SECTOR REPORT | METALS & MINING | AUGUST 2026

Copper

The Security Premium

This report explores a long/short framework for a structurally tight copper market, where jurisdiction, processing capacity and supply-chain security increasingly determine equity outcomes.

Sector view	Constructive, with cyclical risk
Core long	Freeport-McMoRan (FCX)
Supporting longs	Southern Copper (SCCO), Antofagasta (ANTO)
Core short	First Quantum Minerals (FQM)
Supporting short	Ivanhoe Mines (IVN)

Independent equity research on the copper sector. Not investment advice. Data as of August 27, 2026, unless otherwise noted. See Disclosures on the final page.

1 EXECUTIVE SUMMARY

Thesis. Copper sits at the intersection of three reinforcing demand engines (electrification, AI/data-center buildout and resource-security policy) while mine supply is becoming slower, more capital intensive and more exposed to operational and political disruption. The consensus recognizes the first two demand stories. In my view, the underpriced variable is the security premium: the value of reliable production, processing and trade access when copper supply chains are increasingly treated as strategic infrastructure.

The investment implication is more selective than a blanket “long copper miners” call. A structurally constructive commodity backdrop can coexist with large dispersion at the equity level. Producers with durable assets, processing optionality and manageable jurisdictional exposure should command a higher quality premium. Producers whose earnings depend on a narrow set of politically or operationally fragile assets can remain impaired even when the broader copper tape is favorable.

My preferred expression remains **long FCX** against **short First Quantum.** The updated filings make the relative-quality gap clearer. FCX enters 2026 with **41%** of guided copper production coming from the U.S., a temporary mix shift caused by depressed Grasberg output, while retaining roughly **410kt/year** of El Paso refining capacity and about **1bn lb/year** of rod production across El Paso and Miami. First Quantum, by contrast, still has no new mining at Cobre Panamá, carries roughly $**5.1bn** of FY2025 net debt, and has increasingly relied on equity issuance, copper prepayments and streaming transactions to fund deleveraging. Ivanhoe is now a more credible secondary avoid after the 2024–26 execution cascade, but its underlying Kamoa-Kakula economics remain too strong for it to displace FQM as the cleaner short.

The sector is tight today, but the path is not linear**.** Treatment and refining charges collapsed to unprecedented levels, signaling acute concentrate scarcity, while 2026 refined-balance estimates span roughly **150kt to 600kt** of deficit. Yet ICSG has also projected a 2027 surplus. I therefore treat 2026–27 as an air pocket within a longer-duration scarcity thesis rather than assume a permanent deficit every year.

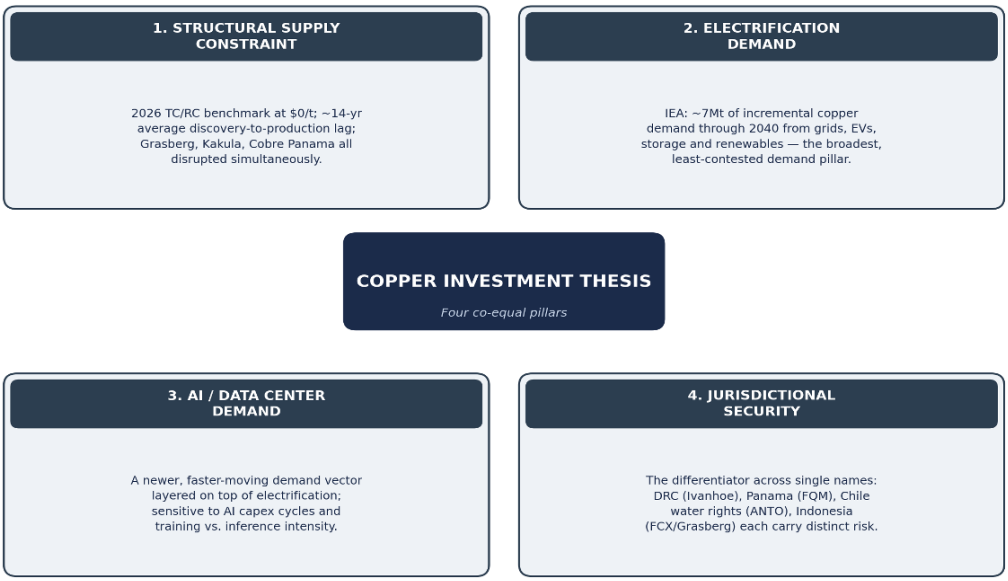


Exhibit 1 | Copper investment thesis

Source: IEA Global Critical Minerals Outlook 2026. Company filings and releases.

2 SECTOR OVERVIEW

The most important near-term signal is occurring upstream of the copper price itself. The 2026 annual treatment and refining charge benchmark settled at **$0/ton**, the lowest benchmark on record, while spot TC/RCs moved deeply negative by mid-year. In practical terms, smelters are competing for scarce concentrate rather than being paid a conventional processing fee. That inversion is difficult to reconcile with a comfortable mine-supply backdrop.

Refined balances are more contested. Institutional estimates for 2026 range from roughly a **150kt** deficit at the conservative end to about **600k**t at the large deficit end. This dispersion matters, copper is not short because every forecaster agrees on a single number; it is tight because relatively small changes in mine output, concentrate availability or trade flows can move the refined market across balance.

The countersignal is 2027. ICSG has projected a swing back toward surplus as disrupted production and restart volumes return. I view this as the key challenge to a simplistic supercycle narrative. If 2027 supply normalizes faster than expected, copper can experience a meaningful cyclical correction even if the post-2030 structural setup remains intact.

