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Global Materials Perspective 2026

October 2026



About this report

The *Global Materials Perspective 2026* is produced by McKinsey's Global Energy & Materials Practice. Now in its third year, the *Perspective* takes stock of the materials industry—its revenues, profit pools, and capital market performance—and examines the forces reshaping it: record returns driven by a surging gold price; governments' increasing use of materials as a strategic consideration; a demand outlook shifting from China to other regions and end markets, with implications for talent and capital; technology-driven productivity opportunities that remain largely untapped; and a tightening of scrap regulations.

Our analysis focuses primarily on developments through 2025, but we also consider more recent events, such as the conflict in Iran and recent public capital commitments. We aim to describe these shifts and what they mean for organizations along the value chain.

Building on the previous two editions, this year's report explores materials supply across three scenarios—base case, high case, and full pipeline—based on asset-level data modeled by McKinsey's MineSpans. We look at demand across the Continued Momentum baseline scenario and the two reference scenarios from the *Global Energy Perspective 2026*: Slow Evolution (Reference scenario 1) and Sustainable Transformation (Reference scenario 2).[1] The findings in this report are based on the Base Case supply and the Continued Momentum demand scenario, unless stated otherwise (for details, see Appendix: Our approach). The data for these scenarios come from a variety of sources, including the American Chemistry Council, Eurostat, the International Energy Agency, the International Trade Centre, Statista, the United Nations, the World Bank, and the World Steel Association, among others. These sources were used as input for McKinsey's proprietary modeling.

This report focuses primarily on metals and mining, although it also touches on other materials subindustries, including building materials (concrete and cement, glass, and others), plastics, and pulp and paper. Within metals and mining, our analysis covers upstream activities, including exploration, mine development, extraction, and beneficiation, as well as downstream activities including smelting, refining, manufacturing, and the processing of metals into semi-finished products, along with the collection, sorting, and recycling of scrap.

About MineSpans by McKinsey: MineSpans is a comprehensive metals and mining market intelligence solution, combining McKinsey's global expertise with proprietary data to provide an independent and holistic view on commodity markets. MineSpans aggregates more than 2.5 million data points across over 11,000 operating mines and projects in more than 130 countries. Built from referenced public sources, proprietary information, and advanced analytics, it provides insight into fundamental market drivers, including 13 cost and CO_2 factors. These insights are backed by McKinsey's global metals and mining expertise.

About Energy Solutions by McKinsey: Energy Solutions is McKinsey's global market intelligence and analytics group focused on the energy sector. The group helps organizations make well-informed strategic, tactical, and operational decisions by using an integrated suite of market models, proprietary industry data, leading industry benchmarks, advanced analytical tools, and a global network of industry experts. It helps leading companies across the entire energy value chain manage risk, optimize their organization, and improve performance.

About McKinsey & Company: McKinsey is a global management consulting firm committed to helping organizations accelerate sustainable and inclusive growth. The firm works with clients across the private, public, and social sectors to solve complex problems and create positive changes for all their stakeholders. It combines bold strategies and transformative technologies to help organizations innovate more sustainably, achieve lasting gains in performance, and build workforces that will thrive for this generation and those to come.

[1] *Global Energy Perspective 2026*, McKinsey, September 30, 2026.

Key takeaways (1/5)

The period since the start of 2025 has been one to remember for the metals and mining industry. Conflicts have disrupted trade routes and highlighted supply-chain vulnerabilities; trade restrictions that once centered on a handful of critical minerals now extend to scrap; and governments and companies have been prompted to allocate ever larger sums to regionalization of supply chains. All of this has played out against a macroeconomic backdrop marked by persistent uncertainty that has sent central banks and investors alike into gold, and rising expectations that AI will deliver a step change in industry performance while adding new sources of demand. But while the productivity toolbox has grown ever larger, and the industry sits on record profitability and cash, overall productivity did not improve.

As in previous years, our aim in this Perspective is to distill the main points of interest from our research and industry discussions. The five key messages that follow examine the state of the industry, supply concentration and trade, availability and growth, productivity and affordability, and sustainability.

I. State of the industry: Record returns driven by a surging gold price and shifting value pools

Metals and mining entered 2026 with some of the healthiest financials of the past decade. The industry's EBITDA margins averaged 27 percent in 2025 (up from 19 percent in 2015), aggregate EBITDA totaled over $0.8 trillion, and market capitalization reached a record $3.7 trillion (an increase of approximately 230 percent from 2015 to 2025). Yet these strong financials belie challenging underlying mechanics. Metals and mining revenues grew only about 1 percent in 2025, with volumes largely flat, labor productivity unchanged, and capital productivity declining. Margin expansion stemmed almost entirely from a volume-mix effect toward higher-margin commodities—notably gold (where prices increased 45 percent year on year) and copper (9 percent).

Indeed, the metals and mining industry has seen a big shift in where value is created. A decade ago, steel, iron ore, and coal comprised the bulk of the sector's value. Since then, the mix has shifted. The contribution of steel, iron ore, and coal has fallen, while gold and silver surged in value, and copper has gained share given its criticality in both the energy and digital transition. Gold overtook steel and thermal coal in the EBITDA pool for the first time ever in 2025 and accounted for 28 percent of that year's total industry EBITDA.

Consequently, companies' capital market performance diverged sharply depending on their commodity exposure. Between 2015 and 2025, gold producers grew total shareholder returns (TSR) 8.1 times; copper producers, 6.3 times; and coal producers, 5.7 times, while the returns for nickel producers increased only 2.2 times over this decade. Diversified metals and mining players generated returns close to the industry median of 5x, as many shifted their exposure toward copper. Despite these differences in returns, most of the industry trades at similar Enterprise Value/EBITDA multiples of 8 to 11 times.

II. Supply concentration and trade: Governments increasingly see materials as central to strategic priorities, and are now extending that pressure to scrap

Materials are increasingly becoming a central component of geopolitical consideration. Many governments are observed implementing a wide array of measures to support their materials industries, strengthen downstream competitiveness, decrease



Key takeaways (2/5)

dependency on materials imports, or reduce the potential downstream "shock effect" in case of supply disruptions.

While last year's *Global Materials Perspective* showed that export barriers focus primarily on materials with high levels of supply concentration and economic importance, restrictions now increasingly extend to scrap and recycled materials, which could provide a lower-cost source of local supply. This trend does, however, put pressure on recycling companies that are dependent on scrap imports from other countries or regions.

Physical constraints or vulnerabilities amplify policy risk. For example, when the conflict in the Strait of Hormuz cut Gulf sulfur exports, sulfur prices spiked, raising the cost of sulfuric acid for refining operations, compressing already slim margins. Governments have responded by developing strategic stockpiles and expanding regional sourcing, and sourcing from trading partners. The US government, for example, has taken equity stakes and offtake agreements in rare earths and other critical mineral producers, while the European Union has designated an initial 60 Strategic Projects under its Critical Raw Materials Act, 47 of them within the bloc.[2]

Concentration has continued to rise, up three percentage points in mining and three percentage points in refining between 2020 and 2025. A core challenge is that value is shifting upstream. Mining and concentrate supply are capturing more margin, while margins in processing and smelting are being squeezed. For announced diversification to become a reality, incentives for refining and processing would need to keep pace with, or even exceed, those for mining.

Tariffs under Section 232 of the US Trade Expansion Act and similar measures have contributed to regional differences in metal prices. For example, US aluminum prices peaked more than 60 percent above those in China, while steel prices in China have remained low amid overcapacity.[3] While higher prices can benefit metals and mining players, tariffs may affect downstream competitiveness through higher input costs. Fabricators and OEMs in protected markets pay structurally higher input costs while competing against some 250 million metric tons moving through direct (semi-finished and finished

[2] "MP Materials announces transformational public-private partnership with the Department of Defense to accelerate U.S. rare earth magnet independence," MP Materials press release, July 10, 2025; "US Department of Energy takes 5% stake in Lithium Americas," Reuters, October 1, 2025; "Commission selects 47 Strategic Projects to secure and diversify access to raw materials in the EU," European Commission press release, March 25, 2025; and "Commission selects 13 Strategic Projects in third countries to secure access to raw materials and to support local value creation," European Commission press release, June 4, 2025.
[3] McKinsey analysis.



Key takeaways (3/5)

steel) and indirect trade (steel-containing goods). While regional material prices are diverging, goods markets remain connected. This means that sustained tariff-driven premiums could impact demand over time, as downstream industries and consumers carry the additional cost. For example, between February 2025, when tariffs were announced, and June 2026, a US-manufactured C-class battery electric vehicle (BEV) faced more than $1,200 in increased materials costs compared with its China equivalent. For a comparable internal combustion-engine (ICE) vehicle, steel, copper, and aluminum alone added more than $900 per vehicle.[4]

One operational response to these supply-chain challenges is to build integrated regional value chains that connect mining, processing, and buyers. This could include developing projects with a clear commercial case for processing and by-product capture rather than stand-alone mining projects that only work at prices above what the global market will pay. Where supply diversification is a priority, governments and companies could support smelting, refining, and the manufacture of semi-finished and finished products.

III. Availability and growth: Capital and talent may need to be boosted and reshuffled as demand shifts and broadens

This year's *Global Materials Perspective* points to resilient demand growth across most commodities through 2030, with coal, steel and iron ore, and platinum group metals (PGMs) being the notable exceptions. New demand sources are emerging alongside traditional ones such as construction, energy, and transportation. Data centers are the most visible example, already contributing 0.4 percent of metals and mining revenue. While their share of total industry revenue is small, data centers are expected to drive a large share of demand for selected commodities, including gallium (where data centers are projected to account for about 6.2 percent of demand by 2030), copper (about 4.3 percent), germanium (about 2.5 percent), and rare earths (about 2.5 percent).

Alongside the diversification of end markets, the industry is also seeing a regional shift in demand patterns. China's share of global metals revenue peaked at around 48 percent in 2020 and fell to about 42 percent in 2025 as construction slowed, affecting demand for base metals; China's revenue share is projected to decline to 38 percent by 2035. India is already the second-largest market, accounting for about 10 percent of global metals revenue in 2025—and it is among the fastest-growing.

Globally, long-range supply–demand gaps have narrowed versus last year's *Perspective*, reflecting slower energy-transition demand and a wave of supply announcements—but deficits remain, notably for copper (about 10 percent), silver, rare earths (more than 20 percent), nickel (between 10 and 20 percent), and manganese.

Closing the next decade's supply gap is likely to require an estimated $4.2 trillion in mining and processing capital. While the industry has been deploying more capital in recent years, a further step-up may be needed in a context where capital productivity is declining. Megaproject overruns and weak returns



[4] McKinsey analysis.

Key takeaways (4/5)

on grassroots exploration raise the effective cost of supply, so capital that looks ample on balance sheets does not translate into metric tons or discoveries at the pace the outlook requires.

The industry's talent challenge has not eased. China's metals and mining workforce is projected to shrink by around 450,000 full-time equivalents (FTEs), mostly outside coal, by 2035 as demand rebalances, while India's metals and mining employment is projected to rise by about 430,000 FTEs as industrial output and steel demand scale. These shifts represent a net need for more than 310,000 workers globally, against graduate pipelines that keep shrinking in mature markets (by about 75 percent in Australia, and 40 percent in the United States, from 2011 to 2021).

That leaves boards with two linked decisions: first, how to balance long-term supply commitments with near-term realities—shifting trade dynamics, talent gaps, price volatility, and shareholder pressure for payouts; and second, how to orient capital where value and demand are shifting—toward India and emerging economies in Asia, toward new commodities, and toward partnerships and execution models that can deliver projects at competitive capital intensity.

IV. Productivity and affordability: A $450 billion to $750 billion opportunity

Mining productivity stagnated again in 2025 after a modest rebound following COVID-19, even as capital expenditures and M&A picked up and margins stayed high. Unit costs for copper, gold, and iron ore have risen between 28 and 36 percent since 2020, compared with a 24 percent increase in the US Consumer Price Index (CPI), while volumes and sector-level productivity gains have not kept pace despite the fact that the productivity toolbox is larger than ever, including advanced analytics, AI, automation, and robotization.

Annual productivity potential ranging from $450 billion to $750 billion sits across metals and mining, representing roughly 15 to 25 percent of industry revenues if captured at scale. The opportunity splits three ways. Operational excellence (about $300 billion to $475 billion) is potentially the largest bucket, comprising throughput optimization, recovery, and operational cost improvements including, for example, a shift toward autonomous hauling systems. Procurement excellence may add about $75 billion to $150 billion primarily from demand management and supplier diversification. Capital excellence may add about $75 billion to $125 billion, potentially by broadening the supply base to include manufacturers that offer significant cost advantages, and improving operational capital expenditure planning through AI solutions on project-related and sustaining capital. Over time, physical AI solutions—the convergence of robotics and AI—may further increase the opportunity and strengthen industry safety, especially when applied in hazardous environments.



Key takeaways (5/5)

Several productivity levers have seen an accelerated implementation in recent years. For example, the global fleet of autonomous hauling systems has roughly tripled over the past two years, yet implementation has been uneven, with China often moving much faster than other regions. That uneven rollout is likely to widen the productivity gap. Regions and operators that scale autonomy and integrate it into mine planning and maintenance may pull ahead; laggards may fall further behind even as the technology becomes mainstream. Not all of the estimated value has the potential to flow through to the industry's profitability, since widespread adoption could affect supply–demand dynamics and industry cost curves, and therefore prices. Even so, it represents a substantial opportunity.

The coming years may prove to be an inflection point for productivity in the industry, and a main source of competitive advantage. Operators that industrialize AI (moving from pilots to owned production systems with KPIs), scale autonomy while peers still experiment, and gate capital expenditures on ROIC and measurable productivity outcomes may compound advantage. When prices normalize, productivity may be the primary source of margin expansion.

V. Sustainability: Growing importance of innovation and scrap

Total greenhouse gas emissions in the metals and mining industry have decreased slightly in 2025 compared to 2024, albeit primarily driven by lower steel production, and another record year for global thermal coal production. Looking ahead, emissions are projected to decline by only 8 percent by 2035, primarily driven by grid decarbonization and continued efficiency improvements, and to a smaller extent, the increasing share of scrap material in the supply mix. The impact of "net-zero" asset-level transitions is expected to be small. Several projects, notably in Europe, have been paused or canceled as their competitiveness relative to conventional technologies remains challenging and customers have not signaled an increased willingness to pay for lower-carbon materials.

A further step-up in innovation may be required to bend the industry's decarbonization trajectory, with a particular focus on steel and aluminum as two of the largest contributors to the industry's emissions and on battery materials, which may see their share of emissions increase as demand increases. In addition, there is also an opportunity to further increase scrap collection and recovery. Next to offering a lower-carbon alternative, scrap feedstocks can provide a more economical supply alternative and present an opportunity to reduce supply dependence in regions that currently export scrap—including Europe and the United States. The last year has seen increased interest, with both Europe and the United States implementing several measures focused on restricting scrap exports. There could also be value, however, in stimulating innovation focused on the processing and upgrading of lower-quality scrap flows.





1. State of the industry

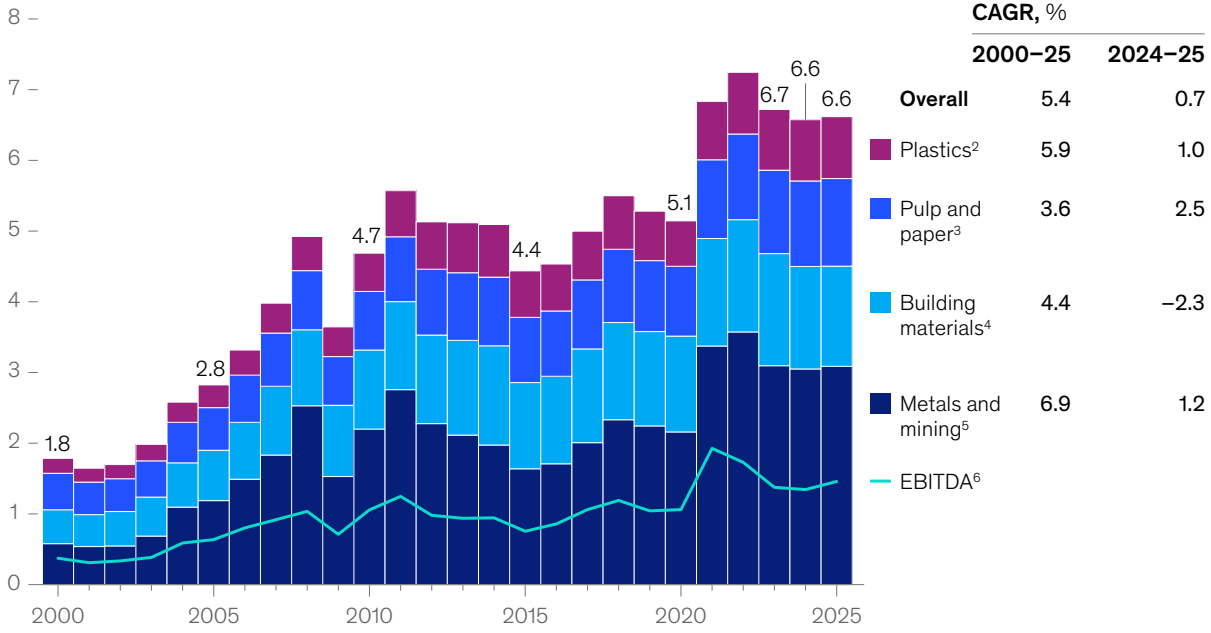
While record EBITDA margins delivered exceptional returns, the gains were driven by prices in gold, copper, aluminum, and other precious metals. Sustaining performance may depend on investment in exploration, expansion, and productivity improvements.

The materials industry marginally grew in 2025 as a decline in construction was offset by growth in pulp and paper, metals and mining, and plastics.

In a year characterized by price volatility and shifting trade conditions, materials revenue grew in 2025 by just over 1 percent to approximately $6.6 trillion, with the decline in construction being offset by growth in pulp and paper, metals and mining, and plastics.

This resilient performance ranks 2025 as the sector's fourth highest-earning year in the past two decades, with all four of these occurring in the last five years.

Revenues of the materials industry,[1] nominal $ trillion



Note: Historical revenues and profitability are different from our 2025 report primarily because of a change in the calculation methodology for steel to better represent quality and regional price differences.
[1]Sum of revenues per material, using average yearly refined materials market prices and demand volumes. [2]Commodity plastics, engineering plastics, high-performance thermoplastics. [3]Pulp, paper, carton board. [4]Wood, cement, sand and gravel, glass. [5]Steel, thermal coal, base metals (aluminum, copper, lead, tin, zinc), battery metals (cobalt, nickel, lithium, graphite, manganese), precious metals (gold, silver, platinum group metals), and others (industrial minerals, rare earth elements, minor metals, fertilizers, uranium). Steel revenues calculated as the regional weighted average of hot-rolled long and flat production and regional average prices between flat and long products. [6]EBITDA calculated using McKinsey MineSpans total revenues and average adjusted EBITDA margin for a company sample of 100 companies for metals and mining. For other industries, the global 3000 list of companies from McKinsey Value Intelligence is used.
Source: American Chemistry Council; Eurostat; FAOSTAT; Fastmarkets; IHS Markit; ITC Trade Map; Statista; World Bank; McKinsey Value Intelligence Platform; McKinsey MineSpans

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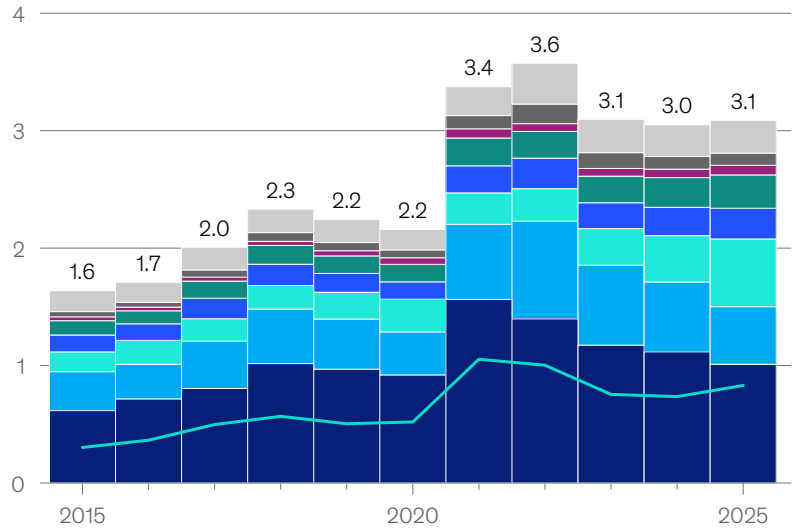
Gold offset declines in steel and thermal coal, leaving 2025 revenues up 1 percent.

For metals and mining revenues, gold, copper, and aluminum offset declines in both thermal coal and steel, leaving 2025 revenues up 1 percent from the prior year.

This is a continuation of a longer-term shift in industry value pools from steel and thermal coal to gold, copper, aluminum, and other precious metals.

At their peak, steel (including iron ore and metallurgical coal) and thermal coal accounted for 65 percent of industry revenue in 2021 and have since seen that share decline to 49 percent in 2025. Falling prices drove the decline in both, and steel also suffered weaker demand as China's construction sector slowed.

Metals and mining revenue,[1] nominal $ trillion



	CAGR, % 2015–25	2024–25
Overall	6.5	1.2
Other	4.5	3.1
Battery metals	8.9	–3.1
Other precious metals	9.6	13.2
Copper	8.8	12.3
Aluminum	6.2	8.3
Gold	13.1	46.2
Thermal coal	4.0	–17.6
Steel value chain	5.1	–9.5
Weighted EBITDA		

[1]Steel, thermal coal, base metals (aluminum, copper, lead, tin, zinc), battery metals (cobalt, nickel, lithium, graphite, manganese), precious metals (gold, silver, platinum group metals), and others (industrial minerals, rare earth elements, minor metals, fertilizers, uranium). Steel revenues calculated as the regional weighted average of hot-rolled long and flat production and regional average prices between flat and long products.
Source: McKinsey MineSpans

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2025 revenue growth came from volume and mix, as higher gold and copper prices were offset by lower steel and coal prices.

Metals and mining revenue growth from 2024 to 2025 was primarily driven by volume increases, as price increases for some commodities were entirely offset by price declines in others.

Most of the revenue increase from price development was driven by three metals:

- Gold prices went up by 45 percent, owing to central bank purchases and investors seeking safe assets.
- Copper prices went up by 9 percent and continued to increase to over $13,500 per metric ton by mid-2026. This was driven by an expected increase in demand from data center buildout and electrification combined with supply disruptions.
- Aluminum prices went up by 6 percent, yet saw an even higher increase to over $3,000 per metric ton by mid-2026, as the closure of the Strait of Hormuz disrupted the supply chain of around 10 percent of global volumes.

Conversely, steel and thermal coal saw prices decline. For steel, this was driven by a continued decline in demand and global overcapacity, most notably from the slowdown of the construction industry in China, while thermal coal prices continued to normalize from their 2022 peak.

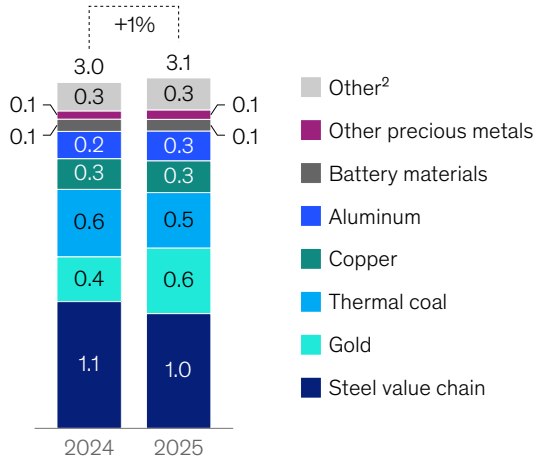
While battery materials in the aggregate also saw prices decline, the impact thereof on the industry revenue has been limited, as these materials only account for about 5 percent of industry revenue.

Evolution of price, volume, and revenue[1] for selected top commodities, 2024–25, %

Change, % *Negative* | *Positive*

		Price	Volume	Revenue
Growing	Gold	45	1	46
	Copper	9	3	12
	Aluminum	6	3	8
Declining	Battery materials[3]	–10	9	–2
	Steel value chain[4]	–9	–1	–9
	Thermal coal	–19	1	–18
Metals and mining industry		0	1	1

Metals and mining revenues by commodity, nominal $ trillion



[1]Revenue calculated as product of average yearly refined material market prices and demand volumes; prices and revenues are nominal.
[2]Includes a set of 30 other materials, eg, zinc, lead, potash, and uranium.
[3]Battery materials: nickel, lithium, cobalt, and graphite (excluding manganese; manganese is included in the battery group on page 10); volume measured as aggregated demand and price as group revenue per metric ton.
[4]Finished-steel revenue at regional hot-rolled coil prices (embedding iron ore and metallurgical coal); volume effect based on finished steel.
Source: McKinsey MineSpans

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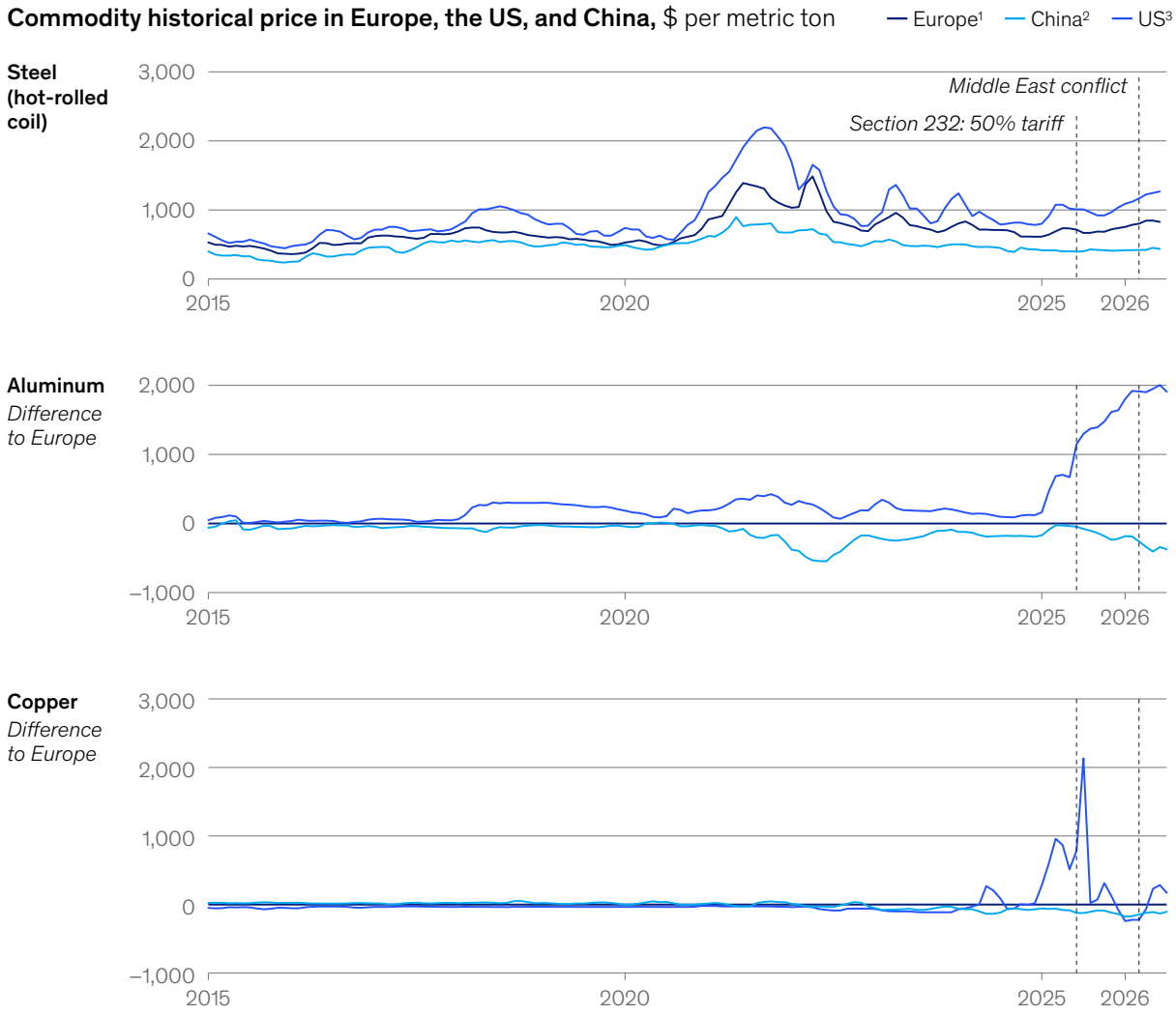
Tariffs have contributed to regional price differences, especially for steel and aluminum; China's over-capacity keeps the steel price structurally low.

