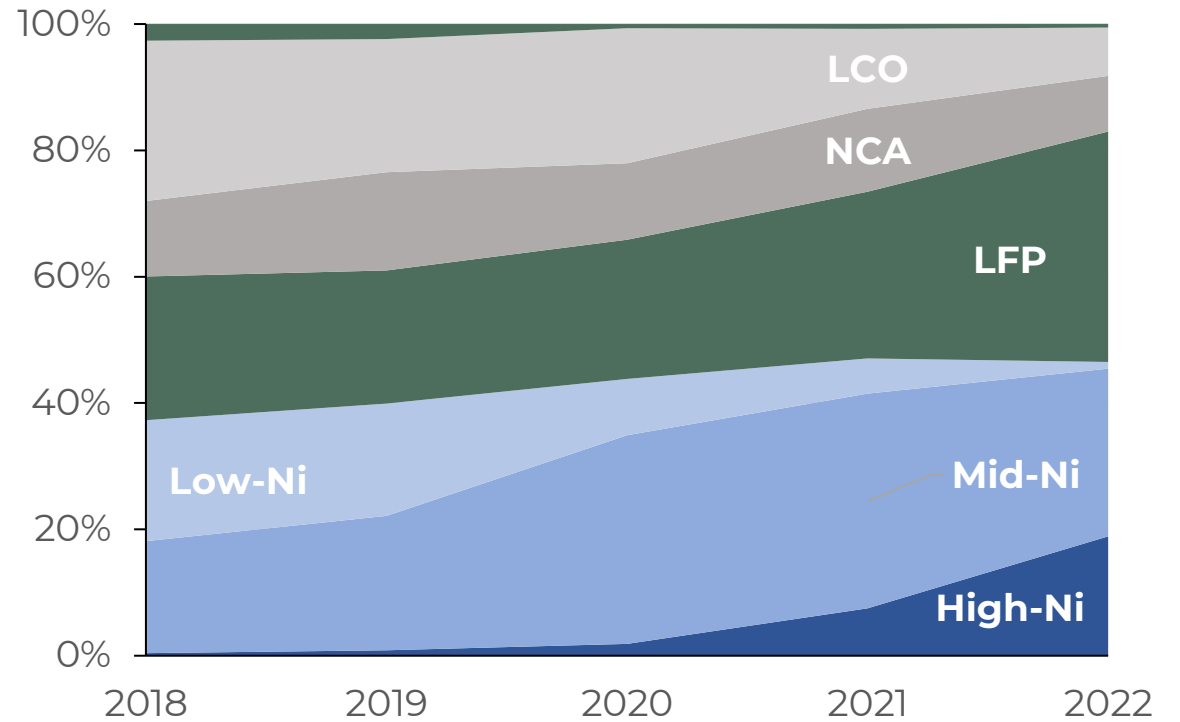
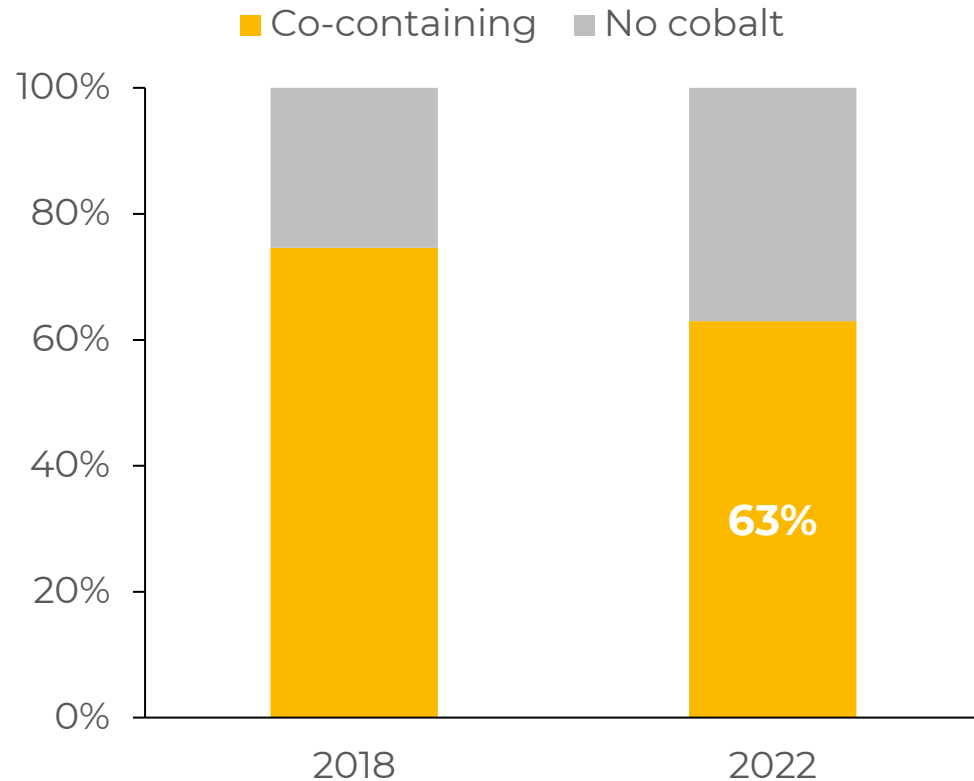


