Mine 2025

Concentrating on the future

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US$689bn
in revenue, ex. trading (+1% from 2023)

US$193bn
EBITDA (–5% from 2023)

US$92bn
net profit (no change from 2023)

For millennia, mining has been the literal bedrock of the global economy. And as industries continue to evolve in the 21st century, mining's connection to every endeavour of human activity becomes even more apparent. Fundamental changes are afoot in the global economy, spurred by megatrends such as urbanisation and the transitions in energy and technology. A fragmented world and geopolitical tensions are continually reshaping value chains and risk in unpredictable ways. These forces are transforming vertical industries and ecosystems with linear value chains into domains centred on fundamental human needs: how we move, how we make and build things, how we feed and care for ourselves, and how we fuel and power society. Demand for the products mined from the earth is rising, thanks to all these changes. And the same transformational forces are placing an immense amount of value in motion.

Except for gold miners, 2024 was a challenging year for the mining industry: revenues and EBITDA (earnings before interest, taxes, depreciation and amortisation) for the top 40 global mining companies (excluding gold-focused firms) were down 3% and 10%, respectively. Record gold prices meant that gold revenues increased by 15%, while gold EBITDA rose to 32% as a result of operating leverage. Rising costs resulted in a decrease in EBITDA margins to 22% from 24% in 2023. The increase in gold capital expenditures and distributions to shareholders also masks the decreases experienced by non-gold companies.

矿业行业正在不断拓展其边界，提供支撑人类基本需求的关键资源。

几千年来，采矿业一直是全球经济名义上的基石。随着21世纪产业的不断演变，采矿与人类一切活动之间的联系变得愈发紧密。伴随着城市化、能源与技术转型等宏观趋势的推动，全球经济正发生根本性变化。一个日益碎片化的世界与地缘政治紧张局势正以难以预测的方式持续重塑价值链与风险格局。这些力量正将以线性价值链为核心的垂直产业和生态系统，转变为围绕人类基本需求的领域：我们如何出行，如何制造和建设，如何获得食物与照护自己，以及如何为社会提供燃料和能源。由于这些变化，来自地下的矿产资源需求不断上升。而这些转型力量本身也在推动大量价值的流动。 除了黄金矿企之外，2024年对整个矿业行业而言是充满挑战的一年：全球排名前40位的

矿业公司（不含专注于黄金采掘的公司）收入与息税折旧摊销前利润（EBITDA）分别下降了3%和10%。创纪录的金价推动黄金收入增长了15%，而EBITDA增长了31%，这得益于经营杠杆的作用。成本上升导致EBITDA利润率从2023年的24%下降至22%。黄金企业在资本支出和股东分红方面的增加，掩盖了非黄金企业所经历的下行。 在本年度的报告中，我们关注的是矿业在不断扩展且相互交织的人类活动领域中所扮演的角色。我们探讨了随着宏观形势的演变，以及人类对这些趋势的应对，如何在供给、需求与投资方面推动价值流动。我们特别关注行业中的资源集中度——即储量与产量在地域层面的分布差异，这使得部分地区在全球供应中占据主导地位。资源集中风险与其他宏观趋势的交互作用，正在重塑供应链格局、影响国家战略、催生新的合作形式并创造新的价值来源。在展望未来十年的同时，我们也分析了正在塑造世界格局的强大力量将如何在2035年前持续变革矿业行业。

Concentrarse en el futuro

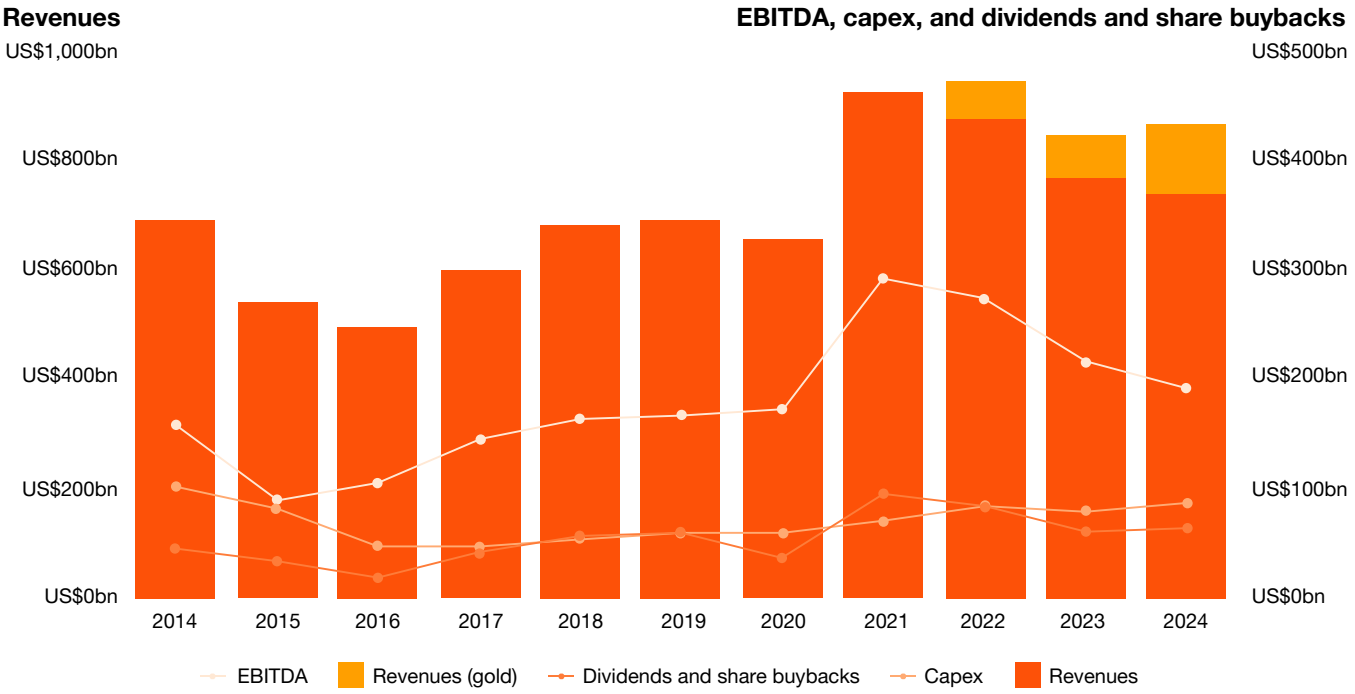
La industria minera continúa ampliando sus horizontes mientras proporciona los materiales esenciales que sustentan las necesidades humanas fundamentales.

Por milenios, la minería ha sido, literalmente, el cimiento de la economía global. Y a medida que las industrias continúan evolucionando en el siglo XXI, su conexión con cada actividad humana se hace todavía más evidente. Se avecinan cambios fundamentales en la economía global, impulsados por mega-tendencias como la urbanización, la transición energética y la revolución tecnológica. Un mundo fragmentado y las crecientes tensiones geopolíticas están reconfigurando continuamente las cadenas de valor y los riesgos de maneras impredecibles. Estas fuerzas están transformando las industrias verticales y los ecosistemas con cadenas de valor lineales en dominios centrados en necesidades humanas fundamentales: cómo nos desplazamos, cómo fabricamos y construimos, cómo nos alimentamos y nos cuidamos, y cómo nos impulsamos y generamos energía para la sociedad. La demanda por los productos extraídos de la tierra está aumentando gracias a todos estos cambios. Y estas mismas fuerzas transformadoras están poniendo una inmensa cantidad de valor en movimiento.

Salvo para las mineras de oro, 2024 fue un año desafiante para la industria: los ingresos y el EBITDA (ganancias antes de intereses, impuestos, depreciación y amortización) de las 40 principales compañías mineras del mundo (excluyendo las empresas enfocadas en oro) disminuyeron un 3% y un 10%, respectivamente. Los precios récord del oro causaron un aumento del 15% en los ingresos generados por este metal, mientras que su EBITDA se elevó a 32% como resultado del apalancamiento operativo. Para la industria minera, el aumento de los costos resultó en una disminución de los márgenes de EBITDA desde 24% en 2023 a 22% en 2024. Por otra parte, el aumento de las inversiones y las distribuciones a los accionistas vinculados al oro también esconden las disminuciones experimentadas por las empresas no auríferas.