Inventories also show policy distortion rather than a clean global signal. U.S. Section 232 policy has encouraged metal to move toward COMEX while inventories elsewhere remain tighter. That geographic divergence matters because the marginal price increasingly reflects not only global availability, but where copper is physically located and under which tariff regime it can move.

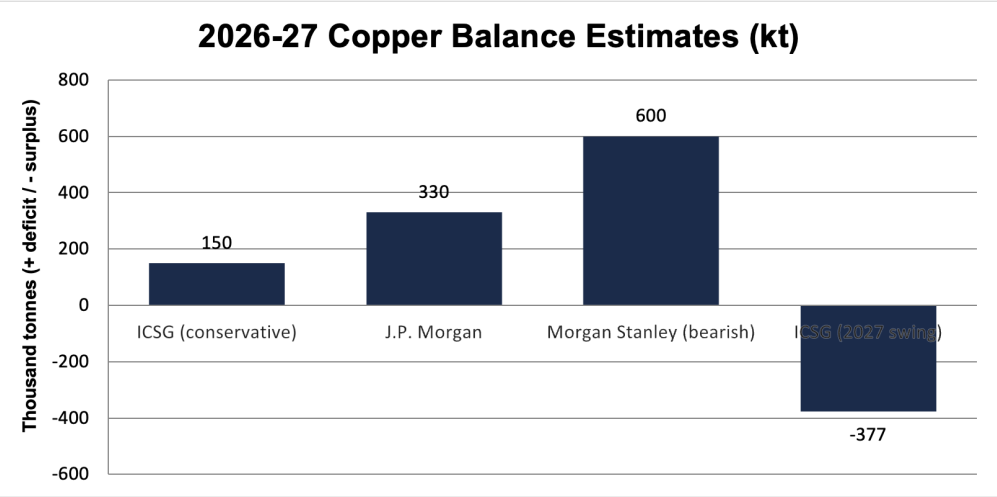


Exhibit 2 | 2026–27 copper balance estimates (kt)
Source: IEA; ICSG estimates. White House Section 232 proclamations.

3 INVESTMENT THESIS: FOUR CORE PILLARS

3.1 Structural supply constraint

Copper's supply problem starts with geology and ends with time. S&P Global data cited in the underlying research show average mined head grade falling **13.4%** to **0.52%** Cu between 2012 and 2022, while stripping ratios have risen. Lower grade means more rock must be moved, crushed and processed for each unit of copper. The result is higher capital intensity, higher energy and water requirements, and a greater sensitivity to execution.

The second constraint is the project clock. Across a large sample of operating mines, discovery-to-production has averaged roughly 14 years, and major projects scheduled for the second half of this decade continue to face multi-year slippage. The Vicuña district is the cleanest forward example: even with BHP and Lundin backing, substantial resources and billions of dollars of planned capital, first production is targeted around 2030. Capital availability cannot manufacture ore on a two-year timetable.

Recent disruptions make the constraint realized rather than theoretical. Grasberg's September 2025 mud-rush incident forced a phased recovery and altered Freeport's near-term geographic mix: 2026 guidance is **1.4bn** lb from the U.S., **1.08bn** lb from South America and **0.9bn** lb from Indonesia, or roughly **41%/32%/27%** of consolidated output. That U.S. weighting is temporary rather than structural and should reverse as Grasberg ramps, while Cobre Panamá remains suspended from new mining. At Kamoa-Kakula, the 2025 seismic/flooding event has now cascaded into 2026 guidance of only **290–310kt**, below even the disrupted 2025 actual of **388.8kt.**

3.2 Electrification demand

Electrification is the broadest and least controversial demand pillar**.** The IEA's 2026 outlook identifies electricity networks, EVs, storage and renewables as dominant drivers of future critical-mineral demand. Copper records the largest absolute volume growth among the major energy minerals, adding roughly **7 million** tons of demand through 2040 in the IEA outlook. The relevant point for equities is not simply that EVs contain copper; it is that electrification requires simultaneous investment in vehicles, charging, generation, transmission and distribution.

Grid constraints strengthen that linkage. The IEA describes grid capacity as an emerging bottleneck globally, with connection queues at record levels. EV electricity demand could exceed **1,500 TWh** by 2035 under

current-policy assumptions, around six times 2025 levels. Even where vehicle-level copper intensity is reduced through engineering, the system-level requirement for conductive infrastructure remains difficult to avoid.

3.3 AI and data centers

AI adds a second, faster-moving electrical load on top of the energy transition. The hyperscaler capex cycle has repeatedly been revised upward, and the physical linkage to copper is straightforward: data centers require busbars, cabling, transformers, switchgear, cooling infrastructure and grid interconnection. S&P Global estimates cited in the research place copper intensity around **27–33** tons per MW for conventional cloud capacity and as high as roughly **47** tons per MW for AI training facilities.

I would not overstate AI's current share of the market. The research estimates 2026 data-center construction embodies roughly **500kt** of copper, still below **2%** of global refined consumption. The more important point is timing: data-center copper demand is scaling into the same late-decade window in which mine supply becomes hardest to accelerate.

3.4 Jurisdictional security and reshoring

Copper increasingly sits inside national-security policy rather than ordinary commodity policy. The U.S. Section 232 process explicitly treats copper imports as a national-security issue. The EU Critical Raw Materials Act codifies extraction, processing, recycling and single-country dependency benchmarks. Indonesia's prior forced divestment at Grasberg remains a copper-specific precedent for resource nationalism.

The equity implication is a security premium, not simply a binary safe/risky geography label**.** Investors should distinguish between realized political impairment, probabilistic political risk, operational disruption and strategic processing value. That distinction is central to the FCX/FQM pair.