Share of cathode demand by chemistry, %



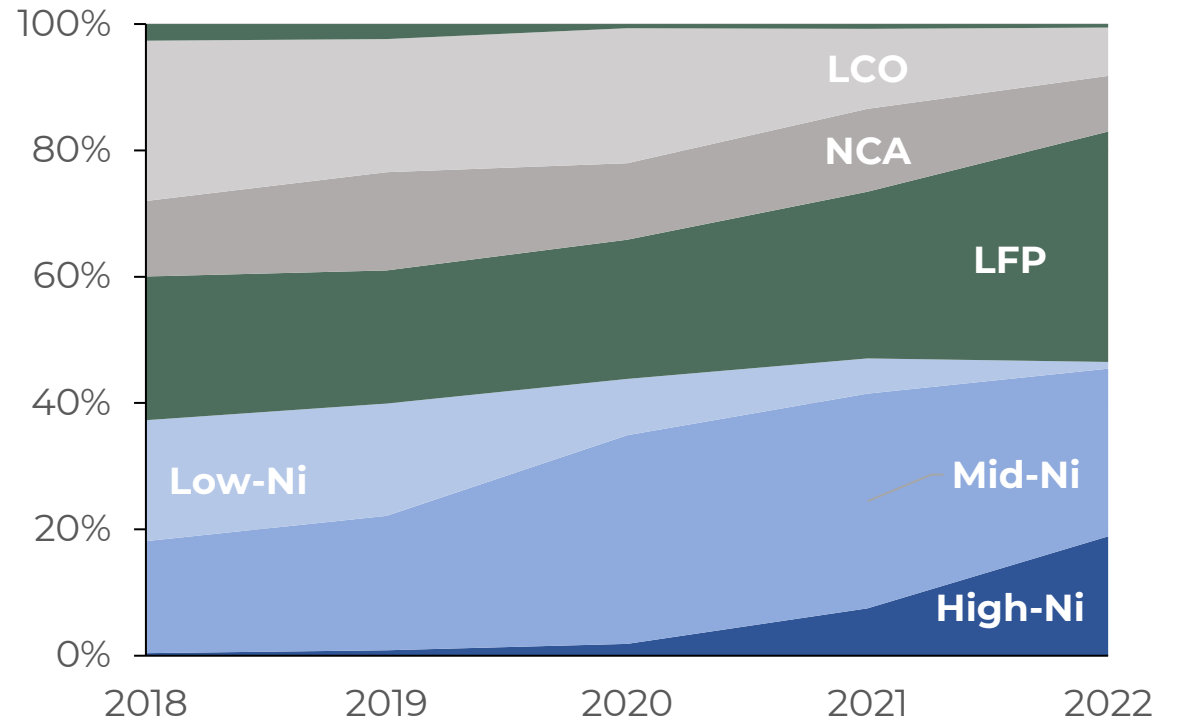
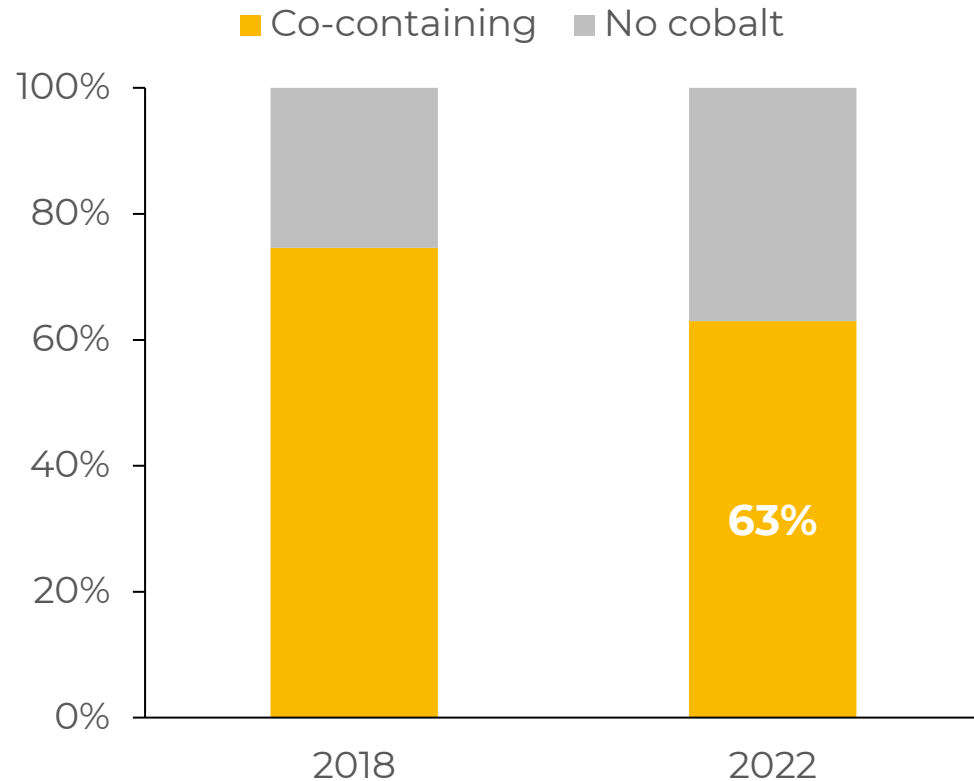
LFP's share has risen but cobalt remains critical

Share of cathode demand by chemistry, %



LFP's share has risen but cobalt remains critical

Share of cathode demand by chemistry, %



This is reinforced by rising levels of OEM upstream activity...

OEM activity in 2022



1st OEM investing upstream in Indonesia



Multi-year supply agreement



RENAULT

Multi-year supply agreement



Joined Pomalaa HPAL project



Acquired 25% stake (in addition to existing stake in Kisanfu)



