



Unearthing emerging and interconnected risks: prospecting new frontiers

The mining sector is navigating a matrix of change and elevated uncertainty. Emerging risks cannot be simply fed into a standard risk framework, and future-ready mining businesses are exploring new ways to identify and address changing exposures.

Preparing for emerging risks can be the difference between success and failure

Miners have **warned** of potential copper deficits in recent years. A rising demand for the metal in transition technologies, from grid expansion to electric vehicles, continues to put new demands on resources. Copper is just one key metal, and when the timeline for discovery to production for metallic mines can average 15.7 years, understanding the risks and opportunities from emerging and interconnected risks is a business imperative.¹ But business leaders are conflicted. Pressure to deliver on short-term stakeholder expectations can prevent organizations from looking beyond their most immediate challenges. Inaction will be costly.

Emerging risks are a product of innovation and change, bringing opportunities for a short- and long-term competitive advantage.

In preparing for emerging risks, leaders will need to consider geopolitics, technology, climate and environmental risks. By combining insights from our **Climate Transition Analytics** and **WTW Research Network** colleagues, leaders will be positioned to take practical steps in identifying opportunities to secure a competitive advantage amid the ongoing volatility of the energy transition.

¹ <https://www.spglobal.com/marketintelligence/en/news-insights/research/discovery-to-production-averages-15-7-years-for-127-mines>

Theme: Technologies are changing the demand for critical minerals

A number of national strategies for critical minerals have been published in recent years,² geared toward de-risking supply chains and increasing mining and processing capacity. Much of this activity is driven by efforts to secure critical minerals for the energy transition.

The list of critical minerals will vary between countries, but the energy transition is increasing demand for copper, nickel, lithium, cobalt, and rare earths. In recent years, price volatility and environmental, social and governance (ESG) concerns around nickel and cobalt have led battery and car manufacturers to look at alternative chemistries, where the dominant nickel-manganese-cobalt (NMC) has been overtaken by nickel-cobalt-free batteries, mainly lithium-iron-phosphate (LFP), which has moved from a market share of around 17% in 2020 to around 44% in 2023 (Figure 1).³

Meanwhile, increased production of LFP batteries in China is adding new competitive pressures for both the domestic market, where consumer preference favours shorter-range vehicles, and export markets looking for cheaper alternatives.⁴

Figure 1:

Changing EV battery chemistry



Source: Bloomberg NEF Zero-Emission Vehicles Factbook⁵

A spotlight on the future of nickel

While nickel is considered critical for the energy transition and an opportunity for the mining industry, technological drivers pose a risk to overall nickel demand over the medium and long term. WTW analysis suggests:

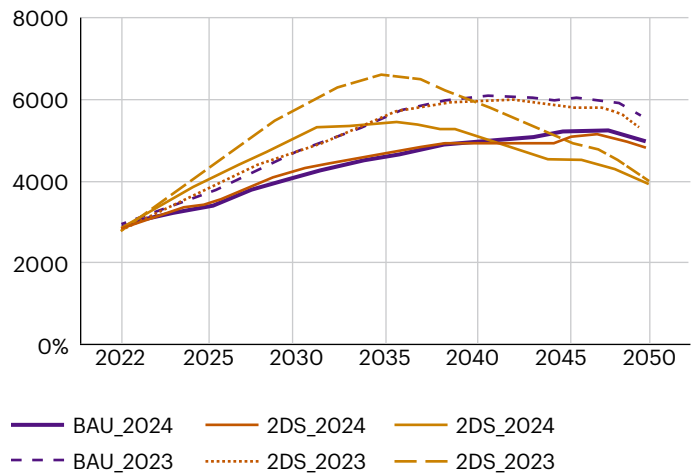
- Demand for nickel could now be up to 500kt per annum, lower than previously expected between 2025 and 2035.
- Changes in long-run expectations are even starker, with demand between 2035 and 2050 potentially reaching 1000kt per annum, also less than previously expected.