4 CATALYSTS AND WHAT THE MARKET IS WATCHING

Section 232: policy can change physical flows before it changes demand

U.S. copper policy is the most dateable macro catalyst. The 2025 Section 232 action-imposed duties on semi-finished copper products and created a pathway for a phased tariff on refined copper. The original recommendation contemplated 15% on refined copper from January 2027 and **30%** from January 2028, subject to a market update and presidential determination. Subsequent 2026 proclamations broadened and adjusted metal-product tariffs, reinforcing the direction of travel toward domestic processing and supply-chain security.

For the trade, the key is not to guess the proclamation, the observable signal is inventory migration. If U.S. policy continues to reward onshore availability, COMEX can remain structurally better stocked than other venues, creating regional basis volatility and making U.S. refining/rod capacity strategically more valuable.

Operational catalysts

— Grasberg ramp: each quarter of safe production recovery reduces the execution discount embedded in FCX while restoring one of the world's most important copper systems.

— Cobre Panamá: the final audit was released in 2026 and reported broad compliance, but stockpile processing remains explicitly separate from reopening the mine. A negotiated restart would be the largest single risk to the FQM short.

— Centinela second concentrator: the company's primary-source project window is 2024–2027 and the build was more than **50%** complete by Q4 2025. It is designed to add roughly **170kt** of copper-equivalent annual production, including **144kt** of copper.

— Vicuña: capital deployment from 2027 with first production targeted around 2030; schedule discipline is a useful read-through for the broader project pipeline.

— TC/RC negotiations and ICSG balance revisions: the fastest recurring indicators of whether concentrate scarcity is easing or worsening.

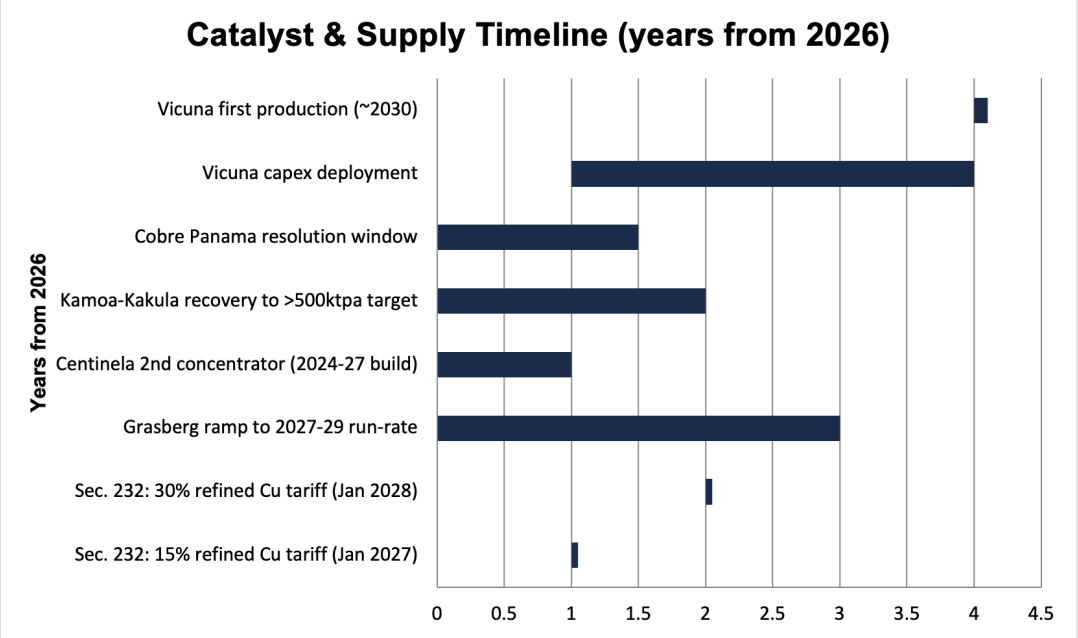


Exhibit 3 | Catalyst & supply timeline (years from 2026)

Source: Company filings and releases. White House Section 232 proclamations.

5 LONG IDEAS

Freeport-McMoRan (FCX) — Core Long

FCX combines scale, copper torque, strategic U.S. processing exposure and a visible recovery catalyst at Grasberg. The reserve data reinforce why the story should not be reduced to 'U.S. copper': 2025 recoverable copper reserves were **38%** North America, **40%** South America and **22%** Indonesia. That was a discrete shift from the relatively stable 2021–24 mix and likely reflects the Grasberg mine-plan disruption rather than a secular geographic migration. The more relevant near-term figure is 2026 production guidance, which is temporarily **41%** U.S.-weighted because Indonesian output remains depressed.

Grasberg is both the risk and the catalyst. The September 2025 mud rush demonstrated the operational fragility of underground block-cave mining and materially reduced near-term production. The recovery path is now clearer, but it will take time. Company guidance points to a staged normalization through 2026 and 2027 rather than a clean snapback, with district output moving back toward pre-incident levels only as the affected production blocks return. I therefore treat Grasberg as a multi-year execution catalyst: each successful restart milestone removes part of the operational discount, while any further slippage matters disproportionately at FCX's current valuation.