Equity in future production

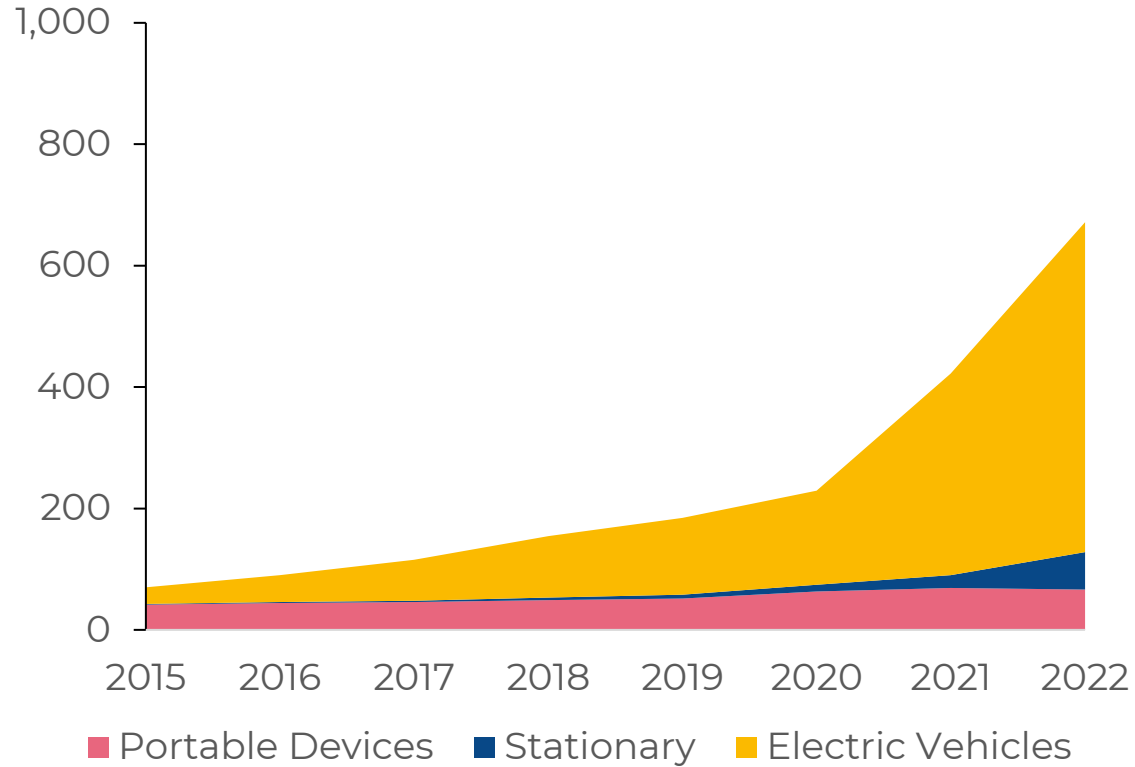


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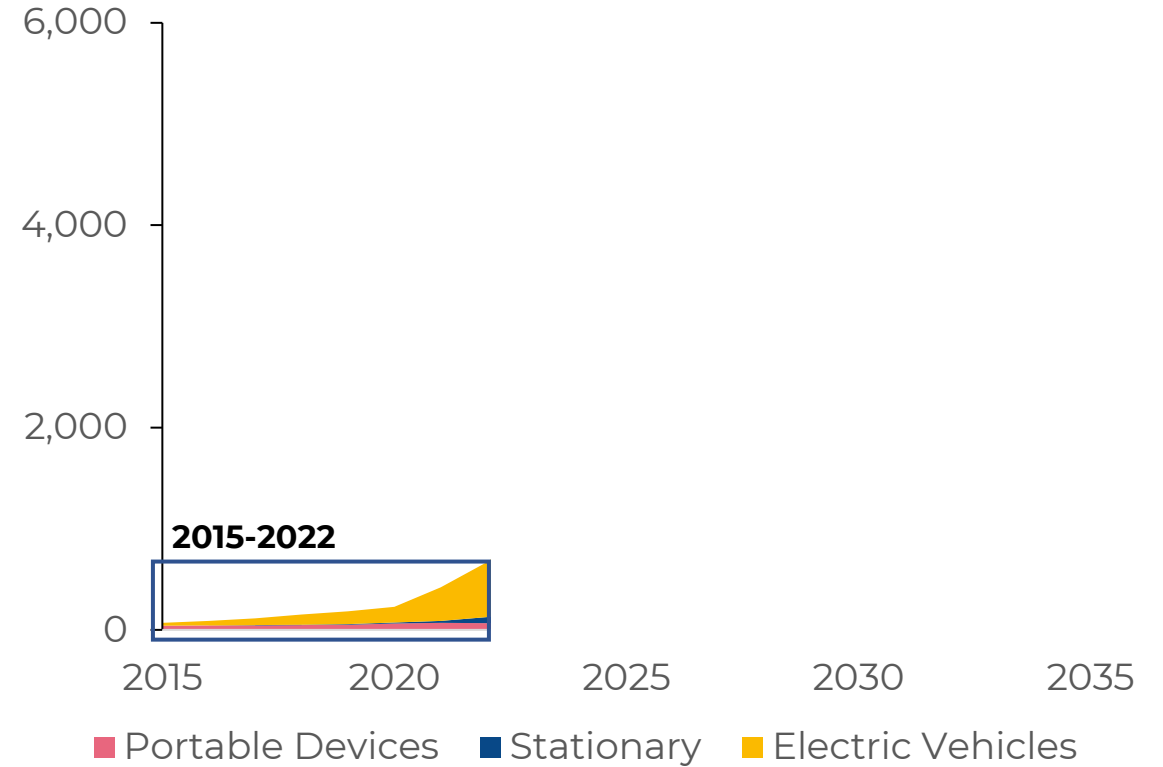
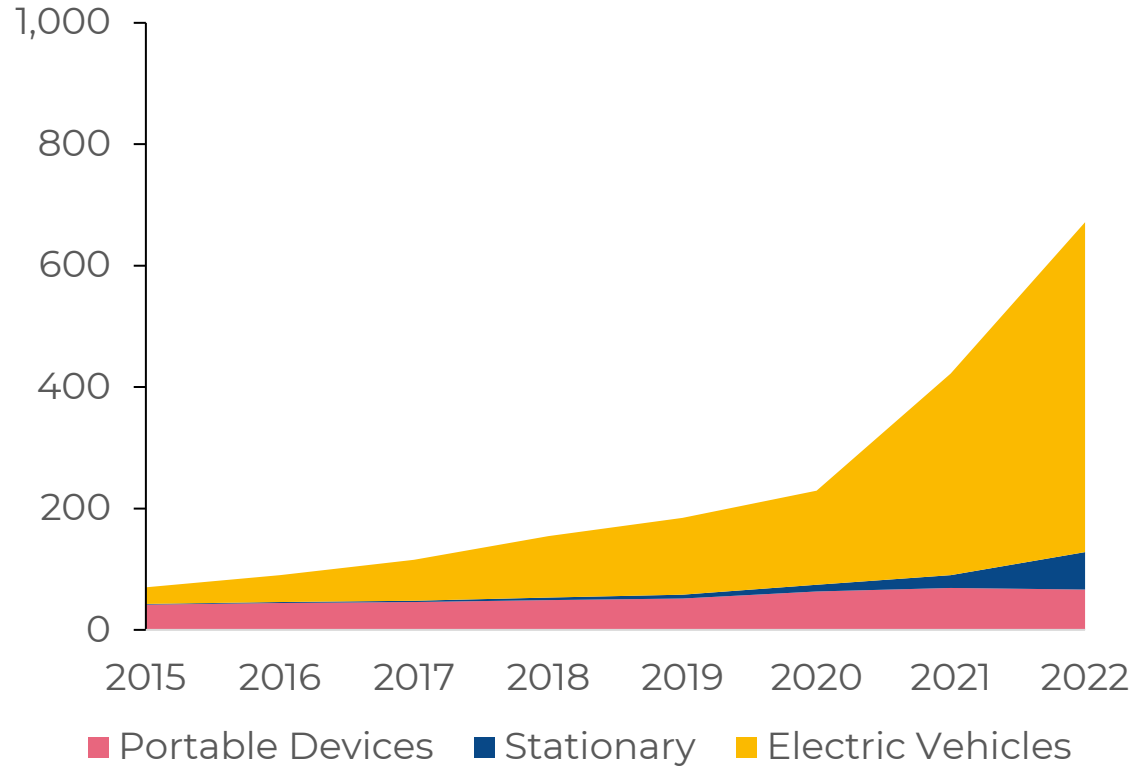
The battery revolution is only just getting started..