Steel prices have diverged by region, with overcapacity in China keeping the steel price low and tariffs in Europe and the US sustaining regional price premiums.

Aluminum followed a single global price from 2015 to 2024. Regional prices diverged when the US tariff increased to 50 percent in June 2025.[5] This created a US-only premium that pushed US prices past $6,200 per metric ton by mid-2026.

Copper, by contrast, shows no regional divergence. Global AI and electrification demand, combined with mine supply losses, drove copper's rally to over $13,500 per metric ton by mid-2026. The potential for further tariffs contributed to elevated copper prices. US and European prices began to diverge amid increased US stocking activity.

Commodity historical price in Europe, the US, and China, $ per metric ton



Note: Aluminum and copper are shown as the difference between the US and Chinese price and the European price.
[1]Steel: MEPS Europe average; aluminum: London Metal Exchange (LME) plus EU duty-paid premium; copper: LME plus copper grade A cathode premium, cost, insurance, and freight (CIF) Rotterdam.
[2]Steel: MEPS China; aluminum: LME plus Shanghai premium; copper: LME plus copper grade A cathode premium, CIF Shanghai.
[3]Steel: MEPS US; aluminum: LME plus US Midwest premium; copper: LME plus copper grade A cathode warrant premium, in-warehouse US until 2023; COMEX from 2024 onward.
Source: Fastmarkets; LME; MEPS

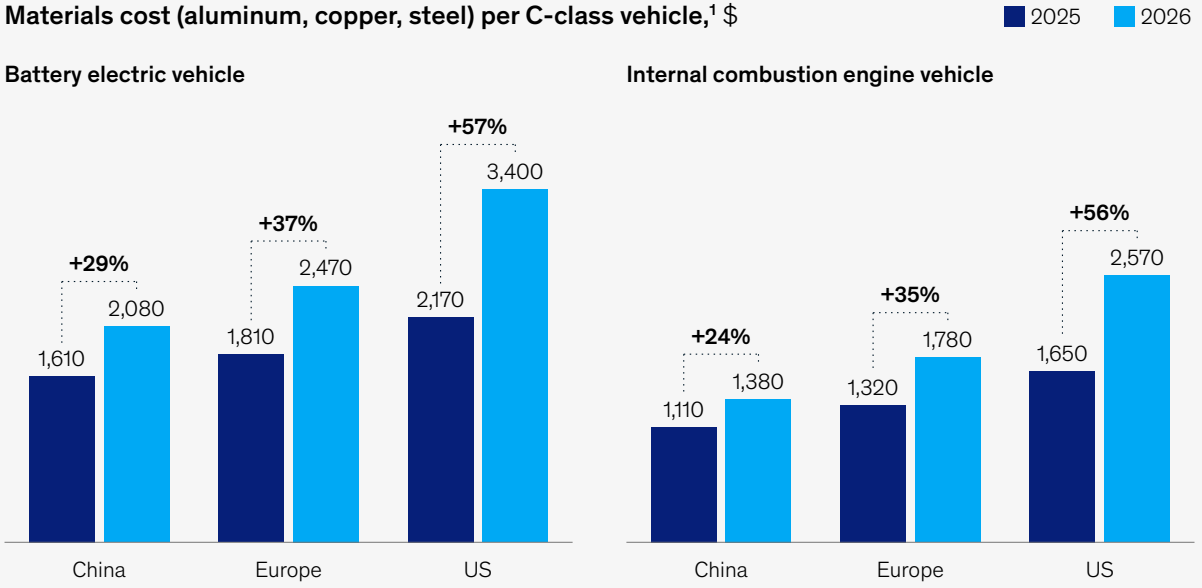
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[5] "Adjusting imports of aluminum and steel into the United States," Proclamation 10947, The White House, June 3, 2025.

Deep dive: Tariff-influenced regional prices affect downstream industries, making production in Europe and the United States more expensive.

Downstream manufacturers bear the cost of regional price divergence. In the United States, for example, materials costs for C-class BEVs and ICE vehicles rose by about 57 percent and 56 percent, respectively, between early 2025 and mid-2026. Chinese manufacturers saw smaller increases over the same period: about 29 percent for BEVs and 24 percent for ICE vehicles. As a result, the cost gap between US and Chinese manufacturers more than doubled, from about $500 per vehicle in 2025 to roughly $1,200 to $1,400 in 2026.

Materials cost (aluminum, copper, steel) per C-class vehicle,[1] $



[1]Materials price in Feb 2025, before the first US tariffs, and Jun 2026 price. Assumes the following material weights per vehicle: battery electric, aluminum 291 kg, copper 50 kg, steel 742 kg; internal combustion engine, aluminum 213 kg, copper 17 kg, steel 828 kg.
Source: Fastmarkets; LME; MEPS; McKinsey analysis

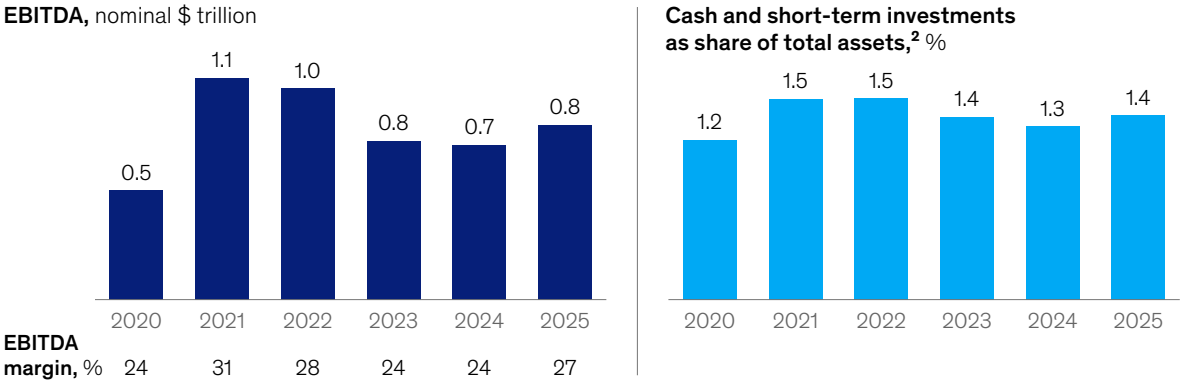
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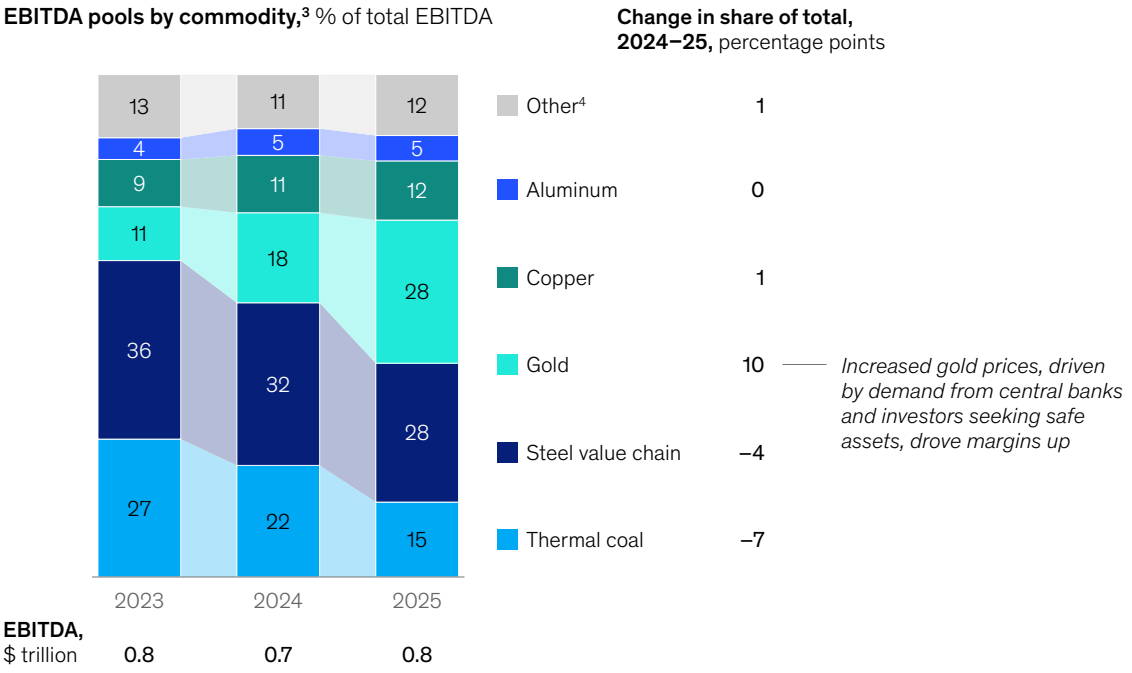
Strong profitability and cash positions emerged, as value pools shifted from steel and coal to gold and copper.

Following the price increase, profitability and cash positions stayed strong as value pools shifted from steel and thermal coal to gold, copper, and aluminum.

Metals and mining EBITDA rose to $0.8 trillion in 2025, the third-highest level since 2000. The most striking change was in gold, whose share of EBITDA jumped from 18 percent to 28 percent in a single year, making it the largest contributor to sector earnings growth and the largest absolute contributor alongside steel. Thermal coal and steel ceded seven percentage points and four percentage points, respectively.

Profitability and cash position for the metals and mining industry[1]





Note: Figures may not sum to 100%, because of rounding.
[1]Calculated based on bottom-up McKinsey MineSpans global revenues and average adjusted EBITDA margin for a sample of 100 metals and mining companies from McKinsey Value Intelligence Platform, weighted based on revenue split by commodity. Sample includes both metals and mining companies.
[2]Calculated as sum of adjusted cash and short-term investments divided by sum of total assets, using a data set of 355 metals and mining companies, by fiscal year.
[3]Calculated using averaged adjusted EBITDA margin by commodity for a sample of 100 metals and mining companies from McKinsey Value Intelligence Platform; players dealing in diversified metals and mining in the sample of 100 companies are included in others.
[4]Increase is driven mainly by silver (~$8 billion) and other precious metals (~$10 billion) and consolidation of various other metals.
Source: S&P Global Market Intelligence; McKinsey Value Intelligence Platform; McKinsey MineSpans

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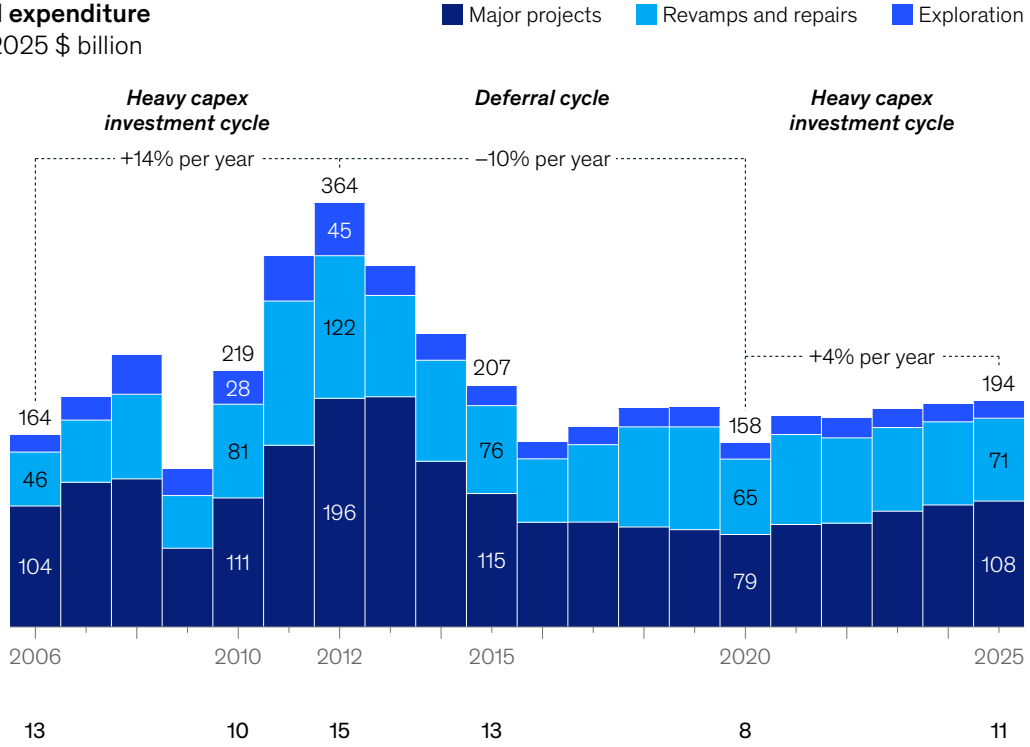
Strong profitability in recent years has not yet translated into a step-up in capital investments, which remain about 45 percent below the 2012 peak in real US dollar terms.

Organizational capital discipline has kept capital expenditures controlled despite strong commodity prices. At $194 billion, 2025 investment remains about 45 percent below the 2012 peak in real terms, with capital expenditure intensity at around 11 percent of revenue, compared with about 15 percent at the prior peak.

The slowest growth can be seen in exploration, where spend remains about 65 percent below 2012 levels, and has been flat since the late 2010s.

Continued underinvestment, alongside depletion and rising orebody complexity, is increasing pressure on the future project pipeline for several base metals.

Mining capital expenditure (capex),[1] real 2025 $ billion



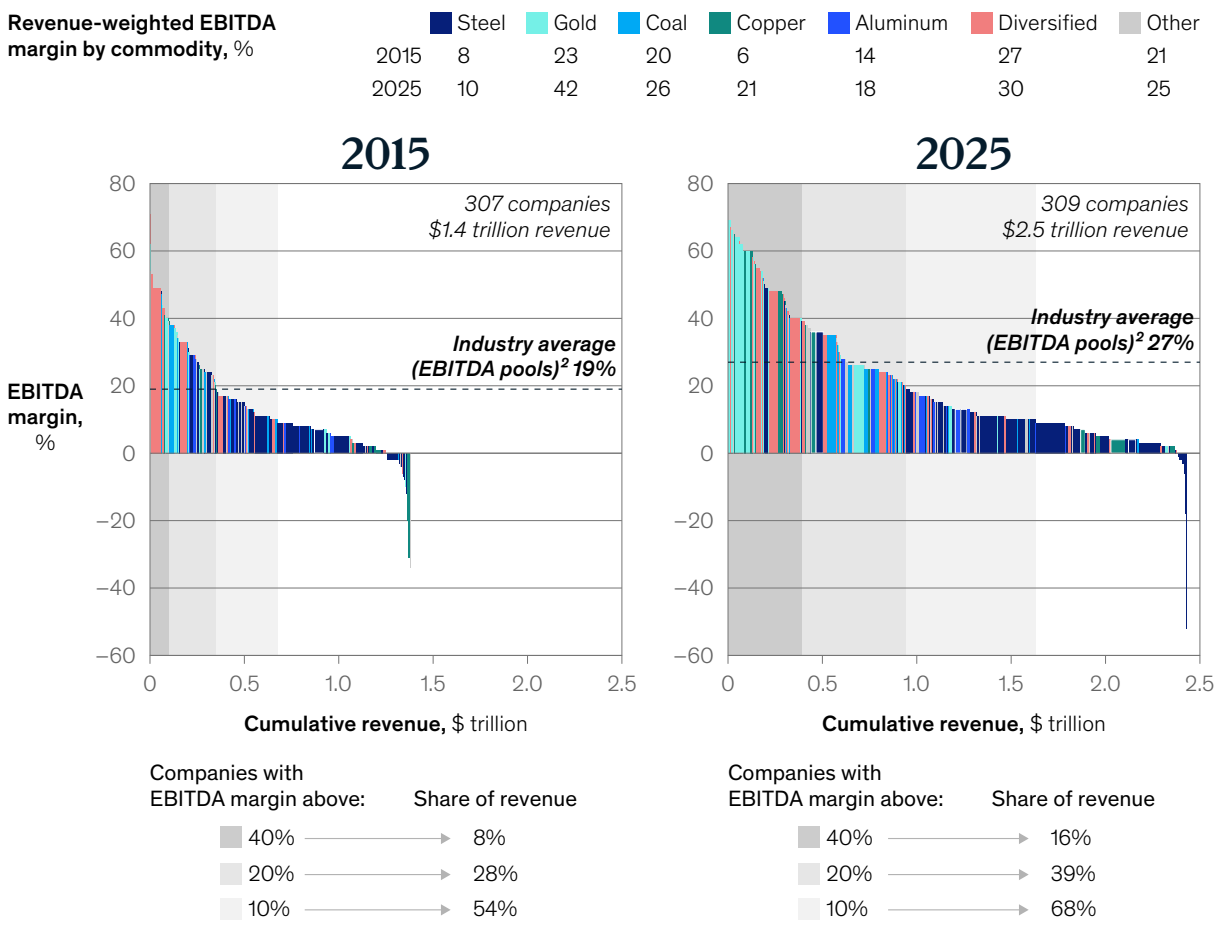
Note: Figures may not sum to totals, because of rounding.
[1]Real US dollar value calculated with the US consumer price index, 2006–25.
Source: McKinsey MineSpans; includes captive thermal coal for power stations and captive smelters

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The margin curve shifted upward by about 8 percentage points to 27 percent EBITDA, with gold companies overtaking diversified metals and mining players as the most profitable cohort.

The corporate EBITDA margin curve, covering a broad sample of more than 300 metals and mining companies across geographies and commodities, shifted up approximately eight percentage points in the last decade, as average EBITDA rose to 27 percent.

Pure gold players are now leading the margin ranking with a weighted average margin of 42 percent, followed by diversified metals and mining companies (30 percent) that have increasingly shifted their portfolio toward copper and other critical materials.



[1]Sample of 307 (2015) and 309 (2025) public and private pure metals and mining players out of a 337-company set; excludes trading companies, subsidiaries, and royalty companies. Private companies include large players that have disclosed their financials in McKinsey Value Intelligence. Companies with EBITDA margin below −50% are excluded from the chart. Diversified = diversified metals and mining.
[2]Based on the EBITDA-pool analysis (100-company margin sample applied to McKinsey MineSpans industry revenue); the revenue-weighted average of the companies shown is 13% (2015) and 20% (2025).
Source: McKinsey Value Intelligence Platform; McKinsey MineSpans; McKinsey analysis

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Steel deep dive: Regional profitability varies significantly, with India showing the most favorable market dynamics.

Regional price differences also drive regional differences in profitability levels, particularly in steel, where India enjoys the most favorable market dynamics.

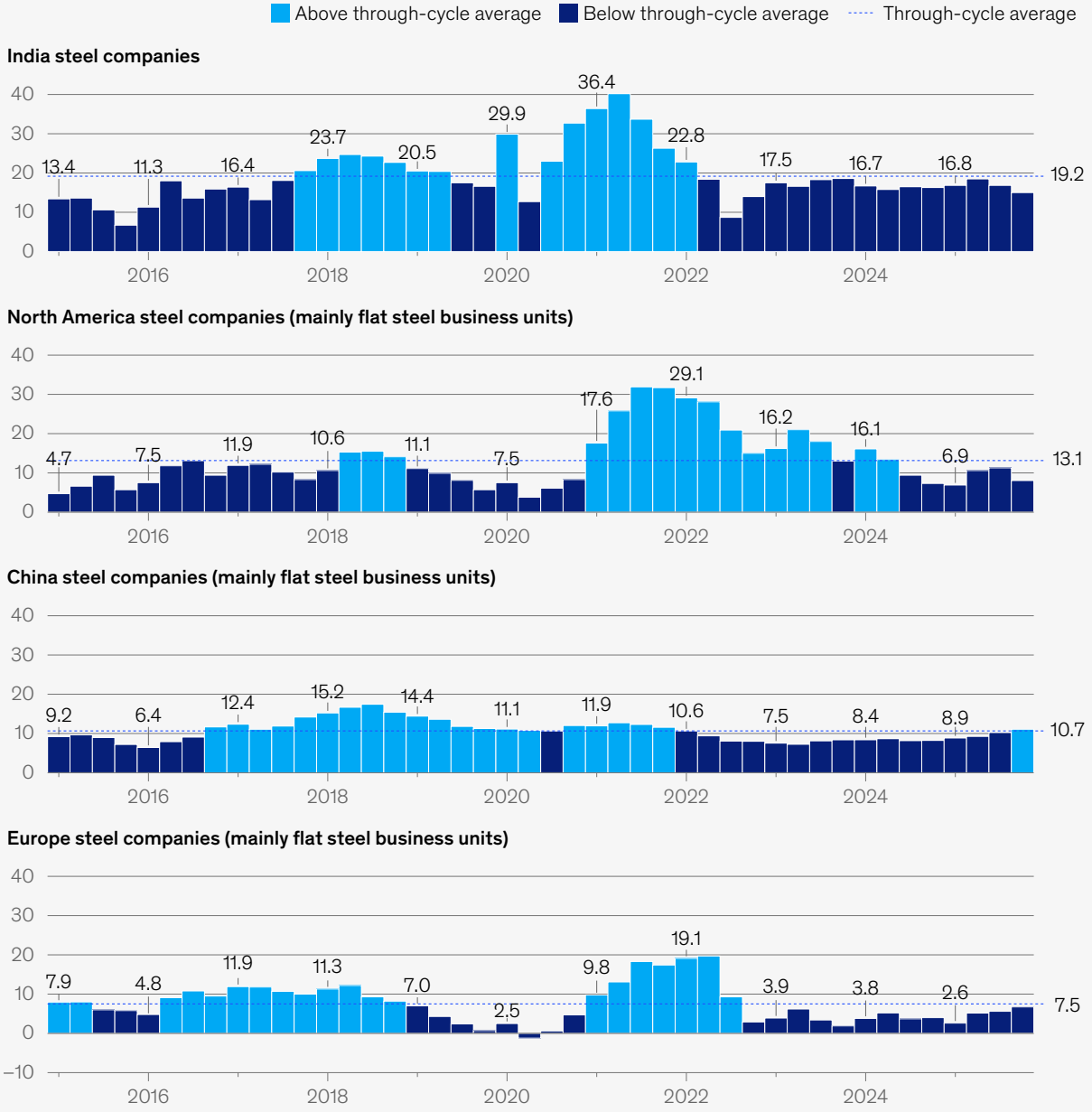
Profitability in steel in 2025 was below historical averages in all regions, but the spread was wide. Indian producers sustained EBITDA margins around 16 to 17 percent, well above North American companies at roughly 7 percent, European companies at 2 to 5 percent, and Chinese companies at around 9 to 10 percent.

This divergence is a result of prices and costs. Tariffs and trade measures have fragmented what was once a more global steel market into regional pricing zones. In North America, tariff protection has kept domestic prices above international levels. In Europe, on the other hand, producers are exposed to import competition and face high energy costs.

Average profitability among Chinese steel companies is dropping as they continue to deal with persistent excess capacity because of the slowdown in the construction industry.

In India, by contrast, high domestic demand drives prices and correspondingly higher profitability, creating opportunities for growth.

EBITDA margin of steel companies by region, quarterly, %



Source: McKinsey analysis

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Value pools are shifting futher upstream for some commodities, driven mainly by processing overcapacity.

Looking along the value chain, value pools are shifting further upstream for some commodities, driven mainly by processing overcapacity.

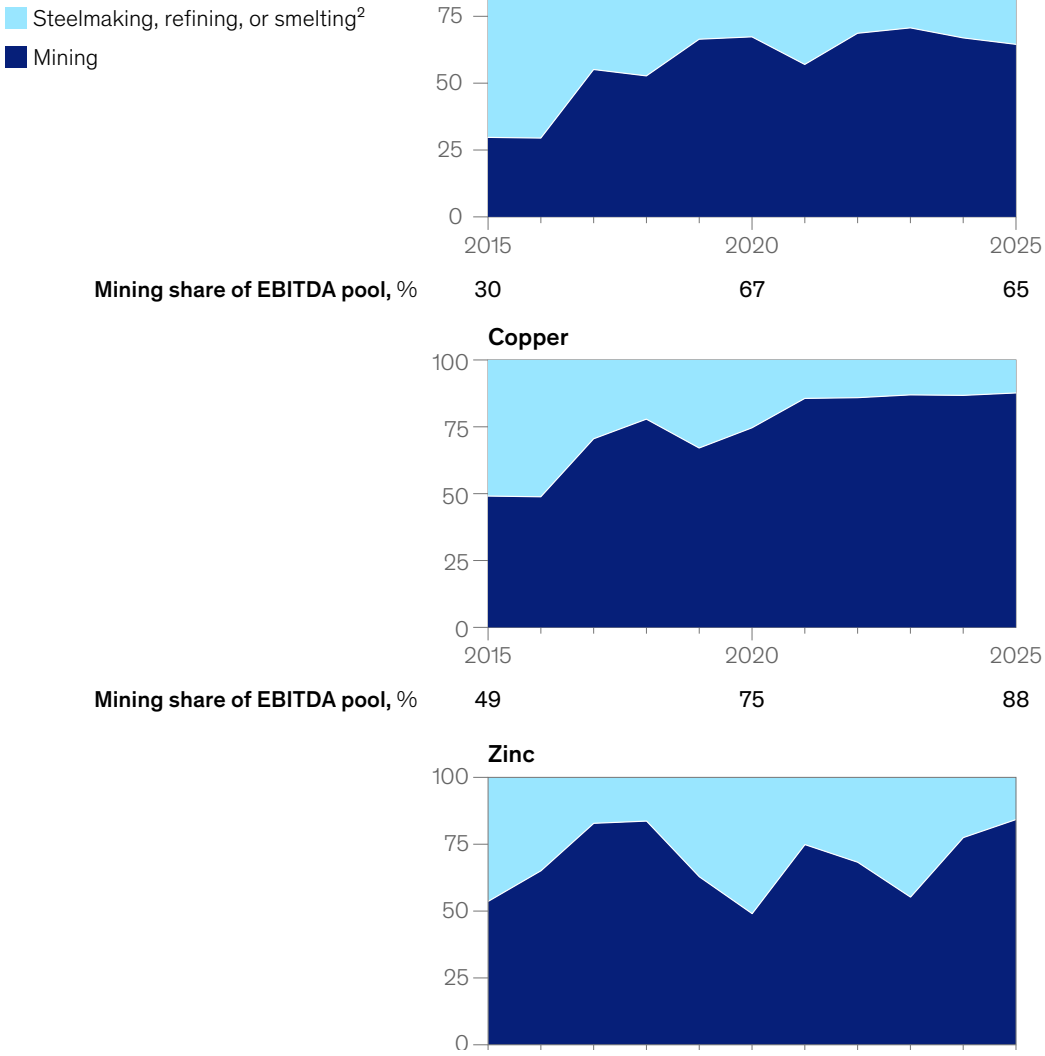
In steel, competition squeezed processing margins, while concentrated mining supply allowed major producers to maintain high margins.

In copper, exploration and development of new mines have not kept pace with smelting capacity growth, leading to higher returns for mining operations controlling scarcer supply—and lower returns for processing operations.

Zinc followed a more cyclical path, with shifts in mine supply relative to smelting capacity driving large swings in processing margins and treatment charges (TCs).