The updated recovery schedule is concrete. Grasberg district copper production was approximately **1.0bn lb** in 2025 and is guided to roughly the same level in 2026, before rising to **1.5bn lb** in 2027 and **1.7bn lb** in 2028. Big Gossan and Deep MLZ resumed in October 2025, while PB2/PB3 began ramping in Q2 2026 and daily rates doubled from **34,000** to **69,000** metric tons between April and June. PB1 South is targeted for mid-2027 and PB1C for year-end 2027. Management guides to roughly **65%** of full district capacity in 2H26, **80%** by mid-2027 and full capacity by year-end 2027. Q2 2026 also showed that the rest of the business can absorb part of the disruption: adjusted EPS was **$0.74** versus **$0.62** consensus, and cash-cost guidance improved to **$1.75/lb**. The copper torque remains material; management estimates that a **$0.10/lb** move in realized copper

price changes annual EBITDA by roughly **$390m**. Separately, the pending IUPK extension would preserve FCX's **48.76%** PTFI ownership through 2041 and reduce it to approximately **37%** thereafter. I view that as a terminal-value issue, not a 12–24 month catalyst, and weight it accordingly.

The strategic angle is processing, and the distinction matters**.** FCX's El Paso refinery has roughly **410,000** metric tons per year of capacity, while the El Paso and Miami rod mills together produce about 1bn lb annually. El Paso refined only **204,900** tons in 2025, leaving meaningful headroom if U.S. policy increases the value of domestic availability and processing capacity. Atlantic Copper belongs in the global asset discussion, not the reshoring thesis: the smelter/refinery is in Huelva, Spain. FCX's 2026 consolidated unit net cash-cost guidance is **$1.75/lb**; FY2025 net debt was approximately **$5.6bn** after **$4.5bn** of capex.

Valuation. The updated comparable screen places FCX at roughly **11.04x** TTM EV/EBITDA, above Antofagasta at **9.35x** but still below Southern Copper's premium multiple. That premium to ANTO means the FCX long should be defended on catalyst quality and strategic processing value rather than on a simple 'cheap miner' argument. Successful Grasberg execution can support the multiple while restoring earnings power, but the current valuation leaves less room for operational slippage than the earlier ~8x screen implied.

Southern Copper (SCCO) — Quality Long, Valuation-Constrained

SCCO remains the cleanest quality expression in the group, but not the cheapest. As of year-end 2025, the company held **108.96bn lb** of proven and probable contained copper reserves, approximately **49.4Mt: 40.5%** in Mexican open pits, **41.8%** in Peruvian operations and **17.7%** in development projects. Net cash cost was only **$0.58/lb** in 2025, but the improvement from **$0.89/lb** in 2024 was driven primarily by stronger molybdenum and silver by-product credits rather than lower underlying mining cost. FY2025 net debt was about **$2.45bn** and capex rose to **$1.33bn** as Tía María construction accelerated. The reserve life and margin profile justify a quality premium, but the valuation still limits the asymmetry versus FCX.

Antofagasta (ANTO) — Managed-Risk Long

Antofagasta sits in the middle of the risk spectrum. FY2025 EBITDA reached **$5.20bn**, up **52%** year over year, with a **60%** EBITDA margin, while net debt was **$2.75bn** and net debt/EBITDA only **0.53x**. Production was **653.7kt** at a **$1.19/lb** net cash cost. The Centinela second concentrator was more than **50%** complete by Q4 2025 and is designed to add **144kt** of copper plus gold and molybdenum by-products within the company's 2024–27 construction window. At approximately **9.35x** TTM EV/EBITDA, ANTO screens below FCX while carrying a conservative balance sheet. The offset is Chile-specific water and permitting exposure, including a Los Pelambres mine-life extension beyond 2035 that remained pending at year-end 2025.

Water is a structural risk that is important to note**.** Los Pelambres can draw up to 400 liters/second from the Choapa River during drought conditions only under a redistribution agreement that requires annual administrative renewal by Chile's DGA. Antofagasta's capital allocation is the stronger evidence that this is the cost of doing business rather than a decorative ESG risk: Q2 2026 results disclosed a newly approved **~$0.9bn** pipeline and pumping system for Zaldívar, intended to eliminate continental-water use by mid-2028 and support a mine-life extension to 2051, alongside the Los Pelambres desalination expansion and Centinela build. The January 2026 **~$775,000** environmental fine is financially immaterial, but it documents regulatory friction. Net debt/EBITDA has also moved from **0.53x** at year-end 2025 to **0.68x** by June 2026 as growth and water capex peak. None of these points breaks the long thesis today, they do, however, prevent me from treating ANTO as a jurisdictionally 'clean' long when the company itself is committing billions of dollars to mitigate a recurring resource constraint.

Company	Asset Quality	Jurisdiction	Balance Sheet	Processing Exposure	Growth	Valuation Room
FCX	5	3	3	5	5	3
SCCO	5	4	3	2	3	2
ANTO	4	3	5	2	4	3

Exhibit 4 | Long-side scorecard — FCX, SCCO, ANTO

Source: Company filings. Analyst judgement.

6 SHORT IDEAS: FIRST QUANTUM MINERALS (FQM)

Short thesis. First Quantum remains the strongest short candidate because jurisdiction risk is realized, economically material and layered onto a capital structure that has required repeated financing interventions. The case is not that the company has been historically weak: pre-Panama financials were mixed-to-strong, and Kansanshi's S3 expansion is an executed growth catalyst. The bet is narrower, where Cobre Panamá demonstrates how quickly a world-class asset can become stranded by legal and political failure, while Zambia adds a second sovereign-risk vector through a persistent VAT receivable. The copper bull case does not automatically repair either problem.

Cobre Panamá remains impaired despite 2026 progress

The distinction between processing and reopening is critical. Panama has authorized removal, processing and export of previously extracted stockpiled ore, explicitly without new extraction, drilling or blasting. Earlier concentrate stockpile sales generated **$328m** of Cobre Panamá segment revenue in FY2025, yet the segment still recorded a **$69m** operating loss. The operating history is the key evidence: the concession framework was already under constitutional challenge before the 2023 shutdown; Panama then enacted Law 407 on November 3, 2023, imposing an indefinite nationwide moratorium on granting new metallic-mining concessions and on renewing or extending existing ones; and Law 406 was declared unconstitutional later that month. The jurisdictional failure was therefore not a single surprise event but the culmination of several legal tracks that now must be unwound separately.

