Allied Mettle, Allied Metals:
A Market-Based Playbook for Critical-Mineral Supply Chains

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> "We have to win this race [. . .] because if you think about a democracy, we have the guardrails. [. . .] We can[not] afford to have these transformative technologies pioneered by authoritarian regimes." — Former Secretary of State Condoleezza Rice[1]

> "Liberal democracy's ability to incubate innovation, technology, culture[,] and sustainable growth [. . .] will determine the geopolitics of the future." — Francis Fukuyama[2]

1. Introduction

The United States has invented the technologies that power the modern world — yet, it imports over two-thirds of the critical minerals required to manufacture them from its primary strategic competitor.[3]

Despite pioneering the Internet,[4] electric vehicles,[5] and renewable energy systems,[6] the

[1] Condoleezza Rice, director of the Hoover Institution and former U.S. Secretary of State, spoke at the U.S. Department of State on February 25, 2025, to inaugurate Stanford University's *Emerging Technology Review 2025*. There she lamented a (geo-)politicized "race" in frontier technologies and called upon industrial democracies — including the United States — to compete not under coercion but under guardrails of law and accountability, directly linking those domains to their enabling bases in materials science and the mineral-dependent midstream that they presuppose. See Justin Reynolds, "Former Secretary Rice stresses importance of winning emerging technology race," *State Magazine*, n.d., https://statemag.state.gov/2025/04/0425itn07.

[2] Francis Fukuyama sets his treatise *Liberalism and Its Discontents* (2022) against ubiquitous post-COVID-19 democratic and industrial strain. He avers that democracies' core strength — their capacity for "self-correction" through competitive feedback mechanisms — becomes a weakness when they try to match authoritarian coordination without becoming authoritarian themselves. Yet, through regulated markets that channel private incentives toward public ends, democratic accountability that prevents capture, and the rule of law that sustains commitments across political cycles, democracies can "convert strategy into capacity," as Fukuyama opines. See Francis Fukuyama, *Liberalism and Its Discontents* (New York: Farrar, Straus and Giroux, 2022), 139.

[3] U.S. Department of Energy, Office of Fossil Energy and Carbon Management, "Developing a Domestic Supply of Critical Minerals and Materials," accessed September 11, 2025, https://www.energy.gov/fecm/articles/developing-domestic-supply-critical-minerals-and-materials; U.S. Geological Survey, *Mineral Commodity Summaries 2025* (ver. 1.2, March 2025), 7–9, 24, https://doi.org/10.3133/mcs2025; U.S. Geological Survey, "Rare Earths," in *Mineral Commodity Summaries 2025* (Reston, VA: U.S. Geological Survey, 2025), 1–2, https://pubs.usgs.gov/periodicals/mcs2025/mcs2025-rare-earths.pdf.

[4] Barry M. Leiner, Vinton G. Cerf, David D. Clark, Robert E. Kahn, Leonard Kleinrock, Daniel C. Lynch, Jon Postel, Larry G. Roberts, and Stephen S. Wolff, "A Brief History of the Internet" (Reston, VA: Internet Society, 1997), esp. pp. 2–4, 10–11, https://www.internetsociety.org/wp-content/uploads/2017/09/ISOC-History-of-the-Internet_1997.pdf.

[5] U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy, "The History of the Electric Car," September 15, 2014, https://www.energy.gov/articles/history-electric-car.

[6] D. M. Chapin, C. S. Fuller, and G. L. Pearson, "A New Silicon p–n Junction Photocell for Converting Solar Radiation into Electrical Power," *Journal of Applied Physics* 25, no. 5 (1954): 676–677, https://doi.org/10.1063/1.1721711.

