



## Energy transition materials and supply chain bottlenecks



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June 2022



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#### There have been many new policy developments since my WMF presentation last year



- The key takeaways from COP26:
  - o India's pledges (4 pledges plus a long-term target of reaching net-zero by 2070).
  - Pledge to make a "coal history" (69 countries aim to phase out coal power by 2030s for major economies and by 2040s for other nations).
  - Global Methane pledge (\$325 M raised to help reduce methane emissions by at least 30% from 2020 levels by 2030).
  - Deforestation (\$19.2 bn fund to halt and reverse of deforestation by 2030).
  - US-China joint climate declaration (the China Methane National Plan and US zero carbon electricity plan by 2035).
  - Glasgow Financial Alliance for Net Zero support for transition to net zero (more than 450 Financial market participants with \$130 tn assets under management have committed to fight climate change).
  - Advanced countries to provide \$100 bn a year to less developed economies.
  - Not yet major action for adaptation.
- The above pledges, if followed with effective domestic policies, could help to contain the increase in global temperatures to ~1.8–1.9 °C by the end of the century. This is significantly lower than the projected increase of ~2.7 °C under current policies or that based on pre-COP26 commitments of ~2.1 °C.
- COP26 did not deliver any major breakthroughs, it helped entrench the so-called ratchet mechanism, which will require countries to return with more ambitious climate-change targets in the future. This is a good platform for further progress, starting with COP27 in Egypt in 2022.

...COP26 announcements should restrain the increase in global temperatures, but questions remain

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#### Energy transition is leading to supply chain bottlenecks for key elements - Cu and REE





#### However, there is little consensus on how and when to spend the promised inveestment

The sustainability drive is unlikely to be reversible, but as yet it is far from relentless – short-term blips to facilitate supply chain evolution are acceptable



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#### Energy transition demands new commodities and this year prices are booming

CRU basket of 38 mining, metals and fertiliser price forecasts | 2022 over 2021\*



DATA: CRU Market Outlooks \*2022 annual average price forecast over 2021 (29 April 2022). \*\*ITA

Wind turbines and NEVs represent most NdFeB demand



#### Rare earth market transitioning rapidly due to e-mobility and supply diversification



Share of market value, % (Total value: \$14.7bn)



- Accelerating shift to e-mobility has resulted in steadily increasing demand for rare earth magnetic materials (NdFeB) and consequently neodymium (Nd), praseodymium (Pr) and dysprosium (Dy) in direct drive wind turbines and HEVs/NEVS
- REE demand is also driven by advanced manufacturing and advanced consumer goods.
- This exposure to energy transition brings longer-term risks to some REE end uses the switch from internal combustion engines (ICEs) to NEVs and HEVs will reduce the demand for catalytic converters as well as fluid cracking catalysts (FCCs) in oil refining.





#### China is the dominant producer but many more projects will be needed to meet future demand





59	60	66
Pr	Nd	Dy

- Trade tensions between US and China have sparked renewed interest in non-Chinese mining. New mines should be sought to optimise the supply mix to meet demand.
- Chinese mines dominate supply
  – which are not especially NdPr- nor DyTb-heavy within the REE basket
- China may be able to keep the market well-supplied with better capacity utilisation and higher quotas for now
- Prices will need to stay high to stimulate the needed investments in new mining capacity





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Cu

#### Renewable energy generation is highly copper intensive vs traditional generation

There is a high degree of uncertainty about timing of investments

1. Total wire & cable intensity by renewable energy type kt conductor / GW (2021 intensities)





Green energy share of copper demand to triple over the next decade





2. Wire and cable demand from renewables

'000 tonnes conductor





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Cu

#### Copper mining projects focused in South America, Australia, central Africa, China and Russia







Projects underpinning mine output growth, at least in the near term



# MATERIALS

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#### Russian projects at risk because of Western sanctions

Mining projects in Russia a big part of medium-term supply 77 Project





- Russia is ranked eighth among producers of mined copper, accounting for 0.8 Mt Cu in 2021
- Production is divided among three integrated producers: Nornickel, Ural Mining and Metallurgical Company (UMMC), and Russian Copper Company (RCC).

Mine

- Large scale projects currently under development include UMC's Udokan, RCC's Malmyzh and Intergeo's Ak-Sug. Reliance on western technology and equipment and difficulties accessing finance can affect the development of these projects
- Committed production and probable projects will be able to meet demand until 2027



Without critical minerals, vast investments and strong public commitment needed the energy transition will fail



We will now learn more from some producers of Cu and REE



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### Happy to answer your questions