The political setup has improved, but the legal path is less binary than the arbitration framing alone would suggest. Government engagement, stockpile-processing authorization and audit work create a credible route back toward negotiation, and First Quantum discontinued its ICC arbitration in March 2025. The Canada-Panama FTA arbitration nevertheless remains live through an ICSID panel constituted in September 2025. A favorable award or bilateral settlement can resolve the contract dispute and materially improve FQM's bargaining position, but neither outcome by itself recreates the statutory authority needed to grant or renew a metallic-mining concession. That distinction matters for timing: the political process can improve while the legal mechanism required for a durable restart remains unresolved.

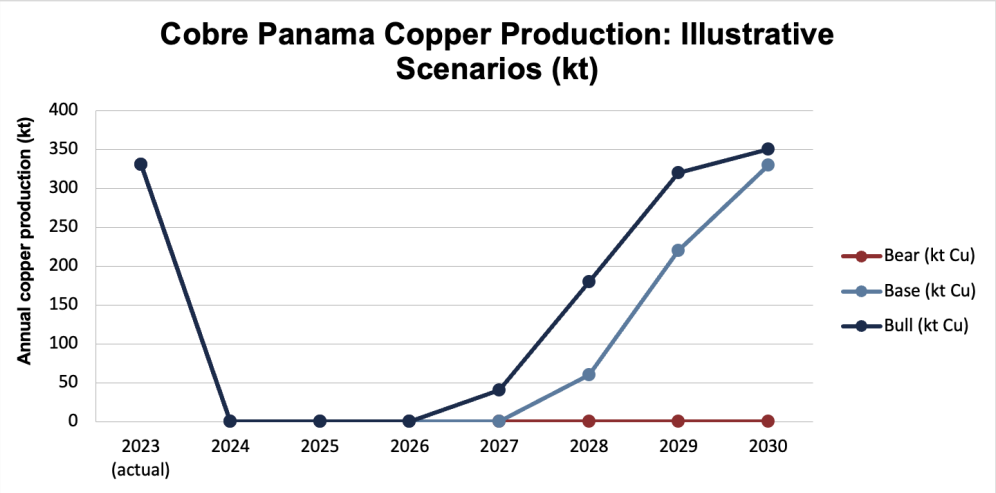


Exhibit 5 | Cobre Panamá copper production — illustrative restart scenarios (kt)

Source: Company filings and releases. Illustrative scenario construction.

The legal bottleneck is two-track

Law 407 is the stronger addition to the short thesis because it is a standing statute rather than another court order or administrative condition. Enacted by Panama's National Assembly in November 2023, it bars new metallic-mining concessions and prevents existing concessions from being renewed or extended. Cobre Panamá no longer has a valid Law 406 concession after the Supreme Court ruling, so any negotiated path back to full production would need a lawful replacement framework that can coexist with, or follow repeal or amendment of, the moratorium. That creates a second gate underneath the arbitration question. The contract dispute can move in FQM's favor while the legislative obstacle remains in place on a separate timetable. Law 287, Panama's Rights of Nature statute, raises the bar again because the Supreme Court cited it when striking down the prior contract; any replacement framework therefore has to clear both the mining-law problem and a materially higher environmental standard. I would treat this as a duration risk rather than claim restart is impossible. The point is narrower: the market can price improving political intent faster than Panama can actually rebuild a legally durable concession regime.

Leverage turns political duration into equity risk

The balance sheet increases the cost of political duration. FY2025 total debt was **$5.84bn** against **$716m** of cash, implying roughly **$5.12bn** of net debt. Reported debt has declined from FY2021 levels, though the 2023 Cobre Panamá shutdown marks the onset of the current balance-sheet stress period**.** The direction of travel since then has been constructive, but the path matters: FY2024 deleveraging included **$1.10bn** of new equity and a **$500m** copper prepayment, while FY2025 added roughly **$1.5bn** of monetization through a Royal Gold stream and another Jiangxi Copper prepayment. Deferred revenue rose to **$3.29bn**, creating a quasi-debt obligation not captured cleanly in conventional net-debt metrics. The new **$2.2bn** facility signed in February 2026 is constructive because it pushes out the refinancing wall, but it does not erase the higher cost of capital or the financing dependence created after Panama.

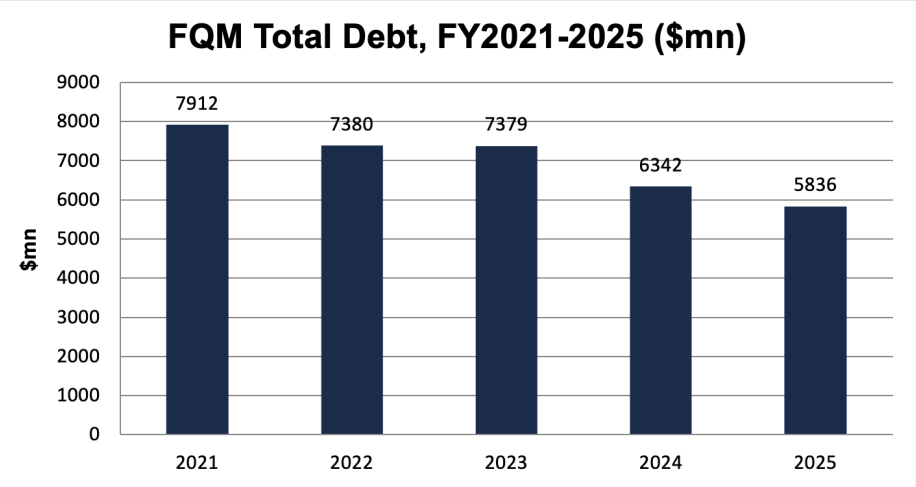


Exhibit 6 | FQM total debt, FY2021–2025 ($mn)

Source: Company filings, FY2021–2025 10-K/annual report series.