United States has ceded control of the supply chains that sustain them: China now commands 87 percent of global rare-earth refining capacity,[7] produces over 97% of anode-active material capacity,[8] and accounts for 99 percent of primary gallium production[9] — not through superior innovation, but through coordinated techno-industrial policy that democratic procurement and finance have yet to counter.[10]

This dependency challenges a core assumption: that democratic capitalism can outcompete authoritarian state control in strategic industries. Indeed, since 1945, reinforced institutionally by the National Science Foundation Act of 1950, the United States built a public–private research system that repeatedly delivered frontier (yet general-purpose) technologies through market-driven entrepreneurship, competitive universities, and venture-capital networks that reward technological breakthroughs.[11] By 1960, it was financing roughly 69 percent of the world's research and development (R&D).[12] That dominance has, since, eroded markedly: By 2019, the U.S. share of global R&D stood near 27 percent (with China about 22 percent), and by 2020 it was barely 31 percent on alternative international series.[13] And, now, in the strategic inputs that make modern systems work — the "vitamins of modern technology"[14] — China's sheer advantage in coordination sets the terms of trade. When Beijing imposes licensing or export controls — as it did in December 2024 on gallium, germanium, and antimony, and in April 2025 on a tranche of medium- and heavy-rare-earth elements — it successfully converts commercial concentration into geopolitical leverage.[15]

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[7] Ernest Scheyder, "Western Start-ups Seek to Break China's Grip on Rare Earths Refining," *Reuters*, December 4, 2023, https://www.reuters.com/sustainability/climate-energy/western-start-ups-seek-break-chinas-grip-rare-earths-refining-2023-12-04; Natural Resources Canada, "Rare Earth Elements Facts," last modified December 20, 2024, https://natural-resources.canada.ca/minerals-mining/mining-data-statistics-analysis/minerals-metals-facts/rare-earth-elements-facts.

[8] Matt Blois, "China Restricts Exports of Graphite Used to Make Battery Anodes," *Chemical & Engineering News* 101, no. 36 (October 26, 2023), https://pubs.acs.org/doi/full/10.1021/cen-10136-buscon2.

[9] U.S. Geological Survey, "Gallium," in *Mineral Commodity Summaries 2025* (Reston, VA: U.S. Geological Survey, 2025), 74, https://pubs.usgs.gov/periodicals/mcs2025/mcs2025-gallium.pdf; U.S. Geological Survey, *Mineral Commodity Summaries 2025* (ver. 1.2, March 2025), https://doi.org/10.3133/mcs2025.

[10] Harry Kaplan, Sidharth Gopisetty, Alexis Opferman, Abby Reinhold, and Emma Williamson, "Critical Minerals and the Business of National Security: Engineering Competitive Incentives into America's Mineral Strategy" (Gordian Knot Center [Stanford University], September 2, 2025), 8–9, https://media.licdn.com/dms/document/media/v2/D4E1FAQEY-d9DiDu9qg/feedshare-document-pdf-analyzed/B4EZkQRaD4GUAk-/0/1756914631671?e=1758153600&v=beta&t=rp2tnVSQgHNR8xSdUB2Tn9VPHZB4DjYgzarVhL2lkUY.

[11] National Science Foundation Act of 1950, Pub. L. 81-507, 64 Stat. 149 (May 10, 1950), codified as amended at 42 U.S.C. §1861 *et seq.*, https://www.govinfo.gov/content/pkg/COMPS-10350/pdf/COMPS-10350.pdf.

[12] See especially Vannevar Bush, *Science — The Endless Frontier* (Washington, DC: U.S. Government Printing Office, 1945), https://babel.hathitrust.org/cgi/pt?id=mdp.39015013109148.

[13] John F. Sargent Jr., "Global Research and Development Expenditures: Fact Sheet," Congressional Research Service (R44283), updated September 14, 2022, 1, https://sgp.fas.org/crs/misc/R44283.pdf.

[14] Rare earth elements are widely described as the "vitamins of modern technology." In Chinese technical/policy literature the parallel phrase is "industrial vitamins" (), and the metaphor is often attributed to the Soviet geochemist A. E. Fersman; see A. S. Komlev et al., "The Influence of Chemical Impurities on the Properties. . . ," *Materials Today Chemistry* 21 (2021); Marc Humphries, *Rare Earth Elements: The Global Supply Chain*, CRS Report R41347 (Washington, DC: Congressional Research Service, 2013), 8; Pui-Kwan Tse, *China's Rare-Earth Industry*, U.S. Geological Survey Open-File Report 2011-1042 (Reston, VA: U.S. Geological Survey, 2011), 1; and Li Zhonghua, Zhang Weiping, and Liu Jiaxiang, "Applications and Development Trends of Rare Earth Materials in Modern Military Technology," Hunan Rare-Earth Materials Research Academy, April 16, 2006, cited in Cindy A. Hurst, "China's Ace in the Hole: Rare Earth Elements," *Joint Force Quarterly* 59 (2010): 122.

