CIRCULAR ECONOMY IN MINERALS FOR GREEN TRANSITION

Business Brief
THE GREEN TRANSITION AND WHAT IT MEANS

This is a brief for business audiences. Please visit “The Future is Circular” report here.

The transition towards a net-zero economy will require a large-scale implementation of low-carbon technologies. Concerns have been raised about whether the availability of minerals will be a bottleneck for the green transition, prompting discussion about opening new mining frontiers for supplying these minerals. One of the most controversial options is the exploration of minerals in the deep sea.
The current global economy is highly reliant on the supply of raw materials. They form a strong industrial base, producing a broad range of goods and applications used in everyday life and modern technologies. Reliable and unhindered access to certain raw materials is a growing concern. To address this challenge, the European Commission has created a list of critical raw materials (CRMs), which is subject to a regular review and update. The total demand for minerals and whether critical minerals will become a challenge for the green transition depends on the path we take.

Some actors in the private sector are now looking to deep seabed mining as a possible solution for this increasing demand. But a recent study commissioned by WWF reveals that minerals from the deep sea are not needed. Instead, with adequate investments in new technologies, recycling, a circular economy and in responsible extraction of mining waste and in responsible mining of existing mineral reserves these bottlenecks can be opened and the green transition can be achieved.

**THE RAPIDLY INCREASING DEMAND FOR RAW MATERIALS CAN BE MET WITH RESPONSIBLE MINING METHODS**

What is responsible mining?

WWF envisions a mining sector that is responsible to people, nature and all its shareholders. This includes applying the mitigation hierarchy for nature conservation and preventing negative environmental and social impacts. In addition, a responsible mining sector creates and maximises its social benefits and does not harm people’s future opportunities. Companies can learn more from the Initiative for Responsible Mining Assurance (IRMA).
MINING AS A KEY DRIVER OF ENVIRONMENTAL DEGRADATION AND LOSS OF BIODIVERSITY

Our planet is changing rapidly due to ever-increasing human consumption, which relies on large inputs of natural resources, such as water, land and energy. Driven by increasing consumption levels and reliance on high-tech metals, mining activities are expected to grow. This will increase the pressure on biodiversity, which is already under threat: The Living Planet Report reveals an average decline of 69% in species populations since 1970. While conservation efforts are helping, urgent action is required if we are to reverse nature loss. Together with expanding agriculture and growing urbanisation, mining is one of the main drivers of ecosystem degradation. It contributes to degradation through a series of severe and persistent direct and indirect environmental impacts associated with exploration, extraction, processing, smelting, refining and transport. Important negative environmental impacts include:

- **Large land footprint**: Mining projects, in particular open-pit mines, typically occupy large areas of land, causing environmental degradation through the destruction of ecosystems, erosion or deforestation.

- **Energy use and GHG (greenhouse gas) emissions**: Mining is highly energy intensive and accounts for over 38% of total industrial energy use world-wide.

- **Water use**: Adverse effects of high water demand in mining are particularly noticeable in countries that are already experiencing severe levels of water stress.

- **Waste**: Mining often generates large amounts of waste rock and tailings, which need to be stored and require large storage facilities.

- **Contamination and pollution**: Toxic residues of mining processes such as arsenic and lead, or radioactive material can be released into the surrounding environment and cause irreversible harm.

- **Loss of biodiversity**: Mining projects significantly disrupt ecosystems, threatening habitats and natural cycles in the living environment.

- **Reverine, marine, and deep seabed mining**: The exploration and extraction of deep seabed minerals is evolving and will increase the human footprint on previously largely pristine, unknown and vulnerable ecosystems.

- **Abandoned mines, insufficient rehabilitation**: Although mining companies are in most countries required by law to rehabilitate mining sites after mine closure, rehabilitation is often insufficient and ecosystems are often impossible to restore to their former state.

- **Any further indirect impacts**: Often mining operations are set up on formerly undeveloped areas and infrastructure is built that fragments animal habitats and leads to human migration, the development of residential areas and detrimental activities such as poaching.
CIRCULAR ECONOMY STRATEGIES ARE IMPORTANT FOR A RESPONSIBLE GREEN TRANSITION

A green transition must promote not only technological solutions but also strategies to promote the responsible use and sourcing of minerals. A circular economy model aims to move from a linear system of extraction, use, and disposal, to a system where service delivery is prioritised over products and materials. In a circular economy, extracted materials remain in society for longer and, when products and infrastructure reach the end-of-life, the materials are recovered and looped back into the production of new products and technologies. This will help reduce the demand for new materials.