A challenging year

Higher costs and rising investment are eating into the top 40 global mining companies' profits.



Note: Gold revenues are shown separately only for the past three years, during which they've comprised a significant portion of total revenues. Prior to 2022, gold revenues are displayed as part of total revenues.

Source: PwC's global Mine reports, 2014–23; company financial statements; PwC analysis

2024 financial snapshot

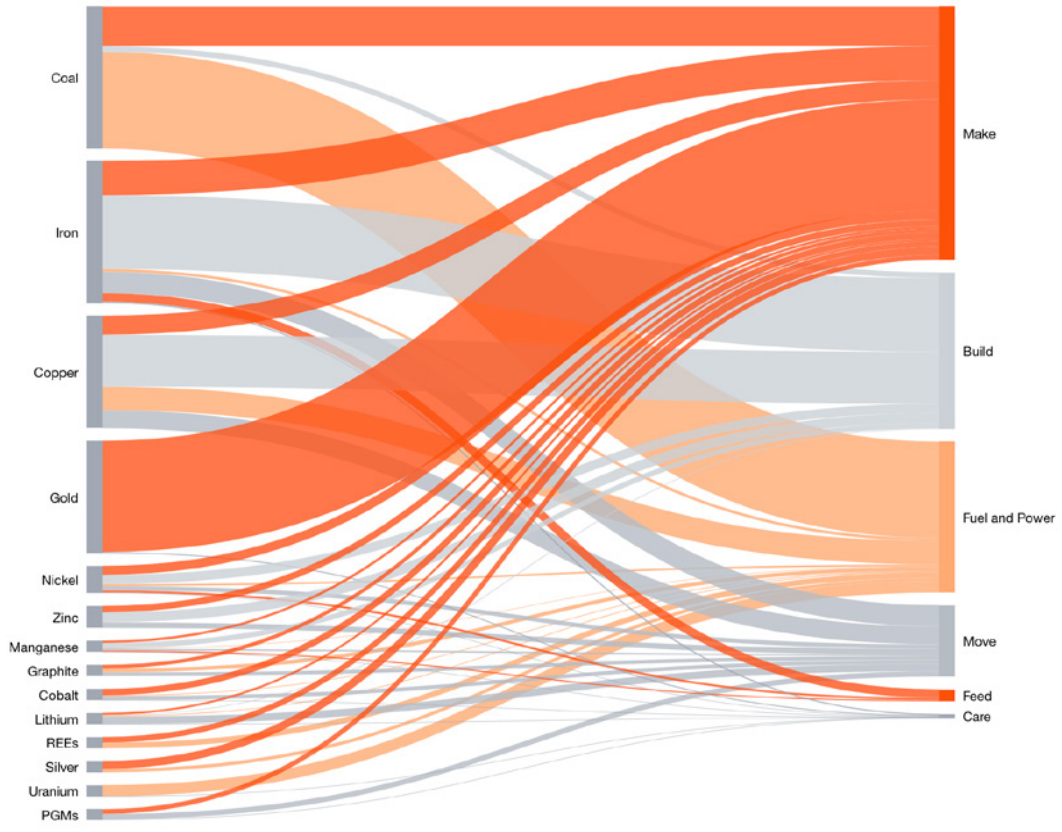
In this year's report, we focus on the role that mining plays in the expanding and interlocking domains of human activity. We examine the ways that value is being put into motion, as megatrends—and the responses to them—dictate developments in supply, demand and investment. We shine a particular light on commodity concentration in the industry—the degree to which reserves and production vary on a geographic basis today, making some regions highly dominant. The interplay of concentration risk and other megatrends is forging new supply chains, dictating national strategy, inspiring new forms of collaboration and creating new value pools. And, as we consider the coming decade, we also examine how the powerful forces shaping our world will transform the mining industry through 2035.

A world of domains

As the chart below shows, mining creates inputs into each of the six key domains of growth.

Commodities in motion

Minerals will catalyse value creation in the new domains of growth.



Note: *PGMs* refers to platinum-group metals. *REEs* refers to rare earth elements.
Source: PwC analysis

Some mined commodities feed only one or two domains. And some domains are disproportionately reliant on one or two commodities. But increasingly, we see broader roles and opportunities for the mining industry as value is put into motion.

Fuel and Power. Despite significant growth in renewable energy sources, coal accounted for 35% of total electricity generated in 2024, and nuclear power (which relies on uranium) accounted for 10%. Mining also plays a pivotal role in supplying the essential minerals needed for renewable energy and storage technologies, as well as transmission and distribution infrastructure.

Move. Platinum-group metals (PGMs) have traditionally been used in auto catalysts to reduce the emissions of internal combustion engines. This role may decline as new mobility technologies are adopted. But the electrification of mobility is also a key driver of commodity demand. The development of battery storage technologies is increasing demand for lithium, cobalt, phosphate, nickel and manganese.

Feed. As the need for food continues to rise with population growth and urbanisation, extracted materials such as fertilisers will be even more crucial to improve soil health and boost agricultural yields. Phosphate is essential in producing phosphorus-based fertilisers, which underpin global grain and vegetable production. Potassium salts are used to produce fertilisers that improve drought resistance and are essential for global food crops such as wheat, corn, soybeans and rice.

Care. In the healthcare sector, mining's role goes far beyond the gold and silver found in dental fillings. The industry provides essential minerals and resources used in the research and development of medical equipment and devices, as well as their production. Titanium, cobalt, PGMs and nickel are used in the manufacture of surgical tools, implants, prosthetics, dental drills and other instruments. Uranium plays a vital role in the production of medical radioisotopes used in advanced imaging equipment such as MRI machines and CT scanners.

Build. Steel (iron ore, manganese and metallurgical coal), copper, aluminium, zinc, tin and nickel are all needed for the construction of buildings in urban environments. Aggregates such as limestone for cement, stone, clay and sand are vital for roads, bridges, buildings and other construction projects.

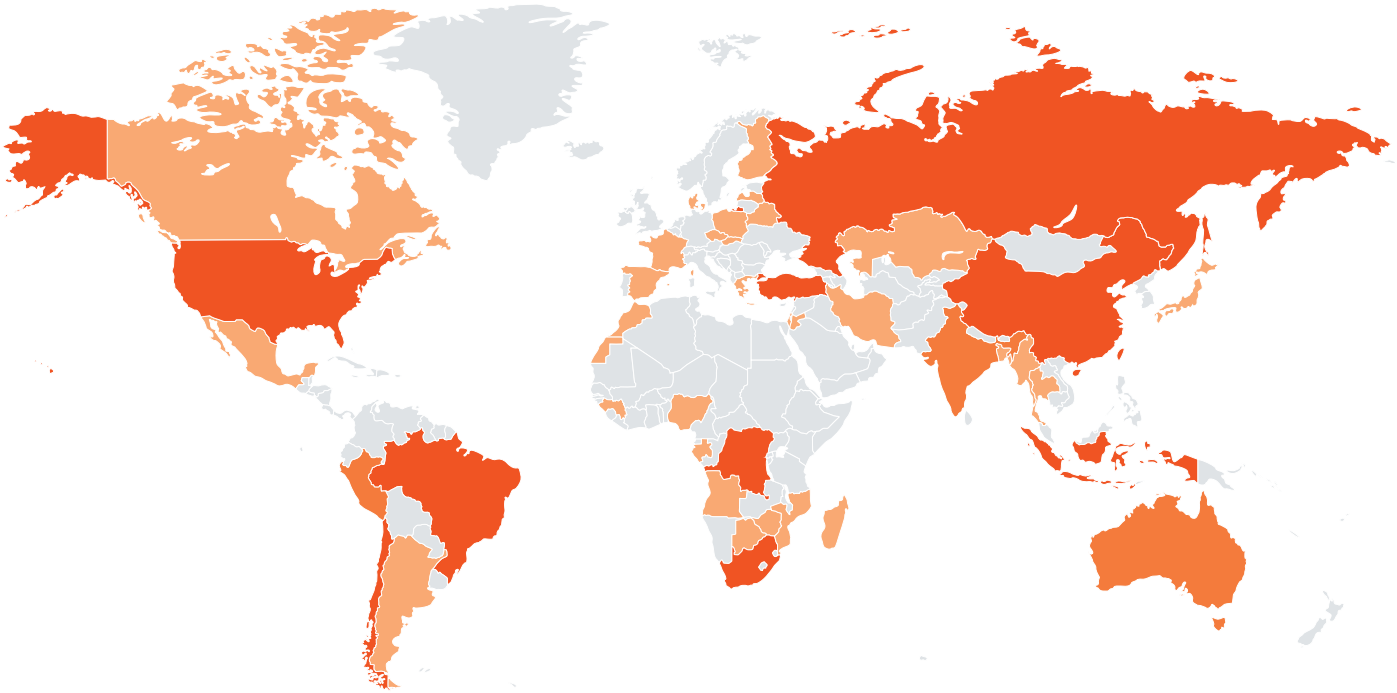
Make. Virtually all manufactured goods contain inputs from mining. Gold is used in discretionary luxury items such as jewelry. Stainless steel is a key input for devices big and small, from kitchen appliances to massive industrial equipment. And a range of metals are deployed in the manufacture of aircraft, space technology and defence systems.

