

The critical mineral supply chain:

Five actions to protect the route to revenue

New extraction capacity does not guarantee revenue. Critical mineral projects can fail or underperform because vulnerabilities often sit beyond the mine gate, in processing, infrastructure, logistics and market access. For mining and metals leaders, the decisive question is whether a project can preserve value from financing and construction through to commercialization, and whether its insurance program reflects that same route to revenue.

Mining investment can diversify extraction while deepening dependence elsewhere. A project may control the orebody yet remain exposed to a single processor, reagent, power source, transport corridor, port, license or buyer. Our recent Lithium Triangle research points to the same conclusion: delivery confidence depends on the whole system required to convert a resource into saleable material and cash flow.

Research by Oxford Analytica and Willis reinforces this concern. A panel of metals executives and risk professionals identified fragmented global trade, energy-cost inflation, Asian demand and processing concentration, regional conflict and maritime disruption as the leading economic risks for 2026. Different shocks converge on the same commercial question: whether material can reach the market on viable terms.

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The International Energy Agency 2026 Global Critical Minerals Outlook reports that refining concentration across key energy minerals (such as copper, lithium, nickel, cobalt and rare earths) reached record levels in 2025. The average share of the largest refined supplier rose to 70%, while Indonesia for nickel and China for most other key minerals accounted for more than three-quarters of refined-supply growth between 2023 and 2025. The gap between mineral availability and the capacity to turn it into usable supply downstream is widening.

Decision makers are preparing for volatility by:

- Protecting bankability before production. Prices, tariffs, sanctions, input-costs and commissioning assumptions need to be tested to assess whether they still hold under credible downside scenarios, not only the base case used at feasibility.
- Separating physical loss from loss of access and loss of value. A mine can remain intact while a reagent shortage, railway outage, export restriction or unavailable processor interrupts revenue. Financial disruption can come from insurance triggers outside first-party control.
- Challenging the diversification illusion. Adding more mines to a stressed supply chain does little to build resilience if projects still rely on the same supplier(s) grid and technology or converge on the same processor, port, or customer. Governmental departments in the host country may also become stretched and inefficient as new projects are proposed and/or come online.
- Building one route-to-revenue map. Risk, operations, procurement, finance and other corporate functions should all work from the same shared plan, encompassing the impact of critical nodes, contractual obligations, inventory buffers, recovery times and cash-flow consequences.
- Testing insurance against the operating reality. For each critical dependency, mapping what must happen, where it must happen and how long the effect must last before cover may respond, then comparing the output to the proposed recovery plan and balance-sheet tolerance will help to identify vulnerabilities and gaps.

Using these insights:

A specialist review connects five tests that are often assessed separately: bankability, dependency, access, monetization and insurability. Use the lens at feasibility, before financial close, before construction placement, at major expansion decisions and ahead of renewal. This turns insurance from a final procurement step into a test of whether the project's recovery assumptions are commercially and contractually credible.

Feasibility studies establish project economics using assumptions about commodity prices, capital and operating costs, market access and the date of commercial production. Tariffs, sanctions, export controls, state subsidies and state-imposed mandates to localize downstream value-accretive processing can alter those assumptions quickly. Once construction begins, inflation and trade disruption can increase capital requirements and delay commissioning. A project built around one price cycle can reach the market in another.

The impact can run in either direction. A delay may weaken returns, strain financing and leave completed capacity idle. Production that arrives during a price upswing may generate strong early cash flow and support expansion. In both cases, bankability depends on the interaction between policy, cost, schedule and price — not geology alone.

Higher financing costs reinforce the pressure. EY's 2026 Mining and Metals Outlook estimated that higher interest rates and capital intensity had pushed the sector's weighted average cost of capital to 8%–10%. Projects increasingly need to demonstrate value across a range of economic conditions rather than relying on favorable price, cost and commissioning assumptions.

New mines do not remove downstream concentration

Rare earths illustrate how concentration can differ between stages of the same chain. IMF research published in July 2026 examines mining and refining separately and emphasizes the persistence of downstream concentration even where extraction diversifies. The model is a stress test rather than a forecast, but its implication is clear: a system can contain surplus mined material and scarce refined supply at the same time.