Understanding the factors driving changes in demand expectations — which will drive price volatility — will be fundamental to robust investment decisions.

Figure 2:

Projected nickel demand

Total nickel demand (kt)



BAU = Business-as-usual, a 'market expectations' scenario aligning to current policies and investment plans, with temperatures exceeding 2°C by 2100

2DS = <2 Degrees Scenario, orderly global transition limiting warming to well below 2°C by 2100

1DS = 1.5 Degrees Scenario, orderly global transition, limiting warming to 1.5°C by 2100 and global net zero emissions by 2050

Source: WTW Analysis

² <https://www.iea.org/policies?topic=Critical%20Minerals&type%5B0%5D=Strategic%20plans>

³ <https://assets.bbhub.io/professional/sites/24/2023-COP28-ZEV-Factbook.pdf>

⁴ <https://iea.blob.core.windows.net/assets/aa21aa97-eea2-45b4-8686-ae19d8939161/GlobalEVOutlook2024.pdf> and https://www.greencarreports.com/news/1142723_gm-seeks-american-catl-ev-battery-deal

⁵ <https://assets.bbhub.io/professional/sites/24/2023-COP28-ZEV-Factbook.pdf>

Theme: Geopolitical priorities are disrupting supply chains

China dominates supply chains for the transition metals across mining and processing,⁶ but the United States' Inflation Reduction Act (IRA) is incentivizing batteries with components sourced in the U.S. or other Free Trade Agreement (FTA) countries.

While Indonesia controls around 50% of the nickel mining and processing, much of this has been driven by Chinese investments in Indonesia after it imposed an export ban on unprocessed nickel ore.⁷ As a result, it is currently largely ineligible for IRA incentives. Indonesia's policy aimed to encourage downstream investments to increase domestic share of the value chain. However, the increase in production capacity of nickel has generated a short-term oversupply, leading the price to halve in a year and placing some mines at risk of closure.⁸ A risk for some and an opportunity for others.

Carbon intensity of production processes is likely to come under increased international scrutiny. With countries such as Indonesia reliant on a power system that is still dominated by fossil fuels, implications could be amplified across global supply chains.

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Organizations looking to make investment decisions in these areas will benefit from richly informed scenario analysis. Effective leaders are factoring geopolitical trends into their intelligence monitoring to identify opportunities for growth, while preparing to act quickly and decisively when events occur.

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Theme: Climate change is putting sites at risk

It is estimated that natural catastrophe (nat cat) losses breached the 10-year average by approximately 40% in 2022.⁹ Events once thought rare are occurring at scales previously unseen and unexpected.

Site dynamics will need to deliver

Water is a key part of mining: operators need to be mindful of an asset's design to strike the optimal balance between deficiency and excess. Mines are often in remote locations with limited historical data to project future extremes of flood and drought. Compounding these exposures is an increase in severe weather, making it harder to estimate parameters for design.

Adapting the latest climate and hydrological modelling techniques can inform planning considerations and risk calibration — a deep dive can be found in this review in 'Preparing for a new climate: Building resilience in the mining sector'. These data-driven insights enable business leaders to:

- Uphold ESG obligations. Reviewing change and taking action can provide assurance to regulators when seeking approvals and improve ESG disclosures during operation, whilst protecting local environments and the communities who depend upon them — a key area of interest for broadening financial disclosure questions.
- Build a robust risk management strategy to address geological hazards. Much of the risk comes in the form of structural stability of mine workings and secondary effects, such as increased susceptibility to landslides or subsidence affecting overlying development and infrastructure. These are hazards that must constantly be considered during the lifecycle of a mine's operation and do not cease when it is decommissioned. In addition to long-term structural stability of disused mine workings or remediated land, there is also a priority to ensure there are no contamination risks to either the overlying geology or groundwater.

Businesses are rethinking their opportunities

Emerging risks are a product of change. With change, comes opportunity. For mining companies, identifying and aligning these opportunities with lifecycle planning can be the gateway to success.