[15] See generally Ministry of Commerce of the People's Republic of China, Announcement No. 46 of 2024: Strengthening Export Controls on Certain Dual-Use Items to the United States, December 3, 2024, https://www.mofcom.gov.cn/zwgk/zcfb/art/2024/art_3d5e990b43424e60828030f58a547b60.html; see also Ministry of Commerce of the People's Republic of China and General Administration of Customs, Announcement No. 18 of 2025: Implementing Export Control on Some Medium and Heavy Rare Earth–Related Items, April 4, 2025, https://english.mofcom.gov.cn/Policies/AnnouncementsOrders/art/2025/art_0dd87cbee7b045bf93fabe6ab2faceee.html.

The empirical record (still) favors democracies on innovation and long-run growth:[16] countries that democratize also realize large, persistent gains in income per capita over the subsequent decades, and advanced democracies continue to dominate global innovation benchmarks.[17] Even then, the institutions that reward discovery do not automatically translate into capacity at scale in strategic inputs, and defense-driven demand is far too small, by itself, to reprice global materials markets.[18] The task is not to mimic authoritarian direction; it is to translate strategic objectives into market incentives and allied scale.

To that end, this Proposal section advances four recommendations: firstly, to price verifiable supply-chain security inside best-value source selection; secondly, to stand up Allied Processing Investment Supports (APIS) that pair tax credits with long-dated offtakes and price collars; thirdly, to adopt a single Provenance–Ownership–Audit (POA) template that turns statutory duties into auditable practice; and, fourthly, to designate one federal lead to keep a stage-specific processing list that aligns programs across agencies and with allies. Together, these steps align market incentives with security, crowd in private capital, and build a verifiable allied backbone without abandoning the guardrails that distinguish any democracy.

2. Analysis

Three structural failures — namely, (i) mispriced security, (ii) insufficient demand leverage, and (iii) capital scarcity reinforced by strategic predation — explain how and why history's most innovative democracy remains dependent on China. The latter, in turn, has made each of these weaknesses an advantage by overbuilding processing capacity to flood markets, driving prices down with subsidies to eliminate competitors, then acquiring distressed assets and intellectual property to control entire supply chains.[19] In fact, China has invested more than $16 billion annually in mining capacity since 2014 and, for several materials, now commands well over ninety percent of midstream[20] processing.[21]

The problem starts with perverse incentives, when resilience premia are treated as costs to avoid rather than value to secure.[22] "We incentivize the defense primes' performance based on cost," explains one Pentagon official. "There [is] a mismatch between political intent and economic incentive structure."[23] In one documented case, a major defense contractor traced

[16] Daron Acemoglu, Suresh Naidu, Pascual Restrepo, and James A. Robinson, "Democracy Does Cause Growth," *Journal of Political Economy* 127, no. 1 (2019): 47–100, esp. 58–59, 75–76, https://doi.org/10.1086/700936.

[17] World Intellectual Property Organization, *Global Innovation Index 2024: Unlocking the Promise of Social Entrepreneurship* (Geneva: WIPO, 2024), Executive Summary and rankings, https://www.wipo.int/edocs/pubdocs/en/wipo-pub-2000-2024-exec-en-global-innovation-index-2024.pdf.

[18] U.S. Government Accountability Office, *Critical Materials: Action Needed to Implement Requirements That Reduce Supply Chain Risks*, GAO-24-107176 (Washington, DC: GAO, September 10, 2024), 20, https://www.gao.gov/assets/gao-24-107176.pdf.

[19] Kaplan et al., "Critical Minerals and the Business of National Security," 8–11.

[20] Critical mineral supply chains consist of three stages: (i) upstream (raw material extraction and mining); (ii) midstream (refining, separation, and processing of raw materials into intermediate products); and (iii) downstream (manufacturing of finished components and end products). China's dominance concentrates especially in midstream processing, whereupon technical barriers, environmental costs, and economies of scale create natural bottlenecks.