The IMF's fragmentation scenario highlights the bottleneck between converting available ore into a material that customers can use and buy. Removing China from other markets leaves importing economies with around 11% more mined material, because China imports raw rare earths for processing, but an estimated 42% shortfall in refined supply. In their scenario, refined prices rise to almost 80 times baseline, compared with 7.4 times for mined material, which consumption falls by about 48%.

The location of concentration changes by commodity, but the commercial effect is consistent: more mined material does not ensure more usable supply. Concentration can also sit outside the mineral value chain altogether, in the energy, chemical, transport and infrastructure systems that enable production.

> A project that appears bankable at feasibility can become uneconomic very quickly. Commodity-price assumptions, tariffs, sanctions, state subsidies and requirements to localize processing can alter revenue and profit projections, while inflation, trade disruption and construction delays increase costs and push back commercial production. The same volatility makes business interruption values harder to calculate: insurers need a realistic view of the loss at current prices, even when company forecasts and internal budgets use different assumptions.



William Fremlin-Key, Global Head of Mining and Metals, Willis Natural Resources

Critical dependencies can sit outside the mineral value chain

Control of a critical process can matter more to resilience than ownership of another resource. The 2026 disruption to sulphur markets shows how a peripheral input can become a binding constraint. The Middle East produces around one-quarter of global sulfur supply, and roughly half of global seaborne sulfur trade passes through the Strait of Hormuz. Disruption affected countries that rely on imported sulphur to manufacture sulfuric acid, an input used in mining uranium and processing copper, nickel, cobalt, rare earths and other battery chemicals.

The exposure can begin at the mine gate. In Kazakhstan, uncertainty over sulfuric acid suppliers – alongside

construction delays – contributed to planned 2025 uranium output being reduced. Sulfuric acid is integral to the in-situ leaching process used across its operations, showing how a reagent produced outside the mineral chain can become a direct constraint on mined supply, contractual delivery and revenue.

Indonesia illustrates the exposure. It supplies more than half of global nickel and relies on the Middle East for about 75% of its sulfur imports. A conflict far from the mine can constrain an input central to production economics.

The implications extend beyond nickel. Sulfuric acid supports the processing of copper, cobalt, rare earths and battery chemicals. A mine can be operating, its plant intact and its customer ready to buy, while the absence or price of one input thousands of kilometers away constrains production.

Integration can change the outcome. First Quantum reported its Kansanshi smelter meant the company was not reliant on external sulfuric acid supply during tight global availability. The site produces acid as a by-product and expected surplus output as its smelter expanded, creating the potential for external sales. Resilience came from controlling a critical process dependency rather than adding another mine.

When operational disruption becomes financial loss

Flood, cyclone, policy intervention, export controls and input shortages begin differently. Their commercial consequence can converge: material exists, demand exists, but access to the customer or revenue does not.

- Cyclone Debbie in 2017 caused extensive flooding at coal mines in Queensland, while rail damage constrained access to export terminals. The event shows how mine-site and infrastructure disruption can combine to interrupt revenue, create complex property damage and business interruption losses, and influence decisions about how risk is transferred or retained.
- Looking forwards, climate change could make this type of disruption more frequent and persistent. More severe floods, cyclones, heat and other weather hazards may affect mine sites and their supporting infrastructure simultaneously, requiring route-to-revenue assessments to test repeated and compounding interruptions — not only single events.
- Cobre Panamá shows how extraction, processing, export and sale can separate under political stress. Production was mandated to halt by the Panamanian government in November 2023. In April 2026, Panama authorized the processing and export of material mined before the suspension without reopening mining operations.

First Quantum estimated the stockpile at around 38 million tons of mineralized ore containing approximately 70,000 tons of recoverable copper; 2.1 million tons were processed during the second quarter.

