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JANUARY 2023

Energy transition metals and minerals: new strategic issues

Metals and minerals are at the core of many global economic, social, and geopolitical issues

While Europe is striving to become **independent from Russian energy**, new dependency issues have emerged. Before the war in Ukraine, Russia was the European Union's leading supplier of fossil fuels, accounting for around 40% of gas imports, 20% of oil imports, and 70% of thermal coal imports.

The response from the EU, through its RePowerEU plan, involves **increasing electrification** throughout the economy (notably for heating, mobility, and industry) and accelerating the development of **renewable energies**. Naturally, this has ushered in other **geopolitical**, **environmental**, and **social implications**.

It is believed there are over 4,000 different minerals on Earth, many of which have metallic components. Metals are elementary substances, such as gold, silver, and copper, which are crystalline when solid and are frequently found in minerals.

Being essential to modern life, metals and minerals have now taken on a **strategic dimension**, particularly as they feature in so many **transition enabling technologies** - notably for renewable energy and the electrification of transport.

Faced with China's hegemony in this area, what strategy has the European Union developed to diversify supplies and reduce its dependency? And how can the environmental and social impact of the sector be reduced?

The energy transition is causing demand for metals and minerals to soar

Metals and minerals are essential for the deployment of green technologies

Known to be **good conductors of electricity and heat**, metals are naturally present in many technologies; their use is therefore expected to grow massively in the context of the energy transition.

Technologies such as **power grids**, **solar panels**, **wind turbines**, **electric cars**, **storage batteries**… are metal intensive. For example, a wind turbine contains copper, steel, aluminum, zinc, neodymium, dysprosium, and terbium.

An electric car requires 6 times more minerals than a conventional vehicle. Offshore wind farms require 10 times more minerals than gas power stations. According to ADEME, the French agency for ecological transition, a wind turbine uses 17 kg of rare earth metals, while an electric vehicle needs 5 to 9 kg of cobalt.

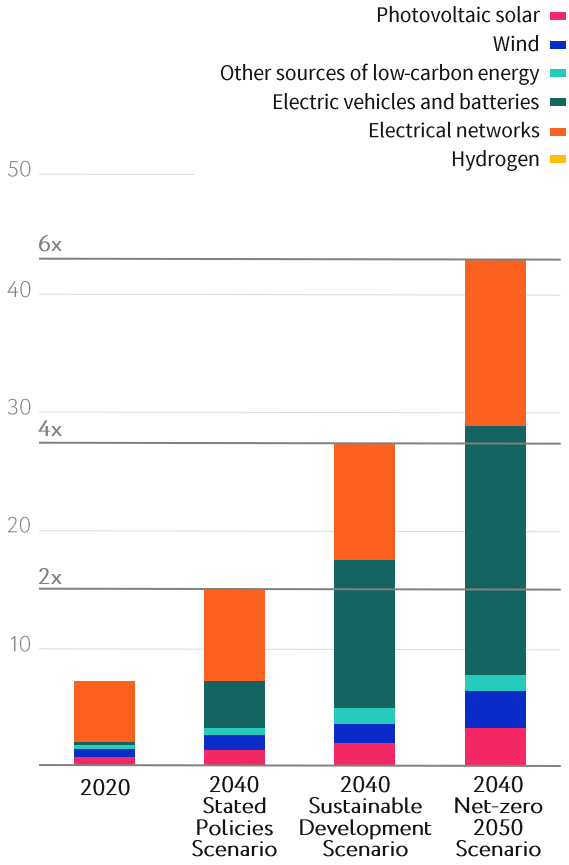
Copper is also a critical metal for the energy transition, both for **renewable energy technologies** and for the **transmission and distribution of electricity**. Copper can be found in relative abundance in the earth's crust. **Lithium**, on the other hand, is present in electrical batteries, as are **cobalt** and **nickel**.

The International Energy Agency (IAE) has assessed the **growth in global demand** for metals and minerals according to different scenarios: the current trend (2040 - Stated Policies Scenario), a +2°C pathway (2040 – Sustainable Development Scenario) and a +1.5°C pathway (2040 – Net-zero by 2050 scenario).