[21] International Energy Agency, *Global Critical Minerals Outlook 2024* (Paris: IEA, 2024), 87, https://www.iea.org/reports/global-critical-minerals-outlook-2024; see also Edward White, "China Raises State Funding for Strategic Minerals amid US Trade War," *Financial Times*, March 19, 2025, https://www.ft.com/content/china-strategic-minerals-funding-trade-war.

[22] Federal Acquisition Regulation 15.101-2, "Lowest Price Technically Acceptable Source Selection Process," https://www.acquisition.gov/far/15.101-2. See also Defense Federal Acquisition Regulation Supplement (DFARS) 215.101-2-70, https://www.acq.osd.mil/dpap/dars/dfars/html/current/215_1.htm.

[23] Interview conducted by report authors on April 2, 2025. Current Department of Defense official promised confidentiality.

a titanium supply chain thirteen tiers down, discovering direct dependence on "Chinese mines, Chinese roads, and Chinese trucks." When the firm disclosed these findings to the Department of Defense, officials penalized it for delays caused by the investigation itself — a perverse incentive that discouraged future transparency even as Chinese-sourced materials continued flowing into critical defense systems.[24]

Perhaps, China's overcapacity is exemplified by Europe's gallium collapse: As subsidized Chinese exports surged between 2014 and 2016, gallium prices fell approximately 75 percent, forcing the Germany-based Ingal Stade GmbH — the continent's last producer — to shutter operations in 2016. After China announced licensing controls in July 2023 and subsequently banned exports to the United States in December 2024, external prices surged dramatically from $110–130 per kilogram to $687 per kilogram by May 2025 — a show of "weaponized uncertainty," according to one U.S. industrial commentator.[25] Once rival companies ceased operations, China raised prices again and, thus, cemented asymmetric control over a critical bottleneck.

Meanwhile, responsibility for "critical" materials disperses across a kind of "spaghetti monster:" a tangled web of overlapping authorities, inconsistent reporting standards, and fractured information-sharing protocols spanning more than forty governmental offices, with coordination remaining episodic rather than continuous.[26] "We need a shared map and a shared playbook," demands one Interior Department official interviewed for Stanford University's Gordian Knot Center for National Security Innovation. "Right now, each agency is optimizing its own corner." Even when intent aligns, divergent federal lists and designations have blurred priorities and impeded execution.[27] Across the shifting categories that different missions require, no clear federal leader coordinates the response.[28]

These institutional failures compound: Private capital reads these signals and withdraws unless bankable demand materializes. In other words, "[p]rivate capital does not [even] want to touch it," explained one institutional investor to the Gordian Knot Center. "Permitting takes too long[,] [c]osts more[,] [a]nd the track record is poor." Offtake agreements remain thin, permitting proceeds slowly, and the credible threat of dumping can strand projects mid-development. The Pentagon's consumption cannot move world markets because defense demand for rare earths and similar inputs represents less than one-tenth of one percent of global use. Scale completes the argument: "We are not in the driver's seat in these markets," noted a defense acquisitions team. "We make twelve fighter jets monthly while Tesla produces [nearly 5,000] electric vehicles daily."[29]

Cited in Kaplan et al., "Critical Minerals and the Business of National Security," 14.

[24] *Ibid.*, 15.

[25] Kaplan et al., "Critical Minerals and the Business of National Security," 10; see also Fastmarkets, "Are China's export curbs on gallium and germanium a political symbol or a real threat?" July 7, 2023, `https://www.fastmarkets.com/insights/are-chinas-export-curbs-on-gallium-and-germanium-a-political-symbol-or-a-real-threat`.

[26] U.S. Government Accountability Office, *Critical Minerals: Building on Federal Efforts to Address Supply Chain Risks* (GAO-22-104824) (Washington, DC: GAO, June 16, 2022), 5–7, `https://www.gao.gov/assets/gao-22-104824.pdf`.