Low profitability and global overcapacity in processing limit willingness to invest. For regions seeking to diversify their supply, this becomes critical: Building new refining or smelting capacity can be economically challenging without additional financial support.

Metals EBITDA[1] pool by value-chain step, % of total

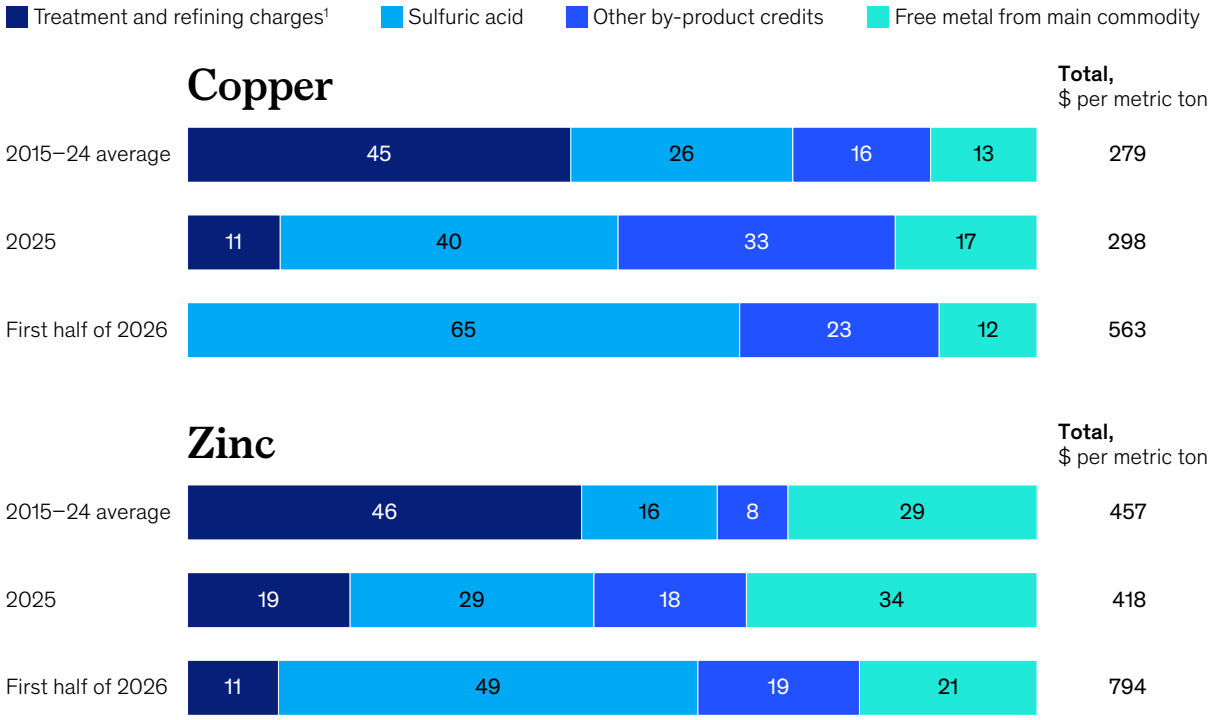


Copper and zinc smelter value pools are shifting from treatment charges toward revenues from by-product metals and sulfuric acid.

The margin squeeze highlighted above has changed the commercial model of smelters. TCs, once the core of smelter income, have fallen as concentrate has become scarce, but higher sulfuric acid prices have more than offset the decline in TCs. Non-TC revenues now account for over 80 percent of total value generated, compared with about 55 percent historically, reflecting the growing contribution from sulfuric acid and other by-products.

Other by-product revenues remain an important source of differences across smelters, particularly for zinc, where by-product exposure varies significantly across players. With concentrate shortages expected to persist, TCs may not return to historical averages in the near term.

Smelter value generation per metric ton of concentrate, %



[1]Based on benchmark terms.
Source: McKinsey MineSpans

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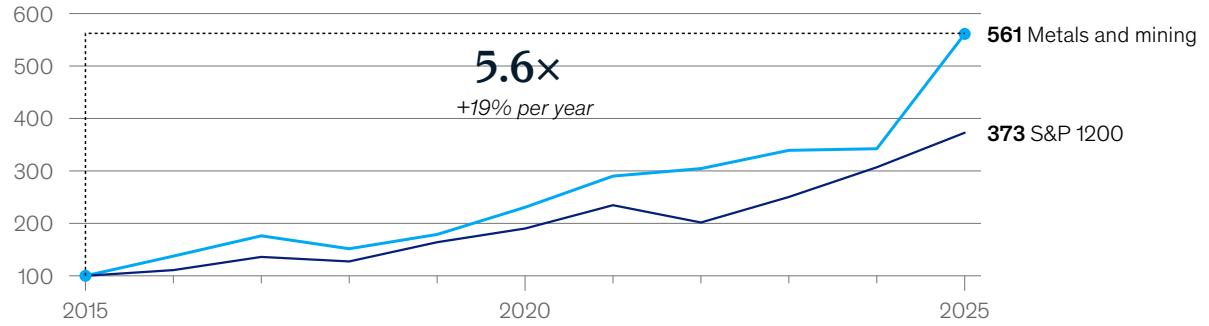
Metals and mining delivered record total shareholder returns through 2025, outpacing the S&P.

Capital markets, meanwhile, have rewarded the sector. Metals and mining delivered TSR of 5.6 times from 2015 to 2025, well ahead of the S&P Global 1200's 3.7 times, while its market capitalization roughly tripled over the same period. Both accelerated in 2025.

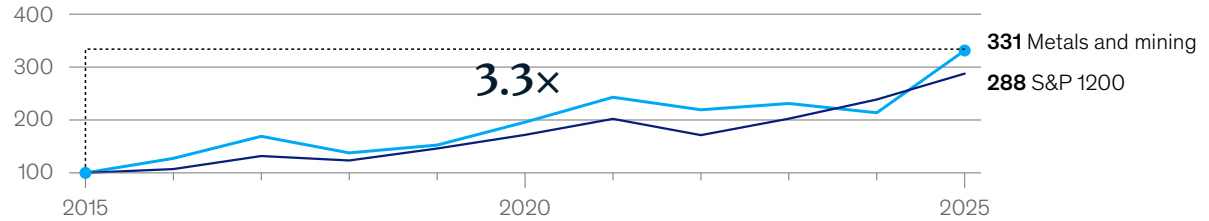
TSR growth was driven by expanding EBITDA and dividends. Despite this rapid growth, EV/EBITDA multiples have, on average, not exceeded ten times, on par with 2015 levels and slightly above those of 2020.

Metals and mining vs the S&P 1200,[1] index (2015 = 100)

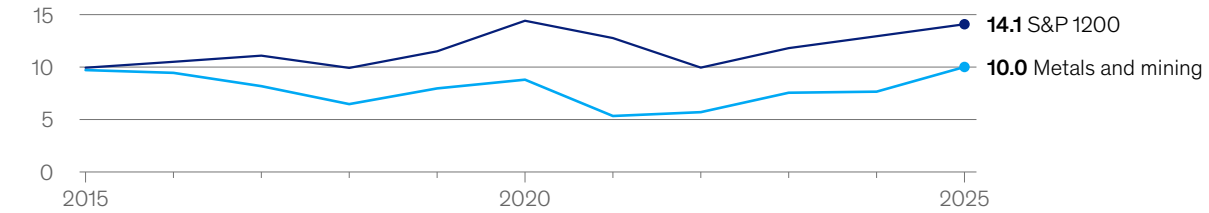
Total shareholder return[2]



Market capitalization



EV/EBITDA ratio, multiple



[1]Data set of 355 metals and mining companies, by fiscal year.
[2]Total shareholder value weighted average by market cap. Total shareholder return includes share price appreciation (capital gains) and dividends, with data from the end of each calendar year.
Source: S&P Global Market Intelligence; McKinsey Value Intelligence Platform

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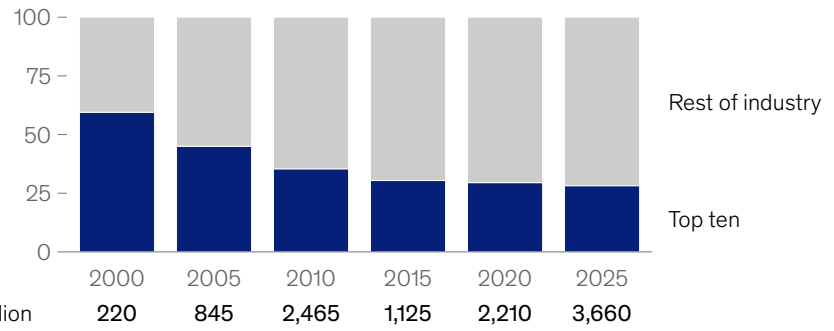
‘Gold rush’ is reflected in the valuation of the top ten metals and mining companies globally.

The equity value of metals and mining has grown more than 16 times from 2000 to 2025 to $3.7 trillion, and has rotated across geographies and commodities. But leadership is fragmenting. In 2000, the top ten metals and mining companies accounted for 60 percent of the total market capitalization of the industry. By 2025, the share had fallen to 28 percent and has since stabilized.

The regional composition of listed metals and mining companies is also shifting. From 2000 to 2025, companies based in China and North America significantly increased their share of total market capitalization. In 2026, China and North America together account for approximately 60 percent of the $3.7 trillion total, compared to 22 percent in 2000. Europe’s share has dropped to 11 percent from 35 percent at the start of the millennium.

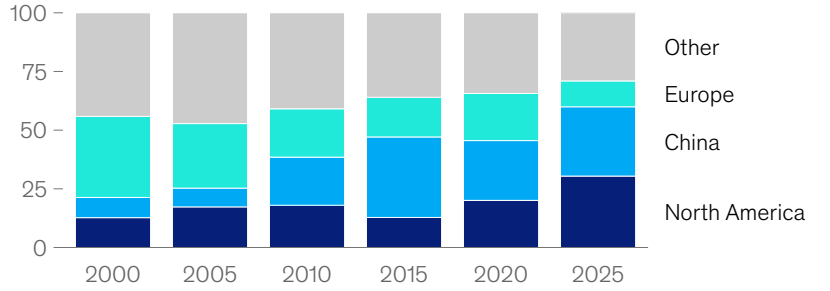
Ferrous metals have lost ground in the list of top ten highest-valued metals and mining companies globally. Steel companies made up about 20 percent of the top ten’s market capitalization in 2000, and peaked at roughly a third in 2010. They had dropped out of the top ten entirely by 2025. Non-ferrous metals, on the other hand, gained. Gold and copper together grew from about 5 percent in 2000 to nearly 60 percent in 2025.

Top ten: Market share of the top ten metals and mining companies[1] by market cap, % of total



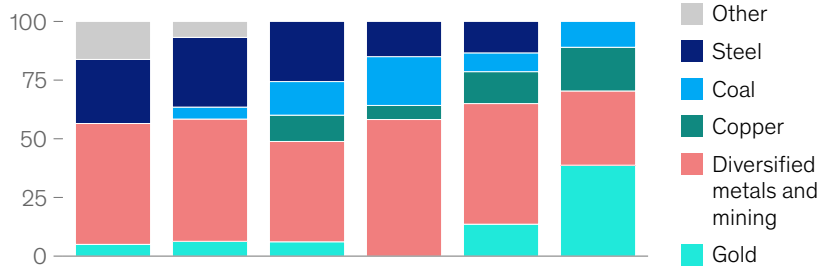
Total, $ billion	2000	2005	2010	2015	2020	2025
	220	845	2,465	1,125	2,210	3,660

Regional distribution: Chinese, North American, and European companies’ share of total market cap,[1] % of total



Total, $ billion	2000	2005	2010	2015	2020	2025
	220	845	2,465	1,125	2,210	3,660

Company type: Market cap of the top ten metals and mining companies by commodity type, % of total



Total, $ billion	2000	2005	2010	2015	2020	2025
	131	381	873	341	648	1,022

Note: Figures may not sum to 100%, because of rounding.
[1]Data set of 355 metals and mining companies, by fiscal year; market capitalization at fiscal year-end.
Source: S&P Global Market Intelligence; McKinsey Value Intelligence Platform

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Top ten companies by market capitalization accounted for 35 percent of TSR growth, with most outperforming the industry average significantly.

Eight of the ten largest metals and mining companies by market capitalization outperformed the sector's average annual TSR of 19 percent from 2015 to 2025, and, as a group, the largest players beat the sector average by about six percentage points.

In so doing, they captured an outsized share of the industry's shareholder value creation of approximately 35 percent over the period (versus their 28 percent share of total market capitalization in 2025).

All but two of the eight outperformers—Maaden and China Shenhua Energy—are primarily gold and copper miners.

TSR of top ten companies by market capitalization

Average, all metals and mining[1] | Average, largest ten players

Company[2]	Headquarters	Average annual TSR, 2015–25, %	Market cap, 2025, $ billion	TSR contribution,[3] 2015–25, %	Dividends paid, 2015–25,[4] $ billion	Primary activity[5]
Zijin Mining Group	China	33	128	2.6	10.9	Gold, copper
Newmont	US	28	108	1.5	8.9	Gold
Barrick Mining	Canada	27	73	1.4	5.5	Gold
Agnico Eagle Mines	Canada	26	85	1.0	3.4	Gold
Southern Copper	US	25	117	3.9	16.5	Copper
Freeport-McMoRan	US	22	72	1.5	4.4	Gold, copper
Maaden	Saudi Arabia	21	63	1.2	1.0[6]	Phosphate, aluminum, gold
China Shenhua Energy	China	19	112	8.4	47.1	Coal
Rio Tinto	UK	16	137	6.9	65.2	Copper, aluminum, iron
BHP	Australia	13	154	6.5	78.5	Iron, copper
Total			**1,053**	**34.9**	**241.4**	

6 percentage points

Note: Figures may not sum to totals, because of rounding.
[1]Data set of 355 metals and mining companies, by fiscal year. [2]Top ten metals and mining players by market cap in 2025. [3]Share of absolute industry total shareholder return (value created), 2015–25; value created = market capitalization at Dec 31, 2015 × TSR index growth 2015–25, calendar year-end basis for all companies. [4]Cumulative common dividends paid, 2016–25, per McKinsey Value Intelligence Platform and company filings. [5]Commodities with 15 percent or more of fiscal-year 2025 revenue; Zijin on a mine-produced revenue basis (excluding refining and trading); China Shenhua Energy also derives ~30% of revenue from power generation. [6]First dividend paid in 2025.
Source: Company filings; Financial Times; S&P Global Market Intelligence; McKinsey Value Intelligence Platform

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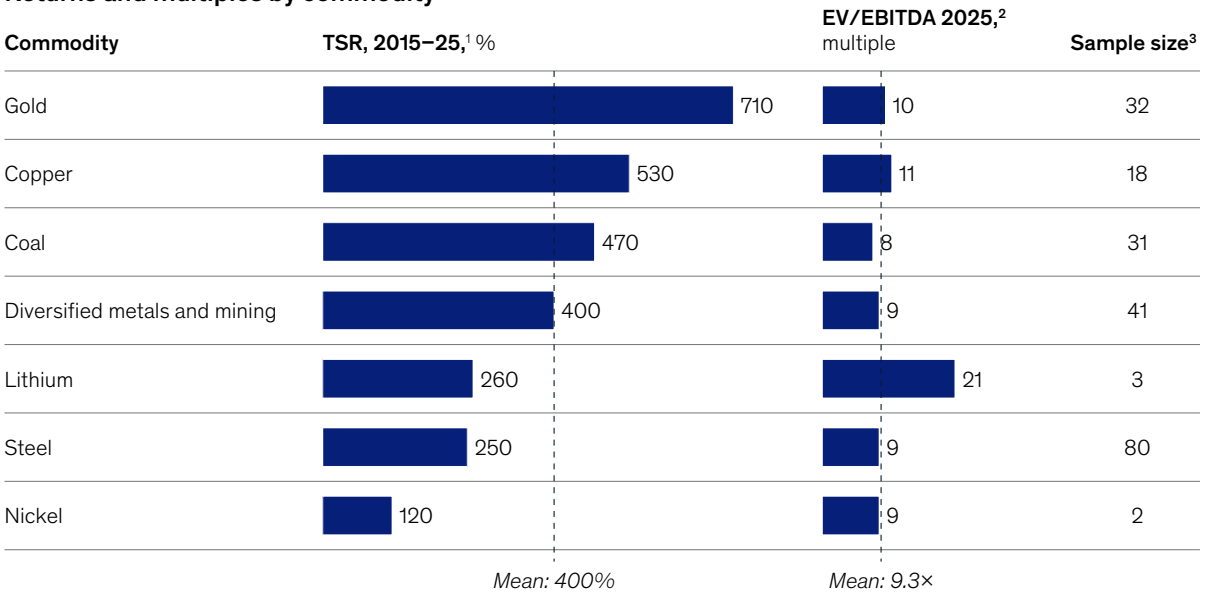
Commodity-cohort returns have diverged sharply since 2015—gold delivered about 8 times and copper about 6 times, while lithium and nickel lagged.

By commodity, returns have diverged sharply from 2015 to 2025. Gold led the pack, delivering TSR of more than 700 percent—an approximately eightfold increase—while nickel lagged behind with a gain of 120 percent, or roughly a twofold increase.

Higher prices drove gold's strong TSR performance, lifting EBITDA faster than valuations and resulting in falling EV/EBITDA multiples.

Copper and coal also performed strongly, with TSR of 530 percent and 470 percent, respectively, followed by diversified metals and mining players at 400 percent.

Returns and multiples by commodity



[1]Cohort market-cap-weighted TSR, end of 2015 to end of 2025 (portfolio bought at 2015 market values).
[2]Sum of enterprise value divided by sum of adjusted 2025 EBITDA of the cohort; companies with negative EBITDA excluded.
[3]Companies with a full 2015–25 TSR history and positive 2025 EBITDA; the same companies underlie both columns. Lithium (3) and nickel (2) are indicative only.
Source: 355 listed metals and mining companies, of which 207 meet both criteria; McKinsey Value Intelligence Platform

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2. Supply concentration and trade

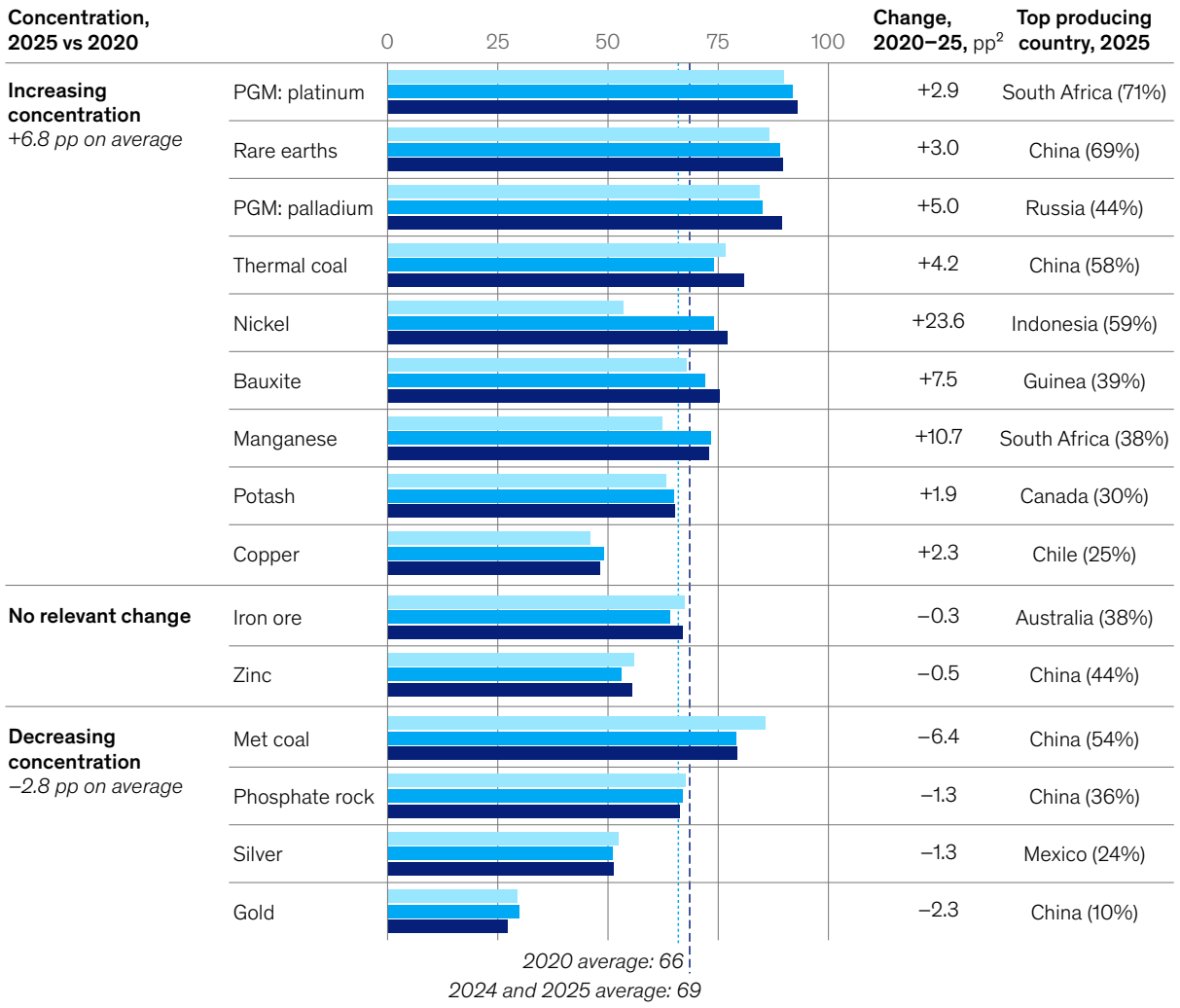
Highly concentrated minor and strategic metals are increasingly seen as strategic assets. In response, importing countries are increasing investment in supply chain diversification.

Mine supply became further concentrated through 2025 (+3 percentage points).

Mine supply has become more concentrated, despite the strategic actions being taken by importing countries to diversify supply chains. Across the top 15 commodities, the top three countries' average share rose from 66 percent in 2020 to 69 percent in 2025.

Nine of the 15 largest commodities became more concentrated over the same period: platinum, rare earths, palladium, thermal coal, nickel, bauxite, manganese, potash, and copper.

Production remains highly concentrated for certain materials—for example, South Africa in platinum, China in rare earths, and Indonesia in nickel.



[1]Chart represents the concentration in production of the top 15 commodities by share of total revenues in 2025. Steel is not included here given this is an analysis on mining production; however, its constituent elements such as iron ore and met coal are included instead. Similarly, aluminum is not included, but bauxite is.
[2]Percentage point.
Source: International Energy Agency (IEA); United States Geological Survey (USGS); McKinsey MineSpans

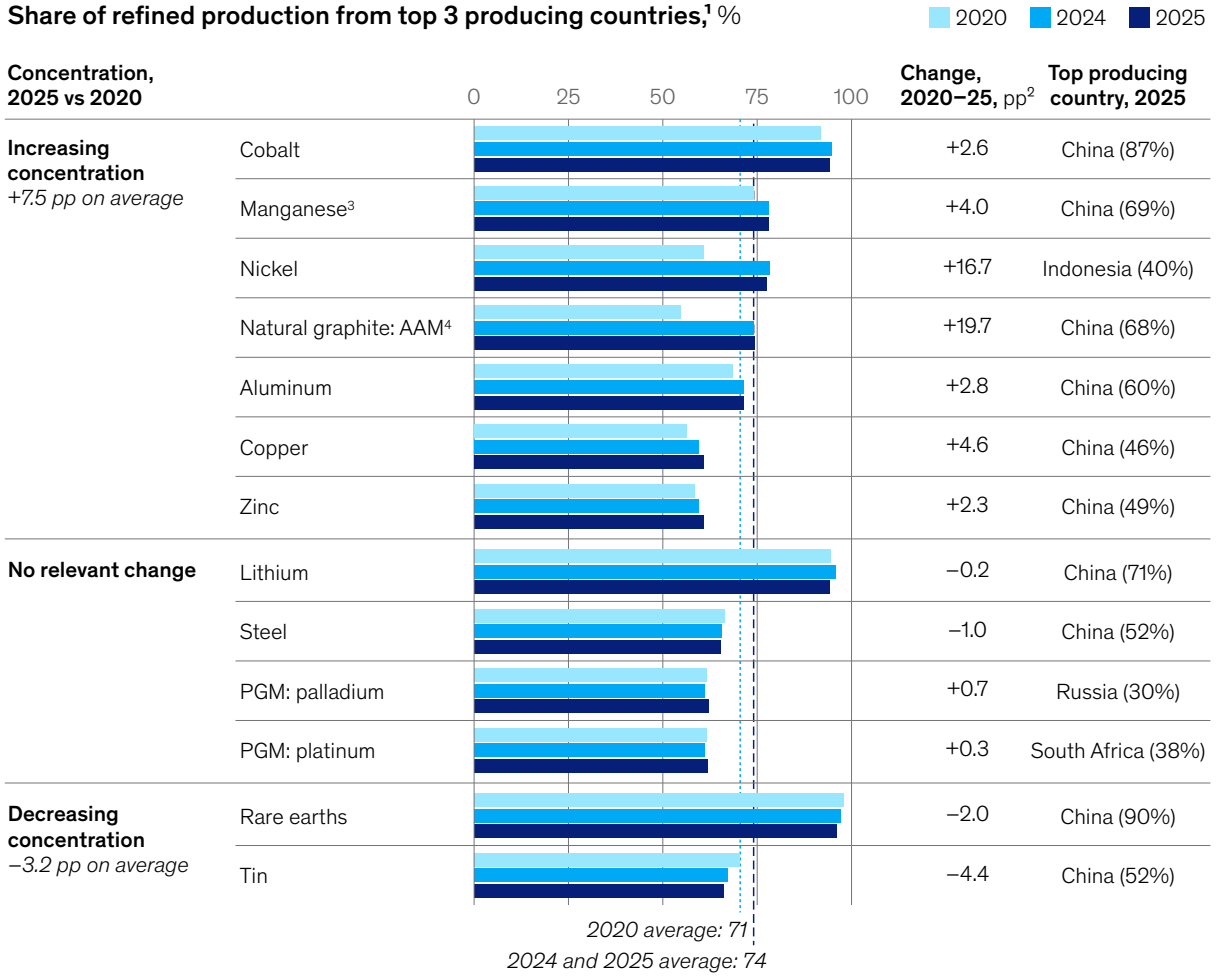
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Supply of refined materials has become increasingly concentrated; for many critical minerals, supply concentration rose by about 3 percentage points since 2020.

For refined materials, the picture is similar. From 2020 to 2025, supply became three percentage points more concentrated for the top 15 commodities, with China accounting for the largest share in all but nickel (Indonesia), palladium (Russia), and platinum (South Africa).

Compared with mining, this picture may shift more rapidly, as lead time for new refineries tends to be shorter than development lead times for mines. Further, more than one-third of refineries required to process the new ore supply have not yet been announced.

Share of refined production from top 3 producing countries,[1] %



[1]Chart represents top 13 commodities by share of total revenues in 2024. Coal and iron ore are not included given this is an analysis on refining production; however, refined materials such as steel are included instead. Analysis of primary processing, not secondary/remelting of scrap.
[2]Percentage point.
[3]Based on 2023 data for manganese alloys.
[4]Anode active material.
Source: IEA; USGS; McKinsey MineSpans

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Countries are taking measures to reduce reliance on geopolitically sensitive materials.

Given this supply concentration and the evolving global trade environment, countries and regions around the globe are increasingly adopting policies to strengthen their position in the materials supply chain.

Net exporters are introducing measures affecting activities across the materials supply chain through export restrictions, downstream integration requirements, or, in some cases, nationalization of supply.