Cross-domain opportunities

The growth of the domains also offers potential for mining companies to become involved in other industries that help mines operate more effectively. These efforts often result in economic development initiatives that provide benefits to the climate, and to broader society. We have seen this particularly in the domains involving energy and construction: Fuel and Power, and Build.

- As they pursue energy security and climate goals, miners are investing in emissions-free electricity production. Fortescue, a large producer of iron ore, in April 2024 **announced a joint venture** with OCP Group to create a green energy hub in Morocco. China's Zijin Mining Group is developing renewable projects such as photovoltaic and wind farms at its mining and smelter sites.
- In May 2024, work began on the **Trans-Guinean Railway**, a joint initiative between the Guinean government, Rio Tinto and Chalco Iron Ore Holdings. It will connect the Simandou iron ore deposits with a port to be built on Matakong, an island just off the coast, near the border with Sierra Leone. The primary objective of the line is the transport of iron ore, but the project also includes the provision of passenger services and a strategic corridor for Mali, Burkina Faso and cities in northern Nigeria.

Mining production 2024 concentration heatmap



Source: US Geological Survey Mineral Commodity Summaries, PwC analysis

The world map demonstrate concentration of mined production with darker colours representing more concentrated supply and lighter colours less concentration.

Concentration Risk

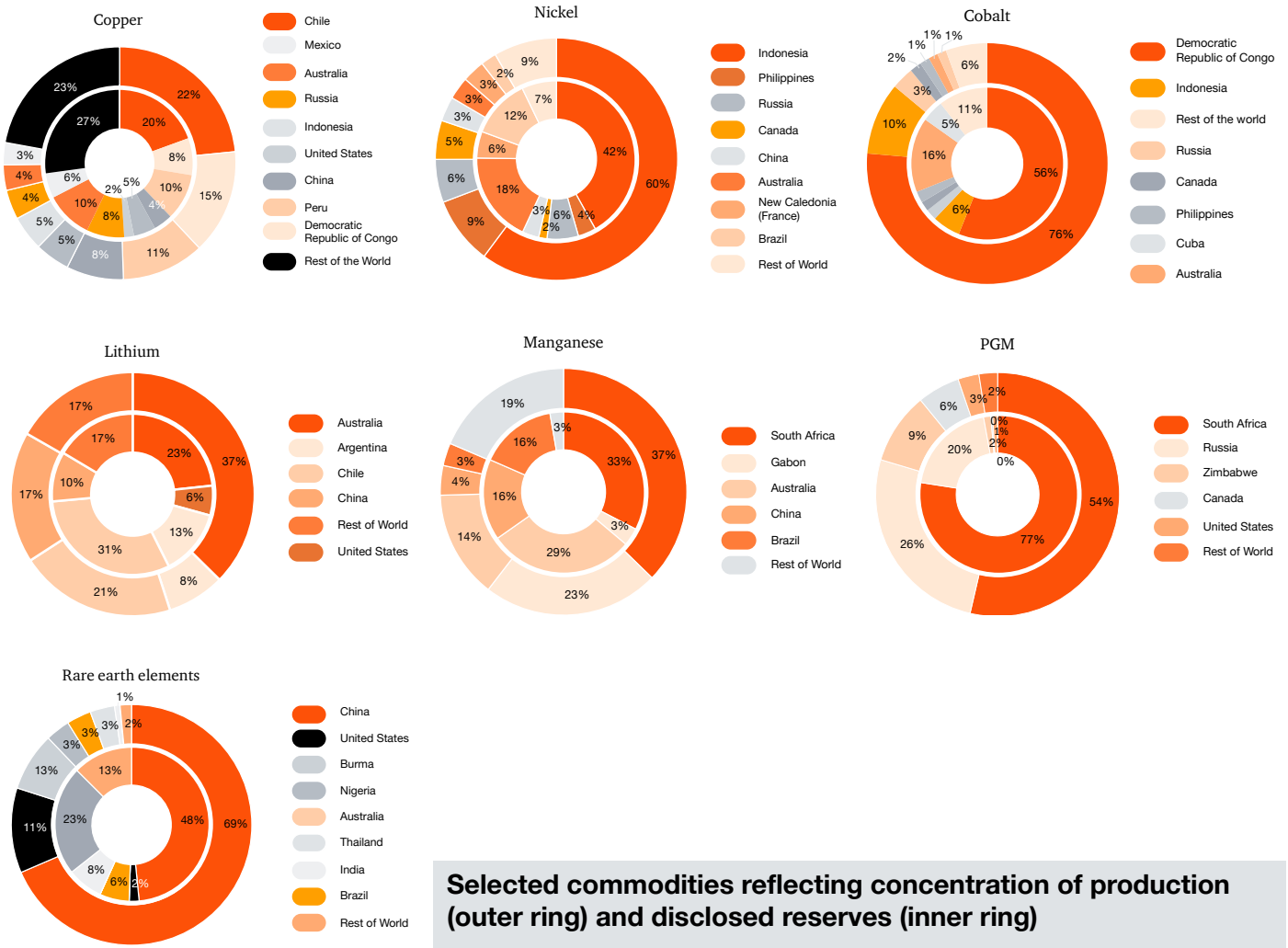
Concentration risk arises from two forces, one natural and one human-made. The natural endowment of mineral resources cannot be changed. Increased exploration and new technologies might identify resources in different territories, but they cannot relocate resources or create new reserves. Production and processing endowment, by contrast, is reliant on such factors as the availability of financing and government policies. As a result, over the years, we've seen a rise in the concentration of both reserves and production—as well as the development of substantial mismatches between the two (see chart, below).

China has by far the highest mineral concentration of any country. It's responsible for more than 50% of production for 18 minerals, and it has a greater-than-10% concentration of reserves for a further 35 minerals. The next-richest is the US, which produces more than 50% of seven minerals and has a greater-than-10% concentration of reserves of a further 12 minerals. Processing for many minerals is also highly concentrated in China, even those minerals of which China is not the primary producer. In this chart, we show the concentration of both reserves and production for seven key mining outputs: cobalt, copper, lithium, manganese, nickel, PGMs and rare earth elements (REEs).