[27] Kaplan et al., "Critical Minerals and the Business of National Security," 10–11; see also Linda R. Rowan, *Critical Mineral Resources: National Policy and Critical Minerals List* (CRS R47982) (Washington, DC: Congressional Research Service, July 17, 2025), 2–5, `https://www.congress.gov/crs/product/R47982`; cf. U.S. Department of the Interior, "Department of the Interior Releases Draft 2025 List of Critical Minerals," press release, August 25, 2025, `https://www.doi.gov/pressreleases/department-interior-releases-draft-2025-list-critical-minerals`.

[28] Interview conducted by report authors on May 7, 2025. Current Department of Interior official promised confidentiality. Cited in Kaplan et al., "Critical Minerals and the Business of National Security," 13.

[29] Two interviews conducted by report authors on April 21 and April 29, 2025. Current defense prime acquisitions team

The outcome is structural underinvestment in Western processing and persistent vulnerability that can be activated by policy decree. By mid-2025, China's controls covered at least sixteen minerals and alloys, and the strategic signal had become unambiguous: commercial concentration could be converted into geopolitical leverage at will.[30] As one former National Security Council member avers, "[t]he CCP has attempted a plan of asymmetrical dominance. As a result, they will utilize this strength against the United States without hesitation."[31]

3. Recommendations

The United States can close the gap between strategic intent and market behavior without abandoning competitive procurement or allied trade.

The first recommendation is to price supply-chain security inside best-value source selection rather than relying on waivers. Existing law already permits tradeoffs among cost, schedule, and other factors when it serves the government's interest, and Defense guidance discourages lowest-price-technically-acceptable methods for complex or mission-critical buys.[32] Making a clearly weighted "security" factor part of each evaluation — scoring verified allied processing, stage-specific provenance from mine through neodymium magnet, and beneficial ownership — aligns practice with statute. Beginning January 1, 2027, the restriction applies across the entire chain for covered magnets, including those from neodymium.[33] These rules justify awarding to chains that can prove origin and ownership even when they are not the absolute lowest price.

The second recommendation is to make Allied Processing Investment Supports (APIS) the financing template that operationalizes Interior Secretary Doug Burgum's "three-pillar strategy" for critical mineral security in his dual capacity as chair of the National Energy Dominance Council (NEDC): first, strategic stockpiling during price wars; second, sovereign risk insurance through loan guarantees; third, direct equity investment backing. Specifically, APIS pairs the Defense Production Act's (DPA) Title III offtakes and calibrated price collars with the Inflation Reduction Act's (IRA) Section 45X production credit.[34] The latter lowers unit costs once plants are producing, which is particularly effective given that the Treasury Department's October 2024 final rules now include mining and extraction costs in production cost calculations.[35] APIS covers projects across the expanded 2025 draft list — copper, silver,

promised confidentiality. Cited in Kaplan et al., "Critical Minerals and the Business of National Security," 16. Production data from Lockheed Martin, "Statement: F-35 2024 Deliveries," January 8, 2025, https://www.lockheedmartin.com/en-us/news/statements-speeches/2025/statement-f35-2024-deliveries.html; Tesla, "Vehicle Production & Deliveries," January 2, 2024, https://ir.tesla.com/press-release/tesla-vehicle-production-deliveries-and-date-financial-results-webcast-fourth-quarter-2023.

[30] Aidan Powers-Riggs, Joseph Webster, Scott Kennedy, and Ilaria Mazzocco, *Hidden Reach: China's Expanding Leverage over Gallium Supply Chains* (Center for Strategic and International Studies, 2025), 4–5, https://csis-website-prod.s3.amazonaws.com/s3fs-public/2025-07/250707_Riggs_Hidden_Reach.pdf?VersionId=ttMYRKHGQo.z9.NyCY0vEsJ.nMXERxND.

[31] Interview conducted by report authors on May 16, 2025. Former National Security Council member promised confidentiality. Cited in Kaplan et al., "Critical Minerals and the Business of National Security," 10.

[32] Federal Acquisition Regulation 15.101-1, "Tradeoff Process," https://www.acquisition.gov/far/subpart-15.1; Federal Acquisition Regulation 15.304(c), "Evaluation Factors and Significant Subfactors," https://www.acquisition.gov/far/15.304; Defense Federal Acquisition Regulation Supplement 215.101-2-70, "Limitations and Prohibitions," https://www.acquisition.gov/dfars/215.101-2-70-limitations-and-prohibitions.

