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PANEL II: The Risk of Chinese Components and Critical Minerals

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How the U.S. can counter China's dominance of critical mineral supply chains

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I. Introduction

Commissioner Goodwin, Commissioner Brands, and members of the Commission, thank you for your invitation to testify here today. As the world electrifies and automates, demand for the critical minerals required for these core technologies is growing on an unprecedented scale. China has established an imposing presence in the mining, refining and processing of many of these minerals, and now holds significant control over their supply chains. This dominance, in the context of broader geopolitical tensions, could pose a major risk to the economic and national security of the United States and the world. In this testimony I will address how China built up its position as the leader in the critical minerals space, and the challenges and opportunities that the U.S. faces in reducing its supply chain vulnerability.

TechMet is a critical minerals investment company founded in 2017. We build projects that produce, process, and recycle the critical minerals needed to secure competitive, China-free supply chains to feed American industry and national defense. Our portfolio currently includes ten companies across four continents, including four in the United States. We focus on seven critical minerals – lithium, nickel, cobalt, tin, tungsten, vanadium, and rare earth elements.

TechMet is unique in that we are partially owned by the U.S. Government through a series of equity investments by the International Development Finance Corporation (DFC), the first of which was in 2020. The investments by the DFC have been transformational for TechMet, as they have allowed us to invest in more projects, accelerate their development, and attract additional private sector investment and partnerships. It has also meant that U.S. taxpayers are able to benefit from the success of our projects. In addition to our partnership with the DFC, we are engaging in other funding processes with various agencies, both at the TechMet and project levels.

While U.S. efforts to combat Chinese dominance in this area have progressed significantly in recent years, there remains much more to be done.

II. An overview of current critical minerals supply chains

The Energy Act of 2020's definition of a critical mineral has two key criteria¹.

The first is that the mineral is deemed essential in the manufacturing of a product or application, without which there would be serious implications for the economic or national security of the U.S.

Today, many critical minerals are the integral ingredients for burgeoning electrification and energy storage technologies. Lithium, nickel, cobalt and manganese are the main components of lithium-ion batteries which power handheld devices, electric vehicles (EVs), robotics and energy storage systems that provide stabilisation for renewable energy. Rare earth elements are crucial in permanent magnet electric motors in wind turbines and defense equipment. Tin is the solder in circuit boards, underpinning all electronics. All of these applications are at the very centre of an industrial shift in the U.S., fuelling future economic growth and maintaining national security.

As adoption of these technologies accelerates, so too will the demand for these critical minerals. Global lithium demand is forecast to reach nearly 3.8 million tonnes of lithium carbonate equivalent (LCE) in 2034, up from 1.1 million tonnes LCE last year², and approximately 10x demand in 2020³. Demand growth rates in the U.S. alone are projected to be similarly strong over the next five years⁴, as EV penetration – which currently lags other key markets such as China and Europe – ramps up.

The second component of the definition of a critical mineral is that its supply chain is highly vulnerable to disruption, including through foreign political risk.

Of the 50 minerals included in the 2022 Final List of Critical Minerals⁵, the U.S. relied on imports in 2024 to meet 100% of its apparent consumption for 12 of these minerals and had over 50% import reliance for another 28. China was the largest producer of at least 30 of the minerals on the list⁶.

¹ *116th Congress.* "Consolidated Appropriations Act 2021". Pub. L. No. 116-260, 134 Stat. 2564 (2020). https://www.congress.gov/bill/116th-congress/house-bill/133/text

² Benchmark Mineral Intelligence. "Battery minerals deficits continue to be expected within a decade" (7 January 2025).

https://source.benchmarkminerals.com/article/battery-cathode-material-deficits-continue-to-be-expected-by-the-end-of-decade

³ *U.S. Geological Survey.* "2021 Minerals Yearbook: Lithium" (January 2025). https://pubs.usgs.gov/myb/vol1/2021/myb1-2021-lithium.pdf

⁴ *Fastmarkets*. "US lithium demand predicted to grow nearly 500% by 2030; Fastmarkets steps in to provide regional price transparency" (3 April 2024).

https://www.fastmarkets.com/insights/us-lithium-demand-to-grow-fastmarkets-provide-regional-price-transparency/

⁵ U.S. Geological Survey. "2022 Final List of Critical Minerals" (February 2022).

https://d9-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/s3fs-

public/media/files/2022%20Final%20List%20of%20Critical%20Minerals%20Federal%20Register%20 Notice_2222022-F.pdf

⁶ U.S. Geological Survey. "Mineral commodity summaries 2025" (March 2025).

https://pubs.usgs.gov/periodicals/mcs2025/mcs2025.pdf

Chinese dominance over the production of many of these critical minerals stretches across their supply chains. The control also extends downstream into the end-use products – China produces 80% of the world's lithium-ion batteries⁷.