  - Greater state intervention in strategic resources is making licenses, operating rights and export permissions less predictable, requiring projects to test whether value can still be realized if production, processing or sale are separated.
- Policy can move the bottleneck just as abruptly. The International Energy Agency reports that cobalt prices rose by around 130% after export restrictions imposed by the Democratic Republic of the Congo. China's rare-earth controls created similar downstream effects, including reduced utilization and temporary stoppages in automotive supply chains outside China.
  - The expanding use of export controls, tariffs and industrial policy could shift bottlenecks more frequently between minerals, processing stages and markets, requiring companies to monitor policy dependencies alongside physical supply.

These events differ in origin, but each interrupted the pathway between production and revenue.

Mining insurance has a long history of responding to fires, machinery breakdown, natural catastrophe and geotechnical failure. Those exposures remain central, but

disruption may also begin without physical damage to the mine. Production can continue while export and personnel access, a critical reagent, processing capacity or the ability to realize value is lost.

Interruption can materialize in different ways. Property damage and business interruption insurance remain central, but the route to revenue may also engage contingent business interruption, service interruption, marine, political risk and trade credit solutions. The broker's critical role is not to attach a product label to every dependency, but to trace how an operational event becomes a financial loss, identify the contractual and policy trigger, and show where risk can be reduced, transferred or retained. This is where sector-specialist brokers come to the fore.

Five actions to protect the route to revenue

Diversification on paper does not always create resilience in practice. New sources of supply may still depend on the same processor, reagent, transport corridor or end market. Insurers, lenders and investors need evidence that these concentrations are understood and that recovery assumptions are realistic. Traditional mine-site engineering remains essential, alongside a second lens focused on the nodes without which production loses economic value.

1. **Identify dependency where it actually sits.** Map where material is concentrated, processed, transported, stored and sold. Identify who controls each stage and where apparently different suppliers, routes or customers converge on the same processor, reagent, power system, port, technology or jurisdiction. This distinguishes genuine diversification from dependencies that have shifted elsewhere in the chain.

2. **Stress-test delay, access and monetization.** Remove a critical processor, input, railway, port, market or jurisdiction from the system and model the consequences. Include scenarios in which nothing is physically damaged. Test how long inventory lasts, when revenue is affected, which contractual obligations are triggered and how quickly an interruption becomes material to cash flow or debt servicing.

3. **Challenge delivery and recovery assumptions.** Assess whether project economics remain viable if tariffs, sanctions, input costs, policy or commissioning dates change. Confirm whether alternative processors can technically accept the material, how long qualification would take, whether replacement transport capacity exists and whether substitution rights are workable in practice. Recovery plans should reflect real lead times rather than optimistic procurement assumptions.

4. **Align contractual, operational and risk financing decisions**. Identify which exposures can be engineered out, diversified, allocated contractually, insured or financed, and which remain on the balance sheet. Supplier obligations, stockpiles, offtake terms, business interruption values, indemnity periods and policy triggers should all reflect the same recovery pathway. The objective is not to insure every exposure. It is to protect the dependencies with the greatest financial consequence.

5. **Validate the insurance response before a loss.** Run a short scenario with operations, finance, legal and the broker: define the event, affected location, physical-damage position, cash-flow effect, expected recovery pathway and evidence required. Record where the policy responds, where the wording is uncertain and where the business knowingly retains risk.

Turning resources into reliable revenue

The strategic challenge is to ensure that investment in new extraction capacity translates into reliable mineral supply and revenue. That depends on whether processing, infrastructure, specialist inputs and market access can scale alongside the resource base.



The next major interruption may begin with a flood, fire or equipment failure at the mine. It may also begin with a sulfur shortage, an export restriction, a damaged railway, a blocked port, a license suspension or regulatory intervention, or a project whose economics change before commissioning.

Leaders that locate these dependencies, quantify when disruption reaches cash flow and align project design, contracts and insurance to realistic recovery pathways will be better positioned to convert mineral resources into dependable supply and revenue.

Bottom line: Preparedness is demanding more of risk leaders. A sophisticated approach looks not solely whether or not a mine can operate, but whether material can be processed, moved and sold through the mineral value chain, and ultimately, whether the insurance program is aligned with that same route to revenue.

To find out how to align your risk strategy with your supply chain exposures, contact:



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