[33] Defense Federal Acquisition Regulation Supplement 252.225-7052, "Restriction on the Acquisition of Certain Magnets, Tantalum, and Tungsten," *Federal Register* 89, no. 105 (May 30, 2024): 46818–46821, https://www.govinfo.gov/content/pkg/FR-2024-05-30/pdf/2024-11516.pdf.

[34] Dan Schumaker, "Trump weighs investments in critical mineral companies, Burgum says," CNBC, April 24, 2025, https://www.cnbc.com/2025/04/24/trump-weighs-investments-in-critical-mineral-companies-burgum-says.html.

[35] U.S. Department of the Treasury and Internal Revenue Service, "Advanced Manufacturing Production Credit (Section 45X) — Final Regulations," *Federal Register* 89 (October 28, 2024): 85798–85842, https://www.federalregister.gov/documents/

potash, silicon, rhenium, and lead — providing the much-needed, science-based roadmap for reducing dependence on foreign adversaries that Secretary Burgum had championed.[36]

The third recommendation is to enforce a single Provenance-Ownership-Audit (POA) standard across grants, tax credits, stockpiling, and procurement. The template should require lot-level identifiers; smelter and refiner IDs and addresses; stage-by-stage attestations from mine through separation and refining to metals and alloys, as well as finished parts; and beneficial-ownership disclosures, with risk-based third-party audits. The Government Accountability Office has shown that fragmented lists, uneven reporting, and inconsistent verification blur priorities and drive costs higher; a single evidentiary standard cures that defect and gives the 2027 magnet rule practical effect.[37]

The fourth and final recommendation is to designate the National Energy Dominance Council (NEDC), chaired by Interior Secretary Burgum, as the lead coordinator for critical materials strategy and to task the Interior Department, under NEDC coordination, with maintaining one stage-specific processing list that aligns procurement, Section 45X, Title III, stockpiling, and trade tools to that framework.[38] The NEDC should work through the Minerals Security Partnership (MSP), the Australia–U.S. Ministerial Consultations (AUSMIN), and the U.S.–Australia Critical Minerals Compact to publish shared commissioning schedules and joint financing targets.[39]

4. Methods & Metrics

Evaluation should be quarterly, public, and tied to automatic course correction. The greatest exposure lies in midstream stages: As Figure 1 (below) illustrates, China's control of key processing stages ranges from 87 percent of rare-earth refining to over 98 percent of primary gallium production, with similarly dominant positions in neodymium-praseodymium (NdPr) oxide separation and graphite anode active material:[40]

2024/10/28/2024-24840/advanced-manufacturing-production-credit.

[36] U.S. Department of the Interior, "Department of the Interior Releases Draft 2025 List of Critical Minerals," press release, August 26, 2025, https://www.doi.gov/pressreleases/department-interior-releases-draft-2025-list-critical-minerals; see also The White House, "Immediate Measures to Increase American Mineral Production," Executive Order, March 20, 2025, https://www.whitehouse.gov/presidential-actions/2025/03/immediate-measures-to-increase-american-mineral-production.

[37] U.S. Government Accountability Office, *Critical Materials: Action Needed to Implement Requirements That Reduce Supply Chain Risks*, GAO-24-107176 (Washington, DC: GAO, September 10, 2024), 20, https://www.gao.gov/assets/880/871168.pdf.

[38] U.S. Department of Commerce, Bureau of Industry and Security, "Commerce Launches Section 232 Investigation on Imports of Processed Critical Minerals and Derivative Products," press release, April 23, 2025, https://www.bis.gov/press-release/commerce-launches-section-232-investigation-imports-processed-critical-minerals-derivative-products.

[39] U.S. Department of State, "Minerals Security Partnership," accessed September 11, 2025, https://www.state.gov/minerals-security-partnership; The White House, "Australia-United States Climate, Critical Minerals and Clean Energy Transformation Compact," Fact Sheet, May 20, 2023, https://www.whitehouse.gov/briefing-room/statements-releases/2023/05/20/fact-sheet-the-australia-united-states-climate-critical-minerals-and-clean-energy-transformation-compact.