Net importers are moving to make their materials supply chains, and with them their downstream industries, more resilient. Their tools include import restrictions that can stimulate the buildout of domestic industries; resource development funds that could support new projects through improved financing terms, direct subsidies, or, in some cases, equity; the designation of strategic projects, which could gain access to public funding and, through accelerated permitting, face less uncertainty; and strategic stockpiles that offer cushioning to downstream industries when supply chains are disrupted.

Finally, importing and exporting countries are striking many bilateral agreements, often focused on privileged access to certain materials or on mutual investment commitments, though the effects of most of these agreements are yet to be seen.

Selected strategic moves by exporting and importing countries

● Increasing prevalence

	Strategic move	Examples of recent moves	Opportunities for companies
Enacted by exporting countries	● **Export restrictions**	DRC cobalt export suspension (2025) followed by export quotas (2026) Zimbabwe lithium-concentrate export ban replaced by an export quota system (Apr 2026) US Executive Order export restrictions on recoverable critical materials (2026)	Accelerated development of alternative supply routes
	● **Domestic downstream integration requirements**	Nigeria "no value addition, no license" (2025) South Africa Critical Minerals and Metals Strategy (2025) Ghana GoldBod domestic gold-doré refining mandate (2026)	Established independent producers benefiting from gaining a foothold downstream
	Nationalization of supply of strategic commodities	Mozambique Mining Law: Mandatory 15% nondilutable free-carried state stake via new state-owned enterprise Empresa Nacional de Minas plus unprocessed-export ban (2026) Mali's ~$430 million Barrick settlement (2025)	Partnership opportunities with longstanding globally leading producers
Both	● **Bilateral agreements**	US–DRC Strategic Partnership Agreement (2025) US–Australia framework on critical minerals and rare earths (2025) South Korea–Indonesia MoUs (2026) US–EU Critical Minerals MoU (2026)	
Enacted by importing countries	● **Import restrictions**	US Section 232 action on processed critical minerals (2025)	Shift in domestic project economics, enabling new investments
	● **Resource development funds**	Canada C $2 billion Critical Minerals Sovereign Fund (2026) US Executive Order 14241 Defense Production Act critical-minerals fund (2025)	Boost to project timeline and economics
	Strategic projects to secure access	US-backed Orion Consortium (DFC and ADQ): 40% of Glencore's DRC copper–cobalt assets (2026) Liberia's ArcelorMittal Mineral Development Agreement extension to 2050 and multiuser rail access (2026)	Boost to project timeline and economics
	● **Development of strategic stocks**	US National Defense Stockpile critical-minerals expansion (2025) Australia's AU $1.2 billion Critical Minerals Strategic Reserve (2025) Canada's new stockpiling mechanism plus G7 Critical Minerals Resilience and Production Alliance (2025)	Temporary boost to demand

Source: AFP; ArcelorMittal; Australian Department of Industry, Science and Resources; Australian Department of the Prime Minister and Cabinet; Bloomberg; BusinessDay; Center for Strategic and International Studies; Ghana Gold Board; Government of Canada; Mining Weekly; Radio Republik Indonesia; Reuters; S&P Global; South African Government News Agency; US Bureau of Industry and Security; White House; McKinsey MineSpans; McKinsey analysis

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Export barriers are becoming an increasingly prominent feature of global materials trade, with a focus on commodities where one country holds a dominant position.

Trade policy is increasingly used as a strategic lever, as export barriers are almost exclusively focused on those commodities with a high supply concentration and high importance to downstream industries—the latter as measured by the number of times a commodity appears on the list of critical materials as defined by nine countries and regions across the world.

Of the 13 commodities that have both high critical-mineral importance and high production concentration, nine now have trade barriers imposed by a top three supplying country, and a tenth (manganese) has one announced.

Only three commodities outside that group (molybdenum, bauxite, and phosphate rock) have faced similar action.

Selected commodities by production concentration, economic importance, and trade-barrier status

Status of trade barriers set by top 3 supplying countries:
- ● Barrier in place before 2025
- ● Barrier imposed since the start of 2025
- ● Barrier announced, not yet in force
- ○ No barrier imposed

Production concentration,[1] share of top 3 suppliers	**Economic importance, by mentions on national critical mineral lists**[2]		
	Low (0–3 mentions)	**Medium** (4–7 mentions)	**High (7+ mentions)**
Very high (≥90%)			○ Platinum ○ Vanadium ● Antimony ● Gallium
High (70–89%)	○ Metallurgical coal ○ Thermal coal ● Bauxite ○ Alumina	○ Aluminum ○ Selenium ● Molybdenum ○ Titanium	● Cobalt ● Manganese[3] ● Germanium ● Rare earths ● Lithium[4] ○ Palladium ● Graphite ● Tungsten ● Nickel
Medium (50–69%)	○ Lead ○ Uranium ○ Steel ○ Potash ○ Silver ● Phosphate rock[5]	○ Zinc ○ Tin ○ Zirconium	
Low (<50%)	○ Gold ○ Iron ore	○ Copper	

[1]Based on share of top 3 producers, using mine production data at the market level (except steel, alumina, and aluminum, which use refined production data).
[2]Based on critical mineral lists for Australia, Canada, EU, India, Japan, South Africa, South Korea, UK, and US.
[3]The Gabonese government has announced intention to ban raw manganese exports from Jan 1, 2029.
[4]China's export controls (since Jan 2025) apply to lithium processing and cathode technology, not to the raw material.
[5]China tightened its phosphate export quotas and inspection regime in 2025–26.
Source: USGS Mineral Commodity Summaries 2025; McKinsey MineSpans

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Scrap is becoming a contested feedstock, as every commodity with mature recycling now faces restrictions from multiple jurisdictions.

Restrictions increasingly extend beyond primary materials to scrap. For countries that are net importers of materials, restricting scrap supply can provide a means to reduce that import dependency, while at the same time offering a lower-carbon alternative to primary supply. The economic viability of this production route depends on the scrap quality, with processing cost being higher for lower-quality scrap.

The European Union, the United States, Japan, and Russia restrict outbound flows of scrap with duties, licenses, quotas, orders, and bans.

China, Türkiye, and India—historically among the largest global importers of scrap—have introduced measures aimed at restricting imports to higher-quality grades, including purity thresholds, duties, and licensing requirements.

Scrap trade restrictions by commodity and jurisdiction

X 2025 exports, million metric tons | In force | Imminent, second half of 2026 | Future, 2027 or later | Announced | None or N/A

	US	European Union	China	Türkiye	India	Japan	Russia
Steel scrap	*15*	Non-OECD export ban, May 2027[2] *15.9*	Imports allowed since 2021 *<0.1*	Import license *0.2*	*<0.1*	Scrap-yard permit law, by 2028[3] *7.7*	Export quota 2.2 million metric tons (5% duty) *7.7*
Aluminum scrap	*2.0*	Non-OECD export ban planned (15% duty dropped) *1.3*	≥91% purity import screen *<0.1*	Import license *<0.1*	Import duty (2.5%) *<0.1*	Scrap-yard permit law, by 2028 *0.4*	Export duty (10%) *<0.1*
Copper scrap	Domestic sales mandate proposed (25%)[1] *0.9*	Under consideration *0.6*	≥97% purity import screen *<0.1*	Import license *<0.1*	Import duty cut to 0 *<0.1*	Mixed-scrap export approval	Export duty (10%) *<0.1*
Black-mass scrap	Domestic-sales order (100%; Bureau of Industry and Security waiver)	Non-OECD export ban, Nov 2026	Imports legalized; duty cut (6.5% to 3%)	Import ban; export consent	Export permit		
Other scrap	Tungsten scrap 100% domestic-sales order; Defense Production Act covers all critical-mineral scrap	Rare earth magnet-scrap export curbs pledged	ULAB/e-waste import ban	Lead-scrap import ban; ULAB permit	ULAB import license and cap; PGM scrap import license	ULAB/e-waste export approval	Export ban (PGMs/precious metals); lead-scrap license

Note: ULAB = used lead-acid batteries; PGM = platinum group metals; WSR = EU Waste Shipment Regulation.
[1]Proclamation 10962 directed a 25% domestic-sales requirement for copper scrap; no implementing rule has been issued, so not in force. Export licensing was not adopted.
[2]WSR 2024/1157 ban on nonhazardous waste exports to non-OECD countries (unless whitelisted) also covers aluminum and copper scrap; draft country list published Sep 2026.
[3]Waste Management Act amendment (Jun 2026): domestic yard permits plus Ministry of the Environment export confirmation for designated items (eg, ULAB); not an export license for clean scrap.
Source: Bureau of International Recycling (BIR); Institute of Scrap Recycling Industries (ISRI); China MEE Notice 2024/23 and GB/T 39733; EU WSR 2024/1157 and RESourceEU; India Hazardous and Other Wastes (Management and Transboundary Movement) Rules (HOWM Rules), 2016, and Budgets; Japan Act No. 43 of 2026; Russia Decrees 2068, 558, and 1098; Türkiye Communiqués 2026/3 and 2026/23; US Proclamation 10962, BIS DPAS order 2026, and USGS

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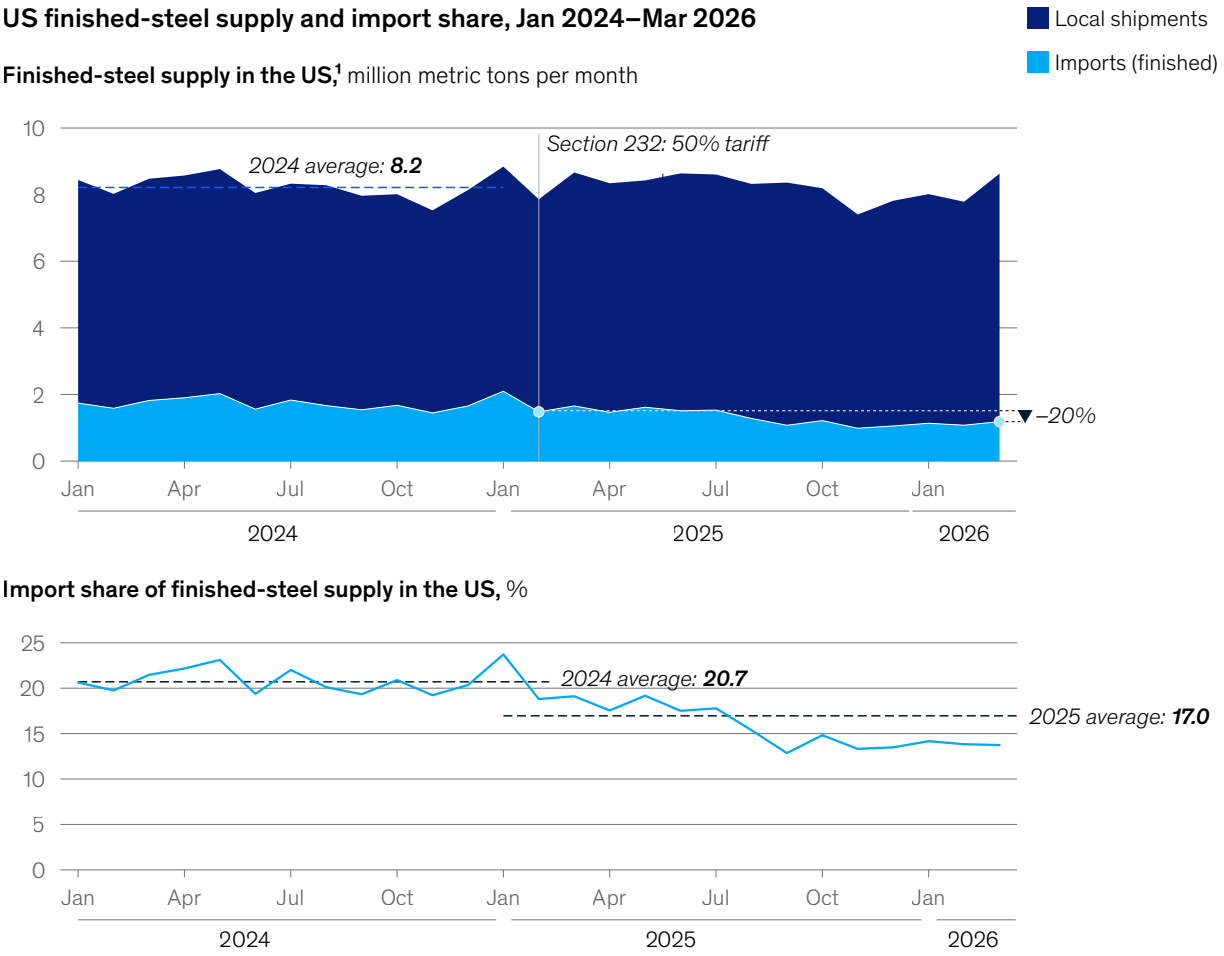
US steel imports declined following the introduction of import tariffs, with a significant drop over the last ten months.

The United States imposed a 50 percent import tariff on steel and aluminum under Section 232. The effects of this regulation are already visible in steel. Steel imports into the United States declined by 20 percent in ten months, even while US steel consumption remains largely unchanged. With demand steady and imports curtailed, domestic plant utilization rose and production increased at higher price levels.

While regional price premiums for aluminum increased in a similar fashion, this has not yet resulted in an increase in domestic production, as the United States has limited domestic production capacity.

Sustained price premiums may have an adverse effect on demand over time, as downstream industries and consumers carry the additional cost.

US finished-steel supply and import share, Jan 2024–Mar 2026



[1]Excluding semi-finished imports (slabs, billet, blooms).
Source: American Iron and Steel Institute; McKinsey MineSpans

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North America could achieve higher mining self-sufficiency than Europe, but gains since 2025 are mostly in copper and graphite.

Countries and regions that are net importers of strategic materials are taking several actions to reduce their import dependency and increase self-sufficiency across different steps in the materials value chain. In some cases—for example, Europe's Strategic Raw Materials Act and Strategic Projects—these efforts extend to overseas projects, especially for those materials with limited known domestic resources.

For Europe and North America, these actions resulted in an increase in expected self-sufficiency for several commodities, when compared to last year's report. For example, North America increased its 2035 lithium mine pipeline by 80 percentage points to 145 percent, and its rare earths refining capacity by 77 percentage points to 117 percent.

However, there are some commodities for which expected self-sufficiency is again on a downward trend. The expected decline is mostly driven by known projects being put on hold due to, among other reasons, a lack of financing.

Share of final-use demand met by regional production, high-supply scenario, 2035, %

Highest share of self-sufficiency · X Change vs GMP 2025, percentage points · **M** Mining project · **R** Refining/processing project

	Mine production			Refined production			Key new projects since 2025, 2035 high-case volume, kt	
Commodity	Europe	Europe plus 13 strategic projects outside the EU[1]	North America	Europe	Europe plus 13 strategic projects outside the EU[1]	North America	New additions[2]	Status changed[3]
Lithium	+5 29	+3 38	+80 145	+2 38	−3 47	+11 63	kt LCE · **M** Geoframe (US) +14 **M** SW Arkansas (US) +8 **M** Boardwalk (CA) +5 **M** Doade (ES) +2	▲ **M** Whabouchi/PAK (CA) +11 ▼ **M** James Bay (CA) −7 (financing lost) **M** Roche (UK) −4 (on hold) **M** Jadar (RS) counted[4]
Nickel	±0 5	−2 9	+2 27	±0 28	+1 29	−8 17	kt Ni · **M** Tamarack 14[5] **M** NorthMet 6[5] **M** Twin Metals 4[5] **M** Sakatti 5[5] **M** Arctic Platinum 4[5] **R** UK sulphate plant +23	**R** NA pipeline 322 → 202 (−120) **R** Finland −26 **R** France −14 (Sandouville closure)
Natural graphite[6]	±0 4	−10 29	+3 104	+28 39	+28 39	−28 30	kt graphite · **M** Lac des Iles (CA) +9 **M** Kilbourne (US) +1 **M** Kaisersberg (AT) +1	▲ **M** Graphite One (US) +163 ▼ **M** BamaStar Ph1–2 (US) −49 (on hold)
Manganese (battery-grade)	±0 28	±0 28	±0 0	−6 7	−25 7	−6 24	kt Mn (M)/kt HPMSM salt (R) · **M** Chvaletice (CZ) 423[5] **R** US HPMSM plants 66 **R** CZ 30	**M** Zandkopsdrift (ZA) counted[4]
Copper	−5 12	−5 12	+12 64	+2 44	+2 44	−5 21	kt Cu · **M** Cactus +108 **M** Copper World Ph1 +92 **M** Gunnison OP +74 **M** Magdalena +28 **M** Nautanen +23 **M** Las Cruces UG +21	▲ **M** Viscaria +25 **M** Ming Ph3 +24 **M** Sakatti +17 ▼ **M** Pumpkin Hollow −64 **M** Creighton Ph5 −12 (on hold)
REE[7]	+1 4	+2 23	−36 56	+5 42	+5 42	+77 117	kt 4-REO · **R** White Mesa 5.2[5] **R** UCORE 3.1[5] **R** Louisiana 2.2[5] **R** Puławy 3.4[5] **R** Teesside 2.0[5] **R** Luleå 1.1[5]	**M** Bear Lodge **M** Round Top (US) remain outside high-case **M** Zandkopsdrift (ZA) counted[4]
Aluminum	1	1	0	26	26	28		

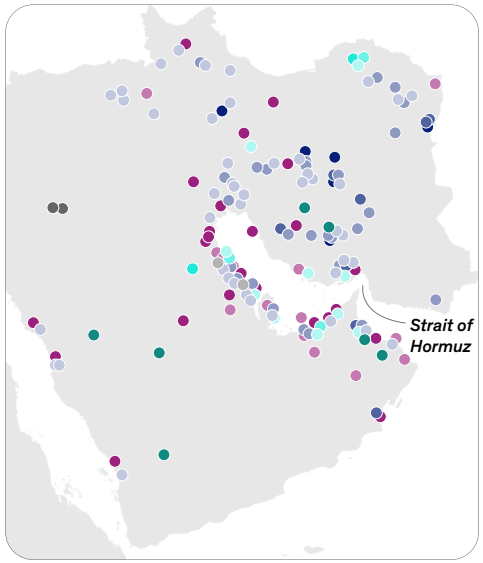
Note: Boxes show the change vs GMP 2025 in percentage points; part of the change reflects updated methodology. North America = US and Canada. HPMSM = high-purity manganese sulfate monohydrate. M = mining, R = refining/processing; plus/minus = change in 2035 high-case volume vs GMP 2025, kt; kt = thousand metric tons.
[1]Includes 13 EU strategic projects outside the EU (Jun 2025). [2]Projects that entered the McKinsey MineSpans high-case or were designated EU strategic projects (Jun 2025). [3]Projects that entered or left the McKinsey MineSpans high-case between the GMP 2025 and GMP 2026 data vintages; reasons in brackets where McKinsey MineSpans records a change in development stage from 2024 to 2025; top 3 projects per cell. [4]Jadar (Serbia, 58 kt LCE; on hold in McKinsey MineSpans since 2025) and Zandkopsdrift (South Africa) are EU strategic projects counted at announced capacity. [5]Pipeline as of Sep 2026 (2035 high-case volume), not compared with a 2025 baseline; no plus/minus sign. [6]Refined production considered as active anode material vs battery-grade graphite demand. [7]Based on four rare earth oxides (dysprosium, neodymium, praseodymium, and terbium).
Source: McKinsey Battery Insights; McKinsey MineSpans; McKinsey analysis

The Middle Eastern conflict has highlighted supply-chain vulnerabilities in iron products, aluminum, and sulfur.

The conflict in the Middle East has exposed how much the world depends on the region for a few key materials. Gulf producers west of the Strait of Hormuz account for roughly 10 percent of global aluminum production and more than a quarter of global sulfur production—up to 50 percent when considering only merchant supply. Intermittent closure of the Strait of Hormuz and temporary closures of some assets drove up prices for these commodities and, in some cases, forced the temporary closure of downstream assets dependent on these materials.

Sulfur prices, which were already on an upward trend prior to the conflict, more than tripled in a year on some benchmarks.

Materials, metals, and mining facilities in the Middle East, 2025



2025 production by commodity and location

Mostly serving domestic market

			West of Hormuz	East of Hormuz	Iran	Share of global production, % West of Hormuz	Share of global production, % Full region
Steel value chain	Iron ore DR pellet feed	Mwmt feed	0	0	59.7	0	41
	DR pellet	Mwmt pellet	10.8	8.7	59.7	6	42
	DRI	Mt DRI	13.6	2.0	34.0	9	33
	Steel	Mt steel	18.4	3.9	32.0	1	3
Aluminum	Bauxite	Mt bauxite	4.8	0	0.6	1	1
	Alumina	Mt alumina	4.3	0	0.2	3	3
	Aluminum	Mt aluminum	5.7	0.4	0.6	9	10
Sulfur	From oil, gas, and in crude oil	Mt sulfur	28.9	3.6	3.7	26	33
Copper	Copper concentrate[1]	kt copper	70	27	412	<1	2
Phosphate	Phosphate rock	Mt rock	9.5	0.8	0.1	5	5
	MAP/DAP	Mt MAP/DAP	6.0	0	0	9	9

Note: Mt = million metric tons; Mwmt = million wet metric tons; kt = thousand metric tons. The boundaries, names, and designations used on this map do not imply official endorsement or acceptance by McKinsey & Company.
[1]National Iranian Copper Industries Company is vertically integrated; about 350 of the 412 kt of copper in concentrate feed its own smelter and refinery.
Source: CEIC; UN Comtrade; McKinsey MineSpans

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Sulfur: Several commodity prices have increased, with sulfur having a strong indirect effect on metals refining costs for multiple materials.

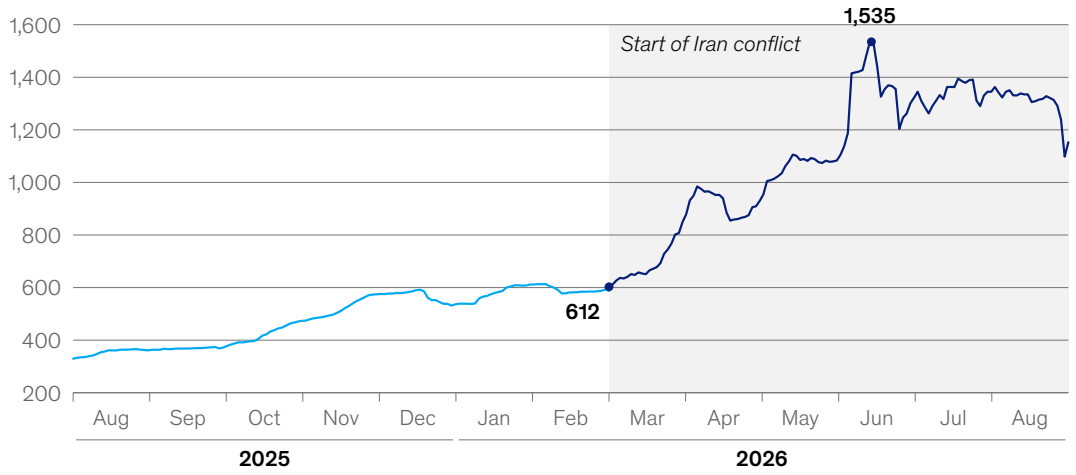
The increase in sulfur prices, due to the conflict's impact on supply deficits, has had a strong indirect effect on the refining costs of multiple metals that require sulfur or sulfuric acid in the production processes.

At sulfur prices of $1,000 per metric ton, a level the market has consistently exceeded since the start of the conflict, sulfur can account for up to 40 percent of operating costs for copper, phosphate, and uranium producers, and close to 50 percent for nickel producers—depending on the feedstock and associated production processes.

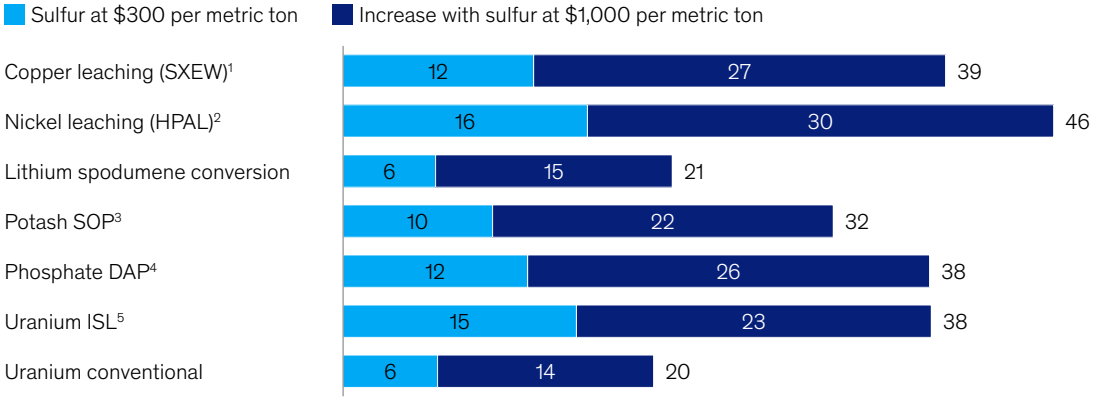
Consumers are feeling it directly. One nickel producer has idled about half its high-pressure acid leach (HPAL) plant, for example; a major phosphate producer cut output by about 30 percent and shifted its product mix to use less sulfur; and a uranium producer halted production altogether due to a shortage of sulfuric acid.

Sulfur price and its impact on refining costs

Sulfur price, China daily spot, $ per metric ton



Share of operating cost attributed to sulfur and sulfuric acid, by process, %



[1]Solvent extraction–electrowinning. [2]High-pressure acid leaching. [3]Sulfate of potash. [4]Diammonium phosphate. [5]In-situ leaching.
Source: Bloomberg; Fastmarkets; Steel Business Briefing by Platts; McKinsey analysis

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3. Availability and growth

Capital and talent may need to be boosted and reshuffled as demand shifts.

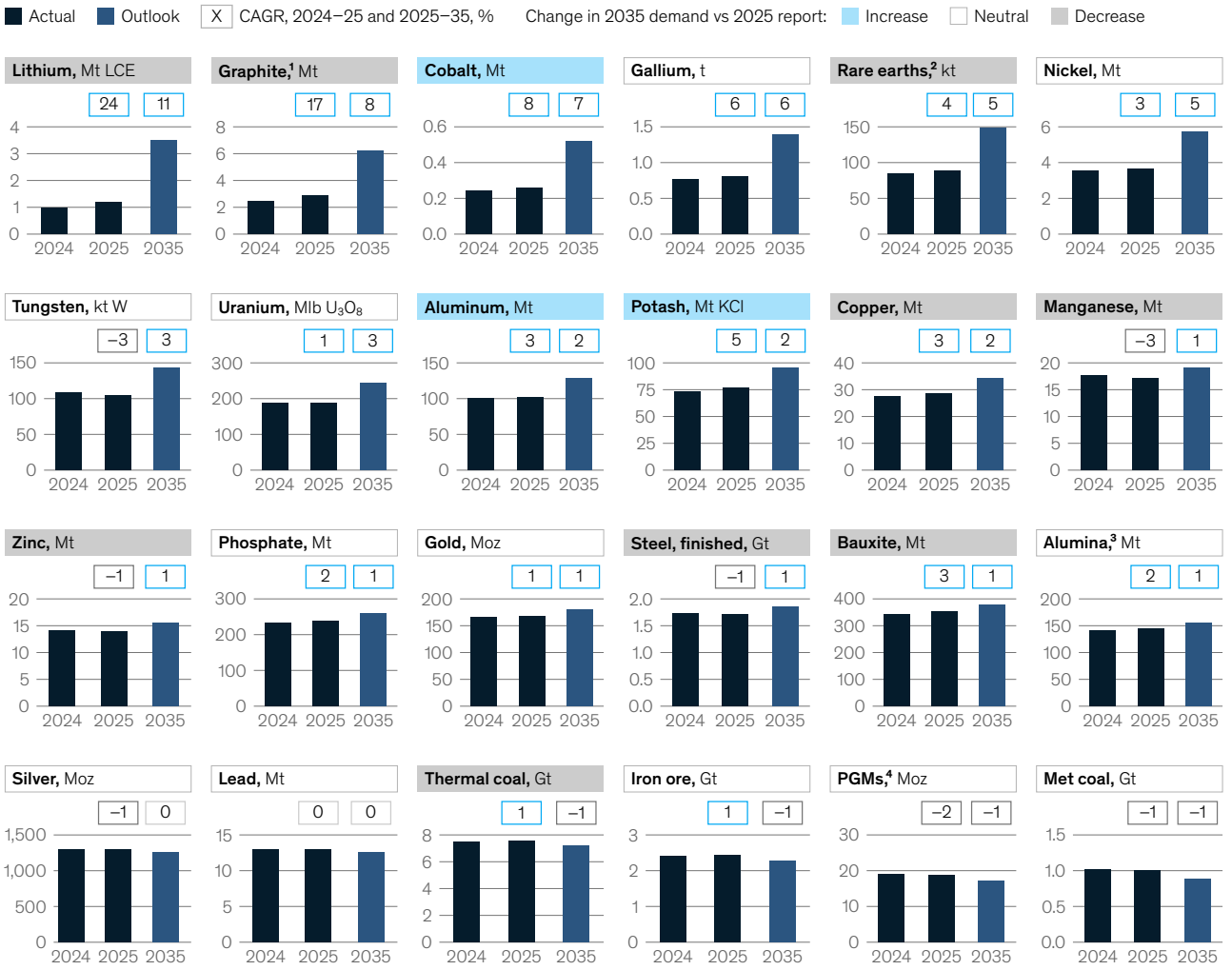
Demand outlook remains resilient across most commodities except for coal, iron ore, and platinum group metals.