There are embedded risks to dependence on raw materials from overseas. Extreme geopolitical fragmentation could cut off sources of critical minerals and leave domestic industries desperately short of feedstock. Even without tensions, compounding demand growth could lead to scarcity, prompting countries to prioritise their own manufacturing bases at the expense of exports. Either way, this would lead to severe consequences for economic and national security.

III. How China tightened its grip on critical minerals

China has spent over two decades strategically positioning itself as the leading player in critical minerals. Upstream mining projects, often owned by Chinese entities outside of the country, feed domestic processing facilities to refine the products used in local industry.

China hosts substantial resources of many critical minerals in country and is highly protective over their exploitation and processing. Foreign investment in the exploration, mining and beneficiation of rare earths and tungsten is prohibited⁸.

Their playbook has been to invest huge amounts of capital in securing resources and developing projects outside of China. From 2000 to 2021, China deployed nearly \$57 billion in aid and subsidized credit for "transition" (i.e., critical) mineral projects in 19 low- and middle-income countries participating in the Belt and Road Initiative⁹.

This scale of investment is perhaps most evident in the Democratic Republic of Congo (DRC), which is responsible for three-quarters of global mined cobalt supply¹⁰. In 2020, it was reported that 15 of the 19 mines producing cobalt in the DRC were owned or financed by Chinese companies¹¹. Chinese firms last year commenced a \$7 billion infrastructure project as part of

⁷ *Benchmark Mineral Intelligence (LinkedIn)*. "China and the rise of lithium-ion battery dominance" (24 March 2024).

https://www.linkedin.com/posts/benchmark-mineral-intelligence_lithiumion-energytransition-activity-7309914573942194177-SP1a/

⁸ *CW CPA*. "China Promulgated the Negative List 2024 for Foreign Investment Access at National Level" (2 November 2024).

https://www.cwhkcpa.com/china-promulgated-the-negative-list-2024-for-foreign-investment-access-at-national-level/

⁹ Escobar, B., Malik, A. A., Zhang, S., Walsh, K., Joosse, A., Parks, B. C., Zimmerman, J., & R. *Fedorochko.* "Power Playbook: Beijing's Bid to Secure Overseas Transition Minerals". Williamsburg, VA: AidData at William & Mary (January 2025).

https://docs.aiddata.org/reports/china-transition-minerals-2025/FULL_REPORT_Power_Playbook.pdf ¹⁰ *Cobalt Institute*. "Quarterly Cobalt Market Update Overview 2024 Q4" (27 January 2025).

https://www.cobaltinstitute.org/wp-content/uploads/2025/01/Cobalt-Institute_Q4-2024-cobalt-market-report.pdf

¹¹ *The New York Times.* "A Power Struggle Over Cobalt Rattles the Clean Energy Revolution" (20 November 2021).

https://www.nytimes.com/2021/11/20/world/china-congo-cobalt.html

a long-disputed and revised deal surrounding the operation of the Sicomines copper and cobalt joint venture project in the country¹².

The rise of China's control over cobalt mining in the DRC included the high-profile acquisition of the Tenke Fungurume operation in 2016 and the Kisanfu project in 2020 from major U.S. miner Freeport-McMoRan^{13,14}. These deals are symptomatic of China's approach to securing access to critical minerals, with Western players often ceding control for shorter-term strategic or financial reasons.

The result is that China holds a commanding share of the DRC's cobalt supply. By 2030, it is estimated that China will control over 53% of DRC cobalt production, and 46% of global supply¹⁵. Most of this supply, in the form of cobalt hydroxide, is shipped to China for processing into higher-value cobalt metal or chemicals.

A similar example of China's influence in critical mineral supply chains is the rapid buildout of nickel processing capacity in Indonesia over the past decade, fuelled by Chinese investment. Recent analysis suggests that over 75% of Indonesia's nickel refining capacity is controlled by Chinese stakeholders, many of whom have ties to the CCP¹⁶. There are serious ESG concerns associated with Indonesian nickel production, including forced labour¹⁷ and deforestation¹⁸.

TechMet is the majority shareholder of Brazilian Nickel, which is developing a nickel mine in Piauí state and is committed to production with high ESG credentials. The DFC has issued a Letter of Interest to Brazilian Nickel for a \$550m loan towards the construction of the project¹⁹.