To reduce our material footprint on the planet and keep warming to less than 1.5°, all stakeholders, including the private sector, need to make the necessary decisions and adopt policies that enable the shift to new, less resource-intensive technologies and fully circular economies. The green transition does not need deep seabed mining to drive a low-carbon economy. There is a path ahead to decarbonise with a much lesser material footprint.

The report finds that demand for seven studied critical raw minerals can be reduced by 58% from now to 2050 with new technology, circular economy models and recycling.

1. The demand for raw materials can be reduced by new technologies:
   - 30% for the seven critical minerals taken together
   - 40-50% for cobalt, nickel, and manganese
   - 20% for rare earth elements
2. In addition to the reduction by technological choices, the demand for raw materials can be further reduced by circular economy strategies by 18% between now (2022) and 2030
3. 20% of the total mineral demand could be supplied by recycling between 2022 and 2050
4. Most of the mineral needs for the green transition can be supplied by recycled minerals by 2050
Deep seabed mining is an industry that is not yet operational, but that plans to mine the deep seafloor for minerals by sucking or scraping mineral rich rock off the deep seafloor or off the sides of underwater mountains and vents.

The International Seabed Authority (ISA) is under pressure to give way to deep sea mining activities as soon as 2023 without clear and needed scientific understanding of the environmental impacts. If the industry proceeds, the intensity, and methods of deep seabed mining could remove entire habitats, species, and the services they provide. This is a risk that we simply can’t afford to take.

With our ocean already under major strain from overexploitation, the last thing we need is a new threat to ocean life. The consequences could very well be irreversible. Scientists tell us that deep seabed mining, should it be allowed to go ahead, would have irreversible impacts on the deep sea, and might also impact negatively on the ocean’s ability to act as a carbon sink, thus exacerbating the impacts of climate change.

The deep seabed mining industry stands to reap profits that will disproportionately benefit a few states and a handful of large businesses. If large-scale extraction goes ahead, it could disrupt a much wider ocean economy valued at US$1.5-2.4 trillion annually. That would put poor coastal communities on the losing end of the deal, exposing coastal food sources to new risks.
WHAT THE PRIVATE SECTOR NEEDS TO DO

1) Join the call for a moratorium on deep seabed mining

Extraction must not go ahead until the environmental, social, and economic risks are understood, and all alternatives to deep sea minerals have been explored. Then appropriate regulation will be needed to protect the marine environment and human well-being.

 Calls for a global moratorium are increasing, with the private sector, community leaders, scientists, local governments, and fishers’ organisations leading the way and with now a growing group of countries also joining the calls. WWF is proud to stand for our ocean alongside a global coalition of individuals, civil society, businesses, and governments.

 Responsible businesses can join the business statement calling for a global moratorium on all deep seabed mining activities, thereby putting increasing pressure on governments not to open the fragile deep sea to mining and instead invest in a circular minerals economy that meets demand without jeopardizing ocean health.

 You can sign up by expressing your interest here.
2) Invest in a circular economy and technological innovation that avoid use of critical minerals.

Technological innovation and circular economy measures from both the demand and supply sides are vital for reducing the need for mineral extraction and associated impacts. Total mineral demand can be halved by 2050, and recycling can supply about 20% of this remaining demand.

A more circular economy, with higher collection and recycling rates, is possible (and necessary) for all minerals. A circular economy could present a viable opportunity for businesses regarding recovered resource value, access to new markets and green investment funds, as well as the value created through new circular products and services.

Simultaneously, such circular approaches can offset pressing resource, market, operational, business, and legal risks associated with the current linear ‘take-make-dispose’ model. So, circular opportunities will let industry and society balance current and future risks associated with the linear economy. Circular economy strategies can decrease total mineral demand by a further 18% between 2022 and 2030.