⁶ <https://iea.blob.core.windows.net/assets/c7716240-ab4f-4f5d-b138-291e76c6a7c7/CriticalMineralsMarketReview2023.pdf>

⁷ <https://carnegieendowment.org/2023/04/11/how-indonesia-used-chinese-industrial-investments-to-turn-nickel-into-new-gold-pub-89500>

⁸ <https://www.miningweekly.com/article/glencore-to-close-unprofitable-new-caledonia-nickel-mine-2024-02-12>

⁹ WTW (2023). Mining Market Review, 2023. <https://www.wtwco.com/-/media/wtw/insights/2023/05/mining-market-review-2023.pdf>

Work is currently underway to understand the potential for disused mine workings. Mine water heating is a form of low-temperature geothermal energy which involves filling disused subsurface mine workings with water and distributing the heat generated underground to heat homes and businesses. Studies by the British Geological Survey and Coal Authority have identified that heating accounts for 40% of energy use in the U.K. and estimate that 25% of homes and businesses in the country are located above former coal mines.¹⁰ It is estimated that mine water projects currently in development or operation will save around 1800-2600 tonnes of CO₂ per year.

How to tackle emerging risks

To harness these uncertainties for competitive advantage, organizations need a process to identify emerging risks and then integrate them into their wider decision-making frameworks. Agility will be critical in seizing new opportunities. The newly released *ISO 31050 — Guidance for managing emerging risks to enhance resilience*¹¹ — provides a framework for organizations to develop processes that are:

- Customized to their own needs
- Interoperable with existing ISO 31000 risk management frameworks

Risk management starts with risk identification, and this requires clear definitions. ISO 31050 defines emerging risks as, “characterized by their newness, insufficient data, and a lack of verifiable information and knowledge needed for decision-making related to them.” Emerging risks are not standard operational risks. Effectively identifying emerging risks demands a broader lens. This is addressed by ISO 31050’s introduction of the risk intelligence cycle for emerging risk, a framework designed to detect changes in the environment and build an understanding of how they could impact organizational objectives; offering a structured framework to develop sustainable strategies.

Building foresight starts with identifying the data you need to capture, from micro to macro trends and from local to global issues. ISO 31050’s risk intelligence cycle for emerging risk outlines two interconnected iterative cycles: an external cycle and an internal cycle.

1. The external cycle consists of ‘continual scanning across multiple aspects of the organizational context’ for changes that can ‘signify an early warning or an indicator’ of threats or opportunities to organizational objectives.



2. Early indicators can then become data sources to systematically track changes in context. Assigning values to measurable elements from these markers — including likelihood and consequences — builds the foundation for ongoing monitoring and review, as would be implemented for any other risk.
3. External signals provide inputs to the four stages of the internal cycle. Which involves:
- a. Identifying connections between external trends and internal issues
 - b. Establishing the boundaries for data collection
 - c. Building a data collection and analytics capability
 - d. Assessing the data-driven insights with a critical eye
 - e. Applying the knowledge to decision-making on emerging risks
 - f. Integrating intelligence into the organization’s broader ISO 31000 risk management process

¹⁰ <https://www.gov.uk/government/collections/mine-water-heat>

¹¹ <https://www.iso.org/obp/ui/en/#iso:std:iso:ts:31050:ed-1:v1:en>

The future of emerging risks: data will be the differentiator

Mining businesses are navigating headwinds. Keeping pace with this velocity will demand sophisticated analytics, expert judgement and decision-making frameworks to unlock competitive advantage.

Partnering with a specialist climate transition analytics team with access to leading academics will help businesses stay ahead of the curve. Achieving a clearer understanding of what's at stake if leaders make a misstep, will be critical. To reinforce leading analytic perspectives, access to a research network including wider academic partnerships can help to explore the intersections of geopolitics and climate transition.

Mining has always required the ability to discern long-term investment opportunities, whilst dealing with immediate issues. Implementing ISO 30150 for emerging risks will increase assurance and evidence for those enduring success factors.



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