Zambia is the second vector

The short is not a claim that Zambia is un-investable**.** Kansanshi generated $795m of FY2025 operating profit and Trident **$448m**, and Kansanshi S3 reached commercial production in December 2025. The issue is concentration and sovereign friction. The Zambian VAT receivable reached roughly **$884m** in FY2025, up from **$639m** in 2022 despite a government agreement on repayment. When Panama is suspended and Zambia is the earnings engine, tax, FX, power, fuel and policy outcomes have an outsized effect on consolidated cash flow.

What makes the short wrong

A negotiated, legally durable Cobre Panamá restart remains the primary upside risk, and the improving political process means that risk is real. The hurdle is simply higher than an arbitration headline: a sustainable restart would also need a concession framework that survives Law 407 and the constitutional/environmental standards that invalidated the prior contract. FY2025 also produced about **$948m** of headline free cash flow, although the operating-cash-flow series is complicated by prepayment inflows. If Panama clears both legal tracks, copper remains strong and Kansanshi S3 ramps successfully, FQM could de-lever faster than the short thesis assumes. Position sizing should therefore reflect event risk rather than treat the equity as a slow-moving secular short.

7 RELATIVE VALUE AND THE CONTESTED SHORT

Ivanhoe Mines (IVN) — Secondary Avoid / Valuation Risk

Ivanhoe is a more credible short considering the 2024–26 execution cascade, but the case is fundamentally different from First Quantum. Kamoa-Kakula set production records through 2024, then the May 2025 seismic/flooding event broke that trend. Probable reserve grade fell from **3.91%** Cu in 2024 to **2.82%** in 2025 and contained copper fell from **17.7Mt** to **13.0Mt**. Production declined from **437.1kt** in 2024 to **388.8kt** in 2025, and 2026 guidance has since been tightened to **only 290–310kt**, the first guidance in the asset's history below the prior year's realized output. Industrial action and third-party smelter downtime added a new labor/execution dimension in Q2 2026. This is an execution and timing thesis on a strong asset, not an argument that Kamoa-Kakula is geologically marginal or that DRC risk suddenly appeared.

Valuation strengthens the short case, but the accounting requires a more measured look. Kamoa-Kakula is equity-accounted: Ivanhoe's effective interest in the underlying mine is **39.6%,** so the copper JV does not

appear in consolidated revenue. FY2025 consolidated adjusted EBITDA was **$578m**, while Ivanhoe's attributable share of Kamoa-Kakula EBITDA was about **$569m**. At an August 27, 2026, enterprise value of roughly **$13.0–13.3bn**, consolidated EV/EBITDA screens near **22–23x**, roughly double FCX and ANTO. A working SOTP that applies FCX's **11.04x** multiple to attributable Kamoa-Kakula EBITDA values the copper stake at roughly **$6.3bn;** using ANTO's **9.35x** yields about **$5.3bn**. The residual **$6.7–8.0bn** is therefore being paid for Kipushi, Platreef and exploration optionality. That is a substantial optionality premium at precisely the point when Kamoa's 2026 production guidance is another **20–25%** below FY2025. I still stop short of making IVN the primary short because this working SOTP has not been cross-checked against a sell-side NAV model, and intellectual honesty matters here: Kamoa-Kakula remains one of the strongest copper assets in the sector on underlying project economics.

Comparable valuation snapshot

Company	EV/EBITDA	Role	Interpretation
Glencore	~6.2x	Reference	Diversified major; lower copper purity
Rio Tinto	~6.4x	Reference	Diversified major; lower copper purity
FCX	11.04x TTM	Core long	Strategic processing + Grasberg recovery; no longer a cheap-multiple call
Antofagasta	9.35x TTM	Long	Conservative leverage; Centinela growth; Chile water/permitting risk
SCCO	~14.5x	Long / quality	49.4Mt reserves; premium valuation; by-product-assisted cash costs
First Quantum	18–24x TTM / ~4.5–7x fwd	Core short	TTM inflated by Cobre Panamá's near-zero trailing EBITDA contribution; the cheap forward multiple (UBS) already assumes a successful restart — short thesis rests on restart timing/execution, not the trailing multiple
Ivanhoe	22–23x consolidated	Secondary avoid	Equity-accounted Kamoa; use SOTP/NAV, not headline multiple alone

Source: Updated comps log using FY2021–25 primary filings and Aug. 27, 2026 vendor valuation data. FCX 11.04x and ANTO 9.35x are TTM vendor-sourced conventions; IVN is shown on consolidated EBITDA only with an explicit equity-accounting caveat. First Quantum shown on both bases given the distortion from Cobre Panamá's suspension: TTM per stockanalysis.com (18.63x) and a CAD-basis vendor (24.10x); forward ~4.5x 2027 EV/EBITDA per UBS research (Mar 2026), which assumes a full restart and roughly a doubling of EBITDA by 2027 — an analyst-adjusted estimate, not vendor consensus.

8 FORWARD SUPPLY: THE CLOCK IS THE CONSTRAINT

Vicuña compresses the supply thesis into one project. The district combines Filo del Sol and Josemaría under a 50/50 BHP-Lundin structure. It is large, well-capitalized and strategically important. Yet the planned capital program begins in 2027 and first production is targeted around 2030, with staged expansion thereafter. That gap between resource quality and deliverable tons is the point: even excellent projects do not solve a near-term concentrate shortage on demand.