¹² Argus Media. "China starts \$7bn road-building project in DRC" (1 August 2024).

https://www.argusmedia.com/en/news-and-insights/latest-market-news/2593779-china-starts-7bn-road-building-project-in-drc

¹³ *Freeport-McMoRan.* "Freeport-McMoRan Completes Sale of Interest in TF Holdings Limited for \$2.65 Billion in Cash" (16 November 2016).

https://investors.fcx.com/investors/news-releases/news-release-details/2016/Freeport-McMoRan-

Completes-Sale-of-Interest-in-TF-Holdings-Limited-for-265-Billion-in-Cash/default.aspx

¹⁴ *CMOC.* "CMOC Announces Acquisition of Kisanfu Copper-cobalt Deposit in DRC" (13 December 2020).

https://en.cmoc.com/html/2020/News_1213/39.html

¹⁵ Benchmark Mineral Intelligence. "How much cobalt production is owned by Chinese companies?" (17 October 2024).

https://source.benchmarkminerals.com/article/how-much-cobalt-production-is-owned-by-chinese-companies

¹⁶ Center for Advanced Defense Studies, "Refining Power" (4 February 2025).

https://c4ads.org/commentary/refining-power/

¹⁷ U.S. Department of Labor. "List of Goods Produced by Child Labor or Forced Labor" (September 2024).

https://www.dol.gov/agencies/ilab/reports/child-labor/list-of-goods

¹⁸ *Financial Times.* "Nickel miners linked to devastation of Indonesian forests" (8 October 2023). https://www.ft.com/content/cd1fd7f3-b3ea-4603-8024-db75ec6e1843

¹⁹ *Brazilian Nickel.* "U.S. International Development Finance Corporation Issues Letter of Interest to Brazilian Nickel for up to US\$550 Million Loan as Part of Overall Financing Package for Piauí Nickel Project" (9 December 2024).

https://www.braziliannickel.com/u-s-international-development-finance-corporation-issues-letter-ofinterest-to-brazilian-nickel-for-up-to-us550-million-loan-as-part-of-overall-financing-package-for-piauinickel-project/

IV. Current trends suggest China shows no signs of abating

There are strong indications that China is consolidating its hold over critical minerals and is prepared to use its position as geopolitical leverage amid escalating trade tensions. The implementation of export restrictions poses a significant risk of near-term scarcity, while rapid supply growth from Chinese-subsidised operations is suppressing prices and stifling the development of projects which are needed to meet longer-term demand.

China is placing increasingly stringent controls on the export of critical minerals, components and technologies, citing national security concerns as the reason for doing so. In December 2024, an immediate ban on exports of antimony, gallium and germanium to the U.S. was enforced in retaliation to restrictions on sales of advanced technology from the U.S. to China²⁰. Gallium and germanium are essential components of semiconductors. This year, China has levied export controls on various critical minerals, including most recently on several rare earth elements as a countermeasure to U.S. tariffs²¹.

Similar export controls on processing technologies threaten the ability of projects outside of China to extract and refine critical minerals. It was reported in February that a Chinese manufacturer of sorbents – a key component of direct lithium extraction (DLE) technology – has stopped exports of the material after restrictions on exports of technological processes were proposed²². This conveys the importance of developing supply chains which are not reliant on foreign control and susceptible to disruption. TechMet is the largest shareholder of EnergySource Minerals (ESM), whose subsidiary ILiAD Technologies has developed its own DLE technology with a resilient supply chain unbeholden to China. ESM is looking to deploy the technology at a geothermal lithium project on the Salton Sea in California.

The risks associated with concentrated supply chains are clearly greater than ever, leaving those exposed scrambling for new sources of their components. Skydio, a leading U.S. drone manufacturer, rushed to find alternative battery suppliers late last year after China placed sanctions on the company²³.

Despite its already commanding lead, China continues to deploy capital and cement its dominance, taking advantage of continued divestment by Western companies. Recent transactions include Appian's sale of Mineração Vale Verde (MVV – the owner of the Serrote copper-gold project in Brazil) to Baiyin Nonferrous²⁴, and Anglo American's sale of its nickel

²⁰ *Reuters*. "China bans export of critical minerals to US as trade tensions escalate" (3 December 2024). https://www.reuters.com/markets/commodities/china-bans-exports-gallium-germanium-antimony-us-2024-12-03/

²¹ *Reuters.* "China hits back at US tariffs with export controls on key rare earths" (4 April 2025).

https://www.reuters.com/world/china-hits-back-us-tariffs-with-rare-earth-export-controls-2025-04-04/ ²² *Reuters*. "Exclusive: Chinese lithium company halts tech exports as trade tensions build" (19 February 2025).