Li-ion battery demand, GWh



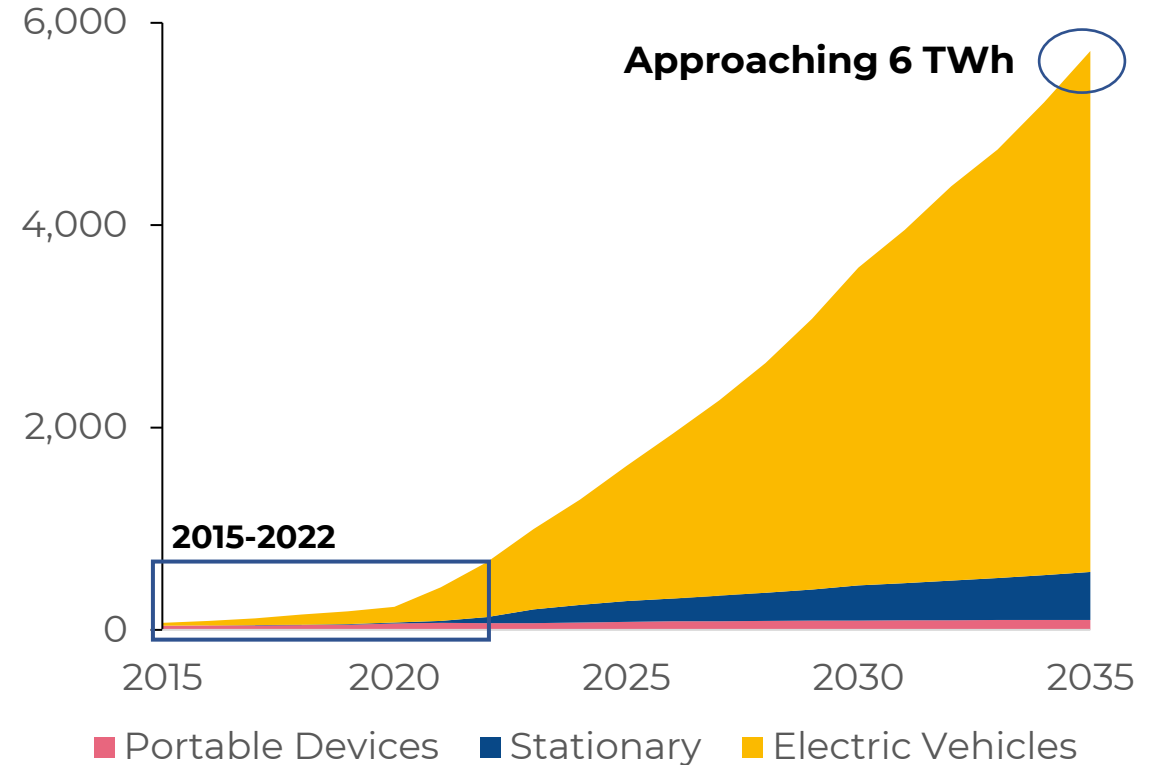
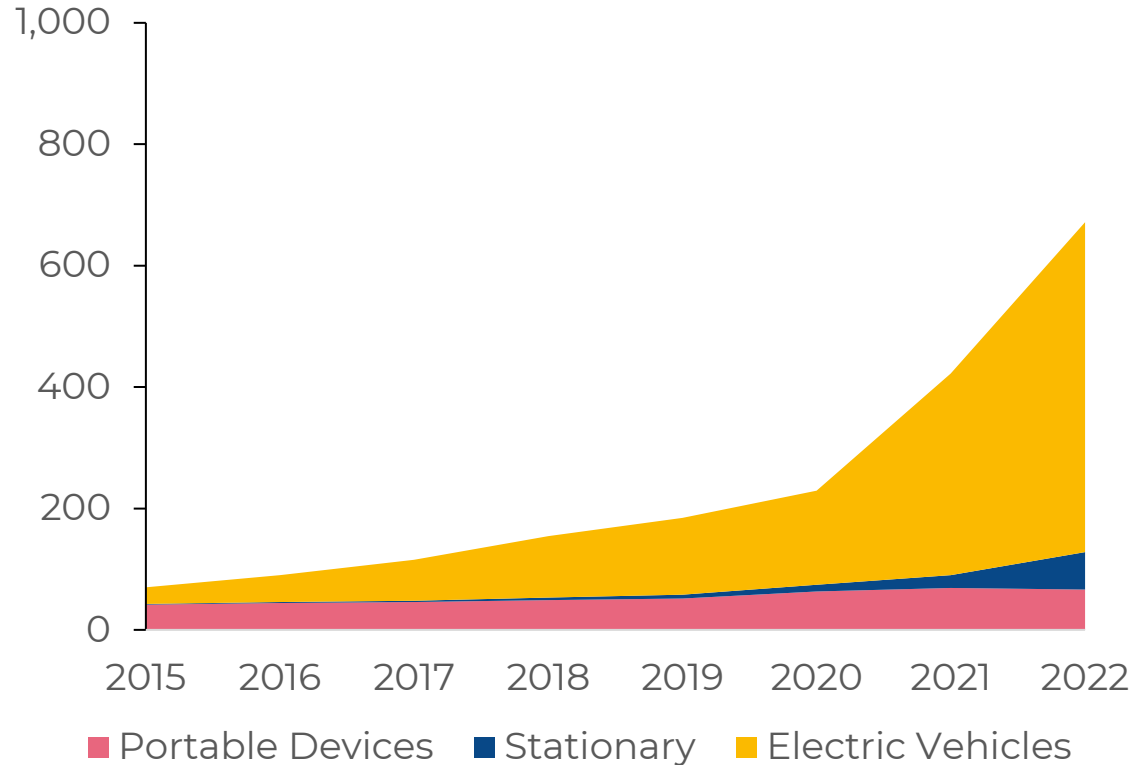
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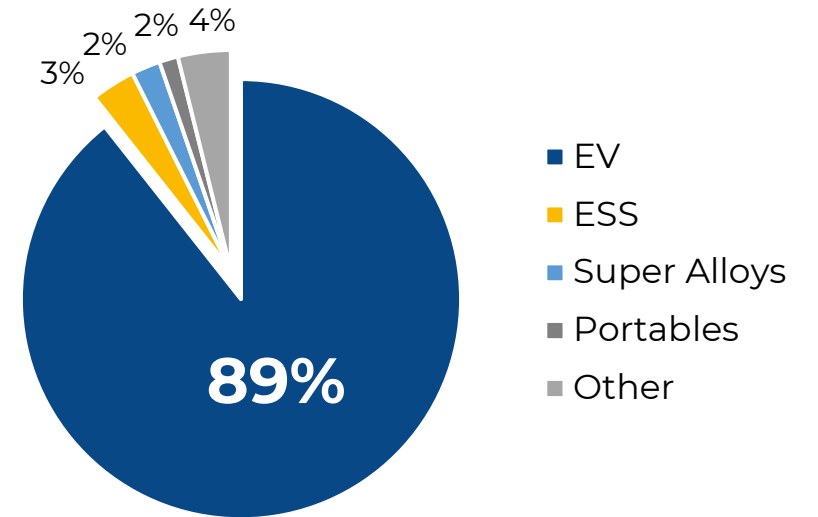
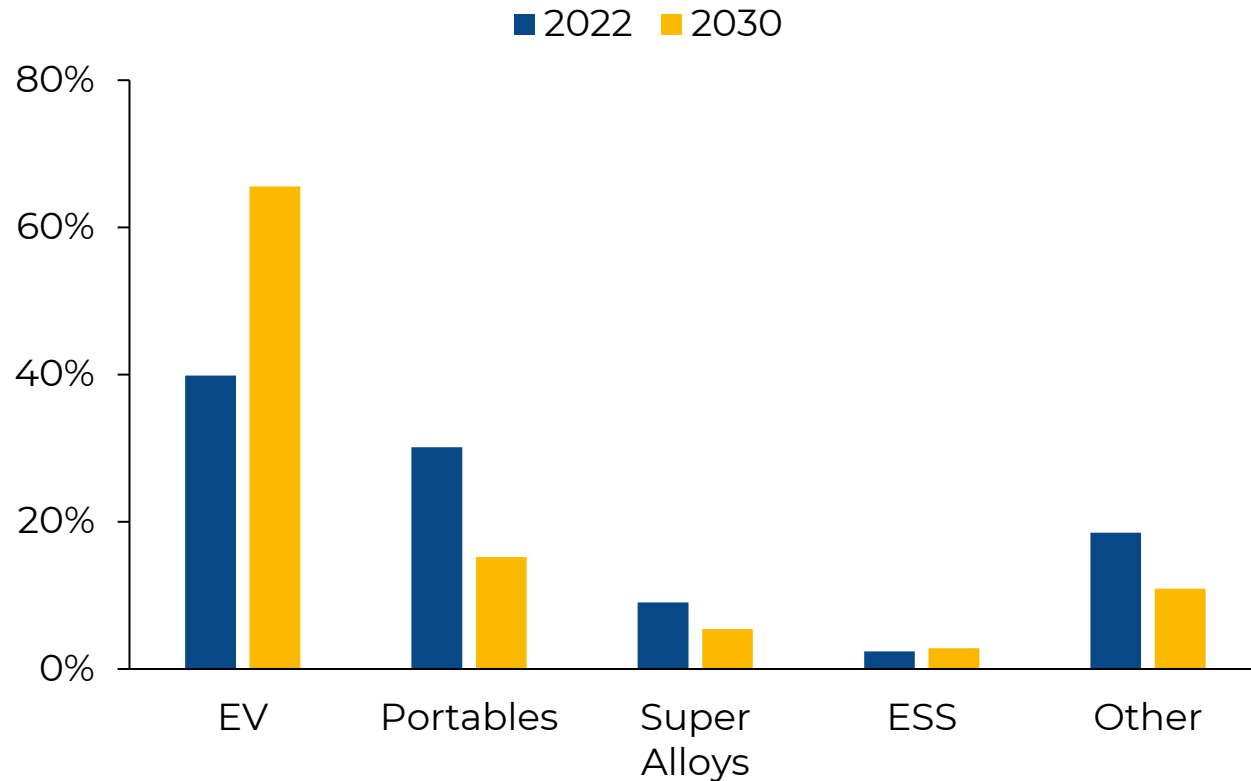
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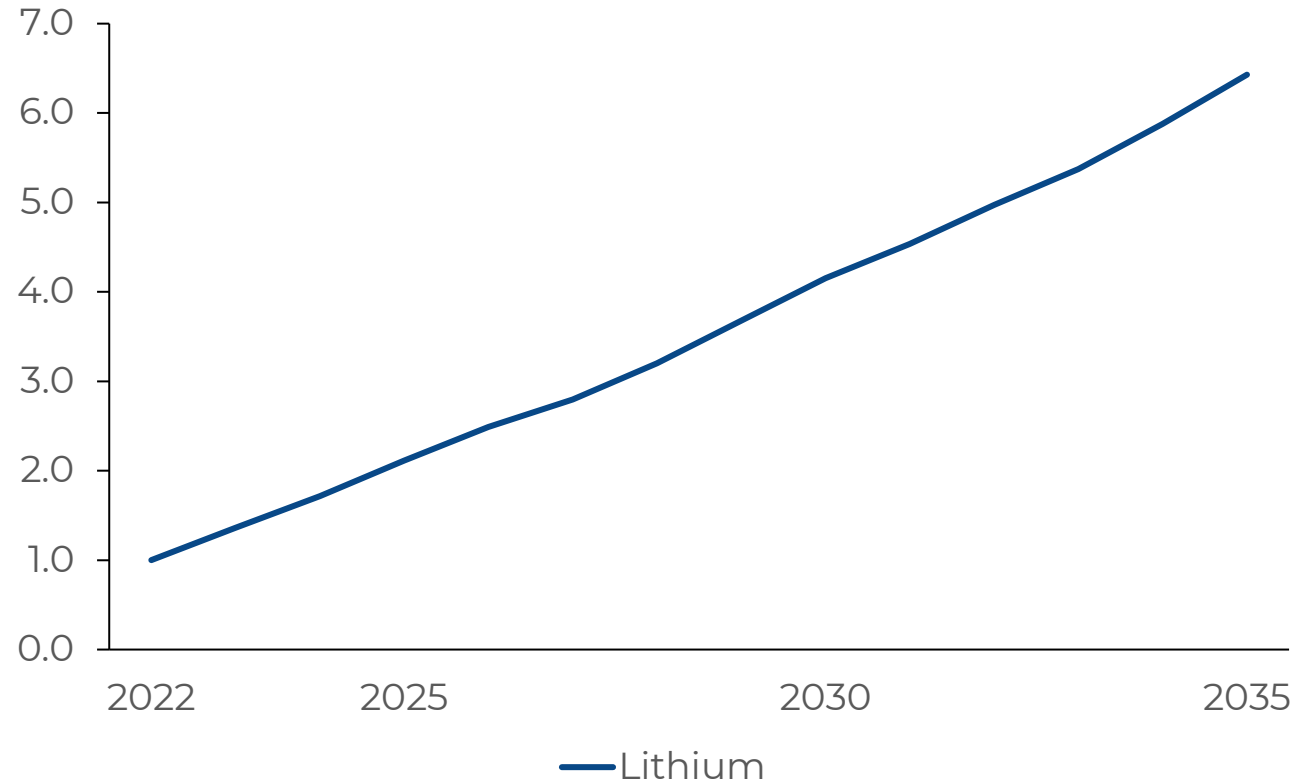
Rising EV penetration provides strong support to cobalt demand