Although projected demand growth until 2035 for several commodities decreased compared with last year's report—a continuation of last year's trend—overall materials demand remains resilient except for coal, iron ore, and platinum group metals (PGMs). Several materials are also seeing a diversification of demand from data centers and the defense industry, among others.

Battery materials saw a downward revision due to a slower than expected transition to electric vehicles yet continue to be among the fastest-growing materials in the industry, with expected growth rates of 5 to 11 percent per annum until 2035. Conversely, the slower expected transition increased the outlook for PGMs used in ICE vehicles.

The outlook on steel and iron ore has also become more modest due to a further expected slowdown of the construction industry in China. The outlook for metallurgical coal remained stable due to an expected slower shift from blast furnace–basic oxygen furnace (BF–BOF) toward alternative steelmaking technologies.

Materials demand and compound annual growth rate, 2024–35, Continued Momentum scenario



Note: Increase = change of more than +1%; decrease = change of less than –1%; neutral = within ±1%; Mt = million metric tons; kt = thousand metric tons; t = metric tons; Moz = million troy ounces; Mlb = million pounds; LCE = lithium carbonate equivalent; KCl = potassium chloride; U_3O_8 = triuranium octoxide; W = tungsten.
[1]Synthetic and natural graphite demand.
[2]Metal content, including dysprosium, neodymium, praseodymium, and terbium.
[3]Smelter-grade alumina.
[4]Platinum group metals, including palladium, platinum, and rhodium.
Source: McKinsey MineSpans

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Deep dive: Thermal coal demand is expected to peak before 2030 and then shrink, with growth in India and decline in most other regions.

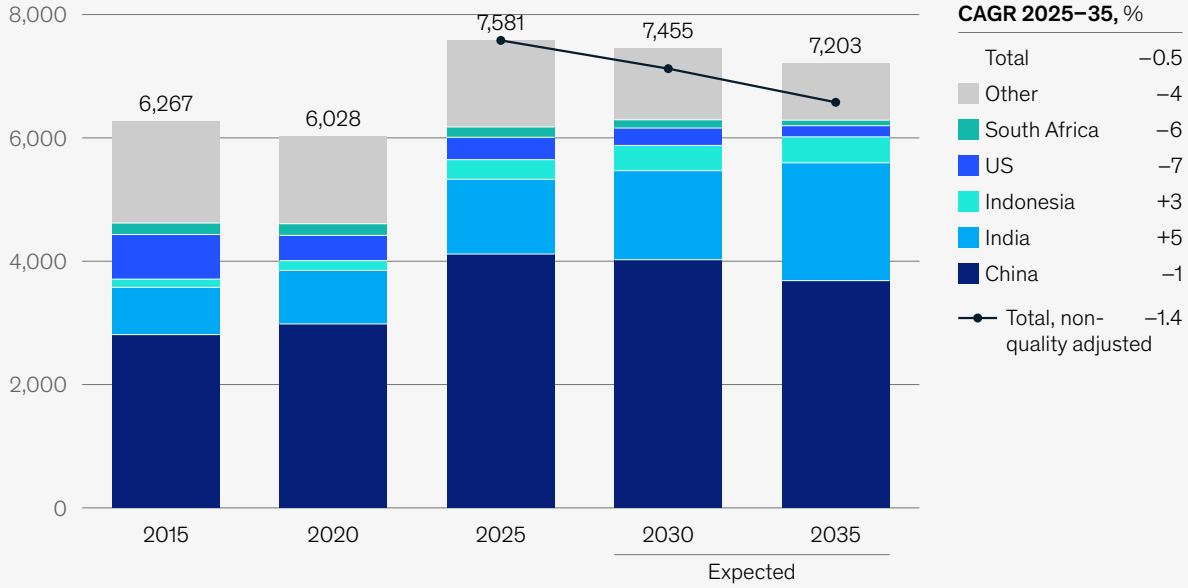
2025 marked another record year for thermal coal, with a production increase of 71 million metric tons, an increase of about 1 percent compared to the prior year.

Looking ahead, demand for thermal coal is expected to shrink by a modest 0.5 percent per year, on average, worldwide, as developed economies replace thermal coal use with gas and renewables. This is a downward revision from last year's outlook mainly driven by more optimistic deployment of renewable energy sources in India and Southeast Asia.

The expected decline is slower than the projected decline in coal's share of the energy mix. As accessible, higher-quality seams are depleted—particularly in China and India—producers must extract more coal to deliver the same energy output.

Average thermal coal quality has declined by about 1.5 to 2.0 percent a year and is expected to keep deteriorating at a similar rate, partially offsetting the overall decline in energy demand from thermal coal.

Thermal coal demand outlook by region, quality adjusted,[1] million metric tons of wet coal



[1]Assuming coal quality declines at historic rates in India and China.
Source: McKinsey MineSpans

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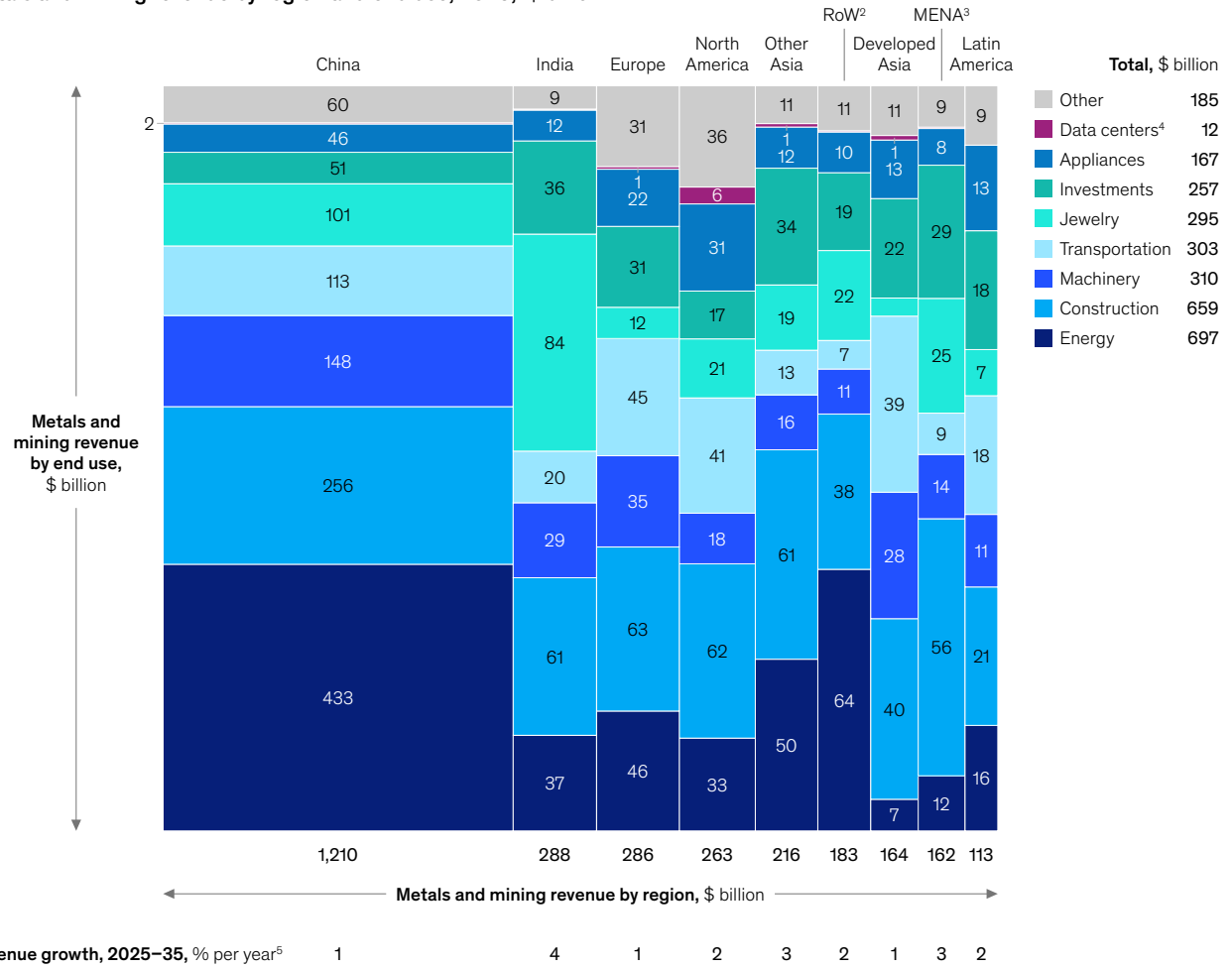
Traditional growth vectors remain the key demand centers, with China as the pivotal region.

Metals demand continues to be driven by traditional sectors linked to global middle-class development, with the largest drivers of total metals and mining revenue in 2025 being the energy and construction industries, followed by industrial machinery, transportation, and jewelry—the latter seeing its share increase substantially in 2025 as a result of increasing gold prices.

The sector is seeing new sources of demand, including those related to the global deployment of data center capacity and increasing investments in the defense sector, among others. Data centers already accounted for about 0.5 percent of the industry revenue in 2025 (equivalent to about $12 billion), a share that is expected to increase in the coming years.

China accounts for the largest regional share, with about 40 percent of the total metals and mining revenue in 2025, although faster growth is expected in North America, India, and Other Asia markets, which may reduce China's overall share in the next decade.[6]

Metals and mining revenue by region and end use, 2025,[1] $ billion



Note: Figures may not sum to totals, because of rounding.
[1]Including aluminum, battery materials, copper, gold, PGMs, REEs, silver, steel, thermal coal, tin, uranium, and zinc; other metals and minerals are not considered, as no regional breakdown is available. 100% translates to $2.9 trillion. [2]Rest of world. [3]Middle East and North Africa. [4]Direct metal content of data center capacity added in 2025–26 (about 28 GW) valued at 2025 prices (about $0.41 million per MW), allocated to regions by data center copper demand; other metals used in data center buildings are included in construction. [5]2025–35 CAGR of metal revenue by end use for the individual regions; 2030 and 2035 revenues based on long-term price forecasts: incentive-price-driven forecasts for base metals and battery raw materials; publicly available forecasts for precious metals (including gold); regional supply–demand-driven prices for coal; raw-material-basket modeling at constant conversion margin for steel.
Source: McKinsey MineSpans

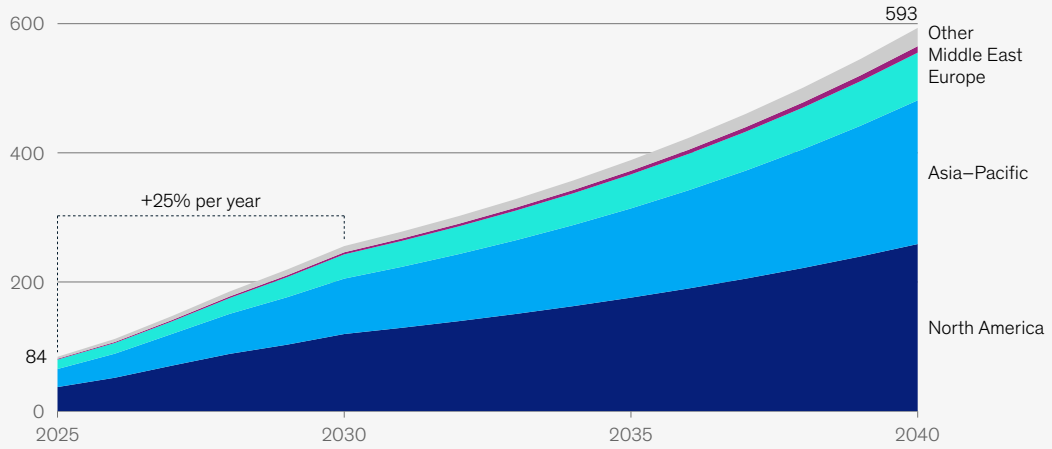
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[6] Other Asia is Asia excluding China, India, and the Middle East and North Africa (MENA).

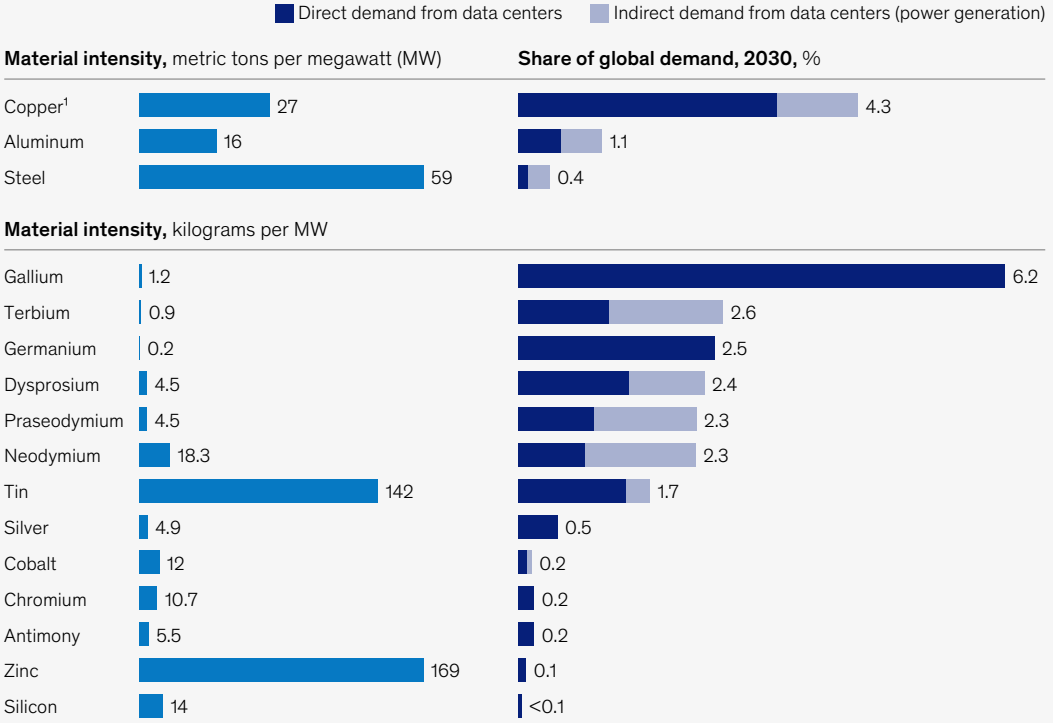
Deep dive: Data center scale-up is an energy and hence a materials question, with copper as the biggest driver of value.

In one of the most impactful demand shifts since earlier outlooks, global data center capacity is set to grow roughly 25 percent a year, from 84 gigawatts (GW) in 2025 to nearly 600 GW by 2040, driven largely by North America and Asia–Pacific.

Data center capacity by region, GW



Material intensity and share of commodity demand related to data center buildout, 2030



[1]Conventional data centers require 27 metric tons of copper per MW; AI data centers require 35 metric tons per MW.
Source: S&P; McKinsey Data Center Model; McKinsey MineSpans

The share of demand from AI may continue to evolve as metal intensity shifts, similar to what we have seen in the past for other technologies.

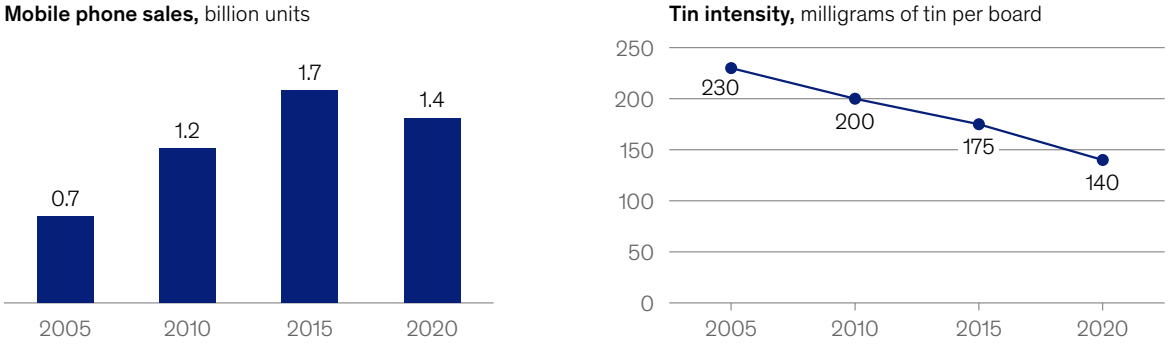
Looking ahead to 2030, data centers drive demand for several metals, both directly through the materials that are physically embedded in data centers but also indirectly through the additional materials that are needed to build out the energy infrastructure required to power these data centers.

For the industry as a whole, the share is small, but for selected value pools, it matters more, often for those materials where supply is currently concentrated in a handful of countries globally. For example, by 2030, about 6.2 percent of global gallium demand is expected to come from data centers—in a context where China holds close to 100 percent of global supply. Other materials that may see a sizable demand impact from data centers include copper (about 4.3 percent), germanium (about 2.5 percent), and rare earths (about 2.5 percent).

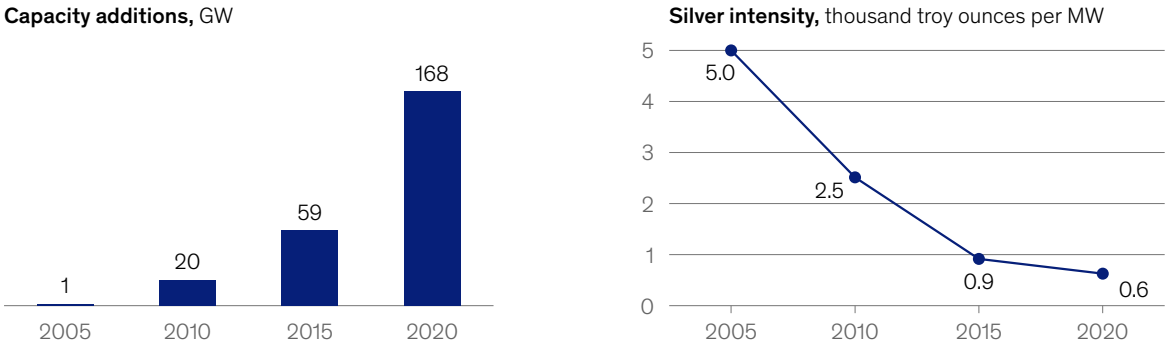
The extent to which the global deployment of data centers will drive materials demand depends on the evolving design and metal intensity of data centers. There are several historical examples that show that material intensity, especially for materials with a high cost or supply chain risks, goes down over time.

Technology scale-up and material intensity

Mobile phone sales and tin intensity of printed circuit boards



Solar photovoltaic capacity additions and silver intensity of panels



Source: Nedal T. Nassar, David R. Wilburn, and Thomas G. Goonan, "Byproduct metal requirements for U.S. wind and solar photovoltaic electricity generation up to the year 2040 under various Clean Power Plan scenarios," *Applied Energy*, 2016, Volume 183; Euromonitor; Aleksander Jandric et al., "Material composition trends in printed circuit boards of mobile phones," *Resources, Conservation and Recycling*, 2026, Volume 227; Damien Giurco et al., "Requirements for minerals and metals for 100% renewable scenarios," in *Achieving the Paris Climate Agreement Goals: Global and Regional 100% Renewable Energy Scenarios with Non-energy GHG Pathways for +1.5°C and +2°C*, ed. Sven Teske, Springer, 2019; McKinsey MineSpans

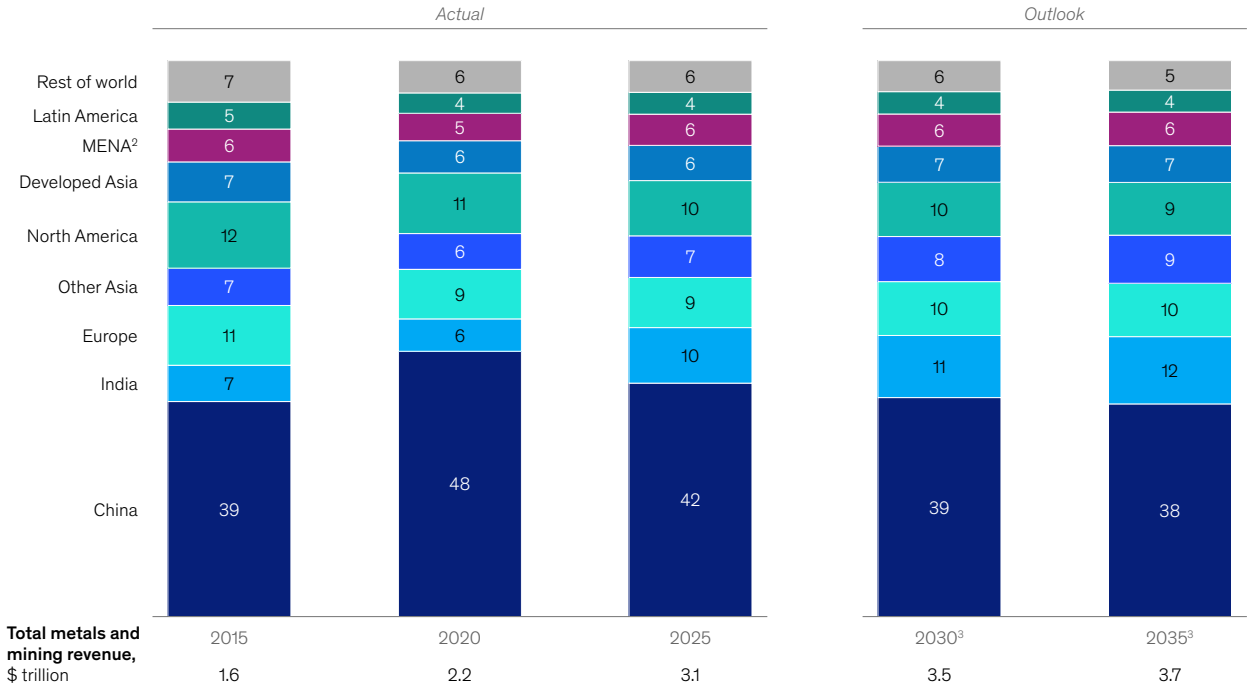
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Geography: China's material consumption share peaked in 2020 and is projected to decline further while India is growing sharply.

China remains the largest metals and mining market. China's share of metals and mining revenue, measured by the value of the metal consumed in the country, peaked at 48 percent in 2020, driven largely by thermal coal and elevated commodity prices, and has since fallen to 42 percent in 2025, and may decline further.

India's share, by contrast, is a demand growth story. It has risen from 6 percent in 2020 to 10 percent in 2025 and is expected to reach 12 percent by 2035.

Metals and mining revenue by region, 2015–35,[1] %



Note: Figures may not sum to 100%, because of rounding.
[1]Including aluminum, battery materials, copper, gold, PGMs, REEs, silver, steel, thermal coal, tin, uranium, and zinc; the same regional breakdown is assumed on average for all other commodities.
[2]Middle East and North Africa.
[3]2030 and 2035 revenues based on long-term price forecasts: incentive-price-driven forecasts for base metals and battery raw materials; publicly available forecasts for precious metals (including gold); regional supply–demand-driven prices for coal; raw-material-basket modeling at constant conversion margin for steel.
Source: McKinsey MineSpans

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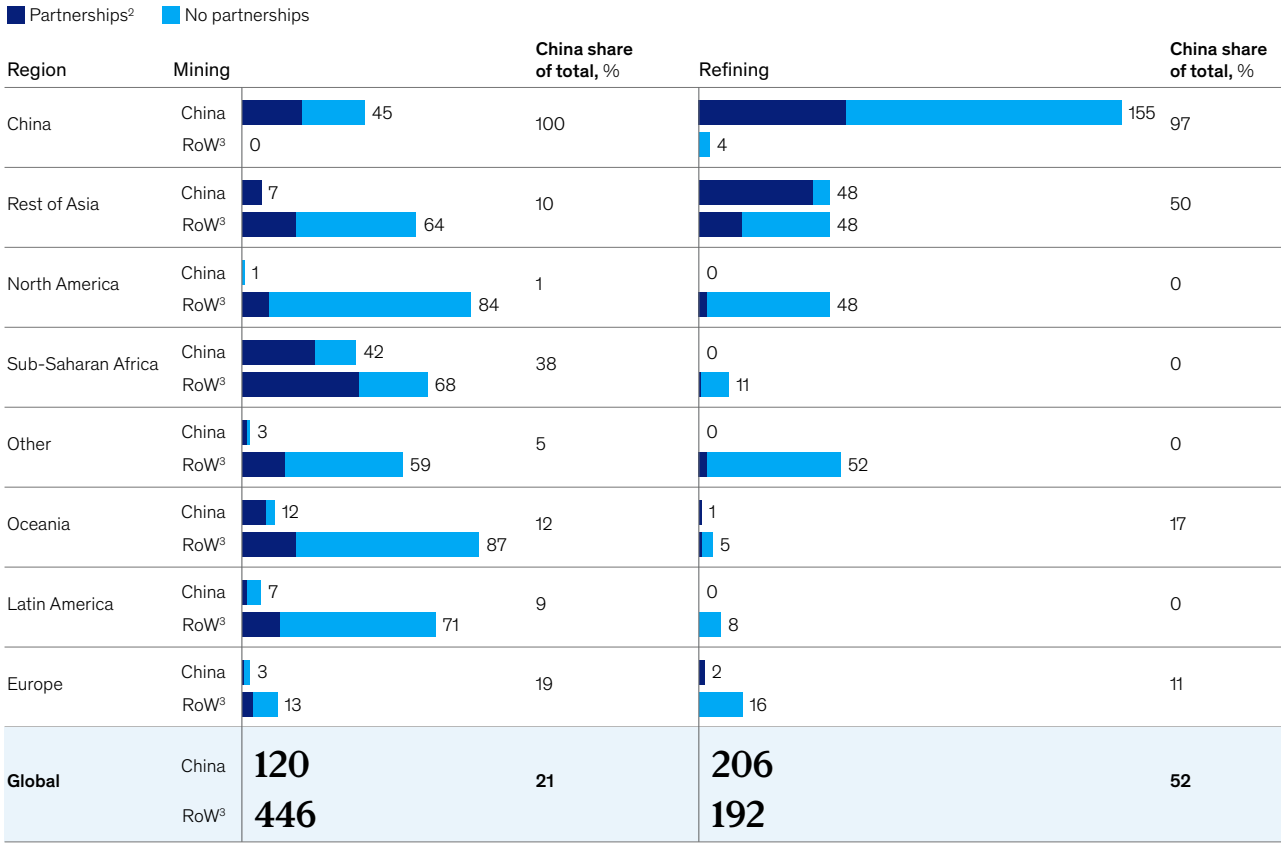
Chinese companies have driven global scale-up and represent 34 percent of total new assets, with investments concentrated in Asia and sub-Saharan Africa.