https://www.reuters.com/technology/chinese-lithium-company-halts-tech-exports-trade-tensions-build-2025-02-18/

²³ *Financial Times.* "Chinese sanctions hit US drone maker supplying Ukraine" (31 October 2024). https://www.ft.com/content/b1104594-5da7-4b9a-b635-e7a80ab68fad

²⁴ *Appian Capital Advisory.* "EXIT: Appian completes sales of MVV to Baiyin Nonferrous for US\$420 million" (2 April 2025).

https://appiancapitaladvisory.com/exit-appian-completes-sale-of-mvv-to-baiyin-nonferrous-for-us420-million/

assets in Brazil – including producing assets and highly prospective deposits – to MMG²⁵. Chinese EV maker BYD also took over a manufacturing plant in Brazil in 2023 from Ford, which was to the detriment of the workers amid abusive labour claims²⁶.

Looking ahead, current low spot prices of many critical minerals are threatening the ability to meet future demand projections. Lithium, nickel, rare earth element and cobalt prices are currently trading near multi-year lows due to oversupply, brought about by rapid supply growth stemming from the previous price cycles. Much of this growth has come from Chinese-associated operations, including those producing nickel in Indonesia, and lithium concentrate in Africa²⁷ and China²⁸. In the DRC, CMOC's surging cobalt production has weighed heavily on prices, but the miner plans to continue increasing output²⁹.

These metal markets are now at an impasse – the need to diversify supply and boost future production means that new projects need to be developed now, but the rise in prices needed to incentivize private investment in these projects is unlikely to happen presently. If this continues, the risk of a widening supply/demand dislocation in the future will continue to grow.

V. The challenge facing the U.S.

The U.S. faces many challenges in trying to balance China's control of critical minerals supply chains, which it has been building over the last 20 years. Ultimately, it boils down to time and money.

Critical minerals projects can take well over a decade to develop – the U.S. is ranked as having some of the longest mine development times in the world, taking over 19 years from first discovery to first production³⁰. The projects are also capital intensive, and highly technical. The long timelines, combined with regulatory issues and market uncertainties, mean that they are challenging to finance. China has overcome these challenges by using state-backed money to finance high-risk projects to establish control over supply.

In the U.S., private investors are often risk averse or seek more immediate returns on their capital than critical mineral projects offer. Private Equity funds and other institutional investors

²⁵ *Anglo American.* "Anglo American agrees sale of nickel business for up to \$500 million" (18 February 2025).

https://www.angloamerican.com/media/press-releases/2025/18-02-2025a

²⁶ *Reuters.* "Exclusive: Chinese workers in BYD Brazil factory signed contracts with abusive clauses, investigators say" (31 January 2025).

https://www.reuters.com/business/autos-transportation/chinese-workers-byd-brazil-factory-signed-contracts-with-abusive-clauses-2025-01-31/

²⁷ *CRU*. "Lithium floods out of Africa as artisanal miners exploit old tin workings" (3 July 2024). https://www.crugroup.com/en/communities/thought-leadership/2024/lithium-floods-out-of-africa-asartisanal-miners-exploit-old-tin-workings/

²⁸ *Fastmarkets.* "Shining a light on lepidolite producers" (21 February 2024).

https://www.fastmarkets.com/insights/china-lepidolite-producers-andrea-hotter/

²⁹ *Bloomber*g. "World's No. 1 Cobalt Miner Sees 2025 Output Approaching Record" (23 January 2025). https://www.bloomberg.com/news/articles/2025-01-23/world-s-no-1-cobalt-miner-sees-2025-output-approaching-record

³⁰ *S&P Global.* "From 6 years to 18 years: The increasing trend of mine lead times" (11 April 2025). https://www.spglobal.com/market-intelligence/en/news-insights/research/from-6years-to-18years-the-increasing-trend-of-mine-lead-times

have not been active in the critical minerals space, as it does not fit within their typical investment structures. This has created a financing gap for Western-aligned projects and made it more difficult to compete with Chinese projects that have access to sources of cheap, long-term funding.

In addition, investment in a critical minerals project is often tied to the price of that material during the fundraising period. Currently, low prices are hindering the financing of many projects, with investors more concerned about short-term bearishness than longer-term fundamentals. Meanwhile, Chinese projects can continue to operate and increase supply, which limits the potential for price recovery. For example, Chinese rare earth miners can maintain strong margins well below the incentive price for new projects outside of the country³¹.

Chinese processing and manufacturing are also inherently lower cost domestically than outside of the country. Lithium-ion battery cell manufacturing is approximately 20% cheaper in China than in the U.S.³² As long as China controls feedstock supply, it will be able to support its lower-cost manufacturing base. This is evident in the destination of Chinese funding – of the previously mentioned \$57 billion provided to 19 low- and middle-income countries, 92% was deployed to upstream mining projects, and just 8% to midstream processing projects³³.

