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Conscientious extraction: forging a greener path for responsible mining



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Metals are essential to everyday life. They also play a critical role in the energy transition and electrification of our economy. However, we often overlook their origins and the mining processes involved.

Typically, metals mining occurs in remote locations, away from public scrutiny and only garners attention when disasters strike. Indonesia, the largest producer of nickel in the world¹, has faced severe environmental issues. Off the coast of Obi Island, the sea has turned red due to contamination from mining activities. In January 2019, a tailings dam gave way in a mine operated by Brazilian giant Vale, killing 270 people and causing substantial environmental damage².

What if we could establish a best-in-class framework for sustainable mining practices, enabling companies to benchmark and hold themselves accountable?

To conduct due diligence on potential investment opportunities, N. M. Rothschild & Sons established the Exploration Company in 1886 alongside Hamilton Smith, one of the most influential American mining engineers³.

By 1896, the Exploration Company was recognised as the strongest institution of its kind in the world.

More than a century later, mining responsibly is as important as it's ever been. In collaboration with Terra Capital, Rothschild & Co hosted a Sustainability Sphere to discuss sustainable mining practices.

Founded in 2010, Terra Capital is a specialist investment manager that we recently partnered with in the Exbury strategy.* Terra provides an opportunity for us to invest in companies that actively contribute to easing a critical bottleneck in the energy transition. Just as the Exploration Company recognised in the 19th century, the provenance and practices of sustainable mining are crucial, and this principle forms the foundation of our relationship with Terra today.

Read on to discover the key takeaways of our discussion.

¹ Top 10 nickel-producing countries in 2023 - Mining Technology

² Vale dam disaster: \$7bn compensation for disaster victims - BBC News

³ Exhibitions, Rothschild Timeline: The Rothschild Archive

* Please note this article does not constitute a solicitation or promotion of the above mentioned external companies or institutions. The content is also not intended as formal investment advice nor a recommendation and the suitability for your personal circumstances has not been checked.



EXPLORING A CIRCULAR MINING LIFECYCLE

Historically, mining has been inefficient and harmful to the environment. The industry's public image has been further damaged by media coverage of toxic emissions from operations and the obliteration of landscapes. In addition, declining ore quality necessitates deeper and more costly excavation, amplifying the environmental impact.

However, three billion tons of minerals are needed to achieve a 'below two degrees Celsius' future, according to a World Bank Group report⁴. To ensure resources are available for the next generation, we must therefore enhance exploration to align with the principles of a circular economy.

The incorporation of renewable energy sources, such as hydrogen technology, can power mines and reduce transport emissions. For example, Foran Mining is working on a project in Canada to produce net-zero carbon copper by 2026 through fully electrifying their operations.

Tailings, a by-product of mining, could also be repurposed for carbon capture, reducing waste and combating greenhouse gas emissions. Through a natural process known as carbon mineralisation, CO₂ reacts with minerals in tailings, trapping the gas into a cement-like mineral⁵.

'Smart mining' could be another answer. The use of drones for aerial surveys and data collection can significantly speed up geological surveying, making the process more accurate and efficient. New technology is also being developed, such as XtremeX Mining's drilling machine which can be used continuously, with greater precision and pace.

While China dominates global expertise in metal processing and refining, recycling could help drive circularity. To reduce plastic waste, the EU has imposed a 25% target for recycled content in plastic bottles by 2025⁶. A similar commitment to recycled metals would reduce the need to mine for more resources.

UNEARTHING OPPORTUNITIES FOR LOCAL COMMUNITIES

To mine for the future, we must prioritise the protection of both employees and local communities. Ensuring robust safety protocols and providing adequate protective gear are essential steps in safeguarding the wellbeing of miners.

Mining operations can also be disruptive to the local area. In November 2023, the world's 10th largest copper mine, Cobre Panamá, was shut down following intense protests. During contract negotiations with the government, the miner failed to engage with the community. The social media hashtag #PanamaTeQuieroVerde (Panama, I Want You Green) trended as protests alleged the mine was taking water required by the Panama Canal, contaminating rivers and undervaluing the country with an unusually low 2% royalty rate.

Mines can only succeed with significant investment in local communities and their employees. The two can also go hand in hand. Rio Tinto awarded a contract to a local Mongolian shoe factor to supply safety boots to the Oyu Tolgoi mine⁷, one of the largest known copper and gold deposits in the world⁸.

⁴ Minerals-for-Climate-Action-The-Mineral-Intensity-of-the-Clean-Energy-Transition.pdf

⁵ UBC-led project combats emissions by locking carbon dioxide in mine waste | UBC Research + Innovation

⁶ Single-use plastics - European Commission

⁷ Tolgoi expands domestic supply chain with locally manufactured safety boots

⁸ Oyu Tolgoi | Global

According to a World Bank Group report, 3 billion tons of minerals are needed to achieve a 'below two degrees Celsius' future



In the past, when a mine came to the end of its lifecycle, all too often it would cause social and economic devastation. For this reason, mines built since the turn of the century are now legally required to provide financial support and detailed plans to prevent such outcomes. Company-sponsored skills programmes can enhance transferability to other sectors and alternative land use strategies can help transition the area to a viable long-term future.

RECLAIMING THE SUPPLY CHAIN

The average lead time from discovery to mining has increased by five years over the past decade to almost 18 years⁹. As global demand rises, the need to trace the 'story of the ore' becomes increasingly important. Critical mineral supply chains cannot be truly sustainable without transparency but inevitably, this is complicated by long lead times.

Mining often occurs in countries with weak governance, where corruption can lead to illegally mined minerals being laundered. Implementing traceability measures would ensure a greater degree of transparency and accountability in the supply chain.

For miners, a traceable supply chain can mitigate some of the risks of the long lead time in operations, helping improve resilience and promote consumer trust. Traceability can help verify environmental impact to meet regulations and hold companies accountable for their social responsibility. This can increase costs, and while corporates are often willing to pay a premium as a hedge against reputational damage, individual consumers are more price sensitive.

Blockchain is a valuable tool to showcase responsible provenance by creating digital certificates which are rated end-to-end from the point of extraction. The Raw Material Radar (RMR) Consortium is one example of a platform that combines blockchain and internet of things technologies to track mineral ownership to promote responsible mining practices in Liberia and Western Africa.

Once ESG ratings are available, transparent disclosure is aided by platforms such as Digbee, who were represented in the discussion. They help mining companies manage their data and offer transparency to investors.

A VISION FOR THE FUTURE

Mining is critical to electrification but is inefficient and rife with the risks of significant harm to our environment and local communities.

Technology and mining share a symbiotic relationship; mining is essential for technological progress, and in turn, innovation drives the industry towards a zero-carbon future, while maintaining a 'clean and green' supply chain.

By leveraging advanced technologies and fostering collaboration with local communities, we can drive the industry towards a greener future.

⁹Average lead time almost 18 years for mines started in 2020–23 | S&P Global

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SUSTAINABILITY SPHERES

The Sustainability Spheres is a series of events curated by Becky Orme and Laura Negus. Each event brings together key stakeholders from specific industries to explore the sustainability challenges they face, the actions needed to catalyse positive change and how capital allocations can help.

The inaugural event featured industry experts discussing the future of ‘fast fashion’, a sector that has faced criticism for its unsustainable practices. Attendees engaged in a dialogue on how the industry can integrate more sustainable practices into its business models. Subsequent events in the series delved into topics such as the video gaming industry and regenerative agriculture, focusing on how we can inspire individuals to ‘play for the planet’ and explore innovative ways to ‘grow for tomorrow’.





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Cover image: raw copper ore

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