Chinese companies have accounted for a significant share of new mining and refining assets, accounting for 34 percent of all new mining and refining assets coming online from 2021 to 2025. China's share of new refining assets is higher than that for mining assets, considering China's historical leadership in refining and the fact that many refining assets are built in China and Southeast Asia, while mining assets are more globally spread.

Indeed, Chinese companies have concentrated their expansion in the emerging markets geographically closest to China, including Asia and Sub-Saharan Africa, while their ownership share of new assets in mature markets or more distant markets—including Europe, North America, and Latin America—remains more limited.

Investments in sub-Saharan Africa and the rest of Asia are also more often made in partnership, frequently with public investors, than investments in other regions.

Number of new assets[1] coming online by ownership status and region, 2021–25 cumulative



Region	Mining		China share of total, %	Refining		China share of total, %
China	China	45	100	155		97
	RoW[3]	0		4		
Rest of Asia	China	7	10	48		50
	RoW[3]	64		48		
North America	China	1	1	0		0
	RoW[3]	84		48		
Sub-Saharan Africa	China	42	38	0		0
	RoW[3]	68		11		
Other	China	3	5	0		0
	RoW[3]	59		52		
Oceania	China	12	12	1		17
	RoW[3]	87		5		
Latin America	China	7	9	0		0
	RoW[3]	71		8		
Europe	China	3	19	2		11
	RoW[3]	13		16		
Global	China	**120**	**21**	**206**		**52**
	RoW[3]	**446**		**192**		

*China accounts for **34%** of new assets over 2021–25; 21% of new mining assets; and 52% of new refining assets.*

[1]Excludes thermal coal; counts brownfield expansions, subsequent phases of a project, and refineries for different products as new, distinct assets.
[2]Partnerships include acquisitions of a partial share, joint ventures, and other joint ownership arrangements.
[3]Rest of world.
Source: McKinsey MineSpans

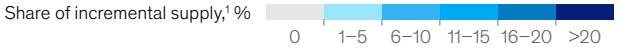
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Mining supply is expected to remain concentrated, with some diversification of supply within the top three supplying countries.

The pipeline of announced mining projects suggests growth opportunities across regions for most commodities. This geographical spread is reducing supply concentration for several commodities: The market share of the top three suppliers is expected to decline by as much as 22 percentage points in the case of natural graphite.

Despite diversification efforts, mining supply is likely to remain concentrated; the top three supplying countries are expected to change for only five of the commodities analyzed.

Announced projects of additional mining supply, 2025–35, high-supply scenario, % of total announced capacity



Commodity[2]	North America	Latin America	Europe	Sub-Saharan Africa	China	Rest of Asia[3]	Oceania	Other[4]	Top supplying country, 2025	Change in top 3 share, 2025–35,[1] percentage points	Expected change in top 3 suppliers by 2035
Iron ore									Australia	+1	No
Met coal (seaborne)[5]									China	+1	No
Gold									China	0	**Yes**
Copper									Chile	–5	No
Bauxite									Guinea	–2	No
Zinc									China	–4	No
Phosphate									Saudi Arabia	+5	No
Silver									Mexico	–10	No
Potash									Canada	–7	No
PGMs[6]									South Africa	–2	No
Uranium									Kazakhstan	–2	No
REEs[7]									China	–13	**Yes**
Nickel									Indonesia	–1	**Yes**
Manganese[8]									South Africa	+1	No
Lithium									Australia	–19	No
Cobalt									DRC	–3	**Yes**
Natural graphite									China	–22	**Yes**

[1]Share of total announced projects' capacity of supply increase between 2025 and 2035. [2]Excluding steel and aluminum, which are refined products, because of limitations in modeling. [3]India and other Asian countries. [4]Commonwealth of Independent States and Middle East and North Africa; growth driven mainly by Russia (zinc, phosphate, PGMs), Iran and Algeria (zinc), and Ukraine and Kazakhstan (manganese). [5]Includes seaborne coal only; total increase from regions with increased supply is less than 5%. [6]Platinum group metals, including palladium, platinum, and rhodium; based on a weighted-average approach. [7]Rare earth elements, including dysprosium, neodymium, praseodymium, and terbium; based on a weighted-average approach. [8]Includes supply for batteries and nonbattery uses.
Source: McKinsey MineSpans

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A more modest demand outlook is narrowing the expected global supply–demand gap for several commodities.

Bringing supply and demand together, the expected supply–demand balances for 2035 have stabilized or improved across all commodities in the scope of the analysis, compared to last year's Perspective.

However, supply–demand imbalances are still expected for most commodities, especially in a base-case supply scenario, and for four commodities in a high-case supply scenario (silver, rare earths, nickel, and manganese).

The commodities for which a supply–demand imbalance may be expected in a scenario with accelerated global decarbonization ("sustainable transformation") remain unchanged, although the expected imbalances become more pronounced.

As shown in last year's report, there are several innovations that could positively impact, if not resolve, these supply–demand balances in the coming years, yet which may trigger periods of price volatility.

Supply–demand balance, 2035 forecast,[1] supply vs demand gap, %

Gap: –30 to –21 | –20 to –11 | –10 to –1 | 0 (no gap) | ↘ Closing of gap | ↗ Increase of gap | ✓ No gap remains | ↔ Gap remains the same

Commodity		Change vs GMP 2025 (base-case)	2026 Continued Momentum		2026 Sustainable Transformation		Key drivers, demand	Key drivers, supply
			Base-case supply[2]	High-case supply[3]	Base-case supply[2]	High-case supply[3]		
Steel value chain	Iron ore	✓					↓ More modest demand outlook due to construction slowdown in China	↑ Increased production from Latin America and the development of Simandou in Sub-Saharan Africa
	Met coal	↔	–20 to –11		–20 to –11		↓ More modest demand outlook due to construction slowdown in China	
Base materials	Bauxite	✓					↔ Demand outlook unchanged; slowdown in transportation and China construction offset by solar buildout	
	Copper	↘	–10 to –1		–20 to –11		↓ More modest demand outlook due to EV and China construction slowdown, partly offset by data centers	↑ Increased production from Latin America, North America, and Oceania
	Zinc	↔	–20 to –11		–20 to –11		↓ More modest demand outlook due to China construction slowdown	↓ Supply reduction from less secondary material due to slower electric arc furnace steel transition
Precious metals	Silver	↔	–30 to –21	–30 to –21	–30 to –21	–30 to –21	↔ Demand outlook unchanged; solar growth offsets consumer electronics slowdown	↑ Increased production from China and North America and advancement in recycling
	Uranium	↘	–20 to –11		–20 to –11			↑ Growth in high-case supply projects linked to higher spot prices
	REEs[4]	↗	–30 to –21	–20 to –11	–30 to –21	–30 to –21	↓ More modest demand outlook due to appliances and EV slowdown	↑ Increase in NdPr supply outlook from China
Battery-related materials[5]	Nickel	↗	–20 to –11	–10 to –1	–30 to –21	–20 to –11	↔ Demand outlook unchanged; battery growth offset by machinery and stainless steel slowdown	↓ Reduction in Indonesia from lower ore grades, halted assets, and smelter permits
	Manganese	↘	–10 to –1	–10 to –1	–20 to –11	–10 to –1	↓ More modest demand outlook due to construction and machinery slowdown	
	Lithium	↘	–10 to –1		–30 to –21		↓ More modest demand outlook due to EV slowdown, partly offset by energy storage	↑ Increased production from Africa, China, and Australia
	Cobalt	↗	–10 to –1		–20 to –11		↓ More modest demand outlook due to EV and energy transition slowdown	
	Natural graphite	✓					↑ Increased demand outlook due to EV and energy storage anode demand	↑ Increased production from China, Sub-Saharan Africa, and North America

[1]Considering mined supply in final product equivalents. [2]Base-case supply includes all announced projects that are deemed certain or probable to come online. [3]High-case supply includes projects of which feasibility is not yet confirmed; announced early-stage projects. [4]Rare earth elements, including dysprosium, neodymium, praseodymium, and terbium. [5]Including supply and demand for batteries and nonbattery use.
Source: Bloomberg; CNBC; Massachusetts Institute of Technology; McKinsey MineSpans; McKinsey analysis

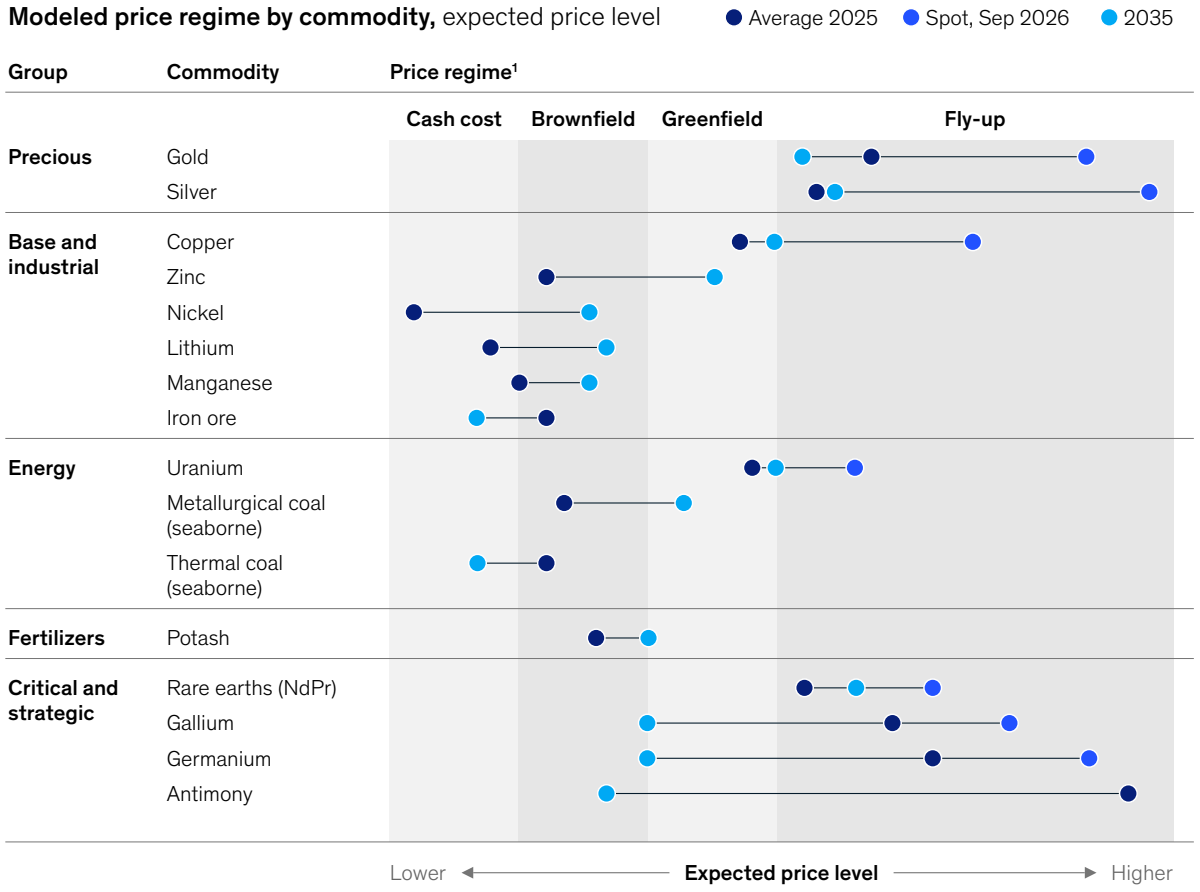
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Price regimes diverge to 2035 reflecting varying supply–demand fundamentals across commodities.

The assessment of the supply–demand balances provides an indication for the expected pricing regimes in the coming decade.

While several commodities are currently in a “fly-up” pricing regime, most of them are expected to move back to a greenfield or brownfield regime by 2035, except for those where there is currently still an expected imbalance.

Modeled price regime by commodity, expected price level



[1]Price regimes are measured against the C90 cost (the cost of the asset at the 90th percentile of the cost curve): cash cost = 0–20%, brownfield = 20–50%, greenfield = 50–70%, fly-up = 70% and above.
Source: McKinsey MineSpans

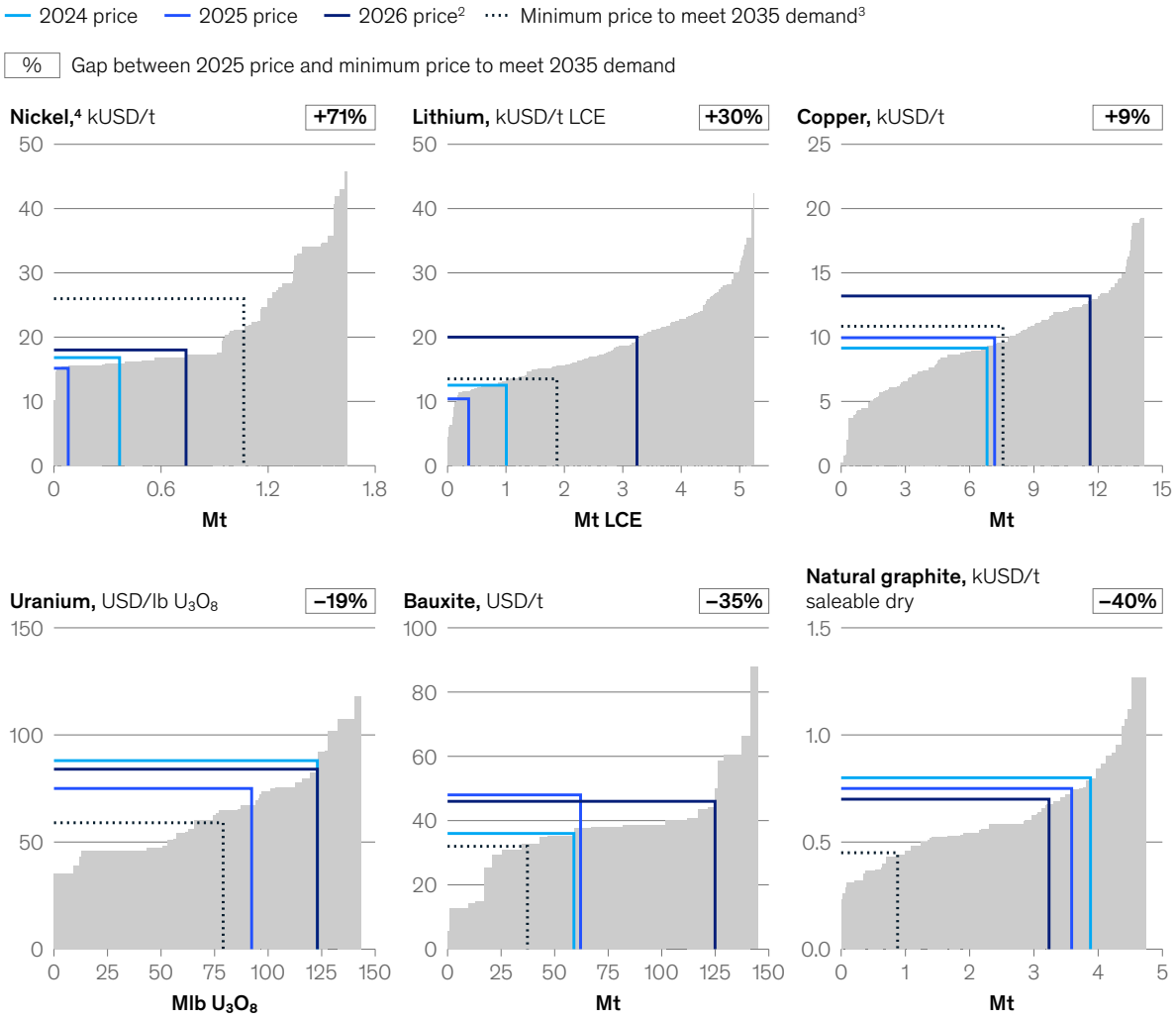
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Incentive price of copper is close to current price levels, despite rising costs to meet 2035 demand.

Incentive prices of copper and lithium are now roughly on par with current price levels, despite rising costs to meet 2035 demand.

Nickel's incentive price sits 71 percent above current levels. For bauxite, uranium, and natural graphite, current prices already exceed the level required to meet 2035 demand, by 35 percent, 19 percent, and 40 percent, respectively.

Incentive price of projects with announced start-up before or during 2035, 15% internal rate of return (IRR),[1] full-potential supply scenario



[1]Each project's incentive price is an estimate of the average benchmark price, throughout the life of the mine, that sets the net present value of the investment to zero using a discount rate of 15%, including new project developments, excluding already operating assets. Projects with an incentive price above 20 kUSD/t copper, 45 kUSD/t lithium, 50 kUSD/t nickel, and 1.5 kUSD/t natural graphite are removed from the charts.
[2]Average price year to date, Sep 23, 2026.
[3]Remaining gap between 2035 demand and supply (operating assets plus recycling) that needs to be bridged by new projects.
[4]Limited amount of nickel projects announced due to current oversupply; additional low-cost projects expected once the supply–demand gap begins to close.
Source: McKinsey MineSpans

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$4.2 trillion in capital expenditures, 270 GW of power, and 310,000 net new jobs are needed to meet demand scale-up.

Closing the supply–demand gap by 2035 may require approximately $4.2 trillion in capital, 310,000 net-new jobs, and 270 gigawatts (GW) of new low-carbon power capacity, based on the currently announced project pipeline and associated capital and labor intensity by region.

In theory, the the metals and mining industry has enough investment capacity to finance the scale-up. But there is a mismatch between where profits are generated today and where the majority of investments are required, which suggests that companies may need to diversify their commodity exposure, attract new sources of capital to the industry, or both.

Employment needs may rise across the industry overall, but some regions are expected to shed jobs while others, notably India, are expected to add more than the global net indicates, suggesting the need for local approaches to talent development and reskilling.

Energy need is estimated at 270 GW of power, assuming all new assets would be powered by intermittent renewable energy sources. Using nonrenewable alternatives could reduce the required capacity buildout, yet may increases the exposure of those assets dependent on those energy sources to evolving carbon tax regulations globally.

Requirements to close the supply–demand gap by 2035

	Energy	People	Investments
GMP 2026	**~270 GW of power[1]**	**~310,000 net new jobs[2]**	**~$4.2 trillion capex[3]**
Challenge	An additional 1,100 GW[4] is needed to decarbonize current industry power supply, nearly equaling the current total solar power capacity of China (~1,290 GW)	Net decrease of 110,000 thermal coal jobs offset by growth of 420,000 across other commodities; largest expansion in India, with more than 430,000 additional full-time equivalents needed	For mining, this implies about $215 billion per year, roughly 10 percent above 2025 and still well below the 2012 peak in real terms

[1]Assuming renewable power at 90% utilization and a 25% capacity factor.
[2]Total change over the 10-year period.
[3]Including exploration, sustaining, and project capital expenditures, for both mining and processing—a ~18% increase compared with the previous decade.
[4]Assuming renewable energy to fuel operations, requiring higher power than fossil due to a lower capacity factor.
Source: McKinsey analysis; McKinsey MineSpans

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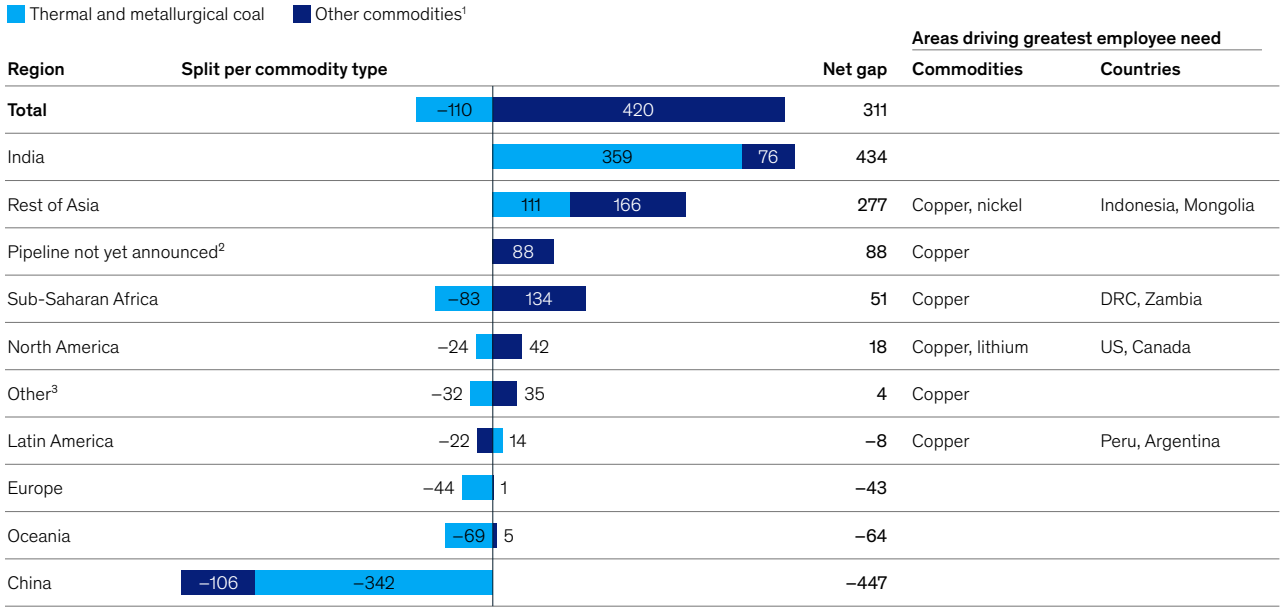
People: +310,000 additional full-time equivalents may be needed, driven by India, Rest of Asia, and sub-Saharan Africa.

Globally, the metals and mining industry could generate an additional 310,000 direct jobs by 2035, and a multiple of that when also considering indirect employment. This assumes current labor intensity levels, which are likely to decrease in the coming decade driven by automation and robotization, including the use of physical AI, especially in hazardous environments.

Overall, the decline in employment in the thermal coal industry is more than offset by the demand for talent in growing commodities.

The shift is uneven across regions, however. China may face a significant decline, with a net loss of about 450,000 workers, while India may see the largest growth with a net increase of about 430,000 workers.

Change in employee need by 2035, thousand full-time equivalents



Note: Figures may not sum to totals, because of rounding.
[1]Including steel, gold, iron ore, copper, aluminum, nickel, tin, zinc, cobalt, and lithium.
[2]Additional employees needed to cover the demand–supply gap in regions where capital expenditure investment is unknown.
[3]Commonwealth of Independent States and Middle East and North Africa.
Source: McKinsey MineSpans

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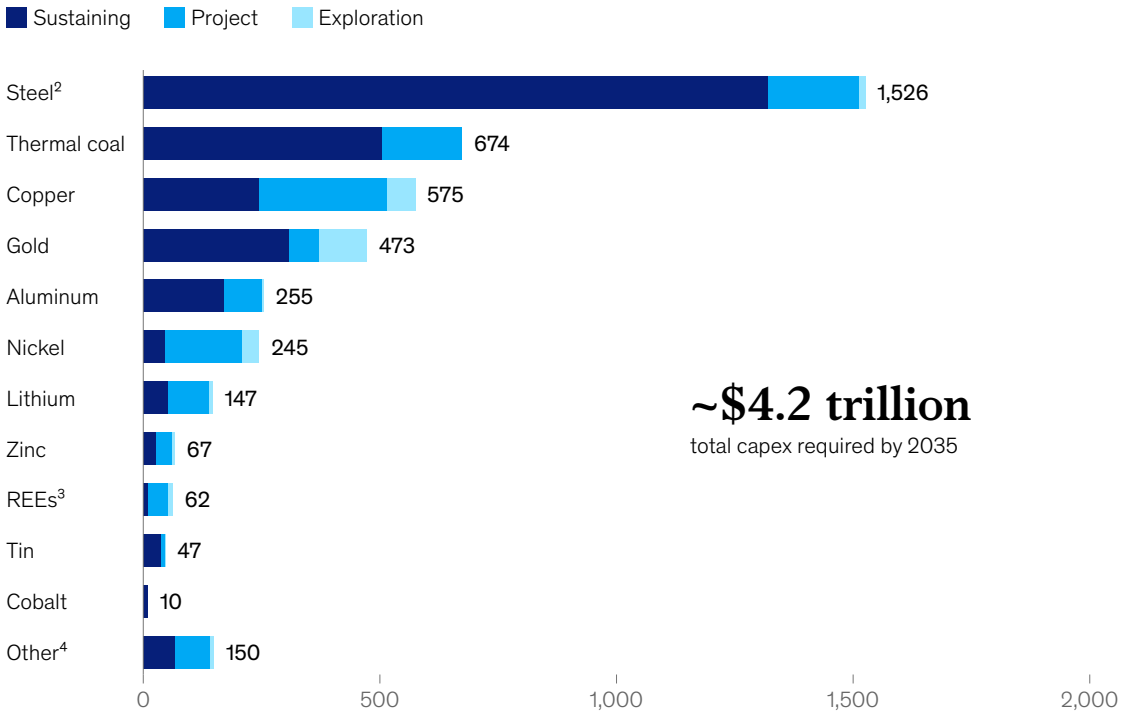
The metals and mining industry may require $4.2 trillion of investments in the next decade to cover demand and offset depletion.

To keep pace with demand, the metals and mining industry may require $4.2 trillion in total capital expenditure over the next decade, covering sustaining, project, and exploration capital expenditure across both mining and refining.

Steel is expected to account for the largest share at about $1.5 trillion, followed by thermal coal ($674 billion) and copper ($575 billion).

The majority of investments may be required to sustain existing operations. Project investments are dominated by copper and battery materials, and thermal coal—the latter largely to replace depleting operational assets.

Approximate capital expenditure (capex) need per material,[1] 2025–35, $ billion



[1]Only sustaining capex for cobalt; mining and processing capex is included in copper and nickel deposits as it is a by-product. Project capex covers growth plus replacement of depleting mines, at blended greenfield and brownfield intensity (McKinsey MineSpans 2026 project pipeline for copper and zinc, pro rata for others). Inflation adjusted with the 2015–24 average global PPI, HCPI, and CCPI (copper and zinc already in 2026 dollars), plus 1.5% per year for sector cost increases in project and exploration capex; gold exploration at the last five-year average intensity, inflation adjusted for 2023.
[2]Including the financing need of iron ore and met coal.
[3]Rare earth elements; capex includes a diversification premium, based on the announced project pipeline.
[4]Considering other materials such as uranium, PGMs, graphite, silicon, and manganese.
Source: McKinsey MineSpans

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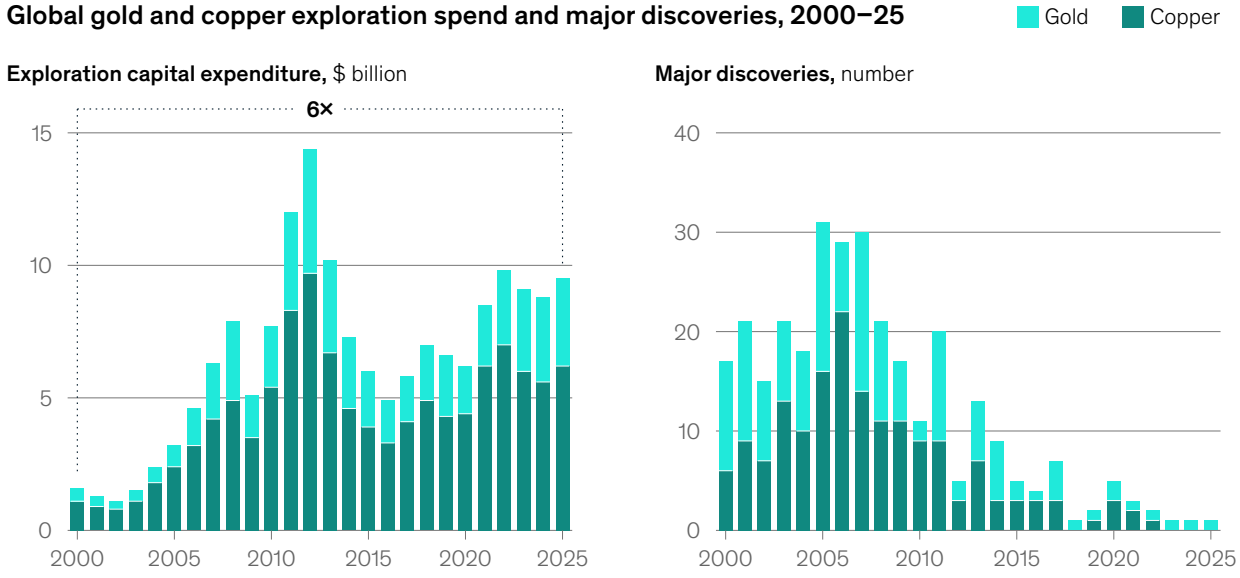
Rising exploration spend has not translated into more discoveries over the last 25 years.