Furthermore, the IAE has projected that in a +2°C scenario, demand for the minerals used in electric cars and batteries would increase 30-fold by 2040, with lithium most in demand.

The IAE has projected that demand for metals and minerals will increase at least twofold by 2040 and up to sixfold in a Net Zero scenario by 2050

Demand for minerals according to different clean energy technologies and different climate scenarios.



Geopolitics are affecting supply

Critical materials and dependencies

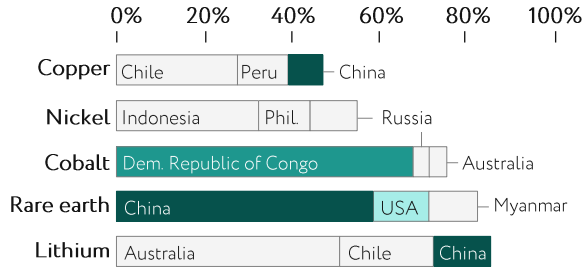
The European Union and the United States have drawn up a list of **critical raw materials**, and most of these are metals. A raw material is deemed critical when it is used in many sectors of industry, when there are **no easy short-term substitutes**, when its economic value is high, and if supply and production are **concentrated geographically**. The EU also takes into account the "country risk" associated with suppliers, which covers environmental factors and trade restrictions.

These critical raw materials include lithium, magnesium, cobalt, titanium, and several rare earths. The **economic criticality of lithium**, for example, is largely due to the concentration of reserves, **with 5 players owning 90% of the market**. It is also due to the lack of transparency on pricing. On the other hand, **cobalt** carries a high level of **geological criticality**, but even more importantly, supply could be restrained due to geopolitical tensions around the material. More than 70% of the world's resources are in the Democratic Republic of Congo (DRC).

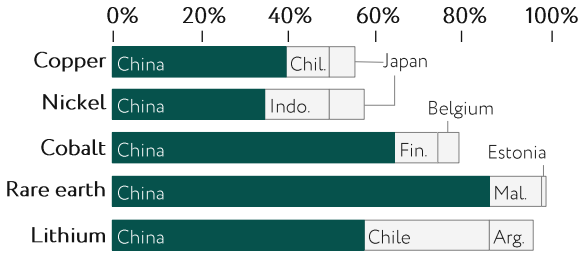
The Chinese hegemony

The graphs below illustrate the importance of China in the production of rare earths, as well as the country's dominance in the refining of most metals. In 2020, China provided 98% of the EU's supply in rare earths. South Africa, on the other hand, covered 71% of the EU's purchases of platinum. The percentage is even higher for iridium, rhodium and ruthenium.

Main countries producers of minerals used for clean energy technologies



And where they are refined and processed



The issues of security of supply and dependency have been brought to the front stage by the energy transition.

The European Commission is working on diversifying supply, reducing dependencies on other countries, and improving the efficiency and circularity of resources:

- The first objective is to **favor supply from within the European Union** – where many metal resources are currently unmined. For example, by 2025, the European Battery Alliance should be able to satisfy 80% of Europe's demand for lithium by relying on European sources.
- In addition, the European Commission tends to **partner up with third-party exporting countries**. These partnerships will allow the latter to develop their mineral resources sustainably, while building trust-based relations with the EU.
- Finally, the EU is **investing in its recycling industry and in innovation**. In 2020, over 50% of several metals – including steel, zinc, and platinum - were recycled, and already weighed over 25% of the EU's total consumption. For other metals, though, and notably those required for renewable energy technologies, the use of secondary materials remains rather marginal.

Environmental and social challenges

The mining of these metals, instrumental to the energy transition - and notably to support the deployment of renewable energies - also raises the question of their social and environmental impacts. Some mines, in the Democratic Republic of Congo for example, neither comply with **labor rights**, nor with the methods established to contain the **environmental impact of their operations**.

Notwithstanding their scandalous aspects, in reaction to these poor practices, policy makers and investors are disengaging, and public opinion is rejecting mining projects.

Lithium-mining projects were suspended in Bolivia and in Serbia due to local opposition. In response, the European Union drew up a new **Conflict Minerals Regulation** which came into effect in January 2021, setting due diligence obligations with respect to the supply chain.