Each of the outputs has a distinct concentration profile that presents challenges and opportunities. For example:

- The Democratic Republic of Congo (DRC) accounts for 76% of global mined cobalt, whose most important use is in batteries for electric vehicles (EVs). Pricing has been volatile as the DRC has boosted supply above the growth of demand. China is the leading consumer of cobalt (representing 80% of global demand) and is the main producer of refined cobalt. China also has the highest foreign share of mining assets in the DRC, having provided infrastructure investment in exchange for access to minerals.
- Each of the 17 rare earth elements—essential components in electronics, defence and a wide array of other industrial applications—has its own supply dynamics. China accounts for 69% of global mine production and 92% of processing, the most processing concentration of any energy transition mineral. In April 2025, in response to US tariffs, China placed export restrictions on rare earths, permanent magnets and other finished goods that use rare earth inputs.

Examples of Concentration Risk



Selected commodities reflecting concentration of production (outer ring) and disclosed reserves (inner ring)

- Uranium is a key input to nuclear energy, which has gained renewed momentum. In 2024, Kazakhstan produced the largest share of uranium from mines (38% of world supply). Production in Kazakhstan often involves Russian ownership, which has become a concern amid sanctions levied in response to Russian aggression in Ukraine. In addition, about 40% of uranium enrichment takes place in Russia.
- The mining of manganese, used in steel manufacturing and a variety of other applications such as metallurgical processes, batteries, fertiliser and animal feed, is concentrated in three countries: South Africa (37%), Gabon (23%) and Australia (14%). Each has seen climate-related supply disruptions in recent years: mines in Gabon have been affected by a landslide on a key rail line, a mine in Australia was closed due to a cyclone and flooding, and mines in South Africa have had to contend with maintenance challenges, extreme weather and poor infrastructure conditions.

Responses to concentration risk

We're highlighting concentration risk for several reasons. The concentration of mining and processing in a small number of geographies creates the risk that global supply and prices will be affected by location-specific challenges such as natural disasters, wars, social unrest, political or regulatory changes, and infrastructure failures. Copper spot prices, for example, hit an all-time high after the US announced in February 2025 that it was investigating the possibility of adding tariffs, and US copper importers rushed to stockpile the metal. In addition, established mining and processing territories can deter diversification investment by supplying sufficient quantities of material to keep prices low. Other countries and territories are responding to these issues through new investments, technological innovations and government actions, all of which are increasingly putting value in motion.

Countries invest in production

Governments such as Australia, Canada, Chile, the EU and its member countries, and the US have developed critical mineral strategies focused on diversifying mining production and resource locations. These strategies include various incentives for exploration activities such as tax breaks, access to government funding and simplified licensing regimes.

The number of cobalt-producing countries has more than doubled, from seven in 2000 to 16 in 2024. Australia may have potential to grow supply: it has 16% of reserves but accounted for just 1% of 2024 production.

There have been discoveries of large REE deposits outside China, such as Ramaco Resource's deposit in Wyoming (2023), LKAB's deposit in Sweden (2023) and Defense Metals' Wicheeda project in Canada (2021). As a result, mining production of REEs is expected to diversify away from China (although it's challenging to diversify processing capacity that is economically viable).

Countries secure supplies

Countries that are end users of minerals are looking to secure supply to support the strategic domains that will determine how we move and how we fuel and power our communities and to mitigate disruptions in supply chains. Each country's mineral list is unique, but sought-after materials include rare earths, cobalt, lithium and uranium. The Sapporo 5—a coalition of countries comprising Canada, France, Japan, the United Kingdom and the United States—in April 2024 pledged to collaborate on securing a reliable nuclear fuel supply chain. Achieving this objective will require a sustained increase in allied financing across all stages of the fuel cycle, including uranium enrichment.

Mining firms invest in processing

In November 2024, the Lynas Rare Earths facility opened in Kalgoorlie, Australia, making it the first rare earths processing plant in the country and the largest outside China. Renascor Resources is expected to start construction on a graphite demonstration plant in Australia in 2025. In the US, Mountain Pass has established an integrated rare earths value chain for permanent magnets, and Doe Run is advancing a cobalt and nickel processing facility.

End users pursue alternative materials

In some areas, new technologies allow end users to reduce their reliance on minerals where supply is constrained or concentrated in risky markets. The shift towards lithium iron phosphate (LFP) batteries could reduce demand for cobalt and nickel for EV sources. The proportion of passenger EVs in China with LFP technology rose from 45% in 2021 to 60% by 2023.

Class 1 nickel, a high-purity form critical for batteries, currently sees around 65% of its production directed towards stainless steel. There are substitutes in various applications: low-nickel, duplex or ultra-high-chromium stainless steels have been substituted for austenitic grades in construction. Titanium alloys can substitute for nickel metal or nickel-base alloys in corrosive chemical environments.

Industry players focus on technological innovation

Although there are few substitutes for uranium, technological advancements have improved reactor efficiency, requiring less input. Some advanced reactor designs are likely to be able to make use of thorium on a substantial scale (although such reactors are not yet in commercial use).

In 2023, BHP and Microsoft partnered to improve the copper recoveries at BHP's Escondida operations. Through AI-based recommendations, the concentrator operators can adjust operational variables that affect ore processing and grade recovery.

PGMs include some of the rarest metals on earth. Technological advancements help to drive more efficient use and substitution in existing applications, allowing for more sustained long-term applications.

Countries step up recycling and repurposing

Recycling may become more prevalent in the future, particularly in countries that do not have opportunities for primary production but that are significant consumers. Chile and Peru together account for 34% of copper supply, whereas China accounts for 45% of global refined copper production. Copper has strong potential in the secondary market as it can be recycled many times without losing quality. Historical levels of recycling for mature recyclable commodities such as copper can easily reach 30% of demand.

Reprocessing old tailings provides an opportunity for significant value extraction from waste while also allowing waste to be handled more responsibly. In South Africa, the reprocessing of old gold tailings has created significant value and, at the same time, helped in the cleanup old gold sites for new use. The same can be said for copper tailings in old copper jurisdictions such as the DRC and South America. Critical minerals not previously recovered from primary processing can now also be recovered from mining tailings given their new relevance and new processing technology.

End users secure supplies

It's becoming more common for companies to seek to lock in supplies of crucial materials through offtake agreements and direct equity investments. Several EV manufacturers have invested in early-stage lithium projects to help manage future supply risk. As an example, in October 2024, General Motors entered a joint-venture agreement with Lithium Americas to develop the Thacker Pass lithium mine in Nevada, committing US$625 million (including cash and letters of credit) in exchange for a 38% asset-level ownership stake.