Exploration spending on gold and copper has risen sixfold over the past 25 years, yet the number of major discoveries has fallen.

Three factors explain the gap: Targets are deeper and better concealed; more exploration goes to brownfield sites than greenfield ones; and development cycles, including permitting, are longer.

The declining number of discoveries per exploration dollar suggests the industry may need not only to invest more in exploration to meet growing demand, but also to explore more efficiently—for example, through AI-enabled data integration and target generation using historical geological data and satellite imagery.

Global gold and copper exploration spend and major discoveries, 2000–25



Source: MinEx Consulting; S&P Global; S&P Global World Exploration Trends Report 2025; McKinsey MineSpans

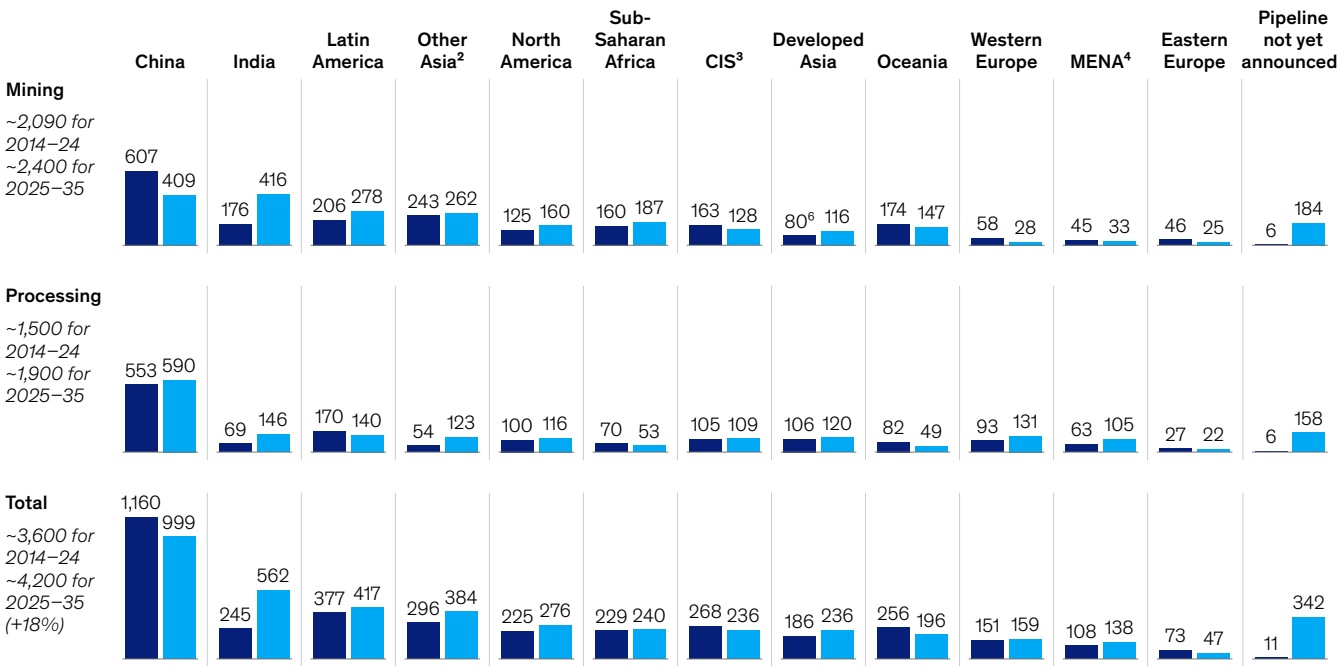
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The highest scale-up may be needed in Asia, India, and Latin America, with a significant uptake compared to the last decade in Other Asia.

The capital investment that may be needed over the coming decade is split roughly evenly between mining and processing. China may require the largest share of these investments, about 25 percent of the total, mainly to sustain its large existing asset base.

Geographically, the highest scale-up in capital investment may be needed in India (driven by thermal coal, iron ore, and steel) and Other Asia (driven by additional buildout of nickel assets in Indonesia). China, Oceania, and Eastern Europe may see a decline in capital investment based on the currently announced project pipeline.

Regional split of capital expenditures (capex) for scale-up of mining and processing operations, 2014–35,[1] $ billion



Note: Figures may not sum to totals, because of rounding.
[1]Based on actual announcements; does not yet take into account further potential supply shifts and buildout due to self-sufficiency capacity announcements, such as the Critical Raw Materials Act in Europe. [2]High capex driven by nickel expansion in Indonesia; Other Asia is Asia excluding China, India, and Developed Asia (which includes, for example, South Korea and Japan). [3]Commonwealth of Independent States. [4]Middle East and North Africa. [5]Considering volumes that are required to meet demand; however, no capacity announcements have been made (that is, an undersupplied market). [6]Drive by thermal coal.
Source: McKinsey MineSpans

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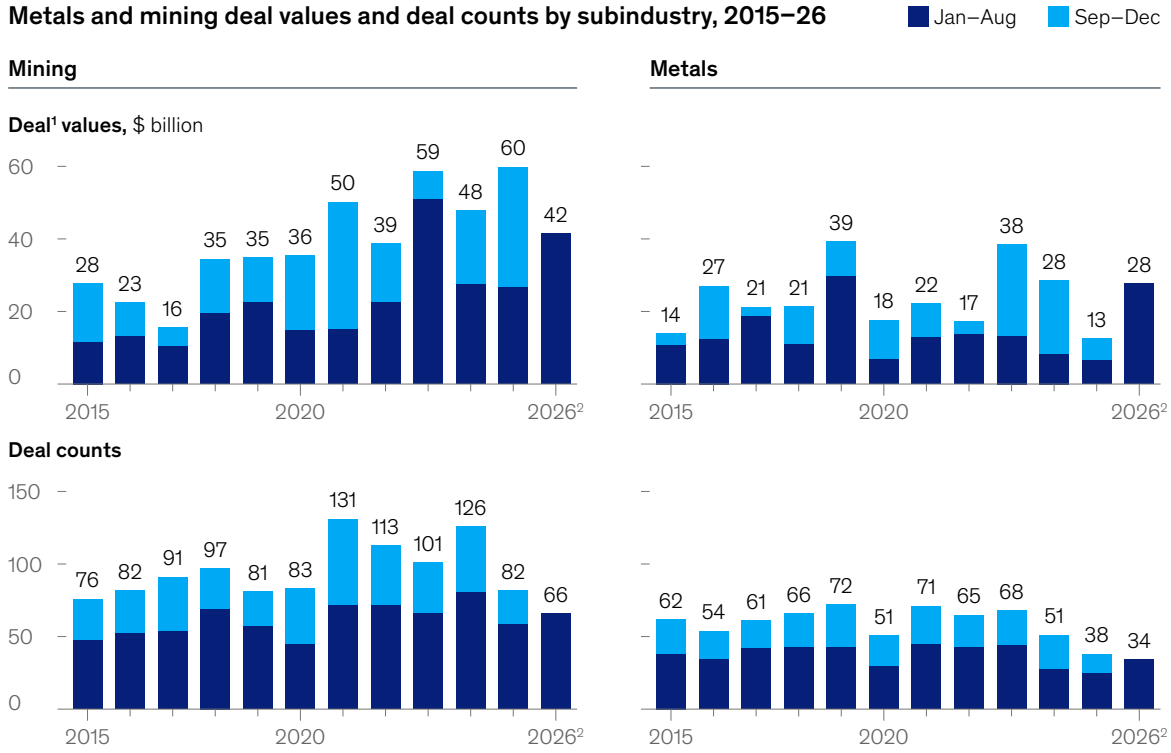
2026 year to date nearly matches 2025 deal value, signaling the fastest consolidation pace of the decade.

An increasing amount of capital is also going into inorganic growth. 2026 is on track to be one of the biggest M&A years of the decade in both metals and mining. Total deal value of $70 billion year to date already equals the full-year 2025 total, with four and a half months still to run.

Mining has driven M&A throughout the 2020s, but in 2026, the metals deal value of $28 billion is year to date already more than twice the $13 billion recorded in all of 2025.

A handful of megadeals account for nearly half the total. The top five deals represent 45 percent of 2026 deal value.

Metals and mining deal values and deal counts by subindustry, 2015–26



[1]Deals with a disclosed transaction value of $25 million or more at announcement.
[2]Includes deals to Aug 17, 2026.
Source: Capital IQ

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Expanding buyer pools are reshaping mining M&A.

Mining assets are attracting a broader set of capital providers, each with distinct return expectations. For companies already in the value chain, this investment holds the potential to open up new sources of capital and expand partnership options to accelerate growth. Matching the right capital to each asset matters, as each investor brings its own time horizon, risk appetite, and expectations for control.

Buyer archetypes in mining mergers and acquisitions

Buyer archetype	Looking for:	Example deal
Historical buyers		
Traditional producers	Operational synergies and scale	Newmont's acquisition of Newcrest Mining
Portfolio-repositioning producers	Commodity diversification and strategic repositioning	Teck Resources' sale of its steelmaking coal business to Glencore
New or growing buyers		
Downstream and industrial players	Security of supply and vertical integration	General Motors Holdings' investment in Lithium Americas (Thacker Pass)
Private capital (private equity and resource funds)	Operational uplift and disciplined exit returns	Orion's investments in base metals and royalties
Infrastructure funds	Long-duration, contracted, utility-like cash flows	Global Infrastructure Partners' acquisition of 49% of BHP's Western Australia Iron Ore power assets
Government and strategic capital	Critical-minerals security and domestic supply chains	Saudi Arabia's Public Investment Fund's investment platform in metals and mining

Source: BHP; Lithium Americas; Newmont; Orion Resource Partners; Public Investment Fund; Teck Resources; McKinsey analysis

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4. Productivity and affordability

A $450 billion to $750 billion productivity opportunity remains largely untapped.

Global mining productivity is stagnating again following a modest rebound journey.

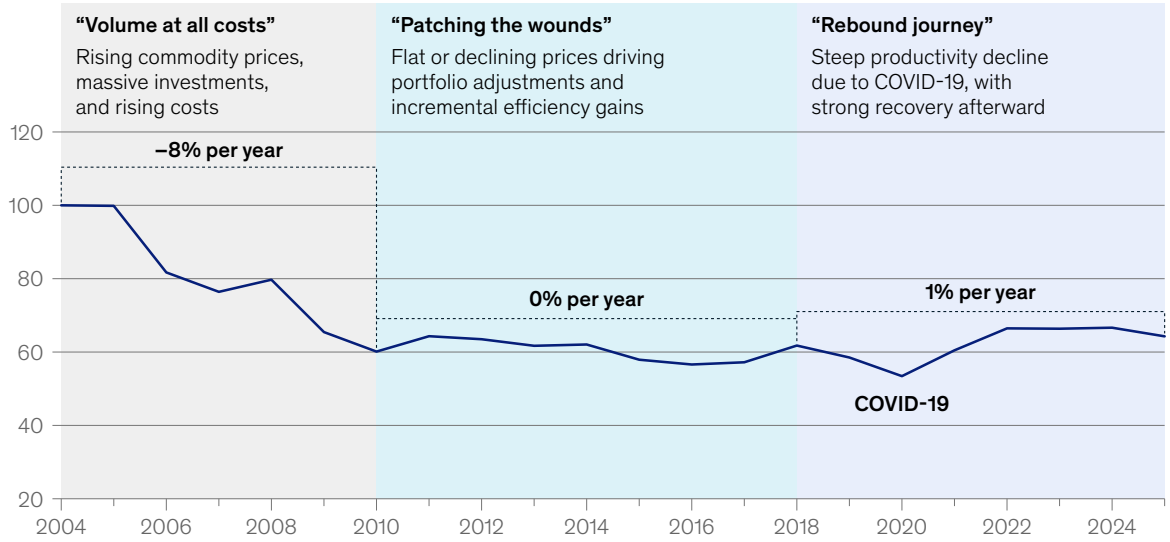
The commodity supercycle of the early 2000s to the early 2010s was marked by heavy investment and rising costs, yet it delivered only limited production growth, and productivity fell sharply as a result.

As commodity prices fell in the first half of the 2010s, mining companies shifted their focus to operational efficiency, primarily targeting labor productivity to offset persistent cost inflation. That put downward pressure on capital productivity in particular.

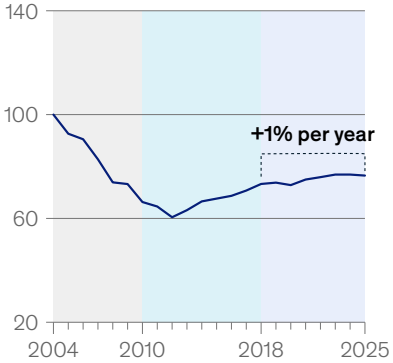
The industry began a modest recovery in productivity around 2017, interrupted temporarily by the COVID-19 pandemic, but now appears to be stagnating again. Labor and factor cost productivity have both edged up, but capital productivity has dragged down the total.

Capital intensity kept rising as deeper pits and declining ore grades, among other factors, increased the capital needed simply to sustain operations. With operational complexity expected to increase further and inflation persisting, capital productivity may remain under pressure in the coming years unless the industry reimagines its approach to capital spending.

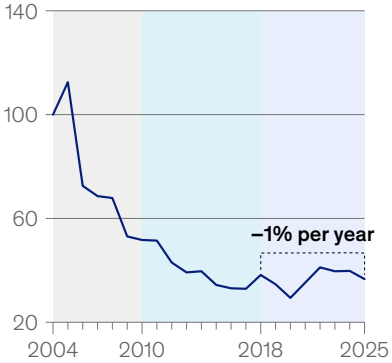
McKinsey MineLens Productivity Index, 2004 = 100, n = 567



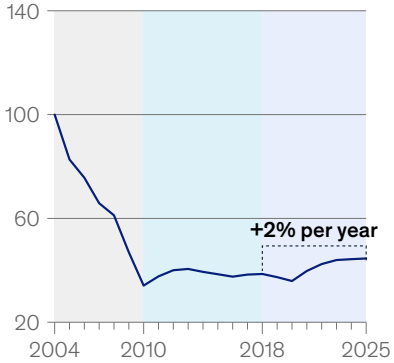
Labor productivity, index (2004 = 100)



Capital productivity, index (2004 = 100) in real terms[1]



Factor cost productivity, index (2004 = 100) in real terms[1]



[1]Capital expenditures and operating expenditures adjusted for mine cost inflation. Capital expenditures include book value of property, plant, and equipment.
Source: McKinsey MineLens; McKinsey MineSpans

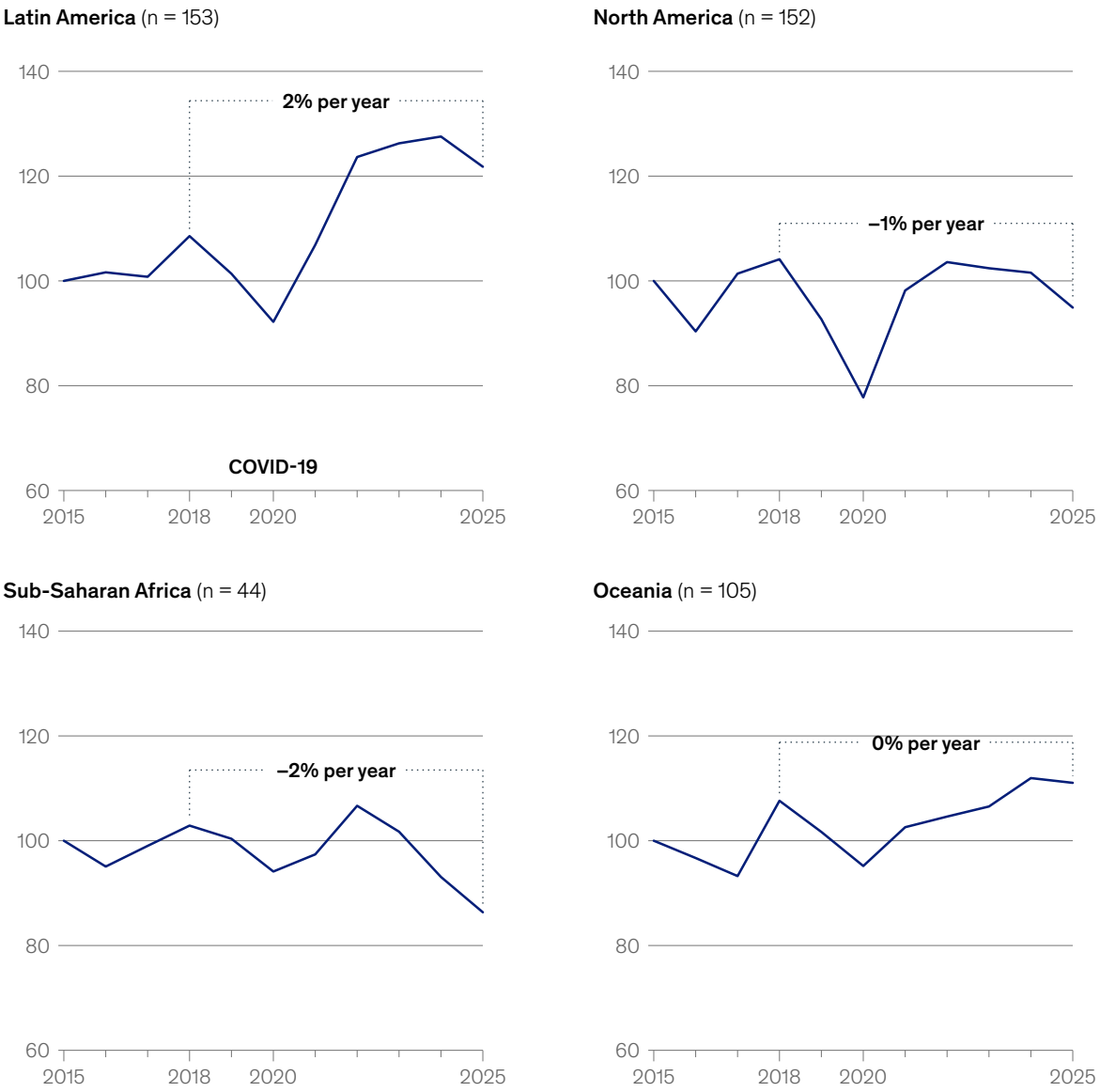
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Productivity stagnation is consistent across all geographies.

In Latin America, post-2018 gains were largely driven by factor cost and capital productivity. By contrast, North America's and Oceania's flat trend mostly reflects a drop in labor productivity, offsetting improvements in factor cost productivity.

These patterns highlight that while operational efficiencies can deliver short-term improvements, sustained growth may require strengthening capital and labor productivity—through modernization, better asset management, and more efficient use of resources.

McKinsey MineLens Productivity Index,[1] 2015 = 100



[1]The MineLens productivity index database covers an estimated 55% of total material moved in 2025 in Latin America, 54% in Oceania, 37% in North America, and 24% in Sub-Saharan Africa.
Source: McKinsey MineLens analysis; McKinsey MineSpans

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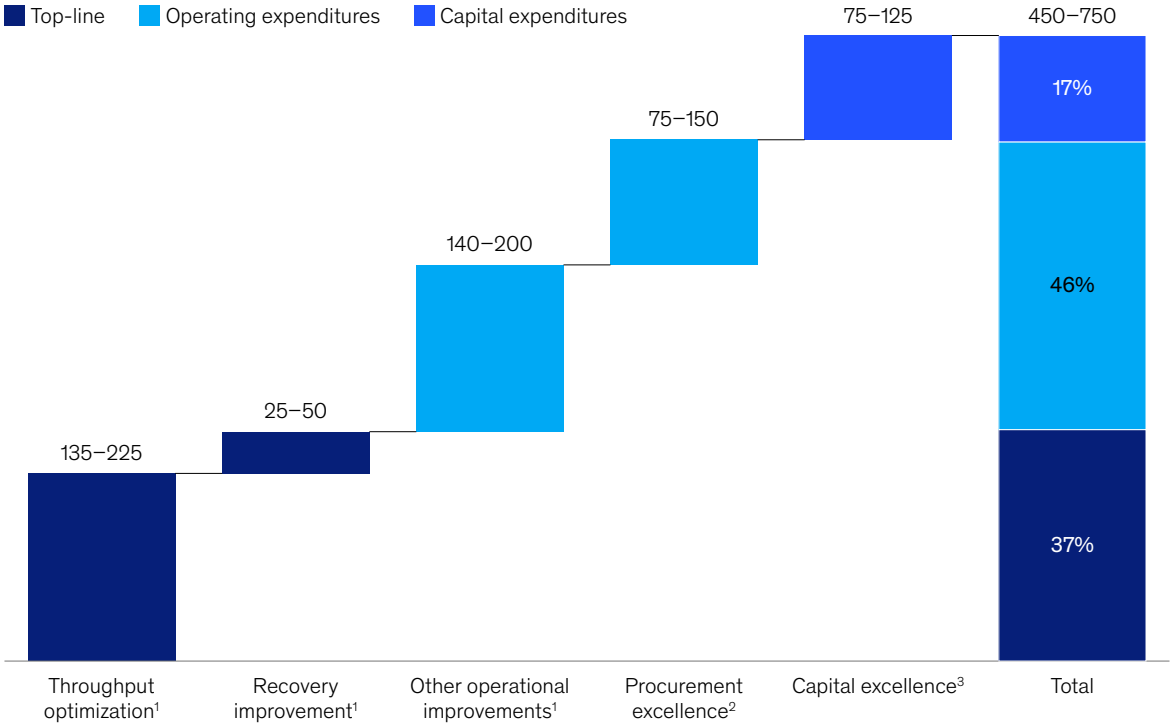
Total value at stake from productivity improvements is estimated at $450 billion to $750 billion annually across the mining and metals industries.

Next-generation technologies—including automation and robotics, often combined with AI, and the use of AI and advanced analytics to improve processes—along with competitive sourcing are creating new opportunities to raise productivity across the value chain.

A full-potential assessment based on a scan of more than 150 known innovations and proven industry references suggests an annualized value creation opportunity of $450 billion to $750 billion across throughput, operational excellence, and capital excellence, measured against a 2025 baseline. This opportunity is equivalent to 15 to 25 percent of the industry revenue of $3.1 trillion in 2025.

Not all of this value would flow through to the industry's profitability, since widespread adoption could impact supply–demand dynamics and industry cost curves, and therefore prices. Even so, it represents a substantial opportunity to strengthen competitiveness, both within the industry and against potential substitutes.

Annualized productivity potential across the metals and mining industry, $ billion



Note: Percentages are shares of the upper-end total by type.
[1]Mining: technology-lever savings (innovations database) as a percentage of each commodity's cost pool, applied to the full market. Steel and aluminum processing: labor, consumables, and energy intensity moved to top-decile plants; smelter and alumina refinery blended with the innovations database.
[2]Procurement excellence savings (4–8% of addressable spend, excluding labor and energy) on full-market pools, scaled to the finished-product cost stack. Procurement excellence is included in the total after a 20% haircut for overlap with operational improvements.
[3]Refining: 36% capital expenditure gap across regions in refining, 2025–35. Mining: top-decile-vs-rest project capital-intensity gap (McKinsey MineSpans 2026 Q2) on new projects and sustaining capital expenditures, at the case capture rate.
Source: McKinsey MineSpans

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Deep dive: China now has the largest autonomous haulage fleet, and its robot density has grown rapidly in recent years.

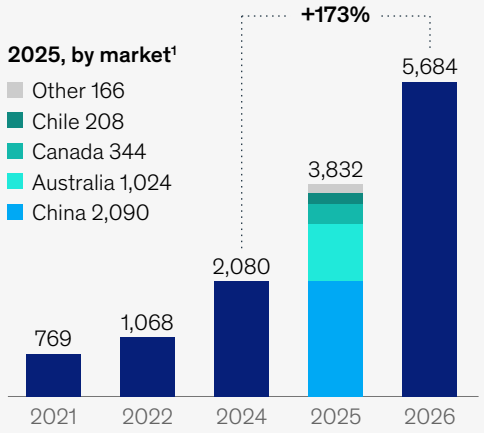
Automation and robotics solutions are being adopted more and more across the industry, with China seeing substantial growth in adoption.

Autonomous haulage system (AHS) fleets nearly tripled from 2024 to 2026, for example, with China now the largest market, accounting for more than 50 percent of all operating fleets.

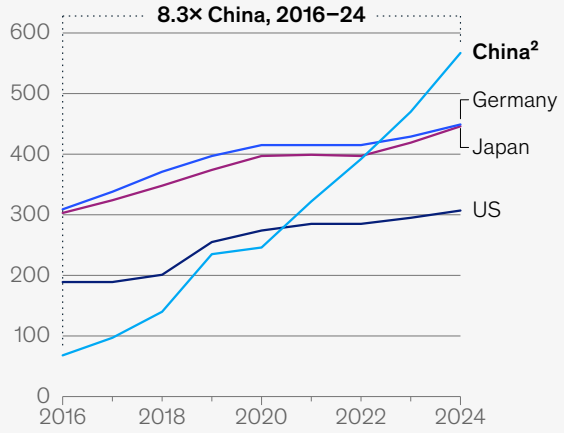
Similarly, robot density in manufacturing in mature markets—including the metals industry—has been rising again since 2022 after a slowdown in the wake of the COVID-19 pandemic. China, however, has grown its installations at a steady 18 percent a year since 2018, has surpassed every mature economy in robot density since 2022, and accounts for 40 to 50 percent of all robotics patents worldwide.

Autonomous haulage fleet and industrial robot density

Tracked autonomous haulage system (AHS) fleet, number of trucks



Industrial robot density, 2016–24, operational industrial robots per 10,000 manufacturing employees



[1]Market split as of Jul 2025; Other is the difference between the 2025 total (3,832) and the four markets shown.
[2]In 2024, China ranked third globally in robot density.
Source: China National Intellectual Property Administration (CNIPA); GGII; Gkong; GlobalData Mining Intelligence Center census; International Federation of Robotics; World Economic Forum; World Intellectual Property Organization; McKinsey analysis

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5. Sustainability

Climate ambition is diverging by region, yet affordability and feedstock security are converging everywhere.

Sustainability momentum is progressing more selectively in Europe and the United States amid competitiveness pressures.

Momentum is diverging across regions. In Europe and the United States, cost pressures are mounting, and there are examples of climate policies and commitments being scaled back.

Other regions retain momentum for several reasons. Chief among them are the need for new investment where continued spending on legacy technologies offers little long-term value, and a growing focus on supply chain security, particularly using recycled materials.