How should investors be positioned on energy transition metals?

On the corporate side, some companies do apply best practices. Sycomore AM's proprietary fundamental analysis model, **SPICE**, enables our portfolio managers to consider all **extra-financial** factors specific to the sector when making investment decisions.

The NEC, Net Environmental Contribution - our compass for navigating the transition

To assess the **environmental impact of companies** operating within the metals and minerals sector, we use the NEC – a multidimensional indicator measuring the extent to which a given activity contributes to the environmental transition. Applicable to all occupations and all asset classes, the NEC ranges between -100% and +100%; it covers **climate change**, but also biodiversity, including water usage and pollution, and **resources**, such as the management of waste.

Our investment solutions supporting a sustainable transition for resources

The stock selection process applied to our Environment funds, **Sycomore Europe Eco Solutions** and Sycomore Global Eco Solutions, requires investee companies to display **NECs strictly above zero** (i.e., a clear positive contribution to the environmental and energy transition, according to 8 environment-based subthemes).

These criteria naturally apply to companies operating within the metal and minerals industry, to ensure we only select players fostering an economy that is both **carbon frugal and respectful of natural capital**. Importantly, we seek to ensure that the companies producing the metals instrumental to the transition have established **a roadmap for reducing their impact**, notably in terms of GHG emissions and pollution.

By applying our analysis model, we also pay particular attention to **human rights** and the **quality of business relations** with the providers of raw materials.

How are listed companies addressing the challenges of energy transition metals?

umicore

Umicore, formerly a Belgian mining company, now operates in the **metal transformation** industry, with a focus on essential components for batteries and solar panels, and in the recycling of critical metals.

The company has developed an ambitious **CSR** strategy and its **climate plan** has been approved by the Science Based Target initiative as being aligned with the objective of a 1.5°C rise in global temperatures by 2030. The Sustainable Procurement Framework for Cobalt, developed in-house, governs the sourcing of this material. Umicore plans to extend this policy to other metals, such as lithium and nickel. At the same time, the company plans to increase the incorporation of metals recycled in house and derived from batteries into its own production.

BEFESA

Befesa is a leading player in **steel and aluminium dust recycling**. The group recycles and transforms over 2 million tonnes of hazardous waste every year. This helps to increase the supply of critical metals, such as zinc, aluminium, nickel, and chrome, while reducing the environmental impact from the primary production of these metals.

According to the group's estimates, these activities have prevented around 2.4 million tonnes of CO2 emissions. Befesa also monitors the footprint of its operations and has set up a roadmap aimed at **reducing its energy consumption** and its own emissions (the recycling process is energy intensive).

Aurubis

Aurubis produces several types of metal, including **copper** and copper derivatives. The group is also positioned as a **leader in the recycling** of copper.

Aurubis applies a strict policy when sourcing its raw materials. It operates partnerships with around 30 mines, meaning it can ensure **human rights** are respected and that best environmental practices are duly observed. The group abides by the standards set by the International Labour Organisation (ILO), with the OECD rules on Due Diligence Guidance, and conducts pre-contract assessments according to the framework provided by the OECD.

Nexans

Nexans is also a key player in the energy transition. The group designs **high-quality cables** for power transmission, notably for use in off-shore wind farms, subsea interconnectors, high-voltage power lines, etc.

The company's roadmap includes strengthening activities enabling **electrification**, using a growing percentage of recycled copper. This roadmap is clear and quantified and has been approved by the Science Based Target initiative. Furthermore, CSR considerations are addressed at the heart of the company's governance: the Board of Directors includes a Climate Director, as well as a committee dedicated to strategy and sustainable development.

MP MATERIALS

MP Materials is one of the world's leaders in the **extraction** and **refining of rare earths**, notably **neodymium**, used in the engines of **electric vehicles** and **wind turbines**. The company owns the only operating rare-earth element mine in the US, located in Mountain Pass.

The extracted materials are processed on-site, limiting need for transport. By integrating extraction and processing activities, the company will be able to offer much higher environmental and social standards than the market average. For example, 95% of its water needs are met with water that is recycled on site using a closed loop process.