That timing matters more than the headline resource. Vicuña holds roughly **14.3Mt** measured and indicated copper plus **32.3Mt** inferred in the research compilation. A project of this scale can eventually change the supply curve, but it cannot solve a concentrate shortage in 2026 or 2027. The market can be structurally well supplied in the 2030s and still experience acute scarcity before those tons arrive. The catalyst and supply timeline in Exhibit 3 places Vicuña's 2030 first-production target alongside the nearer-term Section 232 tariff schedule and the Grasberg, Kamoa-Kakula and Centinela recovery windows that will determine whether the market clears the 2026–27 air pocket before new tons arrive.

9 THESIS BREAKDOWN AND RISK MANAGEMENT

A credible copper long has to survive contact with the cycle. The structural case does not immunize the commodity from recession. Copper has historically fallen sharply ahead of U.S. downturns; the 2008 collapse is the relevant tail case because credit, trade finance and industrial activity failed simultaneously. In that environment, supply tightness does not protect price.

What breaks the long case

— A durable 2027 refined surplus that persists rather than reverting toward deficit.

— AI capex deceleration or materially lower copper intensity in data-center infrastructure.

— Faster-than-expected project delivery across the Tier 1–4 development pipeline.

— A systemic recession that overwhelms electrification and AI demand growth.

— Technological substitution, including greater use of optical/photonic interconnect at the margin.

What breaks the short case

— A negotiated and legally durable reopening of Cobre Panamá, including legislative clearance of the Law 407 moratorium and a replacement framework that survives constitutional review.

— Copper prices remaining sufficiently high to allow FQM to de-lever rapidly despite Panama uncertainty.

— Kansanshi and Sentinel materially outperforming mine plans and offsetting political-duration costs.

— A broad re-rating of high-beta copper equities that overwhelms company-specific impairment.

Portfolio construction implication: The pair is designed to reduce pure copper beta relative to an outright miner long, but it is not market neutral by construction. FCX and FQM differ in geography, balance sheet, gold by-product exposure, operating mix and listing currency. A real implementation should size the legs using beta, copper-price sensitivity and scenario P&L rather than equal dollar allocation.

10 CONCLUSIONS: OWN SCARCITY, SHORT FRAGILITY

Copper's next phase is likely to be defined by dispersion. Demand remains supported by electrification and a rapidly scaling AI power buildout, while supply is constrained by declining grades, long project lead times and recurring disruption. The differentiated layer is security: governments are increasingly treating copper production, processing and trade access as strategic assets.

That shifts the question from '*is copper bullish?*' to '*who monetizes the scarcity?*' FCX offers scale, underutilized U.S. refining capacity, roughly **1bn lb** of domestic rod output and a visible Grasberg recovery path, but at an updated **11.04x** TTM EV/EBITDA it must earn its premium through execution. SCCO provides the deepest reserve base at roughly **49.4Mt** and exceptionally low net cash costs, though by-product credits explain much of the recent cost improvement. Antofagasta combines a conservative **0.53x** net-debt/EBITDA balance sheet with a 2024–27 Centinela expansion**.** Ivanhoe owns one of the strongest underlying copper assets in the sector at Kamoa-Kakula, but repeated production resets, higher near-term costs and a valuation that still assigns substantial value to future optionality leave too little margin for execution and DRC-specific risk, making it an avoid rather than a clean short**.** First Quantum remains the cleanest short because Panama shows how sovereign/legal failure can strand a world-class asset while financing measures transfer value forward and increase balance-sheet complexity.

Appendix A — Methodology and source discipline

Financial reporting. FCX and Southern Copper are U.S. 10-K filers. Several peers report under IFRS through 20-F, 40-F or local annual-report frameworks. Non-GAAP measures such as C1 cash cost, AISC and adjusted EBITDA are not standardized and should not be compared mechanically without checking definitions.

Valuation. Use a single timestamp and consistent forward/trailing convention for the final comps page. The updated working convention uses TTM vendor-sourced EV/EBITDA for FCX and Antofagasta. Ivanhoe requires a second lens because Kamoa-Kakula is equity-accounted: show consolidated EV/EBITDA only as a screening statistic, then use attributable Kamoa EBITDA and an SOTP/NAV framework for the actual relative-value argument.

Primary sources prioritized. Company filings and investor releases, IEA critical-minerals and electricity outlooks, White House Section 232 proclamations, and the underlying research compilation. Third-party estimates cited throughout are dated as of their original publication and are attributed individually rather than presented as vendor consensus. Panama-specific legal claims are separated by instrument: Law 406 and the Supreme Court ruling address the prior concession contract; Law 407 addresses the statutory moratorium; Law 287 informs the environmental/constitutional standard for any replacement framework.

Selected Sources

— International Energy Agency, *Global Critical Minerals Outlook 2026* — copper market balance, mine-supply constraints, processing concentration and long-term critical-minerals outlook.

— International Energy Agency, *Electricity 2026* — global electricity-demand growth, grid investment and transmission-related copper demand.

— International Energy Agency, *Global EV Outlook 2026* — EV penetration, charging infrastructure and associated electricity and copper-demand implications.

— White House, *Adjusting Imports of Copper into the United States* (2025), together with subsequent 2026 Section 232 metals proclamations and implementation materials — U.S. copper trade policy, domestic processing capacity and strategic-security framing.