Share of total demand (LHS) and growth to 2030 (RHS), %



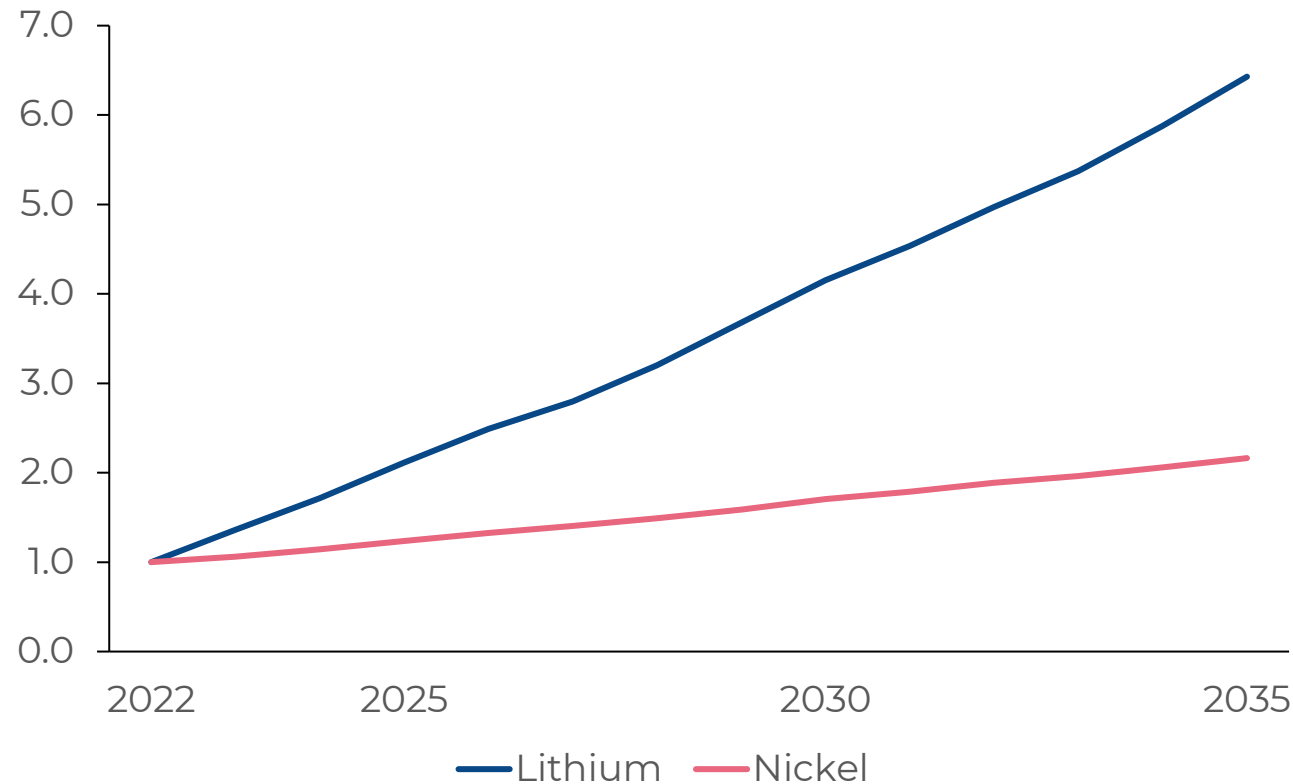
Battery revolution will pull raw materials demand to new heights