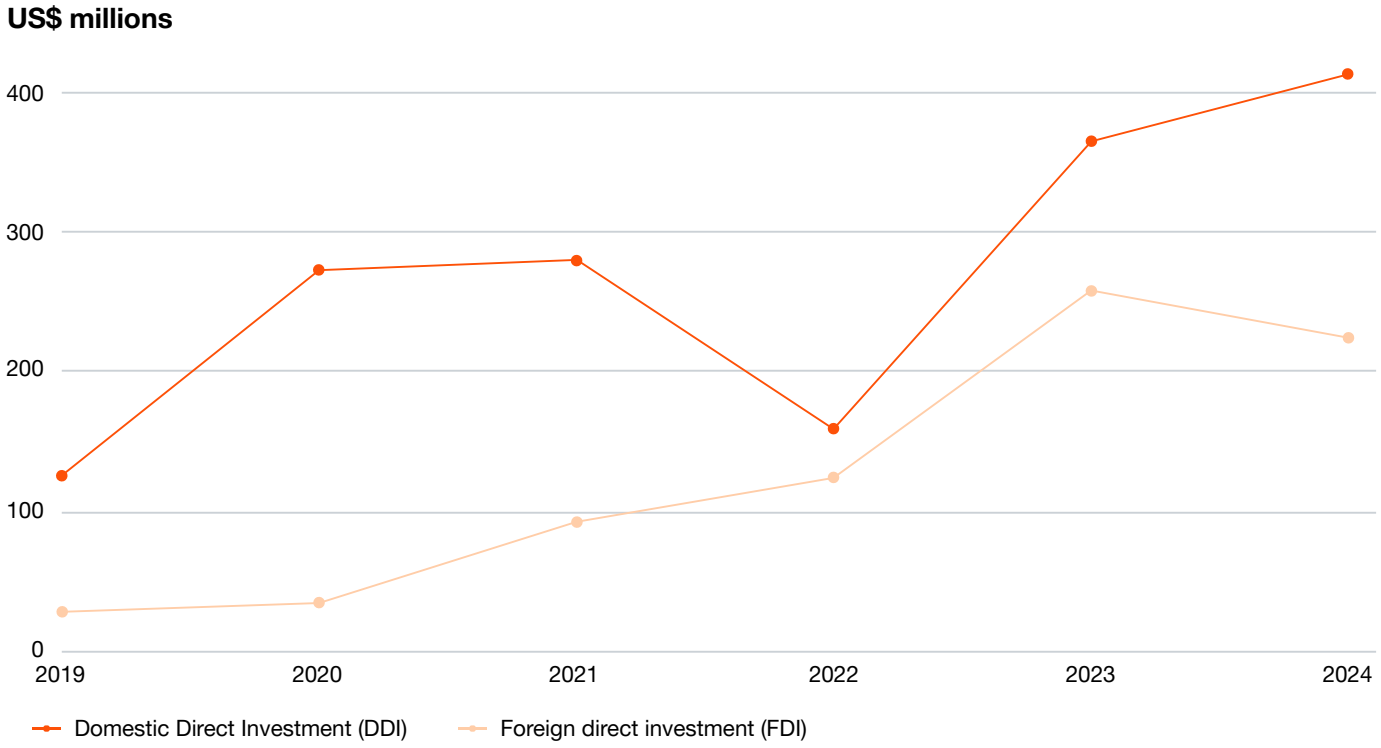
Building digital mines

Ma'aden, the largest multi-commodity mining company in the Middle East, has partnered with OffWorld Inc. (which makes AI-powered industrial swarm robotic mining systems) to innovate in mining operations through the deployment of autonomous robots and advanced AI technologies. The partnership focuses on precision mining for deep underground ore bodies, using robots designed to operate in extreme conditions to minimise environmental impact while maximising resource extraction efficiency. The project also integrates other advanced technologies, including augmented reality (AR) and digital twin systems. The benefits of the collaboration include increased efficiency, reduced waste, optimisation of ore extraction processes, shorter operational times and higher safety standards.

Nickel shines in Indonesia

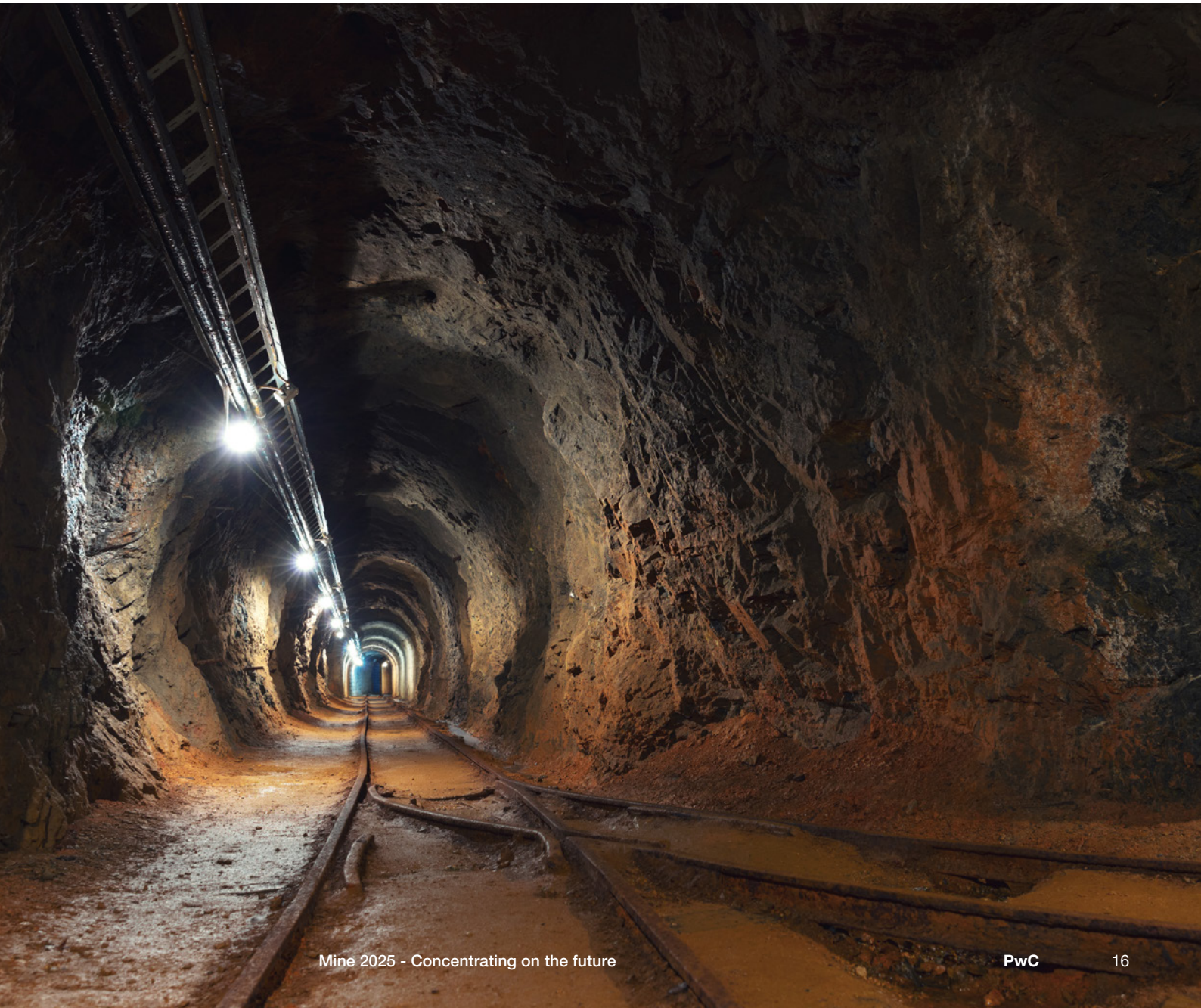
Indonesia represents around 40% of global reserves of nickel and 53% of production. Nickel is in high demand because of its application in stainless steel and in EV batteries. Through policy measures, Indonesia has changed the way value is created in its domestic nickel industry. To encourage both foreign and direct investment, the government, in 2014, began to institute various levels of nickel ore export limitations, including a complete ban on low-grae nickel exports starting in 2019. The result has been a boom in processing capacity. Chinese and German investors, in particular, have contributed to the establishment of smelters and high-tech processing facilities. This move has not only increased the value of Indonesia's exports but also enhanced the industry's economic impact.

Foreign and domestic investment in processing capacity from 2019 to 2024.



Fuelled by more than US$1.6bn in foreign direct investment (FDI) and US$761m in domestic direct investment (DDI) between 2019 and 2024, the number of smelters in Indonesia rose from two in 2016 to more than 60 by 2024. Initially, these smelters focused on producing ferronickel, or 'nickel pig iron,' for stainless steel production. However, they have since expanded to produce nickel matte and other intermediate products that can be further refined into Class 1 nickel, an essential component for EV battery cathodes.

Indonesia has rapidly advanced its nickel processing capabilities by establishing several high-pressure acid leach (HPAL) plants, such as QMB New Energy Materials, Huayue Nickel and Cobalt (HNC), and PT Halmahera Persada Lygend. These plants enable the conversion of nickel ore into mixed hydroxide precipitate (MHP), which can be refined into Class 1 nickel. Aided by Chinese technology, Indonesia has built this infrastructure with lower capital costs and shorter ramp-up periods compared with traditional HPAL facilities in other regions. The investment and growth have brought challenges, including environmental degradation and concerns over occupational hazards and labour issues. But the efficiency and cost-effectiveness have positioned Indonesia as a formidable player in the global nickel market, particularly for the EV industry.