— Freeport-McMoRan Inc., **Forms 10-K for FY2021, FY2022, FY2023, FY2024 and FY2025**, together with the corresponding **2021, 2022, 2023, 2024 and 2025 Annual Reports** — historical production, reserves, geographic exposure, unit net cash costs, capital expenditure, debt, cash flow, U.S. smelting/refining and rod capacity, and Grasberg operating performance.

— Freeport-McMoRan Inc., **Q1 2026 and Q2 2026 Forms 10-Q, earnings releases and investor materials** — updated 2026 production and cost guidance, Grasberg recovery progress, capital spending, financial performance and near-term operating outlook.

— Freeport-McMoRan Inc., *Restart Plans for Grasberg Minerals District* (18 Nov. 2025), Q2 2026 results and *Grasberg Operating-Rights MOU* (18 Feb. 2026) — staged Grasberg restart, production normalization and longer-dated Indonesian operating-rights framework.

— Southern Copper Corporation, **Forms 10-K for FY2021, FY2022, FY2023, FY2024 and FY2025**, together with the corresponding **2021, 2022, 2023, 2024 and 2025 Annual Reports** — reserve base, Mexico and Peru exposure, copper production, by-product credits, net cash costs, capital expenditure, leverage and major growth projects.

— Southern Copper Corporation, **Q1 2026 and Q2 2026 Forms 10-Q, earnings releases and investor materials** — current production, realized pricing, operating costs, project execution and 2026 financial position.

— Antofagasta plc, **Annual Reports for FY2021, FY2022, FY2023, FY2024 and FY2025**, together with 2026 half-year results and associated investor presentations — copper production, Los Pelambres and Centinela operations, reserve and resource position, net debt, capital expenditure, Centinela Second Concentrator development and Chilean water-security investment.

— Antofagasta plc, company announcements and regulatory disclosures concerning Los Pelambres desalination expansion, Zaldívar water infrastructure, environmental compliance and 2026 project execution.

— First Quantum Minerals Ltd., **Annual Reports and audited consolidated financial statements for FY2021, FY2022, FY2023, FY2024 and FY2025**, together with the corresponding Annual Information Forms where applicable — production, Cobre Panamá contribution, consolidated debt, deferred revenue, capital expenditure, liquidity, Zambia operations and historical cash-flow development.

— First Quantum Minerals Ltd., **Q1 2026 and Q2 2026 results, Management's Discussion & Analysis and interim consolidated financial statements** — current leverage, liquidity, Kansanshi S3 ramp-up, Cobre Panamá carrying costs, stockpile processing and 2026 operating performance.

— First Quantum Minerals Ltd., Government of Panama approval for Cobre Panamá stockpile processing (7 Apr. 2026), together with company disclosures concerning the technical audit, preservation activities, arbitration proceedings and potential paths toward a negotiated resolution.

— Ivanhoe Mines Ltd., **Annual Information Forms, audited annual financial statements and Management's Discussion & Analysis for FY2021, FY2022, FY2023, FY2024 and FY2025** — Kamoa-Kakula ownership and economics, production, reserves and resources, C1 costs, balance-sheet development, Kipushi, Platreef and attributable project earnings.

— Ivanhoe Mines Ltd., **Q1 2026 and Q2 2026 interim financial statements, Management's Discussion & Analysis and operating updates** — revised Kamoa-Kakula production guidance, underground and smelter disruptions, cost escalation and 2026 project execution.

— Panama, **Law 406**, concession-contract legislation and Supreme Court constitutional ruling concerning Minera Panamá / Cobre Panamá.

— Panama, **Law 407 of 3 Nov. 2023**, Official Gazette and UNCTAD Investment Policy Monitor — nationwide moratorium on the granting, renewal and extension of metallic-mining concessions.

— Panama, **Law 287 of 24 Feb. 2022 (Rights of Nature)** and related constitutional/environmental materials — environmental framework relevant to any future mining-law or concession structure.

— Panama Mining Chamber constitutional challenge to the mining moratorium; contemporaneous reporting and legal analysis concerning Law 407, the Cobre Panamá closure and potential legislative reform.

— Cobre Panamá legal and mining-policy analysis, including 2026 industry commentary concerning the interaction between arbitration, legislative reform, permitting and any prospective replacement concession framework.

— Comps Data Updates Log — cross-company primary-filing review covering **FY2021–FY2025** for Freeport-McMoRan, Southern Copper, Antofagasta, First Quantum and Ivanhoe Mines, supplemented by **Q1/Q2 2026 filings and operating updates** and market-data observations updated through Aug. 27, 2026.

Disclosures & Important Information

This report reflects the analysis and opinions of the author as of August 27, 2026, and constitutes independent equity research on the copper sector. It does not constitute investment advice, a research recommendation within the meaning of applicable securities regulation, or an offer or solicitation to buy or sell any security. Nothing herein should be relied upon as the basis for an investment decision.

Financial data, reserve figures and operating statistics are drawn from company filings (Forms 10-K, 20-F and 40-F, as applicable), investor presentations and the primary and third-party sources cited in Section 10 and the source register above. Valuation multiples and comparable-company metrics are point-in-time figures as of the dates specified and are subject to change without notice; they should not be relied upon as current at any later date. Non-GAAP measures such as C1 cash cost, AISC and adjusted EBITDA are reported under company-specific definitions and are not standardized across issuers.

The sum-of-the-parts valuation of Ivanhoe Mines presented in Section 7 is an independently constructed estimate based on attributable Kamoa-Kakula EBITDA and comparable-company multiples; it has not been benchmarked against a sell-side net asset value model and should be treated as illustrative rather than definitive. Forward-looking statements, including production guidance, project timelines and catalyst scenarios, are inherently uncertain, and actual outcomes may differ materially from those described.

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