Battery raw materials demand, indexed (2022 = 1)



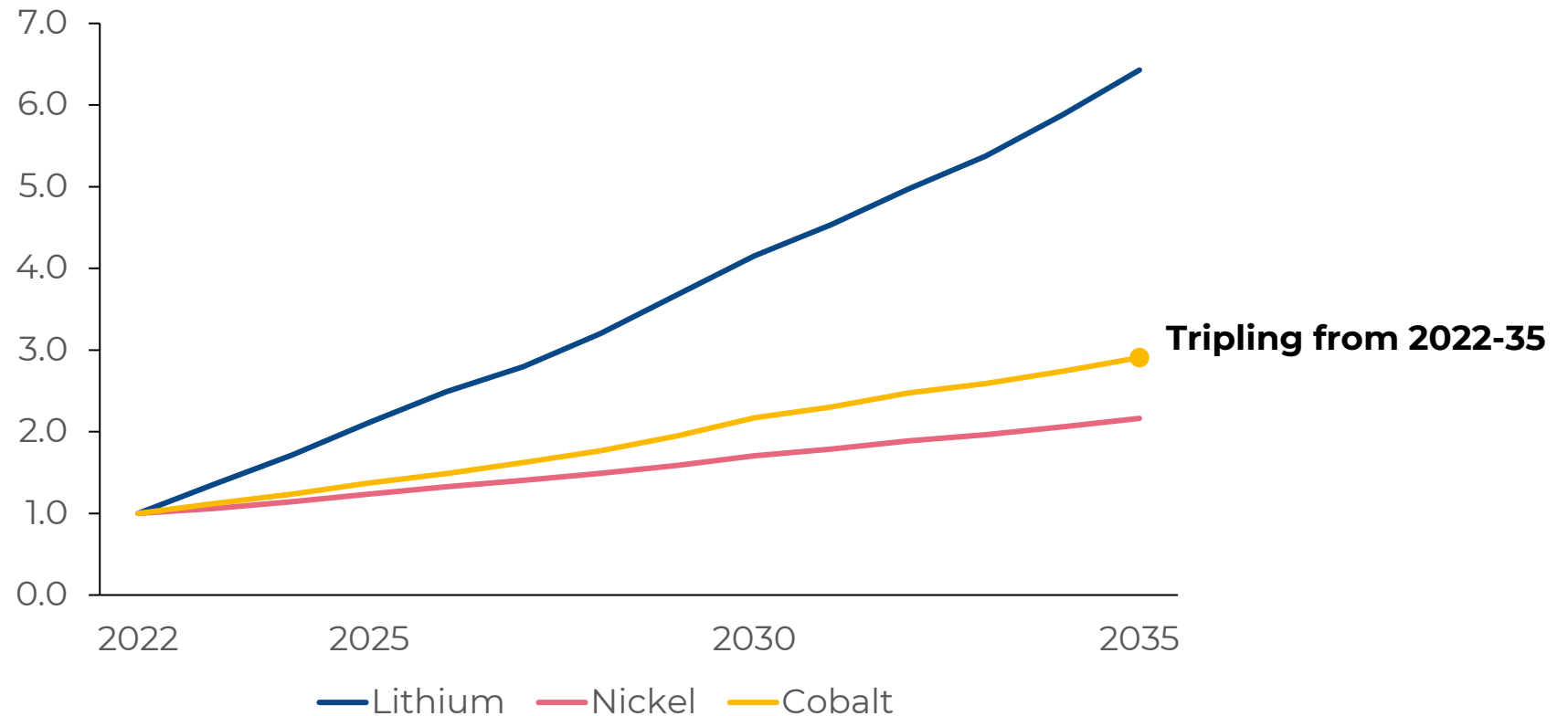
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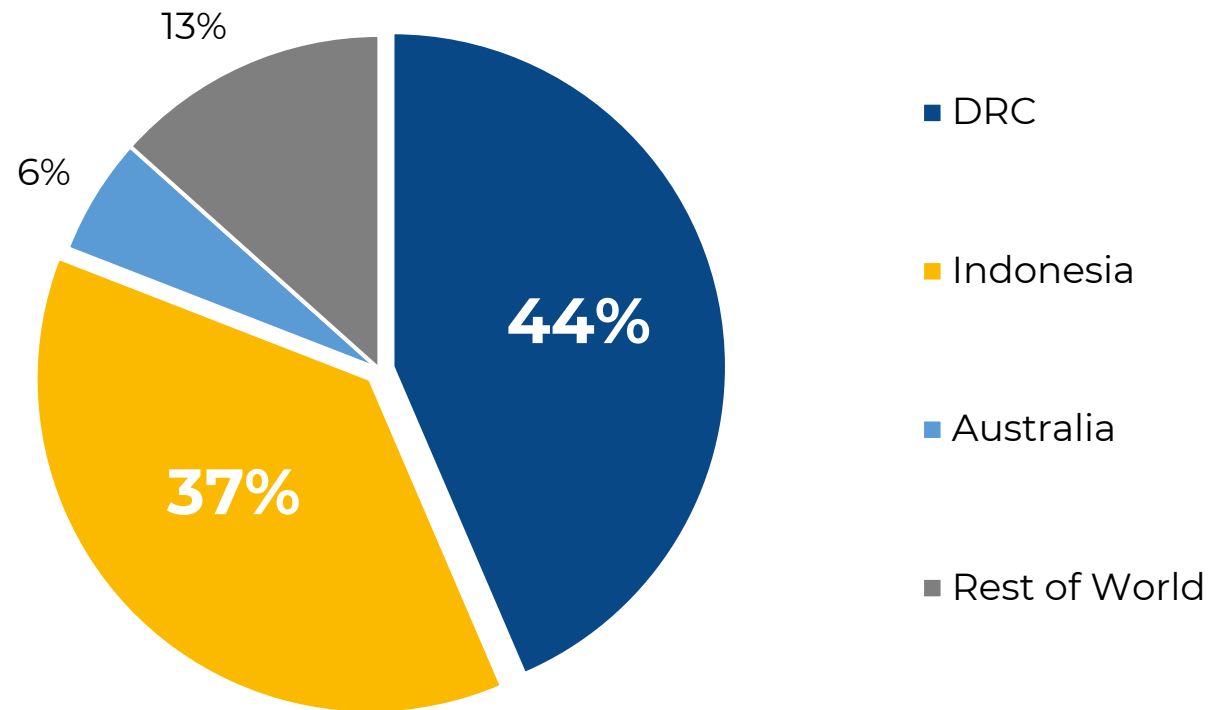
Battery revolution will pull raw materials demand to new heights

Battery raw materials demand, indexed (2022 = 1)