The U.S. will need to work with industry to identify and address the barriers to building new production and processing capacity. Access to financing, vulnerability to price manipulation, slow public sector support, speed of permitting, and other regulatory hurdles are just some of the key challenges facing U.S. projects.

VI. Recommendations

To diversify supply chains away from Chinese control and build capacity both in the U.S. and allied nations, the Government will need to move much more quickly and invest much more money. The U.S. already has many of the tools required to address these issues, both at home and abroad, but they need to be well-resourced, de-conflicted, and reformed to address the unique challenges of the critical minerals sector. The DFC, U.S. EXIM Bank, and the DOD all have existing funding mechanisms that can be utilized for this purpose.

In 2018, President Trump signed the BUILD Act, creating the DFC. In 2020, the Trump Administration used it to invest in our company. This has had an outsized effect on TechMet's ability to attract additional private investment and build more projects free from Chinese control while providing a return to U.S. taxpayers. However, the DFC's authorization is currently set

³¹ *Benchmark Mineral Intelligence.* "Why higher prices are needed to develop ex-China rare earths supply" (30 April 2024).

https://source.benchmarkminerals.com/article/higher-prices-needed-to-develop-ex-china-rare-earths-supply

³² *International Energy Agency.* "Global EV Outlook 2024: Trends in electric vehicle batteries" (April 2024).

https://www.iea.org/reports/global-ev-outlook-2024/trends-in-electric-vehicle-batteries

³³ Escobar, B., Malik, A. A., Zhang, S., Walsh, K., Joosse, A., Parks, B. C., Zimmerman, J., & R. *Fedorochko*. "Power Playbook: Beijing's Bid to Secure Overseas Transition Minerals". Williamsburg, VA: AidData at William & Mary (January 2025).

https://docs.aiddata.org/reports/china-transition-minerals-2025/FULL_REPORT_Power_Playbook.pdf

to expire in October of this year. In addition, it is rapidly approaching its investment cap, forced to score equity investments as grants, and required to notify Congress of every transaction over \$10 million, which impacts both its speed and risk threshold. Reauthorizing the DFC for a longer period, with a higher investment cap, correcting the equity scoring, lifting the Congressional notification threshold, and expanding the countries in which it can operate would allow it to have a much greater impact.

Similarly, the EXIM Bank has a series of tools that could be impactful in the critical minerals sector. These include the Make More in America Initiative (MMIA), the China and Transformational Exports Program (CTEP), and the recently established Supply Chain Resiliency Initiative (SCRI). However, EXIM is also coming up against a reauthorization window as its current mandate expires at the end of 2026. In addition, it is bound by a 2% default cap that means it is forced to be risk averse in its lending. Extensive bureaucracy and limited human resources extend its timelines and restrict deal pipeline, which minimize its impact. Reauthorizing EXIM for a longer period, addressing the statutory restrictions, and adding technical capacity could unleash significant support for the critical minerals sector.

The Department of Defense has several initiatives and funding mechanisms that could support critical minerals projects, including the Defense Logistics Agency (DLA), the National Defense Stockpile (NDS) and the recently created Office of Strategic Capital (OSC). In addition, the fleets of vehicles, equipment, and materials owned by the DOD represent a significant potential recycling opportunity with resource grades that would rival many mines. With a more focused approach, DOD can utilize these tools to direct funding and purchasing toward areas that would secure American critical mineral supplies and expand production and processing capacity.

The departments of Commerce, Energy, Interior, State, and Treasury also have programs that could be optimized to secure portions of the supply chain and crowd in greater private sector investment. Strengthening the enforcement and monitoring of Foreign Entity of Concern provisions, the targeted and strategic use of tariffs, and implementing incentives for production domestically and among closely allied nations will also mobilize the private sector.

VII. Conclusion

China's dominant position in critical minerals is the result of a dedicated, unwavering strategy implemented over many years. Substantial capital deployment in overseas mining projects, combined with consolidation of a hugely competitive domestic refining and manufacturing base, has given China formidable control of global supply chains which countries around the world are reliant on, and now, are overexposed.

Increasing signs that this position could be used as geopolitical leverage mean that the need to diversify away from China is stronger than ever. This is possible, despite the scale of the challenge, but it will require the U.S. to finely tune and optimize the tools at its disposal to efficiently build out Western-aligned supply chains. Without urgent action, the U.S. could face severe disruption to its economic stability and national security.