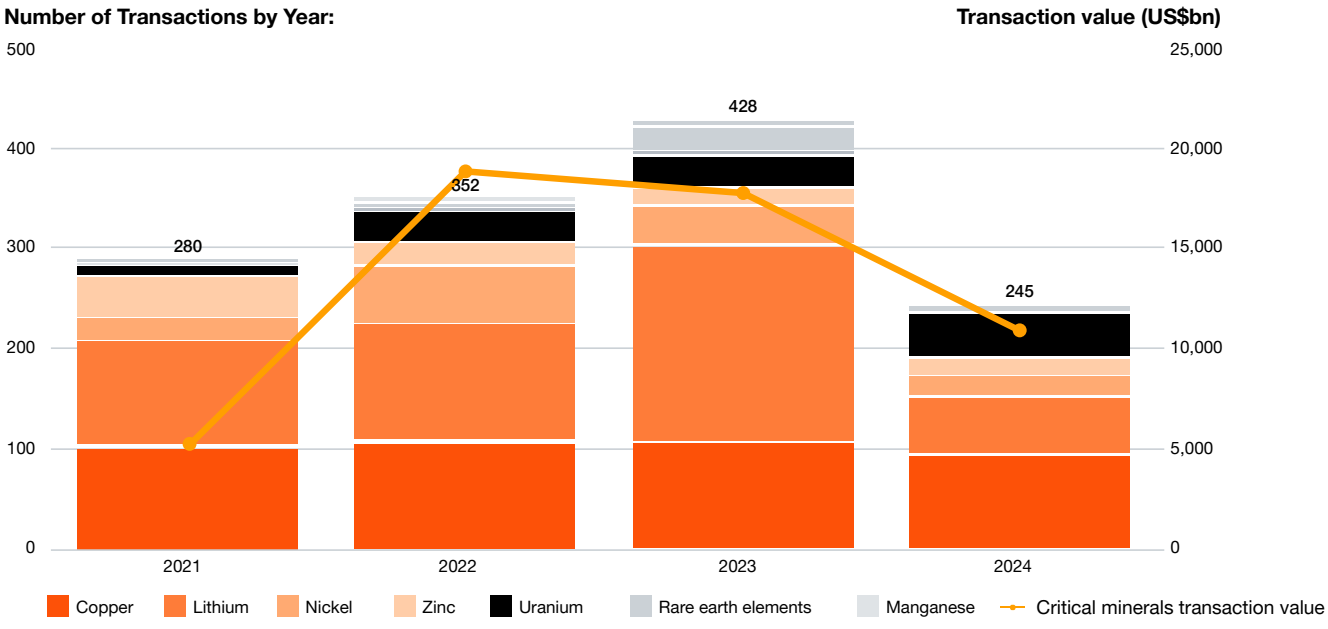


Concentrating on deals

M&A plays an essential role in the mining industry, allowing companies to secure critical resources, consolidate supply chains and align with the global energy/technology transition. The value and volume of deals fell in 2024, with energy transition minerals accounting for a smaller share of activity than in years past. If a single big transaction in each year is excluded, deal value maintains a mostly steady trend.

Deal flow declines for critical minerals

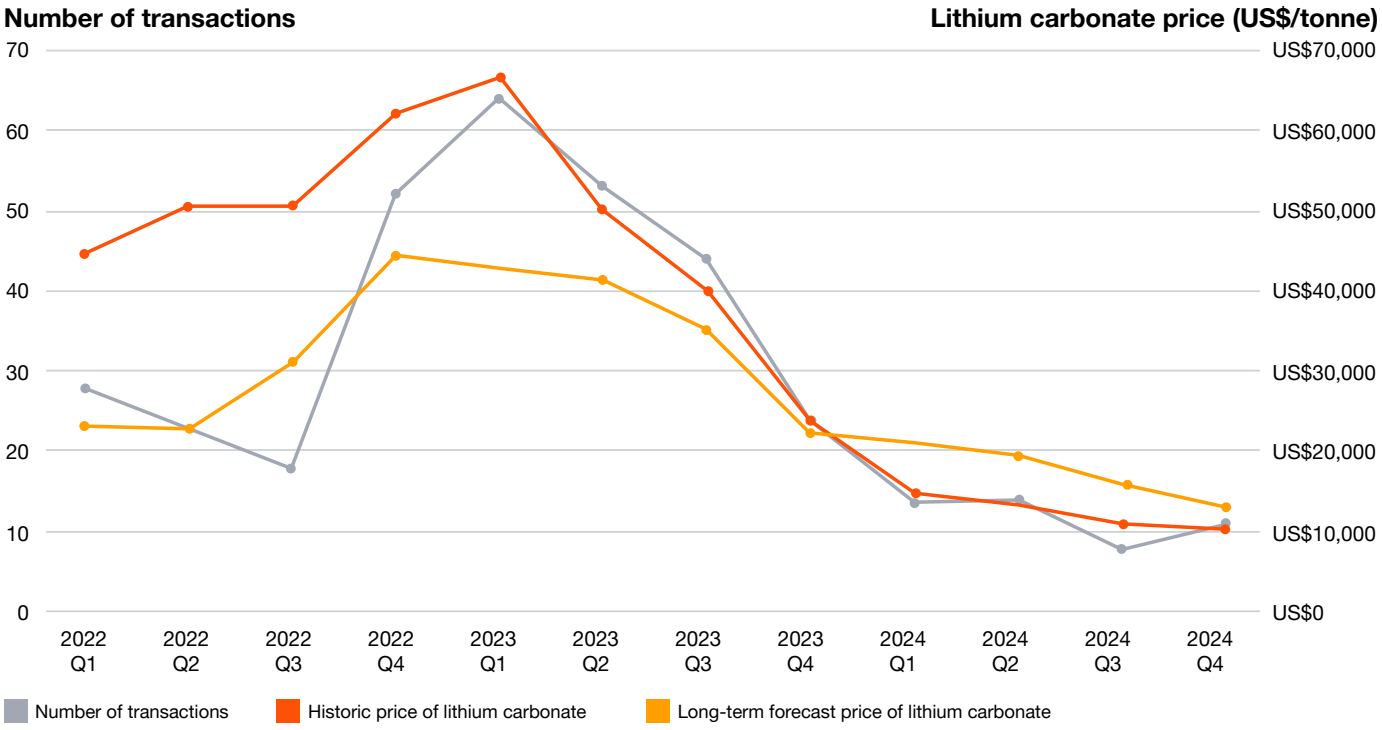
The chart illustrates the number of transactions by commodity and the transaction value (in US$ billions) for critical minerals from 2021 to 2024.



Source: S&P Capital IQ, PwC analysis

Lithium loses its charge

As fears over scarcity abate, prices and deals fall.



Source: S&P Capital IQ, Consensus Economics, PwC analysis

As mining companies explore and benefit from the new domains of growth, deal flow in the sector will continue to be strong, but will not lack headwinds. Several key themes are evident.

Consolidation continues…

…especially in gold and silver, as companies seek scale and resilience. Record-high gold prices have spurred significant activity, such as Gold Fields Limited's US$2.35bn bid for Gold Road Resources. Silver is also seeing strategic consolidation, with deals like First Majestic's US$970m acquisition of Gatos Silver, Coeur Mining's US$1.7bn purchase of SilverCrest Metals, and Pan American Silver's proposed US$2.1bn merger with MAG Silver. However, rising asset valuations are making deals more expensive and may slow decision-making as buyers reassess risks and returns.

Non-core assets are being divested…

…so that companies can focus on Tier 1 projects, as evident in Newmont's US$3.8bn sale of six non-core operations and Barrick's ongoing divestments. This creates opportunities for buyers to acquire assets with potential. Vertical integration is also on the rise. Rio Tinto has acquired Arcadium Lithium, enhancing its control over processing and value capture.