[40] Ernest Scheyder, "Western Start-ups Seek to Break China's Grip on Rare-Earths Refining," *Reuters*, December 4, 2023, https://www.reuters.com/sustainability/climate-energy/western-start-ups-seek-break-chinas-grip-rare-earths-refining-2023-12-04; U.S. Geological Survey, *Mineral Commodity Summaries 2025*, "Gallium," 74, https://pubs.usgs.gov/periodicals/mcs2025/mcs2025-gallium.pdf.

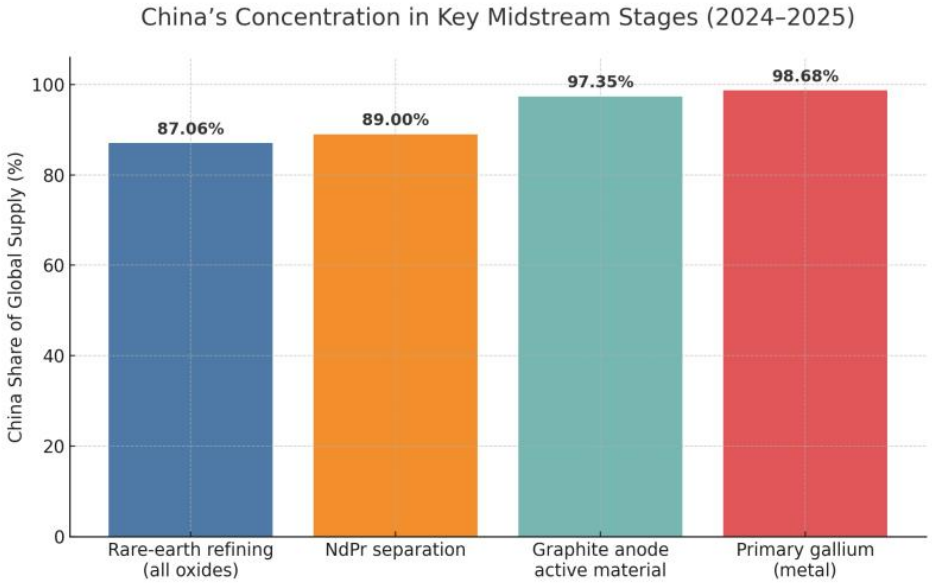

Figure 1: China's concentration in key midstream stages (2024–2025)

Shares use the latest year available and are shown to two decimals: 87.06 percent for rare-earth refining is calculated from Natural Resources Canada's 2022 refined output (175,000 divided by 201,000); 89.00 percent for rare-earth-oxide separation (including neodymium and praseodymium) is reported by the United States Department of Energy; 97.35 percent for anode-active-material capacity is an author's point estimate derived as follows: The International Energy Agency states that China holds "over 97 percent" of installed capacity; public 2024 shipment data indicate that producers outside China shipped roughly forty thousand to sixty thousand metric tons out of about two million one hundred eleven thousand metric tons of global anode shipments, implying a China production share between 97.1 percent and 98.1 percent; because facilities outside China were ramping and operated below nameplate capacity in 2024, capacity shares lie toward the lower portion of that band, so I adopt the midpoint of the capacity-consistent 97.1 percent to 97.6 percent interval, namely 97.35 percent; 98.68 percent for primary gallium is computed from United States Geological Survey 2024 estimated totals (750,000 divided by 760,000 kilograms). Government of Canada, Natural Resources Canada, "Rare Earth Elements Facts," last modified December 20, 2024, `https://natural-resources.canada.ca/minerals-mining/mining-data-statistics-analysis/minerals-metals-facts/rare-earth-elements-facts`; United States Department of Energy, *Rare Earth Permanent Magnets: Supply Chain Deep-Dive Assessment* (Washington, District of Columbia: United States Department of Energy, 2022), table 5; International Energy Agency, *Global EV Outlook 2024* (Paris: International Energy Agency, 2024) and *Global Critical Minerals Outlook 2024* (Paris: International Energy Agency, 2024); United States Geological Survey, "Gallium," in *Mineral Commodity Summaries 2025* (Reston, Virginia: United States Geological Survey, 2025), 1–2, `https://pubs.usgs.gov/periodicals/mcs2025/mcs2025-gallium.pdf`.