DRC still the major driver but Indonesia catching up

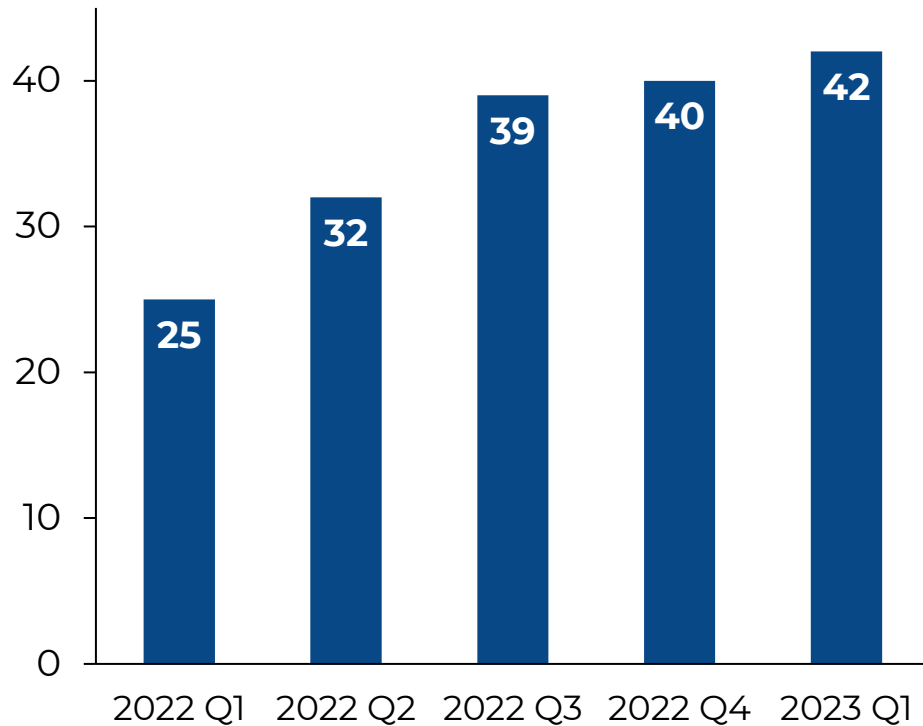
Share of supply growth* to 2030, %



Note: * Not weighted by project development potential.

Indonesia's role in the battery supply chain gathering pace

Number of Indonesian Ni-Co projects tracked by Benchmark



FINANCIAL TIMES

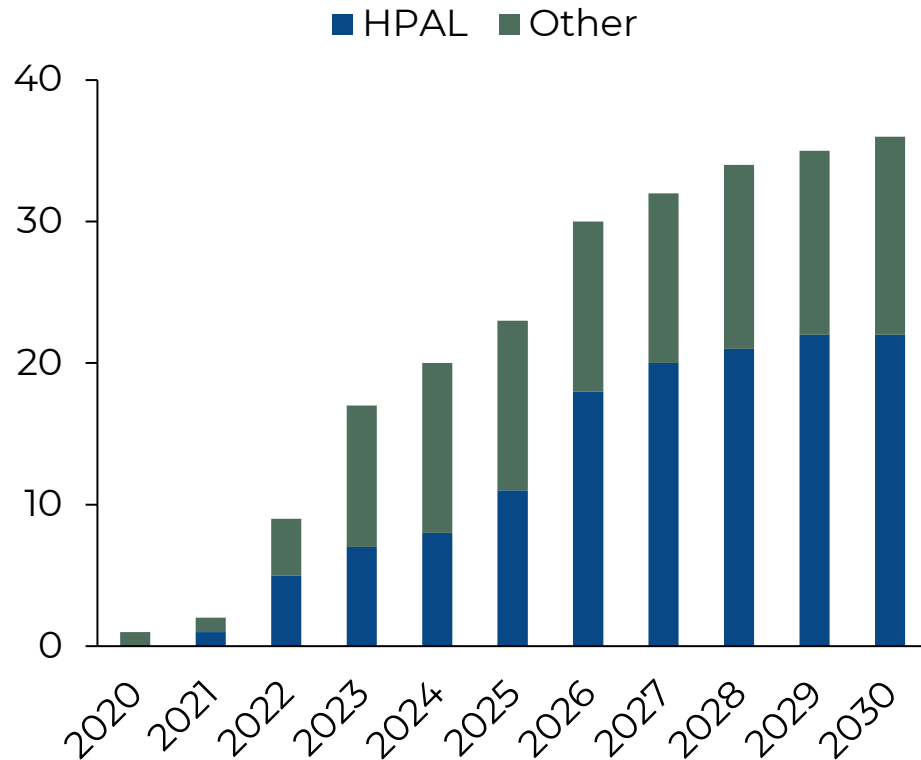
LG Energy signs \$9bn EV supply chain deal in Indonesia