Mining companies are diversifying…

…and expanding into new minerals or regions to reduce concentration risk. For example, Pilbara Minerals' acquisition of Latin Resources, which owned the Salinas Project in Brazil, diversifies its lithium portfolio beyond Australia.

Technology-driven M&A is gaining traction…

…with deals like Weir Group's roughly US$800m purchase of Micromine, a software provider to the mining industry, to drive productivity and sustainability in mining.

Government involvement in deals…

…is increasingly shaping M&A dynamics. Supportive measures include stable investment policies and joint ventures for strategic resources, such as Codelco lithium partnerships with Rio Tinto and SQM's in Chile. However, heightened regulatory scrutiny, resource nationalism and tariff uncertainties are complicating cross-border deals and supply chains.

Despite these headwinds, the mining sector's growing importance in the global economy is expected to sustain strong M&A activity through the second half of 2025 and beyond.

Mining in 2035

If mining companies are to create value for stakeholders in the emerging world of domains, they need to future-proof their businesses. In this capital-intensive industry, with its long life cycles, firms must make decisions well in advance in order to ensure they are best placed to take advantage of the opportunities and mitigate the risks invariably created by change. Just as our colleagues within PwC **envisioned a series of scenarios for what the world might look like in 2035**, we've imagined how the same powerful creative forces might affect the mining world in 2035. We created a framework of seven key future forces/influences and their resultant impact on the industry of the future.

Some of the key findings are presented in the infographic below.

Influence/force	Demand impacts	Supply impacts	Health and safety impacts	Collaboration opportunities	Financial impacts
Population growth and urbanisation	Very positive	Potentially negative (not-in-my-backyard concerns)	Socioeconomic challenges could impact safety negatively	Host communities, governments	Depends on local circumstances
Energy transition	Net positive, commodity -specific	Potential for remote energy security	Lower emissions	OEMs, electricity generators, host communities	Regulatory costs, initial capital investment with potential longer-term savings
Environmental impact	Net positive, commodity -specific	Climate events have a negative impact on supply	Increased risk for employees	All stakeholders, supply chain collaboration	Increased cost
Technology, innovation and automation	Very positive despite efficiency gains	Very positive: unlocking potential and improved	Safer working environment	Tech companies, OEMs, academia	Upfront capital with potential operating savings
Human capital	No impact	Lack of human capital could impact ability to supply	Safer working environment could attract more	Host community training and upskilling, academia	Scarce skills drive costs
Access to funding	Ability to fund infrastructure and consumer needs impact demand	Funding is needed to grow supply; prohibiting funding can reduce supply	Supports investment in safety	Governments and fellow miners for mutually beneficial infrastructure	Investment in efficiency
Government policy and regulation	Policy could drive or curb demand for specific commodities	Enabling environment could support supply	General drive for safer working conditions	Government and mines for infrastructure development	Regulatory and tax environment can be cost prohibitive or encouraging

The 2035 view

Several key trends will influence the trajectory of the mining industry in the coming decade.

Population growth. The urban population is expected to more than double by 2050, at which point nearly seven in ten people will live in cities. And as global economies grow, the per capita demand for commodities will also increase despite more efficient use and higher recycling levels. The result will be a mounting appreciation of the need for a greater supply of minerals.

Energy transition. The energy transition is a key driver of critical mineral demand. In response, significant new supply is expected to come on stream or to be in development.

Environmental impact. For people to live in more extreme weather conditions, energy needs—for example, to power air conditioning, heating and the pumping of water—will grow significantly. Growing energy needs increase demand for the underlying commodities. Climate risks present higher costs and challenges to supply, as droughts, floods and rising sea levels affect the logistics of mining operations. Given the prospect of further climate change, arctic waterways are expected to be open year-round and would be the fastest route from China to Europe. Arctic nations like Canada and the US are more focused on growing infrastructure and military presence in the region, which could remove barriers to mining there.

Technology, innovation and automation. Advancements will improve mining equipment performance, allowing for higher output with reduced resource consumption and improved safety. Unstaffed autonomous vehicles in remote operations will reduce operator risk, improve productivity and increase equipment operational uptime. Due to the capital-intensive, long-life-cycle nature of mining, large-scale changes will first be implemented at new mines. Existing mines will consider specific areas of adoption where it makes economic sense.

Human capital. A substantial portion of traditional mining jobs will be augmented or replaced by technology—with remote operations employing data scientists, AI and specialists to complement field labour. Workers will need to transition into higher-skilled positions overseeing automated systems. Increased use of technology will result in more office-based work than on-site work and a reduced focus on physical strength. The appeal of working in a high-tech industry, increased safety and greater ability to work remotely or from offices will all make mining more appealing to a younger and more diverse workforce.

Access to funding. The profile of mining investors is set to evolve significantly by 2035. As market dynamics shift, investor composition will continue to diversify, comprising both public- and private-sector participants. Although these groups remain essential for securing sufficient investment, future investors may include those not active in the mining sector today, potentially broadening the overall investment base.

Government policy and regulation. Targeted and collaborative government regulation and policy will be essential in shaping a sustainable and prosperous global mining sector through 2035 and beyond. Resource nationalism will take precedence over optimised supply chains in a geopolitically risky world. We do not believe that the current drive for security of supply will be reversed by 2035.

Conclusion: Collaboration in domains

One thing is clear. Regardless of how events unfold in the coming decade, collaboration will be the order of the day—in 2025, in 2030 and in 2035. As we survey the industry today, collaboration opportunities are present everywhere.

Miners can support the downstream research, development and commercialisation of their products, like the PGM producers supporting hydrogen initiatives. They can collaborate with host communities and government to improve mutually beneficial infrastructure such as transport, water, electricity, education and healthcare to strengthen mines' long-term sustainability. They can partner with universities and education institutions to encourage the digital natives of generation Z (born between 1995 and 2009) and generation alpha (between 2010 and 2024) to become part of the mining industry.

As they confront systemic change and concentration risk, strategic leaders will have to adjust their mindset to mine for value and growth in adjacent domains, and to harness the innovations that they can apply to traditional operations—wherever they can be uncovered.

Mine 2025 writing team

The writing of Mine 2025 was led by Andries Rossouw (PwC South Africa), Germán Millán (PwC Chile) and Franz Wentzel (PwC Australia). Core members of the writing team were Matt Williams (project lead, PwC United Kingdom), Swapnil Gupta (PwC India), Mary Kwarteng-Darko (PwC Ghana), Danelle Lombard (PwC South Africa), Cameron McKee (PwC Australia), Gabriela Moquillaza (PwC Chile), Wynand Oosthuizen (PwC South Africa), Carlos Rivas (PwC Chile), Isakh Salomon (PwC Indonesia), Gemma Stanton-Hagan (PwC Canada) and Sara Vasquez Grandez (PwC Peru).