Technological choices that businesses make will have a major influence on the demand for minerals. A scenario with high technological innovation and substitution will reduce the total demand for these minerals by 30% between 2022 and 2050. Innovation, resource constraints, social and environmental standards, price fluctuation for critical minerals, and policies and regulations will determine whether we take a path with high or lower demand for critical minerals. However, a future with technology choices that will reduce the demand for these minerals is possible.
3) Adhere to UNEP Finance Initiative’s guidance on Harmful Marine Extractives and establish policies not to invest in deep seabed mining and other harmful extractive activities.

The energy transition will require a lot of materials, not only the equipment itself, such as solar panels and wind turbines but also for building and operating large infrastructure such as roads, foundations, mounting structures, as well as infrastructure for the transmission, distribution, and storage of electricity. This is the key argument provided behind the expansion into the exploration of deep seabed mining.

The UN Environment Programme (UNEP) Finance Initiative has provided detailed guidance on alternatives to deep-sea mining, and they include recommendations for businesses and financial institutions to (i) reduce the environmental footprint of terrestrial mining; and (ii) support the transition toward a circular economy that promotes the reuse of raw materials in the economy, making current minerals demand obsolete and setting us on a path to a circular resource economy. Supplement to that, the European Investment Bank (EIB) criteria for eligibility includes guides on bank-wide excluded activities which includes extraction of mineral deposits from the deep sea.

4) Design out the bottleneck minerals from their products.

Steel and aluminium correspond to around one-third of all future material demand for the transition to a low-carbon economy. Copper, as well, while not found in regional lists of critical minerals, is often discussed as a potential bottleneck for the energy transition. This is because copper is essential for all energy technologies and, in addition, to many other new and mature technologies. At the same time, copper mining is becoming increasingly more expensive in capital and energy consumption. Companies can work with the Initiative for Responsible Mining Assurance (IRMA) to attain third-party verification and certification against a comprehensive standard for all mined materials that provides ‘one-stop coverage’ of the full range of issues related to the impacts of industrial-scale mines.

To ensure that we achieve the energy transition, stay within the climate goals and ensure functional ecosystems, there must be a move towards many concurrent strategies: material efficiency in all stages in the supply chain of infrastructure and final products that use these minerals, better product design that aims to improved collection and recycling rates, and when possible, the substitution of critical minerals for other materials with lower supply risks.
5) Ensure your supply chains are from responsible sources in existing mineral reserves, meeting social and environmental responsibility guidelines and standards, such as the Initiative for Responsible Mining Assurance (IRMA)

Companies may face risks in their mineral supply chains because of circumstances of mineral extraction, trade, or handling which by their nature have higher risks of significant adverse impacts, such as financing conflict or fuelling, facilitating, or exacerbating conditions of conflict. Despite the fragmented production process in the supply chain, and independent from their position or leverage over suppliers, companies are not insulated from the risk of contributing to or being associated with adverse impacts occurring at various points in the mineral supply chain. Because of this, companies should take reasonable steps and make good faith efforts to conduct due diligence to identify and prevent or mitigate any risks of adverse impacts associated with the conditions of mineral extraction and the relationships of suppliers operating in conflict-affected or high-risk.

THE INITIATIVE FOR RESPONSIBLE MINING ASSURANCE

The Initiative for Responsible Mining Assurance (IRMA) is an organisation that provides verification and certification for a more socially and environmentally responsible mining. The IRMA Standard for Responsible Mining is a standard developed through a multi-stakeholder process that covers 26 chapters on business integrity, social responsibility, environmental responsibility, and planning for positive legacies. The standard reflects the best practices on the mining industry, including human rights due diligence, mining in conflict-affected areas, resettlement and cultural heritage, revenue and payments transparency, security, labour rights and worker health and safety, tailings management, and biodiversity management.

Many large vehicle manufacturers have committed to this initiative to ensure that the minerals in their value chains are sourced responsibly, such as BMW, Ford, General Motors, Mercedes-Benz, Volkswagen, and Tesla.
WANT TO LEARN MORE?

You can act against deep seabed mining today. Here are some other useful links:

- The business call for a moratorium on deep seabed mining
- Standard for responsible mining on land
- In Too Deep report – What we know and don’t know about deep seabed mining
- Untangled: Deep seabed mining (Video)

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