For program-critical forms, such as neodymium magnet blocks, graphite anode active material, battery-grade manganese sulfate, antimony trioxide, battery-grade silicon, and copper rod, the United States should publish the allied and U.S. share of U.S. demand by stage and track import-source concentration indices.[41]

Optimum financing efficacy necessitates tracking final investment decisions, commissioning

[41] U.S. Government Accountability Office, *Defense Production Act: Information Sharing Needed to Improve Use of DPA Authorities*, GAO-25-108497 (Washington, DC: GAO, June 12, 2025), `https://www.gao.gov/products/gao-25-108497`.

timelines, and realized prices against collar boundaries for each APIS contract. Two consecutive quarters outside price collars should trigger contract reviews; chronic delays should prompt milestone audits under DPA Title III authority.[42] Strategic stockpiling metrics should include material volumes purchased during price manipulation events and inventory levels relative to 180-day consumption benchmarks. Compliance visibility, too, becomes critical as the 2027 magnet restrictions take full effect.[43] Finally, allied coordination should generate measurable joint projects, not just diplomatic statements. Updates vis-à-vis the MSP and AUSMIN, in particular, should list co-financed midstream facilities, stages, commissioning dates, and shared stockpiling commitments.[44]

5. Conclusion

Critics may impugn, perhaps reasonably, whether market-based incentives can counter China's coordinated strategy fast enough. After all, expanding production tax credits could cost $12–15 billion over five years, and supply-chain auditing may increase procurement timelines.[45] These concerns deserve consideration. However, continued dependence on an adversary that weaponizes commercial concentration imposes far greater costs. Pre-existing vulnerabilities may disable critical systems within months of supply cutoffs, potentially costing hundreds of billions in emergency sourcing.[46]

The deeper issue transcends any single material. In the spirit of Secretary Rice and Mr. Fukuyama, democracies cannot cede transformative technologies to authoritarian control — a principle that extends to enabling supply chains. The four recommendations in this Proposal bespeak that the United States need not choose between market competition and strategic security. Aligning procurement incentives with verifiable provenance, scaling allied financing, and coordinating transparent standards can restore democratic competitive advantage.

The expected result is measurable strategic autonomy: In defending the techno-industrial policy that powers democratic innovation, such reforms will, ultimately, power democracy itself.

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[42] *Ibid.*

[43] Defense Federal Acquisition Regulation Supplement 252.225-7052, "Restriction on the Acquisition of Certain Magnets, Tantalum, and Tungsten," *Federal Register* 89, no. 105 (May 30, 2024): 46818–46821, `https://www.govinfo.gov/content/pkg/FR-2024-05-30/pdf/2024-11516.pdf`.

[44] U.S. Department of State, "Minerals Security Partnership," accessed September 11, 2025, `https://www.state.gov/minerals-security-partnership`; The White House, "Australia-United States Climate, Critical Minerals and Clean Energy Transformation Compact," Fact Sheet, May 20, 2023, `https://www.whitehouse.gov/briefing-room/statements-releases/2023/05/20/fact-sheet-the-australia-united-states-climate-critical-minerals-and-clean-energy-transformation-compact`.

[45] U.S. Government Accountability Office, *Critical Materials: Action Needed to Implement Requirements That Reduce Supply Chain Risks*, GAO-24-107176 (Washington, DC: GAO, September 10, 2024), 15–18, `https://www.gao.gov/assets/gao-24-107176.pdf`; Kaplan et al., "Critical Minerals and the Business of National Security," 17.

[46] U.S. Government Accountability Office, *Defense Production Act: Information Sharing Needed to Improve Use of DPA Authorities*, GAO-25-108497 (Washington, DC: GAO, June 12, 2025); U.S. Government Accountability Office, *Critical Minerals: Building on Federal Efforts to Address Supply Chain Risks*, GAO-22-104824 (Washington, DC: GAO, June 16, 2022), 12–14.