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Appendix I

Top 40 global mining companies

2025 rank	2024 rank	Change in ranking	Company name	Country/territory of incorporation	Commodity focus
1	1	0	BHP Group Limited	Australia	Diversified
2	3	1	China Shenhua Energy Company Limited	China	Coal
3	2	-1	Rio Tinto Group	United Kingdom	Diversified
4	6	2	Freeport-McMoRan Inc.	United States	Diversified
5	10	5	Zijin Mining Group Company Limited	China	Diversified
6	4	-2	Glencore plc	Switzerland	Diversified
7	8	1	Saudi Arabian Mining Company	Saudi Arabia	Diversified
8	12	4	PT Bayan Resources Tbk.	Indonesia	Coal
9	9	0	Newmont Corporation	United States	Gold
10	17	7	Agnico Eagle Mines Limited	Canada	Gold
11	14	3	PT Amman Mineral Internasional Tbk	Indonesia	Gold/Copper
12	5	-7	Vale S.A.	Brazil	Diversified
13	15	2	Anglo American plc	United Kingdom	Diversified
14	7	-7	Fortescue Ltd	Australia	Iron ore
15		New	Shaanxi Coal Industry Company Limited	China	Coal
16	16	0	Coal India Limited	India	Coal
17	13	-4	Barrick Gold Corporation	Canada	Gold
18		New	Public Joint Stock Company Mining and Metallurgical Company Norilsk Nickel	Russia	Nickel
19	20	1	Cameco Corporation	Canada	Uranium
20	23	3	Hindustan Zinc Limited	India	Diversified
21	18	-3	Teck Resources Limited	Canada	Diversified
22	22	0	China Coal Energy Company Limited	China	Coal
23	19	-4	Antofagasta plc	United Kingdom	Copper
24	24	0	CMOC Group Limited	China	Diversified
25	21	-4	Yankuang Energy Group Company Limited	China	Coal
26	28	2	Ivanhoe Mines Ltd.	Canada	Diversified
27	26	-1	Shandong Gold Mining Co., Ltd.	China	Gold
28	25	-3	Gold Fields Limited	South Africa	Gold
29	36	7	AngloGold Ashanti plc	United States	Gold
30	37	7	Kinross Gold Corporation	Canada	Gold

2025 rank	2024 rank	Change in ranking	Company name	Country/territory of incorporation	Commodity focus
31	30	-1	Northern Star Resources Limited	Australia	Gold
32		New	First Quantum Minerals Ltd.	Canada	Copper
33		New	Sociedad Química y Minera de Chile S.A.	Chile	Lithium
34	31	-3	National Atomic Company Kazatomprom JSC	Kazakhstan	Uranium
35	32	-3	South32 Limited	Australia	Diversified
36	39	3	Jiangxi Copper Company Limited	China	Copper
37		New	Zhongjin Gold Corp.,Ltd	China	Gold
38		New	PT Petrindo Jaya Kreasi Tbk	Indonesia	Coal
39	29	-10	The Mosaic Company	United States	Potash/phosphates
40		New	Alamos Gold Inc.	Canada	Gold

Appendix II

Aggregated financial statements

Top 40 global mining companies: Income statements (US$bn)

	2025 Forecast	2024	2023	2023–24 Change
Revenue (excluding trading revenue)	698	689	697	(0%)
Trading revenue	165	178	163	1%
Total revenues	**863**	**867**	**860**	**1%**
Operating expenses	(673)	(674)	(656)	3%
EBITDA	**190**	**193**	**204**	**(5%)**
Impairment charge	(14)	(10)	(14)	(29%)
Depreciation charge	(48)	(47)	(51)	(8%)
Net finance costs	(7)	(9)	(8)	13%
Profit/(loss) before tax	**121**	**127**	**131**	**(3%)**
Tax expense	(33)	(35)	(40)	(13%)
Net profit	**88**	**92**	**91**	**1%**
Profitability measures				
EBITDA margin	22%	22%	24%	
Net profits margin	10%	11%	11%	
Effective tax rate	27%	27%	31%	

Top 40 cash flow statement (US$bn)

	2025 Forecast	2024	2023	2023–24 Change
Net operating cash flows	140	143	140	2%
Purchase of property, plant and equipment	(77)	(88)	(89)	(1%)
Free cash flow	**63**	**55**	**51**	**8%**
Other investing cash flows	**(4)**	**(2)**	**(4)**	**(50%)**
Dividends paid	(59)	(62)	(65)	(5%)
Share buybacks	(3)	(3)	(8)	(63%)
Total shareholder returns	**(62)**	**(65)**	**(73)**	**(11%)**
Other financing cash flows	**1**	**7**	**1**	**700%**
Net drawdowns/(repayment) of debt	2	3	8	(63)%
Net cash flow	**0**	**(2)**	**(17)**	**(100%)**

Top 40 global mining companies: Balance sheet extract (US$bn)

Top 40 global mining companies: Balance sheet extract (US$bn)	2024	2023	% Change
Current assets			
Cash and cash equivalents	131	128	2%
Inventories	104	106	(-3%)
Receivables and other current assets	64	68	(-6%)
Other current assets	41	50	(-17%)
Total current assets	**340**	**352**	**(-3%)**
Non-current assets			
Mining and production assets	693	680	2%
Goodwill and intangible assets	73	76	(4%)
Investments and loans granted	77	68	13%
Other non-current assets	68	68	0%
Total non-current assets	911	892	2%
Total assets	**1,251**	**1,244**	**1%**

Top 40 global mining companies: Balance sheet extract (US$bn)	2024	2023	% Change
Current liabilities			
Accounts payable and other liabilities	115	120	(4%)
Borrowings current	59	59	0%
Short-term lease liabilities	5	5	0%
Unearned revenue current liabilities	3	3	0%
Other current liabilities	59	57	4%
Total current liabilities	**241**	**244**	**(1%**

Top 40 global mining companies: Balance sheet extract (US$bn)	2024	2023	% Change
Non-current liabilities			
Borrowings non-current	207	203	2%
Long-term lease liabilities	4	5	(20%)
Environmental provisions	84	89	(6%)
Unearned revenue non-current	5	8	(37%)
Other non-current liabilities	81	88	(7%)
Total non-current liabilities	**388**	**393**	**(1%)**
Total liabilities	**629**	**637**	**(1%)**
Net assets	**622**	**607**	**3%**
Total shareholder's equity	**622**	**607**	**(7%**

Ratios					
Gearing	22%	20%			
Market to book ratio	2.1	2.0	140	(-100%)	2%
Current ratio	1.4	1.4	-89	(-100%)	(-1%)

Constructing the report

Our analysis includes major companies whose primary business is assessed to be mining. The results aggregated in this report have been sourced from the latest publicly available information, primarily annual reports and financial disclosures available to shareholders. Our report also expresses PwC's point of view on topics affecting the industry, developed through interactions with our clients and other industry leaders and analysis.

Companies have different fiscal year ends and report under various accounting regimes, including International Financial Reporting Standards (IFRS), United States Generally Accepted Accounting Principles (US GAAP) and others. Information has been aggregated for the individual companies, and no adjustments have been made on the basis of different reporting requirements. As far as possible, we have aligned company financial results to be as at, and for, the year ended 31 December 2024. For companies that do not have December year ends, we added and deducted reviewed results to reflect the comparable 12-month period.

All figures in this publication are reported in US dollars (US$), except where specifically stated. The balance sheets of companies that report in currencies other than US dollars have been translated at the closing US dollar exchange rate, and the cash flow and financial performance was translated using average foreign exchange rates for the respective years.

Some diversified miners undertake part of their activities outside mining, such as parts of Rio Tinto's aluminium business and Glencore's marketing and trading arms. We have not excluded these activities from the aggregated financial information, except where noted. Companies whose primary business is not mining have been excluded from the Top 40 listing.

All royalty companies and metal streamers are excluded. Entities that are controlled by others in the Top 40 and consolidated within their results have been excluded, even where minority stakes are listed.

Mine 2025 methodology

Income statement

We have forecast revenues from the sale of commodities based on critical inputs of commodity price and production volumes. Foreign exchange has been considered for expenses. There is a wide variety of functional and operating currencies used by the Top 40, so estimates are subject to judgement.

For commodity prices, we have utilised the latest consensus economic data available for each of the major commodities mined by the Top 40, coupled with the latest production estimates for the 2025 financial year from annual reporting. More recent public information releases made prior to the finalisation of this publication have also been used.

Taxes are forecast with reference to the average effective tax rate over recent years, with the exception of notable anomalies.

Cash flow statement

Cash flow from operations was forecast with reference to movement in EBITDA. The drivers of working capital balances are expected to move in line with their historical tendencies, and no material movement in working capital adjustment is expected.

Investing cash flows include capital expenditure forecasts based on guidance issued by our Top 40 at the date of the report.

Dividends are forecast with reference to amounts declared at the date of the report and expected profitability. Net debt repayments are expected to remain consistent with historical trends.

Share buybacks are based on history and announcements made at the date of the report.

S&P Capital IQ waiver

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Thank you