Key shifts in policymaking and at companies, 2025–26

XX Share of global greenhouse gas (GHG) emissions, 2024, %

● Constant or increasing momentum

● Decreasing momentum

Region	Key shifts in policymaking, 2025–26	Key shifts at companies, 2025–26
China 33	● Carbon pricing expanded into heavy industry, while clean-power deployment accelerated (ETS[1] expanded to steel, cement, and aluminum)	● Low-carbon steelmaking moved toward scale, with hydrogen-DRI[2] trials commencing ● China remained the global leader in renewable deployment, with 58% of global solar additions in 2025
Rest of Asia 14	● Carbon-pricing mechanisms remain limited in scope, with Korean steel fully exempt from auctioning and Japan limiting price volatility	● Low-carbon steel capacity is scaling in South Korea, with >2.5 Mt of electric arc furnace steel capacity announced
Europe 12	● EU narrowed sustainability reporting and due-diligence requirements (ETS2;[3] CSRD[4]/CSDDD[5] rules) ● CBAM[6] entered its definitive regime and is now applying a carbon price to imported steel, aluminum, and other materials	● ~20 Mt/year of European green-steel capacity is paused, postponed, or canceled
US 12	● US federal measures included changes to vehicle GHG standards and clean-vehicle incentives, affecting steel, aluminum, and energy-intensive manufacturing	● Higher-emissions steelmaking regained ground as the US saw a blast furnace restart to meet demand
Africa 9	● Carbon-pricing pressure increased in South Africa and Morocco, particularly for steel, aluminum, and export-intensive industries	● Green materials industrial projects advanced in Namibia and Morocco, such as green iron trials
India 8	● 58 steel units had received green-steel certification by end-2025, covering 9.1 Mt of production	● Low-carbon steelmaking moved toward commercial capacity

Note: Nonexhaustive. Remaining ~12% of global GHG emissions is mainly the Americas outside the US plus Oceania.
[1]European Union Emissions Trading System. [2]Direct reduced iron. [3]Emissions Trading System for buildings, road transport, and additional sectors.
[4]Corporate Sustainability Reporting Directive. [5]Corporate Sustainability Due Diligence Directive. [6]Carbon Border Adjustment Mechanism.
Source: Emissions Database for Global Atmospheric Research (EDGAR) 2025, 2024 GHG emissions, excluding land use, land use change, and forestry (LULUCF); McKinsey Green Steel Monitor; McKinsey analysis

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Metals and mining emissions are projected to decrease by 8 percent by 2035.

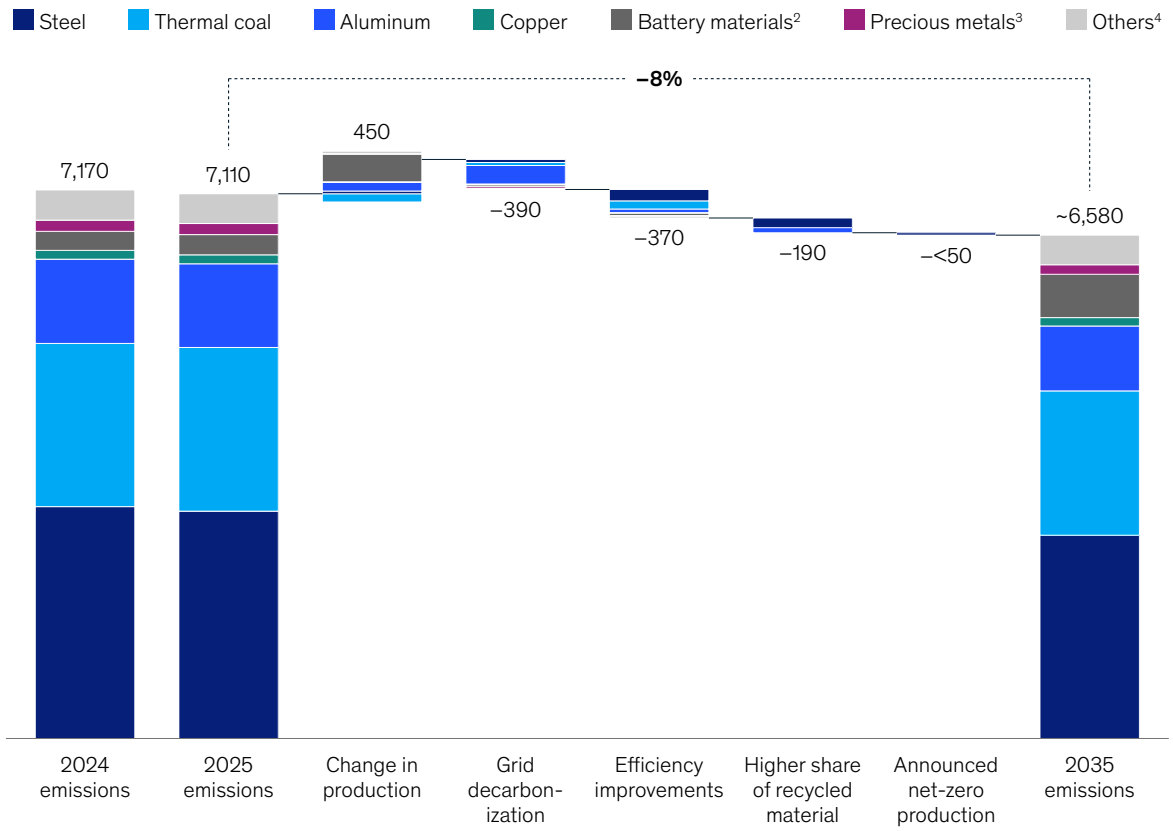
Global industry emissions are estimated to have decreased about 1 percent from 2024 to 2025, primarily driven by lower steel production.

Steel remains the largest source of emissions, accounting for about 38 percent of the industry total, followed by thermal coal (30 percent) and aluminum (15 percent).

Assuming long-term supply equals current demand outlooks, emissions from metals and minerals production are projected to fall roughly 8 percent by 2035, from about 7,110 million tons of carbon dioxide equivalent (CO_2e) to about 6,580 million tons of CO_2e per year, even as production growth adds around 450 million tons of CO_2e at current average emission intensities.

Grid decarbonization and continued efficiency improvements may drive the bulk of the decline, with higher recycled-materials shares and announced net-zero production contribution the remainder.

Emissions from metals and mining,[1] megatons of CO_2 equivalent per year



Note: Figures are approximations; assumes long-term supply is equal to demand. The change in production nets to a rise because growth in battery materials, aluminum, steel, and other commodities outweighs the drop in thermal coal.
[1]Does not contain downstream scope 3 emissions such as burning of thermal coal; 2024 figures revised to reflect updated thermal coal volumes.
[2]Lithium, nickel, cobalt, manganese, and graphite.
[3]Gold and PGMs.
[4]Zinc, sulfur, uranium, tin, silicon, and others.
Source: IEA; Industrial Transformation 2050 (Material Economics, 2019); International Aluminium Institute; International Copper Association; Statista; Transition Pathway Initiative; World Steel Association; McKinsey MineSpans

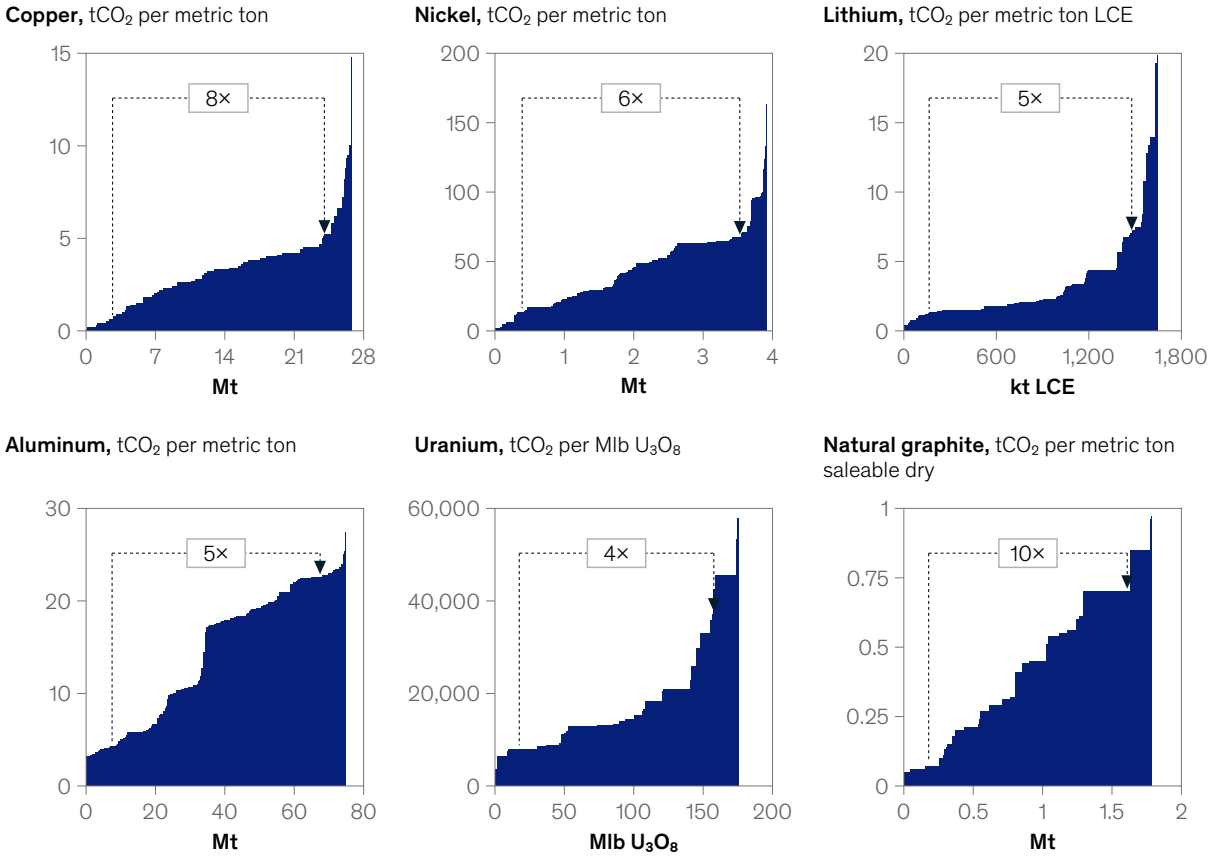
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Emission intensities in most materials operations have a large spread between low- and high-CO_2 assets.

Across metals and minerals, the highest-emitting assets produce almost 4 to 8 times more CO_2 per metric ton than the lowest-emitting ones, with natural graphite showing the widest spread (10 times) and uranium the narrowest (4 times).

CO_2 intensities of selected materials,[1] 2025

X Ratio between C90 and C10 emission intensity[2]



[1]Total CO_2 intensity of primary refined metals for copper, nickel, lithium, and aluminum (no secondary production); mining and processing CO_2 intensity for uranium and graphite.
[2]C90 and C10 are the intensities of the assets at the 90th and 10th percentile of cumulative production.
Source: McKinsey MineSpans

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6. The way forward

Five potential areas of action—operations value creation, capital excellence, procurement excellence, commercial excellence, and technology and AI—may offer players across the value chain ways to navigate current uncertainties and capture opportunities.

There are ten themes that emerge from this year's *Global Materials Perspective.*

With a record market capitalization of about $3.7 trillion but stagnant revenue and productivity, the biggest opportunity lies in a $450 billion to $750 billion productivity prize, though the execution gap between leaders and laggards is widening.

The industry's regional demand patterns are shifting, with growth in India and new value pools such as data centers emerging, while trade restrictions, constraints along key supply routes, and rising capital costs make supply harder to secure and finance.

Selected priority themes by chapter

Chapter	Priority themes	Key figures
State of the industry	**Demand reorientation to India and new value pools** China's revenue share has declined from its peak; India is now the second-largest demand market; data centers add critical-materials demand	**+4%** of 2030 copper demand from data centers
	Downstream industry affected by input-cost asymmetry US aluminum peaked above $6,200 per metric ton; price divergence following tariffs and trade restrictions across commodities	**>$1,000** higher cost of material for US compared to Chinese car at peak price post-tariffs
	Reinvestment gap; margins cyclical, not structural Record market cap of ~$3.7 trillion and EBITDA of ~27%, yet revenue grew ~1% and productivity remained stagnant	**$3.7 trillion** record market cap without productivity and revenue growth
Geopolitics	**Investing in a world where value pools are diverging** Shifts in regional demand and value pools create new requirements for local knowledge, execution, and capital	**50%** of 2035 materials revenue expected in China and India
	Geopolitical conflicts expose vulnerabilities Export bans and trade restrictions highlighted supply-chain vulnerabilities; supply curtailments followed the sulfur price shock	**+40%** of copper-leaching operating costs attributed to sulfur post start of Iran conflict
Availability and growth	**Copper and critical-material scarcity** Slowdown of the energy transition and supply announcements alleviate the supply–demand gap; AI adds incremental demand on top	**20–30%** demand gap for rare earth metals in all energy transition scenarios
	Exploration and discovery productivity decline Exploration spend is flat while cost per discovery has risen more than fivefold	**<5** major copper or gold findings on average per year last decade
Productivity and affordability	**The largest productivity toolbox** $450 billion to $750 billion of productivity value at stake; a larger toolbox than ever, and 2026–27 could prove pivotal for, for example, AI adoption	**$450 billion–$750 billion** productivity value at stake
	Execution gap that compounds annually Capital productivity fell more than 5%; the execution gap could continue to widen, with significant regional variation in capital intensity and project delivery	**>5%** capital productivity decline
Sustainability	**Circular metals as contested low-cost supply** Scrap is often the cheapest, lowest-emission unit, but access is increasingly contested	**25%** US domestic sales mandate on copper scrap proposed

Source: McKinsey MineSpans; McKinsey analysis

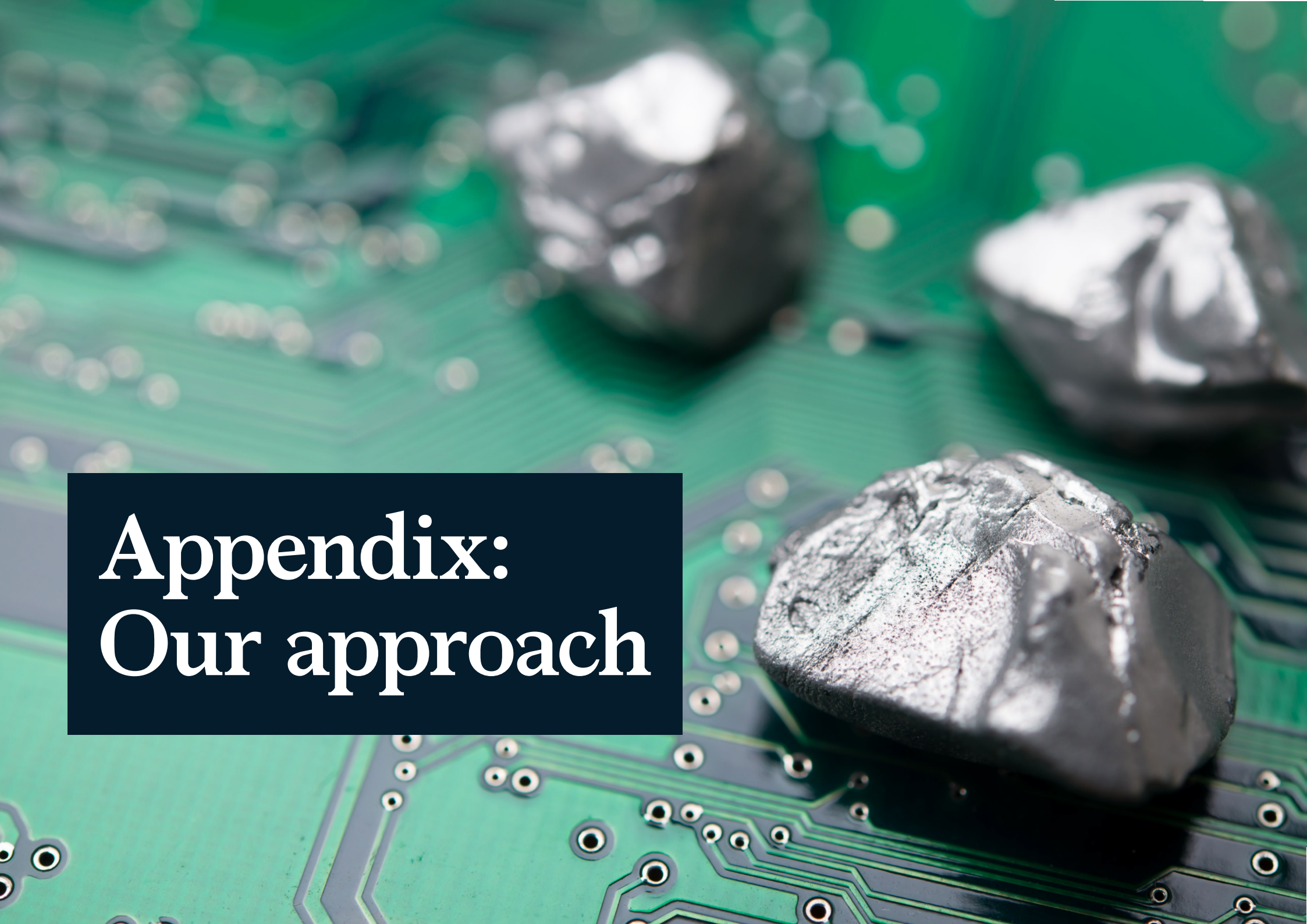
Stakeholders could consider five potential areas of action.

Perspective on potential priority themes for the industry in the coming year

Area of action	Opportunity	What we've seen with clients
1 **Operations value creation**	More than $300 billion of potential, both from optimizing to best-practice operational excellence and, primarily, from using the expanding toolbox of physical AI: real-time drilling data integration, autonomous haulage, autonomous reagent dosing, digital furnace control loops, and more	A copper producer gained 5% throughput from machine-learning optimization with close to no new capital
2 **Capital excellence**	$75 billion to $125 billion of annualized potential, comparing leading capital performers with laggards. Most of the gap is bridgeable with the key levers of speed and diligence of execution; gen AI planning is emerging as a key lever for large-scale projects	A global energy major revamped ~$50 billion of capital projects following an independent project-challenge review
3 **Procurement excellence**	More than $75 billion of potential; the primary lever is to consider the full range of potential suppliers, for example, for equipment. Broadening the supply base to include Chinese manufacturers can offer significant cost advantages; partnerships are key to unlocking value	A global miner achieved 20% EBITDA savings from an AI-driven procurement review of its full spend profile
4 **Commercial excellence**	Cross-cutting theme: Shifts in demand, trade conditions, and capital markets create significant opportunities and requirements for commercial skills—negotiations, partnerships, and real-time digital sales companions	A real-time digital sales companion enabled ~3× customer contacts
5 **Technology and AI**	Cross-cutting theme: Innovation today offers the largest toolbox, and the gap between leaders and laggards is expanding in light of AI; 2026 and 2027 could prove pivotal; companies without pilots, waiting for the right solution, could risk falling behind	More than 5% energy reduction from electric arc furnace heat-profile optimization

Source: McKinsey analysis

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Appendix: Our approach

Supply outlooks presented in this report are based on McKinsey MineSpans proprietary databases and supply scenarios.

This Perspective assesses the outlook for metals and mining across three dimensions: supply, demand, and the pace of the energy transition, each modeled under a range of scenarios.

The findings in this report are based on the base-case scenario, unless stated otherwise. The base-case scenario includes all currently operating projects (corrected for depleting assets), as well as projects currently under construction or with feasibility study completed and financing secured. It also includes projects for which a feasibility study is currently under development, in which case the start-up date is adjusted for likelihood of execution.

Supply scenarios are based on announced projects—to the extent that they are available in the public domain—and do not consider theoretical capacity increases.

Supply scenarios components

● Included in scenario ○ Not included

McKinsey MineSpans database

11,000+
operating mines and projects

130+
countries

13
cost and CO_2 factors

14+
year outlook

2.5 million+
data points

Project status	Status description	Base case	High case	Full pipeline
In operation	Currently operating projects, corrected for depleting assets	●	●	●
Certain	Projects currently under construction or with feasibility study completed and financing secured	●	●	●
Probable	Projects with feasibility study under development; start-up date adjusted for likelihood of execution	●	●	●
Possible[1]	Projects with prefeasibility study completed; start-up date adjusted for likelihood of execution	○	●	●
Unlikely	Projects with prefeasibility study completed, yet clear roadblocks identified	○	○	●
Unrealistic/ in exploration	Any project that has ever been announced	○	○	●

Scenario used throughout in publication unless explicitly stated otherwise

Theoretical scenario, not considered

[1]Some prefeasibility study projects may also be included in the "Probable" category in case the project's characteristics and expectations are robust.
Source: McKinsey MineSpans

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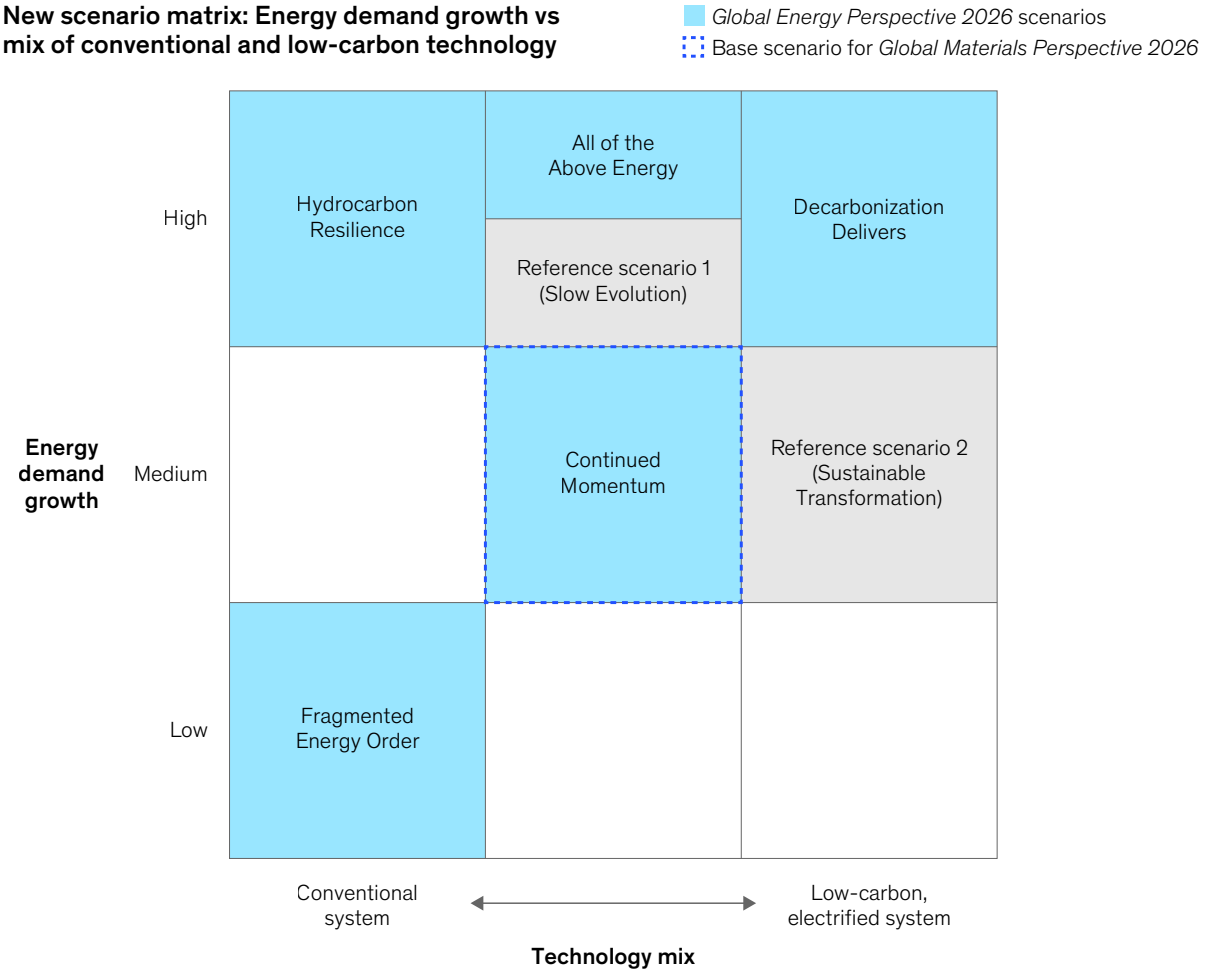
The demand outlooks are based on the scenarios presented in the *Global Energy Perspective.*

For demand, we look across the Continued Momentum baseline and the two reference scenarios: Slow Evolution, and Sustainable Transformation.[7] The demand outlook in this report is based on the Continued Momentum baseline.

In this scenario, national policies balance affordability, security of supply, and sustainability, with technology and efficiency improvements that hover around current trends. Emerging economies prioritize growth over sustainability in the pursuit of development.

Clean-energy projects gain some traction in cross-regional financing, with mature economies helping to finance some of the decarbonization of emerging economies. Global coordination efforts to alleviate bottlenecks do not relieve many practical constraints, slowing the widespread adoption of low-carbon technologies, such as electricity grid constraints.

New scenario matrix: Energy demand growth vs mix of conventional and low-carbon technology



Note: No probability assigned to any scenario.
Source: McKinsey Energy Solutions

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[7] *Global Energy Perspective 2026*, McKinsey, September 30, 2026

Authors and contributors

The authors wish to thank Adam Kendall, Aleksandra Krauze, Camila Nucci, François Fontaine, Gabriel Motta, Ilana Kochetkova, Ishita Agarwal, Janusz Niekrasz, Jeffrey Lorch, Khawla Ouadie, Martyna Zielinska, Michal Polcyn, Nathan Flesher, Nicolas Goffaux, Otto van der Ende, Richard Sellschop, Sean Buckley, and Yermolai Solzhenitsyn for their contributions to this report.



Karel Eloot
Senior partner
Shenzhen



Michel Foucart
Partner
Brussels



Michel Van Hoey
Senior partner
Luxembourg



David Ebereonwu
Consultant
Düsseldorf



Greg Callaway
Expert
Toronto



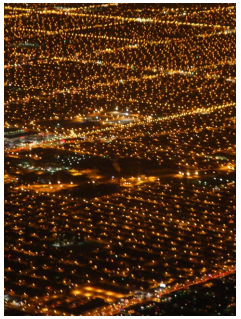
Gustav Hedengren
Consultant
Stockholm



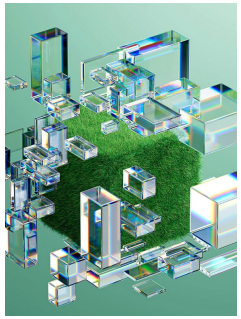
Marcelo Azevedo
Associate partner
London

To learn more

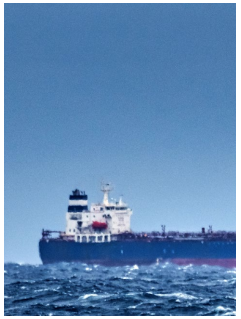
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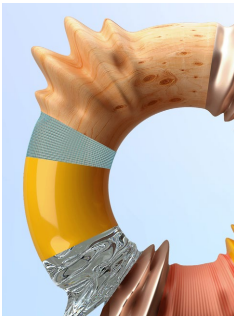
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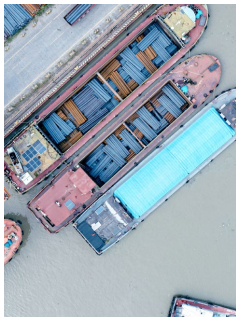
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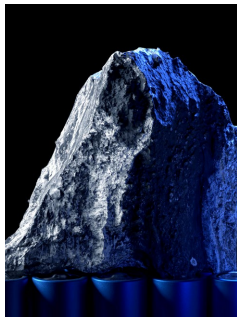
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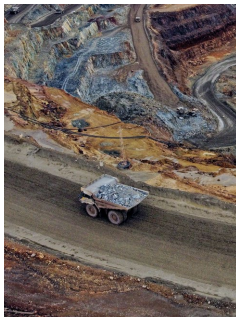
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