Volkswagen to partner on Indonesia EV battery ecosystem

Indonesia's role in the battery supply chain gathering pace

Number of potential Indonesian Ni-Co projects by type



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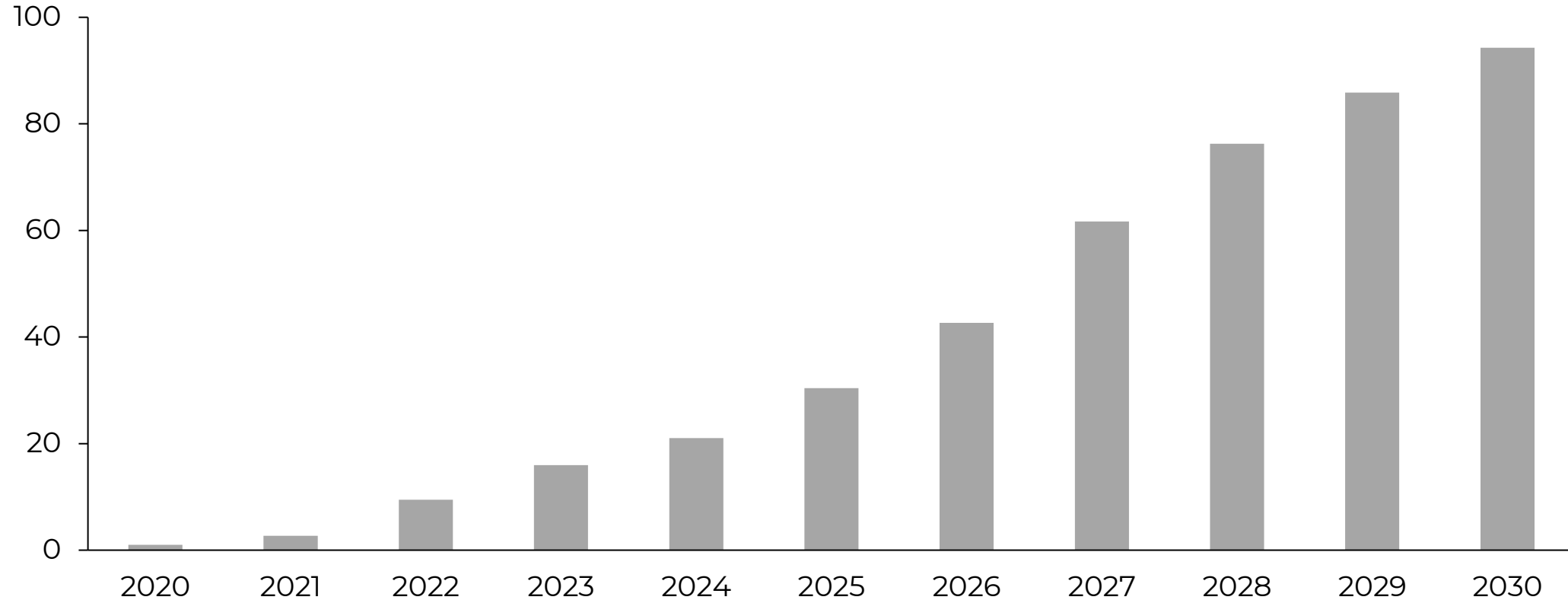
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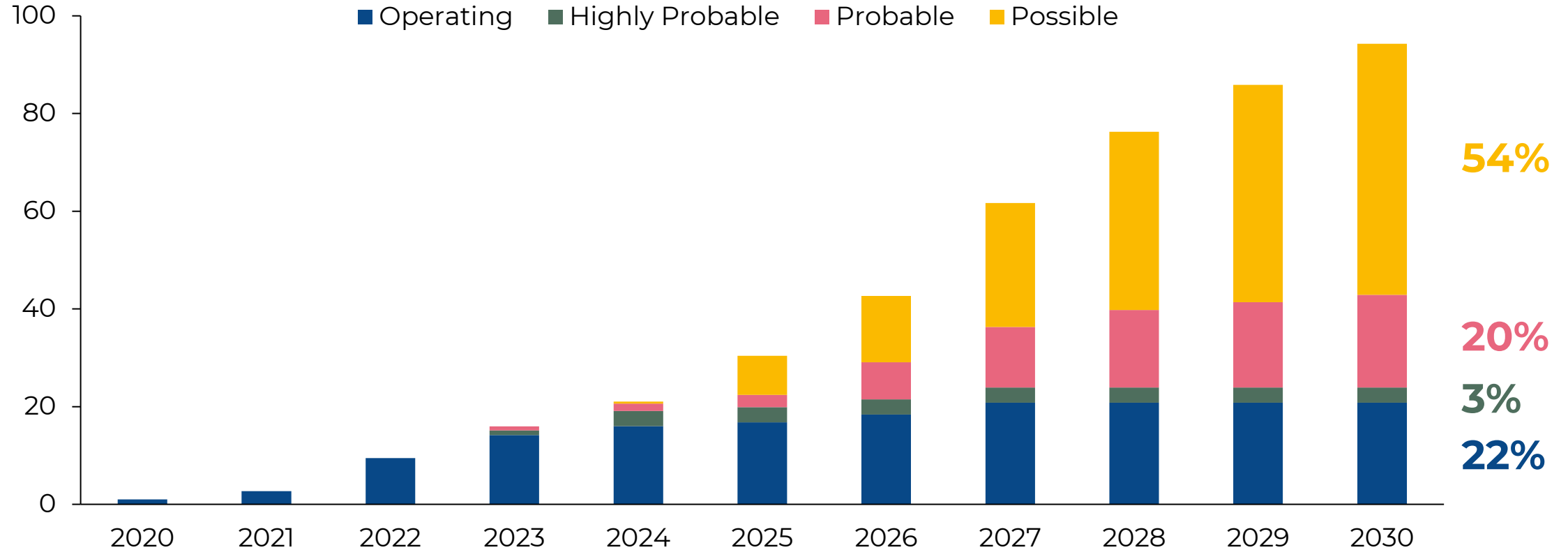
Indonesia's cobalt supply potential is high...

Cobalt supply potential from Indonesia, kt



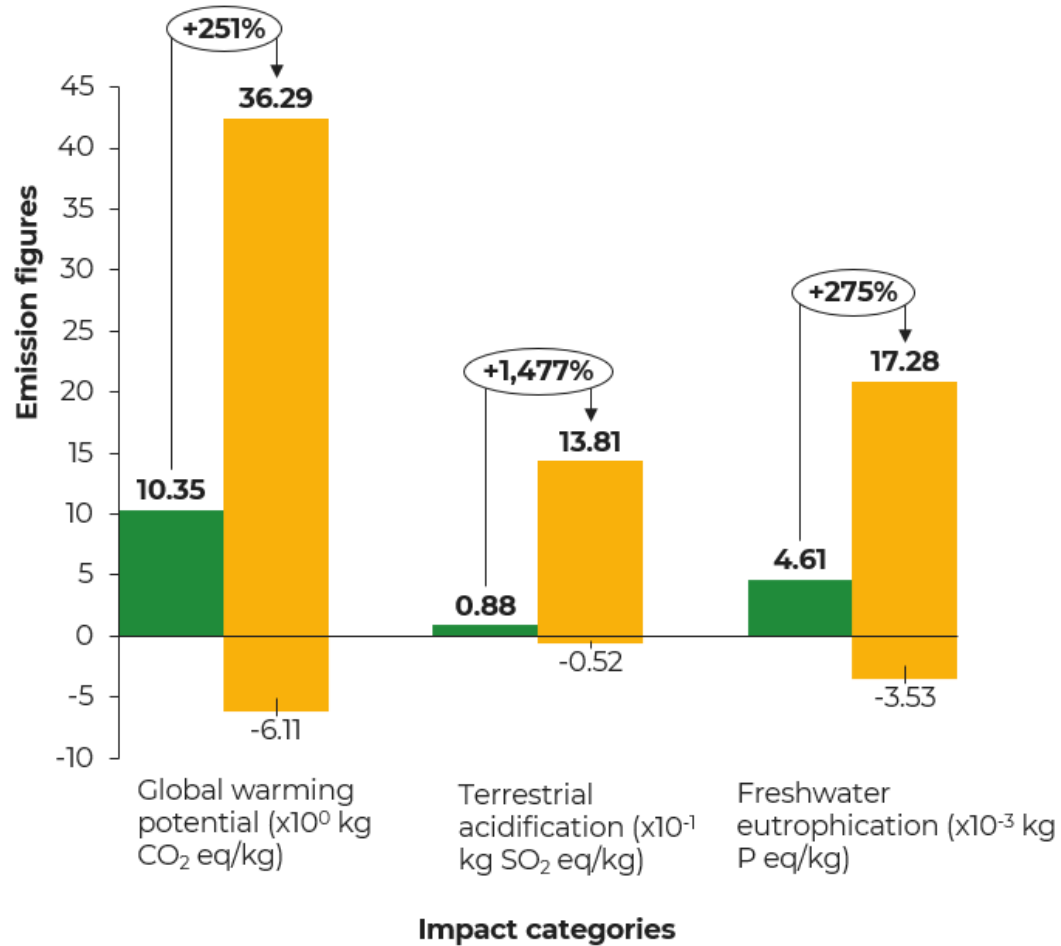
...but risks remain from project development...

Cobalt supply potential from Indonesia by status, kt



...and ESG concerns

- Cobalt contained in Cobalt Sulphate Heptahydrate (DRC/China - Benchmark)
- Cobalt metal (HPAL - Benchmark)
- Environmental credit (HPAL - Benchmark)



Project development



ESG concerns



OEM acceptance



Key takeaways

- Short term fundamentals weakened considerably
- But mid to long term demand outlook remains strong
- Prices will recover to incentivise new supply investment
- New policy announcements will re-shape supply chains

FOR ANY QUERIES, CONTACT US :



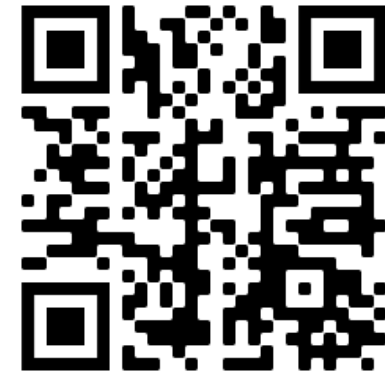
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